NMCRIS Activity Nos. 125104, 91198, 97117, 94842, 100189

From Acequias to Industry, the Archaeology of Neighborhood and Infrastructure at the Santa Fe Railyard

Volume I: Excavation, Analysis, Synthesis

Jessica A. Badner, Matthew J. Barbour, and Chris T. Wenker

Office of Archaeological Studies   Museum of New Mexico

Archaeology Notes 422

2014


SANTA FE
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NMCRIS Activity Nos.: 125104 (excavated sites); 91198,
97117, 94842 (tested sites); 100189 (recorded sites)

MUSEUM OF NEW MEXICO

OFFICE OF ARCHAEOLOGICAL STUDIES

From Acequias to Industry, the Archaeology of Neighborhood and Infrastructure at the Santa Fe Railyard

Volume I:
Excavation, Analysis, Synthesis
Volume II:
Appendixes

by

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ARCHAEOLOGY NOTES 422

SANTA FE 2014 NEW MEXICO

Administrative Summary

From September 2004 to April 2006, the Office of Archaeological Studies (OAS), Department of Cultural Affairs, Museum of New Mexico, conducted archaeological testing and data-recovery excavations at 31 archaeological sites in the Santa Fe Railyard Park in Santa Fe, New Mexico. The multi-phased project was first conducted at the request of Lleta Scoggins, Executive Director of the Santa Fe Railyard Community Corporation (SFRCC); after November 2005, Richard Czoski succeeded the SFRCC directorship.

Chris T. Wenker directed field work for both testing and data recovery project phases. Principal Investigators were Dr. Tim Maxwell and, after November 2005, Dr. Eric Blinman (who assumed OAS directorship), Stephen S. Post, and Dr. Robert Dello-Russo. Both Stephen Post and, after January 2012, Dr. Robert Dello-Russo—both OAS deputy directors—provided administrative support. Laboratory investigations and project curation were overseen by Stephen Post. Final report writing was overseen by Stephen Post and, later, by Deputy Director Dr. Robert Dello-Russo. Final project reporting and curation were overseen by Jessica A. Badner and were conducted by Jessica Badner and Matthew J. Barbour.

The archaeological work complies with 4.10.8 NMAC and Santa Fe Archaeological Review Districts Ordinance 14-75. A Memorandum of Understanding signed by the City of Santa Fe, the SFRCC, the Trust for Public Land, the City of Santa Fe Archaeological Review Committee (ARC), the New Mexico Historic Preservation Division (HPD), and the New Mexico Cultural Properties Review Committee guided the archaeological compliance process.

Prior to the testing phases completed by OAS, archival research reports were produced by Southwest Archaeological Consultants, Inc. (Deyloff 2004; Scheick et al. 2003). The research design that guided this data recovery project was presented by Wenker, Post, and Moore (2005), and the work plan that specified the data recovery procedures for the Railyard Park sites was outlined by Wenker (2005c). The current report, titled *From Acequias to Industry, the Archaeology of Neighborhood and Infrastructure at the Santa Fe Railyard*, presents final reporting of excavation results at all of the railyard sites that were excavated under State Land Excavation Permit Number SE-223.

Of 31 tested archaeological sites, 16 were determined to be eligible for inclusion in the National Register of Historic Places (NRHP).

The data recovery excavations at the railyard were phased to allow development and construction activities to commence before all archaeological fieldwork was complete. To facilitate timely compliance review, a series of three testing reports (Archaeology Notes 352A–352C), six interim excavation reports (Archaeology Notes 359A–359F), and two data recovery plans (Archaeology Notes 354A and 354B) were submitted to the ARC and the HPD before the completion of this final project report. Various sites, usually different sections of a single watercourse, were excavated in separate project phases and reported in several interim reports. Because the discussion of sites by project phase in narrative would have been both tedious and confusing, archaeological sites are listed by assigned LA number and are summarized in Appendix 2 (Table App2.1) with a brief site description, excavation and testing dates, site area calculation, and testing and preliminary excavation report references by Archaeology Note number, all of which correspond to various excavation phases.

Excavations at these sites, which followed the procedures outlined in the data recovery work plan (see Chapter 1), recovered the requisite data to address relevant aspects of the project's research design. No further impact-mitigation archaeological fieldwork was recommended for these sites prior to the start of, or during, construction.

NMCRIS Activity Nos.: 125104 (excavated sites); 91198, 97117, 94842 (tested sites); 100189 (recorded sites: LA 153441, LA 153442)
MNM Project No.: 41.763 and 41.791
State Land Excavation Permit No.: SE-223
NM General Archaeological Investigation Permits: NM-04-027-T and NM-05-027-T

Acknowledgments

The Office of Archaeological Studies would like to thank Lleta Scoggins and Richard Czoski Executive Directors of the Santa Fe Railyard Community Corporation (SFRCC) for their support during this undertaking. Feedback from Philip J. Bové, Commissioner of the Acequia Madre de Santa Fe Acequia Association, during acequia excavation was invaluable. Cordelia Snow provided helpful insight into background research that she conducted during the project's inception. She also made OAS aware of Tara Plewa's excellent research on the Santa Fe River watershed, which Dr. Plewa generously provided to the Archaeological Research Management Section (ARMS) and which was used by OAS in the preparation of this report. Members of the Santa Fe community also helped research efforts. At an OAS open house, Easy Hill delivered two postcards of the railyard area used by David Snow during archival research. Mr. Joe Brown, a former AT&SF freight manager at the Santa Fe Station, provided the Atchison, Topeka and Santa Fe Railway Co. Station Map used in Chapter 3. The map remains on file at OAS. Research into the AT&SF Railway was also aided by Paul Entrom, Bernie Brock, and Bill Luxford, members of the Santa Fe Model Railroad Club of Northern New Mexico who, during a club open house at the Santa Fe Fairgrounds, were willing to share knowledge of a specialized, and perhaps esoteric subject, providing information about engines that would have likely been used when the AT&SF well and water tower were in operation as well as clarification about some aspects of the AT&SF Station Map. This was augmented by correspondence with Bob Hayden, President of the Santa Fe Model Railroad Club of Northern New Mexico, who to took the time to provide sources and pointed the way to the Santa Fe Railway Historical & Modeling Society. An intrepid volunteer, Barbara Chaterjee, put me in touch with Don Bailey, a moderator for the D_RGW_Chilli_Line Yahoo interest group. Project volunteers assisted in excavation, artifact processing, and curation, and included Mimi Burling, Rich Cunningham, John Denison, Mary Denison, Don Fiero, John Green, Pat Hall, Harriet Levine, Olivia Love, Colette Pogue, Kathleen McRee, Don Pierce, Adam Stricklad, Bob Mizerak, Mary Anne Sanborn, and Leslie Schumann. Carol Stanford illustrated ongoing fieldwork. Research librarians Allison Colborne, at the Laboratory of Anthropology, and Faith Yoman, at the New Mexico State Library, dug up unfamiliar sources. Finally, the work of former OAS Deputy Director Steve Post should be acknowledged. Through various organizational changes Steve's eye for detail and keen sense kept this project "on track." Though he retired just prior to project completion, Steve stayed interested, even when he didn't have to.

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1 | Background

Introduction

Jessica A. Badner, Matthew J. Barbour, and Chris T. Wenker

From September 2004 to April 2006, the Office of Archaeological Studies (OAS), Department of Cultural Affairs, Museum of New Mexico, conducted archaeological testing and data-recovery excavations at 31 archaeological sites in the Santa Fe Railyard Park in Santa Fe, New Mexico. The multiphased project was first conducted at the request of Lleta Scoggins, Executive Director of the Santa Fe Railyard Community Corporation (SFRCC) and then, after November 2005, by Richard Czoski who assumed the SFRCC directorship. The SFRCC is a nonprofit organization hired by the City of Santa Fe to direct the city-owned railyard's urban development. The Santa Fe Railyard's development plan called for a dramatic urban renewal project that expanded the number and variety of small-scale businesses in the railyard while preserving open space in the form of parkland and trail corridors. The project involved extensive subsurface disturbance across substantial portions of the project area, prompting the implementation of archaeological data recovery. A Memorandum of Understanding signed by the City of Santa Fe, the Santa Fe Railyard Community Corporation, The Trust for Public Land, The City of Santa Fe Archaeological Review Committee, The New Mexico Historic Preservation Division and the New Mexico Cultural Properties Review Committee guided archaeological work and compliance proceedings related to the project's development. The research design and work plan that guided data recovery (Wenker et al. 2005) is included in Chapter 1. The plan complies with 4.10.8 NMAC and Santa Fe Archaeological Review Districts Ordinance 14-75 and was presented to and approved by the CPRC as part of the permit application for State Land Excavation Permit Number SE-223 under which work was conducted.

For administrative purposes the Santa Fe Railyard project area was divided into north and south excavation areas separated by the School for the Deaf and Fairview Cemetery. The North Railyard is that portion north and east of St. Francis Drive, and bounded to the south and west by Cerrillos Road and South Guadalupe Street. The parcel is itself divided into 4 sub-areas, listed here from north to south: the North Guadalupe area, the South Guadalupe area, the Railyard Park, and the Alarid Street parcel. In the South Railyard portion, the project's excavation area was dubbed the Baca Street parcel. Figure 1.1 shows the project area with all sites in the scope of this project labeled; Figure 1.2 shows the project area with the focus parcels and sub-areas shown; Figure 1.3 is an aerial photo with the respective parcels delineated; and Figure 1.4 is a composite rendering of the historic station grounds.

All totaled, the various project parcels cover approximately 189,015 sq m (45.5 acres). The overall North Railyard property includes a total of approximately 132,968 sq m (32.9 acres) that is divided among the North Guadalupe area (63,827 sq m; 15.8 acres), the South Guadalupe area (23,520 sq m; 5.8 acres), the Railyard Park (45,621 sq m, 11.3 acres), and the Alarid Street section (5018 sq. m; 1.23 acres). In the South Railyard, the Baca Street parcel covers approximately 51,009 sq m (12.6 acres).

North Railyard: The 15.8-acre North Guadalupe area and the 5.8-acre South Guadalupe area both lay west of South Guadalupe Street, to the north and south of Paseo de Peralta, respectively. Both North and South Guadalupe parcels includes parts of the SE 1/4 of the SE 1/4 and the SE 1/4 of the NE 1/4 of the SE 1/4 of Section 23, and the NW 1/4 of the SW 1/4 of the SW 1/4 and the SW 1/4 of the NW 1/4 of the SW 1/4 of Section 24, and the N 1/2 of the NE 1/4 of Section 26, T 17 N, R 9 E, NMMB (projected sections). The approximate center point of the North and South Guadalupe parcels lies at Zone 13 North UTM coordinate 414117 N, 3948866 E (NAD83).

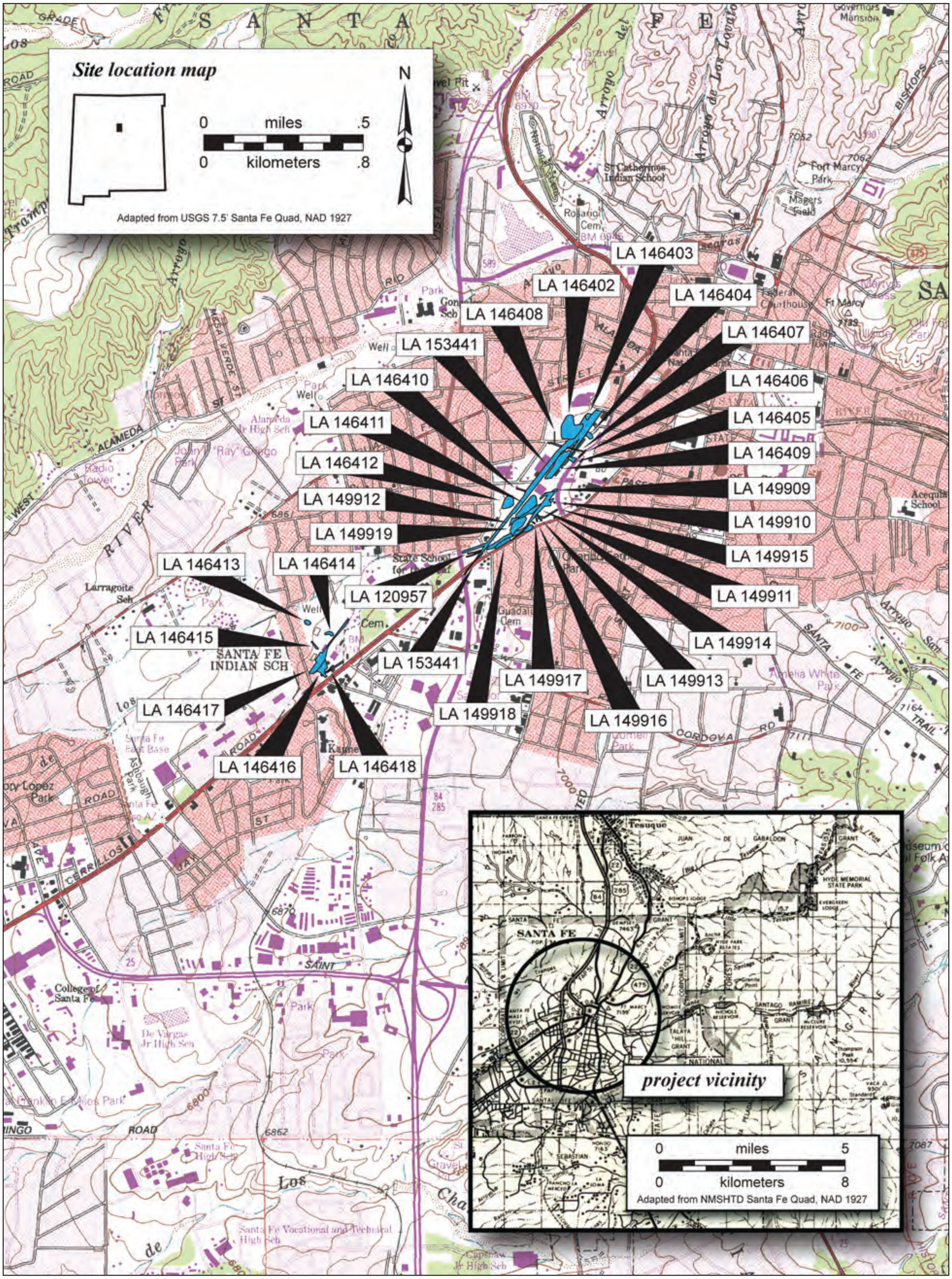


Figure 1.1. Santa Fe Railyard project, sites location map.

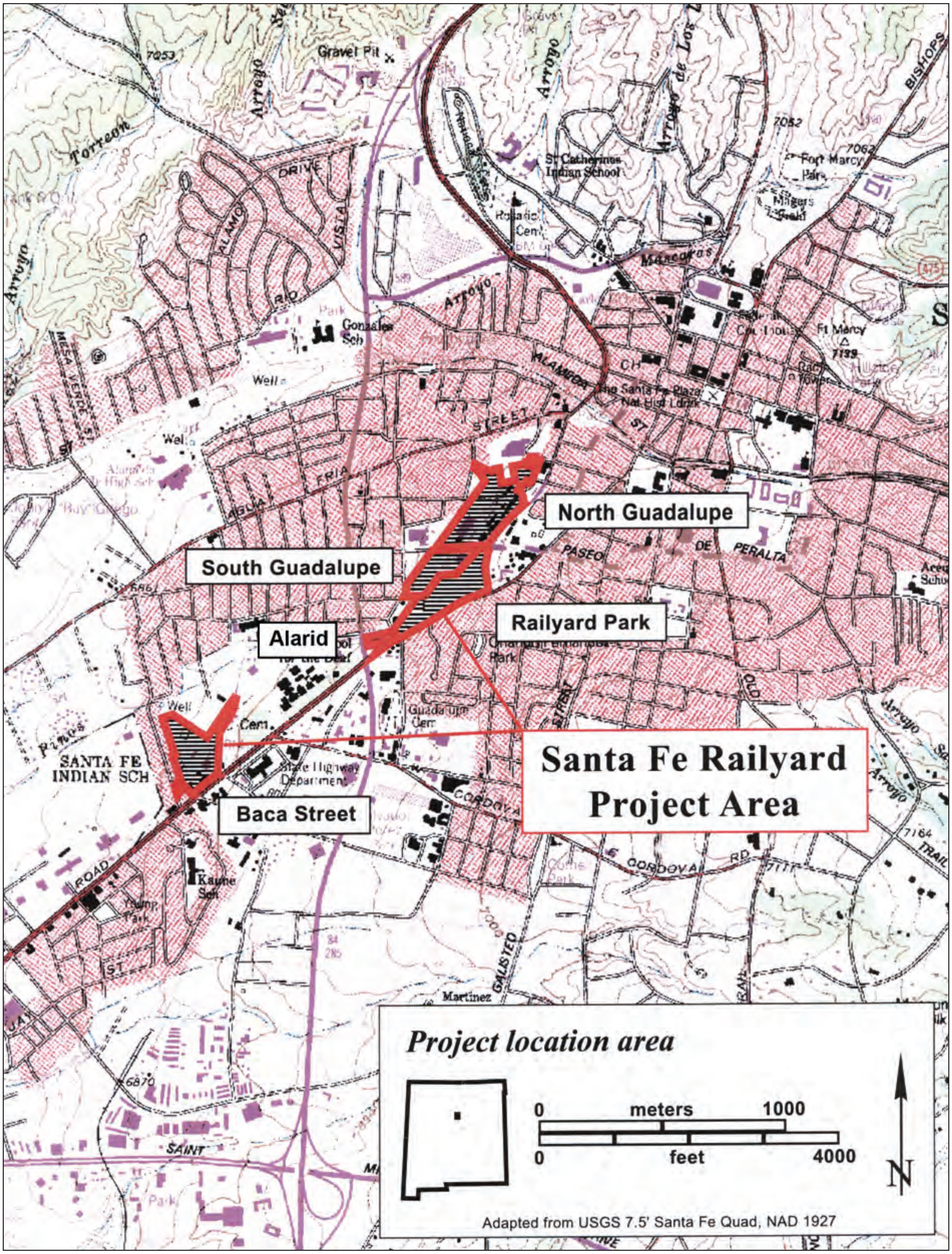


Figure 1.2. Santa Fe Railyard project area.

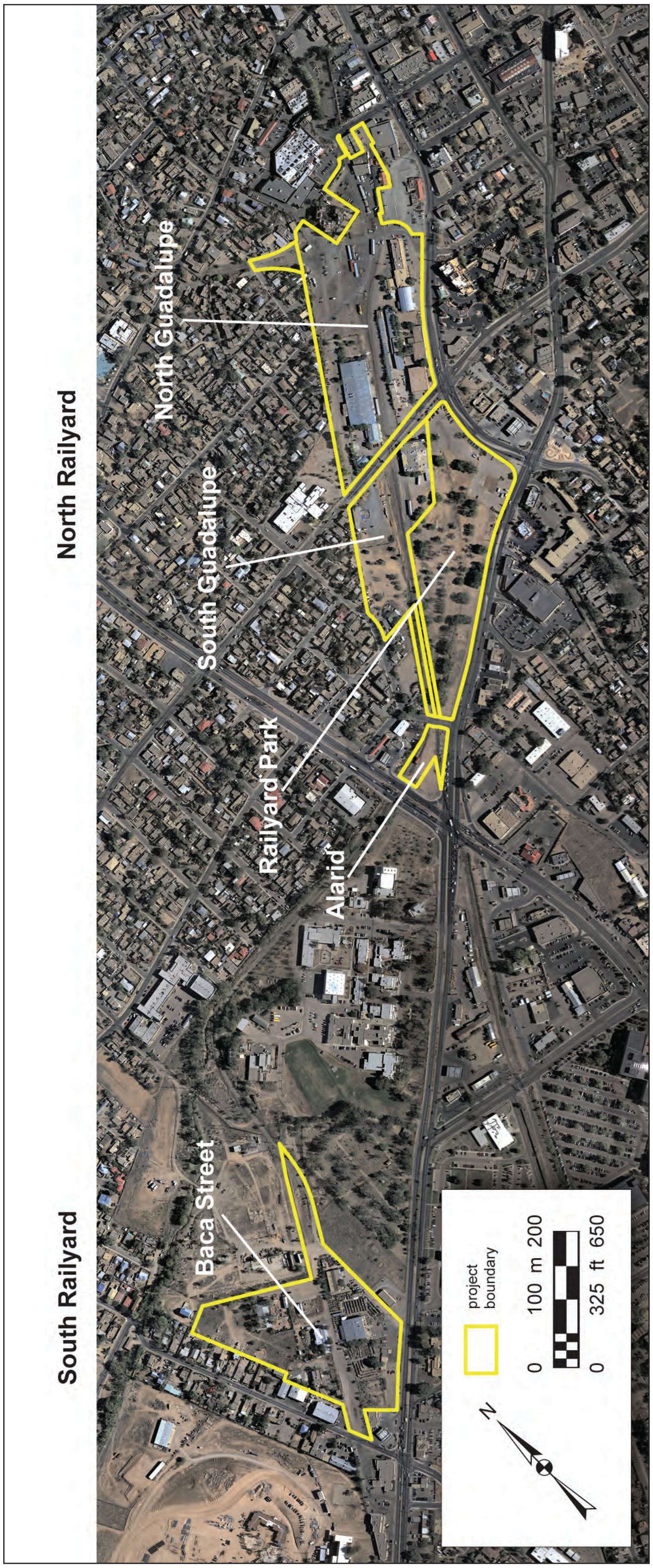
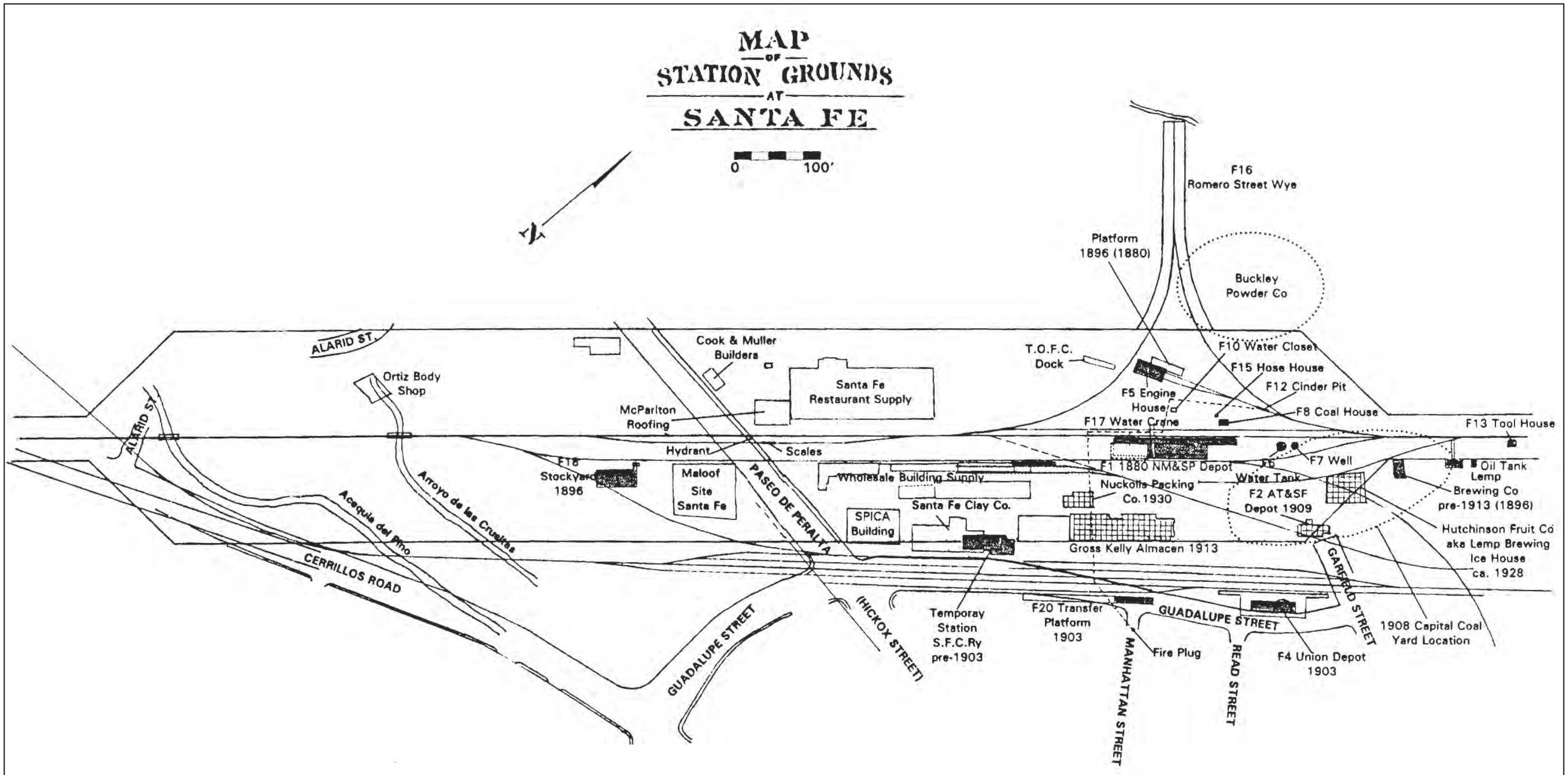


Figure 1.3. Contemporary aerial photograph of the Santa Fe Railyard with development parcel subdivisions labeled.



Sources: 1896 Map of Station Grounds at Santa Fe. Santa Fe Ry Records, Crump Collection (dark hachure)
1904 Map of Station Grounds at Santa Fe. Sante Fe Ry Records, Crump Collection (dark hachure)
1977 Santa Fe Land Improvement Company Map (grid)
1991 Smith & Williamson Survey for Catellus Development Company

Figure 1.4. Map of the station grounds compiled by C. T. Snow from the Russell Crump collection, 1991. A version drafted by Gloria Vigil was published in Archaeological Resources of "La Otra Banda del Rio," City of Santa Fe Railroad Properties (SW458b, Scheick 2003:51, Figure 4.2). Used with the generous permission of Southwest Archaeological Consultants and Cordelia Thomas Snow, October 15, 2012.

Seventeen archaeological sites (LA 146402 through LA 146418) were identified in these parcels by mechanical and hand testing. Eight sites were located in the North Guadalupe area; three were located in the South Guadalupe area.

The Railyard Park parcel includes parts of S 1/2 of the SE 1/4 of the SE1/4 of Section 23, and the N 1/2 of the NE 1/4 of Section 26, T 17N R9E, NMMB (projected sections). The approximate center of the section lies at Zone 13 North UTM 414044N 3948690E (NAD83). The Railyard Park covers approximately 45,966 sq. m (11. 4 acres).

The Alarid Street parcel includes parts of the N ½ of the NE ¼ of Section 26, T 17N R9E, NMMB (projected sections); the approximate center of the section lies at Zone 13 North 413797 N 3948518 E (NAD 83). The parcel covers approximately 5,018 sq. m (1.2 acres).

South Railyard (Baca Street): The Baca Street parcel occupied the southern end of the project in a 12.6-acre locale northwest of the intersection of Cerrillos Road and Baca Street. The Baca Street parcel encompasses parts of the NE 1/4 of the NW 1/4 of the SW 1/4, the SW 1/4 of the NW 1/4, and the W 1/2 of the SE 1/4 of the NW 1/4 of Section 26, T 17 N, R 9 E, NMMB (projected section). The approximate center point of the Baca Street parcel lies at Zone 13 North UTM coordinate 413011N 3948072E (NAD 83). Six sites were located in the Baca Street parcel.

Reporting History

The data-recovery excavations at the railyard were phased to allow development-construction activities to commence before all archaeological fieldwork was complete. To facilitate timely compliance review, a series of three testing reports (*Archaeology Notes 352A–352C*), six interim excavation reports (*Archaeology Notes 359A-–359F*), and two data recovery plans (*Archaeology Notes 354A–354B*) were submitted to and accepted by the ARC and the HPD before the completion of this final project report. Various sites, usually different sections of a single watercourse, were excavated in separate project phase and reported in several interim reports. Because discussions of sites by project phase in narrative would have been both tedious and confusing, archaeological sites are listed in numerical order by assigned LA number and are summarized in Table 1.1 (and repeated in Appendix 2, Table App2.1) with a brief site description, testing dates, excavation dates, site area calculation, and testing and preliminary excavation report reference by *Archaeology Notes* number, all of which correspond to various excavation phases. In general, testing-phase excavations for all sites except for LA 146411 (AT&SF tracks) and LA 146442 (transmission lines) and LA 120957 (Acequia Madre) were conducted between September and December of 2004. LA 120957 was tested in September of 2005 and LA153441 and LA 153442 were investigated in June 2006. Phased data-recovery excavation started in February of 2005 and continued until April 2006.

Chris T. Wenker directed fieldwork for both testing and data recovery project phases. Principal Investigators were then-OAS director, Dr. Tim Maxwell and, after November 2005, Dr. Eric Blinman (who assumed OAS directorship), Stephen S. Post, and Dr. Robert Dello-Russo. Both Stephen Post and, after January 2012, Dr. Robert Dello-Russo—both OAS deputy directors—provided administrative support. Laboratory investigations and project curation were overseen by Stephen Post. Final report writing was overseen by Stephen Post and, later, by Deputy Director Dr. Robert Dello-Russo. Final project reporting and curation were overseen by Jessica A. Badner and were conducted by Jessica Badner and Matthew J. Barbour.

Field and laboratory personnel included Tim Ade, Phil Alldritt, Jessica Badner (crew chief), Matt Barbour, Gavin Bird, Alfides Chavez, Isaiah Coan, Colin Cunningham, Henry Etsitty, Lenora Etsitty, Lynette Etsitty, Jason Fenton, Vern Foster, Tess Fresquez, Isaac Herrera, Maria Jonsson, Renea Kempf, Alan Kirkland, Hannah Lockard, Collette Maes, Guadalupe Martinez (crew chief), Rick Montoya (crew chief), Marlene Owens, Virginia Prihoda, Ramona Quesada, Robyn Richards, Luke Suchy, Phyllis Thompson, Tyrone Trujillo, and Matt Traucht. Eric Blinman, Jeff Boyer, and Chuck Hannaford also engaged in fieldwork-related site visits. Backhoe services were provided by Ruiz Excavating. The reader is directed to phased preliminary reporting for specific crew manifests contained in the Archaeology Notes mentioned above.

Laboratory analyses were directed by, J. Royce Cox (archaeomagnetism), Guadalupe Martinez (Euroamerican artifacts), Pamela J. McBride (archaeobotany), James L. Moore (chipped stone), Britt M.

Starkovich (fauna), C. Dean Wilson (native ceramics), Karen Wening (groundstone). Archival research was conducted under contract by David H. Snow. Geomorphology and associated pollen analysis were conducted under contract with Stephen A. Hall, Red Rock Geological Enterprises, and Susan Smith, Northern Arizona University.

Various sections of the final report manuscript were reviewed by Stephen Post, Robert Dello-Russo, and Yvonne Oakes. Illustrations were produced by Scott Jaquith and Rob Turner. Sheila Martin prepared the tables. Artifact photography was conducted by volunteers Mimi Burling and Kathleen McRee. Curation and clerical tasks were conducted by Virginia Prihoda, Gerald Lujan, and Dorothy Zamora.

Project volunteers included Mimi Burling, Barbara Chatterjee, Rich Cunningham, John Denison, Mary Denison, Don Fiero, John Green, Pat Hall, Harriet Levine, Olivia Love, Colette Pogue, Kathleen McRee, Don Pierce, Adam Stricklad, Bob Mizerak, Mary Anne Sanborn, Leslie Schumann, and Carol Stanford.

Current Report Outline

Excavation at the railyard exposed seven cultural temporal components discussed in Chapters 2 through 6 of this report. Instead of presenting sites in sequential order as dictated by Laboratory of Anthropology (LA) number, they are presented in groups according to cultural temporal assignment and are generally reported from north to south. Major components include: a Spanish Colonial- to Mexican-era midden deposit, nineteenth-century field remnants excavated at LA 146402 (Chapter 3); Acequias (Chapter 2); sites primarily associated with the Atchison, Topeka and Santa Fe Railway (Chapter 3); sites primarily associated with the New Mexico Central Railway (Chapter 4); Neighborhood Refuse sites (Chapter 5); and Twentieth-Century Industrial sites (Chapter 6). Artifact content and other sampling analyses are reported on the site level in each chapter. Project-level interpretation, synthesis, and laboratory methods specific to each analysis are presented in Chapter 7. Chapter 7 also contains detailed archival research. Geomorphology reporting may be found in Appendix 1. Environmental and cultural overview, field methods, and research design are presented in Chapter 1.

Spanish Colonial Midden (Chapter 3: LA 146402). A Spanish Colonial- to Mexican-era pit midden was excavated at LA 146402. Located along the northernmost site boundary this midden survived 200 to 250 years of subsequent neighborhood and industrial activity. The excavation of the midden deposits was undertaken in order to evaluate *Research Domain 2*: *Frontier Model for Social and Economic Acculturation: Material Culture Study*. Attempts to address questions about cultural and economic relationships between core and periphery in the nineteenth century posed in *Research Question 4* and to consider related hypothesis about manufactured and imported goods availability in both core and periphery areas posed by *Research Design Question 5* were inconclusive. However, midden analysis did address *Question 5* in the Spanish Colonial temporal component. A comparison of dinnerwares and associated Euroamerican artifacts recovered from LA 146402, at Trujillo House in Valencia, and the Baca-Garvisu house excavated at the Santa Fe Civic center north of the river reveals the potential presence of the lowest economic status at LA 146402. This result is counterintuitive to traditional core and periphery models and the Frontier Model as developed by Moore et al., which predicted fewer imported goods and a greater reliance on local manufacture at Trujillo house than in the villa. This contradiction is potentially illustrative of diverse economics within the villa, demonstrating that neighborhoods within the villa exhibited a degree of socioeconomic variability that was in part a result of ethnically based social stratification.

Acequias (Chapter 2). Seven acequias were excavated within the project boundaries of the Santa Fe Railyard. Archaeological excavation and associated research conducted at these sites was undertaken to address questions posed in *Research Domain 1: The Spanish Colonial to late Territorial period Acequia and Field System at the Santa Fe Railyard* (Wenker et al. 2005:92–105). Excavation and archival research informs on the integral role that the water system played in the founding and growth of the villa. This study elucidates the system's subsequent growth and evolution as it served Santa Fe through a series of main ditches and laterals, some of which passed through the Santa Fe Railyard and continued to irrigate land through the nineteenth and into the mid-twentieth century.

Acequias LA 146407 and LA 146408 likely correspond to archival documented courses of the Acequia de Diego Romero and Manhattan Street ditches, respectively. At LA 146407, a complete lack of Euroamerican artifact content in basal deposits suggests a pre-railroad date, possibly as early as the mid-eighteenth century. A wooden culvert installed beneath the AT&SF railroad tracks to carry the Manhattan Street Ditch waters indicates that Acequia de Diego Romero was likely abandoned and filled by 1880. Waters diverted from the Manhattan Street Ditch continued to carry water for fields west of the AT&SF tracks into the twentieth century.

LA 149909 and LA 146410 are the same watercourse, likely the archivally documented Acequia de los Pinos (aka Acequia Madre) or a nearby lateral of that ditch (D. H. Snow, Chapter 7, this report), the course of which ran down, or potentially parallel to what is now Paseo de Peralta. Territorial era artifacts were not included in lowest alluvium, suggesting a late eighteenth-century construction date.

LA 149912, Arroyo de los Tenorios, is likely the same watercourse as Arroyo en Medio and Arroyo de las Cruces (LA 149912 summary, Chapter 2). The arroyo housed a smaller redirected channel. Both upper fill and lower alluvium contained artifacts consistent with residential refuse from upstream context post-dating 1821. The acequia's course may have been diverted by the railway to the current course of the Acequia Madre sometime between 1880 and 1892.

LA 120957, Acequia Madre de Santa Fe, is one of Santa Fe's last operable and oldest irrigation ditches, designated Ditch 11 in the 1914 Santa Fe Hydrology Study, with a priority date from "time immemorial and prior to 1680," established by the state engineer (D. H. Snow 1988:35) and is nominated to the National Register of Historic Places (Historic Santa Fe Foundation 1892:56, in D. H. Snow 1988:36). In addition to archival sources, archaeological evidence of early use is provided by an abandoned lateral with an OSL date of 1830±30 years.

LA 146418 was excavated within the Baca Street project area. The watercourse is potentially the oldest intact acequia encountered within the project area. Unlike acequias excavated in the Railyard Park this unnamed acequia was abandoned and capped by 1940. An OSL sample from basal deposit context dated to approximately 1630 (Berger, Post, and Wenker 2009). If accurate, this uncorroborated date provides tentative evidence of irrigation predating the 1680 Pueblo Revolt.

Atchison, Topeka and Santa Fe Railway (Chapter 3). The Atchison, Topeka and Santa Fe Railway (AT&SF) is one of the storied transcontinental railroads that opened the western United States to mass immigration from the east and west coasts enabling and driving a profound change in the nation's population dynamics. Although Santa Fe provided a namesake for the railroad, the line serving the City Different was a spur financed by local business interests (C. T. Snow 2003). The AT&SF railroad complex was installed into Barrio de Guadalupe, changing the previously agrarian neighborhood forever. AT&SF infrastructure was documented at seven sites (LA 146402, LA 146403, LA 146404, LA 146406, LA 146409, LA 153411, and LA 1453412) within the project area though much of the earliest and most clearly related infrastructure was located in the North Guadalupe project parcel at LA 146402 and LA 146403. Sites with minor or ephemeral AT&SF components but with clearly defined later infrastructure are reported in Chapter 6 (LA 146409 and LA 153412). Excavation of these components addressed *Research Domain 3: Bringing Archaeology and History to bear on the Archeological Buildings and Structures of the Santa Fe Railyard*.

Construction of the Santa Fe spur precipitated a sea change in the city's political, economic, and cultural affiliation and inclusion from a Spanish or Mexican frontier to the Union as a U.S. Territory. Railroad buildings relied on cut stone and milled lumber, two materials that were in short supply before the American invasion. The eventual effect of railroad construction on the town's overall appearance was visual evidence of Spanish acculturation and the transition from Mexican frontier to U.S. Territory.

New Mexico Central Railway (Chapter 4). The New Mexico Central Railway (NMC) was a standard-gauge railroad that ran south of Santa Fe through the Estancia Basin and eventually reached El Paso. Its primary function was to haul agricultural produce. The NMC was founded as the Santa Fe, Albuquerque, and Pacific Railroad in 1900 and was in operation until 1926. During this 26-year period, it was a speculative venture developed by New Mexico entrepreneurs. Financial difficulties brought on by a lack of capital investment, ultimately led to its demise. The NMC rail and structures were subsequently bought by the AT&SF.

Investigations within the Santa Fe Railyard project unearthed eight archaeological sites associated with the NMC Railway. Testing and excavation of NMC components addressed *Research Domain 3*. These sites included portions of the initial depot, loading dock, stockyard, and rail. In addition, two of the sites identified appear to function primarily as flood control and/or water diversion. Three sites (LA 146405, LA 149913, and LA 149915) were determined "eligible for the National Register of Historic Places (NRHP). The remainder (LA 146406, LA 146414, LA 146415, LA 146417, and LA 149911), were tested and recommended as either "not eligible" or "eligible" with archaeological testing exhausting the potential of the site to yield further information relevant to New Mexico's past.

Neighborhood Refuse (Chapter 5). Two archaeological sites (LA 146412 and LA 146413) located within the Santa Fe Railyard project area were found to be associated with residential trash disposal into vacant lots in the early to mid-twentieth century. Both sites were excavated to evaluate *Research Domain 2: Frontier Model for Social and Economic Acculturation: Material Culture Study* but the cultural temporal component did not lend itself to relevant analysis. Rather these sites offered an opportunity to examine waste disposal practices and consumption and discard patterns of Santa Fe residents living in or near the Railroad District Historic Neighborhood in the 1930s, 1940s, and 1950s.

Twentieth-Century Industrial Sites (Chapter 6). Ten archaeological sites identified within the Santa Fe Railyard project area were associated with early to mid-twentieth-century industrial activities not directly tied to the AT&SF or NMC. Of the 10, all but one (LA 146411) were recommended as either "not eligible" for the National Register of Historic Places (NRHP) or "eligible" with archaeological testing exhausting the potential of the site to yield further information relevant to New Mexico's past.

Archaeological and archival research of these sites informed upon some of Santa Fe's freight-dependent commercial businesses in service during the early twentieth century. A total of 10 archaeological sites were associated with early to mid-twentieth-century industrial activities not directly tied to the AT&SF or NMC railways. More than half of these sites (LA 146411, LA 146416, LA 149916, LA 149917, and LA 149918) were linked to bulk oil stations. The remainder included a creamery (LA 149914), a transmission line (LA 153442), and three sites (LA 146409, LA 149910, and LA 149919) presumably tied to the transportation and/or freight storage. These operations were presumably built in the railyard project area to capitalize on the existing rail infrastructure. In most instances, the rail offered a means to move materials cheaply into the city for processing and distribution. Ultimately, other modes of transportation undermined the need for the Santa Fe Railyard as a freight depot.

Conclusion

Results from excavations at the Santa Fe Railyard chronicle changing land use and occupation in the Barrio de Guadalupe with a time span conservatively beginning in the early to mid-eighteenth century continuing through the post WWII era providing a rare look at material culture south of the Santa Fe River, and a glimpse into the local neighborhood economy and life way which evolved from an agrarian, largely barter-based system focused on domestic and farming activities, to a small scale industrial port of entry.

The project excavated one of only two extensive Spanish Colonial middens excavated to date south of the Santa Fe River. Acequia segments that run through the Santa Fe Railyard are, to date, some of the only acequias excavated in Santa Fe's south side system and the only irrigation features extensively investigated as a group. Excavation and archival research of these sites inform on the integral role that the water system played in the founding and growth of the villa. Excavation also provided a wealth of information concerning railroad related building practice and helped to define and document temporal sequencing of railroad buildings and infrastructure associated with the AT&SF, NMC, and to some extent Denver and Rio Grande Railways (Figs. 1.5, 1.6).

Archaeological work at the Santa Fe Railyard complies with provisions set forth in Wenker et al. (2005) and with 4.10.8 NMAC and Santa Fe Archaeological Review Districts Ordinance 14-75. The excavations at these sites followed the procedures

Figure 1.5. LA 146402, mapping in progress, Santa Fe Railyard project.

Figure 1.6. LA 146403, during excavation of the windmill/well complex and water tower, Santa Fe Railyard project.

outlined in the data-recovery work plan and recovered the requisite data to address relevant aspects of the project's research design. No further impact-mitigation archaeological fieldwork was recommended for these sites prior to the start of, or during, construction. ARC and HPD have reviewed all preliminary reporting submitted by Wenker, in *Preliminary Testing Reports; Archaeology Notes 352 through 352C* and in *Preliminary Excavation Reports; Archaeology Notes 359A through 359F* (listed by site in Table 1.1 [and Appendix 2, Table App2.1]) and have concurred with all determinations made by OAS.

Natural Environment

Chris T. Wenker

revised by Jessica A. Badner

The project area is within a structural subdivision of the Southern Rocky Mountain physiographic zone (Folks 1975:110). The basin is bounded on the west by the Jemez Mountains and on the east by the Sangre de Cristo Mountains. The City of Santa Fe is situated on the dissected piedmont plain of the western flank of the Sangre de Cristo Mountains. The ancient alluvial fan is made up of Tertiary and Quaternary sediments of the Santa Fe Group deposited by the river, which passes only 0.4 km to the north of the railyard as it flows westward to the Rio Grande. The river originates in the Sangre de Cristo Mountains at Santa Fe Lake, 12,408 ft above sea level where it flows down steep slopes approaching 40 percent grade. Beyond the mountains, the river's grade moderates as it flows over rolling hills and drainages which flatten to about 5 percent upon reaching the Caja del Rio as the river flows towards its confluence with the Rio Grande at 5,220 ft (Plewa 2009:13). The Santa Fe River is 46 miles in length and drains and area of 257 square miles.

The river basin's geology is documented by Spiegel and Baldwin (1963:66–67) as a series of four alluvial terraces, the lowest of which is less than five feet above its bed. The rivers "lower terrace" is mapped downstream of the Agua Fria area. The ″middle terrace″ which is elevated 20-30 feet above the river is generally found on the river's south side. The highest terrace is described at the river's upper reach in the mountains east of Santa Fe. The Santa Fe Railyard is located in its entirety on the river's broad Pleistocene "middle terrace."

The railyard parcels exhibit low topographic relief and gradual elevation change. The North Railyard ranges in elevation from nearly 6967 ft (2123 m) above sea level at a point east of the Atchison, Topeka and Santa Fe Railway depot in the northeastern corner to 6926 ft (2111 m) at the far southwestern corner of the Railyard Park. The Baca Street parcel ranges in elevation from 6897 ft (2102 m) along the southeastern edge fronting Cerrillos Road to 6871 ft (2094 m) in the far northwestern corner.

The project area is within the Santa Fe River inner valley or airport physiographic surface (Spiegel and Baldwin 1963:56). Soils are formed in reworked, mixed alluvial material of the Tertiary/Quaternary Period Santa Fe Group (Folks 1975). Folks maps the major soil association in the Santa Fe area as Panky fine sandy loam. This soil occurs on 0- to 5-percent slopes and may co-occur with Agua Fria, Cerrillos, Pojoaque, and Fivemile soils. The fine sandy loam has slow permeability with medium runoff and moderate erosion hazard. It has a 1.0 m rooting depth but only a 10–12 cm water-holding capacity. It is not recommended for irrigation, even though the gentle slopes south of the Santa Fe River were some of the most heavily irrigated land during the Spanish Colonial and early Territorial periods. More specific and recent soil designation of the immediate railyard area is of discrete Quaternary alluvial deposits. On the north side of the river these deposits are mapped by Reed et al (2000) as Qts3 late Holocene alluvium, and Qts2 early to mid-Holocene alluvium. In the railyard project area alluvium is mid- to late-Pleistocene reddish brown sandy gravel designated Qts1. Soils within the majority of the railyard project area are described by the USDA Soil Conservation Service (2008) as Urban Land (map unit 207). In the south railroad park, bounded by the corner of Cerrillos Road and St. Francis Drive to the south and Paseo de Peralta to the north, soil is mapped as DeVargas Urban land complex (map unity 114) and described as a well-drained loam (above 9 inches) to clay loam (to 25 inches) with low water capacity and 1–3 percent slope (USDA Custom Soil Resource Report, websoilsurvey.nrcs.usda.gov/app/HomePage.htm).

Santa Fe area has a semiarid climate. The area generally receives between 229 to 254 mm of precipitation per year and a mean snowfall of 356 mm (E. Kelley 1980:112). This average is misleading when considering modern water availability. Most of the yearly precipitation occurs as intense summer thunderstorms, which create severe runoff. Seemingly capricious drought cycles tied to El Niño events have historically affected mountain discharge creating cycles of plenty followed by drought. Santa Fe's surrounding mountains receive more than twice that of the middle watershed (Grant 2000 in Plewa 2009:14 and the town of Santa Fe) and heavy rain in the upper watershed has led to episodic and disastrous flooding throughout Santa Fe's history (Plewa 2009). In addition to yearly rainfall, a number of springs have been historically documented within the Santa Fe river basin forming a chain of springs along the rivers reach. Augmented by irrigation, they were historically charged by water absorbed by Ancha formation gravels and guided by the underlying impermeable Tesuque sandstone unit to the river where it seeped to the surface through a series of faults (Plewa 2009:110).

The biotic community falls within Great Basin Conifer Woodland ecological zone (D. Brown 1982), but, being situated in an active urban setting, little native flora or fauna presently occupy the immediate area. Prior to Spanish settlement this area would have supported a plant and animal community similar to the rabbitbrush community of the arroyo channels and terrace slopes described by N. Kelley (1980). Affected by runoff, flooding, and erosion, arroyo channels and terraces tend to support the grasses, shrubs, and succulents that favor disturbed conditions. The arroyo channels or terraces also may have been historically dry farmed, which would have created disturbed soils zones when left uncultivated. Plant species of the rabbitbrush community include prickly pear, yucca, Chenopodium sp., Amaranthus sp., and Indian ricegrass. Though the growing season ranges from 130 to 220 days and averages 170 days. The last spring frost usually occurs in the first week of May and the first fall frost occurs around the middle of October. The mean yearly temperature is 10.5 degrees. Cultigens recovered at the Santa Fe Civic center indicate that corn, beans, and squash were cultivated in Santa Fe area well before the Spanish entrada (Toll and McBride 2011:310–313). Early Spanish crops grown in the Santa Fe area included wheat, and chile in addition to corn (Toll 2011:263) apricots, peaches, watermelon, cantaloupe, onions, lentils, garbanzos, carrots, lettuce (Hammond and Rey 1953).

Cultural Overview

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This section provides a general historical background for the North Santa Fe Railyard and Baca Street properties. For this study the historic era will be confined to the periods following Don Diego de Vargas' reconquest and resettlement of Santa Fe and northern New Mexico and ending with 1955. The latter date reflects the 50-year age limit for significant historic properties defined by state statutes. No cultural features within the studied sites that postdate 1955 have been recommended as being significant.

Spanish Colonial Period (1696–1821)

During this period, Spain under Hapsburg (until 1700) and Bourbon (1700–1821) rulers was changed from a world empire to a second-tier political and economic power as its European land holdings dissolved, its New World riches were spent, and the social hold of its missionization effort was diminished (Kamen 2003). At the height of its empire early in the eighteenth century, Spain had economic ties covering three-quarters of the known world at the time. The empire was based on economic superiority gained through alliances with the rich bankers and royalty of the Italian city states, with the Flemish, and with its neighbor and sea power, Portugal. New Spain and New Mexico were affected by imperial trends as the structure of the government, the focus of the economy, and pressures on the imperial borderlands changed. New Mexico and Santa Fe were on the frontier of the Spanish Empire and at the end of the Camino Real, the main communication and transport route for public, governmental, ecclesiastic institutions, and individuals. Pressured for most of a century by the French and English advances into the North American interior until 1789, Santa Fe soon felt the social and economic pressures brought on by the growing pains of the United States and its rapid institution of Manifest Destiny. These pressures were exerting tremendous influence on New Mexico as Mexico gained its independence from Spain in 1821.

Government and Military

During the eighteenth century and into the early nineteenth century, Santa Fe functioned as the provincial capital of Nuevo Mexico in New Spain. The greater territory and military were administered by the governor and his appointed officials (Jenkins and Schroeder 1974; Kessell 1979; D. Weber 1992). After 1735, the governor ruled under the *Audencia* of Mexico and the Viceroy of New Spain (Westphall 1983:16–17). Locally, Santa Fe was governed by an *alcalde mayor* and *cabildo* or town council (Hordes 1990; C. T. Snow 1990; Twitchell 1925). The alcalde and cabildo were responsible for carrying out daily operation of the local government, fulfilling the legal requirements of land petitions as assigned by the governor, and the collection of taxes and tithes for the church. These individuals, who were citizens and soldiers, controlled the social and economic well-being and development of the community and surrounding area (Bustamante 1989; Westphall 1983). After 1722, the alcalde mayor in Santa Fe appointed two *juezes repartidores*, one for each side of the river to inspect farmlands and acequias and to allot water based on need (J. Baxter 1997:19). Beginning in 1776 and continuing into the 1800s, the *presidio* system was revamped along with the military importance of Santa Fe and New Mexico. Until the late 1780s, the Santa Fe presidio and the improved and expanded presidio system provided protection against continued Indian raiding of Spanish and Pueblo villages. With a major decrease in the raiding following Governor Juan Bautista de Anza's treaty with the Comanches, the military served as a buffer against French, English, and later American incursions from the north and east (Moorhead 1974; Simmons 1990; D. Weber 1992). During this time the Spanish governmental organization in Mexico changed three times, but New Mexico remained primarily under its governor who also remained the military commanding officer.

Settlement and Economy

Following Don Diego de Vargas' Reconquest (1692–1696), both pre-Pueblo Revolt and new settlers returned to Santa Fe and the Rio Grande Valley. They allegedly returned to a villa that had been partially destroyed after the escape of Governor Otermín and the surviving colonists, soldiers, and missionaries. The fact that settlers temporarily moved into the Tano pueblo that occupied the former *casas reales* suggests that most of the residences were destroyed or rendered uninhabitable. Early priorities for the returning colonists and administration were rebuilding the casa reales and the *acequia* system, re-allotting grants to former *encomenderos* and landholders or their surviving family members, and expanding on the pre-Revolt settlement (Kessell 1989; Simmons 1979a). With the termination of *encomienda,* settlers were expected to be more independent and self-sufficient and to properly compensate the Indians for their labor and goods (Westphall 1983:7). For defensive purposes, settlers were encouraged to settle lands near Santa Fe. However, the quality and quantity of suitable farm land, combined with the practice of living close to their fields, resulted in an elongated and dispersed settlement pattern along the Santa Fe River and adjacent to acequia-irrigated fields as depicted in the 1766–1768 Urrutia map (Simmons 1979a:105–106; Adams and Chavez 1956:40; Moorhead 1975:148–149).

Presumably, all families were eligible for the typical town lot, which in the seventeenth century was defined as "two lots for house and garden, two contiguous fields for vegetable gardens, two others for vineyards and olive groves, and in addition four *caballerias* of land; and for irrigation, the necessary water, if available, obligating the settlers to establish residence for ten consecutive years without absenting themselves" (Hammond and Rey 1953:1088). Land documents from the eighteenth century clearly show that house and garden lots were common and that they were bought and sold regularly, once the ten-year residency requirement had been fulfilled (Tigges 1990). The extent to which vineyards and olive groves were actually introduced is unclear and has not been addressed archaeologically or well-documented historically.

Obviously, arable land within the *villa* was scarce by the mid 1700s. Individual or family grants within the city league that included the full four caballerias of land or explicit access to the *ejido* or common land parcels for livestock grazing were relatively few. Only twenty-four are shown on William White's undated *Sketch Map of Grants within the Santa Fe Grant* reflecting land ownership in the early 1890s and coinciding with land claims filed with the Court of Private Land Claims (Westphall 1983:237). Based on William White's 1895 map *Showing Owners of Land within the Santa Fe Grant Outside of City Limits*, the long-lot land subdivision pattern is clearly evident. These long-lots were the basis of the small-scale agro-pastoral economic tradition that typified eighteenth- and early nineteenth-century land use within village or urban settings such as Santa Fe. The residences, which may be termed *ranchos* or *rancherias*, were much smaller in scale than *haciendas* (Simmons 1979a; Payne 1999:100–109). They were sufficient for subsistence, but did not lead to economic advantage or prosperity. Long-lots allowed access into the ejido or common lands for other natural resources, such as wood, game, and stone for construction (Wozniak 1987:23–25). Acequia irrigation that supported intensive wheat and corn cultivation was the backbone of successful settlement in New Mexico (Ackerly 1996; Baxter 1997; D. H. Snow 1988; Wozniak 1987).

On William White's undated *Sketch Map of Grants within the Santa Fe Grant* the holdings of Felipe Tafoya, Felipe Pacheco, and Tomas Tapia are shown as relatively large and unsubdivided land grants near the project area. It is more likely that these lands were subdivided among family members, but records of those transactions have not been found. White's 1895 map shows very intensive subdivision of land along the Santa Fe River on both sides from the "city limit" to the Santa Fe Grant limit. Based on this map, there is good reason to believe that the land within the project area was similarly divided. Although changes in legal ownership may not have been filed before the end of the nineteenth century, Hordes and Payne (in Scheick 2003; Deyloff 2004) trace the ownership history of 16 individual railyard tracts located in the North Railyard which, with further research, D. H. Snow has revised for this report (Chapter 7).

Class and Community

During the eighteenth century, Santa Fe and New Mexico were inhabited by a diverse population. It was a socially stratified society with the governor, high-ranking officials, and officers of the presidio in the upper echelon. The middle class was made up of farmers and artisans, who were slightly more prosperous than the common people and the presidio soldiers (Bustamante 1989:70). Other divisions within *Hispano* society reflected a diverse, mixed, and perhaps somewhat discriminatory and arbitrarily defined caste system (Brooks 2002; Bustamante 1989; Frank 2000). Economic-based social stratification was present, but the majority of the population was small-landholders of Hispano, *mestizo*, *genizaro*, or *indio* castes. The Urrutia map shows the area south of the Santa Fe River and between San Miguel church and the North Railyard area as the Barrio de Analco, in which the population was partly composed of Tlaxacalan Indians from Mexico. Men were soldiers, farmers, shepherds, and laborers with a few skilled blacksmiths, educators, and medical professionals. During this time, churches and secular *cofradias* remained the main avenues by which social and economically defined groups would cooperate and act as a community (R. Frank 2000). Until the building of the Sanctuario de Guadalupe in the early 1800s, worship and service would have been connected with the Parroquia or would have occurred at San Miguel chapel. With addition of the Sanctuario de Guadalupe, the area assumed a more communal organization mediated through church membership and lay organizations (Sze and Spears 1988:37). Residents within the project area were soldiers, farmer, laborers. Earlier archival research suggested evidence for a family mill in the North Railyard, (Hordes and Payne, in Scheick 2003) but subsequent archival investigation suggests it may have been located south of Hickox Street and Cerrillos Road (D. H. Snow, Chapter 7, this report).

Mexican Period (1821–1846)

At the beginning of the nineteenth century, Spain's hold on Mexico and the northern territories had diminished significantly. Recognizing that the citizens of New Mexico could not partake in the normal political, economic, and social activities of the declining empire, Spain allowed New Mexico to operate in virtual independence, except for the most important activities (LeCompte 1989; Westphall 1983). The positive effect was that New Mexico could determine much of its social and economic future. The negative effect was that the economic problems, compounded by limited sources of money, limited access to durable goods, and slow responses to military and administrative issues, created a stagnant economic environment. In addition, pressure from the United States to open economic ties, applied through small-scale economic strategies, increased in frequency between 1803 and 1821.

With Mexico's independence from Spain in 1821, New Mexico became a frontier province and economic avenue to the commercial markets and production centers of the United States. Two major changes instituted by the new Mexican government had important consequences in northern New Mexico. These were the establishment of normal economic relations with the United States through overland trade on the Santa Fe Trail and the abolition of the caste system, which meant that everyone was a Mexican citizen.

Government

The political structure of Santa Fe experienced only minor change with the switch to a Mexican administration (LeCompte 1989; Pratt and Snow 1988). The abolition of the caste system meant that any citizen had an equal opportunity to hold a public office. Governors were still appointed by Mexico and the governor continued to be the military commander. He was also responsible for collecting tariffs and regulating the Santa Fe Trail commerce. The town council and alcalde still oversaw the town business. Santa Fe was divided into six parishes that formed the nucleus through which issues could be advanced to the council and discussed throughout the community.

Economy

In 1821, with Mexico's independence, the New Mexican frontier was opened to trade with the United States. The Santa Fe Trail, extending from Santa Fe, New Mexico, to Independence, Missouri, became a major trade route for European goods from the east (Jenkins and Schroeder 1974; Simmons 1989). Meanwhile, England opened formal trade relations with Mexico and large volumes of Euroamerican manufactured goods became available in Mexico. Though these goods filtered north on the Camino Real the dominant source of manufactured Euro American goods by the 1830s was the Santa Fe Trail, which eclipsed the Camino Real in importance as a trade route. Business between the U.S. traders and Mexico did continue with a special focus on the northern Mexican silver mining region (Scheick and Viklund 2003:14). Americans not only traded in New Mexico, but also became involved in the illegal transfer and allotment of large land grants from Mexican officials (Westphall 1983).

New Mexico still remained predominantly an agro-pastoral economy upon the opening of the Santa Fe Trail. Most villages and towns barely felt the effects of the increase in commercial and consumer opportunity, except that basic household and work items were more readily available. The opening of the Santa Fe Trail and the effect that it had on northern New Mexico's economy has been explored by many researchers (LeCompte 1989; Pratt and Snow 1988; Boyle 1997). While not widespread immediately, but with greater effect through time, the Santa Fe Trail trade provided access to durable and manufactured goods in quantities and at lower costs than had been available from Camino Real commerce. Basic household goods, such as window glass, dishware, hand tools, etc. were available to anyone who could afford to buy them either with currency or with a line of credit based on projected farm and ranch production. Santa Fe's census reports an increase in merchants from three in 1823 census to and nine in (D. H. Snow, Chapter 7, this report). The beginnings of a more viable cash economy bolstered by trade mean that wage labor could be added to the available options for supporting a family.

Society in Transition

Mexican independence from Spain resulted in limited changes to the family- and church-based social structure of Santa Fe and New Mexico. The abolition of the caste system and the granting of equal citizenship to all Mexicans and New Mexicans potentially allowed for changes in the social status of local and provincial office-holders or officials, but there is not strong evidence for such changes in Santa Fe.

General historical descriptions indicate that under Mexican rule, Santa Fe and New Mexico continued to have considerable autonomy resulting in strong organizations that governed secular aspects of religion and other aspects of Hispanic organization (LeCompte 1989:83; Abbink and Stein 1977:160; Frank 2000). Abolition of the caste system and full citizenship had little effect on Hispanic populations, but had serious consequences for the Pueblo Indians who had enjoyed special status relative to land holdings under Spanish rule. Their lands could now be sold and were subject to the vagaries of land transactions (Hall 1987).

Perhaps, the strongest social consequence in Santa Fe resulted from the opening of the Santa Fe Trail. This officially opened New Mexico to influences and settlement by populations from the United States. This added a new layer of cultural diversity to the social setting which would eventually shift the balance of the social and economic relations in Santa Fe and along the Rio Grande. In terms of the railyard property, social change would have been most pronounced as galvanization of the parish and surrounding community before major structural political, social, and economic changes were brought on by a rapidly changing economy and an the influx of Anglo American settlers to Santa Fe and the American Southwest when New Mexico became a territory of the United States.

American Territorial Period (1846–1912)

New Mexico's Territorial-period quest for statehood was one of the longest endured by any state of the Union. Following the U.S. acquisition of new southwestern and western territories, there was a disorderly and turbulent rush to own or control land, mineral, and natural resources. The struggle for control created a political, economic, and social order that still affects how New Mexico functions as a state today. Two authoritative accounts of this period are Larson's *New Mexico's Quest for Statehood: 1846–1912* (1968) and Lamar's *The Far Southwest* (1966). Much of the following summary is derived from those sources and a history of the Old Pecos Trail in Santa Fe authored by Maxwell and Post (1992).

Santa Fe Trail and Pre-Railroad Times (1846–1879)

On July 30, 1846, rumors that the United States would invade Mexican territory became a reality as Kearny proclaimed his intention to occupy New Mexico. After possible secret negotiations with General Manuel Armijo, the Army of the West arrived in Santa Fe on August 18, and New Mexico was surrendered to the United States (Jenkins and Schroeder 1974:44). Between 1846 and the ratification of the Treaty of Guadalupe Hidalgo on March 10, 1848, the U.S. army continued to occupy New Mexico, and a civilian government was installed, including a governor (initially appointed by General Kearny) and a Territorial assembly.

New Mexico changed politically when it was designated a territory of the United States under the Organic Act of 1851 (Lamar 1966:13). The act set up the Territorial governorship, from which important appointments were made in the Territorial administration. The Territorial legislative assembly dealt with issues on a local level, while the Territorial governor's job was to ensure that federal interests were served (Lamar 1966:14). The center of government remained in Santa Fe, as it had been during the Spanish and Mexican administrations.

Between 1848 and 1865, the economy continued to focus on Santa Fe Trail trade, with the inclusion of routes from Texas (Scurlock 1988:95–97). Santa Fe continued to be the economic and political center of the territory. In addition to the mercantile trade, the establishment of military forts such as Fort Union and Fort Stanton expanded the economic markets (Jenkins and Schroeder 1974:50; Scurlock 1988:76–88). Local economies continued to be agrarian and pastoral. The large ranches supplied cattle and wool to the eastern markets and, until the end of the Civil War, to Mexico. A full-scale cash and wage economy was not yet in place as New Mexico was still isolated from the rest of the United States by long distances and hostile Indian tribes (Abbink and Stein 1977:167; Fierman 1964:10).

Changes in the social structure were gradual before the Civil War. Early migration by Anglo-American and European entrepreneurs was slow because industries such as mining had only been established on a small scale. As the terminus of the Santa Fe Trail, Santa Fe attracted immigrant Jewish and German merchants, who brought eastern European business experience into the new territory. These merchants replaced the early traders and established formal businesses (Jenkins and Schroeder 1974:63). These early merchants participated in growing land speculation in Spanish and Mexican land grants.

Between 1865 and 1880, the trends that began with establishment of the territory were amplified. Before 1860, U.S. attention was focused on the sectional conflict and the resulting Civil War. New Mexico was a Union territory, and for a brief period in 1862 the Confederates occupied Santa Fe without a shot being fired from the cannons of Fort Marcy, which overlooked Santa Fe. However, when the Confederate contingent attempted to move north to the Colorado gold mines they were engaged, defeated, and ejected from the territory (Jenkins and Schroeder 1974:50–51).

With the end of the Civil War, attention was turned to the settlement of the new territories and their potential for economic opportunity. Military attention turned to pacification of the Native American tribes that roamed New Mexico outside the Rio Grande and its tributaries (Jenkins and Schroeder 1974:51–56). The new western territories were perceived by many as a place where lives ruined by the Civil War could be renewed. Eastern professionals with all kinds of expertise were encouraged by associates to come to New Mexico, where the political and economic field was wide open (Lamar 1966). Much of this migration centered on Santa Fe, which continued to be the territory's economic and political center.

These newcomers joined forces with and embraced the *patron* system, thereby gaining access and acceptance to the existing social and political power structure and economy. These alliances were referred to as "rings." The rings were informal organizations of lawyers, cattlemen, mining operators, land owners, merchants, and government officials (Larson 1968:137). Their common goal was to provide a favorable environment for achieving economic and political aims. The most well-known was the Santa Fe Ring, which included Territorial governors, land registrars, newspaper owners, lawyers, and elected and appointed officials. Important persons in New Mexico history belonged to the Santa Fe Ring, including Stephen Elkins (secretary of war and U.S. senator), Thomas Catron (Territorial delegate and U.S. senator), L. Bradford Prince (U.S. senator and Territorial governor), Francisco Chavez (president of the Territorial Assembly), and M. W. Mills (Territorial governor) (Larson 1968:142–144). The Santa Fe Ring crossed party lines and was extremely fluid in its membership; disloyalty resulted in ostracization and often in political or economic ruin. Opposition to the ring was suppressed by law and violence, as demonstrated by the Lincoln and Colfax County wars in the 1870s (Larson 1968:137–140).

The alliances between the new political and economic entrepreneurs and the old power structure came to dominate the Territorial legislature, which, through time passed an increasing number of laws benefitting the new structure to the detriment of the Spanish and Native American populations (TANM Roll 102, Frames 78–95). The new westerners often had contacts in Washington through which they influenced Territorial political appointments and disbursement of economic aid (Lamar 1966:169–170).

Perhaps the greatest lure in the New Mexico territory was land. Ownership of large tracts of land was aggressively sought by Santa Fe Ring members. Thomas Catron, who had been in the territory for just 16 years was one of largest landholders in the United States by 1883, quick land acquisition was a typical pattern.(Larson 1968:143) . To land speculators, most of New Mexico was unsettled and unused. This was an illusion promoted by the frontier subsistence economy of low-density, land-extensive farming and ranching, which had prevailed before the Territorial period. Lack of transportation to markets, conflicts with Indians, and a general lack of funds had retarded New Mexico's cattle, lumber, and mining industries. Under the Spanish land grants, non-arable land was a community resource and was therefore not over-exploited. It was the community land that land speculators obtained, to the detriment of New Mexico's rural economy and social structure (Van Ness 1987).

New Mexico's economy changed after the Civil War because of increases in the number of military forts and the growing Anglo-controlled mining and ranching industries. A mercantile system that had focused on Mexican and California trade now supplied the military and transported precious ores from the gold and silver mines of the Santa Rita and Ortiz mountains to national markets. A marginal cash economy grew as the federal government spent money on military forts and the Indian campaigns. The Santa Fe, California, and Texas trails were the main routes for goods. The Chihuahua trade died after the Civil War (Jenkins and Schroeder 1974:61–62).

The Early Railroad Era (1879–1912)

Between 1879 and 1912, political power was concentrated in the Santa Fe Ring, which consisted of several Santa Fe politicians. The group controlled Territorial and local political appointments through a system of patronage and effectively blocked legislation proposed by its opponents. In 1885, Edmund G. Ross was appointed Territorial governor and was asked to end the political and economic control of the Santa Fe Ring, a task he was unable to complete.

National attention on New Mexico focused on the continued abuses of the land grant situation. Between 1870 and 1892, the Santa Fe Ring was able to manipulate land grant speculation to their advantage. Surveyors general were usually appointed with the blessing of the ring and were often involved in land deals with ring members (Westphall 1965). William Julian was appointed surveyor general and given the job of halting the land grant abuses, which he carried out in spectacular if not an overzealous fashion. His inclination was to deny all claims as fraudulent, and he recommended very few to Congress for confirmation. The grants within and on the periphery of Santa Fe were at both ends of the spectrum. Julian recommended the Sebastián de Vargas Grant, located on the southeast boundary of Santa Fe, for confirmation, even though it lacked the proper documents (Court of Private Land Claims [CPLC]). On the other hand, the Salvador Gonzáles Grant, within the northeast corner of the Santa Fe Grant, became the focal point for a national lambasting by Julian (1887) of the abuses of the land grant situation. To the Santa Fe Ring, Julian was an obstructionist, who used his position to advance personal vendettas (Bowden 1969).

At stake in the land grab were millions of acres that would leave private control and enter the public domain if they could not be confirmed as part of a land grant. Julian and Ross believed the public domain should be available to small landholders (Lamar 1966). The Santa Fe Ring supported large-scale ranching and mining interests. Because Santa Fe was the political and economic center of the territory the land around it was valuable, and large tracts not legitimately included in the Spanish land grants were falsely claimed.

From 1880 to 1912, economic growth in the Santa Fe area began to lag as other areas of the state—Las Vegas, the Mesilla Valley, and Albuquerque—grew in importance. Much of the economic slowdown can be ascribed to the lack of a through railroad (Elliott 1988:40). Santa Fe was no longer an important economic center, but became only a stop at the end of a spur on the Atchison, Topeka and Santa Fe Railway. Although it was also the terminus of the Denver and Rio Grande Railway, which had local and regional significance, that route had little national importance because it did not tie in directly to the east–west transportation corridor (Pratt and Snow 1988:419).

In a move to spur economic growth a concerted effort was made to advertise Santa Fe and New Mexico as a tourist and health destination. Sanitariums sprang up all across New Mexico, even in remote locations such as Folsom, in the northeast corner of the state. The trip on the Denver and Rio Grande Railway was described as an excellent remedy for lung problems (Nims 1881; Williams 1986:129–131). New Mexico's unique cultural heritage was recognized as an important tourist draw. Preservation and revival of traditional examples of architecture and native crafts and ceremony were encouraged. Large-scale tourist corporations such as the Harvey Corporation invested heavily in Native American crafts. Tourism and economic development became a dichotomy of economic goals. The tourist industry emphasized the old and romantic, while the economic development interests portrayed New Mexico as booming and vital, embodying the modern values embraced by the eastern establishment (C. M. Wilson 1981:105–159).

As the seat of Territorial government, Santa Fe maintained economic stability. The city acquired many federal and Territorial expenditures and jobs. Attempts to move the capital to Albuquerque in the early 1880s were defeated, which proved critical to the long-term economic stability of Santa Fe (Lamar 1966). Another choice made by legislators interested in Santa Fe's economic growth was to locate the penitentiary in Santa Fe. As a tradeoff, Albuquerque, Las Cruces, Las Vegas, and Socorro received colleges. The penitentiary was viewed as economically more valuable than schools.

The Railways (1879–1945)

This section is condensed from research presented in three thorough archival reports on Santa Fe Railyard property history by Deyloff (2004), D. H. Snow (1995), and C. T. Snow (in Scheick 2003:43–74). Produced during planning phases of this project, these reports provide detailed research into the particular histories of numerous land tracts. Additional research is presented by D. H. Snow in the Archival Research section of this report in Chapter 7.

In response to burgeoning overland trade, America's westward expansion, the Atchison, Topeka and Santa Fe Railway was first chartered in 1859. The actual survey of the proposed route through New Mexico was conducted 19 years later, in the summer of 1878, by W. R. Morley. By the time the railway reached New Mexico, trade along the trail had decreased and other economic considerations were in play. Citing reduction of trade along the Santa Fe Trail (Bryant 1982:59–60) Morley successfully argued for a route change from the 32nd to 35th parallel shifting the route north, and bypassing Santa Fe. This did not please local businessmen who conceded the rail line vital to the city's commerce and agitated to bring rail service to Santa Fe. The citizens of Santa Fe approved $150,000 in bonds to construct the AT&SF spur and another 100 thousand dollars to bring the narrow gauge Texas, Santa Fe and Northern Railway to Santa Fe (Twitchell 1925:398–400).

In 1878, the Atchison, Topeka and Santa Fe Railway (AT&SF) entered New Mexico through Raton Pass, far to the northeast of Santa Fe. Access to the pass was only gained after a prolonged and bitter fight between the AT& SF and the Denver and Rio Grande Western Railway, a subsidiary of the Denver and Rio Grande Railway (D&RG) that saw skirmishes between railroad crews and ended in bitter litigation that effectively divided rail service between northern and southern New Mexico. The agreement banned the D&RG from constructing line south of Española for 10 years (Athearn 1977:96, in C. T. Snow 1995).

On February 9, 1880, the first train reached Santa Fe from a spur line that had been built from AT&SF line at Lamy. Regular rail service for the capital began on February 16 of that year. This period was marked by the construction of a depot, engine house, and all the necessary facilities to maintain and operate a railyard. The spur line that served Santa Fe was operated by the New Mexico Southern Pacific railway (NM&SP), a subsidiary of the AT&SF. In 1899 it was bought by the AT&SF.

Meanwhile, from the north, the D&RG's narrow-gauge line had extended to Española by 1880 but could not complete service to Santa Fe because of the settlement with AT&SF. The Texas, Santa Fe and Northern Railway (TSF&N) was incorporated by local business men to fill the service gap. The TSF&N laid narrow-gauge tracks from Española to Santa Fe and began service to the capital by 1887. The TSF&N, also briefly known as the Santa Fe Southern, was taken over by the D&RG in 1895, when this line became known as the "Chili Line." When the TSF&N originally came into Santa Fe from the north, the company built an engine house and buildings north of the Santa Fe River close to 301 North Guadalupe Street near the existing Alsup's gas station on land owned by one of its investors. By the end of the nineteenth century, the D&RG had moved into the eastern edge of the AT&SF railyard south of the Santa Fe River.

By 1904 a second standard-gauge railway, the New Mexico Central (NMC) operated in Santa Fe. Originally named the Santa Fe, Albuquerque, and Pacific railroad in 1900, the company was known as the Santa Fe Central until 1908. The SFC initially built a temporary depot in the railyard, but eventually shared the Union Depot with the D&RG. The NMC was a standard-gauge railroad that ran south of Santa Fe through Moriarty and on to Torrance. This line was nicknamed the "Bean Line" and eventually reached El Paso by way of the El Paso and Rock Island line.

The NMC and D&RG also shared an approximately 10-acre freight yard southwest of the main terminal. This yard, which is represented today by the Baca Street parcel, was initially planned in 1901 and developed in 1904. The NMC ceased operation in 1926 when AT&SF bought the line and all associated infrastructure. The AT&SF also purchased the D&RG's interest in the Santa Fe Railyard in 1945. Throughout and after this period, much of the eastern edge of the main railyard as well as the Baca Street parcel was leased out by the AT&SF to various commercial interests.

Figures 1.7 and 1.8 convey a sense of the period locomotives and depot transitions.

Figure 1.7. Historic New Mexico Central Railway (formerly the Santa Fe Central Railway) trains, c. 1908–1926. Top, Locomotive 9, c. 1918, at the old Santa Fe depot location (photo credit unavailable); bottom, coal train near Galisteo, N.M. (T. Harmon Parkhurst, 1919–1920, courtesy Palace of the Governors Photo Archives, NMHM/DCA, neg. no. 166098).

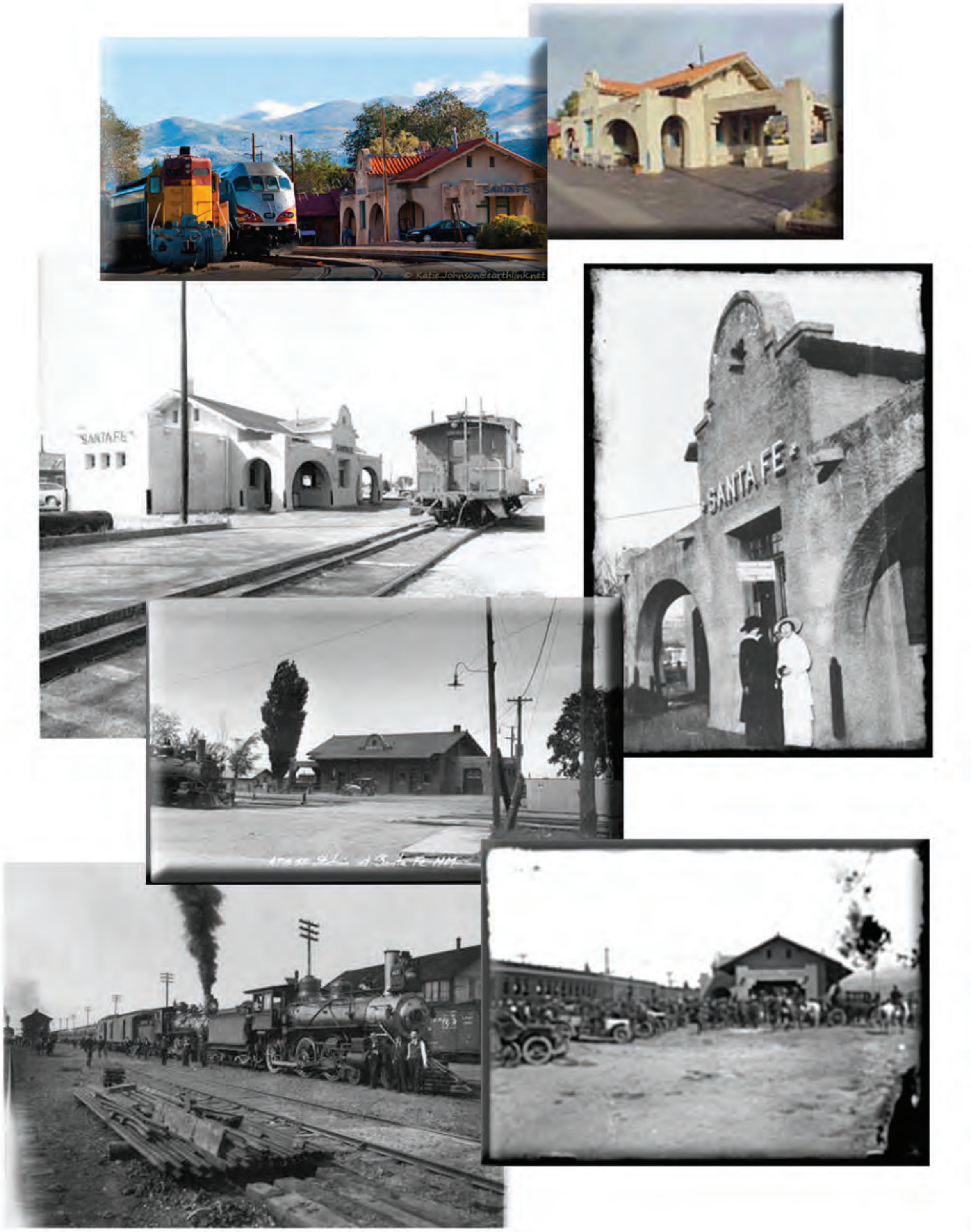


Figure 1.8. Santa Fe depot and historic locomotives, c. 1898 to present. Color photographs, present day: top left, web download (courtesy KatieJohnson@earthlink.net); top right, unattributed web download. Black-and-white photographs, clockwise from bottom right, all courtesy Palace of the Governors Photo Archives (NMHM/DCA): soldiers at Santa Fe depot (Jesse Nusbaum, 1913, neg. no. 061433); AT&SF locomotives 627 and 626, Las Vegas, N.M., depot (1898–1900[?], neg. no. 015227); AT&SF depot, Santa Fe (1928[?], neg. no. 092217; Arthur Taylor, 1976, neg. no. 117224; 1910–1920, neg. no. 104466).

Statehood to Modern Times (1912–2005)

New Mexico was delayed in its quest for statehood by eastern politicians who viewed the small population, the arid climate, and a Spanish-speaking majority as liabilities. Most New Mexicans favored statehood but had different conditions under which they would accept it. Some citizens feared statehood because of the potential for increased taxation, domination by one ethnic group over another, and the loss of federal jobs under a state-run system. These factors, combined with political factionalism in New Mexico, resulted in the struggle (Larson 1968:302–304).

On January 6, 1912, New Mexico was admitted into the Union as a state. After statehood the patterns that were established in the Territorial period continued. New Mexico experienced only slow population growth, with most settlement concentrated along the Rio Grande corridor and in the southeast around Roswell. More than half the state land had a population density of fewer than five people per square mile (Williams 1986:135), this was partly because a large area of land was part of the National Trust and could not be settled. The major industries continued to be mining, ranching, lumber, farming within the Pecos and Rio Grande irrigation districts, and tourism. These industries, except the irrigation projects, were well established before statehood and continue to be important today (Jenkins and Schroeder 1974:77).

In Santa Fe, the absence of a major spur into the national railroad lines proved to be a detriment to industrial growth. Instead, development in Santa Fe focused its state and federal administrative centers and the tourism and art trade (Pratt and D. H. Snow 1988; C. M. Wilson 1981). The lack of industry that had retarded Santa Fe's growth was turned into a positive situation. Without heavy industry and the accompanying population density that accompanies it, quality of life became a draw for people seeking to escape the increasingly crowded and polluted cities. As part of the quality of life and the uniqueness of Santa Fe, its multicultural heritage continued to be emphasized.

Today, Santa Fe is the centerpiece of a tourism industry that brings more than $1 billion into the state every year. Municipal ordinances and efforts of the art and anthropological community to preserve Santa Fe's cultural heritage in the 1920s and 1930s have made it a desirable location for second residences and professional people who supply services to the national markets. Rapid growth in the 1970s combined a blue-collar and lower-economic-class population with residents of a higher economic class (Williams 1986:244).

Since the 1920s, the railyard property has been developed as commercial space (C. T. Snow, in Scheick 2003; Deyloff 2004). Petroleum and coal distributors and warehouse storage companies have combined with bottling companies, builder's supply warehouses, and other commercial businesses to populate the open space surrounding the surviving railroad depots. Changes in land use and business types reflect a national trend away from rail transportation toward overland transport by trucks and air shipping. Bulk storage, wholesale, and manufacturing businesses have been replaced by smaller individually owned businesses, including pottery-supply studios, furniture stores, art studios, and restaurants.

Research Design: Economy, Transportation, and Urban Development from the Late Spanish Colonial Period to the Beginning of the Cold War

James L. Moore, Stephen S. Post, and Chris T. Wenker

Santa Fe occupies a unique position in the study of post-Columbian history and archaeology of the North American Southwest. As a burgeoning cultural center in the early twentieth-century, archaeologists, anthropologists, and historians were drawn by the promise of studying the ancient past through the direct observation of the ethnographic present of the Rio Grande and Colorado Plateau Pueblo and Athabaskan Indians. As the oldest continuously occupied non-mission Spanish settlement in northern New Spain, the city held documentary evidence of the rise and fall of the Spanish empire and how global, hemispheric, and regional events were played out at a local scale. Later, fascination with the American Territorial and National frontiers was reflected in the study of the Santa Fe Trail trade, the military campaigns against the Indian nations, the land and resource machinations of the post-Civil War, and finally the coming of the Atchison, Topeka & Santa Fe Railway. However, over the years these studies about Santa Fe became progressively more sensationalized and less based in the facts. As Santa Fe grew, opportunities for re-examining old issues of culture change and historical processes became less productive. Also, Santa Fe's identity had developed in such a way that the particulars of past were lost to idealized views of the past. Recent studies have strived to revitalize and reexamine the process by which Santa Fe as a community, as a population, and as a cultural icon has changed (C. M. Wilson 1981).

Archaeological test excavations at the Santa Fe Railyard property in Santa Fe, New Mexico, identified 15 sites that were recommended as significant because they have data potential. These sites are anticipated to be damaged or destroyed during the railyard's urban renewal project and therefore require impact-mitigation treatment through the implementation of a research design and data recovery plan. These sites are LA 120957, LA 146402, LA 146403, LA 146405, LA 146407, LA 146408, LA 146410, LA 146411, LA 146412, LA 146413, LA 146418, LA 149909, LA 149912, 149913, and LA 149915.

The archaeological excavations revealed a diverse array of structures, features, and cultural deposits that are eminently suited for addressing a wide range of research themes pertaining to late Spanish Colonial- to post-World War II-period society and economy. Variability in feature function, content, and age should facilitate cross-cultural comparisons of social and economic interaction as the railyard property changed from agricultural/residential to residential/commercial in nature. To facilitate this study the research is divided into three domains: *acequia and field systems, frontier acculturation and material culture, and historical architecture*. These research domains are to be examined using data from the archaeological field excavation and laboratory analysis in combination with archival and ethnohistorical research.

Research Domain 1: The Spanish Colonial to Late Territorial Period Acequia and Field System at the Santa Fe Railyard

This research domain focuses on the acequia and field system uncovered by the railyard test excavation. In the southwestern United States, substantial attention has been paid to the antiquity, operation, and evolution of water-conveyance systems of Native American and European origin (e.g., Ackerly 1996; Ackerly et al. 1987; Baxter 1997; Damp et al. 2002; Howard and Huckleberry 1991; Mabry 1997; Moore and Levine 1994; D. H. Snow 1988), probably due in part to the intimate relationships between water, agriculture, and human societies. In this study, acequias and fields (as long-term technological and economic adaptations) are examined from a world-systems theory perspective. The focus is on chronological, functional, and technological aspects of the system as it operated within core, semi-periphery, and semi-periphery interaction networks. Time depth of the acequia and farm system allows for some consideration of the effect of core shifts from Spanish Colonial settlement to American expansion into the west.

Theoretical Perspective

World-systems theory as developed by Immanuel Wallerstein (1974, 1979) describes, analyzes, and interprets economic interconnections throughout the world after the sixteenth century. A world system is defined as an entity with a single division of labor and multiple cultures. Two subtypes are also proposed; one has intersocietal division of labor under a single imperial polity and the second is characterized as a political system of multiple competing states. Chase-Dunn and Hall (1991:7) further define world systems as "intersocietal networks in which the interaction (trade, warfare, intermarrriage, etc.) is an important condition of the reproduction of the internal structures of the composite units and importantly affects changes which occur in the local structures." A fundamental aspect of world-systems theory is that it attempts to explain the rise and fall of large-scale socioeconomic systems. Although Wallerstein was careful to limit his analysis to the world from the sixteenth century on, archaeologists and prehistorians have applied world-systems theory to ancient times (Chase-Dunn and Hall 1991).

World-systems theory is predicated on the concept that "contemporary change within national societies is conditioned by the linkages with a global network comprising 'developed' societies in core regions, 'less developed' peripheral nations, and intermediate semi-peripheral regions [Chase-Dunn and Hall 1991; Sanderson 1991]" (Payne 1999:267). The social and economic boundaries of core, semi-periphery, and periphery are rarely fixed, giving rise to additional concepts of military buffers and contact peripheries (T. Hall 1991).

A working definition of a core is the urbanized political, economic, and social center of a network of states (Chase-Dunn and Hall, eds. 1991). For example the Holy Roman Empire, which was headed by the Spanish monarchy in the sixteenth and seventeenth centuries, was a confederation or network of states (Kamen 2003). These states exercised economic control and pursued geographic expansion through military efforts in the Old World and exploration/conquest/colonization and missionization in the New World. The core states tend to have concentrated wealth and well-established political, economic, and cultural institutions. Interaction networks sought to extract resources and wealth from the New World in exchange for manufactured commodities. During the eighteenth and early nineteenth centuries, Spain, France, and England vied for core primacy and control over interaction networks of the New World.

The semi-periphery has been broadly defined as having four main characteristics (Chase-Dunn and Hall 1991:21). A semi-periphery may mix or combine core and periphery forms of social, economic, and political organization. Geographically, a semi-periphery may be located intermediate to a core and periphery. Mediating activities such as trade, raw material processing, legal and governmental administration, and military efforts may be carried out between a core and periphery in these semi-peripheral regions. Institutional features may be intermediate to forms found in the core and periphery.

A periphery is a less or undeveloped nation, state, or region that has unequal intersocietal economic and social interactions with core and semi-periphery units (Chase-Dunn and Hall 1991:18–20). The periphery can be conceptualized as weakly connected to the core and more likely to interact directly with the semi-periphery (Wilkinson 1991:121–122). In this sense, Native American groups inhabiting the American Southwest during the Spanish Colonial period represented the periphery.

In practical terms, for much of its post-contact history, New Mexico was a semi-periphery that operated at an economic disadvantage within the core/semi-periphery/periphery hierarchy, but served along with Mexico as intermediary between the Spanish or Old World core and the New World periphery. The semi-periphery geographic limits until the late 1700s was mostly confined to the Rio Grande corridor from Santa Fe to El Paso. Expansion of the semi-periphery was encouraged by military victories over the Comanches by Don Juan Bautista de Anza and resulting treaties in the late 1700s. These treaties allowed settlement expansion and stability in the northern Rio Grande and along the Pecos River. With Mexican independence in 1821 and the opening of the Santa Fe Trail, Hispano settlements within New Mexico operated as social and economic intermediate between the United States and Mexico into the U.S. Territorial period. It can be argued that New Mexico remained a semi-periphery until and after Statehood in 1912, as it was exploited for its land and natural resources in support of the U.S. rise to core status within an increasingly commodified and consumer-based world economy.

Interactions between core, semi-periphery, and periphery included trade, warfare, and intermarriage. Exchange networks operated on prestige goods such as precious metals and on basic goods, which included everyday raw materials and foodstuffs (Wallerstein 1974; Chase-Dunn and Hall 1991:10). Many of these potential interaction networks operated between the New Mexico semi-periphery and the indigenous semi-periphery, especially with regard to marriage (Brooks 2002), raw material extraction and processing, food production, and commodity production and exchange (R. Frank 2000). Within a core/periphery hierarchy there would have been some level of political, economic, or ideological domination between the different societies. For this study, direction of the interaction was predominantly from the Spanish Empire (core) through New Mexico (semi-periphery) over the indigenous populations (periphery). In general and certainly for the New Mexico semi-periphery and indigenous periphery this domination was not always unidirectional or universal. Efforts to dominate or manage the New Mexico semi-periphery by the Spanish Empire included political domination, extraction of resources through taxation, and unequal economic exchange. However, because of the geographical distance from the Spanish Empire core and the more immediate viceregal semi-periphery in Mexico, interactions operated at different levels of intensity and effectiveness with New Mexico, especially as the goals for maintaining a presence in the American Southwest changed from missionization and colonization to military buffer and administration under the Bourbon administration during the eighteenth century.

As interaction networks between Spain and Europe diminished, they were replaced by increased interaction between Mexico and New Mexico. In the late eighteenth and early nineteenth centuries, most social, economic, and political interaction between New Mexico and Mexico can be viewed as between two semi-periphery states. Mexico as a semi-periphery was still somewhat connected to the core through overseas transportation, but it acted as an intermediary between the core and northern semi-periphery and periphery, especially in military matters. Aspects of the core/periphery interaction networks remained in place as exchange of natural resources, bulk goods and products, and to some extent people occurred almost solely between Mexico and New Mexico. For example, economic domination through taxation was limited to church tithing (R. Frank 2000). Most political decisions were made in New Mexico with limited input from Mexico or Spain (Simmons 1990).

The main economic system in New Mexico that is well documented for the Santa Fe area was agro-pastoral (Wozniak 1987; Payne 1999). This subsistence-level adaptation focused on the production of bulk foodstuffs (e.g., wheat, corn, and livestock). The local economy was primarily barter- and trade-based with limited exercise of a cash economy, except during the purchase of land, houses, or large herds of livestock. (Payne 1999; R. Frank 2000). Land was acquired through city and community grants. Typically, small-scale family/community land grants included irrigated farmland and house lots and gardens, and access to common lands for livestock-grazing and bulk resource extraction. In order to obtain a legal land title four conditions had to be fulfilled for 10 years: settlers had to construct a dwelling, clear land, dig irrigation ditches, and cultivate the land. All involved land modification and improvement, which reflects the relationship between survival, land tenure, and productivity in an agro-pastoral system. Most of the following research questions will focus on local scale of interaction within the agricultural component of the agro-pastoral system as it is represented in the acequia and field system identified during the Santa Fe Railyard testing project.

Research Questions (Research Domain 1)

In terms of local interaction networks, the construction, maintenance, use, and management of the acequia systems was important to economic survival and, ultimately, social identity within the greater Santa Fe community. Acequias and the successful cultivation of Old World plant species were critical to the establishment, survival, and longevity of Spanish Colonial settlement, the re-establishment of social customs, and the acculturation of indigenous populations into a new economic system. Acequia-based agriculture was one of the principal means for establishing settlement in the New Mexican periphery and integrating with the Mexican semi-periphery.

The importance of irrigation and access to water is emphasized by the fact that acequias were constructed immediately upon settlement at San Juan del Los Caballeros by Juan de Oñate's colonists. Acequias were immediately built in Santa Fe when the capital moved there in 1610 under Don Pedro de Peralta. One of the first actions that Don Diego de Vargas and settlers took in re-establishing the community in Santa Fe in 1696 was to revitalize the acequia system. In the eighteenth century acequias were a vital component of all individual and community land grants. Finally, these water-conveyance features remained an integral aspect of land ownership and use into the twentieth century, as the agro-pastoral economic base was first supplemented and eventually replaced by a wage labor/cash-based economy in the twentieth century.

Current knowledge of New Mexican acequia systems combines historical accounts, hydrographic records, and land grant documents (Ackerly 1996; Wozniak 1987; D. H. Snow 1988). Regionally, acequia systems in the New Mexican periphery have fairly specific spatial characteristics, but local variations on technological aspects of water diversion and ditch maintenance undoubtedly existed. Geographically separate irrigation systems may be differentiated depending on the breadth of a river's floodplain, streamflow, adjacent arable land, population density, or the number of users. This latter variable changed through time as land was divided through inheritance and, later, land sales. For example, the ditch systems along the Nambe River and the Santa Fe River may have similar fundamental spatial organization, but they should be internally variable, given that the former served a rural community and the latter a urban community, at least as far west as the railyard property.

Archaeological studies of historic acequia systems are few. Specific to the Santa Fe area, a thematic survey by D. H. Snow (1988) contributed a substantial spatial and contextual framework for managing and studying systemic and individual components of the acequia system. Other inventories in conjunction with residential and commercial projects have recorded surface evidence of the fossilized remnants of the acequia system in currently urban and transitional rural/urban areas (Post 1995a, 1995b, 2000, 2001, for example). Excavation data from former acequia channels is rare, with one example reported in the Santa Fe area (McIntosh 2004).

D. H. Snow (1988) documents acequia and ditch locations and conditions in 1988 using historical documents and maps and the 1914 and 1977 hydrographic survey maps. He divides the system geographically into north side and south sides of the Santa Fe River. His data suggest that from the late Spanish Colonial to late U.S. Territorial period, the overall systemic configuration corresponded to conventional or typical systems. The conventional system, as summarized from historical accounts by Wozniak (1987:85), Ackerly (1996:16), and D. H. Snow (1988), consisted of four main components: a natural source of running water, two mother ditches (acequia madres) on each side of the natural watercourse at or near the highest elevation of the arable land, lateral or contra ditches to distribute water to field systems owned by one or more families within a communal land grant, and internal ditches or channels (*sangrias*) connected to lateral ditches for irrigating individual fields or cultivated plots. Until the late nineteenth or early twentieth centuries water was diverted to the system directly from the river or watercourse. Therefore, water was available as long as the river was running.

During the late nineteenth and early twentieth centuries upstream water-impoundment reservoirs in the Santa Fe area served rural and urban water needs (Van Citters 1995:133–144). Dramatic landscape modification, such as accompanied the railyard depot and adjacent commercial spaces, required bridges or runways over ditches to allow water to run freely downstream. However, the coming of the railroad and structural accommodations that maintained the acequia system were the beginning of major shift from a rural economy to wage-based commerce and labor, with land transactions and subdivisions turning farm land into residential neighborhoods (Sze and Spears 1988). Change in the number and distribution of acequia laterals coincided with the beginnings of urban-driven water management. This federally supported and commercially run water-management system eventually only served urban needs, with downstream irrigation within the Santa Fe area halted by the 1960s.

In the railyard property, four sites (LA 146407, LA 146408, LA 146410, and LA 146418) consist of water conveyance channels. LA 146407 is probably the Acequia de Analco, a lateral off of the Acequia Madre, and LA 146408 is probably a sangria off of the Acequia de Analco. LA 146410 is probably the Acequia de los Pinos, also an Acequia Madre lateral. The fourth ditch, LA 146418, was not identified by Snow during the 1988 survey, but it is shown on J. W. Gilmer's 1846–1847 Plan of Santa Fe (Deyloff 2004:13) following a northeast–southwest course along the southern end of the general Baca Street project area. It is probably contemporary with the Acequia de Analco and the Acequia de los Pinos. LA 146407 (and possibly LA 146410) probably also have associated rock concentrations and postholes that may be diversion features. LA 146402 has internal water channels within the remnant field (Feature 2). These sites are short segments within the much larger historical acequia and field system that covered much of the land south of the Santa Fe River and west of the late nineteenth-century city limit.

Within the New Mexico semi-periphery acequia irrigation and farming is one of the primary means by which the local population interacted socially and economically. Archaeological investigations of Spanish Colonial- and early Territorial-period acequia irrigation and farm systems are rare. Therefore, this study is expected to yield archaeological evidence of changing social and economic conditions and interactions as core influences shifted from Spain to the United States and as the direction and intensity of interaction between New Mexico and Mexico semi-peripheries shifted. With this in mind, a range of research questions are proposed regarding chronology, contemporaneity, function, and operation that can be examined through the excavation and documentation of these ditches, potential diversion features, and the field remnant.

> **Research Question 1.** *Can we date the acequia segments and field remnant? If so, are the acequia segments and associated features and field a contemporaneous portion of the south side acequia system? Were the segments built and in continuous use from the 1700s to the early 1900s? Do one or more segments represent organic expansion or periodic realignments of the system?*

These questions examine acequia chronology and sequence from the initial construction to ultimate abandonment of the south side acequia system as represented by the acequia segments identified within the railyard property. Changes in the acequia system or water management primarily reflect local responses to water needs and use within the Santa Fe/New Mexico semi-periphery regardless of interaction with a Spanish or U.S. core. Changes in land tenure and associated land use as it related to economic behaviors may have been partly a response to a shift in core area from Spain/Mexico to the United States during the nineteenth century. Unequal interaction between the United States and the newly acquired New Mexico territory is definitely seen in land grant adjudication, changes in land ownership, and the effects those changes had on preceding economic organization.

The acequias identified in the railyard are part of a system that operated for more than three hundred years (estimated from 1610 to 1950). However, the acequia system as schematically shown in Figure 2.17, derived from D. H. Snow (1988:119), grew and was undoubtedly reconfigured in response to changing land use and ownership patterns.

How much of the southside system was in operation for the whole 300-year span is not known, but can be examined by this study. The southside system consists of the Acequia Madre and large lateral ditches, which should have been long-term fixtures in the system. Thirty-eight ditches totaling 30 miles in length existed early in the twentieth century (D. H. Snow 1988:5). Acequias and roads were commonly identified in Spanish-, Mexican-, and U.S. Territorial-period land deeds and descriptions (D. H. Snow 1988). As population increased and Santa Fe expanded down river toward the rural communities of Cieneguitas and Agua Fria, demands on irrigation should have increased, potentially resulting in the construction of additional ditches. Reliance on ditches for irrigation and livestock continued into the twentieth century. Ditches within urban areas continued to carry water, but the flow was partly derived from street run-off and released water from up-river reservoirs located in the Santa Fe River canyon (Van Citters 1995). It is expected that with the decline of the acequia system, minor laterals and sangrias would be abandoned, filled, or demolished first, followed by major lateral ditches, especially within the growing city limits that included the railyard property.

Test excavations revealed a field remnant (Feature 2) at LA 146402. This 790 sq m area survived repeated historical scraping and leveling of the railyard grounds. The age of field is unknown, although archaeological evidence suggests that it predates the completion of the railroad spur and depot in 1880. The field deposit is near the modern surface, indicating the past removal of nineteenth and twentieth-century overburden. The absence of other field remnants within the site and project area reflects the impact of repeated episodes of construction, demolition, and leveling of buildings and facilities in the twentieth century. Within the field remnant, narrow (45 cm) remnant furrows or internal water channels were exposed. In one instance, the channels (Features 99 and 100) are stratigraphically superpositioned, although they were only separated by a thin soil layer. Artifacts recovered from within these and other channels, and artifacts from other locations throughout the field, can be compared with artifacts from the laterals and sangria. If they date to a similar period, it is probable that the study will be addressing a small, but integrated and related part of the larger system. Datable artifacts may also help to determine if the field was in use immediately preceding the completion of the railroad spur or if land use patterns had changed at an earlier date and are unrelated to the railroad.

Research Question 1 Data Needs. Primarily chronometric data are needed to address questions of chronology and sequence. Recovering chronometric samples or temporally diagnostic artifacts from reliable contexts will be difficult. Upstream from the project area, the ditches are excavated into and pass through lands that have been occupied or used throughout the historic period. Therefore, artifacts recovered from the ditches may not be contemporaneous with their use. Ditches may cut through preexisting deposits that have eroded or fallen into the ditch from maintenance. Through time artifacts from the complete use life of the ditch may become intermingled within the ditch stratigraphy, providing a use-life date range that has limited utility for sequencing changes in the ditch-use history. Because ditches were seasonally maintained deposits would have been removed and piled on the ditch banks, displacing artifacts and contributing to the mixing of non-contemporaneous materials. These are a few examples of natural and human-aided events that could affect the reliability of artifact-based dating.

These problems may not be insurmountable. Artifacts may be recovered from more stratigraphically reliable contexts formed by changes in acequia use, such as occasional abandonments of laterals or events that reduced the maintenance requirements or increased the interval between maintenance events, minor meandering of the acequia channel, and the actual sequence and process of abandonment. The locations of these fortuitously preserved contexts within the acequia system cannot be predetermined, so we will rely on the results of systematic excavation along the different channels and within the field remnant.

It is expected that all of the ditches and the field remnant at LA 146402 will yield artifacts for dating. Hand excavation of deposits within and adjacent to ditches will provide the stratigraphic and contextual basis for assessing the potential dating reliability of the recovered artifacts. Expected temporally diagnostic artifact types may include Pueblo-made pottery from the late Spanish Colonial to beginning of the late U.S. Territorial period. Low frequencies of factory-made items made of glass, ceramic, or metal may suggest early U.S. Territorial-period use with increased frequencies corresponding to later Territorial-period use, and predominantly factory-made items from the post-Statehood period reflecting the covering and abandonment of ditches. Relative frequencies of different artifact classes in combination with datable artifacts may provide the best potential for dating and sequencing the use of the features.

There may arise opportunities to collect chronometric samples for dating. The successful recovery and processing of archaeomagnetic samples from alluvial depositional environments has been demonstrated from both natural riverine settings (e.g., Ellis and Brown 1998) and from culturally produced irrigation features (e.g., Nials and Henderson 2004). Depositional settings where slack-water conditions prevailed, producing high clay and silt contents, will be sampled. Samples can be quickly processed at the OAS archaeomagnetic facility to determine which recovery contexts retain sufficient natural residual magnetism for additional sampling.

Charcoal samples for standard or AMS radiometric analyses will also be recovered, although the source of any charcoal may be suspect given the high potential for water transport and redeposition of cultural materials and inclusions. Contexts to be targeted for all archaeomagnetic and radiocarbon sampling will primarily include strata that are positioned to provide chronometric data on the potentially earliest and latest use periods of the sampled features.

Recently, Berger et al. (2004a, 2004b; see also Nials and Henderson 2004) experimented with the dating of irrigation-canal sediments directly. Using infrared photon-stimulated luminescence, burial-age estimates of sedimentary particles and strata can be derived. "The accuracy of such luminescence dating of waterlain sediments depends critically upon the effectiveness of daylight exposure of individual mineral grains,…[which] zeros the light-sensitive clock" (Berger et al. 2004b:3). A poly-mineral regenerative-dose luminescence method, in conjunction with statistical pooling of the dose measurements, "can generate precision values of 20–100 years for samples <1000 years old" (Berger et al. 2004b:4). If appropriate sample-recovery settings are encountered, sediment samples will be collected and retained for possible dating analysis through this experimental method. One primary criterion for the use of this approach would be the potential for both complementary radiocarbon and archaeomagnetic samples to be recovered from the same strata. Data from those types of chronometric studies would be necessary to allow adequate evaluation of the photon-stimulated luminescence results.

Research Question 2. *What are the most informative characteristics of the different ditches identified as LA 146407, LA 146408, LA 146410, and LA 146418? Are there structural or stratigraphic differences that reflect the organization of water diversion or dispersion from acequia madre to sangria? How does their morphology and stratigraphy compare with other archaeologically excavated or recorded acequias within the southside system? What might these differences mean regarding the organization of ditch use and maintenance through time?*

These questions address the function and structure of the irrigation system. The southside acequia system ditches are expected to exhibit some morphological and stratigraphic variability reflecting their function within the system and, potentially, changes in that function through time. Changes in ditch morphology are more likely to represent long-term local conditions within the Santa Fe/New Mexico semi-periphery regardless of interaction with the shifting Spanish or U.S. core. Fundamental changes in irrigation practices may reflect radical shifts in land tenure and use, as well as management strategies, such as the institution of upstream impoundments and the competing needs of potable water for human consumption. It is expected that in the early 1900s, the acequia system experienced systemic change as water management began to emphasize urban uses at the expense of rural or farming uses.

Testing excavations revealed ditches with variable widths and depths, but the larger ditches, LA 146407, LA 146410, and LA 146418 (see site description section) show some similarity in size and depth within the backhoe-trench and hand-excavated sample. These were some of the main supply ditches for the fields in the railyard and Barrio de Guadalupe neighborhood. The deposits in LA 146407 are characterized as having been "probably laid down in a series of continually shifting ditch channels that drifted laterally over time, as the acequia was periodically maintained and re-excavated during clean-out episodes. These actions would have ultimately obscured all preceding evidence of discrete channel boundaries and fill deposits" (from LA 146407 description, see above). This suggests that current ditch width is a product of many factors. Differences in ditch stratigraphy may be used to assess if morphological differences are only from the accumulative effects of use and maintenance or if portions of the ditch still exhibit remnants of actual size and depth as originally designed and intentionally maintained.

The 0.50 to 0.85-m-thick accumulation of water-deposited sediments within the ditches suggests that maintenance did not always return the ditch to the same depth prior to or following each season. Further investigation may determine if this variation was random or patterned along the ditch lengths or variable among ditches. Differences in large ditch morphology and stratigraphy will be examined for differences that suggest the function of the larger ditches changed or was altered through time.

LA 146408, Feature 28 is a smaller ditch. There is virtually no structural or stratigraphic information on sangrias in the Santa Fe acequia system. Any descriptive information will substantially advance the knowledge base and begin to provide a more informed foundation for their evaluation and management. More extensive and systematic examination and recording of the LA 146408 sangria stratigraphy and morphology, in combination with its smaller size, may provide some insight into the processes and activities that affected the larger ditches. Smaller ditches required less initial labor investment and less maintenance than larger ditches, but they may have been maintained by fewer users, because they served more restricted areas. Excavation may reveal a stratigraphic sequence or morphology that reflects this smaller-scale, lower labor investment, and reduced manpower for maintenance.

Variability in the sediment composition may reflect volume and rate of water passing through the system. The volume and rate may reflect unimpeded conveyance of water from the source to distant field, while shorter distance between source and the irrigated land may result in lower transport volume and rate and a corresponding difference in the sediment composition.

Research Question 2 Data Needs. Data needs for addressing these research questions will be derived from hand and backhoe excavation. Backhoe excavation and detailed recording of profiles at systematic intervals will provide the data necessary to document ditch morphology across the preserved segments. The amount of information will depend on the length of ditch that remains or is available for study; available ditch lengths range from 60 and 190 m. Hand excavation of select areas will allow sample collection for mechanical soil analysis.

Detailed recording of unique and representative cross sections will be conducted by a contracted professional geomorphologist or by experienced OAS staff. Geoarchaeological studies are especially relevant to the study of relict, buried water-distribution features because the study of past irrigation systems requires the linkage of geomorphology, paleoclimatology, subsistence agriculture, and social organization.

Baseline data for testing assumptions and hypotheses about the technology, operation, agricultural capacity, and stability of these systems are primarily contained in the morphology and sediment content of the conveyance channels as well as in the presence, form, and function of related water-control or diversion features. Simple measures, such as that of the stream gradient for example, can be used to determine flow direction. Data on channel geometry and stratigraphy can be used to estimate water velocity and discharge. This information may in turn be used in modeling past acequia operating conditions. Channel geometry is also relevant to the interpretation of system stability. For example, flat-bottomed channels are naturally adjusted for transporting sand and coarse material. Parabolic channels, which are indicative of a cultural origin, may have never attained an equilibrium form, indicating a short use-history or indicating that discharge was maintained at suberosive levels. The presence of subchannels may indicate the reuse or erosion of prior ditch alignments (Huckleberry 1996).

Sedimentological data in particular can provide measures of the impact of flooding or drought on long-term system stability. Sediment samples collected for particle-size analysis can reveal channel-flow characteristics. For example, substantial textural variability is typical of channels in which discharge rates frequently vary. Well-sorted sandy strata are indicative of sediments deposited when a canal is being operated and maintained. Clayey strata may represent either the waning stages of a channel's use or short hiatuses between operation periods. Geomorphological examination of presumed field deposits through sedimentological analysis may also identify locales subjected to prolonged irrigation, especially if they were irrigated with turbid water (Huckleberry 1996).

Extra-systemic environmental factors are also relevant to the interpretation of these relict irrigation systems. Culturally relevant aspects of the environment include landform topography, soils, and river behavior. The fluvial dynamics of the Santa Fe River in particular represent important natural processes that dictated, in many ways, the technological aspects of the acequias' construction and use, and especially affected their archaeological-site formation processes. Historically recorded flood or drought events could possibly be correlated with deposits in the acequias.

To link the geomorphic investigations to an anthropological assessment of the archaeological remains of these conveyance channels, the use of the irrigation systems must also be modeled and evaluated from the point of view of the *parciantes*. Based on morphology and sedimentology, the estimates of water-discharge rates derived for the project-area channels may provide proxy measures of the minimum and maximum irrigable area that could have been served by these ditches. Historical records (and possibly archaeological evidence) of the sizes of the local fields that would have been served by these particular ditches may then be compared to the geoarchaeological estimates to evaluate the validity of both lines of evidence.

Further, an evaluation of the irrigation potential of the overall system may be possible. This evaluation would not attempt to identify all the contemporaneous channels in the system, but would instead attempt to use water-discharge rates from the portion of the acequia system in the railyard to characterize the whole. Historical reports indicate that the entire flow of the Santa Fe River was occasionally required for irrigation use (e.g., Ackerly 1996:10). Acknowledging that both the north and south ditch systems drew water from the river, streamflow retrodictions for the Santa Fe River may therefore be used to estimate the minimum and maximum available historical water supply that was available to the acequia system. Comparisons of the overall volume of the water supply to the proportion of water that was transported through the railyard-area acequias may therefore hint at the overall system size. If the construction and abandonment dates of the railyard acequias can be determined, changes in the system potential may also be trackable.

> **Research Question 3.** *What do traces of remnant fields and diversion and dispersion features indicate about changes in irrigation, farming, or land tenure? Do technological changes in farming and irrigation practices correspond to a shift in core/semi-periphery interaction networks as political and economic administration and domination shifted from Spain to the United States? Is there evidence for crops or plant species and did crop selection change during the life of the field?*

These questions address changing irrigation and farming practices through time and in response to interaction with shifting cores. Irrigated farming was an important factor in the establishment, expansion, and sustainment of the settlements in New Spain and, more specifically, in Santa Fe.

Irrigation increased crop yields within an arable setting that could be described as marginal to moderate at best. Irrigation was also the key to successful introduction of Old World crops (especially wheat, vegetables, and fruit orchards) that were integral to Spanish subsistence economy. Land grants and allotments were based on the estimated land needed to support the extended family socioeconomic units that typified Spanish and Mexican communities, prior to the U.S. Territorial period. Farm land was distributed to allow families to survive, but there was limited allowance for surplus, and expansion of land holdings could only be effected through purchase or marriage.

Knowing how important land and water were to the traditional New Mexico family and community, there must be more to the picture that can add detail and dynamism to what is often presented as a monolithic system. Test excavations have revealed layered field remnants in the railyard (at LA 104102, Feature 2). The field contains water-worn artifacts that included Tewa polychrome sherds, suggesting that it might date to the nineteenth century. This was a critical time in Santa Fe, with the social and economic change brought by the Santa Fe Trail, U.S. victory in the Mexican-American War as codified in the Treaty of Guadalupe Hidalgo, and arrival of the railroads in the latter quarter of the century. Until the 1840s, farming technologies were labor intensive, incorporating limited hand tools and animal-powered implements. This technology was sufficient to cultivate the small tracts within and on the edge of the city limits.

With the opening of the Santa Fe Trail, access to more manufactured goods may have resulted in the use of more efficient or productive tools or implements in farming. However, it is likely that the average landowner or farmer would not have been sufficiently prosperous to afford such improvements. Therefore, aspects of field morphology or structure that suggest a more modern or technologically advanced farming method may signal a shift in land ownership or a shift in the relationship between the farmer and the land, such as from a vested farmer to a tenant farmer. A pattern of tenant farming has been documented for the north side of the Santa Fe River in the 1800s and it may have been a relatively widespread phenomenon (Ballesteros et al. 1985; Post and C. T. Snow 1992).

Furthermore, with the establishment and expansion of the railyard depot and grounds, most farming activities would have been terminated in the railyard. Farming within the railyard property may have effectively ended with the purchase of the Valuable Building Lots addition in 1878 (C. T. Snow 1995). Therefore, evidence for farming is most likely attributable to land use and ownership prior to the railroad.

Water-dispersion features were associated with LA 146407 and LA 146408, and possibly with LA 146410. As described in historical accounts, water-dispersion features such as headgates, drops, tap-boxes, and checks would have been made of stone or wood and earth, with more substantial feature construction occurring the twentieth century (Ackerly 1996:112). If the fields were abandoned by the railroad era, then it is likely that ancillary dispersion features would have been fairly rudimentary, piles of rocks, wooden gates, or earthen berms. The features identified by the testing fit this description, and may most likely to apply to the dispersal of water from sangrias into fields.

As recorded by nineteenth-century observers, the typical irrigation system had two mother ditches, numerous laterals, and sangrias or sub-laterals (Wozniak 1987; Ackerly 1996; D. H. Snow 1988). Spacing between the mother ditch and laterals was not systematic or regular, as is apparent in Figure 2.17 (D. H. Snow 1988), which is a schematic of the Santa Fe acequia system. However, some descriptions suggest that there could have been 18 or 30 m (60 or 100 ft) intervals between sangrias or laterals that corresponded to field dimensions (Ackerly 1996:19–22). Based on the network of ditches, historical observers consistently estimated that a farmer could irrigate, by hand, up to five acres per day. From this information, some projections can be calculated for the distribution of water diversion and dispersion features. Using five acres as a constant (consisting of 20,234 sq m, or 217,800 sq ft) and by dividing that irrigable land into 30 by 30 m (100 by 100 ft) or 929 sq m (10,000 sq ft) plots, then an estimated 22 plots could have been irrigated each day. Assuming a constant 30 by 30 m plot size for estimating the potential number of plots that might front a lateral or sangria, the number of potential dispersion or diversion features can be estimated.

Estimating the number of potential diversion features that might have been distributed along ditch segments can be useful for understanding the organization of irrigation and distributions that may reflect changing land ownership. The post cluster and cobble pile at LA 146407, near its junction with LA 146408, serves as an example of the type of remaining feature that may be found, if more have survived twentieth-century land modification. The number of potential features can be suggested for the four ditch segments using 30 m (100 ft) as a ditch-frontage constant. The LA 146407 segment is 145 m (475.72 ft) long, indicating that around five features could potentially be present, if fields were irrigated directly from this ditch. The LA 146408 segment is 50 m (164.04 ft) long indicating there may be one or two features potentially present. The LA 146410 segment is 130 m (426.51 ft) long indicating that around four features could potentially be present, if fields were irrigated directly from this ditch. The LA 146418 segment is 140 m (457.32 ft) long suggesting that four or five features may be present, if fields were irrigated directly from this ditch.

In addition to water-diversion devices, the three large ditches, LA 146407, LA 146410, and LA 146418, may be intersected by other buried laterals or sangrias. For instance, the145 m (475.72 ft) long LA 146407 segment might have as many as five sangrias along its length. These sangrias would also have the potential for preserved dispersion or diversion features. Finding additional laterals, sangrias, and diversion features would be important for understanding the scale and organization of farms at the time that Santa Fe and New Mexico were experiencing a shift in social and economic interaction networks during the late nineteenth century. While not impossible, it is unlikely that rudimentary features survive from the eighteenth century. Dating of these features may be difficult because they will lack temporally diagnostic artifacts, but factory-made components would help confirm a post-1821 date for their use.

The 790 sq m (8,503.50 sq ft) field remnant at LA 146402 (Feature 2) provides a unique opportunity to follow the irrigation system to its final destination. Test excavations revealed an aggraded field deposit cut by a series of sand-filled channels (Features 99 and 100 are excavated examples). In general, water from a sangria or lateral would have fed into these internal channels, distributing water across the field. In this case, the current configuration and channel elevations suggest irrigation directly from LA 146407, located 70 m (229.66 ft) to the south, or from an unidentified sangria originating from that ditch. Features 99 and 100 occupy different vertical levels within the field fill, indicating substantial accumulation of soil during the field's life span. Further excavation is expected to reveal a network of channels that reflect processes and activities associated with the final stages of water diversion and dispersion. For instance, the fact that both channels contained single-episode fill deposits may indicate an irrigation strategy that encouraged high-volume distribution and dispersal of water. This action would result in the destruction of evidence from earlier irrigation practices and the widespread deposition of water-rolled artifacts across the field and in the channels. The condition of the artifacts (e.g., stream-rolled) contained within the channels and field may provide an indication of the intensity and frequency of flooding.

Excavation of the field at LA 146402 will provide one example of a water-distribution strategy that involved diverting water to a field from a major lateral. Because no sangria channels were discovered during the testing, the implication for water distribution is that Feature 2 was watered from the Acequia de Analco (LA 146407). Should excavation confirm this observation, it would also suggest that in the past the southern boundary of Feature 2 was the Acequia de Analco channel, providing information on field dimensions that can be compared with historical accounts. Another line of evidence for determining the source and direction of Feature 2 irrigation is the flow direction and orientation of the internal channels. If water was diverted to Feature 2 from the Acequia de Analco and distributed within the field by internal channels, then the internal channel orientations should be consistent. Multidirectional orientation for the field channels would indicate different sources of irrigation and a change in field configuration through time.

Excavation of LA 146402 may yield archaeobotanical evidence for crop selection and changes in that selection during the field's use-life. Through pollen and phytolith study, different crop mixes may be discernible. Field crops such as corn, wheat, and alfalfa are expected in Feature 2 if the field is distant from the household location of its tenders. Orchard and garden crops might be expected if Feature 2 and the household location are close to one another, because orchard and garden crops would need more regular and aggressive monitoring for and mitigation of pest and animal infestation and consumption. Recovery of pollen from the different field levels may reflect changing crop strategies.

Research Question 3 Data Needs. Data required for this research may be obtained through additional mechanical and hand excavation. Primary data sources will be stratigraphic, morphological, and spatial information about the acequias, the field, and their subfeatures. The known existing features will be relocated and subjected to more detailed excavation and recording. Mechanical scraping along the edges of projected or exposed ditch alignments will be conducted to at least the depth that ancillary features are expected to be exposed. Hand scraping and sweeping of these mechanically scraped areas may expose articulated rock piles, wooden posts or postholes, and perhaps, additional sangrias.

Mechanical scraping of upper and lower field layers should provide a comprehensive map of the spatial layout of field features and their organization and relationship to nearby ditches and sangrias. Hand excavation of internal field channels will provide fine-grained information about the stratigraphy and the distribution of different strata that may result from multiple irrigation strategies. Hand excavation within the field deposits will also provide stratigraphic information about field-formation processes.

Recovery of archaeobotanical samples from field and channel contexts may provide information on changing crop selection and distribution. Pollen recovered during the test excavations yielded a single corn grain and an abundance of wild plant species, such as would populate a fallow or abandoned field (Wenker 2005a:Appendix 3). With the potential for severe environmental effects on pollen preservation and distribution, the use of botanical sampling will be guided by the quality of the contexts as determined by in-field observation.

Research Domain 2: Frontier Model for Social and Economic Acculturation: A Material Culture Study (James L. Moore)

The examination of Spanish sites in New Mexico has been moving out of the realm of pure historical studies towards more problem-oriented research for the past two decades. No longer is it enough to simply determine who lived at a site and when it was occupied. Documentary research and interviews with locals still remain critical aspects of Spanish archaeology, because they often provide information on site occupants, their social status, and when they lived there. However, rigorous examinations of artifact assemblages like those performed for prehistoric sites allow us to ask new questions. Records provide information on certain aspects of Spanish life in New Mexico, but critical data are often missing. Spanish wills and estate inventories list the most important belongings of people, but they rarely include the inexpensive yet extremely commonplace artifacts that are most often recovered from archaeological sites like chipped stone and locally made pottery. Studies of artifact categories such as these allow us to examine the process of acculturation in a frontier setting and track the changes that occurred as the frontier shifted or modes of transportation become cheaper and more efficient. We can also look at how social status and wealth affected these artifact categories. For example, studies of Spanish assemblages at St. Augustine, Florida have shown that the types of pottery used and the varieties of foods eaten varied according to social status (Deagan 1983).

This research design builds upon experience gained from earlier examinations of sites dating from the Spanish Colonial period to the early Railroad period at Abiquiu (Moore et al. 2004), Pecos (Moore 2003), Valencia (Akins 2001), Talpa (Boyer and Goodman n.d.), and near San Ildefonso (Moore

2001). Though all of the sites being examined by this project date to the later part of the Spanish occupation of New Mexico (Santa Fe Trail and Railroad periods, post-1821), the structure of their assemblages can only be understood in comparison with those of earlier and contemporary sites. In other words, without knowledge of the structure of assemblages from other Spanish sites in New Mexico it is impossible to discern the changes caused by disruption of economic and cultural systems as traditional patterns of commerce and daily life were altered by American influences. Similarly, it is also impossible to determine how these patterns were affected by the location of our sites in the economic core rather than on the frontier. By providing an extensive background on economic patterns throughout the Spanish occupation of New Mexico we are able to model changes in consumption and trade and how they may have affected the assemblages recovered from sites of various periods. This provides a context in which to model our expectations for the sites being examined by this study and to evaluate our findings.

Because this study is also structured as an examination of economic and cultural processes on a frontier, we provide background information on frontiers and the more general research questions. We then discuss how assemblages of artifacts recovered from Spanish components can help address the research questions.

Adaptations to the New Mexico Frontier

New Mexico was a frontier through most of its history, first to New Spain (1598 to 1821), then to Mexico (1821 to 1846), and finally to the United States (1846 to early twentieth century). Its role as a buffer between the silver-producing provinces of New Spain and later Mexico, and the Indians and the French on the plains shaped much of its history. New Mexico remained a frontier during these periods because of distance from other Spanish provinces, the cost and difficulty of communication and transport, and conflict with nomadic Indians. Though communication and transport costs decreased during the American Territorial period (1846 to 1912), and conflict with nomadic Indians ended in the late nineteenth century, New Mexico remained a frontier into the early twentieth century because of its small population and distance from centers of manufacture and consumption.

It should be noted that throughout this discussion the terms settlers and natives are used without regard to ethnic origin. People moving onto a frontier are settlers, while natives are the people who already live there. Most discussions of frontiers are concerned with historic or geographic processes, and are difficult to adapt to archaeological studies. Thus, a general discussion of frontiers is provided, followed by a model that attempts to apply these ideas to archaeological remains. Of particular interest to the model is the process of frontier acculturation.

The Frontier as Place and Process

Billington (1963) distinguishes between the frontier as a place and a process. As a place the frontier is "a geographic region adjacent to the unsettled portions of the continent in which a low man-land ratio and unusually abundant, unexploited, natural resources provide an exceptional opportunity for social and economic betterment to the small-propertied individual" (Billington 1963:25). By this definition, movement onto a frontier is an economic process, where individuals who lack wealth seek a chance to improve their economic situation. A frontier is also "the process through which the socioeconomic-political experiences and standards of individuals were altered by an environment where a low man-land ratio and the presence of untapped natural resources provided an unusual opportunity for individual self-advancement" (Billington 1963:25). Again, this definition views the frontier as an economic process where movement into a new environment caused changes in the settler's social, economic, and political systems.

Steffen (1980) criticizes this model, suggesting that it is not relevant to development of the American frontier past the first tier of states west of the Mississippi River. Rather than farmers struggling to tame the frontier, these later settlers were more closely linked to mercantile capitalism (Steffen 1980). Two types of frontiers are defined:

> Mining and ranching were essentially expeditionary frontiers while the farming frontier was more sedentary in its nature. On the expeditionary frontier there was an absence of a "settling" mentality. Individuals of the mining and ranching frontiers, while temporarily removed from "civilization," retained the value structure

> that they brought with them. On the farming frontier the settler often experienced an equal sense of removal from civilization, but he had no intention of returning. Individuals on the farming frontier were building their own civilization and in the process some of their original manners and customs were altered as an expedient to meet environmental circumstances (Steffen 1980:25).

Thus, while changes in the settler's social organization and structure, customs, and subsistence patterns might be expected on a farming frontier, they should not occur on an expeditionary frontier. While movement onto a farming frontier results in value transformations, this does not occur with movement onto an expeditionary frontier because it remains closely linked to the mainstream culture (Steffen 1980).

In his discussion of frontiers and boundaries, Kristof (1959:272) notes that "the frontier has, and always had, also a strategic meaning—the defensive line which keeps enemies out—and in this depends on support from the hinterland." Frontiers are areas of integration, representing a transition from one way of life to another, where traits from both are assimilated (Kristof 1959:273). As a place, New Mexico was a frontier that provided a chance for economic advancement while serving as a defensive buffer, first for the silver-producing provinces of New Spain and Mexico, then for the United States. As a process, the New Mexico frontier was a place where Spanish, Indian, and Anglo American cultures overlapped and adapted to one another, creating an amalgam that was neither wholly one nor another.

The degree of acculturation probably varied with wealth, the amount of interaction with other groups, and cultural biases. Rich individuals, particularly those of high social status, would be less likely to adopt the trappings of another culture, and more likely to try to preserve their traditional lifestyle. Poor people may have had no choice; partial assimilation of another lifestyle may have been necessary for survival. Such trends are demonstrated in the Spanish Colonial remains at St. Augustine (Deagan 1983). There, the proportion of aboriginal to European pottery decreased as economic status rose. Among the European wares, the proportion of British trade ceramics to Spanish majolica and earthenware also decreased as economic status rose. Thus, access to the more desirable traditional commodities improved with economic status, and they were selected over other available merchandise.

No matter how close or attenuated contact between natives and settlers was, cultural bias could cause the acceptance or rejection of specific aspects of the other lifestyle. Traits seen as superior or adaptive might be assimilated, while those viewed as inferior would be rejected. This is a two-way street—as settlers adapt to new environmental and cultural constraints, they will adopt native traits that are considered useful or necessary. In a similar fashion, the native population will adopt desirable traits from the settlers. However, there may also be a forced assimilation of economic, organizational, or religious traits, with settlers compelling natives to accept their ways.

Acculturation may also depend on the type of frontier being settled. It may act in both directions on a farming frontier, with settlers and natives assimilating adaptive traits from each other. Acculturation is more likely to be one-way on an expeditionary frontier. In that case, settlers should retain most of their traditional cultural baggage, while natives should absorb traits from them. This may be true of the late New Mexican frontier, where the Anglo-American population maintained close ties with the east.

The Frontier as a Dynamic Process

Because of the nature of expansion, frontiers are spatially and temporally impermanent (Lewis 1977:153). They change through time when events that occurred in the center of an occupied region are repeated on its periphery as the region expands outward (Lewis 1977:153). Chances for economic advancement decrease as frontiers become settled—unclaimed land becomes scarce and the best farming and herding areas are already occupied. New settlers begin to press beyond what had been the frontier in search of more economic opportunities. A new frontier is formed, and the earlier frontier becomes part of the core.

This process presumes a continually expanding society, which was certainly not the case in New Mexico. Expansion of the New Mexican frontier was usually hampered by lack of official aid and the presence of hostile Indians who resented and prevented that expansion. Thus, while the New Mexican frontier was dynamic, it did not follow the precise pattern of expansion that has been modeled for the early United States. From the beginning, the New Mexican frontier fulfilled two separate, and often antagonistic, roles—it was a missionizing frontier and a farming frontier. The missionizing function received official recognition and support, while the farming function seems to have been viewed as a necessary adjunct to the missions, but was considered to be of much less importance. Without official support and aid, the secular population of New Mexico was unable to expand out of the region that was already occupied by the various Pueblo villages. Thus, the New Mexican frontier was essentially stagnant during the early Spanish Colonial period.

As a farming frontier, New Mexico was an area of economic opportunity with attenuated contact with the core. According to Steffen (1980), this would have caused changes to the basic structure of Spanish society in New Mexico as the populace grappled with the need to modify custom, behavior, and subsistence patterns, while at the same time struggling to retain as much of their traditional culture as possible. In essence, they needed to absorb some of the native culture in order to adapt and survive. The re-establishment of the New Mexican colony after the Pueblo Revolt ended the missionizing function of this frontier, but it remained a farming frontier as a mostly new population moved in and built farms, ranches, and settlements. The missionization function was replaced by a defensive purpose at this time—New Mexico became a defensive frontier, protecting the more prosperous provinces to the south from the depredations of Athabaskans and Plains Indians.

Although New Mexico was a frontier to New Spain and Mexico, when viewed as a discrete spatial entity it was itself comprised of core and frontier. The core was the area containing the capital at Santa Fe extending south along the Rio Grande into the Rio Abajo where most of the population and wealth were concentrated. The frontier was the zone that surrounded the core and, to some extent, protected it. The frontier represented a chance for economic advancement, and was settled by people who were willing to leave the relative safety of the core in search of land or wealth. Attempts at expansion during the Late Spanish Colonial period were pretty much continual but were not always successful, and at times were only temporarily successful.

This process is illustrated by movement into the Chama Valley (Quintana and D. H. Snow 1980). The first settlements in that area were small, scattered homesteads. Rather than community grants, early settlers built on individual allotments and may have used the valley seasonally for livestock grazing before formal grants were acquired. Occupancy became year-round as the region developed; more substantial homes were built, and multifamily plazas began to appear. This was a rapid process—the first individual grant was approved in 1724 and the first community grant in 1734 (Carrillo 1988; Quintana and D. H. Snow 1980). Conflict with nomadic Indians caused a temporary abandonment of Spanish settlements in the Abiquiu area in the mid-1700s, and kept the frontier from expanding beyond that region until late in the Spanish Colonial period. Initially, the village of Abiquiu was an outpost on the edge of the frontier settlement zone. It stopped serving as an outpost and became a supply center when herders and later farmers pushed beyond to develop lands to the north and west (Van Ness 1987).

Thus, the location of the New Mexican frontier was variable during the Spanish Colonial periods, changing as areas on the fringe of the Spanish-occupied zone were settled or abandoned. The entire territory was a frontier during initial colonization. Later, a core area developed and expanded as the frontier was pushed outward by those seeking economic improvement. A lack of official support hindered this expansion, causing it to proceed slowly and suffer continual setbacks. This process underwent radical change as the United States came into close contact with New Mexico in 1821. Suddenly New Mexico was on the U.S. frontier, and now represented an area that could be exploited for economic gain by American merchants.

The frontier process in New Mexico was even more complex after 1821, because New Mexico essentially became at least two types of frontier at once. For the Republic of Mexico, New Mexico remained a buffer zone between the rich silver-producing provinces to the south and perceived threats from Plains Indians and American entrepreneurs. To the United States, New Mexico became an expeditionary frontier, except that instead of mining and ranching the main draw was mercantile capitalism. Because of this, the American presence was mostly transitory at first. Merchants might stay in New Mexico for a season or a few years, but most eventually returned to their homes in the east. Those who did remain often married local women and became part of New Mexican society—though they often retained many of the customs with which they had arrived.

This was partly because the American traders quickly realized that the real profits to be made were in Mexican provinces further to the south, where cash was available and demand for their goods was high. Owing to the lack of ready cash and general poverty in New Mexico, that market was quickly saturated with American goods and the demand was never high enough to support all of the American traders, forcing them to try to make a profit in Mexico. Farmable land was also at a premium in New Mexico because of its long history of settlement. These factors initially made New Mexico more attractive to entrepreneurs than to settlers, hence its development as an expeditionary frontier rather than a farming frontier.

The process of American settlement in New Mexico began when trappers started filtering into the region. These were men who were seeking economic opportunity, but tended to adapt by acquiring characteristics of the people who were already living in the region they were exploiting. There were also traders involved in the initial wave of American settlement of the northern Southwest, like the Bents who opened a trading post just beyond Spanish territorial boundaries. Movement onto the New Mexican frontier increased after the province was acquired by the United States in 1846. New Mexico became a true expeditionary frontier at this time, as settlers from the United States began to open mines and establish ranches. These settlers considered both Spanish and Indians to be the native population. Thus, the position of the Spanish inhabitants of New Mexico was suddenly reversed—they were in the same position vis-à-vis the American settlers as Pueblo and other Indians had once been to them. Political and economic power had shifted hands, and they no longer completely controlled either. The process of acculturation began once again as both natives and settlers strove to adapt to these new conditions.

Socioeconomic and Cultural Change on Frontiers

Social change accompanies movement onto frontiers, and settlers often suffer a sudden loss of sociocultural complexity because of the attenuation of economic and social contact between frontier and core area (Doolittle 1973; Lewis 1973, 1977). Even so, Lewis (1977) suggests that settlers must maintain a higher level of sociocultural complexity than natives, and Casagrande et al. (1964) feel that settlers must possess technological superiority over natives, as well as a power advantage. Communication between frontier and core are important, and a continuity of tradition with the parent culture is maintained (Casagrande et al. 1964). Doolittle (1973) distinguishes between Colonial and pioneer societies. Colonial societies are almost completely dependent on the parent culture for economic and technological support, while pioneer societies are largely self-sufficient. These differences are relative, and may be a function of communication and transportation speed.

The early Spanish settlers formed a pioneer society in New Mexico. Because of the distance between New Mexico and the core in New Spain and the difficult nature of transportation and communication between the New Mexican frontier and the Mexican core, the Spanish settlers in New Mexico were forced to become largely self-sufficient. American settlers, on the other hand, formed a Colonial society, and remained almost entirely dependent on the United States for their economic and technological support. Of course, neither of these situations was an absolute—Spanish settlers depended on New Spain for goods they could not supply for themselves, and American settlers had to make do with some local products rather than receiving everything they needed from the United States. Still, differences in how New Mexico was settled by Spanish and Americans provide an excellent illustration of the dichotomy between pioneer and Colonial societies.

Frontier societies must be adaptable. Because of the difficulties involved in transportation and communication, many goods may not be available for long periods of time, the delivery of goods may be unreliable, or the cost of transport may make them so expensive that they are affordable by only a small part of the population. When this situation prevails there may be a reverse acculturation—rather than natives adopting the settlers technology, settlers may be forced to adopt native technologies. Because the Spanish colonists of New Mexico comprised a pioneer society, there is evidence that they adopted some native technologies and ways to supplement or replace goods that were economically unavailable to them (Levine 1990; J. Moore 1992).

While frontier models consider adaptational changes in settlers, they are generally silent on corresponding changes in native societies. Obviously, native societies must adapt to the presence of settlers in their midst, and it is necessary to examine these processes before frontier adaptations can be understood. Native responses to settlement by outsiders should be conditioned by a number of factors including:

1. The degree of technological superiority displayed by the settlers.
2. The amount of social and economic interaction occurring between the groups.
3. Communication and transport costs between core area and frontier.
4. Cultural and political attitudes of one group toward the other.
5. The amount of sociocultural disruption caused by contact between settlers and natives.
6. The economic status of natives vis-à-vis settlers.

If settlers have little organizational or technological superiority over natives and there is no perception of an advantage to be gained by their presence, there may be an outright and hostile rejection of the settlers. The movement of Americans onto the northern Plains is an example of this process. European contact with this frontier was based on the fur trade until the early 1800s, operating according to customs that were violated by Americans who began entering Indian lands to hunt and trap in addition to trading (Swagerty 1988:363). Indians allowed trading posts to be built under the economically advantageous conditions of the early fur trade (Swagerty 1988). Their culture underwent significant changes in adapting to this economy, but those changes did not include accepting the presence of permanent settlers. The end of the Mexican War in 1848 brought a surge in westward movement, which was accelerated by the discovery of gold in California and the end of the Civil War (Utley 1988; Winther 1964). Resentful of the foreigners moving onto their lands, the Plains Indians unleashed a devastating campaign to drive them out. Among the factors that probably contributed to hostilities was a perception that the invaders were not militarily superior (frontier defenses were weakened by the Civil War) and there was no advantage to be gained by allowing them to remain.

Overwhelming technological or organizational superiority can result in an initial acceptance of settlers; however, if the deficits associated with colonization outweigh the benefits, organized resistance may eventually occur. Success or failure are dependent on the degree of technological or organizational superiority possessed by settlers. Initial Spanish settlement of New Mexico met little or no organized resistance (Bannon 1963; Sando 1979). However, as the deficits associated with this occupation became clear, a rebellion was organized and the Pueblos were able to displace the settlers for twelve years (Sando 1979; Simmons 1979b). Similarly, the invasion of New Mexico by the United States during the Mexican War met with little initial resistance, but within a year a rebellion broke out that was ruthlessly put down, demonstrating the military superiority of the new colonial power.

The acculturation of settlers and natives to one another depends on the amount of contact occurring between the groups. This is tempered by the cost of communication and transport between frontier and core, and the cultural and political attitudes of one group toward the other. When settlers form elite enclaves and choose not to mix with natives except under controlled conditions, contact is severely limited. While acculturation can occur, it may be slow and selective. Natives might adopt desirable aspects of the settlers' culture, but the settlers will maintain close ties with their core and assimilate little of the native culture. However, as communication between frontier and core becomes more difficult and expensive, the amount of native material culture assimilated by settlers should increase. If natives reject the settler's culture passively rather than overtly, settlers might still be restricted to enclaves and natives may adopt few traits other than the goods they find desirable. The former process is illustrated by the British colonization of India and the latter by European attempts to establish colonies in China.

These processes can be affected by the amount of sociocultural disruption caused by contact between settlers and natives. This is best shown by early European colonies in the New World. Spanish settlers possessed little technological or organizational superiority over the native imperial powers of Mexico and Peru, yet small groups of adventurers were able to prevail over these powerful nations. In both cases, the appearance of Spanish settlers on the scene disrupted the balance of power and introduced new diseases to which the natives had no immunity. In Mexico, Cortez was able to exploit dissension between the Aztecs and their vassal states and enemies, using the latter to cause the downfall of the former (Bray 1968; Cantu 1966). Aztec resistance was seriously affected by an outbreak of smallpox, which reduced the leadership as well as the general populace (Bray 1968; Cantu 1966). Smallpox also contributed to the Spanish conquest of the Incas in Peru by devastating the population before Pizarro's arrival (Hyams and Ordish 1963). The Inca ruler was one of the victims of this epidemic, setting in motion events that culminated in a bitter civil war as two of his sons fought for the throne (Hyams and Ordish 1963). Pizarro was able to exploit these conditions, and several distant provinces eventually allied with him, seizing the opportunity to rid themselves of Inca rule. In both cases, extreme disruptions caused by the introduction of new diseases and alliances with an outside power contributed to the defeat of nations that should have been able to resist the colonial efforts of foreigners under more favorable conditions.

Interaction between natives and settlers and the adoption of aspects of each culture can be conditioned by wealth and proximity. Rich individuals have fewer reasons to interact with the other population than do poor people—they can always hire others to act as go-betweens. Thus, as economic status increases, direct contact with the other population may decrease; conversely, as economic status decreases, interaction with the alien group may increase. Wealth also allows some individuals to better maintain the outward trappings of their traditional culture, or to acquire those of another culture. Thus, wealthy settlers are able to maintain their traditional material culture, while wealthy natives can more easily acquire the settlers' material culture. A similar differentiation should occur at the lower end of the economic scale. The greatest degree of acculturation to native customs and material culture should occur among poor settlers. Economically, they are less able to maintain their traditional material culture, and more prone to adopt aspects of native culture that enhance their prospects for survival. Conversely, the least amount of acculturation in the native population should occur among poorer individuals, who are forced to maintain their traditional material culture because they can't afford to acquire that of the settlers.

While the sites examined by this project can provide little or no information on the acculturative effects of Spanish colonists on Pueblo natives of northern New Mexico, they will provide data on the acculturative effects of American settlers on Spanish natives. As discussed above, the level of Spanish acculturation to Anglo-American ways was tempered by economic and social status. Wealthy Spaniards could find it easier to adopt Anglo-American ways, while poor Spaniards might find it difficult or impossible to do so. However, wealthy Spaniards might also be able to maintain the trappings of traditional Hispanic life in New Mexico, while their poorer neighbors might not be able to do so. Both possibilities must be kept in mind when examining this question.

Applying the Frontier Acculturation Model to Santa Fe and New Mexico

Santa Fe Railyard test excavations identified four sites with refuse-filled features or deposits that can be analyzed with, but also be a test of, the Frontier Acculturation model. The sites are LA 146402, Features 2 (field), 8 (refuse pit), 11/55 (midden), 29 and 34 (unknown pits), and 49 (privy); LA 146405, Feature 68 (refuse pit); LA 146412, Features 66 and 72 (refuse pits); and LA 146413, Features 91 and 92 (refuse pits). These features contain artifact-bearing deposits from the late Spanish Colonial- to post-World War II-periods (1790 to 1950).

The artifact assemblages recovered by this project will be incorporated into ongoing research that began at Santa Rosa de Lima (LA 806), La Puente (LA 54313), and the Trujillo House (LA 59658) near Abiquiu, the Pedro Sánchez Site (LA 65005) near San Ildefonso, the José María Martínez Site (LA 99029) near Pecos, and the Vigil-Torres Site (LA 77861) at Talpa. These Spanish sites were all mainly occupied between 1740 and 1900, and were all essentially on the New Mexican frontier. Profound variation in material remains from Spanish Colonial and later occupations has been found, reflecting differences in access to goods resulting from changing frontier, trade, and transportation patterns. Although general access to manufactured goods was poor during the Spanish Colonial period, the situation was particularly dismal on the New Mexican frontier. Few artifacts of distinctly European manufacture were found in Spanish Colonial deposits at Abiquiu and the Pedro Sánchez Site. Instead, those assemblages indicated heavy trade with local Indians for certain commodities, and some adoption of native technologies. Santa Fe Trail- and Railroad-period deposits demonstrated a different orientation. Dramatically improved access to manufactured goods occurred after 1821 and particularly after 1880 when the railroad arrived, and was associated with decreased reliance on native technologies.

Data from Spanish and American/railroad components will be used to address two types of questions. The first concerns general economic trends in New Mexico and how they varied according to transport efficiency, access to manufactured goods, and position on the frontier or in the core. The second type is more specific, and explores the kinds of information available from specific classes of artifacts. It is expected that artifact assemblages recovered from the four sites (with at least eleven field, midden, and pit features) will be used in addressing all of the following research questions proposed by this study.

The main question that will be addressed is rather simple, but its implications are complex. Succinctly stated, this question is: *What can these archaeological remains tell us about the process of acculturation on the Spanish and American frontiers?*

Access to manufactured goods was limited in Spanish Colonial and Mexican Territorial times by distance to market, lack of money or trade goods, and dangers associated with moving goods to Santa Fe and from there throughout the territory. Thus, many important commodities had to be done without or replaced. Though the situation improved somewhat with the opening of the Santa Fe Trail in 1821, transportation remained difficult and imported goods continued to be comparatively expensive for poor people to acquire. Replacement of imported goods was accomplished in two ways—trade with nearby Indians, and local manufacture of substitutes. Previous studies have focused on two areas of substitution—ceramics and chipped stone tools. These types of substitutes are initially adopted as replacements for manufactured goods that are difficult to acquire and/or expensive. They may eventually become part of the cultural repertoire—the substitutes may become traditional cultural goods that are retained even when manufactured goods are again abundantly available and inexpensive. Thus, local earthenware vessels may be retained for some purposes long after their manufactured counterparts become widely available. Similarly, some chipped stone tools, such as strike-a-light flints, may be retained long after they are no longer needed. If cultural in addition to economic factors are at work, some evidence for the continued use of the substitutes may therefore occur long after they are expected to disappear.

These processes may have been tempered by the position of a household in the economic and social core or on the economic periphery. Substitutions may have been more commonly used as distance from the economic core increased. This would have been due to increased difficulty and cost in acquiring and transporting goods away from the economic center to the periphery. These difficulties could be tempered by wealth, but poor people living on the economic periphery should have been less able to obtain manufactured goods than their counterparts in the core. Similarly, as manufactured goods became more easily obtained with improvements in supply and transportation systems, their substitutes should have begun disappearing earlier and more rapidly in the core. Residents of the economic periphery would have found it more difficult to replace the substitute goods they had been dependent on with manufactured items. Indeed, conservatism on the frontier could have also led to the retention of some substitutes as traditional cultural items after they had essentially disappeared from use in the core, except perhaps among the very poor who remained without other options.

Research Questions (Research Domain 2)

> **Research Question 4.** *How did the location of our sites in the economic core affect the use of substitutes for imported manufactured goods? Ceramics were more important in Spanish colonies than they were in British colonies. Spanish assemblages from Florida and New Mexico are*

dominated by kitchen activity-related remains, which in turn are distinguished by a preponderance of ceramic artifacts (Boyer 1992; Deagan 1983; Moore 2003; Wiseman 1992). Local manufacture of ceramics is generally presumed to mean production by Indian potters. While D. H. Snow (1984) admits that pottery making by genízaros or mestizos was a possibility, he feels that Pueblo and Athabaskan potters dominated the manufacture of this commodity in New Mexico because pottery-making was a very low status occupation in the New World, and was only undertaken by a Spaniard in dire need of economic support. Thus, Snow completely rejects Hurt (1939) and Hurt and Dick's (1946) arguments for a Spanish ceramic tradition, even though evidence was found for pottery manufacture at Spanish Colonial sites at Cochiti Reservoir (Warren 1979a).

In contrast, Carrillo (1987, 1997) asserts that a well-established Spanish ceramic tradition did exist from a fairly early date. Ceramics produced by Hispanic (or Hispanicized) potters are similar to those made by Pueblos and Athabaskans, but are in many ways distinguishable from them. Similarities in decorative style and manufacturing techniques suggest that pottery-making skills were acquired from local Indians, and represent the process of acculturation.

If Hispanic pottery manufacture did occur it was probably more common on the frontier than in the core. The isolated nature of frontier villages, their lack of wealth, and transportation difficulties may have combined to make ceramic production a necessity of frontier life. The opposite may have been true in the core where comparatively more wealth, easier access and transport, and more concern for the outward trappings of social status probably united to severely limit Hispanic ceramic production. In considering the category of locally produced earthenware, the proportion of Indian- to Hispanic-manufactured pottery was probably higher at core area sites than at those on the frontier. Since the sites being investigated by this study were firmly located in the core, we should find little or no evidence for the manufacture or use of Hispanic manufactured pottery in their assemblages if these ideas are correct. Under these conditions, the vast majority (if not all) of the locally manufactured earthenware recovered from these sites should be of Pueblo manufacture. Comparisons can be made with assemblages from contemporary Spanish sites located on the frontier to determine whether this is visible archaeologically.

While Hispanic pottery manufacture may have occurred sporadically during the Spanish Colonial periods, a review of the pottery-producing Spanish villages listed by Carrillo (1997) suggests that most Hispanic pottery manufacture occurred after 1821, the beginning of the Santa Fe Trail period. Thus, this phenomenon may have had economic roots. Economic disruption caused by trade over the Santa Fe Trail may have further impoverished the Spanish lower classes, forcing some to seek alternative means of acquiring needed goods. At the same time, the Pueblos were no longer totally dependent on Spanish merchants for manufactured goods, perhaps increasing the price of their pottery or decreasing the amount manufactured. This would have provided an entry into a craft that could generate some income, yet had not been heavily exploited by the Spanish before this time. Thus, Hispanic pottery manufacture, as a cottage industry, may be closely linked to the expansion of trade networks and the resultant disruption of the traditional system associated with the opening of the Santa Fe Trail. If economics outweighed social strictures, we could see evidence of Hispanic pottery manufacture and use even in the core. Should evidence for this be found in our assemblages, it will be necessary to try to identify which sector of Spanish society was involved in the manufacture of pottery. Were these potters disadvantaged Spaniards, suffering from economic dislocation caused by the opening of trade over the Santa Fe Trail, or could they have been more marginal groups like the genízaros, who also would have suffered from the same type of dislocation? Was Hispanic-manufactured pottery imported from more marginal frontier areas to replace or augment supplies of Pueblo pottery, or was it made locally in the core? Answering these questions will probably be beyond the scope of this study, but some pertinent data might be available from our analyses. However, as noted above we expect to recover little if any Hispanic manufactured pottery from these sites, reflecting their location in the economic and social core.

Chipped stone artifacts are common at Spanish sites in the Southwest, and tend to reflect an array of activities including fire-making, hunting/warfare, and the manufacture and maintenance of tools made from perishable materials (J. Moore 1992). The ubiquity of this artifact class at Spanish sites dating from the Early Spanish Colonial period through the early Railroad period is evidence that chipped stone artifacts are not necessarily indicative of Historic Pueblo or Plains Indian occupations, nor is their presence in so many assemblages evidence of earlier occupations or contamination from nearby prehistoric sites. The association of chipped stone artifacts with Spanish occupations is demonstrated by the presence of tool types indicative of fire-making activities mixed with debitage, cores, and occasional formal tools in stratified deposits at confirmed Spanish residences. Use of chipped stone tools by Spaniards in New Mexico was undoubtedly related to the shortage and high cost of metal tools, and the irregular and undependable supply system. Chipped stone tool manufacture and use appear to represent the assimilation of native technology to supplement or replace metal tools.

It should be noted that lithic technology was not absent from the traditional Spanish lifestyle—gunflints and strike-a-light flints were integral components of firearms and fire-making kits. However, chipped stone tools were not normally used for other purposes. The use of other varieties of chipped stone tools is probably attributable to acculturation, and their substitution for metal tools was undoubtedly conditioned by wealth and access. Such substitutions are expected to have been considerably more common on the frontier than in the core.

Two factors should affect the types and numbers of chipped stone tools recovered from the sites being investigated by this study—period of occupation and location in the core. Because these sites appear to date to the Santa Fe Trail and Railroad periods, they should reflect the greater availability of manufactured goods imported from the eastern United States. With metal tools becoming more easily acquired and less costly during these periods, reliance on substitutes for these goods should decrease. Thus, chipped stone tool use should have declined and eventually disappeared. This process probably occurred more rapidly in the core, so Spanish assemblages from Santa Fe should contain comparatively fewer chipped stone tools than contemporary sites on the frontier. Sometime after the turn of the twentieth century, chipped stone tool use should completely disappear.

Research Question 5. *How did the location of these sites in the economic core affect the availability of imported manufactured goods? Studies of the Spanish economy in New Mexico between the Early Spanish Colonial and Railroad periods have shown that the availability of imported goods varied by the transportation routes and systems being used (Moore 2001, 2004). To summarize, we can see that imported goods comprised very small percentages of Spanish Colonial period assemblages, with percentages actually decreasing in the Late Spanish Colonial period (1.6 percent) when compared to the Early Spanish Colonial period (2.9 percent). The opening of the Santa Fe Trail dramatically improved the availability of imported goods, and this is reflected by the percentage of imports found in assemblages from this period—11.4 percent, representing a more than 700 percent increase over the Late Spanish Colonial period. The arrival of the railroad in New Mexico represented a huge increase in transportation efficiency and a corresponding decrease in shipping costs. This resulted in an average 300 percent increase in amounts of imported goods occurring in Spanish assemblages from the early Railroad period, to 37.6 percent.*

Similar trends should be seen in assemblages from the sites being studied by this project—significant increases in proportions of imported goods should occur in Railroad-period assemblages when compared to Santa Fe Trail-period assemblages. Other trends should also be visible when assemblages from Santa Fe are compared with those from the economic periphery. Goods imported from the eastern United States were delivered to Santa Fe and distributed from there throughout New Mexico during most of the Santa Fe Trail period. This should be reflected by larger percentages of imported goods in Santa Fe assemblages when compared to those from the economic periphery. Though there were more distribution points for goods in the Railroad period, we still expect Santa Fe assemblages from this period to contain larger percentages of imported goods than contemporary sites on the economic periphery, reflecting Santa Fe's role as the center of society and government. Percentages of locally manufactured earthenware and chipped stone tools should decrease in proportion to imported goods through time, essentially disappearing sometime after the beginning of the twentieth century, though just when this should be has not yet been established.

> **Research Question 6.** *How did patterns of faunal use change in the Santa Fe Trail and Railroad periods? As Anglos from the east began moving into New Mexico, they affected meat-use patterns by introducing new consumption and butchering patterns (Crass and Wallsmith 1992).*

Traditionally, New Mexicans mostly consumed sheep and goat meat, with some beef also being used but in lesser quantities. Wild game was consumed, but not commonly. Butchering was accomplished using axes and knives rather than saws, and meat cuts differed from those that were traditionally produced in the eastern United States (Akins 2001). As meat began to be butchered and sold commercially, we expect to see Spanish consumption patterns change to reflect these new conditions. More pork, beef, poultry, and fish should occur in assemblages displaying Anglo tastes (Crass and Wallsmith 1992), corresponding with less reliance on goats and sheep. Consumption patterns in the Santa Fe Trail period are mostly expected to reflect traditional Spanish meat use, though with the addition of some nontraditional meats reflecting their increased availability. The most significant changes are expected to occur in the Railroad period as improved transportation systems made the shipping and acquisition of nontraditional meats easier and cheaper.

The way in which meat was butchered should also change over time. Saw-cut meat portions are expected to increase through time as less butchering was accomplished at home in the traditional manner. These changes may begin to occur in the Santa Fe Trail period, though traditional butchering patterns should still prevail until the Railroad period. Saw-cut meat should become more and more common in the Railroad period, until it finally replaces axe and knife butchering as store-bought meat replaced home-butchered meat. Faunal remains may also become less common when store-bought meat began to predominate. Elements from skeletal sections that provide little or no meat should begin disappearing from assemblages. Rather than entire skeletons being represented, the range of elements should become quite restricted, reflecting the types of cuts available in mercantile establishments.

These processes may occur earlier in the core than on the economic periphery where traditional meat consumption and butchering practices may have been preserved longer either out of economic necessity or cultural preference. By comparing faunal assemblages from contemporary Spanish sites on the economic frontier with those investigated by this project, we may be able to see how the influence and demands of immigrants from the eastern United States affected Spanish meat consumption and butchering patterns in the core and how that might have differed from the periphery.

Test Implications

By contrasting assemblages from the historic sites examined by this project with those from other Spanish sites in New Mexico it may be possible to isolate variation attributable to occupation of the economic core versus settlement on the frontier or economic periphery. If our assumptions are correct, several propositions should hold true:

1. Evidence of variation in wealth and degree of access to manufactured goods should result in a higher proportion of European goods to locally produced goods at sites in the core versus those on the frontier in all time periods.

2. As improvements to transportation and delivery systems occurred, there should be corresponding increases in percentages of imported goods found in Spanish assemblages. This process should become visible earlier in the core than on the frontier.

3. As pottery manufactured in the eastern United States or Europe became more easily acquired and cheaper with improvements in transportation systems, the traditionally used wares including majolicas and local earthenware should begin to decrease in assemblage percentages. By sometime in the Railroad period, majolicas and local earthenware should mostly disappear from assemblages. This process should begin occurring earlier in the core than on the frontier.

4. Within the category of locally manufactured earthenware, the ratio of pottery made by Hispanic potters to that produced by Indians should be higher at sites on the frontier than at sites in the core.

5. The effects of acculturation to Anglo consumption patterns should be visible in the types of meats eaten and butchering techniques used. Spanish households in the core should begin displaying patterns similar to those of the eastern United States by the late Santa Fe Trail period, and certainly by the Railroad period. This process should have occurred at a slower pace on the economic periphery, with traditional Spanish consumption and butchering patterns lasting longer and, perhaps, never completely disappearing.

6. Chipped stone tools other than gunflints and strike-a-light flints should be more common at frontier sites than at sites in the core. They should be replaced by their imported counterparts earlier in the core than on the economic periphery.

The model can be tentatively accepted if these propositions are upheld. If they are not, three possibilities must be considered: 1) the model is incorrect, 2) the variables being studied are not sensitive enough to measure the processes we have modeled, and 3) few changes in consumption patterns resulted from the opening of the Santa Fe Trail and the arrival of the railroad, with the retention of traditional material culture patterns because of cultural rather than economic factors. If the model is wrong, factors other than variation in access to manufactured goods and distribution of wealth may be responsible for the ability to acquire imported goods, and other acculturative processes must be considered. If the variables are not sensitive enough to measure the acculturative effects of residence on the frontier versus the core, the possibility that they are controlled by more general conditions must be considered. In other words, it is possible that they reflect life on the general New Mexican frontier rather than differentiation between a local core and frontier, and thus represent the acculturative process at a coarser-grained level.

Transport cost and difficulty are important aspects of frontier acculturation. Settlers are more prone to embrace aspects of a native adaptational system when it is difficult and expensive to acquire goods from the parent culture. Attenuation of contact with New Spain caused Spanish settlers in New Mexico to adopt aspects of native culture as noted earlier. New Mexico was a farming frontier during the Spanish Colonial- and Mexican Territorial–early Santa Fe Trail-periods, and some alteration of traditional customs was necessary to meet environmental circumstances (Steffen 1980:25). Trade over the Santa Fe Trail improved the supply of manufactured goods in New Mexico and may have caused prices to drop somewhat. Still, imported goods remained relatively expensive, especially for the poorer strata of society on the frontier.

New Mexico was primarily an expeditionary frontier during the American Territorial period (Steffen 1980). Most settlers from the east came to exploit the frontier while retaining their traditional value structure. The arrival of the railroad in 1880 caused the movement of manufactured goods to become much more efficient and less expensive. Settlers would be expected to assimilate few aspects of native material culture under these conditions, and natives would be expected to acquire more aspects of the settler's material culture. Thus, we should see major changes in traditional Spanish consumption patterns through time, which should eventually become nearly indistinguishable from those of their Anglo neighbors. This process should be visible at an earlier date in the economic core than on the periphery.

Access to manufactured goods should have changed as transport became more efficient and associated costs decreased. Transport efficiency was never high in Spanish Colonial times, and may have decreased during the Late Spanish Colonial period as the large wagons used during the early part of that period were replaced by mule trains. Transport efficiency and the availability of manufactured goods increased greatly between 1821 and 1825 as trade over the Santa Fe Trail became established. The arrival of the railroad marked another leap in transport efficiency and the availability of manufactured goods. Amounts and types of manufactured goods in Spanish sites should vary according to the type of transport system in use and the position of a site on the frontier or in the core. Sites in the core should display evidence of better access to manufactured goods through at least the early Railroad period. Most Spanish sites occupied during the Santa Fe Trail period should contain higher percentages of manufactured goods than those dating to the Colonial periods. The types of manufactured goods present should reflect a mixture of Mexican and U.S. sources until at least 1850, after which time the latter should dominate.

These trends may be affected by wealth. People who possess money, whether living on the frontier or in the core, should have had greater access to manufactured goods than people from the lower economic strata who would have had less access to those goods, no matter where they lived. Thus, some idea of the relative economic status of site occupants may be necessary for an accurate assessment of these trends.

Research Question 6 Data Needs. The data needed to test our ideas on acculturation and economy will be derived through analysis of various artifact assemblages. Examination of local earthenware should provide information concerning what cultural group(s) produced the pottery used at these sites. In particular, the analysis will attempt to distinguish pottery made by Pueblo or Athabaskan Indians and that which may have been manufactured by Hispanics. Chipped stone artifact analysis will focus on reduction technology and tool-use patterns to help determine the range of activities in which stone tools functioned, and whether they were produced on-site or procured elsewhere.

Questions concerning the availability and sources of manufactured goods will be addressed using the Euroamerican artifact assemblages. While it may be difficult to distinguish Mexican glass from that produced in the eastern U.S., ceramic artifacts from these sources are usually easily differentiated. This artifact category also provides important temporal data, which can be used to augment documentary and informant sources.

Other data sets can be used to amplify the results of these analyses, and to provide general information concerning Spanish life in New Mexico. Botanical samples should demonstrate that domesticates dominated the array of plants and animals exploited for food. The identification of plant species recovered from flotation samples will provide information on the range of plants used as well as the relative importance of various domestic and wild species. This analysis may also provide information on changes in farming and consumption patterns that accompanied the entry and eventual domination of eastern goods in the local economy. Little is really known about the importance of wild plants in the traditional Spanish economy (Toll 2004), so it is difficult to predict patterning. However, analysis of charcoal from the Abiquiu area showed that Spanish use-patterns differed from those of the Pueblos, with a narrow range of conifers being preferred for firewood over a broad range of locally available trees and shrubs (Toll 2004). Documentation of the use of some native plants for economic purposes may occur, and could be evidence for the adoption of native traits by the Spanish on a farming frontier, and their retention as the region became an expeditionary frontier to the United States.

Animal bone should provide information that will be a valuable aid in testing the model. Spanish faunal remains consistently reflect the use of domestic species for food. Deviance from this pattern can be particularly significant. In St. Augustine, use of domestic versus wild fauna varied according to social and economic status (Reitz and Cumbaa 1983). High status households used a wider range of domestic as well as wild animal species; middle class households mostly exploited domestic animals for food, but there was some use of wild terrestrial species; lower class mestizo households followed the aboriginal pattern of exploiting a wide variety of species, modified to some extent by use of domestic animals (Reitz and Cumbaa 1983:166). Thus, the variety of wild and domestic species in an assemblage can be used to support arguments concerning the economic status of households and their level of access to manufactured goods. Butchering marks can also indicate whether metal or stone tools were used by site residents. Use of the latter would be evidence for the substitution of native tools for traditional goods that were difficult and expensive to acquire.

Mainly, however, the types of species consumed as food, butchering patterns, and element distribution patterns should provide information on the process of Spanish acculturation to Anglo culture. Traditional use patterns may have already begun to disappear when these sites were occupied, especially with their location in the economic core. Thus, faunal assemblages will be compared with those from earlier sites in the core and on the frontier in order to determine whether acculturation in foodways can be demonstrated. At least some evidence for this type of acculturation is expected.

Temporal control is critical to this analysis. Several methods will be used to provide accurate dates. Most accurate would be documents that establish occupational spans. Diagnostic artifacts can also be used to estimate periods of occupation. Other chronometric data may be collected, but will have limited use. Radiocarbon and tree-ring samples can help establish an occupational date, but problems develop when wood salvaged from abandoned structures was reused. This problem was encountered at La Puente (Boyer 1992), and suggests that radiocarbon and tree-ring dates are acceptable only when corroborated by other data. Thus, these methods have limited utility for dating historic sites where more accurate methods of establishing temporality are available.

By focusing on the patterning of Euroamerican goods, locally manufactured ceramics, faunal assemblages, and chipped stone artifacts, and comparing analytic results with those from other studies of Spanish sites, an idea of the degree of assimilation into the American economy may be obtained. Data recovered from studies of floral remains should corroborate these results. Temporal data and documentary information are necessary to establish the comparability of these remains with other sites from New Mexico, and to place them in the proper historical setting.

Analysis of assemblages from four sites which testing suggested have the potential to provide data that will enable us to examine the research questions and test the frontier model. Five features from LA 146402 should be especially amenable to this inquiry. Testing results suggested that two features from this site were used during the Santa Fe Trail period; Feature 11/55 is a large midden and Feature 34 is a small pit. The structure of the assemblages recovered from these features can be compared to materials recovered from features dating to later time periods at this site, including Features 29 and 49. Feature 29 is a small pit dating to the early Railroad period, while Feature 49 is a privy dating to the same approximate period. Comparison with the contents of the privy should be particularly interesting because, while the other features represent residential trash disposal, the privy was part of a commercial establishment. Commercial versus residential patterns of rubbish disposal and merchandise use could vary considerably, and may provide a look at differences in access to goods for local Spanish residents versus railroad travelers.

One other currently known feature on LA 146402 should also provide some interesting contrasts and comparisons. Feature 2 was identified as a field during testing. By comparing the types and distributions of artifacts recovered from this feature to those from features representing residential rubbish disposal areas, we may be able to determine whether domestic refuse was used to fertilize the field, or if trash disposal in that area was more haphazard.

A total of five pits were identified on three other sites—LA 146405 (Feature 68), LA 146412 (Features 66 and 72), and LA 146413 (Features 91 and 92). These features all seem to date to the later Railroad period; 4 pits mostly contain residential refuse, and 1 pit (LA 146405, Feature 68) may contain commercial refuse. These features should provide the later comparisons needed for a detailed examination of the model posed above. If the contents of the residential trash pits fit the model, we would expect to find few locally made earthenware and no chipped stone tools. Faunal consumption patterns should be very similar if not identical for both late Railroad-era Spanish and Anglo households in Santa Fe.

Even if the data recovered from this study provides no definitive answers to the questions posed above, they should contribute a great deal of information that can be used to further explore these topics. By pursuing this examination in such a way that necessitates comparisons with a broad temporal range of Spanish sites from the core as well as the frontier, we should be able to provide some insight on the acculturative process, as well as how shifting economic patterns affected people in New Mexico.

***Research Domain 3**: Bringing Archaeology and History to Bear on the Archaeological Buildings and Structures of the Santa Fe Railyard*

The components of the late historic-period archaeology of the Santa Fe Railyard considered in this section involve those created during the use of the property by the Atchison, Topeka and Santa Fe Railway, its railway competitors, and the freight-dependant commercial businesses that were attracted to the railyard area. The archaeological remains of this era include some of the most substantial and visually arresting features in the project area (such as masonry foundations) as well as some of the most mundane (e.g., coal/cinder pits). As noted in preceding discussions, most of the archaeological data that is expected to be yielded by the structural remains of this period relates to architectural and construction information; data from associated artifactual assemblages are anticipated to be of lesser abundance (excepting the few refuse pits and the privy or privies).

All of the remains of this era represent unique phenomena in the historical archaeology of Santa Fe, in a variety of senses. In one sense, each of the buildings and structures is functionally unique within the AT&SF railyard; all were complementary parts of a functioning whole. In another sense, each of the buildings and structures was unique in all of Santa Fe's history; no other AT&SF wood-frame depot, or engine house, or water tank, for example, were ever built in the city. In yet another sense, the railyard as a whole is unique in the city (although a second D&RG railyard once existed north of the Santa Fe River, it was of a different size, age, and commercial character, and has never been archaeologically investigated).

Theoretical Perspective

These characteristics limit the types of synchronic or diachronic comparisons that can be drawn among the railyard remains, and between the components of the railyard and the rest of the city. These types of pattern-recognition comparisons, which would inform processual or evolutionary archaeological perspectives, are not readily applied because we cannot compare like with like. Instead, in many ways, these features must be considered and evaluated in a particularistic paradigm (South 1977:8-10), which emphasizes individualistic analysis and synthesis and the intensive study of individual cases such as events, dates, individuals, and significant items.

In this perspective, the archaeological investigation of the remains of the railroad-era use of the property provides data to be used, along with archival and ethnographic information, to complement and elaborate the historical record of the Santa Fe Railyard (Gorman 1982:67). Fleshing out our knowledge of construction and remodeling dates, tracking changes in historical technology and observing their implementation in the project area, and, possibly, identifying historical personages associated with particular sites, are all worthwhile goals that help personalize the railyard. Promotion of a humanistic viewpoint such as this in the current archaeological investigation will certainly enhance the knowledge of the city's historical character and will lend to the apprehension and appreciation of the railyard's archaeological significance by the general public (especially by this state's and country's numerous historical railroad aficionados).

Anthropologically framed questions of a processual or evolutionary nature are not precluded by the unique character of the railyard's late-historic properties, however. Preceding sections of this research-domain discussion outline the application of a frontier model and a world-systems theory model to some of the other site classes that are present in the project area. Aspects of those approaches can also appropriately be used to examine other, anthropologically oriented aspects of the railroad- and commercial-era remains. For example, the frontier model of economic and cultural change described above is designed to include the material culture (i.e., artifacts) of the railroad- and commercial-era site components in its analytic database. This late-period assemblage is one that represents a substantial economic disjuncture from preceding temporal periods. By encompassing these late-period materials, the diachronic model of frontier economics will thereby be tested with an enhanced assemblage.

A world-systems approach, also described above, wherein the economic geography of a region is divided into a core/periphery hierarchical structure, can also be applied to the examination of many aspects of the late-historic railyard remains. Considering (and assuming) that all historical railyard economic activities were instituted and implemented in manners that afforded the best (i.e., most efficient) results to the railyard-based companies (in both their short- and long-term goals), some aspects of the archaeological remains are anticipated to reflect those business practices. These aspects can include construction methods and styles, site structure and layout, use practices, and abandonment and demolition methods. In this context the focus of the economic-hierarchical approach examines the potentiality and directionality of the interaction networks that were in operation during the railyard's use. Because the Santa Fe railyard was among the earliest to have been constructed in the American Southwest (initiated by a corporation with no less than national aspirations), and because it was maintained, expanded, and remodeled over time, the give-and-take relationship of this locale with developments in its parent companies and in the North American railway system can be fruitfully examined.

Research Questions, Research Domain 3

> **Research Question 7.** *In a fundamentally particularistic view, many of the specific construction details of the railyard's infrastructure remain unknown. For example, the original 1880 AT&SF depot (LA 146402, Feature 6) is poorly documented in the archival record, although its appearance is preserved in Stoner's 1882 Bird's Eye View map of Santa Fe (**Fig. 3.105**). What was the overall configuration of the original depot? What changes were effected to this building during the switch from passenger to freight service when the second (1909) AT&SF depot was built? Which sections were remodeled (Scheick 2003:52)? Are use-related artifact assemblages present? Are remnants of the extramural park, hydrant, or other related subfeatures present? When and how was the building demolished?*

Similarly, the original 1880 AT&SF engine house (LA 146402, Feature 1) is poorly documented in the archival record, although its appearance is also preserved in Stoner's 1882 Bird's Eye View map of Santa Fe. What was the overall configuration of the original 1880 AT&SF engine house? Are use-related artifact assemblages present? When was it abandoned or demolished? If it was in use during the transition from coal- to diesel-powered engines, what changes were effected? Was it reused for other purposes, and how did that reuse affect the structure?

The original 1880 AT&SF well and water tank complex (LA 146403, Features 38 and 39) is poorly documented in the archival record, although its appearance is also preserved in Stoner's 1882 Bird's Eye View map of Santa Fe. What was the overall configuration of the well and the tank? Are use-related artifact assemblages present? Did the well in fact lack a pump house, and how did the structure operate in its absence? Did the tank conform to the standard 1880–1890 AT&SF design plan for 24-foot wooden water tanks (as illustrated in an original design plan from Mr. Russell Crump's AT&SF railroad archive: www.atsfry.com/EasternArchive/Plans/images/plan96a.jpg)? If the tank's construction diverged from the standard plan, how and why? What changes were effected to these structures when the water crane, which relied on city water (Scheick 2003:59), was built at the turn of the century? Did the well and tank remain in use, and for what purpose? Similarly, where are the remnants of the water crane (is it related to the circular mortar platform at the southern end of the 1880 depot?), and how did it function?

What are the ages of the masonry and concrete foundations identified as Features 20 and 21 at LA 146402? Are these buildings or structures part of the AT&SF infrastructure, and how are they functionally related to their contemporary infrastructure components? Are use-related artifact assemblages present? When and why were they abandoned or demolished?

Is Feature 49 at LA 146402 the first privy or a later privy, and are Features 20 and 21 also later restrooms? If not, where is the second privy indicated by Scheick (2003:57)?

The original (pre-1904) New Mexico Central depot (LA 146405, Feature 61) is poorly documented in the archival record. Sivinski (1979:203) published a blurred 1915 photograph of a barn-like temporary NMC depot, but Sivinski did not note the location. Was that style typical of the NMC, and did the original NMC depot in Santa Fe resemble that structure? If so, why did the Santa Fe depot have a cellar? What changes were effected to this building during the switch from passenger to freight service when the new Union depot was built in 1903 and occupied by the NMC and D&RG? Are use-related artifact assemblages present? When and how was the building demolished?

The concrete-foundation overlying the NMC depot at Feature 61, LA 146405, is also poorly documented in the archival record, although its function as a beer distributorship operated by the Maloof family is indicated. As noted on a company-related website (www.arcoarena.com/default.asp?lnopt=4&pnopt=0), the Maloof family's history in the United States dates back to 1892 when Joe Maloof I opened a small general store in northern New Mexico. By the 1930s, the Maloof family had acquired distribution rights to Coors Beer. In 1937 the family established Quality Imports, a wholesale liquor-distribution center. Was this building the location of Quality Imports? What was the overall configuration of the original building? Was the adjacent Morelli Building part of the structure? Are use-related artifact assemblages present? When and how was the building demolished?

Similarly, the large concrete foundation at Site LA 146411 (Feature 65), is poorly documented in the archival record. What was the original function and construction date of this feature, which is suspected to be a barn or stable related to the railyard's stockyards. Are use-related artifact assemblages present? When and how was the building demolished?

Research Question 7 Data Needs. Basic information about construction, layout, use, abandonment, and demolition activities are required from all archaeological structural foundations in the project area. As previously noted, little pertinent information is expected from any associated artifact assemblages, so the architectural remains themselves must provide the bulk of the requisite information.

Several classes of data are anticipated to be collected during the archaeological fieldwork that will be directly relevant to these questions. Information about the materials used to construct these features will be documented; samples of construction material may be collected as reference specimens or for chronometric, compositional, or mechanical analyses. The layout, morphology, and dimensions of the structures and their constituent components will also be recorded as part of standard archaeological documentation procedures. Stratigraphic and sedimentary descriptions of the fill above, within, under, and surrounding the structures are also expected to provide relevant information. These data classes can in turn inform original historical construction techniques, remodeling events, use periods, and abandonment or demolition events. Through these means many aspects of the appearance, configuration, and function of the Santa Fe Railyard through time are expected to be reconstructible.

These archaeological data are expected to also be enhanced by archival information (including that which has already been collected as well as that derived from additional research). Existing plan maps of the railyard and its constituent structures can be compared to archaeological evidence to evaluate the validity of both data sets. Plan maps, construction plans, photographs, freight inventories, insurance documents, deeds, leases, and the like all also possess great potential to provide construction and demolition dates, functions, and the names of personnel involved in the development of the railyard's infrastructure.

Research Question 8. *More in accordance with the world-systems-theory approach described above, it can be asked what indicators are there of economic activity and speculation among the railyard's archaeological remains? Are signs of the economic potentialities of business-interaction networks apparent, and is any regional, national, or international directionality in these networks traceable? Can the contemporary economic environment that was in effect during the construction and use of the railways' infrastructure be inferred from the archaeological remains? Can daily management aspects of the operation of the railways be observed in the material remains? Do structural remains of the railyard accommodate or dispute the historical records of the quantity and types of passengers, baggage, and freight that was transported and transferred? Are later changes related to the ascendance of truck-powered freight transport evident, and when do they appear?*

Many of the answers to the particularistic questions posed above in research question #7 (if answers are forthcoming) can be parlayed into additional questions about economic conditions in the early days of Santa Fe. For example, observations about the original construction methods and materials of the buildings may provide insight into the intent of the original building constructors. These data classes may indicate if the buildings were built for long-term use or if they were purposefully built with planned obsolescence in mind. The quality and craftsmanship of the buildings may also indicate the degree of financial solvency that the speculators enjoyed during the early phases of railyard construction.

For example, the original New Mexico Central depot (LA 146405, Feature 61) was constructed not long after the first AT&SF depot. Did its construction differ from the AT&SF depot, and how? Are there signs of the intended use of Feature 61 as a temporary depot from the outset, or was its original construction indicative of a planned degree of permanence? Are characteristics of this depot's construction evocative of the local nature of the NMC? Which depot-construction differences between the NMC and AT&SF attributable to the local versus national characters of the responsible parties?

The overlying beer distributorship building at this site (LA 146405, Feature 61) was operated by the

Maloof family, as noted above. Based on archaeological testing results, this building is suspected to have been built sometime in the 1930s, and hence it probably represents one of this family's first substantial distributorship ventures. Was this building built by the Maloof family themselves, or was it leased from others? If it was family built, does the construction reflect a well-funded capital enterprise or does it indicate a self-sufficient approach to construction?

Details of the 1880 AT&SF depot (LA 146402, Feature 1) may also lend to economic analyses. The layout of floors and loading docks, and the allocation of space within the building may allow the estimation of the quantity and types of passengers, baggage, and freight that were transported through the terminal. More importantly, in some senses, these characteristics may actually more accurately indicate the quantity of passengers and freight that was anticipated when the depot was first designed and built. The layout of the second AT&SF depot (built in 1909) can be compared to that of the 1880 depot to assess the design changes that were deemed appropriate or necessary after the first three decades of Santa Fe rail service had passed. Construction features of the 1880 depot may also be evaluated to determine if the building was originally built for long-term use or if it was purposefully built to be replaced by the later depot. Similarly, the locations, sizes, and configurations of the privy or privies opposite the depot (LA 146402, Feature 49 [and Feature 20?]) can provide similar measures of anticipated and actual use and permanence in the depot's functional life.

The storage capacity of the well and elevated water tank (LA 146403, Features 38 and 39) are well documented (Scheick 2003:57). The tank construction may have followed a standardized plan, but the presence of only a single tank has implications for the use of the Santa Fe railyard. How many engines could be supplied on a daily basis from this system, and did this quantity of water correspond with the anticipated needs? Did the well and tank's eventual replacement by the water crane represent an unanticipated increase in rail service to town? Did the water crane really represent an increase in capacity, or did other considerations drive the installation of a new water-supply system?

The 1880 AT&SF engine house (LA 146402, Feature 1) may also provide valuable information regarding the railway's approaches to economic efficiency as well as aspects of daily railyard management. A clue is available in an 1891 description, written by an unknown reporter, of the AT&SF maintenance shops in Topeka, Kansas, which provides a glimpse into the management strategy of this early, successful transcontinental railway. Although it specifically describes a single maintenance shop in a major city, some sections of this contemporary report indicate that archaeologically identifiable characteristics of shop activities in the Santa Fe engine house may be interpretable in terms of economic efficiency and management practices. The following excerpts were transcribed from an 1891 edition of *The National Car and Locomotive Builder* by Russell L. Crump and are posted by him at www.atsfry.com/1890s/nclb1891.htm.

> The Rolling Stock of the Santa Fe.
> June, 1891.
>
> A GREAT RAILROAD WITH POOR REPAIR SHOPS.
>
> As I rambled around the repair shops belonging to the Atchison, Topeka & Santa Fe during a recent visit to Topeka, Kans., I received the impression that there was a curious want of fitness between the railroad company as a property and the provision for keeping the machinery in running order. There was a time when this company was noted for the lavish expenditures on everything that seemed necessary, and many that were not necessary, for first-class railroad equipment, but by omitting to provide first-class repair shops, the management of the day of luxury neglected a very important element in the forces that work prosperity for a railroad company.... It seems strange to find the principal repair and manufacturing establishment of such a system crowded into small, badly arranged, dark buildings that provide the worst facilities for doing work economically. The machine shops were originally designed for a bridge building factory, and the intention was that it should be temporarily used for locomotive purposes; but that is twenty years ago, and other makeshift buildings have been added.…
>
> The company appears to be owners of all kinds of locomotives built in the last twenty years, and no builder who has put engines together in that time has failed to effect sales at Topeka.…The diverse nature of its motive

power is going for years to defeat the efforts of the men now struggling to keep the cost of operating at a low figure, and the blame of this rests on those who were a law unto themselves on the placing of orders for new engines. With all the disadvantage and drawbacks that the inferior shop accommodation presents, the men in charge turn out a wonderful quantity of work.…

The guiding principle in doing work on the rolling stock is, attend merely to essentials. To produce good results it is necessary that bearings and rubbing parts should be well finished, but parts that are generally polished to look well are nonessentials. These receive little attention here. With locomotives the policy appears to be, keep the tires, dods, journals and bearings in good order, keep the cylinders round and the valves flat, the boilers clean and the heating surfaces free from leaks. When these conditions are preserved the engines are in good working order and can haul trains as well as those that have been the object of much more laborious attention to details. The same common sense practice is adopted in the repair of all other members of the rolling stock family.…

The policy of leaving alone all superfluities enables men and tools to turn out what seems to be an extraordinary volume of work, but the efforts of both are aided by the very best kind of shop management. The shop tools are arranged with a view of making it convenient for one man to attend to more than one machine, and numerous special methods are employed for doing work quickly. The great amount of work to be done in the shops enables the foremen to keep men constantly on recurring operations, and the dexterity acquired materially increases production.

The layout of the building, and the facilities and equipment with which the 1880 AT&SF Santa Fe engine house was furnished, can be evaluated in this historically described context of operational efficiency. Further, the indications that the AT&SF operated a great variety of steam engines may be evaluated with data from engine-repair parts, tools, or other features that may be recovered from or present in the engine house.

The locale of the Santa Fe Railyard's stockyard (identified in part as LA 146411, Feature 65) may also contain some information related to the economic standing of the railyard on a regional and national scale. As the AT&SF proceeded to lay track through the American southwest, it initially drew much of its regional traffic from cattle ranchers (Glover 1993:205). The AT&SF built stockyards according to standardized plans; the design that was chosen at any particular location probably responded to the anticipated level of livestock traffic. The construction date and layout of the Santa Fe stockyard are presently unclear, as are the dates of the standardized stockyard plans, but the size and complexity of the archaeological remains of the barn or stables (Feature 65) can be evaluated in light of the standardized AT&SF plans to determine or estimate the historical level of livestock traffic through this semiurban setting.

Research Question 8 Data Needs. As noted above, the data required to answer to some of the particularistic questions posed in the first research question can also apply to the interpretation of the economic conditions in the early days of Santa Fe's railyard. As previously noted, little pertinent information is expected from any associated artifact assemblages, so the architectural remains themselves must provide the bulk of the requisite information. Basic information about construction, layout, use, abandonment, and demolition activities are required from all archaeological structural foundations in the project area. Information about the quality, craftsmanship, and materials used during the original construction and during any remodeling episodes may be applicable to the interpretation of local and regional economic conditions. Dimensions, layouts, and evidence of remodeling of the buildings and structures can also provide some clues regarding the volume and frequency of freight, baggage, passengers, and other material that were anticipated or actually observed during these structures' periods of use.

These classes of archaeological data are expected to also be enhanced by archival information (including that which has already been collected as well as that derived from additional research). Plan maps, freight inventories, insurance documents, deeds, leases, and the like all also possess great potential to provide construction and demolition dates and structure functions. These types of documents should also provide a wealth of information about the volume and frequency of freight, baggage, and passengers that passed through the railyard. These classes of information can help set the Santa Fe railyard in a local, regional, and national economic context, against which the archaeological remains can be compared and contrasted.

> **Research Question 9.** *The city of Santa Fe is widely famed as an emblematic city of the massively successful and highly regarded Atchison, Topeka, and Santa Fe Railway corporation. Santa Fe is, or has also been, worthy of mention in the names of a host of other historical and modern railways (e.g., the Gulf, Colorado and Santa Fe; the Panhandle and Santa Fe; the Santa Fe Central; the Santa Fe Southern; the Santa Fe and Southern Pacific, etc.). The city is still notable among contemporary railways as a namesake of the Burlington Northern and Santa Fe Railway, which acquired the AT&SF in 1995.*

Conversely, even after it was articulated with the national railway system, the city of Santa Fe lay in a relatively marginalized locale (something of a frontier) at the end of a spur line off of the main trunk of what was eventually the second transcontinental railroad. City planners were greatly disappointed in 1879 when the main line was not built though the city itself (Scheick 2003:47). The city had to pay for the construction of the spur line, and regular passenger or freight service was never successfully perpetuated. Other nearby cities on the AT&SF main line (e.g., Albuquerque, Las Vegas) received substantially more lavish attention during the construction of station infrastructure. These characteristics indicate a certain degree of disregard for the city of Santa Fe in the scope of national and international railway planning.

Examining the source of this disjuncture may be illuminating, as may the study of the economic-interaction networks that fomented and perpetuated these seemingly disparate treatments of the real, as opposed to the idealized, Santa Fe. Several opportunities to examine the social and economic interaction networks that surrounded these issues are apparent in the archaeological and archival record of the Santa Fe railyard.

First, as railroads spread across the nation, railroad depots served as social and economic hearts of the railyards in which they were built, as well as occasionally of the entire city in which they were located. These buildings were focal points of information and material transfer, and were emblematic of the arrival of a new technological era. What effects did the physical presence of new depots and other railyard buildings have in the greater municipal cultural and economic milieus? The architectural styles used for the Santa Fe railyard infrastructure can be compared and contrasted against those in use in the rest of the city, and the forces influencing the development of the railyard as a focal point may be evaluated.

In the latter half of the 1800s, and particularly after 1869, when Bishop Lamy's Santa Fe cathedral was being built, the city witnessed a fervent reaction against its image as a frontier Spanish villa. Ellis (1985:1) relates that the promoters of Santa Fe's economic development strove to architecturally remake the city into "a modern midwestern-type community of tall commercial buildings and neat gable-roofed brick cottages." This movement was reversed in the twentieth century and a return to the "old adobe" style was promoted. Still, the railroad arrived at the height of the "modernization" movement, and the social and commercial significance that the railyard's built environment had for the late nineteenth- and early twentieth-century citizenry can be evaluated in this context. How were the AT&SF's choices of train-station construction material, style, and location affected by, or in turn affect, the city's urban-renewal philosophy? Did local conditions even factor into AT&SF's decisions, or did regional or national economic or social factors dictate the design of the Santa Fe Railyard?

The city of Santa Fe quickly became emblematic of railroad expansion through the American southwest, if in name only. The AT&SF Indian chief and war-bonnet advertising icons lent a romantic Southwestern aura to the railway's passenger service. What, if any, steps did AT&SF take in its railyard design to celebrate the city upon its inclusion in the national railroad system? The first and second-generation Santa Fe depots, being focal points of AT&SF railyard activities, can provide some measure of this investment through synchronic and diachronic comparisons of their construction materials and techniques, and their relationships to contemporary AT&SF stations elsewhere.

Secondly, from the outset the AT&SF was working toward the standardization of its depot-construction techniques. Three-room "combination" depots, with separate rooms for freight, passengers and baggage, and railway agents, were the norm, and the basic features were fairly well established by 1872. By 1895, and again in 1910, standardized sets of plans were produced for depots of different configurations, sizes, styles, and functions across the breadth of AT&SF's system (Pounds 1984:17–22). The type of depot that was built in any particular location probably depended on the anticipated type and scale of rail traffic, and, possibly, the image that the AT&SF intended to project through its depots. Some depots of this period were constructed of prefabricated parts. The 1880 AT&SF depot in Santa Fe predates this period of standardization, but this factor may actually provide insight into the development of these standardized plans.

Depots of this pre-standardization period represent experiments in design. How did AT&SF architects try to accommodate local sensibilities and what did they introduce that was novel to the Southwest? Which of the novelties were perpetuated or abandoned in the later standard plans, and which of the southwestern influences were adopted into the standardized models? An examination and comparison of floor layouts of AT&SF wood-framed depots built during this pre-standardization period can help identify these influences. The range of depot configurations can be evaluated and compared to the first Santa Fe depot and perhaps some aspects of the plans that were carried through into widespread application can be identified.

Research Question 9 Data Needs. The configuration, size, and space-allocation in the 1880 AT&SF depot in the Santa Fe railyard (LA 146402, Feature 6) will be determined from both archaeological and archival evidence. Evidence of remodeling episodes can also provide information about expansions or design updates. The appearance, configuration, and style of the depot's superstructure will only be knowable from archival illustrations or photographs (if any can be located).

Comparisons of the railyard to other local architectural-style movements can best be accomplished through an archival review of previous histories and architectural studies of the city of Santa Fe (e.g., Ellis 1985; LaFarge 1959; Noble 1989; Sze and Spears 1988). *State* and *National Register* property-nomination forms, as well as historic-structure reports can also provide useful comparative data, much of which is available at local archival repositories.

The data that can be used in a comparison of nineteenth-century wood-frame AT&SF depots in New Mexico will rely on archival information and literature reviews (e.g., Myrick 1990; Pounds 1984; Sivinski 1979). The information needed to examine the variability (or lack thereof) of structures built in the pre-standardization period includes floor plans, superstructure details, and stylistic attributes. A data table of extant New Mexican railway structures maintained by the Railroad Station Historical Society, Inc. (www.rrshs.org/N.M./nmrrstruc.htm; updated 1/10/05), indicates that few nineteenth-century AT&SF depots of wood-frame construction remain standing. The Abajo (1886), Los Cerrillos (1882), Los Lunas (1879), Magdalena (1885), and Raton (1890) AT&SF depots are extant but have reportedly been moved from their original locations. The Socorro AT&SF depot (1888) may be in place but its integrity is unclear; the Deming station (1881) is known to have been remodeled (Glover 2001) and it may also have been moved. Other extant wood-framed New Mexico AT&SF stations (those in Grants and Yeso [moved to Vaughn]) are of unclear construction dates. Only the Lake Valley (1884), Rincon (1884), and San Antonio (1882) AT&SF wooden depots apparently remain in place, but none of these retain all aspects of their original configuration. When available, information from historical photographs, plan maps, *State* or *National Register* nominations, or other sources will be used to compare the attributes of these structures with the archaeological and archival data about the original Santa Fe AT&SF depot.

Field Excavation Methods and Procedures

Chris T. Wenker

Excavation methods followed standard modern archaeological procedures (e.g., Joukowsky 1980), OAS excavation, sampling and spatial referencing procedures outlined by Boyer et al. (2000; see also Sesler and Hovezak 1992), were incorporated to maintain comparability of the railyard data with other prior OAS project data. The procedures in the OAS safety manual (OAS 1995) were also followed. The nature of some of the railyard archaeological remains and the emphasis on mechanical excavation during this project require some additions and alterations to the general OAS strategy, however.

Mapping and Locational Controls

The corners of all hand-excavation units, backhoe excavations, elevation-datum stakes, and other points of interest were mapped with a Nikon DTM-330 Total Station. The project grid system was established during the testing phase by deriving horizontal (north and east) coordinates from an AutoCAD design file provided by Bohannan Huston, Inc., the Santa Fe Railyard's engineering firm. The AutoCAD design file was imported to ESRI ArcView Geographic Information System (GIS) 3.1, transformed to a shapefile, and metric coordinates for known benchmarks were calculated. Vertical control was established by deriving the true elevation of city-owned sewer-manhole covers from the design file (which are measured in feet above sea level, to the nearest one-hundredth of a foot), converting those elevations to the metric system, and assigning true metric elevations to the horizontal benchmarks. By these means an exact overlay of the project design file's grid system, aligned with true north and tied to true elevations, was established on the ground. The benchmarks were used as primary mapping data to establish additional temporary mapping points at each site. All points recorded with the total station were imported to the GIS and plotted over the design-file layers, allowing excavation areas and features to be overlaid on construction-design plans. This process also removed the need for the archaeological crew to map the project area's modern features and topography, because all relevant data were already digitally available.

Provenience Control

A Provenience Designation (PD) log for each site was maintained to catalog all artifacts and samples collected from excavation contexts. Each unique excavated context (e.g., a 10 cm thick level in an XU, or the loose backdirt from a whole backhoe trench, or a single item extracted from a specific stratum in a trench wall) was assigned a separate PD number that identifies the recovery context of the associated artifacts and samples.

Surface Collections

No surface collections were conducted during the testing phase (Wenker 2005a,b). The bulk of the modern ground surface in the railyard project area was either disturbed or was composed of a mantle of introduced overburden. If temporally or functionally diagnostic items relevant to site interpretations were observed on the modern surface, they were collected. If the item was located in an excavation unit, it was provenienced to the uppermost level in that unit. If the item was outside a planned excavation area, it was mapped and point provenienced to the modern site surface.

Excavation Units

The initial step of fieldwork involved identifying and marking all known utility lines in each site area. The complex overlay of modern permanent, immovable landscape features such as utility lines or railroad tracks and related facilities dictated to some extent, the areas available for excavation. Temporary landscape features such as asphalt and concrete pads, parking curbs, fence lines, and vegetation were retained whenever possible, but archaeological excavation occasionally required the dismantling of these types of features. Mechanical and manual excavation procedures are outlined below.

Mechanical Excavation. Backhoe trenching was the predominant approach used during the testing phase (Wenker 2005a,b and 2006c). Additional exploratory trenches were excavated during the data-recovery phase to further investigate the sites nature and extent as well as to clarify complex alluvial stratigraphy. The position, orientation, and length of all trenches was designed to maximize the potential of each trench while simultaneously avoiding existing infrastructure and minimizing significant conflicts with daily use of the railyard grounds. Backhoe trench (BHT) locations are presented in plan view maps at the beginning of each chapter. Backhoes were equipped with buckets from 32 to 36 in (81 to 91 cm) in width, and trenches were excavated to a minimum width of 90 cm (35 inches) and to a maximum depth of 4 feet (1.2 m). Frequently, culturally sterile gravel and cobble deposits were encountered during testing at depths of 2.5 to 3 feet (0.76 to 0.91 m), and in those cases the trenches were not excavated to the full 4 feet in depth.

An archaeologist monitored the excavation of each backhoe trench (BHT). Functionally or temporally diagnostic artifacts were opportunistically collected from trench backdirt as they were observed. After excavation, trench walls were faced with hand tools. All trenches were closely examined for exposed cultural deposits or features. The stratigraphic character and cultural content of each backhoe trench was documented on a standardized excavation form. Diagnostic artifacts found in situ in trench walls were point-provenienced. Once stratigraphy was documented, selected trench exposures were excavated by both hand and mechanical means to expose structural foundations or acequia and midden deposits. Stratigraphy exposed in the vertical trench walls guided excavation. Trenches that were not expanded were mechanically backfilled as soon as practicable after documentation was complete. Horizontal provenience of trenches was maintained at each site by assigning each a unique number and mapped them with a total station tied into a local datum.

The mechanical removal of recent and historic overburden, as well as of other bulk deposits, was conducted with backhoes equipped with wide, smooth-edged buckets to allow clean scraping surfaces to be exposed. The goal of this approach was to remove relatively thin (5 to 10 cm thick), sequential sediment layers from large expanses of site area horizontally defined as scraping units (SCUs). The primary use of this method removed modern and historical post-abandonment overburden (Strata 1 and 2) from above known feature locales. Further, when excavating within expansive cultural deposits, this method expose buried field surfaces or occupation levels, allowing contemporaneous features to be identified. An archaeologist always monitored and directed all scraping activities, with the goal of identifying and exposing use surfaces, features, or stratigraphic breaks as the scraping proceeded. This type of backhoe excavation was conducted within some of the architectural features at the railyard to remove the modern and historic overburden from within the foundations. Functionally or temporally diagnostic artifacts were opportunistically collected from backdirt when observed. Artifacts found in situ in scraped exposures were point-provenienced.

Horizontal provenience of these scraped areas was maintained at each site by assigning each a unique SCU number. Due to the nature of mechanical excavation, individual SCUs covered irregularly shaped areas. These SCUs both abutted each other, and represented a spatially discrete area. Corners of SUs were mapped with an electronic total station and plotted on site and feature maps. SCUs were sometimes subdivided vertically into the standard strata or levels identified across the rest of the site, but most SCUs were excavated as full-cut units, combining the deposits from top to bottom in one bulk excavation unit.

Manual Excavation. Excavation units (XUs) of standardized sizes (e.g., 1 by 1 m, 1 by 2 m, 2 by 2 m, etc.) were used to excavate and evaluate most of the deposits subjected to manual excavation. The use of these standard-sized XUs and levels was primarily conducted to allow meaningful comparisons of artifact density among excavated volumes of site matrix. These units were not always relegated to specific grid coordinates or to orientations along a north–south axis, although that approach was the default procedure. Instead, when necessary, these units were sized, placed, and oriented to maximize their data-recovery potential. Upon excavation, the corners of all excavation units were mapped with an electronic total station and plotted on site and feature maps. XUs were commonly abutted along the same orientation to form broad excavation blocks or, as at the acequia sites, to form linear trenches.

The standard procedure for the excavation of bulk sediments in XUs were by 10 or 20 cm thick arbitrary levels, unless natural or cultural stratigraphic layers were defined. If natural or cultural stratigraphic layers were thicker than 10 cm, each thick stratum was excavated in separate 10 or 20 cm thick levels. Unless previously determined to be modern or recent overburden or otherwise of a redundant nature, all fill excavated from XUs was screened through 1/4 in mesh hardware cloth. All artifacts were collected and bagged for processing and analysis, unless the fill was not screened. In unscreened proveniences, functionally or temporally diagnostic artifacts were opportunistically collected as they were observed. Bulk construction materials (such as milled lumber or bricks related to a feature's construction) were generally not collected, but their type and quantity were noted in the excavation notes.

Non-standardized hand-excavated trenches of varying widths and lengths were used to expose architectural details, or as exploratory trenches in areas where mechanical excavation was not feasible or safe. Trenches were usually excavated as a full-cut unit, combining the deposits from top to bottom in one bulk excavation unit. Screening of the fill depended on the nature of the excavated deposits as well as the intent and goal of the trenches.

Feature Excavation

Significant features encountered and recorded during the testing phase were relocated, and the backfill removed from all previously excavated areas to expose the feature. The feature cross section was examined and the testing notes were updated.

Small features. Features smaller than 2 m in diameter, the feature boundaries (as exposed by mechanical scraping or manual excavation) were used as the horizontal unit of excavation control. Half of the feature was excavated to expose a cross section for documentation. The remaining half of the feature was then excavated in levels according to assigned stratum.

Large features. Features larger than 2 m in diameter were sampled in quarters, halves or by excavating more standardized XUs within the feature boundaries. The sizes of XU excavations depended on overall feature dimensions, but targeted sample sizes did not fall below 2 percent of the overall feature area.

Manual excavation proceeded through the feature fill in arbitrary 10-cm-thick levels, unless stratigraphic layers were encountered during excavation. Natural or cultural stratigraphic layers thicker than an average of 10 cm were excavated in separate 10 cm thick levels. All excavated intact cultural fill was screened through 1/4 in mesh; post-abandonment overburden was not screened. All artifacts were collected and bagged for processing and analysis. Bulk construction materials (such as milled lumber or bricks related to a feature's construction) were sampled, but their type and quantity were noted in the excavation notes.

As outlined above sites, the mechanical excavation of scraping units (designated SCUs during excavation and SU during testing) were conducted over, within, and around structural features to remove the bulk of modern and historic post abandonment overburden. The fill was mechanically and manually removed from the structures in stages, which allowed the recording of cross-section and profile drawings along the short and long axes of each structure, when appropriate. Archaeologists always monitored these activities, and manual excavation of the overburden in these SUs was conducted in sensitive or fragile locations, particularly during the final stages of an architectural feature's excavation, when sub-features or intact deposits were encountered. The modern and historic overburden was not screened but temporally or functionally diagnostic artifacts were collected opportunistically. Once the internal contents and layout of the structures were known, sub-features or intact deposits were evaluated for excavation.

After, or during, a structure's complete excavation, a 4 m wide strip around the perimeter of the structure was scraped to the top of the culturally sterile substrate. This procedure was used to locate any extramural subfeatures or structural components, which were evaluated and excavated according to standard procedures.

Site Documentation Methods

Project-wide and site-specific master lists tracked the sequential identification numbers of all backhoe trenches (BHT) , hand-excavation units (XUs), backhoe scraping units (designated SCU during excavation; SU during testing), structures, non-structural areas (NSTR), features, strata, and photographic exposures. As noted above, Provenience Designation (PD) lists were maintained to catalog all artifacts and samples recovered from the sites.

All excavation units, features, structures, and extramural areas (including field and midden deposits) were recorded using standard OAS field and feature forms as well as daily field notes taken by crew chiefs. Standard narrative recording included sediment descriptions using a Munsell Soil-Color Chart (*see* Appendix 1, Table App1.1, for Munsell soil-color equivalents) and standard geomorphological descriptors, notes on artifact variety and frequency, evidence of disturbance, horizontal and vertical locations and associations, excavation technique, and temporal associations. Written descriptions were recorded on standardized excavation and feature forms. Scaled plan, profile, and elevation drawings included a scale, north arrow, and key to abbreviations and symbols. A final site map documented excavation limits, architectural and other cultural features, and modern features within the excavation area at each archaeological site.

Excavation records included both digital and black-and-white film photographs of the features, taken during their excavation and of their final appearance. Photographs included a metric scale, north arrow, and label board with the LA and feature number and date. Photographs were also taken of the general site and of selected excavation units, and all features found within the units.

Project Stratigraphy

To facilitate standard documentation, both natural and cultural strata repeatedly encountered across the project area were assigned standard numbers and descriptions. These numbered strata occasionally varied slightly between site locations. Local variations are described in site-level reporting; standard descriptions are provided below:

Stratum 1 was a modern deposit of dark brown (7.5YR 3/2 to 3/4) silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This fill was brought in to level the driving surfaces in the area and was 5 to 30 cm thick.

Stratum 2 was a black (10YR 2/1) sandy loam deposit containing abundant inclusions of coal and cinders and historic refuse (glass, metal, etc.) and was approximately 5 to 40 cm thick. This fill was brought in to level the historical railyard.

Stratum 3, an underlying sterile substrate, was a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions.

Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed, medium crumb structure. Its color ranged from light yellowish brown (10 YR 6/4) to very pale brown (10 YR 6/3), and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions.

Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown (10YR 6/4) to brown (10YR 5/4) in color. Clasts frequently exhibited caliche skins, and the overall stratum was weakly cemented with calcium carbonate.

Geomorphological Field Methods

During the geomorphological examination of the exposed acequia-channel sediments, detailed technical drawings of selected cross sections were recorded to track the channel morphology, fill characteristics, gradient, subfeatures, artifact content, and condition of the channel in the project area. In selected trench exposures, the perpendicular cross sections of the acequias were expanded by excavating short (2 to 5 m [6.56 to 16.40 ft] long) backhoe trenches parallel with the channel orientation to gain longitudinal views of the channel stratigraphy.

Field sediments and field-channel fill deposits were treated similarly, with a focus on lengthy exposures of cross sections in backhoe trenches or scraping blocks. Detailed cross sections were recorded to document fill characteristics, subfeatures, artifact content, and condition, in an effort to determine the source of the field fill and to discern possible stratification within the field fill or superpositioning of field deposits or channels.

Sediment samples were recovered from relevant deposits in acequias, field and channel features, and from non-feature control deposits for particle-size analysis and other processing in the laboratory. Field crews attempted to obtain charcoal samples for radiometric analysis from acequia and field strata best positioned to provide chronometric data on potentially earliest and latest use periods but samples were sparse.

Archaeobotanical Sampling

Sampling procedures were primarily adapted from Toll and McBride (2000), although it is focused on the sampling of residential sites. The potential contribution of botanical analyses to this study was maximized by attention to reasonable and appropriate sampling in the field. It is helpful to recognize a fundamental difference between floral data collected in soil samples and virtually every other artifact category. Standard field procedure dictates collection and curation with provenience information of every sherd, bone, and lithic artifact encountered during most excavation situations; sampling of this universe may take place later in the lab. Doing the equivalent for botanical materials would mean bringing home the entire site, a ludicrous proposition. This makes every soil sample collected in the field a sampling decision. Samples not taken are generally gone forever. On the other hand, a systematic decision to sample widely and intensively to guard against such information loss can generate hundreds or even thousands of unanalyzed samples. Lacking infinite time and resources, OAS focused on judicious sampling.

Two aspects hallmark the most effective sampling protocols: awareness of which depositional contexts are most productive of floral remains, and recognition of site areas from which subsistence data was of most interpretive use for the research foci of the project. Both are fundamentally selection processes. Researchers who aspire to sampling without bias had better approach the job with a very big checkbook indeed. The following guidelines for sampling specific provenience categories provided some simple directives for choosing flotation-sampling locations.

Excavators focused on covering the most informative contexts. Less-informative proveniences were sampled selectively (a small number of well-placed samples). More complex and informative proveniences particularly midden and privy filled were sampled in greater detail, generating finer scale information where it was appropriate and helpful.

Trash fill and roof fall, though voluminous and originating from cultural behavior, are of considerable interest, but as an entity. Except in the rare case of a burned roof falling intact on the floor below and being quickly covered by protective fill, horizontal differences in floral debris are really only a sampling problem. Sampling from contexts without good cultural affiliation (for example, disturbed areas) was minimized.

Botanical samples from floors in domestic context can be a very important source of information, especially when taken from around thermal features. However, data on other work areas that might not be as well defined is also desired. For a clearer picture of what plant materials are associated with specific work areas, we need samples from floor contents unassociated with feature concentrations. The best way to ensure adequate coverage is to take samples from alternate grids, with the idea that analysts will later be able to select floor loci that will represent major activity areas, as well as one or more controls.

A single sample was taken from near the bottom of primary deposits in interior features. Multiple samples were only taken when primary deposits were clearly stratified. Samples were taken from secondary deposits, with the understanding that they did reflect the function of the feature itself. Single 2-liter samples were taken from trash deposits, when well-linked to a later or continuing occupation of the site.

Extramural features were sampled in the same way as features inside structures: a single sample was taken from near the bottom of primary deposits, and multiple samples were only obtained when primary deposits are clearly stratified.

Human Remains

No human remains were discovered during either testing or during data recovery phases of the railyard project.

Laboratory Methods and Procedures

When brought in from the field, PD logs and bags were compared and checked for accuracy. Artifacts were washed or cleaned, sorted, and catalogued. Artifacts and samples were temporarily stored at the OAS laboratory during analysis and in preparation for permanent curation. Maps and notes, analytical data sheets, and photographs were deposited with the Archeological Records Management Section of the New Mexico Historic Preservation Division. Artifacts are stored at the Museum of New Mexico Archaeological Research Collection facility.

Laboratory analysis was conducted by the staff of the OAS and by specialized professional consultants, where necessary. Analysis procedures followed the standards established by the OAS, many of which have been developed for historic sites in the northern Rio Grande area. Specifics of any particular analytical methods discussed are presented in Chapter 7 of this report.

2 | Acequia Sites

Overview

Jessica A. Badner

Santa Fe's irrigation system is arguably one of the oldest in New Mexico. Established in 1610 when Spanish colonists relocated from San Gabriel, it is predated only by a system installed by Juan de Oñate in 1598 and Native American water diversion documented in various early scouting forays by the Spanish. Acequia segments that run through the Santa Fe Railyard are to date, some of the only acequias excavated in Santa Fe's south-side system and the only irrigation features extensively investigated as a group.

Six watercourses, representing seven archaeological sites (LA 146407, LA 146408, LA 149909, LA 146410, LA 149912, LA 120957, and LA 146418) were identified within the Santa Fe Railyard project area (Figs. 2.1a, 2.1b) Excavation and archival research of these sites informs on the integral roll that the water system played in the founding and growth of the villa. This study elucidates the system's subsequent growth and evolution as it served Santa Fe through a series of main ditches and laterals, some of which passed through the Santa Fe Railyard and continued to irrigate land to irrigate land through the nineteenth and into the mid-twentieth century.

Discovered during testing all of the sites discussed were recommended "eligible" for the National Register of Historic Places under Criterion 'd.' Further excavation was undertaken to define the nature and extent, and interrelationship of the waterways to each other and the Santa Fe Railyard. Work was conducted under New Mexico State Historic Preservation (HPD) and City of Santa Fe Archaeological Review Committee (ARC) approved data recovery plans (Wenker 2005c, Wenker et al. 2005).

In order to provide the reader with a coherent picture of the Santa Fe Railyard acequia system, which often predates railroad infrastructure, archaeological sites are presented in a progression from the administratively designated North Guadalupe area, south through the Railyard Park and to the Baca Street area. Additionally, sites are discussed together when watercourses are superimposed as at LA 146407 and LA 146408 or when the same watercourse was given separate site numbers as at LA149909 and LA 146410. Modern drainage features subsumed under other site numbers are not presented in this section and are discussed in context with their associated sites. Likewise, ditch laterals excavated at LA 146402 are discussed with that site. Site level strata are similar across the project area and are described briefly in context of the particular excavation area. Descriptive sections are followed by a synthetic analysis of the sites in relation to research themes and questions proposed under *Research Domain 1: The Spanish Colonial to Late Territorial Period Acequia and Field System and the Santa Fe Railyard* (Wenker et al. 2005:92–106).

LA 146407 and LA 146408

Chris T. Wenker and Charles A. Hannaford
revised by Jessica A. Badner

Introduction

Sites LA 146407 and LA 146408 represent stratigraphically superimposed water-conveyance ditches or acequias (Fig. 2.2a). LA 146407 was originally recorded as Acequia de Analco, but research by D. H. Snow (Chapter 7, this report) indicates this is unlikely. Acequia Analco's course, traced through archival documentation, and as mapped in Figure 2.2b, indicates the acequia likely flowed a block to

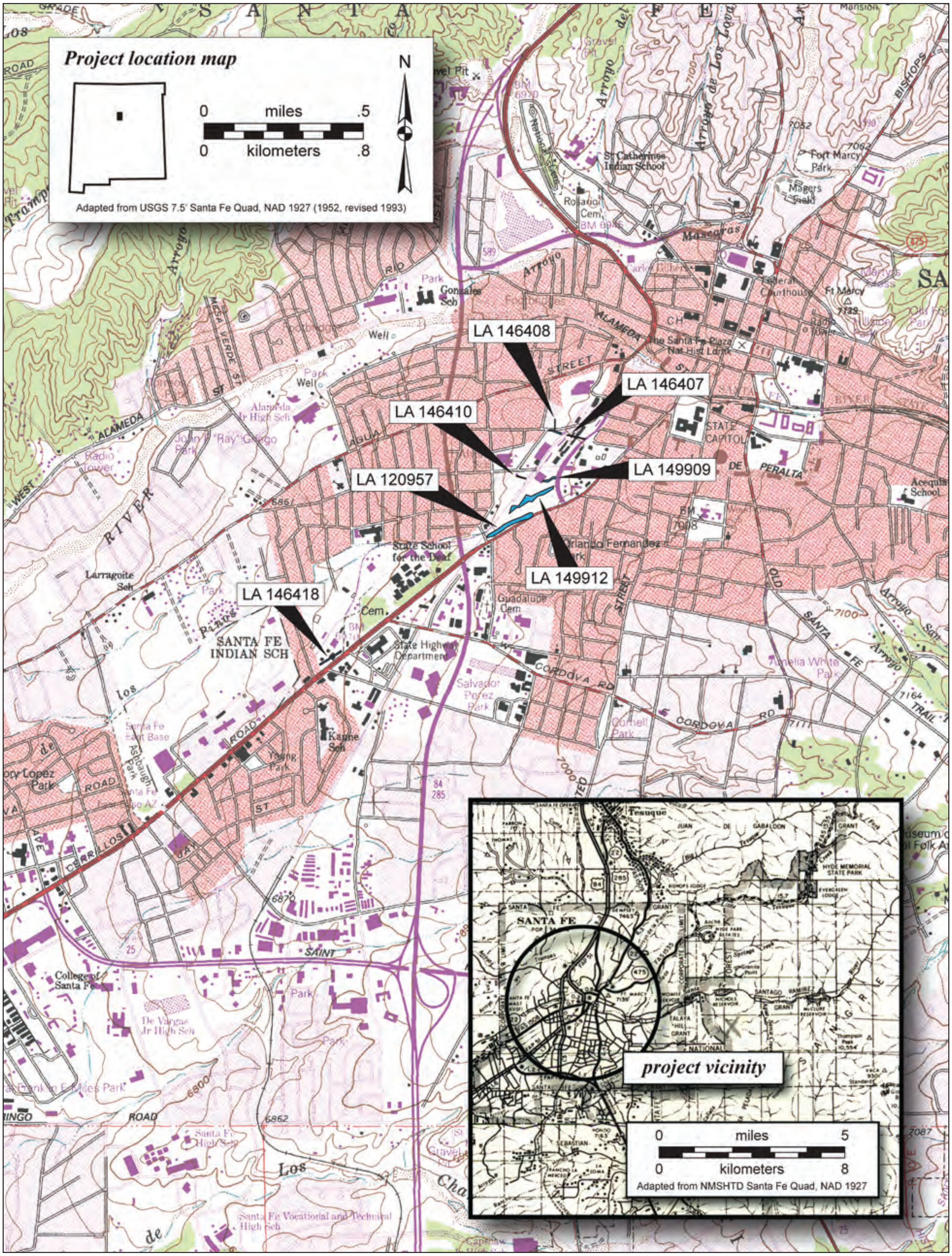


Figure 2.1a. Locations of acequia sites at the Santa Fe Railyard: LA 146407, LA 146408, LA 146410, LA 149909, and LA 146418.

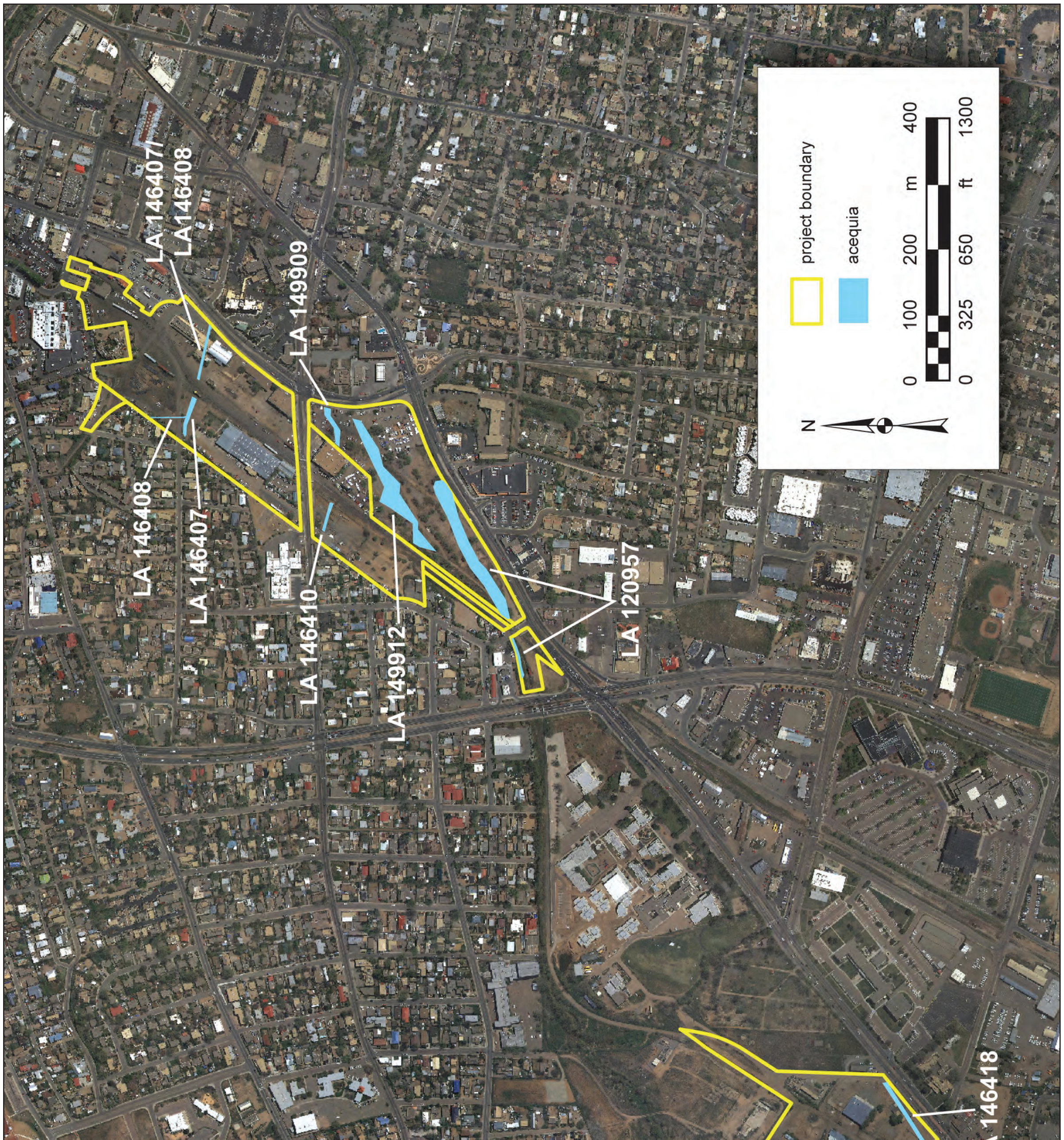


Figure 2.1b. Locations of acequias in relation to sites at the Santa Fe Railyard.

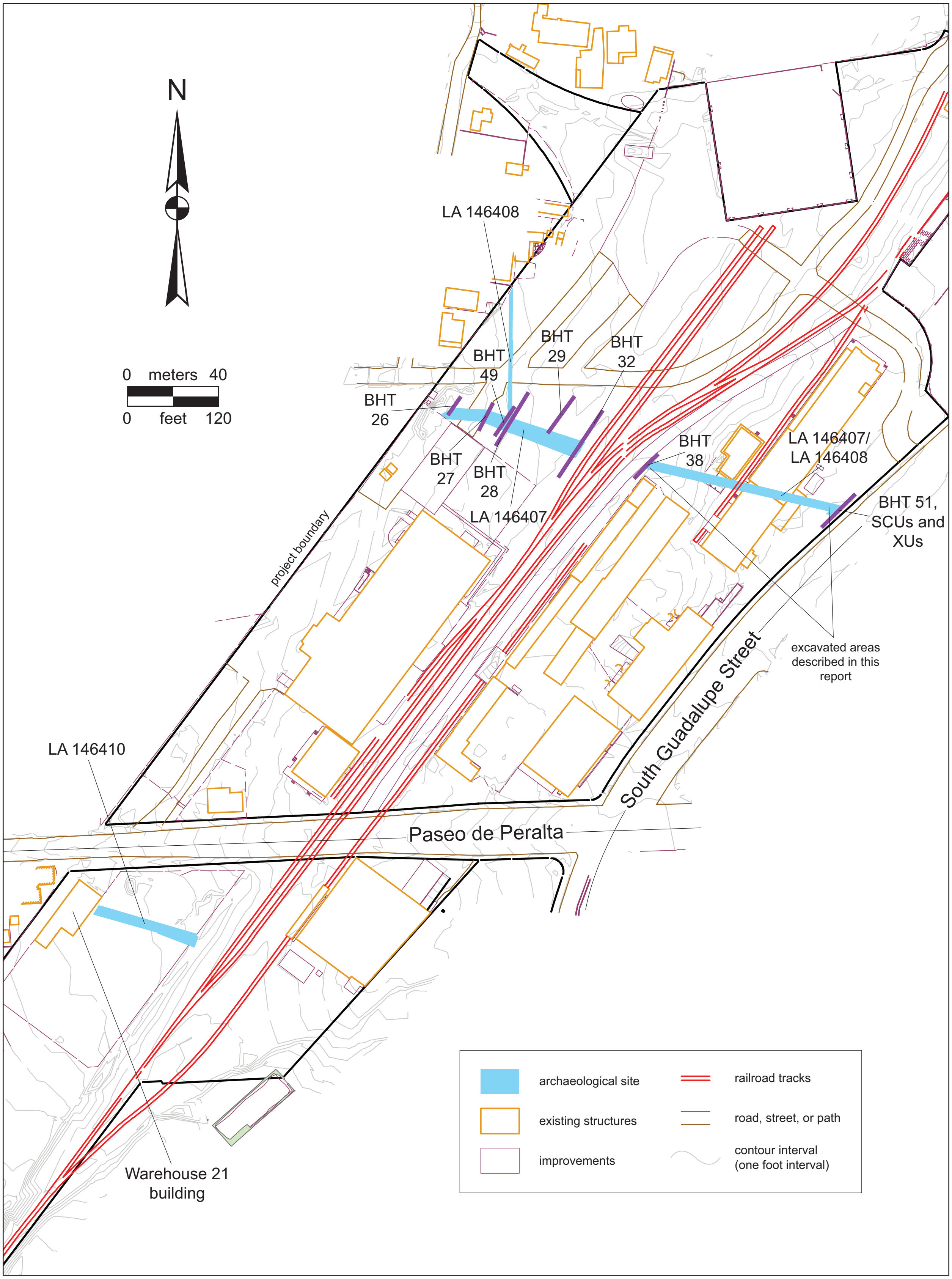
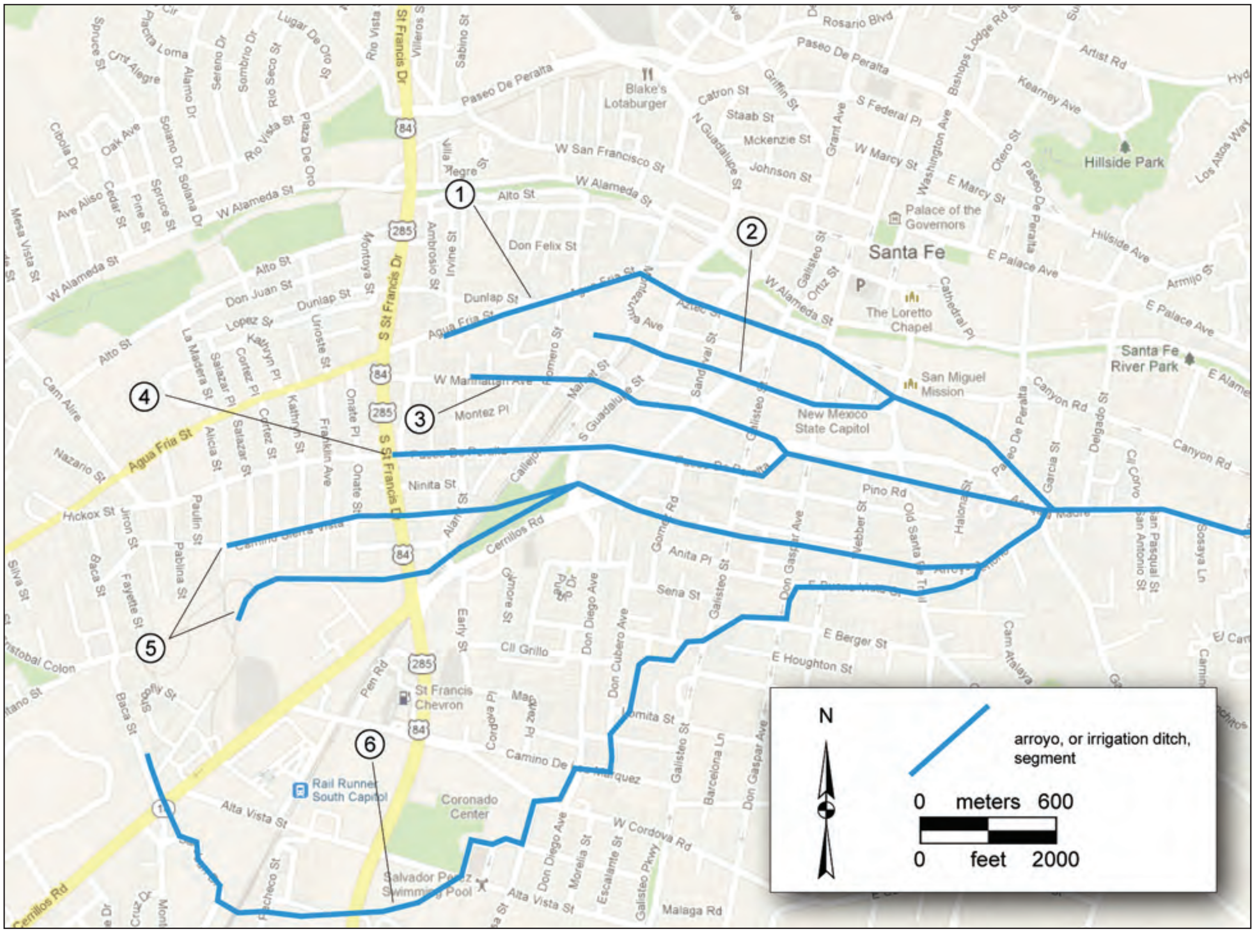


Figure 2.2a. Locations of LA 146407 and LA 146408.



DITCH KEY

1. "Analco Ditch," identified as such in 1866 as extending as far west as 803 Agua Fria Street (SFCD Bk H:454, Bk F-1:598).

2. Analco "contra-acequia" ditch, diverted to the former Delgado House (now the Rio Chama restaurant (McIntosh and D. H. Snow 2006), and identified in 1890 as the "old acequia [of] Diego Gonzales" (Fig. 7.6; William White, surveyor).

3. Ditch of Juan Diego Romero, or the Manhattan Street Ditch (McIntosh and D. H. Snow 2006; D. H. Snow 2005:30, 43).

4. Acequia Madre Ditch, frequently referred to interchangeably with the "ditch" or "acequia del [de los] Pino [Pinos]," and the "main ditch" (SFCD Bk P04:451). I am unclear concerning where the two westerly segments of this major lateral diverged—one branch continuing west along what is today Hickox Street, the other flowing southwesterly along the north side of the New Mexico School for the Deaf.

5. Tenorio Ditch, or "acequia de las crucitas" (SFCD Bk G-1:268), also frequently referred to as the "Acequia Madre." A lateral diverted on the west side of Garcia Street. Its westerly course appears to have been along what is today Sierra Vista Street.

6. Unnamed ditch segment along Baca Street, possibly a lateral from the Buena Vista segment of the lateral frequently called "Acequia Madre," diverted from Arroyo Tenorio to present Buena Vista Street (D. H. Snow 1988).

Figure 2.2b. D. H. Snow's proposed courses of former laterals from the Acequia Madre through the Santa Fe Railyard.

the north. Rather, it appears that LA 146407 (Feature 56/42) represents a filled-in acequia possibly named for Juan Diego Romero that flowed along the course of what would later become the Manhattan Street Ditch. LA 146408 (Feature 28) may represent the more recent (early- to mid-twentieth century) Manhattan Street Ditch (Scheick et al. 2003; Wenker 2005). LA 146407 represents the older, stratigraphically lower channel course. After the abandoned channel was filled, a second acequia, LA 146408, was dug into the final fill deposits, following the course of the earlier channel.

The superimposed acequias were excavated in two sections separated by modern buildings and railroad infrastructure and are discussed below as east and west segments. Because understanding of the two watercourses deposition sequences are dependent upon interrelated strata, both sites are discussed within each section. The eastern section was located along Guadalupe Street in front of the Gross Kelly & Company warehouse along the project's east boundary. The west section was in the area between the railroad tracks and the western project boundary, near existing railroad tracks that cross through the railyard (Fig. 2.2a) and was bisected by Manhattan Avenue. Stratigraphy in the two sections is continuous and internally consistent from east to west. Artifacts are briefly discussed by stratum and are summarized in Tables 2.1, 2.2, 2.3, and 2.4. Analyzed assemblages are detailed by analytic unit in tables within each artifact category's specific section.

Site Location

Within the northern project area, LA 146407 (Feature 56/42) extends from the southeast to the northwest for a distance of roughly 181 m. The Feature 28 channel (LA 146408), spans approximately 101 meters of this length. Its deposits were roughly 5 to 6 m in width. LA 146408 closely followed the course of LA 146407 across the eastern project area, but diverged dramatically from the underlying channel once it had passed under the railroad track, turning sharply to the north and continuing out of the project area. Overall, LA 146408 extended about 202 m through the project area; roughly 101 m was present in the eastern section (Fig. 2.2a). This later channel was generally 1.5 to 2.5 m in maximum width. Before testing, the sites were covered by dirt- and gravel-surfaced automobile parking lots; no features or artifacts were visible on the modern surface.

Data Recovery Procedures

Data recovery was conducted in two phases. The west acequia section, located between railroad tracks and project bounds near Manhattan Avenue, was excavated from February 21 and March 29, 2005, the east section along Guadalupe Street, from April 22 and May 18, 2005. Excavation, mapping, and recording procedures followed those detailed in the data-recovery plan (Wenker et al. 2005). The following section discusses overlying strata common to both loci and is followed by data recovery procedures for each discussed by excavation area. Excavation at both ends of the project area is discussed below. Excavation units in the west area are mapped in Figure 2.3. Those in the east area are shown in Figure 2.4. Features, excavation unit dimensions, grid location and depth are summarized in Tables 2.5, 2.6, 2.7, 2.8, 2.9, and 2.10.

East Section

Two backhoe trenches, BHT 51 and BHT 2, were examined east of the railroad tracks (Figs. 2.2a, 2.4). Along South Guadalupe Street, BHT 51 (originally dug during the testing) was re-excavated and new cross-section drawings were created. A mechanically excavated scraping unit (SCU 7) removed the modern overburden from the eastern edge of the trench. The upper parking lot gravel was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. A row of seven hand-excavated 1 x 1 m units (XUs 23–29) was placed along the eastern trench edge to excavate the fill from within the acequia channels for controlled (1/4-inch screened) artifact recovery. Additional mechanically excavated and hand-dug scraping units (SCUs 3–6 and 8–11) exposed the top of the later acequia to the east and west of BHT 51 to examine its horizontal extent and to search for additional diversion features (such as headgates) or other subsidiary channels, of which none were found. Artifact recovery rates were moderately high (n = 2110 items from LA 146407 and 248 items from LA 146408; Tables 2.1, 2.2).

A second backhoe trench, (BHT 2), was newly

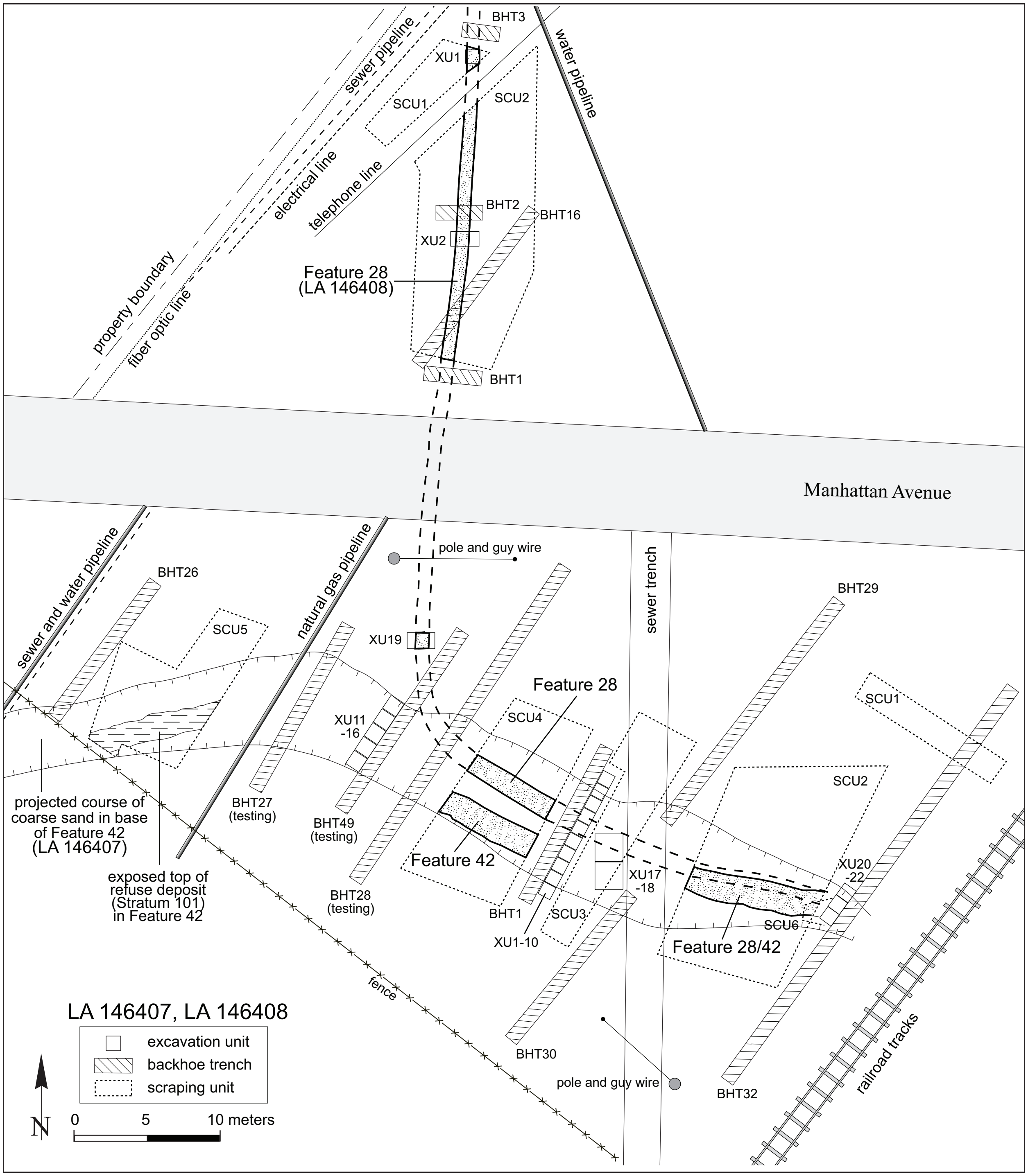


Figure 2.3. LA 146407 and LA 146408, site map.

excavated along the eastern side of the railroad tracks to confirm the channel location and expose additional cross sections. Additional excavation in this area was not possible due to a complex array of buried water, natural gas, telecommunication, electricity, and sewer lines as well as modern roadways. The utilities had probably impacted the features, and their locations precluded the excavation of any additional trenches or units in areas that would have been useful for additional site interpretation.

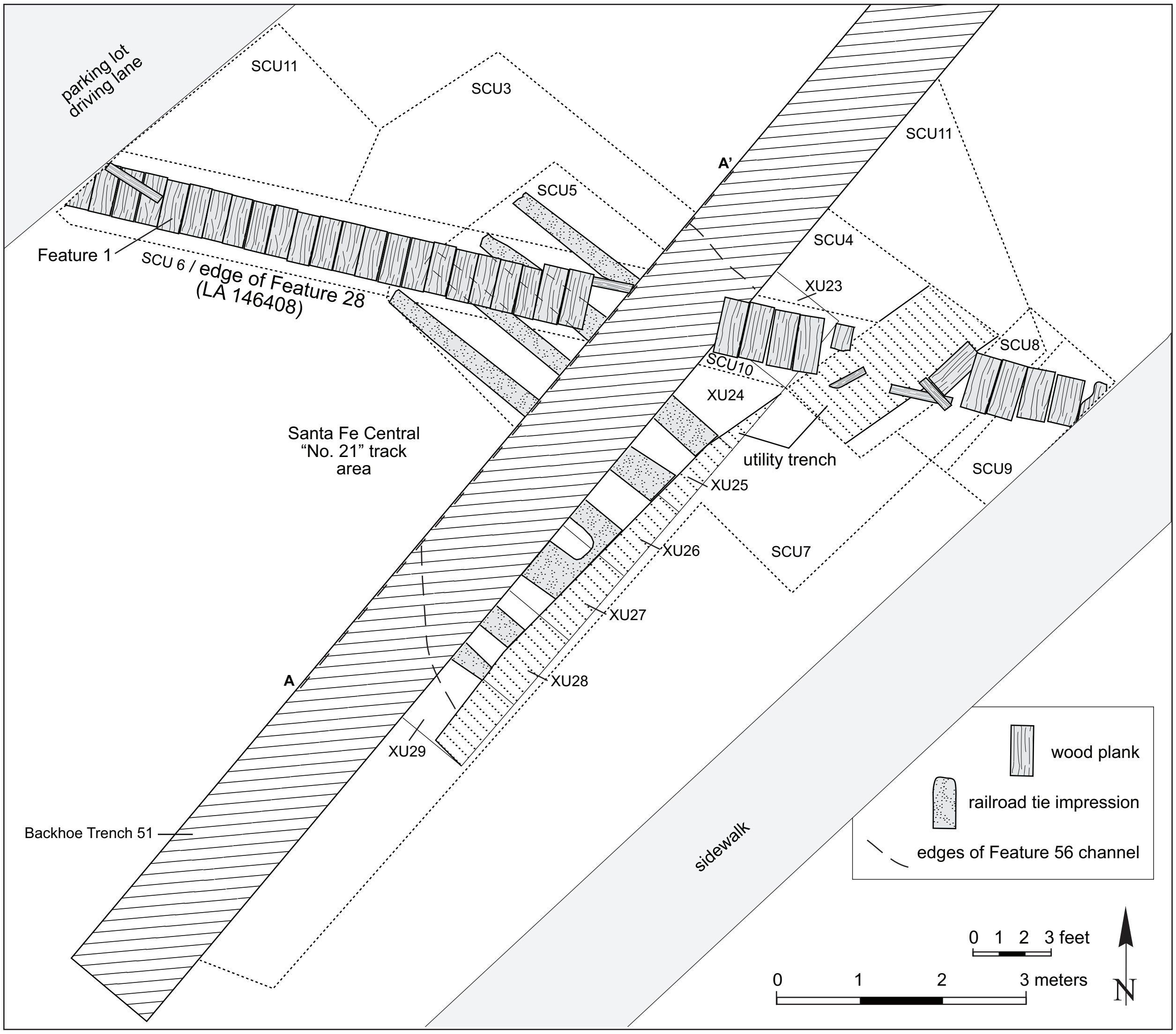


Figure 2.4. LA 146407 and LA 146408, overview and excavation map, eastern area.

West Section

West section excavation started with re-excavation of BHTs 26–30, 32, 49, and 16. Previously excavated during testing, backhoe trenches were placed perpendicular to acequia deposits to gain cross-section views that were reevaluated and profiled. Rows of hand-dug 1 by 1 m excavation units placed to span the channel's entire width were placed along selected backhoe trench faces in each acequia to excavate fill from within the channels for artifact recovery. A series of six mechanically dug scraping units (summarized in Table 2.8; Fig. 2.3) and additional hand-dug excavation were employed to expose the tops of the acequias and search for additional diversion features (such as headgates) or other subsidiary channels.

LA 146407 acequia deposits were found to be present in all trenches south of Manhattan Avenue, despite their not having been noted during testing at the excavation area's far east and west ends. Excavation units were employed along three trench lengths to systematically evaluate these acequia deposits. An additional trench, BHT 1, was excavated east of BHT 28 to provide a view of the stratigraphy for a row of 10 excavation units (XUs 1–10) that spanned the width of the channel in this area. XUs 11 through 16 were excavated along the west side of BHT 49 to gain a view of the sediment and contents farther downstream. Finally, a row of three units (XUs 20–22) was excavated at the far eastern end of the excavated parcel, where the channel was narrowest. Meanwhile, mechanical scraping units between the trenches (SCUs 1–5) attempted to locate buried subfeatures related to the acequias, with little success beyond tracking the refuse-filled upper post-abandonment fill of the final channel deposits. Once it was determined that much of the acequia was eroded out, scraping efforts over the channel were halted (for example, east of BHT 27). Another scraped area (SCU 6) was positioned to track the horizontal orientation of acequia infill (Strata 111 and 113, discussed below) for a short distance west of BHT 32. An area of cobbles, sewer pipe, and wood east of BHT 1 was excavated with two 2 x 2-m units (XUs 17–18) to determine if a feature was present, but the area proved to represent a refuse deposit. No work was conducted west of BHT 27 due to a modern natural gas pipeline. Similarly, no work was conducted south or west of BHT 26 due to the presence of a modern sewer pipe, water pipe, fiber optic line, and the western edge of the property.

LA 146408 was examined concurrently with LA 146407 in the area south of Manhattan Avenue. XU 19 (a 1 x 2 m unit) was placed perpendicular to BHT 49 to accompany the XUs 11–16 series in Feature 42 to the south and to trace the course of Feature 28. North of Manhattan Avenue, BHT 16 was reopened and three new trenches (BHTs 1–3) were placed across the channel's course. Two additional XUs (1–2) were dug into the channel to sample its contents, and two scraping units (SCUs 1–2) were used to expose the areas lateral to the feature. Portions of the northern end of the feature could not be trenched or scraped due to the presence of telephone, water, sewer, electrical, and fiber optic lines along the western property boundary.

Sediment samples were taken from the faces of three different trench or excavation unit exposures for photon-stimulated luminescence dating. Samples were collected from Stratum 115 (the possible early Feature 42 channel fill), Stratum 117 (sand), Stratum 104 (sand), and two locations in Stratum 105 (Feature 28 channel fill). Three locales were targeted for archaeomagnetic sampling but results were inconclusive. Again, Stratum 115 was sampled, as was a fine basal deposit of Stratum 117. Stratum 113, basal channel fill of Feature 28, was also sampled. Artifact recovery for all excavation units are summarized by stratum in Tables 2.3 and 2.4. One flotation sample was taken from an area where possible charcoal could be obtained from Stratum 100 in an XU.

Site Strata

[Here and throughout, see Appendix 1, Table App1.1, for Munsell soil-color equivalents].

Most of the sediment filling and capping the features and the surrounding historical ground surface consisted of purposefully introduced overburden. Stratum 1 was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving and parking surfaces in the area and was 5 to 30 cm thick. Stratum 2 was a black sandy loam deposit containing abundant inclusions of coal and cinders and historic refuse (glass, metal, etc.) and was approximately 5 to 35 cm in thickness. This was probably fill brought in to level the historical railyard. Stratum 3 was the underlying sterile substrate, a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. The underlying Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed medium crumb structure. Its color ranged from light yellowish brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown to brown in color. Clasts frequently exhibited caliche skins, and the overall stratum was weakly cemented with calcium carbonate. Other strata identified during the excavation are noted below in the feature descriptions.

Generally, the upper fill of Stratum 1 was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill was screened. Artifact recovery rates were relatively high (n = 16,445 items from LA 146407 and 6946 items from LA 146408; Tables 2.3, 2.4), although as will be seen, little of the material from LA 146407 is related to use- or abandonment-related acequia channel deposits.

East Segment Stratigraphy and Channel Sequences

East acequia segments and channel stratigraphy were documented in BHT 2 and BHT 51. During the testing project (Wenker 2005), both ditches were identified in BHT 51 as a single feature (Feature 56) and assigned to LA 146407. The feature was mainly evident in cross section as a 5.6 m wide, broad basin-shaped channel with an irregular, abrupt lower boundary. The sediments within the channel consisted of a variegated, interdigitated sand, silty sand, and sandy clay lenses, forming a deposit that was 62 cm thick at its deepest point. No clearly patterned overall alluvial sequence or discrete channels could be isolated within the overall ditch boundaries. These sediments may have represented a complex of aggraded deposits formed over long, sequential periods of use, that were laid down in a series of continually shifting ditch channels that drifted laterally over time, as the acequia was periodically maintained and re-excavated during clean-out episodes. Preliminary interpretation of channel deposits in the preliminary site reports (see Wenker 2005a,d) was that most of the actual LA 146407 acequia channel was eroded and destroyed during a post-1880 catastrophic flood or flood episodes that scoured out a broad erosional channel. Later evaluation by Dr. Stephen Hall (Red Rock Geological Enterprises) indicated that the channel dimensions were likely constructed and not enlarged by a flooding. The channel was then filled with coarse sand and gravel as well as abundant railroad-era artifacts. Subsequent infilling by colluvium and post-abandonment refuse finally filled the channel. Later, the second acequia channel (LA 146408) was excavated. The smaller, stratigraphically higher channel of LA 146408 was also noted during the testing, but it was not segregated as a separate feature or site at that time. During the testing, the wood planks in this channel were interpreted as post-abandonment refuse; the presence of the wood-framed culvert (Feature 1, LA 146408) was a new discovery (discussed below). The remnants of the railroad tracks that cross over both channels were noted during testing and recorded as Feature 104 of Site LA 146406.

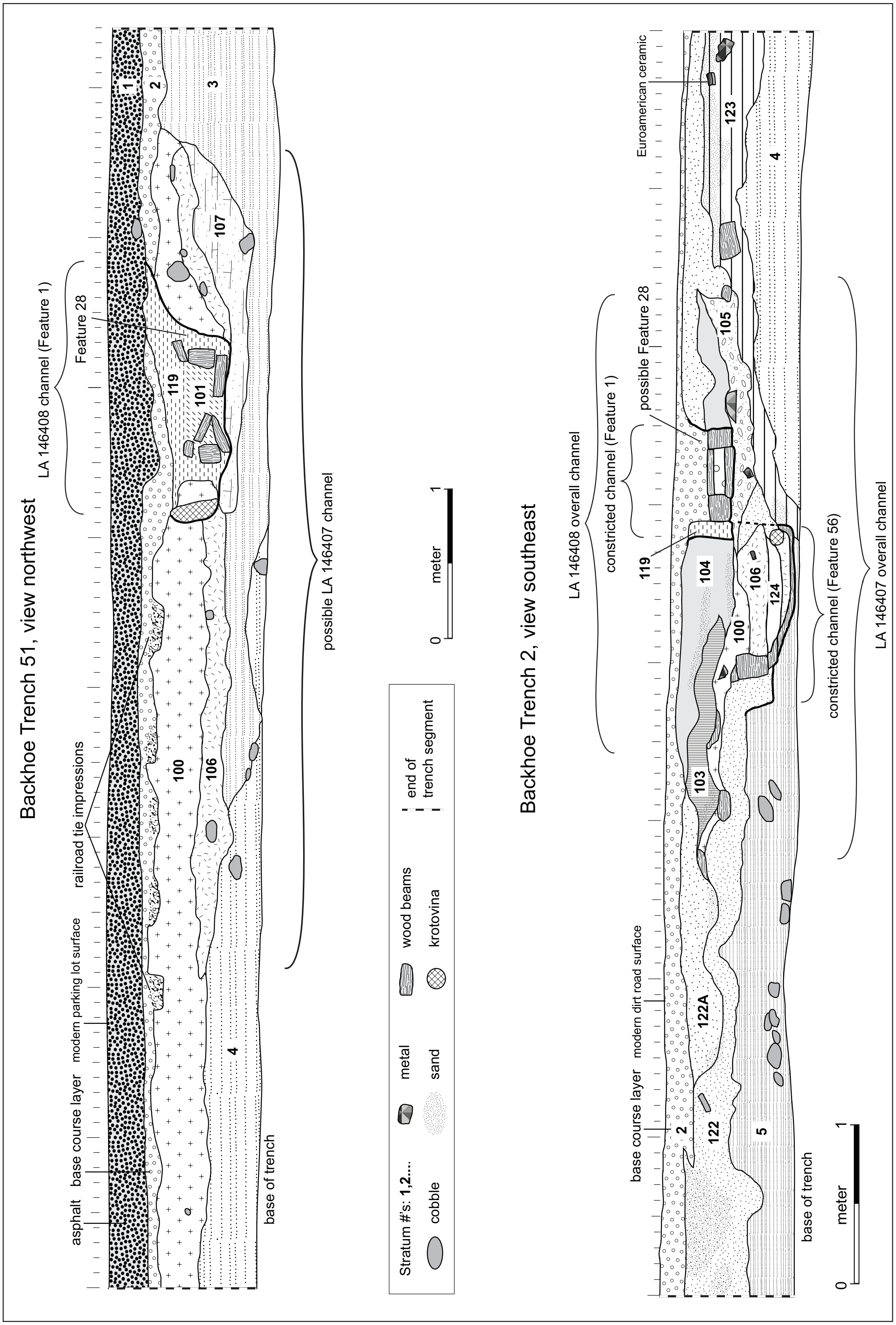
BHT 51

<u>LA 146407</u>

BHT 51, LA 146407 was evident in cross section as a 5.6 m wide, broad basin-shaped channel excavated in XUs 23–39. The sediments within the channel consisted of Strata 106 and 107, forming a 62-cm-thick deposit at its deepest point, which was capped by Stratum 100. At the eastern end of the project area, along BHT 51, a typical exposure of LA 146407 was revealed (Fig. 2.5). In this location, the channel morphology and fill closely resembled that observed west of the railroad tracks.

Earliest deposit. Stratum 107 was the stratigraphically earliest deposit in the overall Feature 56 channel, and it appears to represent sediments deposited in part of the original channel. Stratum 107, 30–40 cm in thickness, was a strong brown loamy silt with few, fine charcoal flecks, and a wavy, clear lower contact with the underlying sterile Stratum 4. Excavations in this deposit yielded low quantities of native ceramics and faunal bone from its upper 5–10 cm level, no metal and only one piece of glass, native ceramics account for 70 percent of the artifact assemblage (Table 2.1). The remnant cross section of the northern edge of the basin occupied by this stratum suggests that it occupied a channel at least 2.2 m wide and 40 cm deep, although these margins could not be confirmed as the actual edges of the original acequia.

Channel fill. The upper and the southern lateral margins of Stratum 107 were truncated and overlain by Stratum 106, a 10–20 cm thick deposit of brown, very gravelly, poorly sorted coarse sand with an irregular, clear lower boundary. As in other excavations in this channel across the railyard, this deposit may represent a high-water-velocity depositional regime. Excavations in seven 1 x 1 m units in this deposit (Fig. 2.4) yielded moderate quantities of artifacts, mainly from the upper 10 cm of the deposit, underneath Stratum 100 (Table 2.1). Highest artifact frequencies seem to have been from bank fill. Euroamerican artifact analysis indicated a railroad-era assemblage including a shoe fragment, dishware and bottle glass. Bottle glass was not machine pressed suggesting that this deposit may predate 1904. Animal bone and native ceramics were more prevalent than glass and metal in the channels bed; many of the ceramics were rounded from alluvial transportation, indicating an upstream origin for much of the material.



Figures 2.5, 2.8. LA 146407 and LA 146408, top (Fig. 2.5): BHT 51, northwest wall, cross-section view; bottom (Fig. 2.8): BHT 2, southeast wall, cross-section view.

Stratum 100, which capped Stratum 106 and extended southward beyond the limit of the channel, consisted of a soft, brown to yellowish brown, fine sandy loam containing few, fine charcoal inclusions, with a wavy, clear lower boundary. Although some of the excavated contexts of Stratum 100 were inadvertently mixed with modern backfill from a telecommunications utility trench (Stratum 120; Fig. 2.4), Stratum 100 contained abundant railroad-era (and earlier) artifact material (Table 2.1). Analysis indicates many of the artifacts are bottle glass fragments likely representing products associated with Food and Indulgence items. The presence of machine-manufactured bottle glass (n = 7, 1904+, Lorrain 1968:43 in Barbour (OAS report project in production) dates the deposit to the early twentieth century. This refuse-rich deposit was also commonly observed in the western extent of the channel, and represents infilling with mixed alluvial and colluvial origins. The channel of LA 146408 was dug into this sediment.

LA 146408

In BHT 51, the testing phase documented an array of planks in a sub-channel of Feature 56, which was originally designated Acequia Analco at LA 146407. Data-recovery excavations revealed that this sub-channel was separate and was assigned Feature 28 of LA 146408. The wood planks were an intact wood-framed subterranean culvert (Feature 1) that had been built within the Feature 28 channel. Sediments within LA 146408 channels were segregated in an SCU and excavated and screened separately from the underlying LA 146407 deposits (Table 2.2), and the horizontal extent of the wooden culvert was explored by additional hand-dug and mechanically excavated scraping units to the east and west (Fig. 2.4). The eastern extent of the wooden culvert was not located because the feature was truncated by the modern sidewalk along South Guadalupe Street. Excavations to expose the western extent of the culvert were limited by an active automobile ingress/egress lane along the front of the Gross Kelly Warehouse building, and the full western extent of the feature could not be exposed. Overall, a 12.75 m (42 ft) long expanse of the top of the culvert was revealed during this excavation (Fig. 2.6).

Feature 28. In BHT 51, Feature 28 represents the apparent first course of the Manhattan Street Ditch, which originally consisted simply of a dirt-walled channel excavated into the post- abandonment deposits of the underlying LA 146407 channel. Feature 28, Stratum 119 fills this flat-bottomed, straight-sided channel, which approached 1 m (3.3 ft) in width and 50 cm (1.7 ft) in depth. Stratum 119 appears to be an introduced deposit that filled the original channel after the wooden culvert was installed. Fill was a brown to dark brown sand, containing abundant, medium coal and clinker chunks and common, medium to large, distinct mottles of gray silt and Stratum 100 material. Excavations of Feature 28 recovered an admixture of common railroad-era and earlier artifacts. Artifact types with highest frequencies were glass, metal and bone. Euroamerican ceramics were twice as common as those of Native American manufacture (Table 2.2). Euroamerican artifacts (n = 4) consisted of an unidentifiable piece of glass, a fragment of a glass bottle, a piece of tin or aluminum foil and semi-vitreous white-bodied earthenware sherd from an unidentifiable vessel. All four of the artifacts are relatively

Figure 2.6. LA 146408, Feature 1, wooden culvert, in-progress excavation view to the northeast.

small and were likely moved into and through the channel as a result of fluvial action.

Feature 1. Feature 1 was one of two wooden culvert remnants documented in LA 146408. The wooden culvert, Feature 1, was installed in the base of the original Feature 28 channel. This structure was built of creosote-impregnated beams and planks (Fig. 2.7). In cross section, the culvert measured about 15 in high by 28 in wide (38 by 71 cm) on the outside, with interior dimensions of 9 in high by 20 in wide (23 by 51 cm). The sides were formed of 4 x 9-in (10 x 23 cm) beams, set on edge, that extended the length of the culvert. The base consisted of a row of abutted 3 x 12 in (8 x 30 cm) planks that measured 28 in (71 cm) long, which were installed under the side-beams, perpendicular to the alignment of the structure. A second set of similarly abutted planks roofed the structure (Fig. 2.6). Most of the base and roof planks were nailed to the side beams with large spikes. Except for a modern utility trench that bisected the eastern end of the culvert, the structure remained in excellent condition. None of the roof planks had collapsed, and in some places an air space was still present above the top of the interior fill, indicating that this structure was still withstanding the weight of vehicular traffic from the parking lot above.

Fill within the culvert consisted of two interdigitated deposits of fine-grained alluvium, presumably representing the final, low-velocity flows through the culvert during or after its abandonment. Stratum 101 (Fig. 2.5), which filled the bottom of the structure and part of the sides, consisted of brown to dark brown silty loam containing few, fine charcoal flecks and moderate quantities of artifacts. Stratum 102 (not illustrated in Figure 2.5) was a light yellowish-brown silt that lacked charcoal; this deposit overlay, abutted, or contained lenses of Stratum 101 in places, indicating that it represents the final infilling deposit in this culvert. Artifact frequencies in this deposit are lower, and lack Native American ceramics (Table 2.2).

Figure 2.7. LA 146408, BHT 51, west wall, Features 1 and 28, cross sections after excavation of overburden, showing construction details.

Track Alignments. Two rows of railroad tie impressions (Feature 4, part of Site LA 146406) crossed over the top of the wooden culvert and were exposed along the southeastern and northwestern sides of BHT 51 (Figs. 2.4, 2.5). These impressions, which contained clinker-rich variants of Stratum 2, had been dug into the underlying Stratum 100. The spacing between the ties on either side of BHT 51 suggests that two different track alignments are represented. This interpretation is supported by an assessment of the tie lengths. Railroad ties in other areas of the railyard were commonly 2.4 m (7.9 ft) long, which closely matches the current, standard U.S. cross-tie lengths of 8, 8.5, or 9 ft. The western ends of the western set of tie impressions were identified in SCU 5, and those partial impressions measured between 1.75 to 2.15 m (5.7 to 7 ft) in length. Therefore the 50 to 75-cm-long tie impressions southeast of the trench (1 m [3.3 ft] away) were probably not part of the same ties as those on the northwest, and hence probably represent a separate set of tracks altogether. The presence of multiple, parallel sidings of the New Mexico Central Railway (NMC) at this location is confirmed by historic maps, which indicate that these lines may be part of the "No. 21" and "No. 22" tracks (Scheick et al. 2003:71). No signs of trestle foundations were found at either culvert crossing.

BHT 2

LA 146407, Feature 56

Deposits constituting Feature 56, the eroded channel of LA 146407, were exposed in cross-section in both Backhoe Trenches 2 and 51 (Figs. 2.5, 2.8, 2.9). The newly excavated BHT 2 revealed a wood-lined section of the channel in cross section (Figs. 2.8 [*see* Fig. 2.5], 2.9), which provides the best information of this channel's original dimensions obtained by excavation.

In BHT 2, the Feature 56 channel cross section shows a slightly concave bottom with vertical sides. The bottom of the channel was lined with a set of flat-lying, highly decomposed wooden planks, and the sides were marked by larger, but also heavily rotted, wooden beams. The southern side of the wood-lined channel was truncated by apparent post-abandonment sediments (Strata 105 and 122), but the bottom of the southern edge was still intact and indicated that the wood-lined channel was

Figure 2.9. LA 146407 and LA 146408, composite photograph of BHT 2 east wall, showing superimposed wood-lined acequia channels.

probably symmetrical in its cross section. The basal planks had rotted and collapsed into a 5-to-7-cm thick organically stained dark brown clay and sand lens, but the side-wall beam dimensions appeared to approach 4 in (10 cm) wide by 8 in (20 cm) high. The interior of the lined channel measured approximately 76 cm (2.5 ft) across. The intact depth of the wood-lined channel was 36 cm (14 in), and there were no indications that the channel sides were originally any higher.

Channel base (Strata 122 and 123). The basal planks of this lined channel segment had apparently been set into a natural substrate deposit of Stratum 5, which may represent the original base of the channel prior to the installation of the lining. The side walls of the wood-lined channel were set against cultural-fill deposits of Strata 122 and 123.

Stratum 122 was a hard yellowish brown, medium grained, very gravelly sand containing common, fine to medium coal and clinker chunks. Stratum 123 was slightly hard, brownish yellow, very gravelly sand containing common, distinct, medium mottles of Stratum 122 material. Neither of these sediments contained internal laminations or size-sorting of particles; both exhibited a mottled, churned appearance. Both also showed flat, abrupt lower and lateral boundaries around the wood-lined channel, but the boundaries became irregular and diffuse to the north and south as the deposits become thicker. The portions of these strata that fill the broad depression around the wood-lined channel appear to represent some of the original Feature 56 channel fill, into which the wood was installed. The lens of Stratum 122 that intrudes into the southern, disturbed side of the wood-lined channel may represent a slumped edge of fill that collapsed into a vacuity left by the southern side-beam after it rotted away or was removed. The portions of these strata that overlay the sterile substrate to the north and south may represent redeposited channel fill that was dumped on the original ground surface or mixed with a pre-existing topsoil layer. These processes likely produced the variants identified as Stratum 122A on Figure 2.8, stratigraphically distinct depositional units that are physically identical to the underlying parent materials. The irregular upper boundaries of these deposits, and the complex array of strata in and between the lower and upper channels, indicate a great deal of post-depositional disturbance.

Channel fill (Strata 106 and 124). The wood-lined channel itself was filled with deposits of Strata 106 and 124. Stratum 106 was a dark yellowish brown, soft, coarse gravelly sand that was typical of all the exposures of LA 146407 west and east of the railroad tracks. This poorly sorted material contained metal and coal inclusions, and is interpreted as a high-water-flow deposit. The lower and upper members of this stratum in this exposure were separated by a thin (7 cm) band of Stratum 124, which was itself a heterogeneous deposit consisting of a lower, 4-cm-thick band of light yellowish-brown silt, a mid-level, 1-cm-thick band of medium-grained sand, and an upper band of light yellowish-brown silt. Both silt lenses exhibited fine internal lamination and both contained few, fine inclusions of charcoal. Stratum 124 appears to represent a period of low-water-velocity deposition during the overall period of Stratum 106's deposition, and so may be interpreted as a localized member of Stratum 106.

Historic ground surface and Stratum 100. Stratum 100 was a deposit commonly found overlying sediments in LA 146407 west and east of the railroad tracks, described as a yellowish brown, slightly hard, fine to medium-grained pebbly sand with common, fine charcoal inclusions. On the north side of Feature 56, the upper level of Stratum 122 was marked by two pieces of flat-lying, heavily rotted wood planks or beams, 40 to 90 cm north of the channel, which were in turn capped by a deposit of Stratum 100. Stratum 100 also capped the Stratum 106 fill within the channel itself. The two pieces of rotted wood at the top of Stratum 122 are matched by a second pair of wood fragments 1.4 to 1.8 m south of the channel, at the top of Stratum 123. The shared elevation and stratigraphic position of these wood inclusions suggests this level marks the historical ground surface related to the wood-lined channel. The burial of this surface by Stratum 100, further supports this inference.

Infill. The BHT 2 profiles shows that north of the channel, Stratum 100 was further capped by Stratum 103, a dark grayish brown, extremely gravelly sand (essentially a gravel lens) containing few, medium coal inclusions. This stratum represents another high-water-flow depositional regime of unclear origin. South of the Feature 56 channel was a roughly equivalent deposit, Stratum 105, which consisted of dark grayish brown, extremely gravelly, coarse-grained sand. Strata 103 and 105 were overlain by Stratum 104 (part of Feature 28 of LA 146408, which is described below), which also contains a remnant wood-framed culvert (Feature 1). Stratum 104 is interpreted as an intrusive, early expression of the later channel.

Summary. The lower wood-lined channel was presumably constructed to direct water under a small trestle in the AT&SF main line; no trestle is visible in the modern tracks. The wood-lined channel showed no signs of a cover, but the relatively large beams used in the side walls suggest that the structure may once have been roofed like Feature 1 of LA 146408 (see below).

LA 146408, Feature 28

In this trench (Fig. 2.8), Strata 103 and 105 of LA 146407 were overlain by Stratum 104, a dark grayish brown, hard, poorly sorted, fine to medium-grained gravelly sand exhibiting few, medium, distinct lenticular lenses of light brown sand. The broad, lenticular deposit of Stratum 104, represents a primary deposit which contains the later channel versions: Feature 28 and Feature 1a were not observed in other exposures of LA 146408 to the east or west. Stratum 104 is interpreted as a somewhat localized, disturbed or modified (widened), earlier expression of Feature 28.

A temporally later and more typical version of the Feature 28 channel was present as a narrow deposit of Stratum 119 that flanked the northern edge of Feature 1, the wood-framed culvert (Fig. 2.8). As was seen in the more easterly exposures in BHT 51 (described above), it appears that Feature 28 was originally an unlined acequia channel into which the wooden culvert was installed. Stratum 119, a yellowish-brown hard sand, represents introduced fill in that original channel.

Feature 1a. The same trench exposure that exposed Feature 28 (LA 146408 in BHT 2) also revealed Feature 1a above the wood-lined channel documented in LA 146407. Feature 1a is the second of two culvert exposures documented in LA 146408 (see also Feature 1, BHT 51). The wood-framed culvert that marked the final alignment of LA 146408 was better preserved in exposures to the east (as described above). In BHT 2, the beams and planks were badly rotted, and the following discussion focuses on the nature of the feature's abandonment. The relatively intact base measured roughly 60 cm (2 ft) wide, but the overall height of the structure only measured 14 cm (6 in), and all the wooden elements were badly distorted and compressed. The trench into which the culvert had been installed also measured 60 cm in width, but had originally been at least 30 cm (1 ft) deep. The top of the trench, above the remnant wooden elements, was filled with a coarse gravel deposit of Stratum 1 or 2, which apparently had been deposited across the parking lot directly over the top of the intact culvert. The culvert then apparently became compacted and flattened (probably through vehicular traffic). As the wooden elements sank into the base of the culvert trench, additional Stratum 2 deposits filled in the resulting depression, capping and obscuring the feature at the modern surface.

In the BHT 2 exposure, the culvert lay 10 m (33 ft) away from the AT&SF tracks to the west. The culvert probably originally extended from BHT 2 to the tracks, possibly to accommodate a roadway along the eastern side of the tracks, but it did not extend beyond the western side of the tracks as indicated by the BHT 32 profiles.

Summary. It is not known if the Manhattan Street Ditch culvert exposures at BHT 2, Feature 1a, and BHT 51, Feature 1 represent a single, continuous feature or two separate culverts, but the latter possibility is the preferred interpretation. If the culvert were a single structure, it would have measured at least 90 m (295 ft) in length. Further, the two trench exposures indicate slightly different culvert widths (71 cm in BHT 51 versus 60 cm in BHT 2). Feature 1a was evidently installed to direct water underneath the main AT&SF tracks (built by 1880), and the Feature 1 culvert coursed underneath the NMC tracks, which post-date 1900. The date of the overall Manhattan Street Ditch's construction remains unclear, but the temporal and functional differences involved in crossing under the two different sets of tracks suggest that two separate culverts were built after 1880.

West Segment Stratigraphy and Channel Sequences

West of the railroad tracks the deposits constituting the eroded channel of LA 146407, Feature 42 were exposed of cross section in eight backhoe trenches, seven of which were originally excavated during testing (Fig. 2.3). During testing, channels associated with LA 146407 and LA 146408 were identified in two backhoe trench exposures. Subsequent excavation exposed the watercourses along the length of the excavation area documenting the continuation of both acequias and their divergence west of the AT&SF railroad tracks. Only a small portion of what appears to be an alluvial deposit in a preserved channel remnant was present in LA 146407, in the easternmost trench (BHT 32) located closest to the railroad tracks. That trench cross-section (Figs. 2.10, 2.11) is illustrative of the interpretation of the sequence of channel excavation and use, erosion, infilling, and reuse, especially when compared to trench exposures farther to the west in BHT 1 (Figs. 2.12 [*see* Fig. 2.10], 2.13).

BHT 32

LA 146407

Feature 42 (designated Feature 56 east of the tracks) likely crossed beneath the railroad tracks and was exposed in BHT 32, and excavated in XUs 20–22. BHT 32 (Fig. 2.3) lies in closest proximity to what presumably would have been a bridge or culvert under the railroad tracks (Scheick et al. 2003:62). Were a bridge and culvert actually present in the post-1880 era, the acequias' courses would have been tightly constrained as they crossed under the railroad tracks. The cross section of BHT 32 (Fig. 2.10) supports this interpretation, as the overall width of the early channel is substantially narrower than in any of the exposures farther west, indicating that little lateral drift was occurring in the BHT 32 vicinity (Fig. 2.10).

Earliest deposit (Stratum 115). The earliest deposit associated with Feature 42, Stratum 115 is a dark yellowish-brown, fine sandy silt with minor laminations of sand throughout. This stratum is interpreted as an infilling sediment deposited in a remnant of the earliest existing acequia channel, probably marking part of the southern edge of the remnant channel. A post-abandonment deposit, this sediment may reflect a period of infilling by slow-velocity water flow, possibly due to a period of disuse of the early channel. It is interesting to note that Stratum 107 is not recorded in this exposure of LA 146407. This lowest and presumably earliest stratum recorded both in BHT 51 and BHT 2 may have been scoured away by high-velocity water as it exited a culvert. The artifact assemblage shown by aggregated stratum (Table 2.3) indicates a railroad-era period of deposition. Artifacts included glass, metal, dishware and mica. Machine-cut square nails indicated the deposit likely dated to the nineteenth century. Two OSL samples were taken from Stratum 115. Sample STF05-2, taken from an earlier fill deposit (Fig. 2.10) was dated to 96±15 years before the 2006 test date, potentially dating the deposit from AD 1895 to 1925 (Berger et al. 2008).

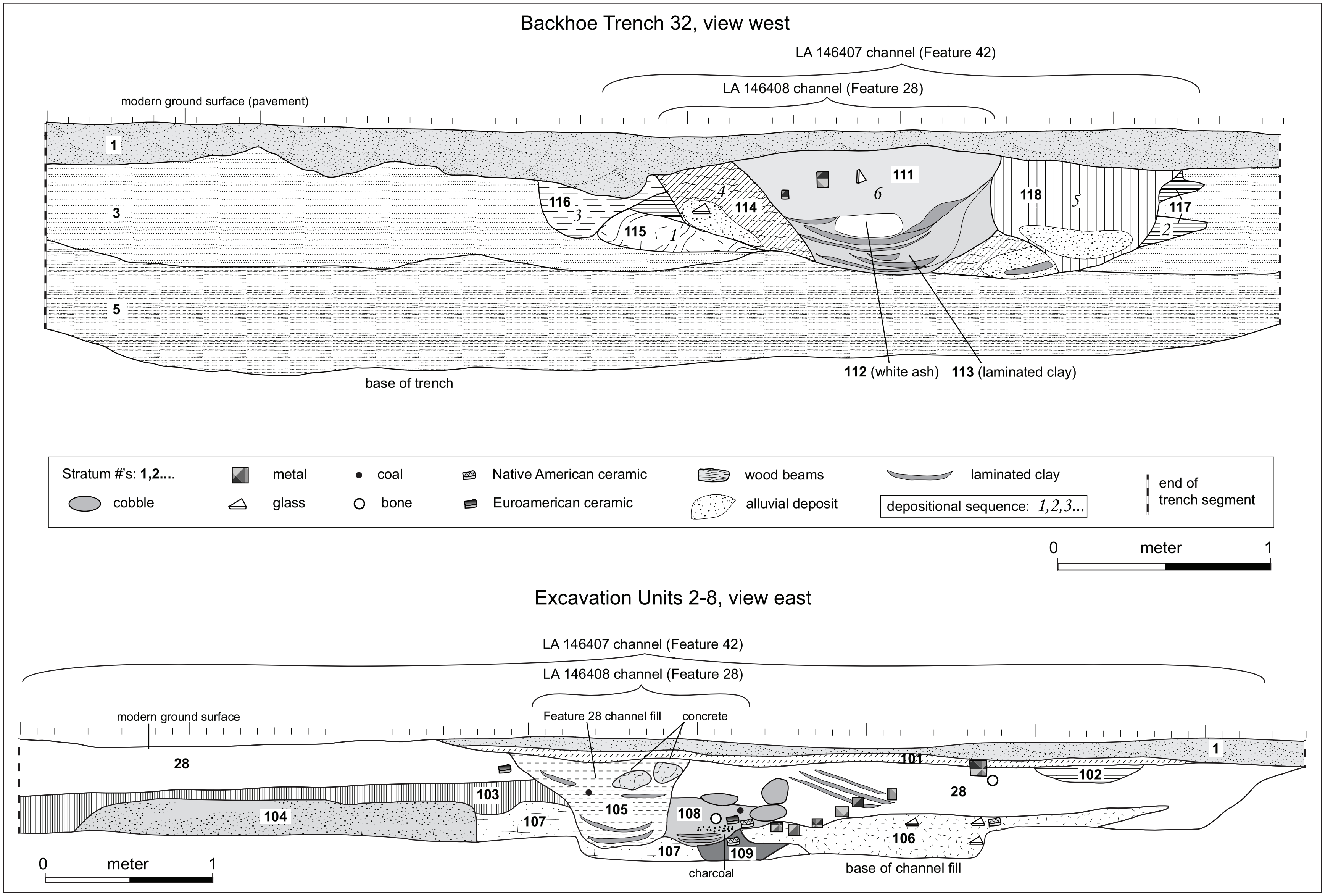
Final fill (Stratum 117). The early, infilled channel was truncated by a deposit of coarse, gravelly sand (Stratum 117), which is present at the northern and southern ends of the BHT 32 profile as wedge-shaped lenses. Stratum 117 is interpreted as being coeval with deposits such as Strata 104 and 106 in trenches farther to the west (Figs. 2.12, 2.13), where it forms the basal deposit across much of the channel's extent. The channel was then filled with coarse sand and gravel as well as abundant railroad-era artifacts (Table 2.3) including unusual amounts of wood, remnant creosote soaked railroad ties. Euroamerican artifacts sampled for analysis indicate that much of the assemblage was fragmentary and unassignable to any functional category (n = 24, 80 percent). The remainder included 14 fragments of an iron buckle.

In the BHT 32 cross section (Fig. 2.10), the southern edge of Stratum 115, the early channel remnant, was truncated again by a deposit of massive brown silt (Stratum 116), possibly representing backfill in an intrusive pit.

LA 146408

The next event evident in this cross section is the excavation and infilling of a new acequia channel (Stratum 114, interpreted as an early component of Feature 28, LA 146408), which intruded through the center of what was once the Stratum 106/117-filled erosional channel. Stratum 114 is a strong brown, granular sandy silt with common railroad-era artifacts (Table 2.4). The general lack of alluvially laid deposits in this stratum suggests that the unit may derive more from colluvium from bank slump rather than downstream flow. One other possible example of this early manifestation of Feature 28 was observed in a downstream trench, evident as Stratum 108 in XUs 5 and 6 (Fig. 2.12).

Channel Fill. The northern edge of this channel in BHT 32, once it had infilled, was truncated by another intrusive pit (filled with Stratum 118, a mottled brown clay and caliche deposit). Finally, another



Figures 2.10, 2.12. LA 146407 and LA 146408, top (Fig. 2.10): cross section of BHT 32, west wall; bottom (Fig. 2.12): BHT 1, cross section of XUs 1–10, east wall.

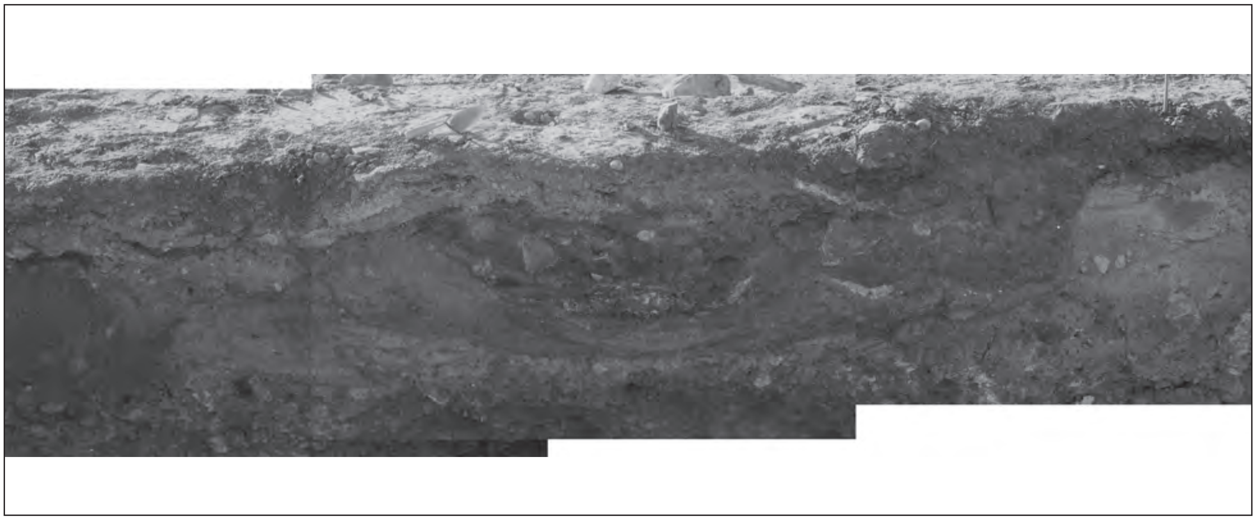


Figure 2.11. LA 146407 and LA 146408, BHT 32, composite view of the west wall cross section.

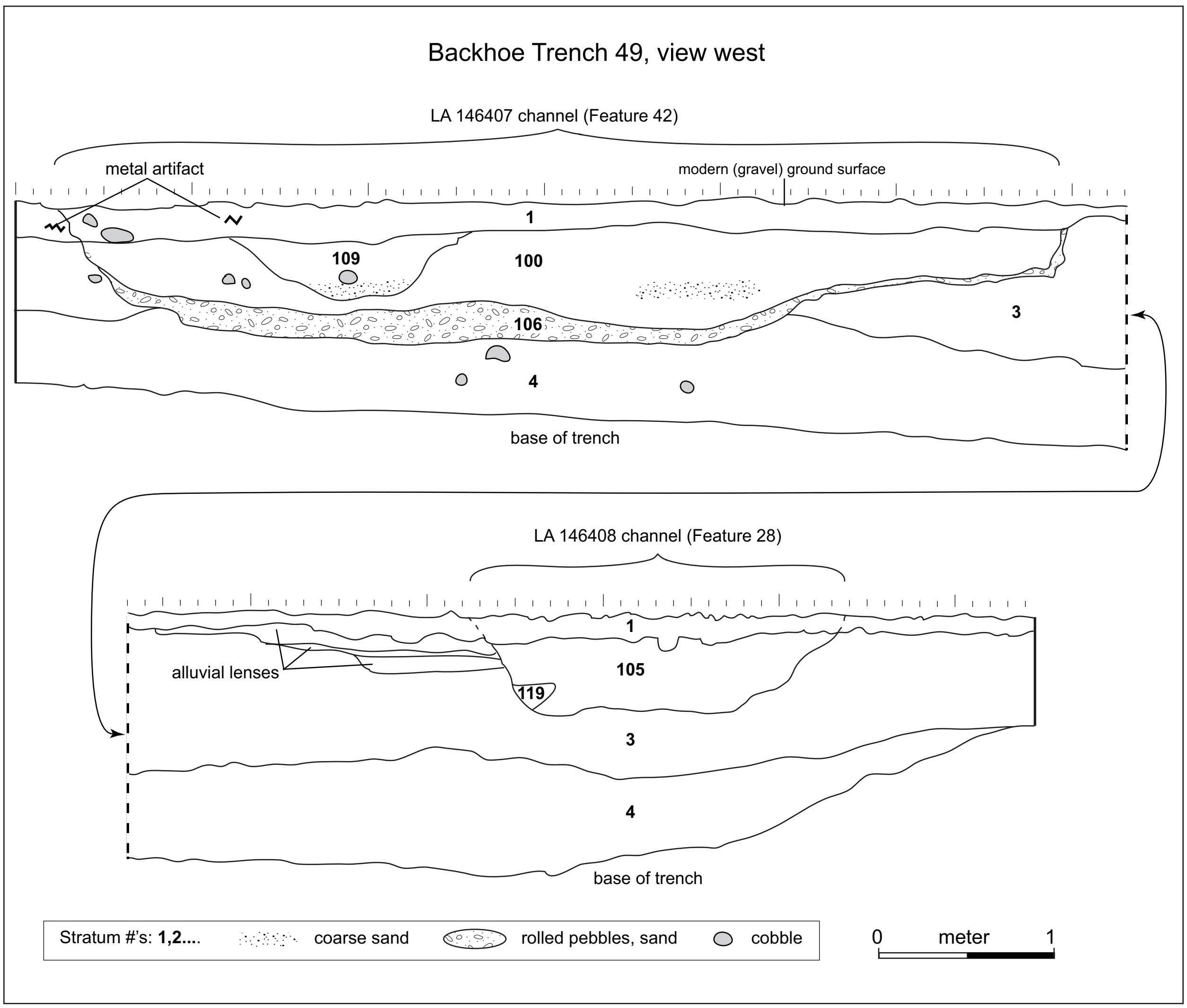


Figure 2.13. LA 146407 and LA 146408, cross section of BHT 49, west wall.

episode of acequia construction re-excavated the center of Stratum 114 to form a somewhat narrower and shallower acequia channel. This is the final acequia course, that of Site LA 146408. This channel was ultimately filled in with Strata 113, 112, and 111, which contained abundant railroad artifacts and occasional discrete refuse dump concentrations (Table 2.4). SCU 6, excavated west of BHT 32, bisected Feature 28 deposits longitudinally, revealing a series of nearly flat-lying fine sediments running down the channel, indicating a low-water-flow depositional regime. The base of this SCU also exposed the top of Stratum 115, confirming that this stratum occupied a linear channel as well, but was truncated along its northern edge by later intrusive deposits of Stratum 117 and Feature 28, as indicated in the trench cross section.

BHT 1 and BHT 49

LA 146407, Feature 42

In BHT 1 (excavated in XUs 1–10), alluvial deposits demonstrated a widening acequia channel. Broad coarse gravelly sand characteristic of Strata 104/106/117 (Fig. 2.12) is evident in the base of the overall LA 146407 channel, which in this locale and all other western exposures, is substantially wider than that in BHT 32. The remarkable width of the overall channel containing the coarse sand (8.5 m in BHT1; 5.5 m in BHT 49) is interpreted as evidence of substantial lateral drift of the erosional channel as it scoured out the course of the original acequia channel. No additional remnants of the early infill associated with Feature 42 channel (Stratum 115) are present in any of the western trenches but Stratum 107 is still evident though it is difficult to define its relationship to deposits further to the east. The stratum no longer lacks Euroamerican artifacts but continues to contain comparatively high percentages of Pueblo ceramics (39 percent of the assemblage) and lacks metal. This is similar to the Stratum 103/104 artifact percentages that are detailed in Table 2.11.

All strata overlying the coarse basal sand and gravel are rapid infilling deposits, the most commonly recorded of which are Strata 28 and 100, both of which are massive to granular, brown or dark gray sandy silts containing abundant railroad-era artifacts. Approximately 10 m west of BHT 1, Feature 28 (LA 146408) diverges from the Feature 42 channel. This split becomes apparent in the walls of BHT 49 (XUs 11–16; Figs. 2.3, 2.13, 2.14), where the Feature 28 channel lies 3 m north of the Feature 42 channel, and is dug into native sterile substrate. The channels rapidly diverge from this point westward (Fig. 2.3). Although the Feature 42 cross-section in BHT 49 (Fig. 2.13) does exhibit a poorly defined upper channel in the course of LA 146407 (containing Stratum 109, a strong brown silt with railroad artifacts), the channel could not be tracked in additional trenches to the east or west. The dark-stained sediment that was exposed in plan view in the scraping units along the top of Feature 42 (Fig. 2.3) represents the top of the overall combined refuse-bearing sediments rather than a discrete channel deposit. The mechanical scraping units failed to locate any diversion features or lateral channels.

Artifacts recovered from final infilling except for Stratum 103 contain high frequencies of modern refuse and comparatively fewer native ceramics. Euroamerican artifacts analyzed from Stratum 100 into which Feature 28 was excavated are water worn and could not be assigned to a category. The remainder of the recovered assemblage includes Indulgences (n = 14, 18 percent), Construction and Maintenance (n = 9) and Personal Effects (n = 2) items. Many, if not all of these artifacts, were likely associated with residential consumption and discard. Among the Personal Effects was the base to a Pluto Water bottle manufactured by Owens-Illinois. Pluto Water was marketed as a product to relieve constipation.

LA 146408, Feature 28

In the east wall of BHT 1 (Fig. 2.12), the cross section shows the later acequia LA 146408 (Feature 28, here containing Stratum 105, channel fill) as a narrow channel excavated into the top of deposits that filled the eroded LA 146407. This small well defined, channel diverges from the preexisting channel approximately 10 m to the west of BHT 1, where, as noted above in the BHT 49 profile, it was excavated into substrate. A PSL (photon-stimulated luminescence) sample (STF05-5) taken from channel fill from this profile indicates that the deposits dates to ca. 67 years before 2006 suggesting an abandonment date of around 1939. Euroamerican analysis (n = 972) indicates recent material culture. Two beer or soda cans produced after 1968 were recovered from Stratum 105 in addition to Indulgence (n = 253, 26 percent), Domestic (n = 6, 1 percent), Construction

Figure 2.14. LA 146407 and LA 146408, Feature 28; LA 146408 as exposed in eastern wall of BHT 49.

and Maintenance (n = 32, 3 percent), and Personal Effects (n = 2, <1 percent) items. Small Unassignable water worn artifacts (n = 679, 70 percent) make up the bulk of the assemblage.

Scraping units successfully tracked the top of the Feature 28, LA 146408 channel on its new course, both north and south of Manhattan Avenue (Fig. 2.3). Additional backhoe trenches and hand-dug excavation units north of the road confirmed the channel's course and morphology as a single, shallow, basin-shaped channel (Fig. 2.15) with simple internal stratigraphy (Stratum 100 in this area, a dark gray sandy silt with common railroad and recent refuse as inclusions). The channel dimensions and shape (75 cm wide, 35 cm deep) at the far northern end of the site match well with those of the most recent channel (Stratum 111) evident in the eastern exposure in BHT 32 (Fig. 2.10) by the railroad tracks (note that the BHT 49 exposure crosses Feature 28 at an oblique angle and is not representative of the feature's dimension).

Stratum 101 overlies all in-filled acequia deposits (including both the LA 146407 and LA 146408 channels) and represents a post-abandonment refuse-filled deposit. All of these deposits' textures and ped morphologies indicate a mix of alluvial and colluvial deposition, suggesting that occasional flow episodes continued down the eroded channel, but that bank slope or purposeful refuse disposal also contributed greatly to the infilling. A 1941 U.S. coin found in an extramural sediment (Stratum 28) and a 1944 U.S. coin from the base of Feature 28 (Stratum 113, see BHT 32) indicate the relative rapidity with which the old, eroded channel became infilled, allowing a new channel to be dug and subsequently abandoned within no more than a roughly 60-year period.

Summary. The divergent channel exhibited at LA 146408 demonstrated its integrity in profiles across the railyard. The site may be indicative of a "*veta*" taken from a larger watercourse, possibly to water a single plot (D. H. Snow, Chapter 7, this report).

Artifact Frequencies

Percentages of Pueblo ceramics and Historic Artifacts (a combination of metal, glass, Euroamerican

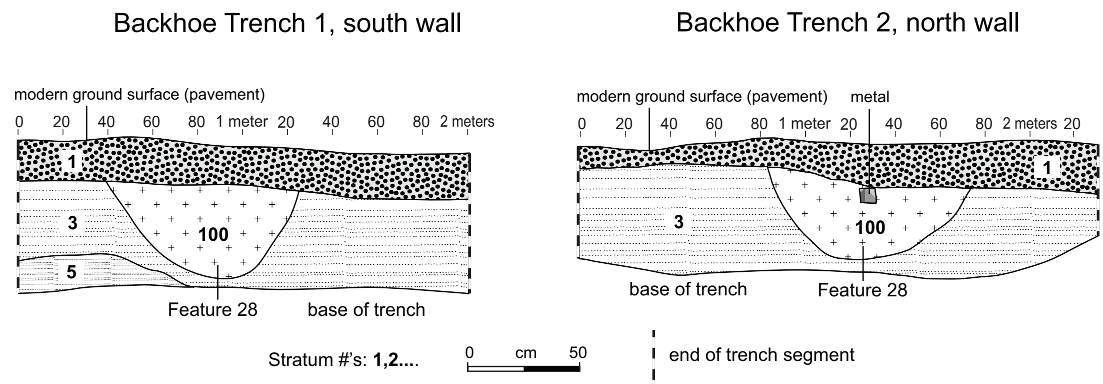


Figure 2.15. LA 146408, cross section of BHT 1, south wall (bottom), and BHT 2, north wall (top).

ceramics, plastic, and rubber) to the entire artifact assemblage were calculated per stratum. These artifact types were selected because their classifications inherently imply limited (albeit wide) date range. Derived from field specimen data, which report the full assemblage as opposed to sampled context, percentages for each stratum can be compared to values for a few set points. Stratum 119 at LA 146408, excavated in BHT 51, was bedding material to a wooden culvert that clearly ran beneath tracks installed in 1900–1903. This deposit likely dates from 1890–1900. Artifact percentages were 3 percent native ceramics to 69 percent Euroamerican artifacts. Original Feature 42 fill, Stratum 115 at LA 146407, dated from 1895 to 1900 with an OSL sample, had 8 percent ceramics and 36 percent historic artifacts. Final channel fill, Stratum 105 at LA 146408 had 2 percent ceramics and 87 percent historic artifacts, including plastic and rubber. This approximate percentage is typical of other closing fill at LA 146408 in which historic artifacts represented up to 95 percent of the assemblage and native ceramics made up 2 percent or less. Final fill deposits at the west end of LA 146407 are variable with no clearly discernable pattern, possibly reflecting channel braiding as it widens across the western project area. One stratum representing basal deposits excavated at the eastern edge of the project area in BHT 51 clearly stands out from this pattern. Stratum 107, described as the earliest fill deposit in Feature 56, lacks metal or any other historic artifacts. Native ceramics [not analyzed] make up 70 percent of the artifact assemblage. To the west, along BHT 1, deposits identified as Stratum 107 maintain a relatively high percentage (39 percent), of Pueblo ceramics and low historic artifact percentage (13 percent), all of it glass [not analyzed]. Artifact concentrations in this deposit are comparatively low. This reverse in proportion of ceramics to historic artifacts could be the result of bias created by small sample size, but could also signal changes in habitation density along the watercourse reflecting a more rural upstream population. It may also be evidence of an earlier and much older watercourse. One peculiarity revealed by this exercise, is the high proportion of bone and low historic artifact frequencies from deposits excavated along the east exposure of LA 146407 (XUs 25–28) south of the Feature 1 culvert. High bone frequencies with trace amounts of historic artifacts and high proportions of Pueblo ceramics are present in Strata 100, 106, and 120. Because bone in of itself has no implicit date range its presence does not help with channel sequencing other than to indicate the nature of the eroded deposit. Lack of high historic artifact counts could indicate that at the time of deposition, waters ran through a less densely populated area than later ditch alignments.

Although Euroamerican analysis may refine or contradict these findings, they potentially indicate (all things being equal) that less material associated with historic-era refuse is moving downstream during earliest depositional sequence. These strata, at the base of LA 146407 may be indications of a watercourse that significantly predates the railyard.

The following analyses, by artifact type, are presented by site. Because artifacts from LA 146407 and LA 146408 are carried by alluvial processes, and are likely the result of both primary deposition and erosion from elsewhere upstream, it is most productive to discuss assemblages by stratum rather than by excavation unit. The following discussion focuses on artifact assemblages by site and stratigraphic unit where appropriate.

146407

Euroamerican Artifacts
Matthew J. Barbour

LA 146407 and LA 146408 represent superimposed ditch segments. LA 146407 is the lower of the two ditches thought to represent the Juan Diego Romero Ditch (Features 42 and 56); it is believed to have been used in the nineteenth century. A total of 14,441 Euroamerican artifacts were recovered of which 3,351 (23 percent) were subjected to intensive analysis. These artifacts included materials from Features 42 and 56, which represent the western and eastern expanses of the acequia respectively. It is unclear exactly how strata from each section correspond to one another. Table 2.11 summarizes the distribution of Euroamerican material culture by category, type and function for each stratigraphic layer of the Juan Diego Romero Ditch (LA 146407, Features 42, 56).

Euroamerican artifacts analyzed from Feature 42 were divided among 7 strata. Stratum 115 represents the lowest deposit and may be associated with initial aggradation of the Feature 42 channel. Sixty-five artifacts were recovered from this context and included unidentifiable fragments of glass and metal (n = 30), unidentifiable bottle glass (n = 19), mica sheet (n = 5), unidentifiable dishware (n = 10), and a machine-cut square nail. No manufacturer marks were present on the bottle glass, however the presence of the machine-cut square nail (1830+, Nelson 1968:8) is a strong indicator that the materials washed in date to the nineteenth century.

Stratum 117 represents alluvial deposition above Stratum 115 and is similar in Euroamerican artifact (n = 30) composition. The majority of cultural materials are Unassignable (n = 24, 80 percent) artifacts including 14 fragments of iron buckle. However, the presence of five fragments of a creosote soaked railroad tie indicates that the deposit post-dates the establishment of the Atchison, Topeka and Santa Fe Railway in Santa Fe (1880+).

Strata 100, 102, 109, and 110 are even later fluvial episodes. Artifacts from these strata are believed to not represent use of the ditch but rather the movement of storm water through the feature after it was abandoned. Artifact types within these strata are similar to those found in earlier fluvial episodes and primarily contain Unassignable artifacts particularly bottle glass and canned products. These materials likely represent Food and Indulgence items, and it seems plausible that many of the materials transported and deposited within the ditch are associated with up-stream residential consumption and discard. As with all fluvial episodes, artifact size is small and many of the Euroamerican materials show evidence of being water worn. Materials within these later fluvial episodes date to the early twentieth century based on the presence of machine manufactured bottle glass (n = 7, 1904+, Lorrain 1968:43) and are also similar in their date of deposition. However, no manufacturer marks were identified and as a result these later fluvial episodes cannot be tied to a specific decade.

Stratum 101, which over lays all acequia deposits, contains a larger number of more robust items (n = 2,315) and is believed to be associated with discard of refuse into the final swale. Table 2.12 lists bottle glass manufacturer marks found within the stratum. These marks provide for a mean bottle glass manufacture date of 1960 (std 15 years). However, not all manufacture marks overlap in periods of use. Some clearly date post-1960 and others to the early twentieth century. While the more recent materials may represent some unrecognized disturbance within the fill, it seems unlikely as modern artifacts are found throughout the assemblage. In addition to the modern glass products, several aluminum pull tabs (1963+, U.S. Patent No. 3,349,949) were found within the assemblage along with a US Penny dating to the year 1960.

Euroamerican artifacts (n = 351) from Feature 56 were analyzed from four discrete strata (Strata 100, 100.12, 106 and 120). These strata represented fluvial filling episodes within the ditch at or after the time of abandonment. The majority of these materials are relatively small water worn artifacts within the Unassignable category (n = 279, 79 percent). Many of the artifacts are bottle glass fragments likely representing products associated with Food and Indulgence items. Like the later fluvial episodes documented in Feature 42, these strata date to the early twentieth century based on the presence of machine manufactured bottle glass (n = 7, 1904+, Lorrain 1968:43). However, no machine-made bottle glass was detectable within Stratum 106 and it is possible that the sediment dates to a slightly earlier period. No manufacturer marks were identified, and the specific decade of the twentieth century is unknown.

In summary, the similarities between upper alluvium in Features 42 and 56 are to be expected as the features are thought to represent east and west segments of the same ditch. Stratum 115 appears to represent some of the earliest accumulation of sediments within the Juan Diego Romero Ditch as it flowed beneath the AT&SF railroad tracks but is underlain by Stratum 107 in other trench exposures (which contains almost no Euroamerican artifacts and was not analyzed). The exact date of accumulation could not be determined but appears to have occurred in the nineteenth century. There is no evidence of Spanish Colonial deposition. Railroad artifacts in Stratum 117 indicate the ditch was still in use after the coming of the railroad in 1880, but may have fallen out of commission shortly thereafter as later alluvium, likely accumulated from storm water runoff, dates to sometime in the early twentieth century. Stratum 101 is the last filling episode within the acequia. This stratum contains Euroamerican artifacts dating to the 1960s and suggests that final infill of the area did not occur until relatively recently.

146407

Fauna

Britt M. Starkovich

The faunal sample from LA 146407 is fairly small, with 741 specimens analyzed. The site represents a filled-in acequia that is possibly named for Juan Diego Romero, and which was in use in the nineteenth and possibly the eighteenth century; it is the original ditch on which LA 146408 is superimposed (Wenker and Hannaford 2005, Wenker et al. 2005). Two features were designated at the site, 42 and 56, and represent the western and eastern expanses of the acequia, respectively. The features were divided into stratigraphic units, but it is unclear how the levels correspond between the two features.

The assemblage is composed almost exclusively of domestic fauna, including house cat, cattle, sheep/goat, pig, horse/burro, and chicken, though two fragments of coyote were also recorded (Table 2.13). It is often difficult to distinguish between small fragments of sheep and goat, so unspecified pieces were assigned to a generalized "sheep/goat" category. A similar issue is found with horse and burro, as well as large cattle and bison, so a similar grouping was employed. Three quarters of the remains could only be identified to ungulate size class, though it is likely that "small ungulate" and "large ungulate" categories represent sheep/goat and cattle, respectively. The assemblage is highly fragmented; over 90 percent of the remains are less than 10 percent complete. Environmental and animal processes are fairly uncommon in the assemblage, and surprisingly, so are burning and human processing (Table 2.13). The few butchery marks correspond to cuts of meat still used today (Ashbrook 1955). Despite the small sample, some basic observations are presented below.

Feature Assemblages

Feature 42. Feature 42 is the western expanse of the acequia and contains the smaller of the two faunal samples (n = 132). It is composed entirely of domestic ungulates, with the exception of one specimen of house cat, one large bird fragment and a coyote fragment (Table 2.13). The remains are highly fragmented, with 83 percent less than 10 percent complete. Environmental alteration was observed on six percent of the bones, most of which is root etching. None of the remains show damage from animals and only one specimen was burned. About eight percent of the specimens exhibit signs of butchering (Table 2.13).

Feature 56. The majority of the sample from LA 146407 comes from Feature 56 (n = 609). Domestic ungulates dominate the fauna, though one medium bird specimen was also recorded (Table 2.13). The remains are highly fragmented; 92 percent are less than 10 percent complete. Environmental alterations occurred on six percent of the sample and animal damage is minimal. Only a small percentage of the remains show signs of human alteration, either in the form of burning or butchery (Table 2.13).

Area Comparisons

The samples from Features 42 and 56 are large enough that some tentative comparisons are possible. Overall the two features are remarkably similar, which is to be expected since the two features make up different areas of the same channel. The faunal assemblages from both areas are dominated by small ungulate and sheep/goat, which makes up between 65 and 70 percent of both assemblages, followed by large ungulate and cattle, which is slightly more heavily represented in Feature 56. Both features contain negligible amounts of house cat and pig, and additionally Feature 56 has trace amounts of horse/burro and chicken (Table 2.13). The greater number of species from Feature 56 likely has to do with the larger sample size from this feature. The remains from Feature 56 are more highly fragmented than those from Feature 42 (Table 2.13).

Frequency of environmental damage for the two features is almost identical, and root etching is the main cause of damage in both cases (Table 2.13). Feature 56 has a greater variety of environmental taphonomic factors, but this is likely due to the larger sample size. Slightly more animal alteration was observed for Feature 56 and burning frequencies for the two are identical. Feature 42 has much more evidence of butchering than Feature 56 (Table 2.13). The majority of the butchered remains were sawn through or are steak cuts, and the uniformity of the saw marks indicates that they were likely done by a professional butcher.

Species Utilization

Evidence of human taphonomic processes, such as butchery patterns, is informative when interpreting a faunal assemblage. It is also important to consider the selection of specific animals for consumption, which can be understood by looking at the age profiles of the animals at the site. Because LA 146407 is an historic site, an analysis of body-part profiles in the classic sense is not the best strategy. In historic times, meat was often purchased as specific cuts, evidenced by smooth, uniform saw marks that were likely made by butchers. Because meat was acquired in this way, body-part profiles that examine specific elements are not as useful as those that consider historic cuts of meat.

Historic meat cuts are useful for understanding the economic situations of people depositing the remains; wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. Unfortunately, since LA 146407 is an acequia, it is not possible to ascertain exactly who deposited the animal bones, and the sediments likely do not represent the trash deposits of a single household. Despite this, there may be some patterns in the meat cuts found at the site. In this discussion, the two features are considered together because they represent different areas of the same channel, and there is no reason to suspect that the assemblage composition is vastly different. Even after combining the features, the sample size is fairly small, so wide interpretations cannot be made. Schulz and Gust (1983) construct a ranking system for meat cuts based on the relative price of beef at the turn of the nineteenth century in Sacramento, California, that has been widely applied to other historic faunal data sets in the western United States. Following this system, most of the cuts of beef at LA 146407 were expensive (n = 6), followed by cheap (n = 2) and moderately (n = 1) priced cuts of meat.

Though this price-based construction is useful, Lyman (1987) argues that simple price rankings may not accurately reflect the economic standing of the people depositing the remains. Rather, cost-efficiency based on the price per pound and pounds of edible meat for each beef cut is likely a more logical model to use when interpreting historic meat use. In terms of cost efficiency, the majority of the butchered remains from LA 146407 were from moderately cost-efficient cuts of meat (n = 4), followed by highly cost-efficient (n = 3) and the least cost-efficient cuts of beef (n = 2) (Table 2.14). From this discussion, it seems that the people depositing the faunal remains into the Acequia de Analco tended to buy more cost-efficient cuts of meat and were probably not on the highest end of the economic scale.

The ages of animals at an historic site are indicative of what kinds of meat were being eaten; for example, if lamb or mutton was preferred, or if veal was eaten instead of older cattle culled after they were no longer useful for milk or breeding. Animal age can be determined by the fusion of long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). Summarized age data for LA 146407 are presented in Table 2.15. Age data is considered by feature and by stratum because different depositional events probably did not include remains from the same animal.

Based on fusion data, Stratum 100 in Feature 42 contains a sheep/goat older than six months. This is not particularly useful since the specific element fuses so early in life. At least two sheep/goats are present in Stratum 100 in Feature 56, one of which was younger than about 28 months, the other older than 36 months. Teeth from an individual between 21 and 24 months were found in this stratum, which may have belonged to the younger of the two sheep/goats. The specimen from Feature 42 may have been part of one of the animals from Feature 56 that was transported, but it is difficult to be sure. The younger animal was probably slaughtered when full-sized, as no remains belonging to an animal younger than a year were found, and it seems to have been utilized when it was at the prime age for consumption. The older animal was either on the upper limits of prime eating age, or it was an older animal that may have been used for wool, but a lack of an upper age limit makes it impossible to tell. A cattle element younger than 30 months was found in Stratum 100 as was a pig younger than 42 months. These age ranges are too wide to draw any specific conclusions, but they probably came from animals of prime eating age.

Stratum 102 contains a cattle element from an individual younger than 48 months, so the animal was slaughtered when it was prime-aged for milk and breeding. Two cattle elements were found in Stratum 106, one of which was from an animal older than seven months, the other from an individual younger than 108 months. These elements may have come from the same animal, but the age range is too wide to determine at what life stage it was slaughtered. At least two different sheep/goats were found in this stratum, one younger than 28 months, the other older than 18 months. It is likely that this represents two different animals, because they are metatarsals, one fused and the other unfused. In a single animal, the right and left of an element should fuse at about the same time, making it unlikely that the metatarsals were from the same individual. The animals are in the range of those raised for meat. Evidence of a sheep/goat older than 36 months and younger than 42 months was found in Stratum 115, and represents at least one animal. Thirty-six months is slightly outside the range of animals typically raised for meat. Stratum 117 contains a sheep/goat younger than 36 months, which may have been raised for meat. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The faunal remains from LA 146407 are typical of an historic acequia in terms of species representation, taphonomy and butchery patterns. Sheep/goat is the most common species, and almost all of the remains are from domestic fauna. Almost all of the animals that were consumed were of prime butchering age. The assemblage is less heavily butchered than might be expected, and the majority of the cuts were likely purchased from a butcher. The cuts of beef that are present are moderately to highly cost-efficient in terms of price per pound and pounds of edible meat, indicating that the people discarding the remains were at the lower end of the economic scale. Because the site is an acequia, however, it is impossible to know exactly who was responsible for depositing the remains, so further interpretations cannot be made.

146407

Ceramics
C. Dean Wilson

The great majority (97.8%) of the 227 native sherds selected for analysis from LA 146407 consist of historic-period types (Table 2.16). Prehistoric types identified include Unpainted Undifferentiated White (.4%) and Plain Gray Body (1.8%). Historic pottery types identified include Tewa Polychrome Painted Undifferentiated Two Slips (0.9%), Black-on -cream Undifferentiated (7.5%), Powhoge Polychrome (0.4%), Historic White Cream Slipped Unpainted (5.3%), Red-on-tan Unpainted (0.4%), Tewa Buff Undifferentiated (14.1%), Tewa Polished Gray (8.8%), Tewa Polished Black (8.8%), Highly Micaceous Paste (10.6%), Smudged Interior Mica Slipped Exterior (4.8%), Tewa Polished Red (1.3%), Tewa Unpolished Buff (20.7%), Smudged Exterior Buff Interior (11.5%), Unpolished Micaceous Slip (0.9%), Plain Micaceous Tan (0.9%), and Puname Polychrome Unpainted (0.9%). This combination of types indicates that most of these ceramics are derived from components dating to the Late Colonial or Territorial periods.

It appears most of these sherds were redeposited from nearby components as indicated by the presence of rounded shapes, abraded edges, and other wear indicative of water transport on the great majority of these sherds (97.4%). Because of this wear the majority (67.4%) of these sherds could not be assigned to a distinctive vessel form. Vessel forms that could be recognized include jars and bowls (Table 2.17).

146407

Chipped Stone
James L. Moore

Seventeen chipped stone artifacts were recovered from a variety of excavation units and strata at LA 146407, as shown in Table 2.18. This assemblage is dominated by cherts, which comprise 80 percent of the total (5 unsourced chert and 7 Madera chert). The three remaining artifacts were made from unsourced obsidian (n = 2; 13.33 percent) and Polvadera obsidian (n = 1; 6.67 percent). Core flakes and angular debris were the dominant artifact types (7 specimens and 46.67 percent apiece). The last artifact is a middle stage obsidian biface fragment (6.67 percent). Other than this specimen, no other artifacts showed signs of retouch or use-wear. Dorsal cortex occurs on only one Madera chert core flake, while an unsourced chert core flake had a cortical platform. In both cases the cortex is waterworn, showing that these materials were obtained from secondary gravel deposits. No evidence of platform modification was noted on any of the flakes. Most of the flakes are whole (n = 5), with the remainder consisting of medial (n = 1), and distal (n = 1) fragments. No evidence of thermal alteration was noted on any of these artifacts.

Considering the amount of rounding and wear on the pottery from this site, which indicates mechanical transport down the acequia from elsewhere, there is a high probability that the chipped stone artifacts were also transported and deposited at LA 146407 by stream flow. Indeed, most of the strata shown in Table 2.18 are sediments occurring at or near the base of acequia channels, confirming this origin. These artifacts mostly washed into the active or in-filling acequia channels from adjacent Late Spanish Colonial or Territorial-period deposits, and were carried downstream to the locations in which they were found. Since most of the native sherds recovered from these excavation units were of historic derivation, the same is probably true of the chipped stone artifacts, though a prehistoric origin certainly cannot be ruled out for some artifacts.

146408

Euroamerican Artifacts
Matthew J. Barbour

LA 146407 and LA 146408 represent stratigraphically superimposed ditch segments. LA 146408 is the upper ditch thought to be the Manhattan Street Ditch (Feature 28) that ran along Manhattan Avenue in the late nineteenth and early twentieth centuries. A total of 14,723 Euroamerican artifacts were recovered from LA 146408 of which 1,054 (7 percent) were subjected to intensive analysis. These artifacts were selected from final channel infill strata (Stratum 100, Stratum 105 and Stratum 119), i.e., the last alluvial episodes with the ditch. Table 2.19 summarizes the distribution of Euroamerican material culture by category, type and function for each stratigraphic layer of the Manhattan Street Ditch (LA 146408, Feature 28).

Stratum 119, which flanks and covers Feature 1a, represents the smallest assemblage of the three strata investigated. Euroamerican artifacts (n = 4) consisted of an unidentifiable piece of glass, a fragment of a glass bottle, a piece of tin or aluminum foil and semi-vitreous white-bodied earthenware sherd from an unidentifiable vessel. All four of the artifacts are relatively small and were likely moved into and through the channel as a result of fluvial action. Because the foil could not definitively identified as having been manufactured from aluminum or tin, the deposit can only be inferred to date to the late nineteenth or twentieth centuries.

Stratum 100, soil matrix into which Feature 28 was excavated, also represents a relatively small assemblage of 80 artifacts. The stratum contains similar artifacts to Stratum 119 including unidentifiable bottle glass (n = 21) and two pieces of tin or aluminum foil. Unassignable artifacts represented over half (n = 55, 69 percent) of the total Euroamerican artifacts. The remainder represented Indulgences (n = 14, 18 percent), Construction and Maintenance (n = 9) and Personal Effects (n = 2) items. Many, if not all of these artifacts, were likely associated with residential consumption and discard. All were water worn and likely transmitted through the channel by fluvial action. Amongst the Personal Effects was the base to a Pluto Water bottle manufactured by Owens-Illinois. Pluto Water was bottled in French Lick, Indiana. It was advertised as "America's Laxative" with the slogan "When Nature Won't, PLUTO Will." The bottle and many advertisements featured an image of the devil. It was marketed nationally in the 1920s, 1930s, and 1940s (Fig. 2.16). No materials directly relating to the mechanical operation of the nearby Atchison, Topeka and Santa Fe and New Mexico Central railways were identified.

Stratum 105, post-abandonment channel infill excavated from a veta that branches to the north, contains the most recent Euroamerican material culture (n = 972) and includes two cans produced by the impact extrusion process developed in 1968 for beer and soda products (Clark 1977:11). As a result, Stratum 105 could date no earlier than the late twentieth century. Small Unassignable water worn artifacts (n = 679, 70 percent) make up the bulk of the assemblage. Indulgence (n = 253, 26 percent), Domestic (n = 6, 1 percent), Construction and Maintenance (n = 32, 3 percent), and Personal Effects (n = 2, <1 percent) artifacts were also identified. The distribution of artifacts across the functional categories is similar to the deposition with Stratum 100 and may represent items associated with residential consumption and discard that were later moved by fluvial action.

In this specific case, it must be emphasized that Euroamerican artifacts were only analyzed from the upper fluvial episodes. These artifacts may not represent use of the ditch but rather the movement of storm water through the feature after it was abandoned. Furthermore, because lower alluvium was analyzed, earlier episodes of use cannot be identified.

146408

Fauna

Britt M. Starkovich

The faunal assemblage from LA 146408 is very small, with only 14 analyzed specimens. The site is part of the Manhattan Street Ditch, and represents a smaller channel, likely dating to the late 1800s (Wenker et al. 2005), which is superimposed on LA 146407, the larger acequia channel (Wenker and Hannaford 2005). The sample comes from Feature 28, which is the channel fill from LA 146408, and includes remains from two stratigraphic levels: 105, post-abandonment channel fill, and 119, a small lens of fill within Stratum 105 (Wenker and Hannaford 2005). Attempts were made to identify all specimens to the level of species, but in some cases only general size classes were assigned. The remains that were identified to species all belonged to domestic animals, and it is likely that those identified to size class were likewise domesticates. The sample is so small that no patterns can be inferred.

Stratigraphic Units

Stratum 105. Stratum 105 is the post-abandonment channel fill of Feature 28 (Wenker and Hannaford 2005). The sample only includes five

Figure 2.16. Pluto Water advertisements.

specimens: undetermined sheep or goat (n = 3), small ungulate (n = 1) and large ungulate (n = 1), the latter of which are likely sheep or goat and cattle, respectively. The remains are highly fragmented, with only one specimen more than 10 percent complete. One specimen is burned, and none show evidence of animal or environmental damage. An unidentified large ungulate flat bone fragment exhibits a steak cut, and was likely cut by a mechanical saw of a butcher. No age estimations could be determined.

Stratum 119. Stratum 119 is a small lens at the base of Feature 28, within Stratum 105. The sample only includes nine specimens, representing cattle (n = 2), undetermined sheep or goat (n = 1), small/small-medium ungulate (n = 4), and large ungulate (n = 2) (likely sheep or goat and cattle, respectively). The remains are highly fragmented, with only one specimen more than 10 percent complete. No burning, environmental damage, or animal damage was observed. One specimen, a cattle calcaneum, was cut through, corresponding to a modern hindshank cut (Ashbrook 1995). The specimen was not cut with a saw so it is possible that it was butchered in-home, as opposed to being purchased from a butcher. Age could only be determined for one cattle femur, which based on long-bone fusion data belonged to an individual older than 30 months (from Schmid 1972 and Silver 1970, in Reitz and Wing 1999).

Conclusions

The sample size of 14 is so small, no definite conclusions can be drawn from the faunal remains of LA 146408. The only observations are that all of the specimens were likely from domestic fauna, and human processes were more readily apparent than environmental or animal disturbances.

146408

Ceramics
C. Dean Wilson

The great majority, 92%, of the 61 native sherds from LA 146408 were assigned to historic types (Table 2.20). Prehistoric types identified include Unpainted Undifferentiated White (1.6%), Unpainted Pindi Black-on-white (1.6%), Glaze-on-red Undifferentiated (3.3%), and Cieneguilla Glaze-on-yellow (1.6%). The presence of glaze wares indicates that some of the ceramics were derived from contexts dating to the Classic period. Historic types identified include Tewa Polychrome Painted Undifferentiated Two Slips (1.6%), Black-on-cream Undifferentiated (4.9%), Historic White Cream Slipped Unpainted (11.5%), Tewa Buff Undifferentiated (16.4%), Tewa Polished Gray (14.8%), Tewa Polished Black (4.9%), Highly Micaceous Paste (6.6%), Smudged Interior Mica Slipped Exterior (1.6%), Tewa Polished Red (3.3%), Tewa Unpolished Buff (24.6%), and Puname Polychrome Unpainted (1.6%). This combination of types indicates that most of these ceramics were derived from components dating to the Late Colonial or Territorial periods.

It appears sherds were redeposited from nearby components as indicated by a rounded shape, abraded edges and other wear indicative of water transport for the majority of these sherds (54.1%). Because of this wear, the majority (75.4%) of these sherds could not be assigned to a distinct vessel form. Vessel forms that could be recognized include jars and bowls (Table 2.21).

146408

Chipped Stone
(No chipped stone was recovered from LA 146408.)

Archival Research, LA 146407 and LA 146408

Hordes and Payne (Scheick et al. 2003:28) map the Acequia de Analco as entering the project area along the west edge of Manhattan Avenue in front of the southern addition to the Gross Kelly Warehouse building. The acequia is shown crossing through the project area along an east–west course similar to that of LA 146407. This interpretation was used during preliminary archival research. However the ditch identified on the Hordes and Payne map as

Analco was apparently labeled in error. The mapped acequia is more likely that of the Manhattan Street Ditch. Archival research conducted by D. H. Snow (1988; Chapter 7, this report) indicates that the Manhattan Street Ditch, derived from the Acequia Madre west of Don Gaspar Street ran along Manhattan Avenue to St. Francis Drive. In some records the acequia is referred to as "de Diego Romero." D. H. Snow (Chapter 7, this report) also traces the course of the Acequia Analco as two diverging waterways: the main acequia, which flowed north of the railyard, and a contra acequia that crossed the project area. Figure 2.2b shows the course of the two waterways, indicating that the Analco contra acequia likely crossed the railyard 150 m to the north of LA 146407, entering the project area from Garfield Street rather than near Manhattan Avenue as mapped by Hordes and Payne. This agrees with observations by D. H. Snow that a slight ditch impression—possibly Analco—was visible until recently between Tomasita's restaurant (the former Union Depot) and the former state records center (Scheick et al. 2003: 61).

At the western project area limit, an unnamed "lateral" ditch is mapped running north–south at the western end of the Romero Street Wye, along present Romero Street (C. T. Snow 1991:69). Scheick et al. (2003:60–61) propose that this lateral may have flowed from the Manhattan Street Ditch into Agua Fria Ditch to the north. D. H. Snow's recent research suggests that this lateral may have flowed to meet one of the Acequia Analco alignments mapped near the Romero Street Wye on King's 1912 rather than Agua Fria Ditch, which D. H. Snow's most recent interpretation places along the north side of Agua Fria Street rather than the south (Chapter 7, this report). Regardless of the alignment of the northern ditches, the presence of a watercourse to the east of Guadalupe Street is supported by comments from two local longtime residents of the neighborhood to the west of the railyard who stated that an acequia once crossed through the Romero Street area along a nearly south-to-north orientation (C. T. Snow 1991:69; Wenker 2005). The LA 146408 ditch section at the western edge of the project area likely represents that ditch, which could be the last alignment of the Manhattan Street Ditch or a surviving lateral. This acequia represents a completely revised channel alignment that was constructed after the first acequia was filled. By using the same bridge or culvert under the railroad tracks, this possible Manhattan Street Ditch crossed the railyard and tracks, then diverged from the old channel's course and served the area north of Manhattan Avenue into the twentieth century. Water mains installed along Manhattan Avenue in 1926 may have heralded the beginning of the ditch's demise as water from city hydrants provided another source of water to the area and was often used for cultivation (D. H. Snow, Chapter 7, this report).

Summary, LA 146407 and LA 146408

Excavations of superimposed acequia channels at LA 146407 and LA 146408 confirms that Features 42 and 56 at LA 146407 to the west and east of the tracks represent the same acequia sites, largely by virtue of the consistent spatial and stratigraphic associations of the upper and lower acequias across the project area. Bone and Euroamerican artifact assemblages selected for analysis from each feature support this finding. The presence of a wood-lined channel section lining Feature 56 illustrates, literally and figuratively, the intersection between the railroad (the new economic engine) and the acequia system (part of the old economic regime). Here, where the railroad required an inviolable transportation right-of-way, the old acequia continued in operation. The wooden planking that lined the acequia could have carried the water beneath a trestle, though none was found. Later, the waterway was adapted again by constructing new culverts that would guide the water under the tracks. PSL (photon-stimulated luminescence) samples obtained from LA 146407's lowest deposit at the sites west end date the earliest deposit from 1895 to 1925. Though samples were taken approximately 370 m west of planking exposed in Feature 56, these dates are consistent with an 1880 date for AT&SF track construction.

Artifacts analyzed from LA 146407 channel fill, provide additional evidence of continuous alluvial deposit. Assemblages are temporally mixed as is typical of Territorial and Early Statehood-era midden deposits previously excavated in downtown Santa Fe. Pueblo ceramics were derived from components dating to the Late Colonial or Territorial periods. Both ceramic and lithic artifacts recovered from this watercourse are water worn and were clearly and consistently eroded from upstream deposits at varying rates. Bone recovered from Feature

42 and Feature 56 acequia fill was predominantly small ungulate and goat, probably purchased from a butcher. Beef represented cost-efficient cuts of meat, suggesting that residents along the acequia represented a population of moderate means.

A few contexts stand out as lacking, or as having relatively low Euroamerican artifact content. Stratum 107 has low artifact frequencies. Though sampling bias is a factor, a high ceramic percentage without historic artifact types suggests a deposit that predates the railyard-era ditch alignment. This stratum is not evident in all backhoe trench exposures and may have been scoured away as high velocity water exited culverts installed beneath the AT&SF tracks. The only other indication of potential pre-railroad acequia flow could be in Stratum 115, which date to 1835 at earliest. Historic artifact analysis indicates that all other strata sampled from LA 146407 likely post date the 1880 track alignments, and that strata predominantly contain stream transported domestic refuse. Overburden sampled from the sites western extent contained high frequencies of more intact modern domestic refuse indicating a combination of colluvial fill and local trash disposal that post-dates 1960.

LA 146408 represents a completely revised channel alignment that was constructed after the first Acequia fell into disuse. The alignment, position and overall layout of LA 146408 strongly indicate it may represent the Manhattan Street Ditch. The ditch alignment at the western site limit is roughly parallel and 53 ft west of a series of braided laterals reported at LA 146402.

The presence of culverts under both the NMC and AT&SF railroad tracks may assist in refining the use periods and abandonment of the Manhattan Street Ditch relative to the dates of the railroad tracks. AT&SF tracks that span the watercourse east of BHT 32 were installed by 1880 suggesting abandonment of LA 146407 at or around that time and continuous use of LA 146408 soon after. Flooding in 1886 (D. H. Snow, Chapter 7, this report) may have been a factor in the acequia realignment but geomorphological evaluation does not supply evidence of a catastrophic flooding event. NMC tracks along Guadalupe Street (under which Feature 1 culvert was installed) were installed around 1900, suggesting that the culvert near Guadalupe Street postdates Feature 1a, which runs under the AT&SF alignment that was constructed in 1880. Introduction of the tracks and presumed acequia realignment may partially explain glass dating to 1904 recovered from LA 146407 fill.

Culverts may also indicate a restriction in water volume from the earlier ditch flow. The volume of water that can move through a culvert depends on velocity but is restricted by the culvert's length and area. Presumably flow through multiple culverts would further restrict the flow. Based on cross-section dimensions, D. H. Snow interprets the LA 146408 watercourse as it branches north at the west end as a veta. Presumably, at one time, the course of LA 146407 could have continued west to eventually intersect the Acequia de Analco. Unfortunately the western course of LA 146407 could not be reliably traced.

LA 146408 which diverged from this course may have been redirected as a reduced flow to a more restricted number of users after the LA 146407 ditch filled and could, in its most recent alignment, be the lateral reported by area residents. PSL samples from LA 146408 date basal sediments to 1939, but a coin with a date stamp of 1945 recovered during excavation indicates the ditch was open until the beginning of WWII. Whether or not the ditch operated into the mid twentieth century is unknown. Archival research suggests abandonment by the 1930s, but artifact assemblages examined from LA 146408 fill is water warn. Bone, native ceramic, and Euroamerican artifact assemblages recovered from all contexts provide continued evidence of upstream erosion of earlier deposits as a contribution to the overall artifact assemblage which was coupled with contemporary waterborne refuse from neighborhoods upstream. The extent to which this material was transported in storm runoff is unknown.

Evidence for ditch use in the twentieth century is supported by the 1914 hydrographic survey which records 14.30 acres irrigated from Ditch 11 in Kings Block 67 which abuts the west boundary of the railyard property north of Manhattan Avenue most of which was cropland (D. H. Snow, Chapter 7, this report). Despite water impoundment by the PNM water company. Plewa calculates approximately 800 acres of irrigated land in Santa Fe from aerial photography taken in 1936. She also documents ongoing water disputes between PNM and local water associations regarding water impoundment which led to a gradual loss of access to water for irrigation by local farmers, culminating in de facto loss of water rights when young men left for WWII (Plewa 2009:251). If the ditch was active until WWII, which artifact content contained in basal deposits suggest, its continued flow demonstrates the robustness and longevity of the ditch's water right and persistence of the ditch association in securing waters until at least the mid-twenty-first century.

Recommendations, LA 146407 and LA 146408

Recommendations for all acequia sites excavated at the railyard remain the same at those previously offered by OAS and approved by ARC and the CPRC during preliminary site reporting (Wenker 2005). Together, east and west segment excavations encompass the entire available extents of both LA 146407 and 146408. All site mitigation was conducted in accordance with the data recovery plan, recovered the requisite data to address relevant aspects of the project's research design, and have exhausted the sites data potential. Because the site is unlikely to yield relevant information beyond that already recorded is no further work is recommended.

LA 149909 and LA 146410 Acequia de los Pinos (Acequia Madre)

Chris T. Wenker and Chuck A. Hannaford

Introduction

The channel that likely represents an alignment of Acequia de los Pinos (a northern arm of the Acequia Madre) was designated as two separate sites, LA 149909 and LA 146410, during initial project phases. The excavated waterways course runs for a distance of approximately 199 m (650 ft) from east to west across the project area from Guadalupe Street to beneath 1618 Paseo de Peralta (Warehouse 21). Site segments were excavated in a series of four phases to accommodate the project's construction schedule and were originally reported as two separate sites in a series of three publications (see AN 359 D–F). Final results are reported below from east (LA 146409) to west (LA 146410) using original site numbers. To simplify the discussion, the four excavation segments are named A through D from east to west. Site descriptions are presented separately after which site strata are compared. Sites are summarized together.

LA 149909

Site Location

LA 149909 is the eastern exposure of an irrigation ditch segment or acequia that probably represented an alignment of the historical Acequia de los Pinos. The channel designated LA 149909 measured approximately 70 m (230 ft) in length and was investigated in two segments measuring 17 and 35 meters in length, shown in Figure 2.18. Channel deposits were roughly 4 to 5 m in width (13 to 16 ft) and covered an area of roughly 350 sq m (1148 sq ft). Hand excavation yielded moderately high artifact counts (n = 1390; Table 2.22). Datable artifacts indicate deposition in the channel in the late nineteenth or early twentieth century. Prior to this project the excavated portion of the site was covered by a dirt automobile parking lot, and no features or artifacts were visible on the modern surface.

Data Recovery

Data-recovery activities were conducted in two phases. The first, conducted on January 13 and 26, 2006 focused on Area B, which overlapped a high-priority construction area for railyard infrastructure development. The area investigated during this work phase included all portions of the site within 30 m (100 ft) of the southeastern wall of the SITE Santa Fe building. The second phase, conducted from February 20 to March 3, 2006, focused on Area A, the acequia's eastern most extent within the project area. Excavation mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker 2005c). Feature, stratum, and excavation unit numbers are not always continuous because in many cases the designations from the testing projects (Wenker 2005a,b) were maintained

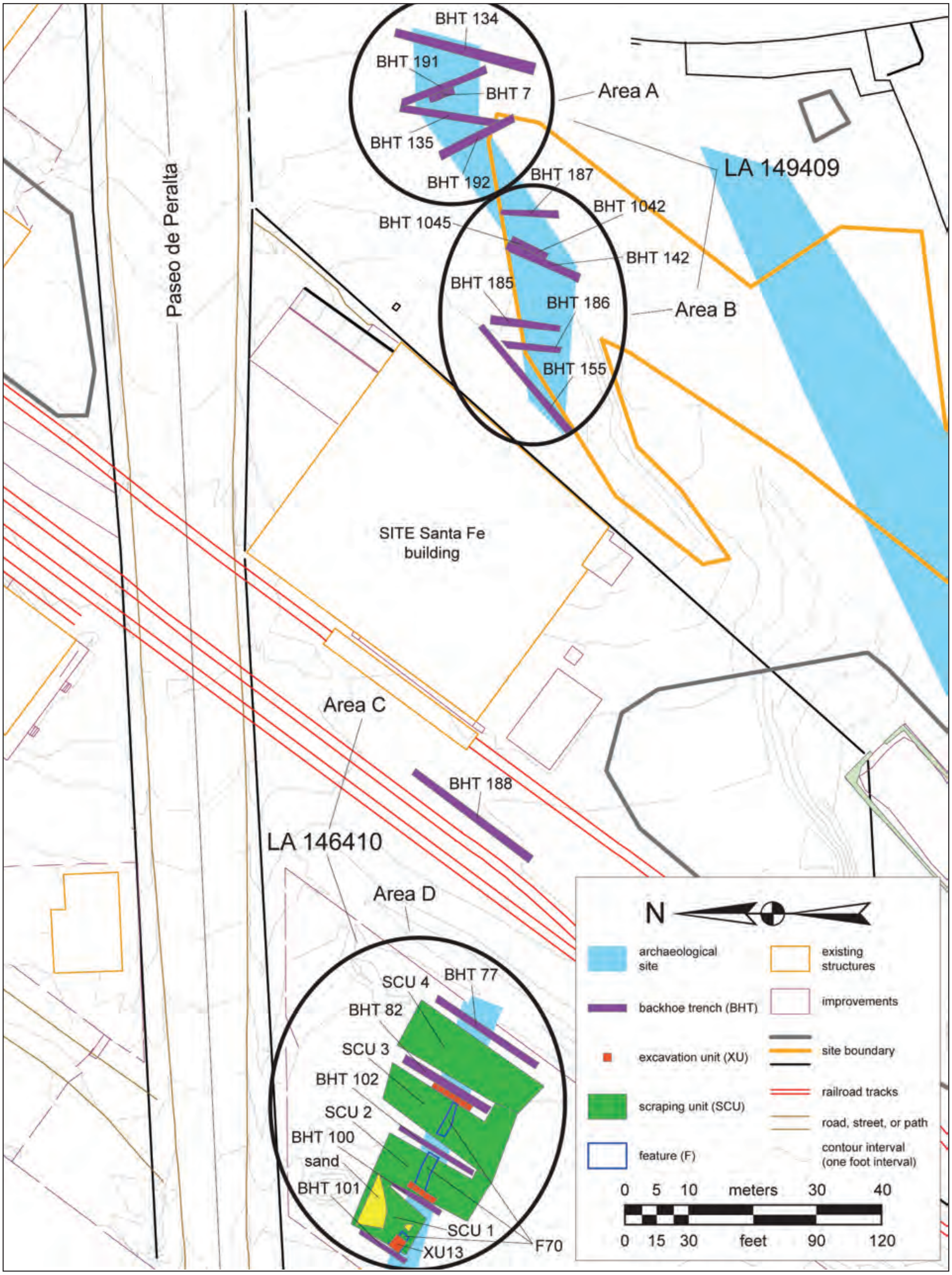


Figure 2.18. LA 146410 and LA 149909, site map, showing projected course of the Acequia de Los Pinos through the project area.

to provide consistency in the provenience designations.

Various types and sizes of excavation units used to expose and define the alignment and cross sections of the acequia channel and its deposits are shown in Figure 2.18 and are summarized in Tables 2.23, 2.24, and 2.25. During the first work phase the two westernmost backhoe trenches from the testing phase (BHTs 142, 155) were re-excavated. Three new backhoe trenches (BHs 185–187) were excavated across the long axis of the channel to gain cross-section views. Of these trenches, BHTs 142 and 155 did not provide good perpendicular cross section views of the feature. BHT 185 contained a large recent disturbance that impacted the acequia, reducing the usefulness of that trench. BHTs 186 (Fig. 2.19) and 187 provided the best perpendicular cross-sections of the feature, although the full channel was not exposed in BHT 187 due to nearby underground electrical cables. A row of hand-dug 1x1-m excavation units (XUs 1–6) was placed along BHT 142 to excavate the fill from within the channel for screened artifact recovery and sediment evaluation.

At the sites eastern extent (Area A), testing phase trenches (BHTs 134, 135) were re-excavated. Two new backhoe trenches (BHTs 191, 192) were excavated to gain additional cross-section views. A row of hand-dug 1 x 1 m excavation units (XUs 7–10) was placed along BHT 191 to excavate the fill from within the channel for screened artifact recovery and sediment evaluation (Fig. 2.20).

The fill of Strata 1 and 2 was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill from the acequia channel was screened through 1/4-inch mesh.

The site was visited by a professional geomorphology consultant (Dr. Stephen Hall, Red Rock Geological Enterprises) during the excavation. The geomorphologist recorded field observations on channel geometry and sediment characteristics from BHTs 191 and 192, and recovered fill samples for later sedimentological analysis as part of the project-wide acequia study.

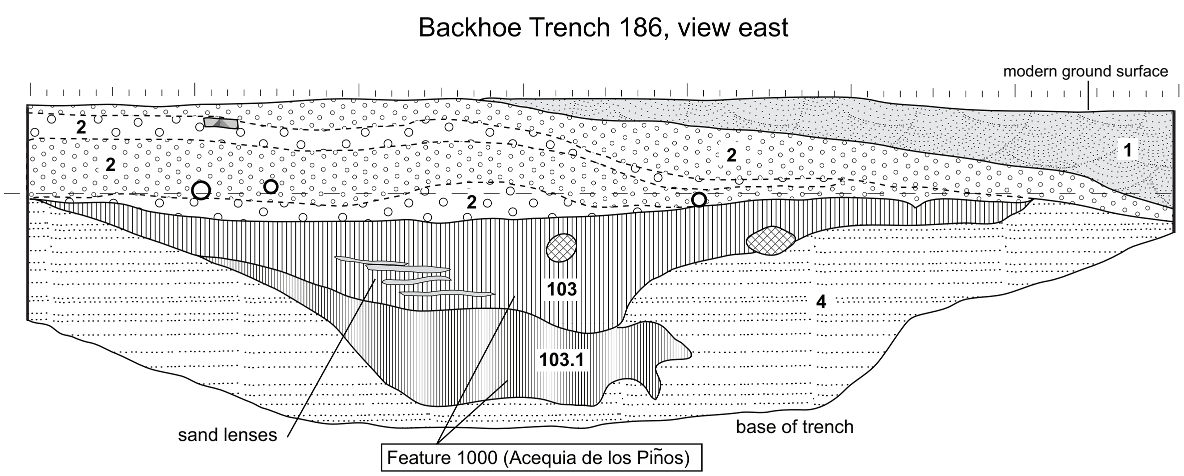


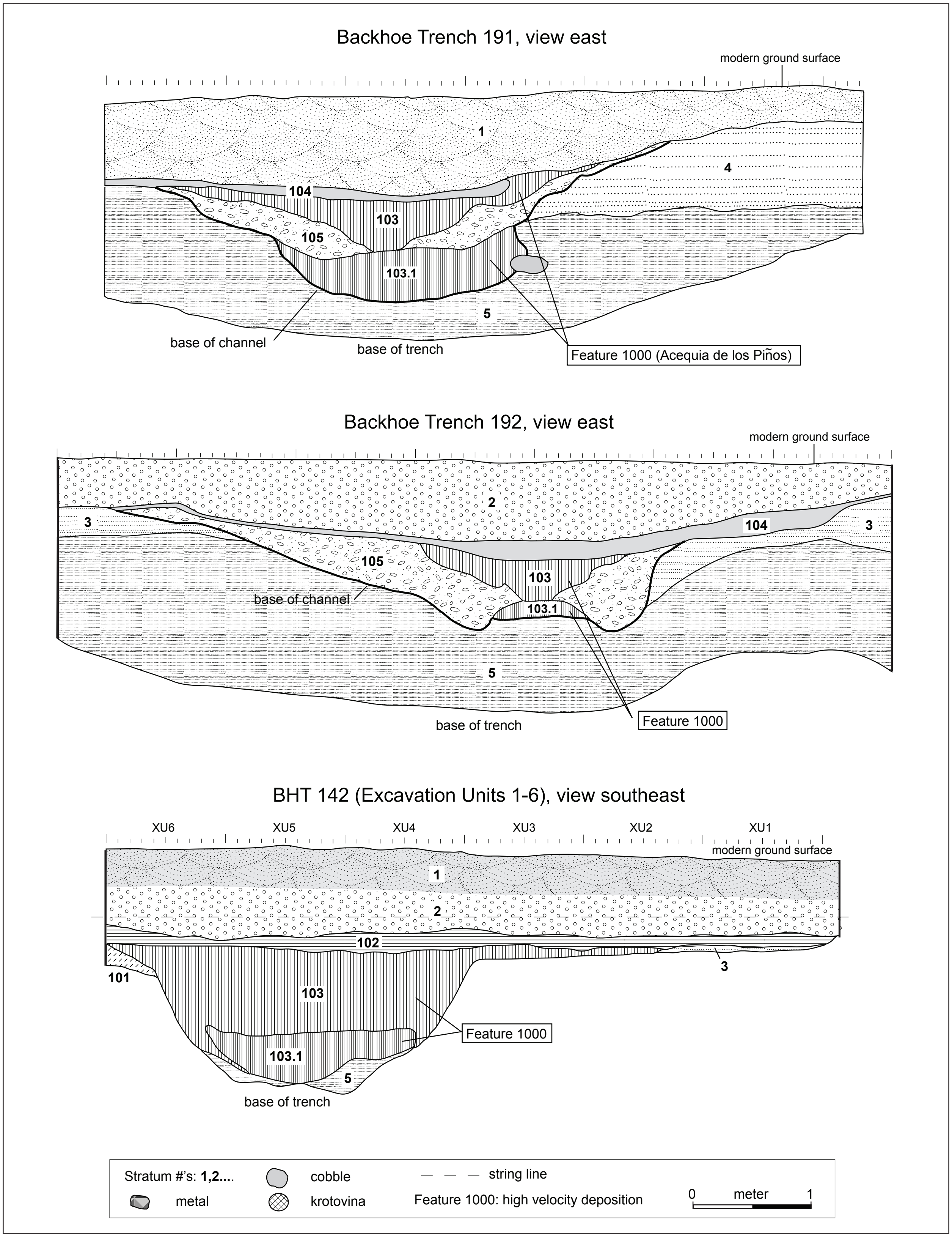
Figure 2.19. LA 149909, BHT 186, east wall, cross-section view of Feature 1000.

Figure 2.20. LA 149909, view of XUs 7–10, west wall.

Site Strata

Feature 1000 identifies the acequia channel in the excavated site area. The central portion of the channel was about 2.5 to 3 m (8.2 to 9.8 ft) in width, but the broad, gradually sloped edges extended in places to roughly 6 m (19.6 ft) across (Figs. 2.21, 2.22). The main channel measured about 80 to 95 cm (2.6 to 3.1 ft) in depth at the east deepening to 90 to 110 cm (3 to 3.6 ft) to the west. In Area B the north and south lateral boundaries gradually sloped up to the adjacent historical ground surface, providing a maximal feature depth of roughly 155 cm (5 ft) (Figs. 2.19, 2.23, 2.24. The upper portion of the channel had been excavated through sterile Stratum 3 substrate, and the lower reaches of the channel base protruded into the underlying Stratum 5 cobble deposits and Stratum 4 at the sites west end.

Most of the sediment filling and capping the channel and the historical ground surface consisted of purposefully introduced overburden. Stratographic distinction within this overburden was better defined at LA 149909 than to the west at LA 146410 but overall thickness was comparable. Stratum 1 was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving surfaces in the area and was 5 to 30 cm (2 to 12 in) thick. Stratum 2, a historical overburden deposit, was present in several variants, including a strong brown loam containing common historical glass inclusions (apparently redeposited refuse-bearing fill from elsewhere), as well as a dark grayish-brown loam containing common coal and clinker inclusions, indicating a local railyard origin. These deposits were in places up to 75 cm (2.5 ft) thick. Some of this Stratum 2 fill probably derived from construction of the New Mexico Central Railway (NMC) railroad track berm that once crossed southwest–northeast through the site area (Wenker 2005b). Stratum 3 was the underlying natural substrate, a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche



Figures 2.21, 2.22, 2.23. LA 149909, top (Fig. 2.21): Area A BHT 191, east wall, cross-section view of Feature 1000; middle (Fig. 2.22): Area A, BHT 192, west wall, cross-section view of Feature 1000; bottom (Fig. 2.23): BHT 142, XUs 1–6, southeast wall, cross-section view of Feature 1000.

Figure 2.24. LA149909, overview of Feature 1000 in XUs 1–6, view to the east.

inclusions. The occasionally underlying Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed medium crumb structure. Its color ranged from light yellowish brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown to brown in color. Clasts frequently exhibited caliche skins, and the overall stratum was weakly cemented with calcium carbonate. Other strata identified during the excavation are noted below in the feature description.

Generally, the fill of Strata 1 and 2 was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill from the acequia channel was screened through 1/4-inch mesh.

Feature Descriptions

Feature 1000 retained the same feature number during data recovery work given during testing when it was identified in a series four backhoe trench exposures. The watercourse is likely the same channel recorded as Feature 70 to the west at LA 146410. Feature strata from both sites are compared in Table 2.26 and discussed in the following feature descriptions. The channel described below is the eastern exposure of Acequia de los Pinos within the railyard project area.

Feature 1000

Early abandonment. The bottom of the acequia channel was filled with 15 to 45 cm (0.5 to 1.5 ft) thick deposits of Stratum 103.1, a dark yellowish-brown coarse gravelly sand with few, fine charcoal inclusions. Stratum 103.1 is interpreted as being indicative of a high-water-velocity depositional environment during the early periods of this feature's infilling or abandonment. Artifacts were relatively common in this deposit, artifact counts from PD logs (Table 2.22) indicate that bone was the most common artifact type making up 58 to 60 percent of the artifact assemblage, followed by native ceramics (27–38 percent). Euroamerican artifact frequencies were low and made up less than 5 percent of the recovered artifact assemblage.

Embankments. Stratum 105 was recorded in Area A (BHT 191 and 192; Figs. 2.21, 2.22) furthest to the east, a brown (10YR 5/3) sandy clay deposit containing common charcoal flecks overlay the margins of the basal Stratum 103.1. Stratum 105 appeared to represent either a channel embankment or an episode of slumped or washed-in material from the adjacent sterile substrate of the channel's bank or the surrounding ground surface. The stratum, absent in BHT 142, XUs 1–7, was not sampled.

Stratum 101, present only along the upper level of the northern bank of the acequia channel in BHT 142, was a yellowish-brown (10 YR 5/4) gravelly silty clay containing few, fine charcoal flecks (Fig. 2.23, Table 2.22). This deposit was positioned upon the sterile surface forming the edge of the channel, and lay underneath Stratum 103. The origin of this deposit is not clear, but it may represent a channel embankment (as at LA 146410 to the west, see Wenker and Hannaford 2005c) or it may derive from channel-cleaning activities. Artifact frequencies were exceptionally low, consisting of a single piece of chipped stone.

Channel fill. Stratum 103, a 20 to 40 cm (0.6 to 1.3 ft) thick deposit of dark yellowish-brown (10YR 4/6) silty clay, overlay Strata 103.1 and 105. Stratum 103, which was also marked by common, medium, laminar bands of dark yellowish-brown sand and coarse sand lenses, contained few, fine charcoal flecks and a moderate quantity of artifacts (Table 2.22), and was interpreted by Wenker as a post-abandonment deposit that derived from repeated alluvial episodes (possibly from uncontrolled storm water) that gradually filled in the exposed channel of the apparently abandoned acequia feature. Independent geological analysis conducted by Dr. Stephen Hall (Appendix 1, this report) supports this interpretation. In his analysis of BHT 191 and 192 acequia fill, Hall notes a 19 cm thick deposition of laminar sand in the acequia's central axis, which he states is clear evidence of running water. Pollen sampled by Hall from this stratum provides evidence of a "shrub grassland with piñon and juniper trees in the vicinity" (Hall, Appendix 1.1a, this report). The sample also contains the only Zea mays pollen recovered from acequia fill. Artifact frequencies were moderate, dominated by bone, which comprised 68 to 73 percent of the assemblage, followed by pueblo ceramics (20 percent), and variable amounts of Euroamerican artifacts, which made up from 2 to 27 percent of the recovered assemblage.

Stratum 104, visible in Area A backhoe trench exposures (BHT 191 and 192), dark grayish-brown (10YR 4/2) sandy loam, represents a late nineteenth- or early twentieth-century deposit of refuse-bearing fill that may have been purposefully deposited across the top of the infilled feature. As such, this deposit is the equivalent to the historical overburden deposit recorded in Area D and classified as Stratum 102 (Fig. 2.23). Both strata are equivalent of site Stratum 2. Both strata were screened during hand excavation of acequia fill. Artifact frequencies were much higher in Stratum 104. Euroamerican artifacts make up 86 percent of the artifact assemblage followed by bone and trace numbers of native ceramics. The Stratum 102 assemblage is more typical of other strata excavated at the site. Each assemblage is summarized by stratum in (Table 2.22).

LA 149909

Euroamerican Artifacts

Matthew J. Barbour

A total of 661 Euroamerican artifacts were collected from the channel, which is thought to have been in use since the eighteenth century (Wenker 2005:22). These artifacts included a diverse array of material types including large quantities of metal (n = 277), glass (n = 322) and European manufactured ceramics (n = 39). From this assemblage, 615 Euroamerican artifacts (a 93 percent sample) were chosen for in depth analysis.

Table 2.27 summarizes the distribution of Euroamerican material culture by category, type and function for each stratigraphic layer within Feature 1000, the Acequia de los Pinos. The majority of artifacts were collected from Stratum 102 (n = 26, 4 percent) and Stratum 104 (n = 550, 89 percent), layers of overburden not associated with the acequia's use. Smaller quantities of Euroamerican artifacts were recovered from the upper alluvium, Stratum 103 (n

= 30, 5 percent) and lower alluvium, Stratum 103.1 (n = 9, 2 percent).

Many of the artifacts recovered from the alluvium (Table 2.27) were small unidentifiable pieces that could not be assigned a specific function and therefore could not inform upon activities occurring at LA 149909 at the time of deposition. This was to be expected as these materials found within the acequia fill likely represent objects carried and deposited in the bedload of the channel. If the channel was intentionally filled, larger fragments such as nearly complete bottles, large pieces of iron sheet metal, and thousands of coal and cinder fragments would have been observed. There is no evidence of these products within the alluvium. Sediments likely accumulated rapidly after the acequia ceased to be maintained. However, only those artifacts small enough to be susceptible to fluvial processes are represented within the artifact assemblage.

Materials within the lower alluvium, Stratum 103.1, represent a mix of eighteenth and early nineteenth-century products. These products include unidentifiable Aranama Polychrome (n = 1, 1750–1800, Fig. 2.25) and Tumacacori (n = 1, 1780–1860) majolica vessels (Deagan 1987:29), window glass (n = 1, 1821+), can (n = 1, ca 1850+) and iron (n = 2) scraps. The two majolica vessels provide a mean Euroamerican ceramic manufacture date of 1798 (std. deviation 32 years). However the presence of window glass and can fragments within the sediment block suggest the sediment represents Spanish Colonial or Mexican Period deposits mixed with later Territorial Period materials of the mid-nineteenth century, not in situ accumulation. The upper alluvium, Stratum 103, also appears to date to the mid-nineteenth century based on the presence of machine-cut square nails, but lacks artifacts with clear manufacture marks.

While very few diagnostic artifacts were identified within the channels final fill (Stratum 104), the absence of machine manufactured bottle glass and the frequency of machine-cut square nails to wire-drawn nails (80:18) suggest the channel had returned to surface grade before the beginning of the twentieth century (ca. 1890). This claim can be somewhat reinforced by four fragments of a bottle with an I.G. Co. manufacturer mark. This mark was used by the Illinois Glass Company between ca. 1880 and 1900 (Toulouse 1971:264). However, no other manufacture marks were identified.

In addition, the appearance of personal effects (n = 2), indulgences (n = 36), food (n = 37), entertainment (n = 1) and domestic (n = 37) products in Stratum 104 suggests discard associated with a residential setting. This could indicate that the fields surrounding the acequia had been developed for domestic use before the turn of the century.

The fill above Stratum 104, Stratum 102, is a relatively recent deposit that includes Styrofoam package filler. This deposit is of limited archaeological value.

In summary, archival research suggests the Acequia de los Pinos was used in the eighteenth century. Majolica sherds identified in the lower alluvium of LA 149909 reinforce this assertion. However, most of the materials from this period were likely removed during perennial cleaning of the channel. Those that remain are found mixed with mid-nineteenth century materials. Overburden above the channel is associated the late nineteenth century residential activities and it appears likely that the acequia had been filled in completely by ca. 1890. These residential products could indicate the transition from an agricultural to urban landscape in the area surrounding LA 149909 before the twentieth century.

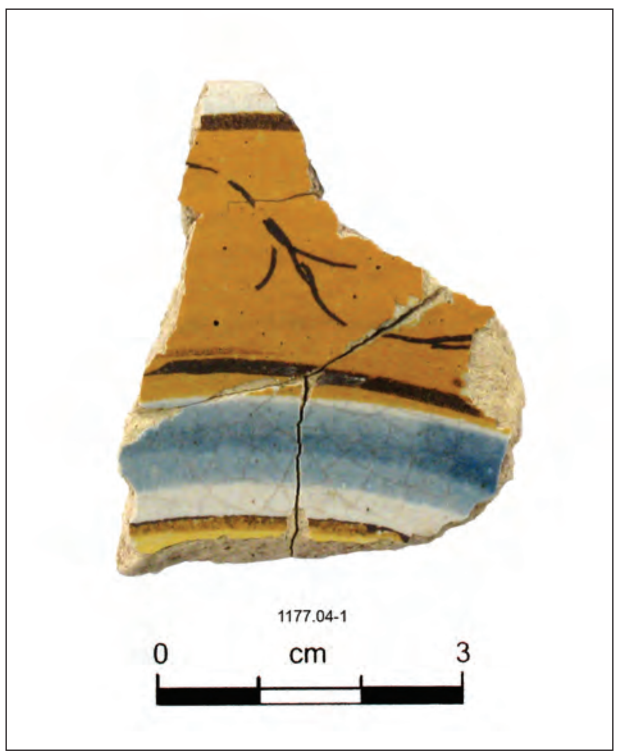


Figure 2.25. Aranama Polychrome majolica sherd.

LA 149909

Fauna
Britt M. Starkovich

The faunal assemblage from LA 149909 is small, with only 376 specimens analyzed. The sample includes remains from four discrete stratigraphic levels: 102.0, a late nineteenth- to early twentieth-century refuse deposit, 103.1, an alluvial deposit representing high-velocity infilling following abandonment of the acequia, 103.0, an alluvial deposit likely formed by multiple flooding episodes, and 104.0, a late nineteenth-century trash deposit (Wenker 2006). Both refuse deposits overlay 103.0 and 103.1 and thus were deposited well after the acequia ceased to be used.

The assemblage is composed almost entirely of domesticated animals, with the exception of one coyote tooth and a fragment from a rodent. Due to difficulties in distinguishing small specimens of sheep from goat, unspecified pieces were called "sheep/goat," though whenever possible an assignment to a specific taxon was made. Sheep/goat and cattle dominate the remains that could be identified to species; small dog, pig and horse/mule are also present. Seventy percent of the remains could only be identified to small or large ungulate, and likely represent sheep/goat and cattle, respectively. Evidence of butchering on several different specimens corresponds to cuts of meat still used today (Ashbrook 1955). On a whole, the assemblage is highly fragmented and exhibits a low incidence of burning or animal alteration. There seem to be slight differences between the levels, particularly between the refuse contexts as opposed to the alluvial deposits, but it is difficult to draw definite conclusions with such a small sample.

Stratigraphic Units

Stratum 103.1. Level 103.1 is the first alluvial level deposited after abandonment of the acequia. It was probably deposited in one or more large, high-energy flooding events (Wenker 2006). It has the largest sample out of the four levels (n = 218). About 65 percent of the remains were assigned to small ungulate or sheep/goat and about 20 percent were identified to large ungulate or cattle (Table 2.28). Large ungulate or cattle makes up a much higher proportion of the remains in level 103.1 than in any of the other stratigraphic levels, which may be a product of sample size. This level contains a single coyote tooth, which represents only one of two identifiable wild species from the site. Level 103.1 has more fragmented remains than the other levels (95 percent of the remains are less than 10 percent complete). Not surprisingly, specimens from this level exhibit more weathering damage than any other level; 7 percent of the bones are either root etched or are rounded, probably from bouncing along a channel during a flood. Two specimens show digestion damage from a carnivore.

Only 1.5 percent of the remains are burned (Table 2.28, whereas four specimens show signs of human processing: a cut mark on a small ungulate rib, a cut mark on a cattle rib, a cattle humerus that was sawn through, and a sheep/goat tibia that was cut through. The sawn cattle humerus corresponds to the modern foreshank cut and the sheep/goat tibia is part of the leg cut (Table 2.29) (Ashbrook 1955). In terms of cost-efficiency considering price per pound and pounds of edible meat per cut, following Lyman (1987), the foreshank cut is a moderately cost-efficient cut of beef. Though this sample is larger than the others, it is still insufficient to examine whether specific regions of the body are over or underrepresented. A large-scale age profile cannot be constructed for this level, but based on dentition eruption stages (Silver 1970) a sheep/goat older than 27 months and one younger than 24 months are present.

Stratum 103.0. Level 103.0 lies directly on top of 103.1 and was likely deposited in a series of alluvial events (Wenker 2006). The sample is small (n = 84) and is composed mostly of small ungulate and sheep/goat (Table 2.28). Large ungulate and cattle/bison make up about 8.5 percent of the assemblage. A horse/mule specimen was also found, in addition to an unidentified small mammal/medium bird and woodrat. Because of the alluvial context of the level, remains likely to accumulate include refuse that was thrown into the abandoned channel, animals that died in the channel, and any remains that may have been swept away during flooding events, and thus does not simply represent human subsistence behaviors. Not surprisingly, the assemblage is highly fragmented, with only two complete specimens, and 89 percent of the remains less than 10 percent complete (Table 2.28).

Though the level represents an alluvial system (Wenker 2006), the fauna show little damage associated with movement by water. Only one specimen exhibits rounding and two have root damage, but this may be a product of sample size. Two specimens have digestion damage from a carnivore and one is burned. Only one small ungulate fragment shows any signs of processing, a saw cut. Again, the sample is small enough that it is impossible to tell if certain body regions were preferentially selected, and since the sample is from a depositional level of mixed origins, body part profiles would likely be meaningless. Age could be determined on two elements based on bone fusion (from Schmid 1972 and Silver 1970, in Reitz and Wing 1999), a sheep tibia belonging to an individual older than 15 months, and a calcaneus belonging to a sheep/goat younger than 36 months. Based on the overlap of the ages, it cannot be ruled out that the two elements belonged to the same individual, but the context makes it impossible to be positive.

Stratum 104.0. The final level included in the sample is 104.0, a late nineteenth-century refuse deposit that overlays the two alluvial levels. Though the sample size is again small (n = 48), the assemblage is noticeably different than the others, particularly the alluvial levels (Table 2.28). All remains identified belong to domestic fauna, the majority of which are medium or large ungulates. In this level, small ungulates and sheep/goat only make up 40 percent of the assemblage. Cattle and pig are also present in small numbers, and 40 percent of the assemblage was classified as medium or large ungulate, which could belong to either cattle or pig. The remains are highly fragmented, with 92 percent less than 10 percent complete.

Unlike the other levels, no environmental damage was recorded on any of the remains. Likewise, no animal damage was observed. Level 104.0 had a much higher incidence of burning, with about 6 percent of the remains showing discard burns. The bones also have a much higher frequency of processing evidence (17 percent as opposed to 0–2 percent in the other levels). Two medium/large ungulate long bone shaft fragments were cut by saws as was a sheep/goat metacarpal, part of the shank wholesale and retail cut (Ashbrook 1955). A cattle astragalus was chopped and a lumbar vertebra and humerus were sawn on two sides, often indicative of a steak or roast cut. The required precision of these cuts indicate that they were most likely made by a mechanical saw, thus the animals that produced these two portions of meat were probably not butchered in-home. These two cuts correspond to the short loin and chuck cuts (Ashbrook 1955), which are both moderately cost-efficient cuts of meat (Lyman 1987) (Table 2.29). The two specimens identified as pig were both processed. A pig pelvis was sawn through and a phalanx was cut. A saw through the pelvis is probably associated with a ham cut (Ashbrook 1955).

The high frequency of burning and processing in this level is consistent with a trash deposit. Body part profiles cannot accurately be constructed. Aging was only possible on the pig phalanx, which belonged to an individual older than a year.

Stratum 102.0. Stratum 102.0 represents a late nineteenth to early twentieth century trash deposit that contained glass, metal, and Euroamerican as well as native ceramics in addition to bone (Wenker 2006). The sample is extremely small (n = 26) and Table 2.28 shows the breakdown of different species in the assemblage. The majority of the remains could only be identified to small ungulate, though large ungulate and an unidentified small mammal/large bird are also present. It is worth noting that an almost complete skeleton of a small-breed puppy was recovered from two adjacent units in this deposit. The puppy skeleton is in good shape and is between 1/2 and 3/4 complete. The other specimens from the level are highly fragmented, with only one bone more than 10 percent complete.

There is very little environmental damage on the bones in this level (one is corroded), and none of the remains show evidence of being altered by animals (Table 2.28). Likewise, none of the bones are burned and none show signs of human processing. Because the sample is so small, it is impossible to make any inferences about specific body parts that were utilized. Similarly, conclusions about the ages of animals consumed cannot be drawn, only that one sheep metatarsal belonged to an individual older than 18 months, based on bone fusion data (from Schmid 1972 and Silver 1970, in Reitz and Wing 1999).

Conclusions

As stressed repeatedly above, the sample size for LA 14909 is so small that only conservative conclusions can be drawn. Not surprisingly, the main differences are between the alluvial contexts and refuse deposits. The refuse deposits contain only domestic taxa. They exhibit less environmental and animal alteration, possibly because they were deposited and then covered quickly, as opposed to being exposed to the elements and moved along an acequia channel. Only level 104.0 had an appreciable difference in the amount of burning and processing than the other levels. It is possible that had the sample from 102.0 been larger, it would have been more similar to the other refuse deposit.

LA 149909

Native Ceramics
C. Dean Wilson

The great majority (93.9%) of the 151 native sherds from LA 149909 consist of historic period types (Table 2.30). Prehistoric types identified include Unpainted Undifferentiated White (0.7%), Organic Paint Undifferentiated (2.0%), Biscuit B (0.7%), Plain Gray Body (2.0%), and Smeared Plain Corrugated (0.7%). Historic types recorded include Tewa Polychrome Painted Undifferentiated Two Slips (0.7%), Black-on-cream Undifferentiated (11.9%), Historic White Cream Slipped Unpainted (6.6%), Red-on-tan Unpainted (1.3%), Tewa Buff Undifferentiated (17.2%), Tewa Polished Gray (1.3%), Tewa Polished Black (4.6%), Highly Micaceous Paste (9.9%), Smudged Interior Mica Slipped Exterior (4.0%), Tewa Polished Red (8.6%), Polished Interior with Mica Slip (2.0%), Smudged Micaceous (0.7%), Tewa Unpolished Black (1.3%), Tewa Unpolished Buff (15.2%), Smudged Exterior Buff Interior (7.9%), and Puname Polychrome Unpainted (0.7%). This combination of types indicates that most of these ceramics are derived from components dating to the Late Colonial or Territorial periods.

Ceramics selected for analysis from Stratum 103.1, the first alluvium deposited after abandonment, are summarized in Table 2.31 and are limited to a sample of 77 artifacts. The assemblage is dominated by Historic Tewa types, the highest percentages of which were Tewa Unpolished Buff (20.0%), Highly Micaceous Paste (16.9%), and Historic White Cream Slipped Unpainted and Tewa Polished Red (both 11.7%); this combination of types is consistent with a nineteenth-century assemblage.

It appears these sherds were redeposited from distant contexts as indicated by the shape, abraded edges, and other wear indicative of water transport for the majority of these sherds (84.1%). Vessel forms that could be recognized (Table 2.32) include jars, which made up 29.2% of the assemblage, and bowls, which accounted for 8.6% of the analyzed ceramics.

LA 149909

Chipped Stone

(No chipped stone was analyzed from LA 149909.)

LA 146410

During data-recovery excavations, Areas C and D, designated LA 146410, were interpreted as a possible natural arroyo that was modified for use as a water-conveyance channel. At the far western edge of the excavation (Area D), a fork in the arroyo was accompanied by a possible rock water-diversion device directing water into one of the channels of the fork. Mechanical scraping units failed to locate any additional diversion features or lateral channels. The orientation of this channel, when compared with the orientation of the acequia channel at LA 149909 farther to the east (see Areas A and B, discussed above), suggests that both sites represent the same acequia. Artifact recovery rates were moderately high (n = 6127 for the entire site; Table 2.33), and datable artifacts indicate deposition in the channel through the 1950s.

Site Location

LA 146410 extends from between the railroad tracks on the southeast, to the west-northwest for a distance of roughly 69 m and continues beneath the SITE Santa Fe building (1606 Paseo de Peralta; Fig. 2.18). Channel deposits were roughly 4 to 5 m in width (covering an area of roughly 345 sq m). Prior to this project, LA 146410 was covered by a dirt automobile parking lot and driveway, the AT&SF railroad tracks, several concrete pads, and the SITE Santa Fe building foundations. No acequia features were visible on the modern surface.

Data Recovery

Data-recovery activities at LA 146410 were conducted in two phases. The first phase, conducted between April 27 and May 25, 2005 examined Area D, the acequia section west of the AT&SF railroad tracks (Fig. 2.18). In that area, the channel deposits covered an area roughly 36 m long and 4 to 5 m in width. The alignment of the channel suggested that additional sections lay east of the railroad tracks, but no exposures of the site had been encountered during the previous testing in that area (Wenker 2005a). The second phase conducted on February 6 and 7, 2006 exposed the continued course of the channel, upstream and to the east, in Area C between the AT&SF tracks, demonstrating probable alignment with the acequia exposed at LA 149909. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker, Post, and Moore 2005).

Various types and sizes of excavation units were used to expose and define the plan view and cross sections of the acequia channel and its deposits. Excavation units are shown in Figure 2.26 and dimensions and grid coordinates are summarized in Tables 2.34, 2.35, and 2.36. Two backhoe trenches (BHTs 77, 82) and the two 1 x 1 m units (XUs 42, 43) from the testing phase were re-excavated. In the lot adjacent to Warehouse 21 three new backhoe trenches (BHTs 100–102) were excavated perpendicular to the long axis of the channel to gain cross-section views. BHT 188 was excavated between the main railroad tracks and an easterly siding track to intersect the acequia midway between the SITE Santa Fe building and LA 149909. In the eastern site area, rows of hand-dug 1 x 1 m excavation units (XUs 1–12) were placed along selected backhoe trenches to excavate the fill from within the channel for artifact recovery and sedi-

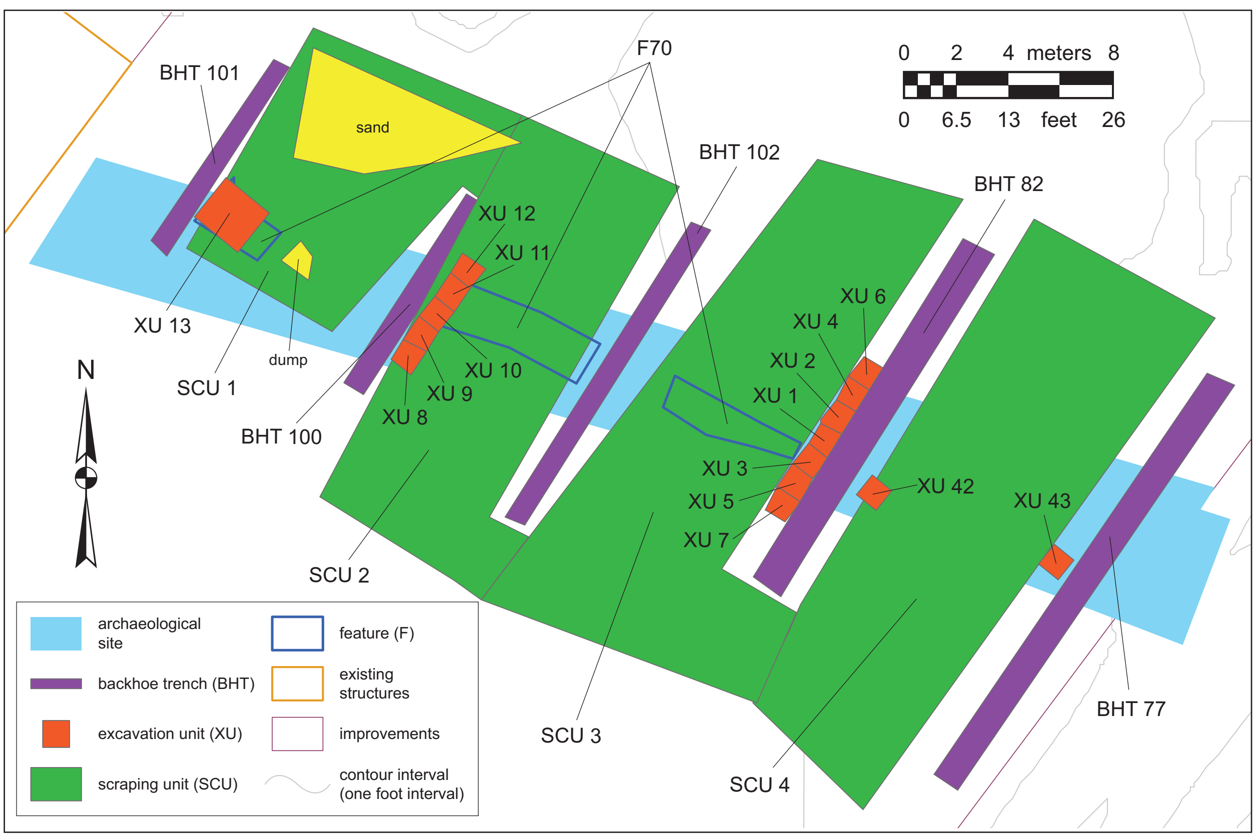


Figure 2.26. LA 146410, Area D, showing projected courses of the Acequia de Los Pinos (Feature 70) through the site area.

ment evaluation. The number of 1 X 1 m excavation units placed along each trench was dictated by the overall width of the channel deposits shown in Figure 2.26. Mechanically excavated scraping units (SCUs 1–4) were dug between the trenches to expose the top of the acequia and to search for diversion features (such as headgates) or other subsidiary channels. In this manner, the channel fork, noted above, was discovered in SCU 1. An additional hand-dug 2 x 2 m excavation unit (XU 13) was placed over the fork to investigate its nature; this excavation unit in turn exposed the Feature 1 cobble alignment. Excavation at the west end of the site was limited by the proximity of the railroad tracks and building foundations, and because the area was heavily used as a freight-loading area and vehicle driveway.

The site was visited by a professional geomorphological consultant (Dr. Stephen Hall, Red Rock Geological Enterprises) during the excavation. The geomorphologist recorded field observations on channel geometry and sediment characteristics, and recovered fill samples for later sedimentological analysis as part of the project-wide acequia study.

Site Strata

Most of the sediment filling and capping the channel and the historical ground surface consisted of purposefully introduced overburden (Fig. 2.27), which consisted of a deposit of very dark grayish-brown fine sand with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. Although the overlying strata are comparable in depth to deposits discussed to the east at LA 149909 they are less well defined. This layer represents a mixed deposit of Stratum 1 (modern) and Stratum 2 (historical) overburden that was introduced to level the driving surfaces and to bed the railroad tracks. This deposit was 40 to 80 cm (1.3 to 2.6 ft) thick at the eastern site (LA 146410) extent and from 5 to 30 cm thick to the west between railroad track alignments where Stratum 2 was absent.

Strata 3, 4, and 5 represent underlying natural substrate and are identical to that described in the preceding LA 149909 discussion.

Feature Descriptions

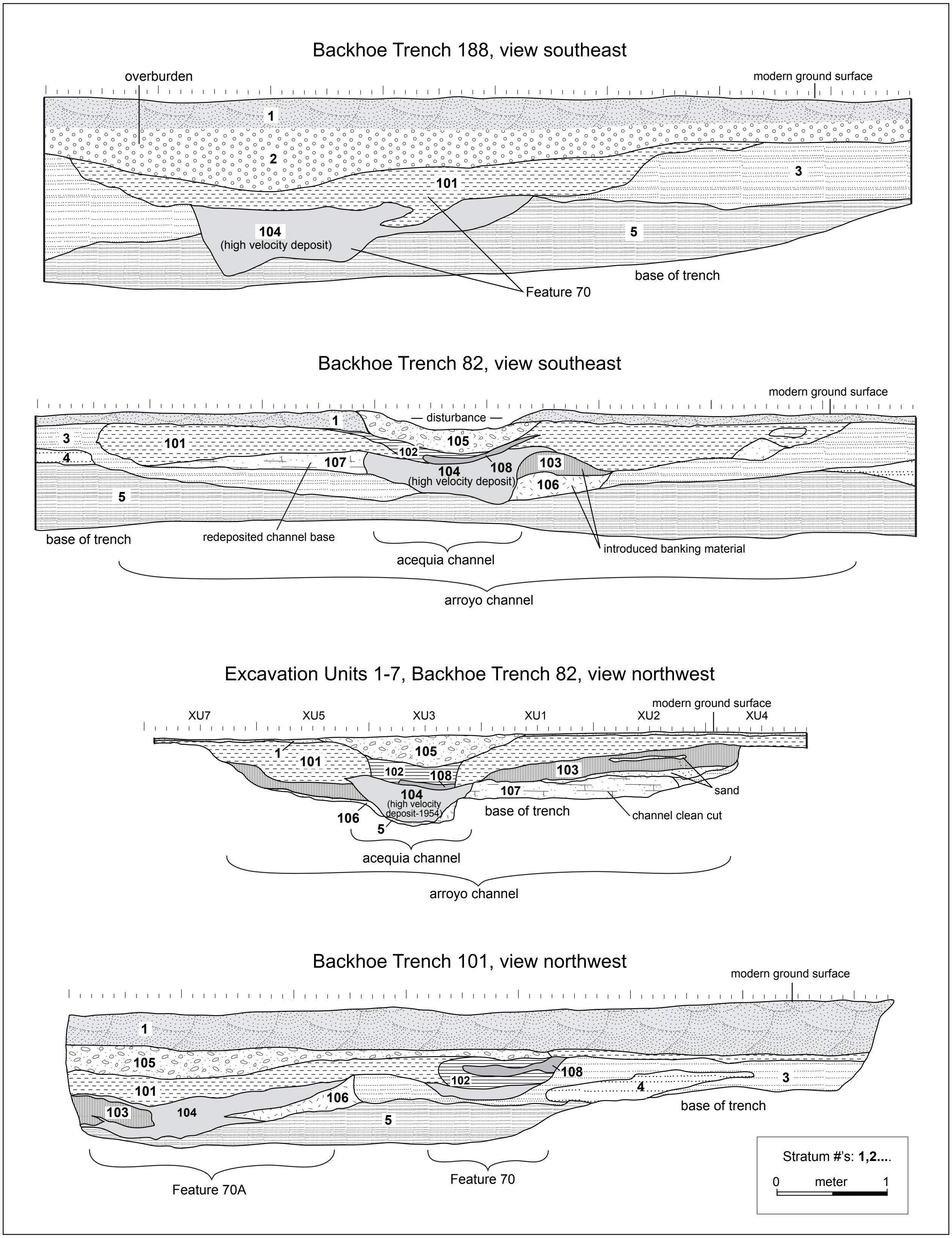
During testing (Wenker 2005), the ditch was recorded in cross section as a broad basin-shaped channel (ca. 5.5 m across) with an irregular, abrupt lower boundary and indistinct lateral edges. The sediments within the channel consisted of silty clay with many alluvial lenses of fine to medium sand, charcoal flecks, and occasional cobbles and pebbles. An overlying charcoal-flecked deposit extended beyond the north and south limits of the channel, forming an overall 60-cm-thick deposit. No clearly patterned overall alluvial sequence or discrete channels could be isolated. At that time, it was thought that the feature fill represented a complex of aggraded deposits formed over long, sequential periods of use, that were laid down in a series of continually shifting ditch channels that drifted laterally over time, as the acequia was periodically maintained and re-excavated during clean-out episodes. Data-recovery excavations indicate instead that the feature represents a broad, possibly natural, gravel and sand-filled channel that was partially filled with cultural fill to constrict and transform the natural watercourse into an acequia. Cultural strata are presented for comparison with Feature 1000 in Areas A and B upstream and to the east in Table 2.26.

Feature 70

Feature 70 identifies the overall main, combined arroyo/acequia channel that crossed through the excavated site area. The subfeature identified as the acequia channel was contained within an overall broad arroyo channel evident as a lens of alluvially deposited sand (Figs. 2.28, 2.29, 2.30).

In Area D the channel's western-most exposure, the broader channel was originally about 8 m in width and 75 cm in depth, dug into the in filled boarder channel with indistinct north and south lateral boundaries. The smaller acequia channel was apparent as an irregular basin-shaped or straight-walled channel that was about 1.6 m wide and 1.10 m in depth.

Arroyo Channel. Much of the bottom of the broad channel was filled with Stratum 107, a slightly hard, reddish brown, very cobbly and gravelly clay loam with common, medium distinct mottles of reddish brown, grayish brown, and gray silty loam. Stratum 107 is interpreted as a culturally modified version of the sterile Stratum 5 substrate, having been formed during an initial period of channel clean-out activi-



Figures 2.27, 2.28, 2.29, 2.30. LA 146410, top (Fig. 2.27): BHT 188, Feature 70, southeast wall, cross-section view; second from top (Fig. 2.28): BHT 82, southeast wall, cross-section view; second from bottom (Fig. 2.29): LA XUs 1–7, northwest wall of BHT 82, cross-section view; bottom (Fig. 2.30): BHT 101, northwest wall, cross-section view.

ties in the center of the arroyo that redeposited the fill along the rest of the base of the channel. Artifacts were rare in this deposit consisting of bone, native ceramics and one piece of metal (Table 2.33).

Embankments. Stratum 106, a soft, strong brown (10 YR 4/3), silty loam containing few, fine charcoal flecks, was also found along the lower margins of the arroyo channel, and was sometimes found beneath or inter-fingered with Stratum 107. Stratum 106, was apparently an anthropogenically introduced material placed along the banks of the modified arroyo to reinforce the edges of the cleaned-out arroyo channel. Stratum 103 was a strong brown (7.5 YR 4.6), silty clay deposit overlying Strata 106 and 107. This sediment, which contained few, fine charcoal flecks and very few artifacts, appears, like Stratum 106, to represent an introduced material that was placed along the banks of the arroyo to stabilize the channel for use as an acequia. All of these strata contained low frequencies of artifacts (Table 2.33). Assemblages in Strata 103 and 107 were dominated by bone with small amounts of native ceramics. Stratum 106 was the only context that had more than trace amounts of metal or glass.

Acequia Channel. Stratum 104 represents the basal deposits within the narrowed channel that had been formed by the introduction of the above-described stream bank deposits. Stratum 104 was a soft, very gravelly, cobbly dark brown (10 YR 3/3), medium- and coarse-grained sandy loam that is indicative of a high-water-velocity depositional environment. This deposit contained abundant artifacts from a range of time periods, including bottle glass with makers' marks as late as 1954. Metal, glass, and Euroamerican ceramics made up approximately 70 percent of the artifact assemblage (Table 2.37). Many of the native-made ceramics exhibited highly rounded edges, indicative of long-term stream transport from upstream locales.

Stratum 101 was a massive deposit of brown (10 YR 5/3) sandy clay loam containing common, fine charcoal flecks and many artifacts (Table 2.33). It was originally interpreted as a culturally introduced deposit framing the upper channel banks of the acequia to narrow and reinforce the edges of the acequia channel, which was evidently witnessing turbid flow events during the deposition of Stratum 104. In Area C, the BHT 188 profile exposure (Fig. 2.27) suggests that the stratum capped Stratum 104 indicating that Stratum 101 was post-abandonment fill derived from colluvial processes or purposeful backfilling of overburden.

Within the re-configured acequia channel formed by the introduction of Stratum 101, Strata 102 and 108 represented additional alluvial channel deposits of lower-velocity flows. Stratum 102 consisted of a laminated series of brown (7.5 YR 5/4), fine sand lenses and Stratum 108 was a thin deposit of medium-grained sand that represented a discrete alluvial episode with moderate velocity within the slower-moving Stratum 102 deposit. Artifact content included high frequencies of non-diagnostic sheet metal and bottle glass; metal glass and Euroamerican ceramics made up 95 percent of the artifact assemblage (Table 2.33).

Post-abandonment fill. The channel swale in the project area was filled with Stratum 105, a redeposited and jumbled construction fill of hard brown (7.5 YR 5/4) cobbly and very gravelly sandy loam that was apparently introduced to level the Warehouse 21 parking lot. Lastly, the project area was covered by about a 25 cm layer of modern parking lot gravel (Stratum 1). Stratum 105 was widely distributed across the western end of the scraped area (SCU 1; Fig. 2.26) and probably also represents disturbances occasioned by the construction of the Warehouse 21 building.

In Area C (BHT 188), the channel was roughly 6.3 m (21 ft) in width (Fig. 2.27). The top of the channel fill was buried under more recent overburden; the channel deposits alone measured roughly 80 cm (2.6 ft) in maximum thickness.

The base of Feature 70 was filled with a 25 to 60-cm-thick (0.8 to 2 ft) deposit of what appears to represent Stratum 104, a dark yellowish-brown coarse gravelly and cobbly sand with fine charcoal flecks as well as inclusions of large mammal bones. In Area D, the deposit represented the basal stream-transported sediment in the overall acequia channel, and it contained abundant artifacts from a range of time periods, many of which exhibited highly rounded edges, indicative of long-term stream transport from upstream locales.

Overlying the Stratum 104 deposit was a 20 to 30 cm thick, irregular deposit of dark yellowish-brown sandy loam, which appears to represent a variant of Stratum 101. The trench exposure also revealed few, fine charcoal flecks as well as inclusions of large mammal bones in this sediment, but no other artifacts were observed. Stratigraphically this exposure is more similar to Feature 70a.

Feature 70A, Southwestern Channel Fork

Feature 70A was a fork off of the Feature 70 channel at the far western end of the project area, near the Warehouse 21 building (Fig. 2.26). The feature was exposed during mechanical scraping in SCU 1 and the fill was removed from the channels in XU 13 to sample the sediments for artifacts and to expose the features' morphology (Fig. 2.32). The exposure of the channels in BHT 101 (Fig. 2.30) represents a cross section downstream from the fork. No additional exposures were possible due to the proximity of modern buildings and features to the west and south of the excavated areas.

In XU 13, Feature 70 was flowing in a west–northwesterly direction, while the Feature 70A channel trended toward the west–southwest (Fig. 2.32). This southwestern course followed a relatively narrow channel that was about 1.6 m wide and 30 cm thick. The banks of the fork channel were formed by Strata 103 and 106, indicating that this channel may represent the original alignment of the natural arroyo that was channelized into an acequia. Stratum 104, the high-velocity coarse sand and cobbles found in Feature 70, also characterized the channel fill of Feature 70A.

Feature 1

The Feature 70A fork was apparently blocked by Feature 1, an amorphous linear array of stones and cobbles that appears to have formed a water-diversion device, placed to direct the water flow down the Feature 70 channel to the northwest. The cobble alignment is about 3.5 m long by 1 m wide and 6 cm thick, although it appeared to be fairly washed-out and disarticulated. A brick and a piece of concrete were present among the cobbles. Stratum 109, the fill forming the matrix of the cobble alignment, consisted of a dark yellowish-brown, gravelly, cobbly, medium-grained sandy loam with abundant artifacts (Table 2.33), mainly bottle glass and non-diagnostic metal pieces.

The abandoned channel of Feature 70A was covered over by the anthropogenically introduced Stratum 101, which did not cover Feature 70, indicating that this northern branch of the channel continued to be used. A 1935 tax token in the main channel in this area shows continued use until at least this date.

LA 146410

Euroamerican Artifacts
Matthew J. Barbour

A total of 4,833 Euroamerican artifacts were collected from the channel fill in LA 146410, which is thought to have been in use since the eighteenth century. These artifacts consisted primarily of large quantities of metal (n = 2,515), glass (n = 1,799) and European-manufactured ceramics (n = 254). From this assemblage, 2,557 Euroamerican artifacts (a 53 percent sample) were chosen for in depth analysis.

Table 2.37 summarizes the distribution of Euroamerican material culture by category, type and function for each extramural stratigraphic layer and Feature 70 filling episode. Extramural artifacts accounted for 33 percent (n = 848) of the Euroamerican artifact sample. These artifacts represent products primarily dating to the twentieth century, such as machine made bottle glass (1904+, Lorrain 1968:43) and sanitary seam can fragments (1898+, Rock 1984:105). The majority could not be assigned to a specific function due to their small size and highly fragmented nature. This would indicate that these materials are a secondary deposit.

The remaining 67 percent of Euroamerican artifacts (n = 1,709) were analyzed from fill within Feature 70, the Acequia de los Pinos. Roughly equal quantities of Euroamerican artifacts were analyzed from Stratum 102 (n = 888) and Stratum 104 (n = 820). Stratum 102 represented the upper alluvium and Stratum 104 was lower channel fill. Artifacts from both strata were similar, and like the extramural fill consisted primarily of products dating to the early twentieth century (ca. 1920) with the majority not being assigned a specific function due to fragment size. The similarities in artifact size and function are to be expected as many of the materials found within the acequia fill likely represent objects carried and deposited into the channel from the surrounding environment.

However, artifact counts are relatively high and some of the artifacts found inside the channel may reflect intentional waste disposal. Figure 2.33 compares the relative frequency of Euroamerican

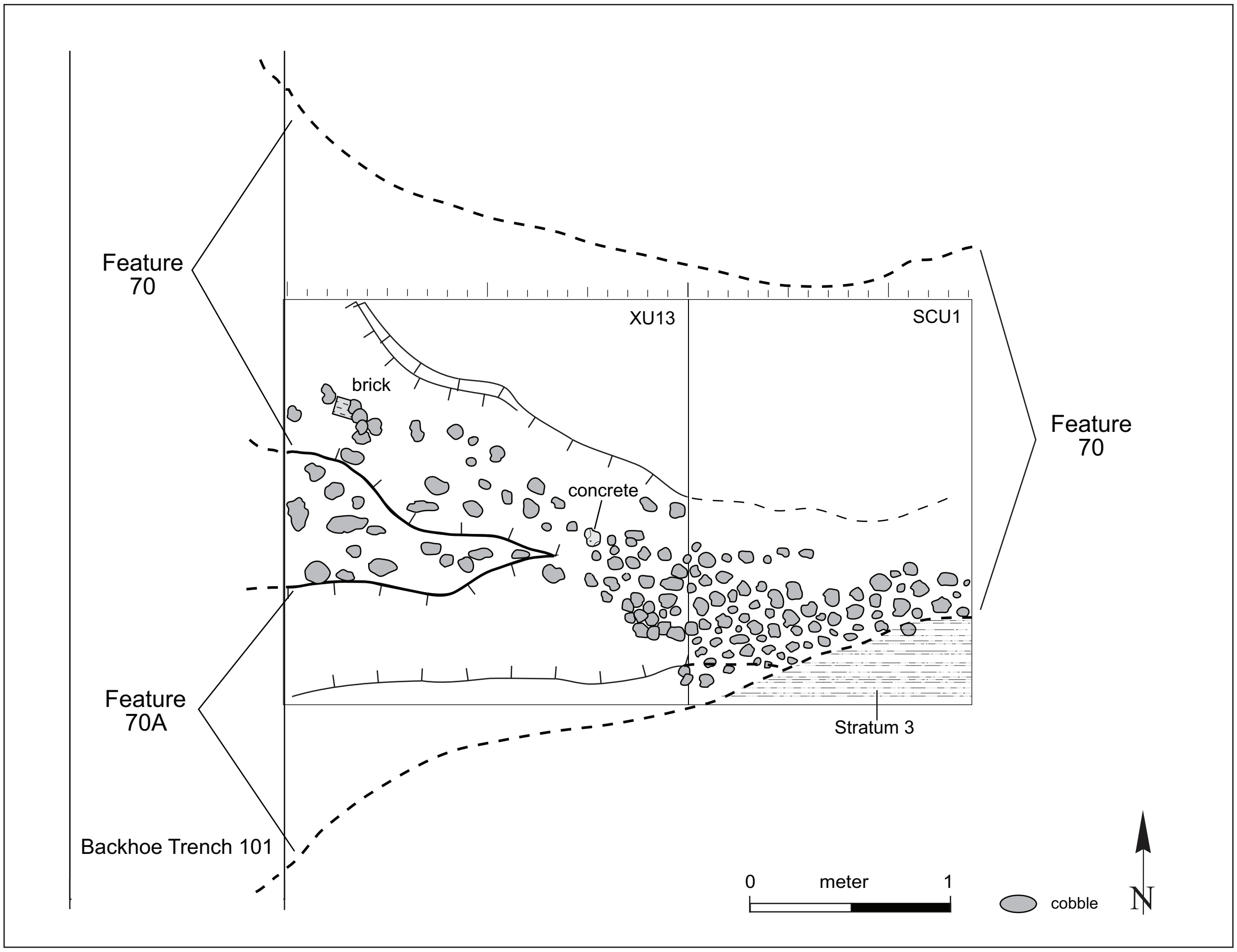


Figure 2.32. LA 146410, excavation map of Features 70 and 70A in XU 13.

artifacts recovered from the extramural area and Feature 70, the Acequia de los Pinos, by functional category. In both instances, Euroamerican artifacts appear to represent residential activities. No industrial products associated with the Santa Fe Railyard were found at LA 146410 and both deposits contain substantial quantities of household products. However, while the extramural refuse and acequia fill are compositionally similar, there are higher quantities of indulgence items within the acequia, i.e., soda, beer, and wine bottle fragments. These goods could reflect intentional waste disposal of some subset of Euroamerican artifacts or indicate that while both assemblages represent residential refuse, they are discrete deposits.

Interestingly, while Stratum 104 contains materials dating to the twentieth century, earlier products are interspersed within this lowest alluvium. These included fragments of an unidentifiable majolica vessel (n = 1, ca. 1610–1850, Deagan 1987), machine-cut square nails (n = 6, ca 1830+, Nelson 1968:8) and a bottle hand blown into a two-piece mold (n = 1, 1840–1920, Lorrain 1968:39–40). Products such as these are strong indicators that the channel was used in the nineteenth century may have also been in used before that time. Dates derived from these artifacts correlate well with archival sources that place creation of the acequia sometime in the eighteenth century.

Understanding the Acequia de los Pinos

LA 146410 and LA 149909 appear to represent segments of the Acequia de los Pinos based on archival evidence and the trajectory of the ditch segments relative to one another. However material culture within the ditch segments is substantially different. While Euroamerican artifacts found in both ditches represent residential discard, the artifacts found in the alluvium of LA 146410 appear to date to the early twentieth century and those in LA 149909 appear to date to the mid-nineteenth century. These dates coupled with the frequency of artifacts in the alluvium tell very different use-lives to the same ditch.

In the case of LA 146410, small quantities of Colonial and early nineteenth-century materials suggest initial use of the acequia in the eighteenth and nineteenth centuries. The small quantities of these materials may reflect intermittent cleaning of the channel. However, the presence of machine made bottle glass in the lower alluvium suggests major aggradation may not have occurred within the ditch until sometime in the twentieth century. Furthermore, the material culture residing in the alluvium and overburden is similar both in age and composition suggesting the ditch was filled relatively rapidly to surface grade. There is even some evidence to suggest that infilling may been intentional.

This is not so in the case of LA 149909. Materials in the lower alluvium represent a much earlier deposit than those above and all evidence suggests a gradual accumulation of material culture with the ditch returning to surface grade sometime in the late nineteenth century. Whereas LA 146410 was filled with large quantities of machine made bottle glass, not a single twentieth-century artifact was recovered from the alluvial fill within LA 149909.

The reason for these discrepancies cannot be explained by the Euroamerican material culture. However, the variability in material culture from the acequia sections suggests that it is impossible to provide broad generalizations about the use-life of the acequia as a whole. It is possible that portions of the Acequia de los Pinos (i.e., Feature 70) were abandoned in the nineteenth century while other portions continued to be utilized (or at least did not begin to aggrade) into the twentieth (see Feature 70a). Furthermore, in case of LA146410, infilling of the ditch appears to have been a relatively rapid event whereas LA 149909 suggests a more gradual sedimentation of the channel.

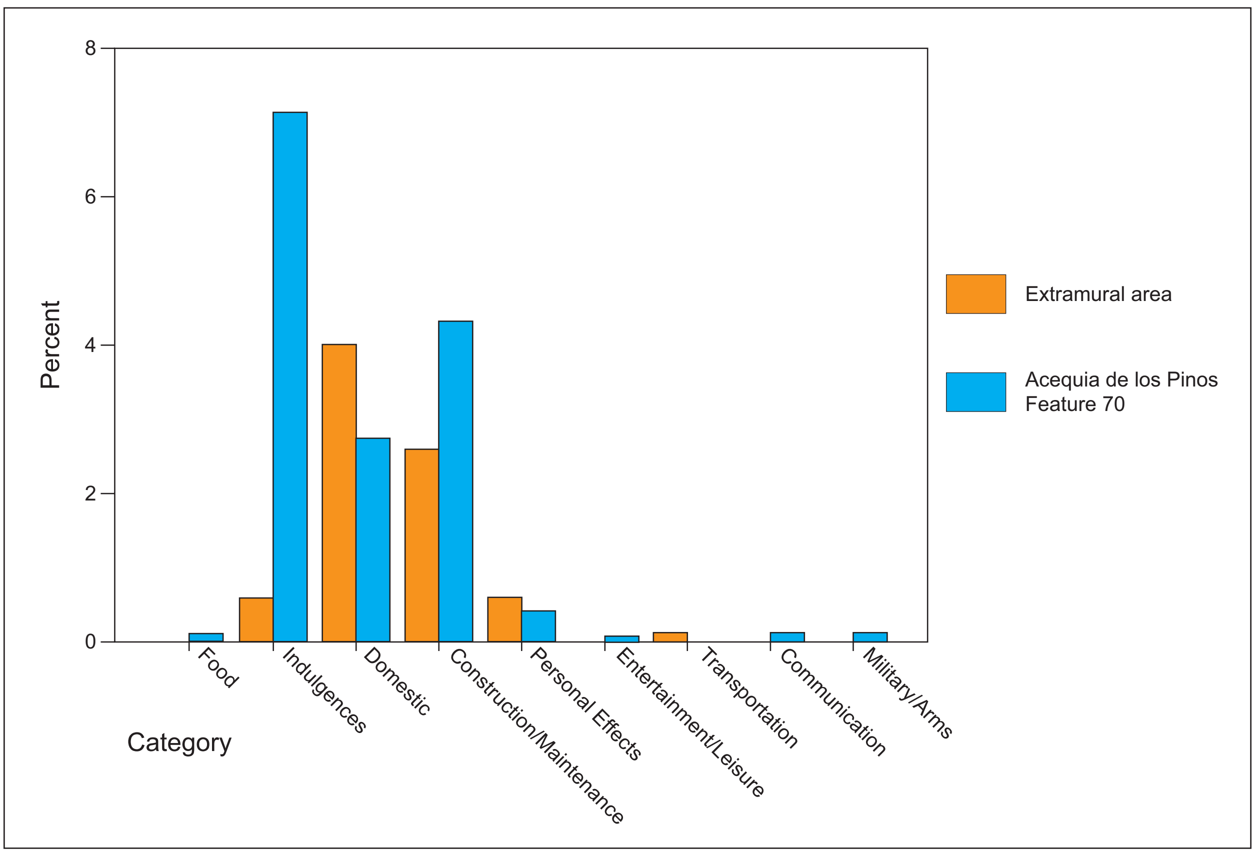


Figure 2.33. LA 146410, relative frequency of Euroamerican artifacts recovered from the extramural area and from Feature 70 (Acequia de Los Pinos), by functional category.

LA 146410

Fauna
Britt M. Starkovich

The faunal assemblage from LA 146410 is relatively small, with 756 identified specimens. The site is thought to be the eastern portion of the historical Acequia de los Pinos (Wenker 2006). The sample comes from a total of eight different stratigraphic levels from three different features, as well as from the extramural fill capping the acequia. Feature 70 is the main acequia channel. Faunal samples were analyzed from strata 102, 103, 103/107, and 104, which mostly represent alluvial fill. Feature 70a is a portion of the acequia that forked away from the initial Feature 70, and was then artificially diverted back to the main acequia channel. Samples were analyzed from stratum 106, a sedimentary unit added artificially for the purpose of diverting the channel. Faunal samples from Feature 1 were analyzed. This feature represents a series of large cobbles placed near the natural fork in the drainage in order to divert the channel, and includes only stratum 109. Several layers from post-abandonment, extramural fill were also sampled, including Strata 101, 101/103, 101/104, 101/107, 104/105, 105, and 106.

The assemblage is composed of almost exclusively domestic fauna, with the exception of one fragment of black-tailed jackrabbit. Due to difficulties in distinguishing small fragments of sheep from goat, a generalized "sheep/goat" category was assigned for unspecified pieces, though species-specific designations were made whenever possible. Almost sixty percent of the specimens could only be identified to different size classes of ungulate, though it is likely that the categories "small ungulate" and "large ungulate" represent sheep/goat and cattle, respectively. Cattle and sheep/goat dominate the identifiable component of the remains, but house cat, horse or burro, and chicken are also present (Table 2.38). On a whole, the assemblage is highly fragmented, with 91 percent of the remains being less than 10 percent complete. Environmental damage is relatively common; about 30 percent of the assemblage shows signs of environmental alterations. Animal alterations and burn damage are fairly infrequent. Roughly 10 percent of the remains show evidence of human butchering, and most of the butchering corresponds to meat cuts still used today (Ashbrook 1955). The sample size is fairly small, though some basic observations and interpretations are possible.

Feature Assemblages

Feature 70. Feature 70 represents the main acequia channel for LA 146410 (Wenker 2006). Based on artifacts found in the alluvium, one of which dates to 1935, the feature likely post-dates the building of the railroad (Wenker 2006). The sample size includes 307 specimens in four different stratigraphic units: 102, 103, 103/107 and 104. Strata 102 and 104 are alluvial layers of acequia fill, Stratum 103 is part of the bank of Feature 70 and Stratum 107 is redeposited sterile caliche and cobbles (Wenker 2006).

All species identified in Feature 70 belong to domestic animals, including cattle, sheep/goat, horse/burro, chicken, and house cat (Table 2.38). The remains are highly fragmented, with 93 percent less than 10 percent complete, and only five complete elements. A quarter of the sample has environmental alteration, primarily exfoliation associated with exposure and root etching. Only three specimens were rounded, which is surprising since the sample came from an acequia context and it might be expected that artifacts would have endured modification from bouncing along in an alluvial environment. Only two specimens were altered by animals, but there is some damage that can be attributed to human processes. About three percent of the assemblage is burned and nine percent shows evidence of butchering. One specimen was modified into a ring shape.

Feature 70a. Feature 70a forked off of the main acequia channel (Feature 70) and was then infilled. The faunal sample came from Stratum 106, which was used in conjunction with Feature 1 to divert the flow back to Feature 70.

Only five specimens came from Feature 70a, all of which are sheep or goat (Table 2.38). The remains are moderately fragmented, though the sample size is too small to draw any conclusions (Table 2.38). All of the specimens show signs of environmental damage, and none exhibit animal damage or burning. Two of the specimens were butchered.

Feature1. Feature 1 was a series of cobbles arranged to divert acequia flow from Feature 70A back to the main acequia channel, Feature 70. Artifacts were sampled from Stratum 109. The sample is small (n = 33) and is composed of cattle, sheep/goat, horse/burro and small and large ungulate (Table 2.38). The remains are highly fragmented; only three are more than 10 percent complete. About 20 percent of the assemblage has environmental damage, and none show signs of animal damage or burning. Twenty percent of the specimens are butchered (Table 2.38).

Extramural Fill. The majority of the faunal sample from LA 146410 comes from extramural fill capping the acequia channel (n = 411) summarized in Table 2.38. Seven stratigraphic levels were included in the sample, all of which are charcoal-filled overburden that in some cases are mixed with underlying strata (Wenker 2006). Domestic fauna dominates the assemblage, sheep/goat and cattle in particular. Other species include horse/burro and house cat, as well as various size classes of ungulate (though small and large ungulate likely represent sheep/goat and cattle, respectively) (Table 2.28). The one non-domestic specimen, black-tailed jackrabbit, came from the extramural fill.

The assemblage is highly fragmented; 91 percent of the specimens are less than 10 percent complete and only five bones are complete elements. About 35 percent of the remains have environmental damage, typically exfoliation and root damage (Table 2.28). Only three specimens have animal damage and five are burned. About eight percent of the assemblage has evidence of human butchery. One specimen, a long bone from a large ungulate, had a small piece of metal forced through it, and was possibly some kind of handle.

Area Comparisons

Features 1 and 70a have such small sample sizes that comparing them to the other areas is not particularly useful. Feature 70 (n = 307) and the extramural fill (n = 411) have sufficiently large samples to warrant a basic level of comparison. Overall, the two areas are remarkably similar. In terms of species representation, both areas are dominated by sheep/goat and small ungulate, which makes up about 70 percent of both assemblages, followed by cattle and large ungulate, which comprises about a quarter of each of the areas. Other fauna follow at much lower frequencies. Both areas are similarly fragmented, with slightly more than 90 percent of the specimens less than 10 percent complete.

Environmental damage is more common in the extramural fill than in feature 70, occurring on 37 percent of the former and 24 percent of the latter (Table 2.38). In both cases, exfoliation from exposure and root damage from plant growth are the most common forms of alteration, though in feature 70 (the acequia), three specimens are rounded, probably from movement through an alluvial system. The higher incidence of exposure damage on the fauna from the extramural fill is not surprising, as bones in an alluvial system would likely get covered up more quickly and would thus be protected from the environment more immediately than the artifacts in the extramural fill. In both areas, there is minimal animal alteration (less than 1 percent) or burning (1–3 percent). Both areas show similar butchering frequencies of around nine percent. The main problem with this comparison is that the extramural fill caps the acequia, so it is not necessarily related to the main feature.

Species Utilization

Human taphonomic processes, such as butchery patterns and prey selection, are informative when interpreting a faunal assemblage. The selection of specific animals for consumption, which can be understood by looking at the age profiles of the animals at the site, is also important. LA 146410 is an historic site, so an analysis of body part profiles in the classic sense is not necessarily the best strategy for understanding species utilization. In historic times, meat was often purchased as specific cuts, evidenced by smooth, uniform saw marks that were likely made by professional butchers. Because meat was acquired in this way, body part profiles that examine specific elements are not as useful as those that consider historic meat cuts.

Historic cuts of meat are useful for understanding the economic situations of people depositing the remains; wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. Since LA 146410 is an acequia, it cannot be associated with a specific household or group of people responsible for depositing the remains. Despite this, there are still points that can be made about the meat cuts found at the site. Unfortunately, the majority of the meat cuts under discussion came from the extramural fill, and are not directly associated with acequia deposits.

Schulz and Gust (1983) present a ranking system for meat cuts based on the relative price of beef at the turn of the nineteenth century in Sacramento, California that has been widely applied to other historic faunal data sets in the western United States. Following this system, most of the cuts of beef from Feature 70 were expensive (n = 7), and the rest were moderately priced (n = 2). In the overburden, most of the cuts were moderately priced (n = 11), and the rest were expensive (n = 7). This construction gives the impression that the people depositing their trash at LA 146410 were on the higher end of the socioeconomic scale. Lyman (1987) argues that simple price rankings may not accurately reflect the economic standing of the people depositing the remains. Rather, cost-efficiency based on the price per pound and pounds of edible meat for each beef cut is likely a more logical model to use when interpreting historic meat consumption patterns. In terms of cost efficiency, all of the beef cuts from Feature 70 at LA 146410 were highly cost-efficient (n = 3) or moderately cost-efficient (n = 6). The majority of the beef cuts from the overburden were highly cost-efficient (n = 9), followed by moderately (n = 5) and the least cost-efficient cuts of meat (n = 4) (Table 2.39). From this, it seems that the people depositing their food remains in and near the Acequia de los Pinos bought more cost-efficient cuts of meat and were probably on the lower end of the economic scale.

The ages of animals at an historic site are indicative of what kinds of meat were eaten: for example, if lamb or mutton was preferred, or if veal was eaten instead of older cattle culled after they were no longer useful for milk or breeding. Animal age can be determined by the fusion of long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). Summarized age data for LA 146410 are presented in Table 2.40. Age data is considered by feature and stratum because different depositional events probably did not include remains from the same animal.

Based on fusion data, Stratum 101 in the overburden contains a cattle vertebra belonging to an animal younger than 108 months. This age range is too wide to provide a useful interpretation. Two sheep/goat individuals are present, one older than 36 months, the other younger than 42 months. Even though the age ranges of these two animals overlap, they are both represented by the same element, one of which is fused and the other is unfused. In a single animal, the right and left of an element should fuse at about the same time, making it unlikely that both elements were from the same sheep/goat. Both animals are slightly older than the upper limits of animals raised for meat. Based on dentition, a sheep/goat older than 12 months is present in Feature 1.

A cattle femur belonging to an individual younger than 42 months was found in Stratum 102 of Feature 70. This animal was slaughtered in the prime age for milking and breeding. In Stratum 104, at least one cattle older than 18 months and younger than 42 months is present. If all of the elements belong to the same individual, it was consumed as an adult at the prime age for breeding. Also in Stratum 104, there is evidence for at least one sheep/goat, older than 30 months and younger than 42 months. If this represents one animal, it was slightly older than the typical age for animals raised for meat. Feature 70a contains at least one sheep/goat older than six months and younger than 28 months. This animal may have been slaughtered as a lamb, or as an adult that was raised for food. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The faunal remains from LA 146410 are fairly typical for a historical acequia in terms of species representation, taphonomy and butchery patterns. Sheep/goat is by far the dominant species, and almost all of the other remains are from domestic fauna. Most of the animals that were consumed were either of prime butchery age, or slightly older. The majority of the butchering was likely done by professional butchers. The cuts of beef that are present are moderately to highly cost-efficient in terms of price per pound and pounds of edible meat, indicating that the people discarding the animal remains were not at the upper end of the economic scale. Because the site is an acequia, it is impossible to know exactly who deposited the remains, so further conclusions cannot be reliably made.

LA 146410

Native Ceramics
C. Dean Wilson

The great majority (92.3%) of the 79 of the native sherds from LA 146410 represent historic types (Table 2.41). Prehistoric types noted include Wiyo Black-on-white (1.3%), Plain Gray Body (1.3%), and Smeared Corrugated (5.1%). Historic types identified include Black-on-cream Undifferentiated (5.1%), Historic White Cream Slipped Unpainted (8.9%), Tewa Buff Undifferentiated (8.9%), Tewa Polished Gray (2.5%), Tewa Polished Black (1.3%), Highly Micaceous Paste (5.1%), Smudged Interior Mica Slipped Exterior (2.5%), Tewa Polished Red (5.1%), Tewa Unpolished Buff (48.0%), Smudge Exterior Buff Interior (1.3%), Unpainted White (2.5%), and Puname Polychrome (1.3%). A component mainly dating to the Late Colonial or Territorial periods is indicated.

The presence of wear indicative of water transport in the majority (79.7%) of the sherds examined indicates most of these ceramics were deposited from elsewhere. The majority (70.8%) of these sherds could not be assigned to specific forms because of the high degree of weathering. Vessels forms that could be identified include jars and bowls.

LA 146410

Chipped Stone Artifacts
James L. Moore

Eighteen chipped stone artifacts were recovered from a variety of excavation units and strata at LA 146410, as shown in Table 2.42. All but two of these artifacts were recovered during the data recovery phase, while the specimens from Excavation Units 42 and 43 were recovered during testing. This assemblage is dominated by cherts, which comprise 77.78 percent of the total (8 unsourced chert and 6 Madera chert). The two remaining artifacts were made from Polvadera obsidian and unsourced obsidian (11.11 percent apiece). Core flakes were the dominant artifact type (n = 11; 61.11 percent), followed by angular debris (n = 6; 33.33 percent), biface flakes (n = 1; 5.56 percent), and cores (n = 1; 5.56 percent). None of these artifacts showed any signs of use-wear. Cortex was noted on 3 artifacts, including 2 of unsourced chert and 1 of Madera chert. In all three cases the cortex is waterworn, showing that these materials were obtained from secondary gravel deposits.

No evidence of platform modification was seen on any of the flakes, including the biface flake, which is represented by a distal fragment. Less than a third of the flakes (27.27 percent) are whole (n = 3), with the remainder consisting of proximal (n = 1), medial (n = 1), distal (n = 5), and lateral (n = 1) fragments. No evidence of thermal alteration was seen on any of these specimens.

Considering the amount of rounding and wear on the ceramic artifacts from this site, which indicates mechanical transport down the acequia from elsewhere, there is a high probability that the chipped stone artifacts were also transported and deposited at LA 140410 by stream flow. Indeed, all of the strata shown in Table 2.42 represent sediments occurring within or near the base of the acequia channel, confirming this origin. These artifacts washed into the active or in-filling acequia channels from adjacent Late Spanish Colonial or Territorial period deposits and carried downstream to the locations in which they were found. Since most of the native sherds are of historic derivation, the same is probably true of the chipped stone artifacts, though a prehistoric origin certainly cannot be ruled out for some.

Comparative Strata and Artifact Proportions, LA 149909 and LA 146410

Final excavation results indicate that many of the strata along the acequia and arroyo segment correspond. Table 2.26 summarizes strata concurrence along the waterway.

At LA 146410 (Areas C and D) Stratum 104, is stratigraphically equivalent to Stratum 103.1 at LA 149909 (Areas A and B) to the east but results of Euroamerican artifact analysis indicate that they represent different temporal components. Western exposures of Feature 70 also exhibited lateral deposits of gravel and cobbles in its base that appeared to represent embankments (similar to stratum that flanked Stratum 104; no such deposits were present in the BHT 188 exposure.

In (Area D), Stratum 101 a post-abandonment fill derived from colluvial processes or purposeful backfilling of overburden. Wenker notes that this sediment may equate to Stratum 103 at LA 149909 but Euroamerican artifact analysis indicates that Stratum 101 fill primarily dates to the twentieth century, post dating the Stratum 103 artifact assemblage with an artifact assemblage assigned to the mid nineteenth century.

Percentages of Pueblo ceramics and then Historic Artifacts (a combination of materials including Metal, Glass, Euroamerican ceramics, plastic and rubber) to the entire artifact assemblage were calculated per stratum using initial artifact counts from data recovery. These artifact types were selected because their classifications inherently imply limited (albeit wide) date range. Derived from field specimen data, which report the full assemblage as opposed to sampled context, percentages for each stratum can be compared to values for a few set points and provide evidence that less material associated with historic-era refuse is moving downstream during earliest depositional sequences.

Stratum 104 at LA 146410 was alluvium from the channel's base. Dates derived from this assemblage indicate a mid early twentieth century association. Artifact percentages were 6 percent native ceramics to 48 percent historic artifacts. Stratum 103.1 basal alluvium in Feature 1000 was assigned a date of approximately 1790–1850 based on Euroamearican artifact analysis. The percentage of native ceramics to Euroamerican artifacts is relatively high when compared with Statehood-era deposits to the west. Pueblo ceramics from this context make up 32.5 percent of the artifact assemblage; Euro American artifacts were 19 percent of the assemblage. Stratum 103 secondary alluvium with a mixed Territorial artifact assemblage shows a similar Pueblo ceramic to Euroamerican artifact percentage, 32.5 to 12 percent respectively. This reverse in proportion of ceramics to historic artifacts was also observed with artifact assemblages recovered from the Manhattan Street Ditch and may signal changes in habitation density along the watercourse reflecting more rural upstream population (Lakatos, personal communication) higher percentages of Pueblo ceramics to Euroamerican artifact content may also be evidence of earlier ditch fill.

Archival Documentation, LA 149909 and LA 146410

D. H. Snow (Chapter 7, this report; 1988:15–16, 118–119) maps the historically known Acequia de los Pinos (Acequia Madre) crossing the AT&SF railroad tracks along Hickox Street (now Paseo de Peralta). His discussion traces the ditches course by referencing land deeds, a series of maps dating from 1892 to 1924 (D. H. Snow 1988: 95, 105–107, 116) as well as a compilation of 1914, 1917, and 1977 Santa Fe River hydrographic surveys (D. H. Snow 1988: Appendix 11: Sheet 20). It is worth noting that the 1914 survey's simultaneous designation of two main watercourses and some associated laterals as Ditch 11 (Acequia Madre) refers to a ditch that ran along Paseo de Peralta and likely continued across the railyard along or just south of Hickox Street (probably LA 149909/LA 146410) and another that ran north of the New Mexico School for the Deaf and U.S. Indian School property. This southern section was documented in 1878 as traced through land claim documents (D. H. Snow 1988:15–16). Snow speculates that the watercourse along Hickox Street is the same that Urrutia designates as *"acequia para regadío"* in his 1767 map of Santa Fe (D. H. Snow, Chapter 7, this report).

In addition to documenting the acequia and arroyo these maps may provide some insight into the demise of the watercourse within the project area. The "Arroyo del Pino" is shown bisecting the railyard on the 1910 Flannagan map (D. H. Snow 1988:105) but is not mapped on the 1924 Official Map of Santa Fe. Snow's compilation of Santa Fe River hydrographic surveys (D. H. Snow 1988:Appendix 11, Sheet 20) shows the watercourse documented in 1914 as ending near the corner of Paseo de Peralta and Cerrillos Road suggesting abandonment of the acequia in the immediate area. Even so, further to the west the same hydrographic survey shows Ditch 11 running parallel to Hickox Street (Fig. 7.8). Snow reports that areas immediately to the west of the railyard were irrigated from 1914 to 1919 and that lands between Hickox Street and Manhattan Avenue were likely irrigated from the northern Acequia Los Pinos ditch lateral (D. H. Snow, Chapter 7, this report). Because of the hydrographic surveys simultaneous designation of two ditches as Ditch 11 it is impossible to tell which laterals irrigated what land. Consultation with the Acequia Madre de Santa Fe commissioner also indicated that the location of the Feature 1000 channel is probably that of the Acequia de los Pinos (Phil Bové, personal communication, September 26, 2005). If this ditch is the Acequia de los Pinos, or a nearby lateral it may have been used in the eighteenth century (D. H. Snow 1988:35–36, 38)

Summary, LA 149909 and LA 146410

The orientation of acequia channels recorded as Feature 1000 and Feature 70 suggests that both sites represent the same channel of the Acequia de los Pinos. Although the sites can not be directly connected, because the eastern extent of Site LA 146410 underlies the SITE Santa Fe building, it is reasonable to assume, given the waterway's alignment, that they are the same watercourse.

Evidence for this was provided by the Area C, BHT 188 profile at LA 146410. Feature 70 in BHT 188, did not contain a complex stratigraphic profile similar to that recorded to the west of the railroad tracks. Instead, the relatively simple pair of acequia channel deposits was similar to the straightforward layering of channel fill observed in more easterly exposures of the Acequia de los Pinos at LA 149909. This characteristic may simply indicate that the configuration of the channel's banks, as well as the processes of the abandonment and infilling of the channel, varied slightly along the acequia's length as it passed through the historical railyard, and was crossed by the AT&SF railroad tracks. The absence of any indication of a wooden culvert or other water conveyance feature in Area C suggests that no provision was made to perpetuate the acequia's flow when the AT&SF railroad tracks were built in 1879. It appears that the channel was simply buried by the track bed, cutting off downstream flow to westerly locales.

Results of artifact analysis from alluvial deposits substantiate this interpretation. Euroamerican artifacts recovered from lower alluvium (Stratum 103.1) were small and fragmentary, indicative of bedload transport and assigned to mix of eighteenth and early nineteenth century dates. Majolica from this assemblage was assigned a mean manufacture date of 1789, latest possible manufacture dates were 1800–1860. Bone from the same context is also fragmentary and dominated by small ungulate. Upper alluvium (Stratum 103) contained a mixture of Colonial or Mexican Period and Territorial refuse and was capped by fill assigned a mid-nineteenth century date. This is the same stratum confidently identified by Hall (Appendix 1.1a, this report) as alluvium from which corn pollen was recovered indicating probable agricultural activities in the near vicinity. The acequia was then capped by fill containing bottle glass with an assigned date of from 1880 to 1900. Fauna is a combination of sheep/goat, beef and pig. While refuse recovered from alluvium reflects residential trash from upstream context, lack of Territorial-era refuse in the lower strata provides a compelling argument for a mid to late eighteenth century construction date of this section of the waterway.

Further to the west, the data-recovery program revealed that the acequia's channel section excavated in Area D, originally identified as a culturally produced acequia is contained within a broader natural arroyo channel. The broader channel was about 8 m wide, with indistinct lateral margins. The smaller acequia channel was about 1.6 m wide and was constructed by reinforcing the arroyo banks with anthropogenically introduced material. This purposefully introduced fill was apparently used to narrow the banks for increased water flow and directional control. Additionally, stratigraphic profiles of LA 146410 recorded along the water course consistently record a later fill episode that may represent a second water course or excavation that cut through Stratum 101 which capped the primary watercourse. Artifacts from both lower acequia bed (Stratum 104) and secondary filling episodes demonstrate that this section of the acequia was modified, probably repeatedly, starting in the early twentieth century and that pre existing basal deposits encountered upstream to the east, represented by Stratum 103.1 were either churned or removed. These later, residential deposits contained copious amounts of bottle glass from spirits and later soda bottles, and a combination of sheep/goat and cost efficient beef cuts probably reflecting economic conditions in the Barrio De Guadalupe and Barrio de Analco to the east up to the early to mid-twentieth century. The assemblage was temporally mixed and showed wear from stream tumbling, indicating that abundant sources of upstream cultural detritus were present. The main channel's artifact assemblage suggests continued use into at least the 1920s, and in filed observations suggest possibly until the 1950s, but the mixed artifact dates complicate the interpretive information about the acequia's use-life. No charcoal was recovered in sufficient quantities for radiocarbon assays to be made. Perhaps the most intriguing result of excavation along the acequia's western limit is the apparent purposeful diversion of the acequia's course, sometime no earlier than 1920 and possibly as late as 1950. Whether the diversion was created to guide storm run-off or to carry water from some other source remains unclear.

Archival research suggests that LA 149909 and LA146410 are sections of the "Arroyo del Pino" or nearby laterals of the same ditch designated Ditch 11 (Acequia Madre) in the 1914 hydrology report (D. H. Snow 1988:Appendix 11). Whether the section excavated within the project area is the same as the "*acequia para regadío*" mapped by Urrutia in 1767 is debatable. The excavated sections of LA 149909 and LA 146410 are on the western edge of the maps boundaries near the legend. The Urrutia map's resolution may be insufficient to tell precisely where that ditch ran, and as D. H. Snow points out, probably didn't capture the intricacies of the acequia network. If analysis assumes that the main ditch is precisely mapped by Urrutia, an overlay of the of the Urrutia map created by Tara Plewa and corrected to the east (Fig. 7.2b) suggests that the "*para regadío*" may have run further to the north within the project boundaries than the course of the excavated acequia. Map rectifications not withstanding, the artifact assemblage from lower bed strata at LA 149909 indicate that contributions of Territorial-era artifacts were not included in lower alluvial deposits providing a good argument for a late eighteenth century, if not earlier, construction date.

Recommendations, LA 149909 and LA 146410

Excavations at both LA 149909 and LA 146410 followed the procedures outlined in the data-recovery work plan and recovered the requisite data to address relevant aspects of the project's research design (Wenker et al. 2005). Recommendations offered by OAS accepted by ARC and HPD during the project's three clearance phases (Wenker et al. 2005d,e,f) remain unchanged and are summarized below. At LA 149909 the data-recovery program has recovered morphologic and stratigraphic data about the channel, and a moderately abundant artifact assemblage from the acequia sediments. The site's potential was exhausted and no further impact-mitigation archaeological fieldwork was recommended.

The LA 146410 section remaining within the project area west of the existing railroad tracks was not likely to yield additional important information beyond that already recovered. No further impact-mitigation archaeological fieldwork was recommended for this portion of the site prior to the start of, or during, construction.

LA 149912, Arroyo de los Tenorios

Chris T. Wenker, revised by Jessica Badner

Introduction

Based on testing results (Wenker 2005b, 2006), LA 149912 was considered a segment of an irrigation ditch or acequia that had been directed down the bed of a previously existing natural arroyo, probably representing the historical Arroyo de los Tenorios. Data recovery indicated that the acequia then branched off from the original arroyo's course. This site extended approximately 260 m (850 ft) in length through the project area from Guadalupe Street on the northeast toward the AT&SF railroad tracks on the southwest, within the Railyard Park parcel (Figure 2.35). It was excavated in two phases to accommodate the projects' construction schedule. Preliminary excavation results were reported in two separate publications (see AN 359E and AN 359F). Excavations are discussed below in east and west site sections shown in Figure 2.36.

Data Recovery

The first phase of data-recovery excavations in the sites western area (Area A) was conducted between December 5, 2005, and January 12, 2006. Excavation focused on the southwestern portion of the site, which overlapped a high-priority construction area for railyard infrastructure development. The area investigated during this work phase includes all portions of the site within 62 m (200 ft) of the AT&SF

railroad tracks and sidings, which pass northwest of the site.

The second phase of data-recovery excavations focused on the far eastern portion of the site (Area B) and was conducted between January 30 and February 17, 2006. The length of the eastern site segment exposed during this phase of work covered roughly 65 m (213 ft; Fig. 2.36) Overall, the channel measured approximately 260 m (850 ft) in length through the project area; the site deposits were roughly 5 m in width (16 ft) and covered an area of roughly 325 sq m (3500 sq ft). No artifacts were collected during the second excavation phase. Prior to this project the excavated portion of the site was covered by a dirt automobile parking lot and an undeveloped city park, and no features or artifacts were visible on the modern surface.

Excavation, mapping, and recording procedures in both phases followed those detailed in the data-recovery work plan (Wenker 2005c). Feature, stratum, and excavation unit numbers used in this project are not always continuous, because in many cases the designations from the testing project (Wenker 2005a, b) were maintained to provide consistency in the provenience designations.

West Segment (Area A)

Various types and sizes of excavation units were used to expose and define the plan view and cross sections of the arroyo and acequia channel and deposits (Fig. 2.37; Tables 2.43, 2.44, 2.45) at LA 149912. Seven of the backhoe trenches from the testing phase (BHTs 132, 133, 138, 139, 140, 143, 159) were re-excavated and, in many cases, expanded. Additionally, 23 new backhoe trenches were dug to intersect the various channel deposits and assist in tracking feature orientations and extents (including BHTs 162 to 184, inclusive). Three of these BHTs (168, 177, 178) were dug along the southeastern side of the acequia channel to determine if other waterways were oriented to intersect the acequia from up-slope locations (such as the site LA 149913). No intersecting water channels were located. The two excavation units (XUs 1000–1001) from testing were not reopened, but 31 new hand-dug 1 x 1 m XUs

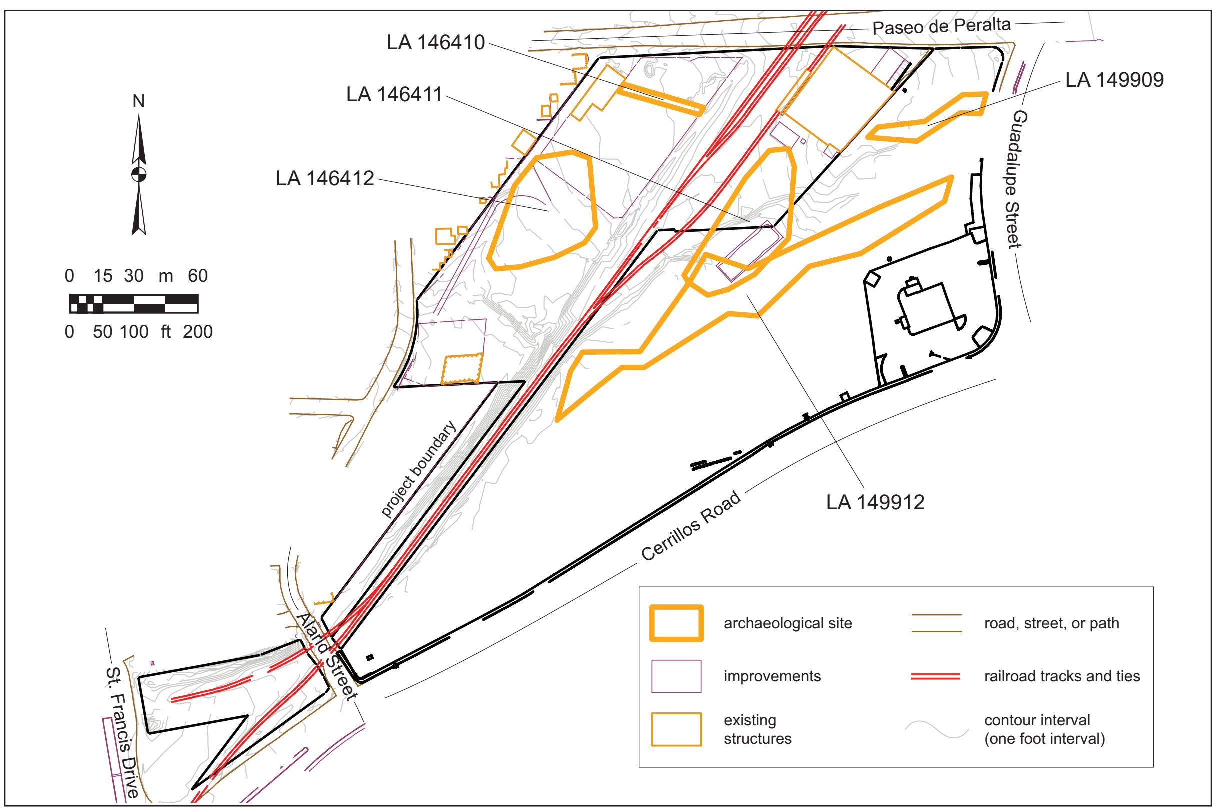


Figure 2.35. North Railyard sites.

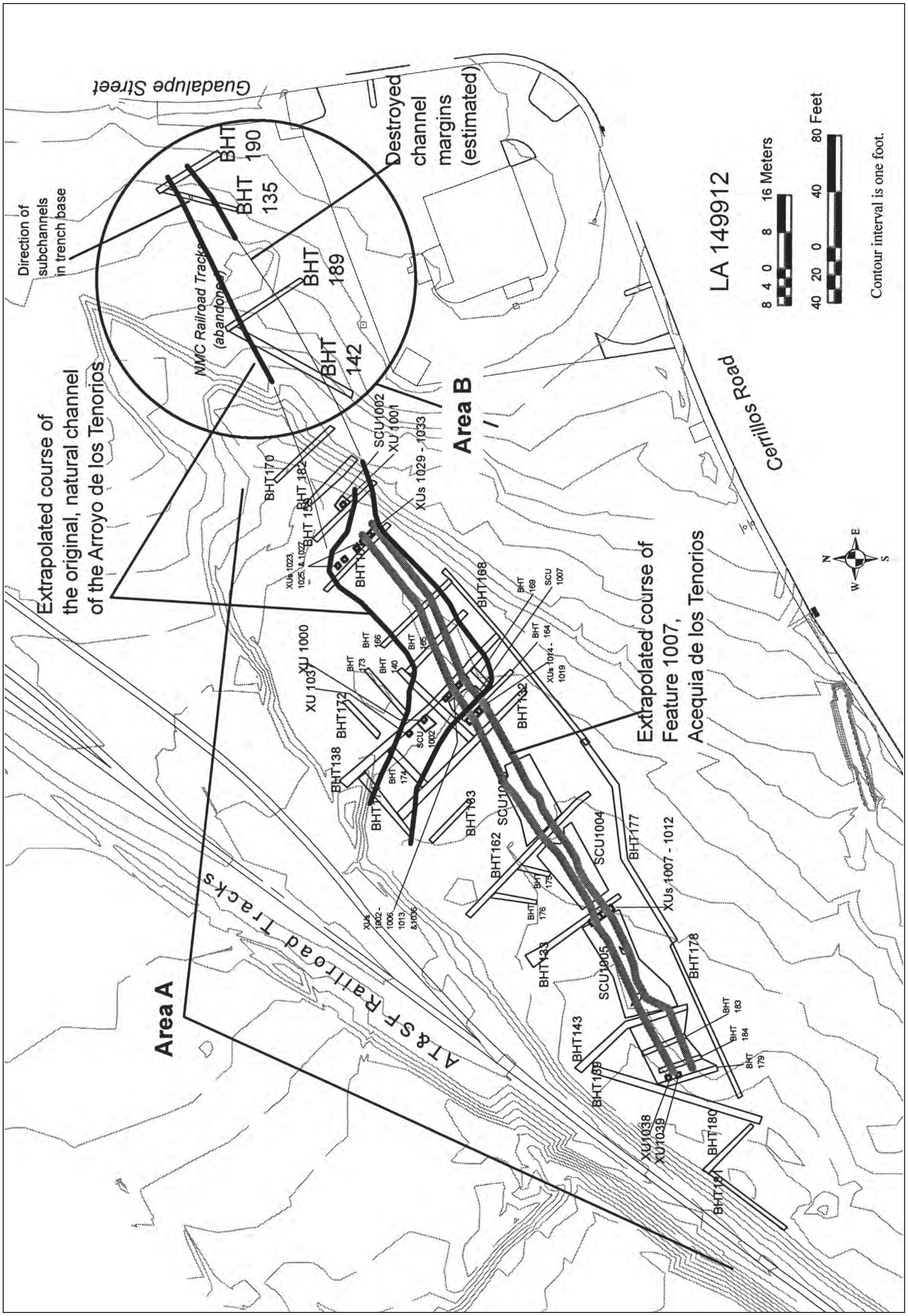


Figure 2.36. LA 149912, site map overview, showing Areas A and B.

were excavated (the XU numbering series is discontinuous because some units were established but never excavated). Four rows or trenches of contiguous XUs along selected backhoe trenches were excavated for artifact recovery and sediment evaluation from within the acequia channel (Feature 1007, below). The number of 1 x 1-m excavation units placed along each trench was dictated by the overall width of the acequia channel deposits. Seven XUs (1002–1006, 1013, 1036) examined Feature 1007 and related deposits along BHT 138; six XUs (1007–1012) crossed Feature 1007 along BHT 133; six XUs (1014–1019) crossed Feature 1007 along BHT 164; and five XUs (1029–1033) crossed Feature 1007 along BHT 167. Further, XUs 1023, 1025, and 1027 were also dug along BHT 167 to sample material from the underlying natural arroyo deposits (discussed below). XU 1037 was dug in the fill of Stratum 1000, an introduced earthen berm fill, to accentuate samples from other XUs in that deposit (namely, XUs 1000 and 1036). Finally, two XUs (1038, 1039) were dug to sample the sediments in the thick intrusive deposits at the southwestern end of the acequia.

Mechanically excavated scraping units (SCUs 1003–1005, 1007) were dug between selected trenches to expose the top of the acequia and to search for diversion features (such as headgates) or other subsidiary channels. No such features were discovered, but part of a mid- to late-twentieth century drainage ditch related to a pumice-block culvert (Feature 1009 from testing) was exposed in partial plan view. This drainage ditch bisected Feature 1007, and BHTs 175, 176, and 177 were used to investigate its orientation.

East Segment (Area B)

Data recovery work at LA 149912's east end focused on locating and tracking the upstream alignment of the combined arroyo/acequia feature. The two prior testing trenches (BHTs 135, 142) were re-excavated, and the previously identified features were relocated and reevaluated. Two new BHTs (189, 190) were then excavated in locations that would cross the projected channel at a perpendicular angle. The two new trenches were dug with broadly sloped western side walls to allow deeper exposures on the eastern vertical trench wall (the sloped edges are not depicted on Fig. 2.36).

The site was visited by a professional geomorphologic consultant (Dr. Stephen Hall, Red Rock Geological Enterprises) during the excavation. The geomorphologist recorded field observations on channel geometry and sediment characteristics, and recovered fill samples for later sedimentological analysis as part of the project-wide acequia study. Finally, Phil Bové, Acequia Madre de Santa Fe ditch commissioner, also visited the site during the data-recovery excavation to view the buried channels.

Site Strata

Most of the sediment filling and capping the channel and the historic ground surface in the eastern and most intact site area of LA 149912 consisted of purposefully introduced overburden. Stratum 1 was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving surfaces in the area and was 5 to 30 cm (2 to 12 in) thick. Stratum 2, a historical-period overburden deposit, was present across much of the project area, and occurred in exceptionally thick deposits along the northwestern edge of the site, where it formed deposits of approximately 1.2 m (4 ft) deep along the base of the AT&SF railroad tracks. Deposits of historic overburden similar to Stratum 2 were also occasionally given unique stratum-number designations when they were excavated as part of the Feature 1007 acequia channel fill-deposit series, and those sediments are described below. Stratum 3 was the underlying natural substrate, a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. The occasionally underlying Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed medium crumb structure. Its color ranged from light yellowish-brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown to brown in color. Clasts frequently exhibited caliche skins though in arroyo deposits carbonate was removed in solution from these gravels (Hall, Appendix 1.1a, this report), and the overall stratum was weakly cemented with calcium carbonate. Other strata identified during the acequia and arroyo excavation are noted below.

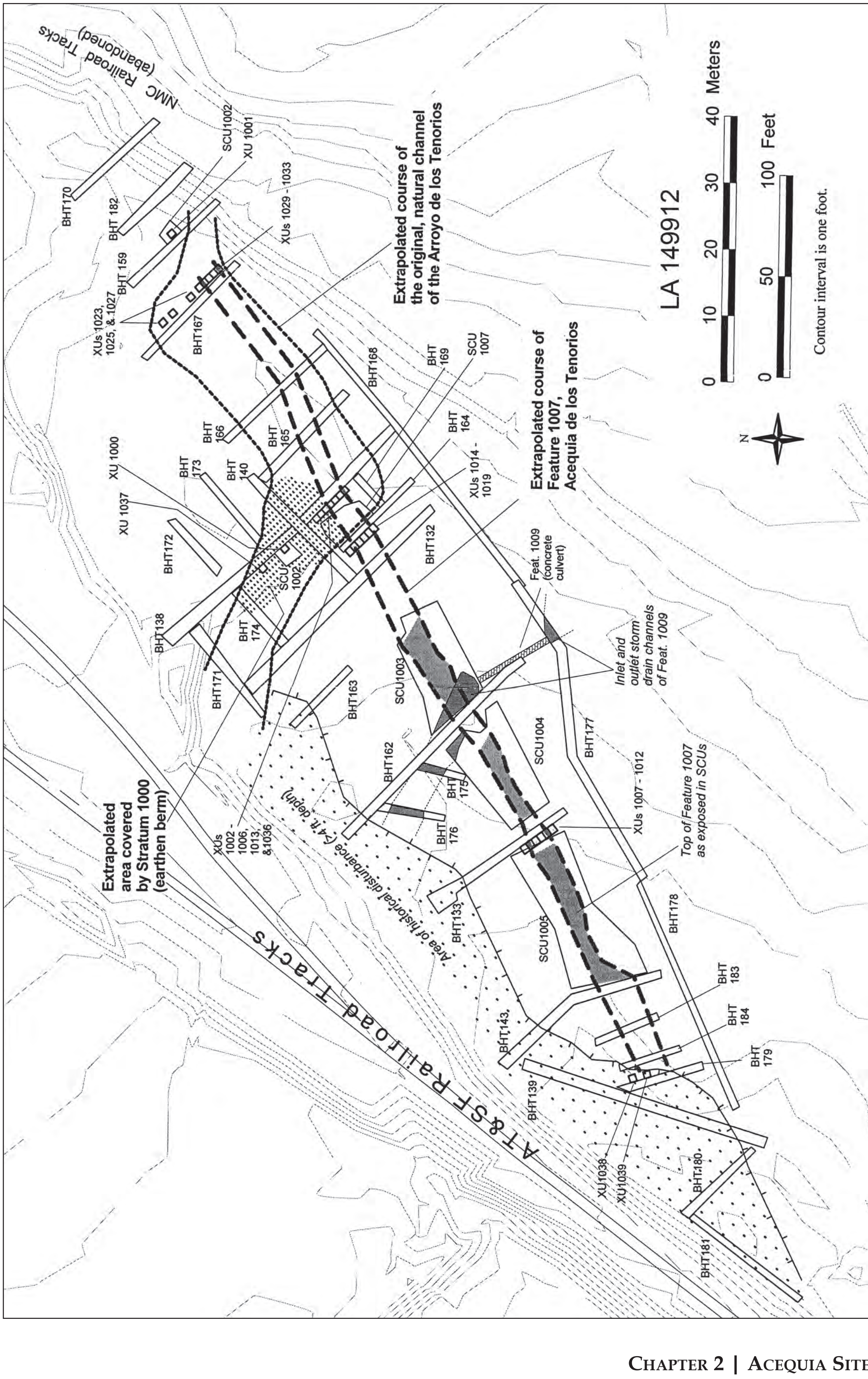


Figure 2.37. LA 149912, site map, Area A detail.

Generally, the fill of Strata 1 and 2 were excavated in full-cut hand and mechanical excavation units and were not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill (including some variants of Stratum 2, as noted above) was screened through 1/4-inch mesh. No hand excavation was undertaken in Area B, the site's western area.

Channel Sequences

Area A

Two superimposed waterways were identified at LA 149912 that crossed northeast-to-southwest through the project area. Based on excavation it appears that originally a natural arroyo channel crossed into the project area from the northeast. This arroyo was adopted into the city-wide acequia irrigation system, as evidenced by a small water channel (Feature 1007) generally containing loamy deposits that overlay parts of the underlying coarse arroyo sand. Further to the west (BHTs 159, 167, 170, 182) excavation revealed that historical disturbances related to the construction of the NMC railroad tracks destroyed most of the feature within 300 meters of Guadalupe Street. Work just east of the railroad tracks further indicates that extensive historical and recent disturbances have also destroyed most of the Arroyo de los Tenorios channels in this area.

During site testing (Wenker 2005b) Area A was identified as an array of features representing apparent acequia channels and possible natural water-transport channels, as well as broad exposures of alluvially derived sediment deposits, that all appeared to represent the course of a buried, abandoned waterway with a complicated site-formation history. Testing revealed only one apparent water channel (Feature 1007) that could be consistently isolated and tracked with some confidence in exposures across four BHTs. Other apparently discrete water channels were observed in single trenches, which could not be linked to other channels in nearby upstream or downstream trenches. Two other trench exposures revealed broad deposits of alluvial sediments in deeply buried, possible arroyo channels. Yet other trench exposures revealed broad, deeply buried alluvial deposits in apparent basins or pond settings along the length of the overall waterway's course.

Data-recovery excavations now indicate that two main waterways crossed northeast-to-southwest through this portion of the Railyard Park. The possible ponds or basins identified during testing proved to be the result of unfortunate testing BHT placement along the length of some channel courses, rather than the more desirable perpendicular trench orientation, which provides accurate dimensional cross sections.

Based on data recovery information, it appears that originally a natural arroyo channel crossed into the project area from the northeast (Fig. 2.37). Ostensibly, based on archival information related by Wenker (2005b), this was the original channel of a natural waterway named the Arroyo de los Tenorios. This arroyo traversed southwardly to a point where a sharp bend in the channel diverted the arroyo to the west-northwest, and exited under the current line of the AT&SF railroad tracks. This arroyo contained coarse sand and gravelly sediments mixed with occasional mammal bone, Native-made ceramics, charcoal, and other Euroamerican artifact types, indicating an early historical-period era of water flow (possibly pre-Santa Fe Trail period).

Later, (possibly in the post-Santa Fe Trail era) this portion of the arroyo was adopted into the city-wide acequia irrigation system (presumably it retained its Arroyo de los Tenorios appellation, but for the sake of distinguishing the acequia from the preceding arroyo, the discrete acequia will be herein termed the Acequia de los Tenorios, or Feature 1007). This period of managed water flow is marked by a small water channel generally containing loamy deposits that overlay parts of the preceding arroyo sand. The acequia channel followed the bed of the historical arroyo from the northeast to the southwest, up to the point where the arroyo originally turned sharply to the west-northwest (Fig. 2.37). At that point, the acequia channel was purposefully excavated through the southwestern arroyo bank and a manmade channel, dug into sterile Strata 3 through 5, was then extended in a relatively straight line farther to the southwest. In the original bank of the arroyo, along the northwestern side of the acequia where it exited the natural stream bed, a broad, thick deposit of artifact-bearing loamy fill had been introduced atop the original arroyo sand. This introduced fill (Stratum 1000) appears to represent a purposefully constructed earthen berm or diversion dam that directed the acequia flow toward the southwest, preventing the water from continuing down the original arroyo channel to the west-northwest.

At the far southwestern end of the manmade acequia channel, a broad, deep historical disturbance truncated the acequia feature, removing any further evidence of its course. This extensive historical disturbance, which extends along the southeastern edge of the AT&SF railroad tracks (Fig. 2.37), may have been related to the original construction of the earthen prism upon which the tracks were built. Further, no signs were found of a conveyance feature such as a culvert that would have allowed the acequia to continue its course underneath the track bed at this projected intersection. It appears, therefore, that this acequia segment was closed and abandoned when the tracks were built, ca. 1879. Post-railroad–era material and sediment then filled and covered the water channel features to varying depths across the project area.

Arroyo de los Tenorios. Nine BHTs in LA 149912's central expanse (BHTs 138, 140, 159, 165, 166, 167, 169, 171, and 174) contained evidence of a broad, relatively deep water channel containing variegated sediments of coarse sand, gravel, and cobbles, as well as laminated bands of fine sand and silt. During testing, various portions of this channel were inadvertently assigned separate designations such as Features 1005 and 1011, and Strata 1000 and 1001. Data recovery work revealed that these disparate exposures of alluvial sediment can all be linked to the course of the arroyo (which was not assigned a discrete feature number during this work phase). As noted above, this waterway is interpreted as the original channel of the Arroyo de los Tenorios. Table 2.46 summarizes strata discussed below.

BHT 167 revealed that the channel exhibited a 15.2 m (50 ft) wide, broadly basin-shaped cross section (Fig. 2.38) that contained up to roughly 75 cm (2.5 ft) of reddish-yellow coarse gravelly and cobbly sand deposits (Stratum 1029), which represented the sediments derived from historical-period natural stream flow. In the eastern end of this trench exposure, the top of the arroyo channel fill was overlain by a deposit of dark gray sandy clay (Stratum 1027) representing fill derived from the controlled water flow of the acequia channel (further described below). Above the acequia and arroyo channel fill, deposits of brown sandy loam (Stratum 1026) and light yellowish-brown silt (Stratum 1028) filled much of the remaining swale that would have been left after abandonment of the acequia. Stratum 1026 was in turn covered by Stratum 1 (which had been mechanically removed prior to documentation of the cross-section), representing subsequent fill deposition episodes in recent periods. XUs 1023, 1025, and 1027 sampled the artifact content from the arroyo fill Stratum 1029 along BHT 167.

Similarly wide and deep exposures of the Arroyo de los Tenorios channel (and the overlying sediments) were revealed in BHTs 166 and 165 to the southwest. During testing, nearly the entire length of BHT 138 was observed to contain various alluvial sediments, which proved perplexing until it was determined that the arroyo channel curves to the west–northwest and BHT 138 crosses into the channel at an oblique angle. This curve in the channel was best documented by tracking the courses of the banks of the channel. The eastern bank is clearly visible in the southeastern end of BHT 138 (Fig. 2.39), but no arroyo channel deposits (e.g., Stratum 1029) were present any trenches farther to the southwest (such as BHT 164). Instead, the eastern bank was clearly demonstrated to curve sharply to become the southern bank, as the channel turned to the west-northwest. This was plainly evident in BHT 169 (Fig. 2.40) and BHT 140 (Fig. 2.41). In the area of BHT 169, the arroyo channel contained a basal deposit of coarse gravelly and cobbly sand (equivalent to Stratum 1029) that was overlain by an equally thick layer of laminated fine light yellowish-brown sands and silty sands (Stratum 1001), also containing charcoal and mammal bone.

The western margin of the arroyo bank just east of the natural bend was also evident in BHT 165 and BHT 166. BHT 165's northern end intersected with BHT 140, which was placed perpendicular to record the arroyo's dogleg to the northwest (Fig. 2.41). Farther west, BHT 174 showed a similar cross-section as BHT 140, but at the far western end of the excavated site area, some extensive historical disturbances in BHT 171 had removed much of the remaining arroyo deposits (see LA 146411 discussion of the concrete slab Feature 1004, above). Still, the coarse sandy arroyo fill was present in the southwestern end of BHT 171, at depths exceeding 1.2 m (4 ft) due to introduced overburden, and the channel clearly continued westwardly from this area toward the railroad tracks.

Previous backhoe trenching in the area west of the railroad tracks during a prior testing phase (Wenker 2005a) had revealed no associated stream deposits, however. Two possibilities may be offered to explain this absence of the arroyo channel west of the tracks. First, the channel may have turned slightly and followed a westerly course through the western parcel underneath the area of a ramped earthen berm, just north of the old Ortiz Body Shop lot, which prevented successful backhoe testing due to the excessive overburden thickness (past the southern ends of testing BHTs 70 and 71; see Wenker 2005a:Figure 6). Alternatively, the channel bed of the Arroyo de los Tenorios may have swung sharply again to the southwest somewhere beyond the BHT 171 exposure, followed under the route of the present railroad tracks, and turned westwardly again under or past the old Ortiz Body Shop, where no testing was conducted due to contaminated soil constraints.

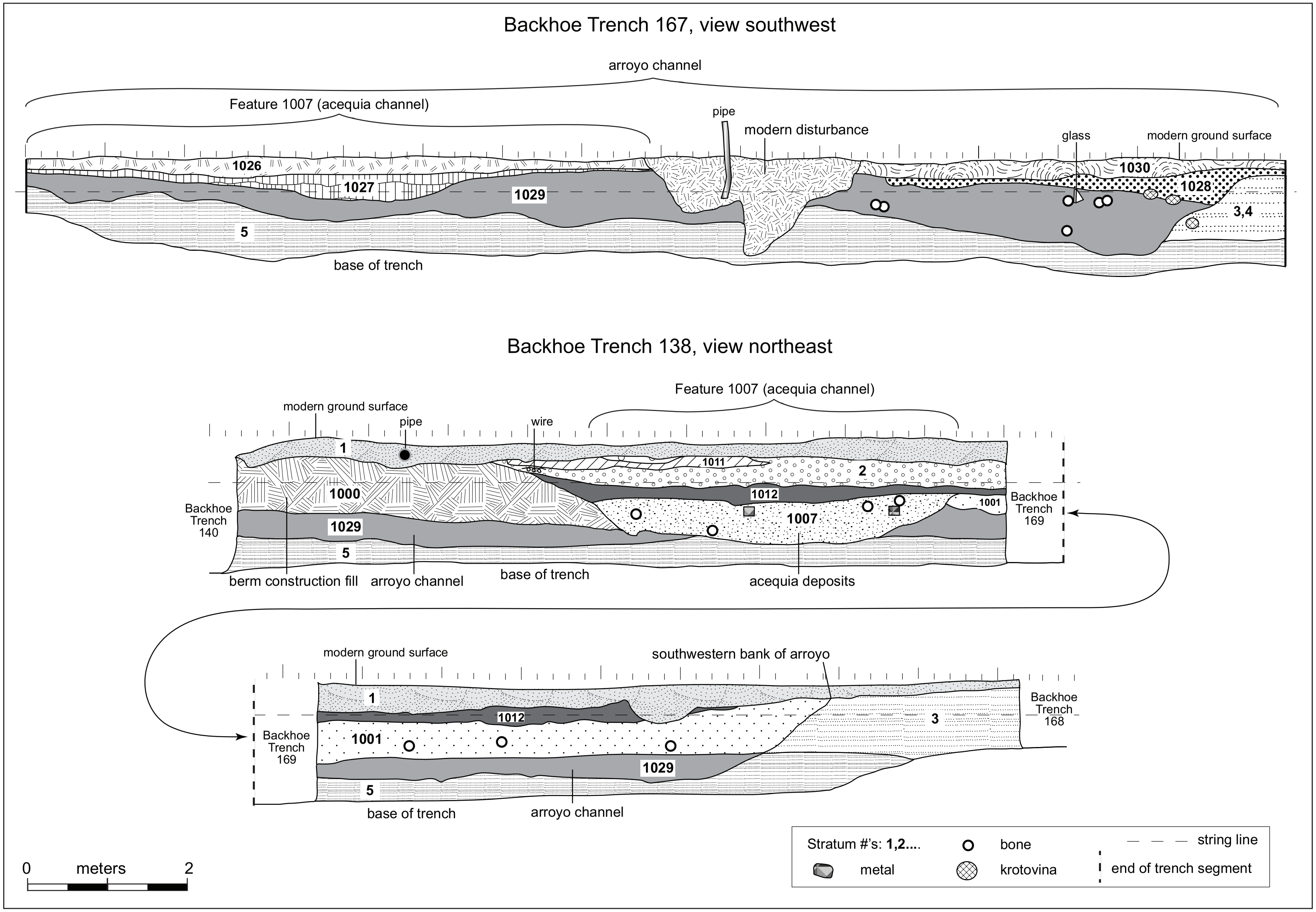
Historic trench. To the northeast of BHT 167 at LA 149912, BHT 159 represented a testing trench in which it was originally thought that Feature 1007 was present (Wenker 2005b). Re-excavation of BHT 159 as well as new BHTs 170 and 182 revealed that a linear depression does exist in this area, aligned roughly northeast-to-southwest. However, this depression is not Feature 1007 but instead represents a broad, intrusive, historical trench excavation that was backfilled with coarse gravelly sand and coal/clinker-rich deposits. This historical trench appears to be related to the construction of the NMC railroad tracks immediately to the southeast. No signs of Arroyo de los Tenorios arroyo channel fill (or of Feature 1007) were present in the two northernmost trenches (BHTs 170, 182). Although most of the channel (and all of the acequia) in BHT 159 was destroyed by the historical trench, one remnant of the channel sediment was observed. This remnant lens of Arroyo de los Tenorios arroyo sands (Stratum 1029) was found in BHT 159 in a location slightly east of the southeastern bank of the channel in BHT 167 to the south. This easterly shift in arroyo fill suggests an easterly bend in the arroyo bed.

Feature 1007, the Acequia de los Tenorios. Ten BHTs distributed across the excavated site area at LA 149912 contained evidence of a relatively narrow, occasionally deep water channel containing variegated sediments of fine sand and silt, with low frequencies of nineteenth-century artifacts and charcoal inclusions. This feature exhibited somewhat different channel geometry between its northeastern and southwestern extents, which reflects the natural versus cultural origins for these segments of the acequia.

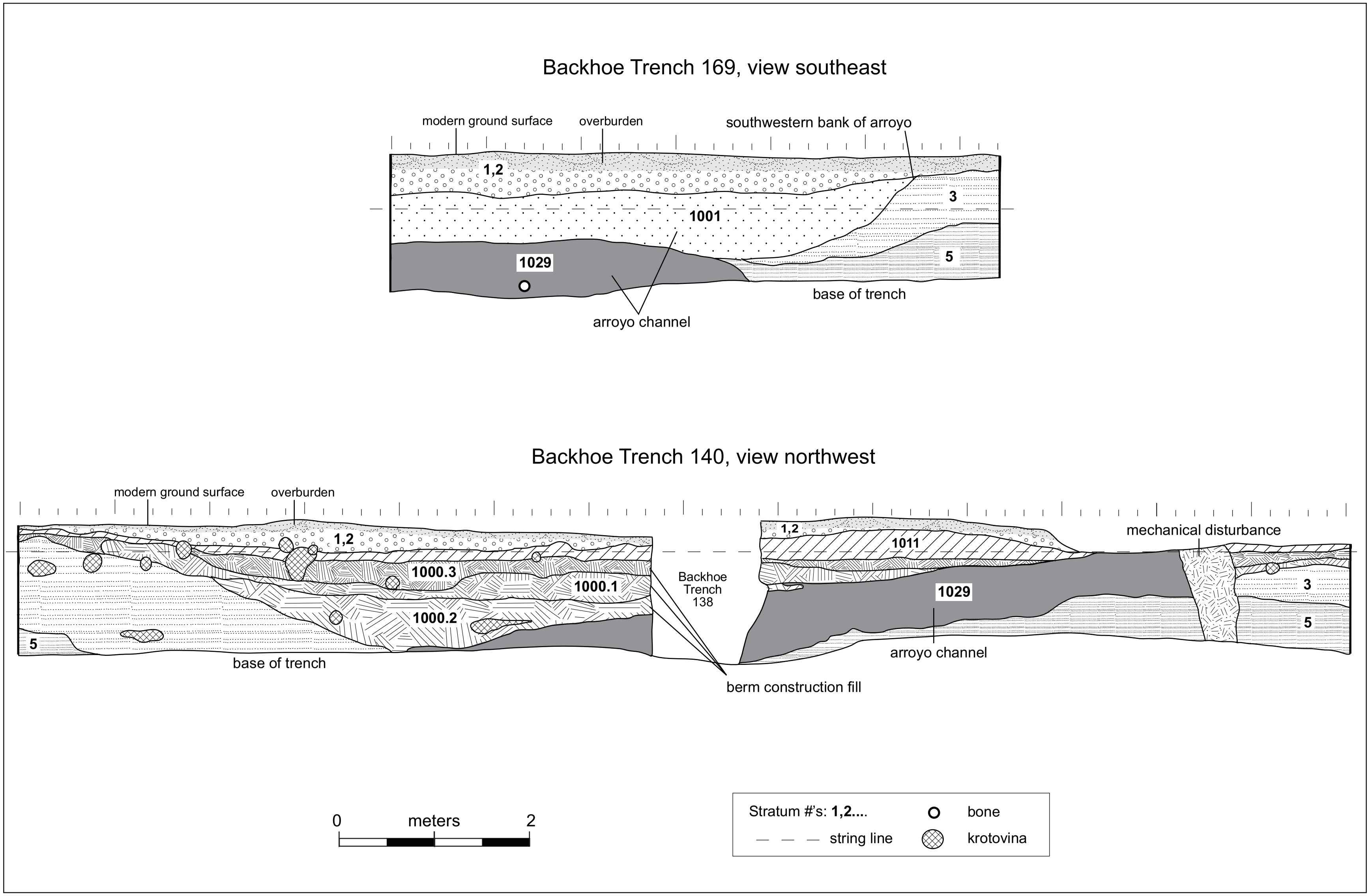
Acequia channel. During testing, four exposures of this channel were originally assigned a Feature 1007 designation, but as noted above the BHT 159 assignation proved to be incorrect; the other three BHTs (132, 133, and 138) did prove to contain this feature. Further, the pit identified as Feature 1019 in BHT 143 (originally attributed to Site LA 149919) is also now known to represent part of this channel. Six other BHTs (164, 165, 166, 167, 183, and 184) also contained exposures of this channel (although BHT 162 did not, due to the Feature 1009 storm-drain disturbance, see above). Four rows of hand-dug XUs were also used to cross-trench Feature 1007 at various points along its length (see above).

Stratum 1027 (acequia channel fill). In the northeastern four exposures (along BHTs 138, 165–167), Feature 1007 was traceable as a roughly 4 m (13 ft) wide, 30 cm (1 ft) thick lens of fine alluvial sediment (called Stratum 1027 in BHT 167) contained within a shallow basin-shaped channel with gradually sloping lateral margins. The fill deposit of dark grayish-brown silt contained few, fine charcoal flecks and moderate quantities of artifacts. This fill capped a portion of the top of the underlying coarse arroyo sand, but no evidence of a purposefully excavated acequia channel was evident (Fig. 2.38). To the northeast, the same historical disturbance in BHTs 159, 182, and 170 that destroyed the underlying arroyo had also removed the acequia.

Flowing from the northeast to the southwest, the acequia apparently was allowed to follow an unconstrained route within the course of the original Arroyo de los Tenorios bed, following it to the point where the arroyo originally turned sharply to the west-northwest (Fig. 2.37). At that point (between BHTs 138 & 164), the acequia builders continued the channel's course to the southwest by digging directly through the arroyo bank. From that point onward, the Acequia de los Tenorios flowed through a manmade water channel, which had been excavated into Strata 3, 4, and 5, that extended in a relatively straight line to the southwest.



Figures 2.38, 2.39. LA 149912, top (Fig. 2.38): BHT 167, southwest wall, cross-section view of the Arroyo de los Tenorios channel and the superimposed acequia (Feature 1007); bottom (Fig. 2.39): BHT 138, northeast wall, cross-section view of the eastern extent of the Arroyo de los Tenorios channel (note the intact eastern bank) and the superimposed acequia (Feature 1007).



Figures 2.40, 2.41. LA 149912, top (Fig. 2.40): BHT 169, southeast wall, cross-section view of the southern extent of the Arroyo de los Tenorios channel; bottom (Fig. 2.41): LA 149912, BHT 140, northwest wall, cross-section view of the Arroyo de los Tenorios channel, containing basal alluvial deposits capped by Stratum 1000, the berm-construction deposit.

This constructed channel measured roughly 3 m (10 ft) in width and 75 cm (2.5 ft) in depth (Figs. 2.43, 2.44, 2.45) and exhibited relatively steeply sloped side walls and a fairly flat base. No discrete sediments within this channel could be consistently tracked across all exposures of this feature, so each row of XUs received unique stratum numbers for the channel fill. Still, the acequia fill exhibited generally similar characteristics of brown loamy or silty sediments shot through with occasional, small laminar bands of fine or coarse sand (cf. Stratum 1027, described above). For example, in the exposure along XUs 1007–1012 (Fig. 2.43), Stratum 1016, a brown silty loam with few, fine charcoal flecks, and Stratum 1015, a brown sandy loam with common, large silty clay mottles and few, fine charcoal flecks, represent the final series of sediments related to the last stages of acequia use or its initial infilling after abandonment. Similar deposits were excavated in XUs along BHTs 138 and 164, where Strata 1013, 1014, 1019, 1023, and 1024 represented similar acequia-fill deposits and are shown in Figures 2.46, 2.47 (and see Tables 2.46, 2.47).

Acequia de los Tenorios was independently evaluated (and recorded in BHT 133) by Dr. Stephen Hall (reported in Appendixes 1.1a and 1.1b, this report). Hall describes a 32–38 cm deep acequia with sloping side walls, capped by 40–50 cm of historic fill. Fill is derivative of surrounding Stratum 3 soil and likely derived from slopewash from the surrounding land. Dish-shaped acequias with sloping side walls are indicative of low-velocity, low-volume stream flow. Hall notes disturbance in acequia fill in the channel's central axis in BHT 164 (Figs. App1a.17, App1a.18; Hall, Appendix 1.1a and 1.1b, this report)

Diversion Berm. The northwestern edge of the intersection of the acequia and the southern arroyo wall at LA 149912 was reinforced by a broad, thick deposit of Stratum 1000 (Fig. 2.37), a reddish-brown clay loam with common, large mottles of caliche as well as few, fine charcoal flecks and sparse Euroamerican artifacts (Table 2.47). Stratum 1000, roughly 95 cm (3 ft) thick along its southeastern edge, filled the entire width of the original arroyo channel in BHT 140 (Fig. 2.41), but its thickness diminished rapidly to the northwest. The introduced soil deposit, which covered an area approximately 12 by 20 m (40 by 66 ft) across appears to have served as a broad reinforcing berm or diversionary dam that formed an artificial northwestern bank of the Acequia de los Tenorios. This berm served to prevent the acequia flow from continuing along the natural arroyo's course to the northwest and to direct water into the manmade channel of Feature 1007 to the southwest. The similarities in sediment color and texture between Stratum 1000 and Stratum 3 (the natural substrate) suggest that the origin of the fill constituting the Stratum 1000 berm could have been the spoil dirt that was excavated from the manmade Feature 1007 acequia channel immediately to the southwest. Artifacts recovered from Stratum 1000 (Table 2.47) may therefore assist in determining the construction date of Feature 1007.

Scraping Unit 1007 was excavated over the presumed intersection of the acequia channel, the southwestern arroyo wall, and the southeastern edge of the Stratum 1000 berm to determine if additional water-control features were present at this juncture. No signs of wooden, stone, or other earthen features were found, and the acequia appears to have simply been diverted from the arroyo into the manmade channel by the artificial bank made of Stratum 1000.

Post-abandonment fill also varied greatly along the length of the site, but one deposit (Stratum 1011) that capped the final acequia fill could be tracked with some confidence from BHT 166 on the northeast to BHT 184 on the southwest, nearly the full length of the acequia. Stratum 1011 directly overlay the uppermost flow- or abandonment-related acequia deposits across these trenches, and was distinguished as a laminated deposit of dark grayish-brown to brown very fine sand interdigitated with silt bands. This sediment, which contained common, fine coal and clinker inclusions, was readily distinguishable by its fine, powdery, non-coherent texture and structure and by its very light gray color when dry, as well as by its basal position in the series of postabandonment deposits directly overlying the acequia fill. Other variegated postabandonment deposits were segregated in certain XU excavations as Strata 1012, 1018, 1021, 1022, 1026, 1028, and 1030 (see Table 2.47). All of these post-acequia deposits were marked by their common inclusions of coal, clinker, and varying quantities of early to mid-twentieth-century artifacts.

At the southwestern end of the site, Strata 1031 and 1032 represented post-abandonment fill deposits that occupied part of a broad intrusive depression that extended along the southeastern margin of the AT&SF railroad tracks (Fig. 2.37). Stratum 1031 was a brown silty loam, and Stratum 1032 was an underlying grayish-brown silt; both contained common coal and clinker inclusions (Fig. 2.48). In the area of BHTs 139 and 179, the Strata 1031 and 1032 deposits were capped by a veneer of Stratum 1011, which represented the post-abandonment flow deposit in other upstream acequia locations. Altogether these three main strata were roughly 65 to 125 cm (2 to 4 ft) thick overall, and were buried beneath the modern surface under an additional 15 cm (6 in) of Stratum 1 overburden. XUs 1038 and 1039 sampled these sediments' contents, which included relatively common mid-twentieth-century artifacts (Table 2.47).

A relatively clear southeastern edge of this broad depression, which had been cut into sterile Strata 3 and 4 deposits, could be tracked from BHT 143 on the north, through BHTs 179, 139, and 180 to the southwest. Just to the east, in the area of BHTs 183 and 184, the acequia channel of Feature 1007 was still present, but that feature was absent in BHT 179, where the channel had been replaced by the edge of the expansive depression. The channel was not present in any additional trenches to the southwest, which were occupied instead by the deep disturbance zone. Hence, between BHTs 179 and 184 the southwestern end of the acequia Feature 1007 was excised by this broad depression. This broad disturbance may have been formed during earthmoving activities related to the 1879 construction of the AT&SF railroad tracks. That construction event appears to have cut the acequia channel, and because no sign was found of a culvert underneath the track berm in BHT 181, it appears that the acequia flow was truncated at this point. This circumstance suggests that after the railroad crossed through the area, controlled irrigation water was no longer flowing in the Feature 1007 channel, and that incidental storm runoff was instead draining down the residual, abandoned channel and settling in the broad basin along the base of the railroad tracks.

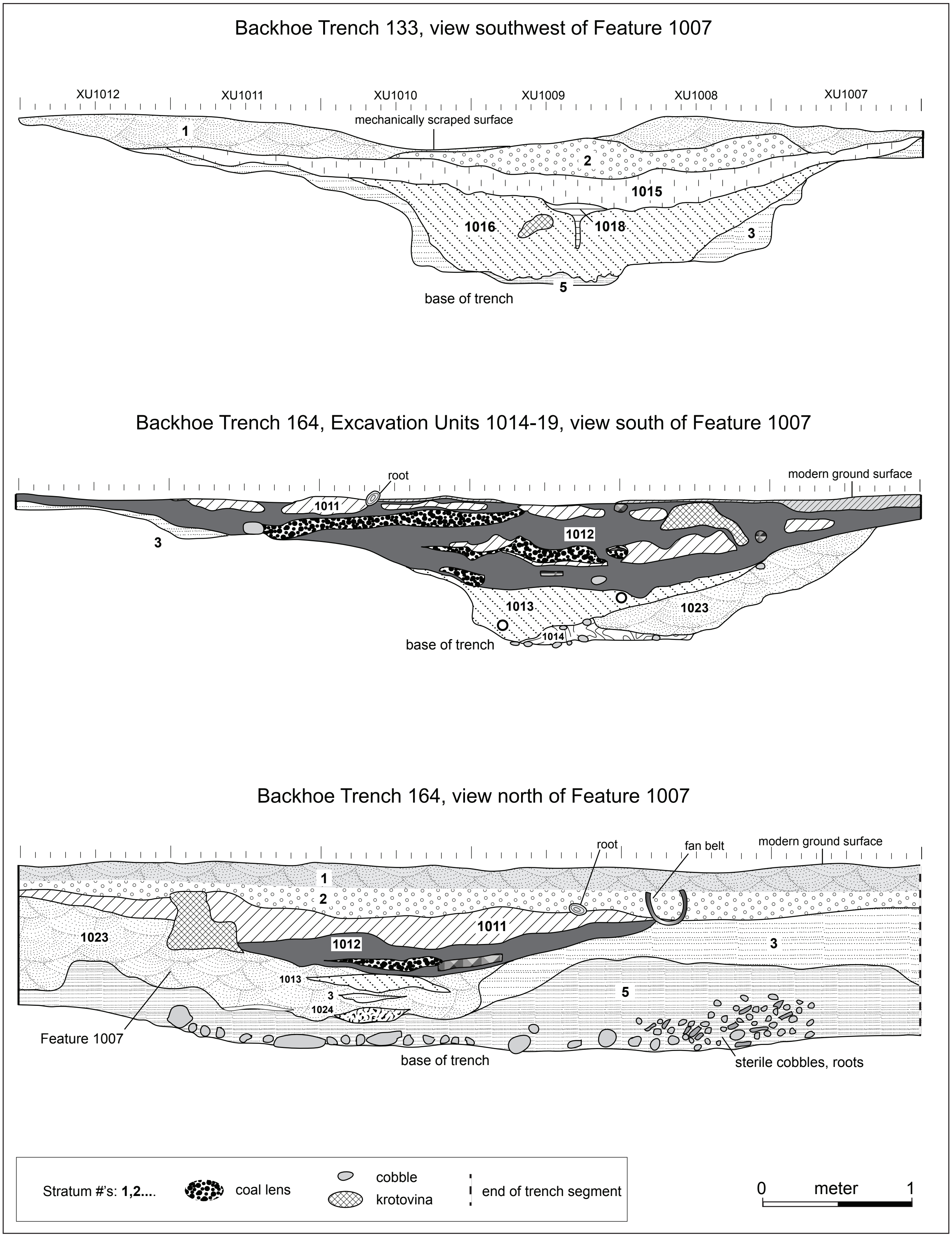
Area B

Arroyo de los Tenorios. Area B stratigraphy at LA 149912 documents modern disturbance within the arroyo. Though sub-channels and possible acequia remnants, were identified at the arroyos eastern exposure, they were obliterated farther to the west by disturbance presumably caused by DR&G track construction. Four trenches were excavated to document this area of the site; Both BHTs 135 and 142 were originally testing trenches (Fig. 2.36), and each contained exposures of what is believed to be part of the Arroyo de los Tenorios channel (these exposures were originally called Feature 1003 in BHT 135 and Feature 1013 in BHT 142 [Wenker 2005b]). These prior testing trenches were re-excavated, and the previously identified features were relocated, but the trenches were not expanded beyond their original dimensions. Two new trenches (BHT 189 and 190) were excavated to the east of each trench and perpendicular to the channel. Backhoe trench profiles are discussed below from west to east.

Backhoe Trench 142 Adjacent to Area A, was aligned with the NMC railroad track bed, and hence did not cross the LA 149912 water channel at a perpendicular angle. In this trench, the arroyo was apparent as an exceptionally broad, deep, basin shaped channel containing a variegated deposit of brown to strong brown coarse gravelly and cobbly sand with common, fine charcoal flecks and few mammal bones as inclusions (Fig. 2.49). The channel deposits in BHT 142 measured at least 24 m (79 ft) in width and were at least 80 cm (2.6 ft) in thickness. Due to a thick mantle of recent overburden, the alluvial feature deposits extended below the base of the trench, and they were truncated and overlain on the southern end by a deep clinker-filled deposit of Stratum 1 that may be related to the 1970s construction of a terraced building pad to the southeast.

BHT 189. A new trench, BHT 189, was located just east of BHT 142 (Fig. 2.36) and was aligned between BHTs 142 and 135 to perpendicularly intersect the buried channel. As noted above, the western wall of this trench was sloped to allow the eastern wall to be vertically excavated to the full depth of the feature (Fig. 2.50).

The northwestern end of this trench revealed a thick construction-fill deposit overlying the sterile substrate. The southeastern face of these fill deposits was steeply sloped, dropping downward from the northwest to the southeast (Fig. 2.51), and the sloped surface continued downward through the sterile sediments into Stratum 4. The construction fill, consisting mainly of hard, light brown sandy clay with few, fine charcoal flecks, may be derived



Figures 2.43, 2.46, 2.47. LA 149912, top (Fig. 2.43): BHT 133, XUs 1007–1012, southwest wall, cross-section view of Feature 1007, the manmade section of the Acequia de los Tenorios; middle (Fig. 2.46): BHT 164, south wall, cross-section view of Feature 1007; bottom (Fig. 2.47): BHT 164, north wall, cross section.

Figure 2.44. LA 149912, overview of Feature 1007 in XUs 1007–1012, view to the southwest.

Figure 2.45. LA 149912, overview of Feature 1007 in XUs 1014–1019, view to the southwest.

from redeposited sterile Stratum 3. The sloping edge of the construction fill matches well with the presumed eastern margin of the NMC railroad tracks, suggesting that this berm represents the built-up railroad bed. Previous exposures of the railroad bed on the western side (e.g., BHT 182) provided corresponding evidence of a built-up track bed.

If the construction fill represents the railroad bed, the zone to the southeast of the tracks appears to have been substantially lowered by historical excavation or leveling. Beyond the toe of the railroad track deposits, the historical ground surface had been lowered into the level of Stratum 4. This artificially lowered historical surface extended at least to the southeast end of BHT 189. At the southeastern base of the railroad berm deposit, a slumped zone of apparently reworked (probably sheet-washed or otherwise eroded) construction fill overlay sterile Strata 3 and 4. Above that lay a highly variegated zone of dark gray loam and sandy loam containing abundant fine to medium coal chunks, clinker fragments, and historical construction material and artifacts (Stratum 2). Scattered lenses of brown alluvial sand throughout indicate some degree of fluvial reworking, but no clear channel deposits were observed.

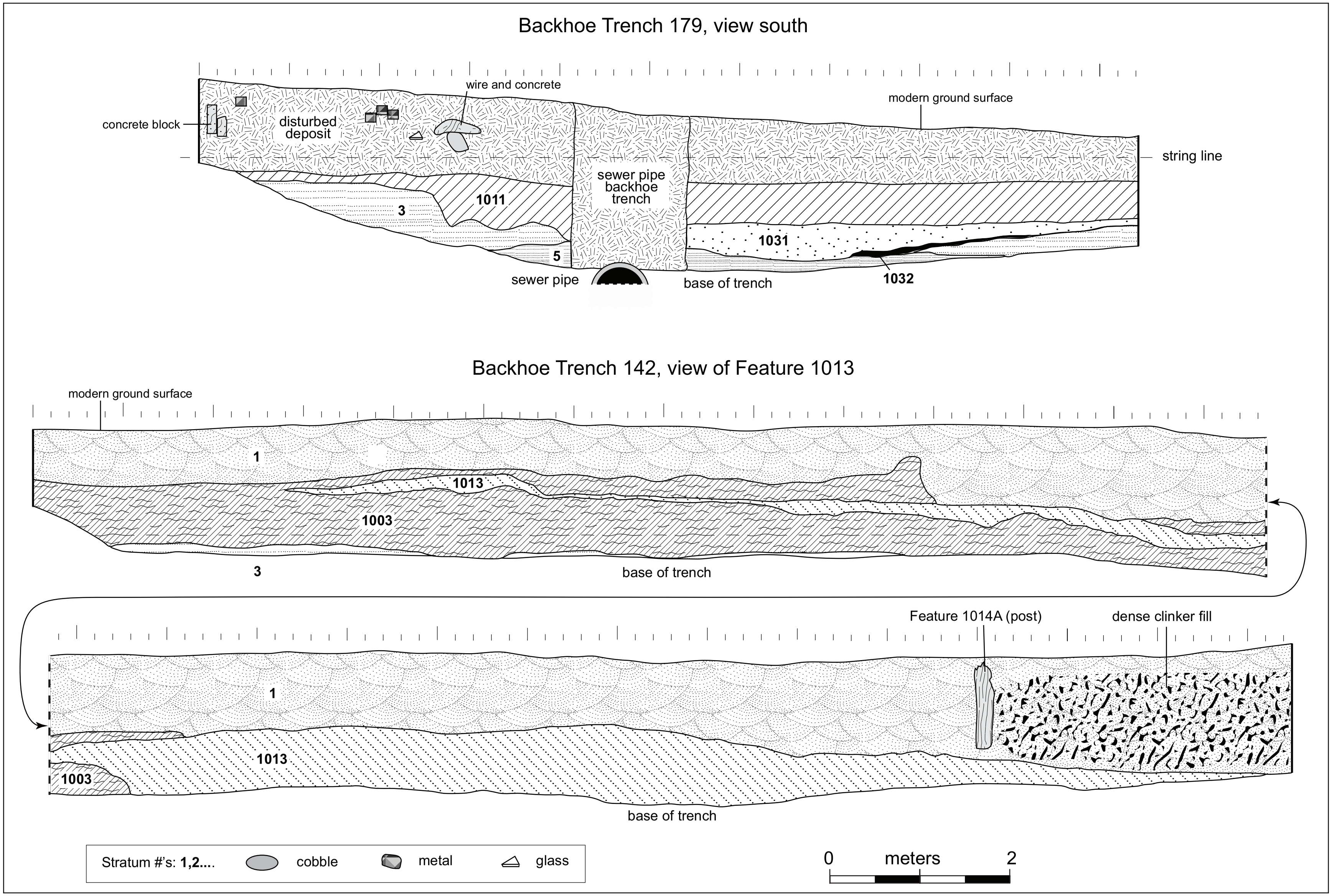
Borrow pit. The origin of this extensive excavation along the southeastern edge of the NMC railroad tracks at LA 149912 is unclear. In Area A BHTs 159, 170, and 182, a broad linear depression paralleled the edge of the abandoned track bed. That depression was thought to represent a borrow pit that was used to build the railroad bed. A similar circumstance may explain the massive depression in BHT 189 on the southeastern edge of the tracks. If this interpretation is correct, the fill of the Arroyo de los Tenorios channels would have been removed from this area when, or shortly after, the NMC railroad tracks were built between ca. 1900 and 1903. The presence of arroyo channel sand in BHT 142, from the testing phase, might be explained by their presence directly under the track bed, where they would have been protected from historical borrow pit excavations.

BHT 135. Farther east at LA 149912, a broad deposit of alluvial sand was present in the very base of BHT 135 (Fig. 2.52). The 13 m wide (43 ft) channel was entrenched into sterile Stratum 3, and was buried by up to 1.2 m of redeposited modern Stratum 1 overburden. The edges of the deposit were thin, but in the center the deposit measured at least 30 cm (1 ft) in thickness, although the full vertical extent of the Feature 1003 sandy deposits were not exposed in the trench, and its overall thickness and depth remain unknown. The feature fill consisted of laminated gray to dark gray, hard, fine to very fine sand and gravelly sand, containing common charcoal, metal, tar, and clinker inclusions as well as fragments of flat-lying lumber (possibly plywood), indicating a fairly late historic or modern period of final site burial. At the northern and southern ends of the exposure, where the thin edges of the channel were fully excavated, small subchannels (roughly 30–50 cm [12–20 in] wide) were observed in the floor of the trench, entrenched into the underlying natural substrate. From these small subchannels, a northeastern-to-southwestern orientation of the flow could be determined (Fig. 2.36).

BHT 190. The second new trench at LA 149912, BHT 190, was located just east of BHT 135 and was aligned parallel to BHT 189 to perpendicularly intersect the buried channel. As noted above, the western wall of this trench was sloped to allow the eastern wall to be vertically excavated to the full depth of the feature (Fig. 2.53).

Backhoe trench 190 revealed modern and historical overburden deposits (Strata 1 and 2) in combined thicknesses in excess of 1.4 m (4.6 ft) on top of the sterile Stratum 3 substrate (Fig. 2.54). A poorly preserved, poorly defined water channel was located in this trench, but it bore little resemblance to other, Area B, western exposures of the Arroyo de los Tenorios channels. In BHT 190, this fairly broad (3.2 m; 10.5 ft), relatively thin (70 cm; 2.3 ft), flat-bottomed channel had been truncated on its southeastern margin by a wide sewer-pipe installation trench. Despite the sewer disturbance, it is estimated that the original channel width was less than 5 m (17 ft). The slight irregularities in the base of this channel may represent the sub-channels that were originally identified in BHT 135 just to the west.

The intact portion of the channel contained two main deposits. The lower deposit, 20 cm (8 in) thick, consisted of poorly sorted, brown, cobbly coarse sand containing common, fine to medium inclusions of coal and clinker fragments. The upper deposit consisted of black silty sand with many, medium



Figures 2.48, 2.49. LA 149912, top (Fig. 2.48): BHT 179, south wall, cross section showing historic trench fill; bottom (Fig. 2.49): BHT 142, cross section of Feature 1013.

Figure 2.50. LA 149912, view of BHT 189, east wall. Sloping railroad berm surface is visible in profile at left.

to large, prominent lenses of sand as well as many, medium to large inclusions of coal and clinker fragments. The abundance of coal and clinker in this channel differs from western examples of the Arroyo de los Tenorios, but this may reflect localized dumping during or after the channel's abandonment.

No signs of other common, site-wide deposits (such as the widely distributed Stratum 1011) were present in this eastern end of the site. Beyond providing evidence for the continuation of a water channel at the northeastern end of the site, due to extensive disturbances and thick deposits of introduced overburden, the four trenches dug during this work phase provided little additional information regarding the development and use of the Arroyo de los Tenorios as an irrigation feature.

Sediments from the arroyo were independently recorded by geomorphologist Dr. Stephen Hall and are described in the Appendix of this report (Appendix 1.1a). Dr. Hall comments on of fine textured channel deposits as strikingly contrasting with coarse sand and gravels observed in modern arroyo exposures. This sedimentation may be the result of comparatively lower velocity more sustained water flow.

Artifact Proportions

At LA 149912, percentages of Pueblo ceramics and then historic artifacts (a combination of materials including metal, glass, Euroamerican ceramics, plastic, and rubber) to the entire artifact assemblage were calculated per stratum using initial artifact counts from data recovery shown in Table 2.47. These artifact types were selected because their classifications inherently imply a limited (albeit wide) date range. Derived from preliminary field specimen data, which report the full assemblage as opposed to sampled context, percentages for each stratum can be compared to values for a few set points and provide evidence that less material associated with historic-era refuse is moving down stream during earliest depositional sequences. Project wide, high percentages of native ceramics to Euroamerican artifact content may provide evidence of earlier ditch fill based on fewer

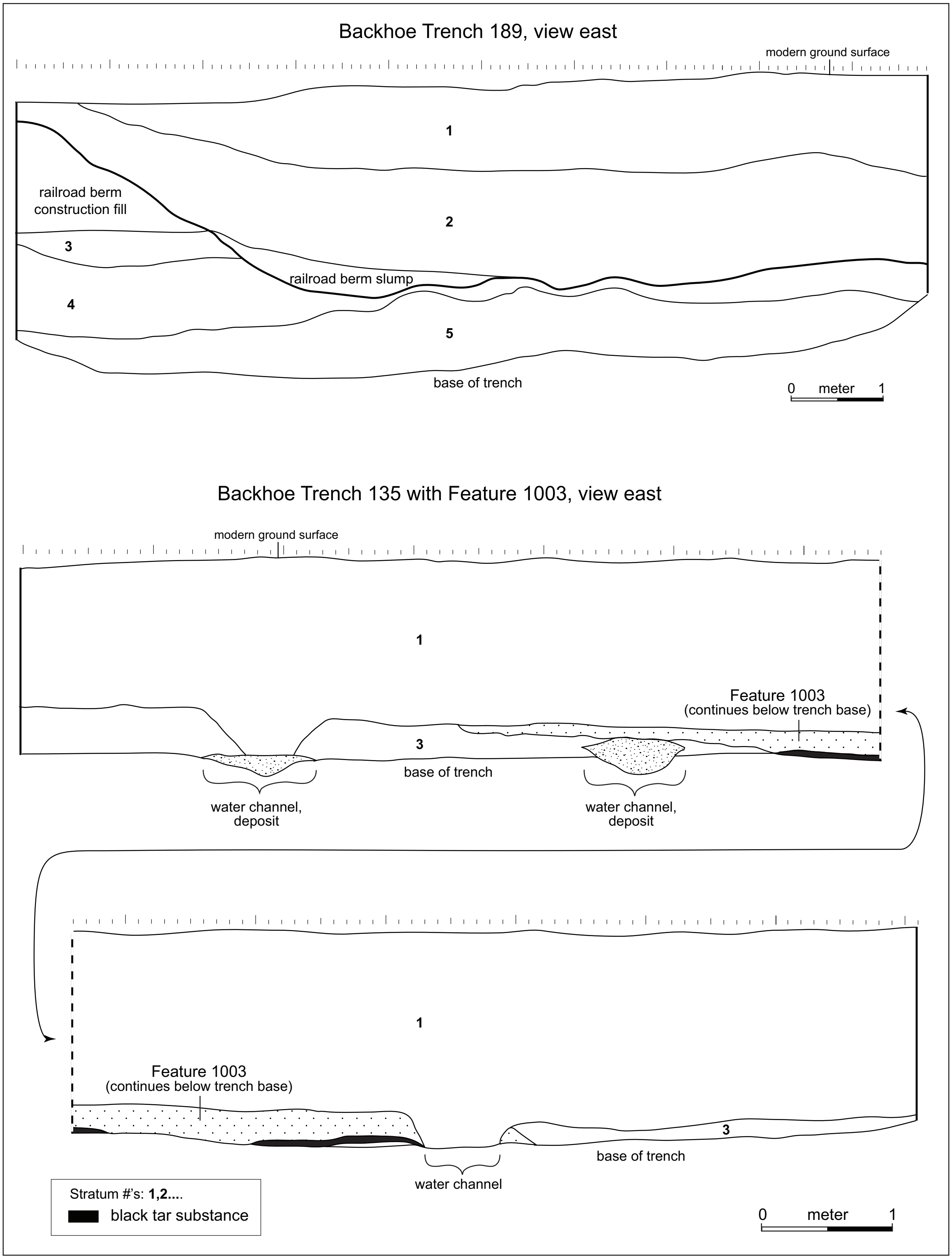


Figure 2.51, 252. LA 149912, top (Fig. 2.51): BHT 189, east wall, cross section; middle and bottom (Fig. 2.52): LA 149912, BHT 135, cross section of Feature 1003.

Euroamerican artifacts moving down stream rather than presence of Pueblo ceramics.

Dates derived from the Arroyo de los Tenorios artifact assemblage suggest a Santa Fe Trail–era association ca. 1820–1840. Artifact percentages calculated for each analyzed stratum ranged from 1 to 9 percent native ceramics to no lower than 40 percent Euroamerican artifacts. At LA 146408 and LA 146407 strata with assigned dates ranging from 1890 to 1903 (based on OSL [optically stimulated luminescence] and relationship to AT&SF infrastructure) have similar artifact percentages. Artifact percentages indicate that comparatively higher frequencies of Euroamerican artifacts from upstream context contributed to the assemblage and a strong association with Euroamerican refuse disposal.

Euroamerican Artifacts
Matthew J. Barbour

A total of 4,584 Euroamerican artifacts were collected from LA 149912, from which a 23-percent sample (n = 1,076) was chosen for in depth analysis. Two hundred seventy-three of these materials were selected from fluvial filling episodes. The remainder (n = 803) was associated with post-abandonment refuse. Table 2.48 summarizes the distribution of Euroamerican material culture by category, type and function for the post-abandonment refuse and each filling episode within the Arroyo de los Tenorios.

Three major fluvial episodes of deposition were documented within the channel along BHT 164; these are represented by Stratum 1013, 1014, and 1023 and are in similar stratigraphic position to Stratum 1027 discussed above. Based on the Law of Superposition, Stratum 1014 is the earliest of the three episodes. Euroamerican artifacts from this stratum consisted of unidentifiable shards of glass (n = 24), bottle fragments (n = 38), unidentifiable dish fragments (n = 16) and two rim fragments of an undecorated plate. Broken bottle glass fragments likely represent food, indulgence or personal effect products. If this is the case, this assemblage may represent objects associated with residential consumption and discard. All materials were relatively small and showed clear evidence of water-wear along their edges suggesting the materials have moved substantially from their primary context. None was appreciably diagnostic to specific age. However, the presence of two Anglo-American pearlware (n = 2, 1780–1835, Noel Hume 1970:128–129) dish fragments could suggest contribution of Santa Fe Trail-era (ca. 1821+) refuse. Considering its context, a single unidentifiable majolica sherd was likely eroded from Territorial-era deposits upstream.

Stratum 1023 lies above 1014 and is similar in composition, consisting of unidentifiable glass (n = 11) and bottle glass (n = 11) shards, a piece of wire, an unidentifiable pearlware dish fragment, and individual pieces of adobe brick and mortar. It too appears to be related to residential consumption and discard patterns and the presence of Anglo-American pearlware suggests deposition during the Santa Fe Trail era.

Stratum 1013 dates slightly later than Stratum 1014 and 1023. However, it follows a similar pattern consisting primarily of water-worn artifacts potentially associated with residential consumption and discard. Artifacts within Stratum 1013 included unidentifiable glass (n = 28), bottle shards (n = 15), a fragment of copper wire, three unidentifiable dish fragments, the rim to a plate, an unidentifiable piece of glassware, adobe brick fragments (n = 6) and parts of a shoe (n = 2). Three dish fragments are undecorated whiteware with a semi-vitreous paste (1840+). One carried a brown transfer print design indicative of late nineteenth century (ca. 1870–1910, Majewski 2008:4).

The overburden above consists of a mix of late nineteenth- and twentieth-century materials. Euroamerican artifacts still appear to be primarily associated with residential consumption. However, construction and maintenance (n = 19) and economy and production (n = 1) items appear in small numbers. These products could be indicative of abandonment of the Arroyo de los Tenorios at or around the time of railyard development. Artifacts in the upper fill are larger and have little evidence of alluvial wear. Much of what appears in the overburden may represent purposeful but gradual filling in of the ditch.

Furthermore, artifact composition in Stratum 1030 (n = 18), 1031 (n = 16), and 1032 (n = 22) (recovered BHT 179 furthest to the south) are similar to those encountered in the alluvial fill from context mentioned above. Most artifacts are small fragments of unidentifiable glass. These strata could represent small periods of re-use of the channel for agriculture. However, artifacts from these strata are not temporally sensitive.

Figure 2.53. LA 149912, view of BHT 190, east wall.

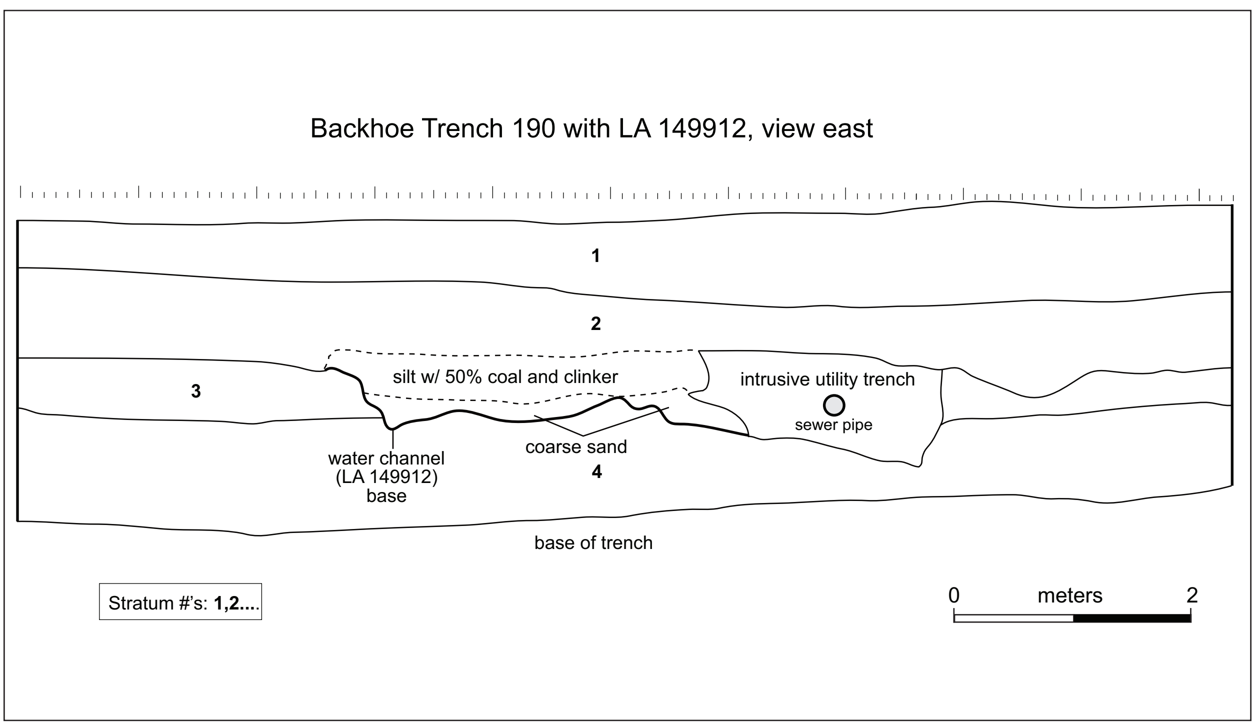


Figure 2.54. LA 149912, BHT 190, east wall, cross section.

In summary, a single majolica sherd is the only artifact that dates to the eighteenth century or earlier. The three major alluvial episodes visible within the Euroamerican artifact assemblage appear to date to the nineteenth century. Strata 1014 and 1023 date ca. 1821; Stratum 1013 dates ca. 1885. These dates are derived from small quantities of Euroamerican ceramic sherds. By the late nineteenth century the acequia may have fallen into disuse. However, materials in Strata 1030, 1031, and 1032 suggest that the Arroyo de los Tenorios may have been revitalized for agricultural purposes for short periods of time.

Native Ceramics
C. Dean Wilson

The great majority (91.3%) of the 46 native sherds from LA 149912 represent types indicative of the historic period (Table 2.49). Prehistoric sherds are represented by Plain Gray Body sherds (8.7%). Historic period types identified include Black-on-cream Undifferentiated (6.5%), Historic White Cream Slipped Unpainted (6.5%), Tewa Buff Undifferentiated, (8.7%), Tewa Polished Gray (30.4%), Tewa Polished Black (13%), Highly Micaceous Paste (6.5%), Smudged Interior Mica Slipped Exterior (4.3%), Tewa Polished Red (6.5%), Polished Interior with Mica Slip (6.5%) and Tewa Unpolished Buff (2.2 %). This combination of types reflects a component dating to the Late Colonial or Territorial period. Vessels include jars and bowls (Table 2.50).

Fauna
Britt M. Starkovich

The faunal sample from LA 149912 is small, with only 72 analyzed bones. The site is thought to be the western segment of the Arroyo de los Tenorios, a natural arroyo adapted for use as a water-conveyance channel in historical times (Wenker 2006). A small portion of the sample (n = 5) came from post-abandonment overburden, but the majority of the sample came from Feature1007, the Acequia de los Tenorios proper. The acequia sample is from six discrete stratigraphic levels: 1013 (n = 10), 1014 (n = 43), 1015 (n = 3), 1019 (n = 2) and 1024 (n = 9). All of these levels are acequia-fill alluvial deposits from the final stages of use or early post-abandonment infilling (Wenker 2006). The levels are from different areas of the site so they do not represent a continuous sequence. Strata 1013 and 1014 are from the same XU and 1024 comes from a nearby XU. Strata 1015 and 1019 are from an XU about 50 meters to the southwest.

The assemblage is composed entirely of domesticated animals, including cattle, sheep or goat, chicken, and house cat (Table 2.51). Attempts were made to identify each specimen to the greatest precision possible. In many cases, the remains were identifiable to the species level, in others general size class assignments were all that was possible. Due to difficulties in distinguishing small specimens of sheep from goat, unspecified pieces were called "sheep/goat," though whenever possible an assignment to a specific taxon was made. Over half of the remains could only be identified to small or large ungulate, which likely represents sheep or goat and cattle, respectively. Evidence of butchering on several different specimens corresponds to cuts of meat still used today (Ashbrook 1955). On a whole, the assemblage is highly fragmented and exhibits a low incidence of burning or animal alteration, though environmental damage is somewhat frequent. Any major differences between the levels are masked by the small sample size and no definitive conclusions can be made.

Feature 1007 Alluvium

Stratum 1014. Stratum 1014 is an alluvial level at the base of the channel, and has the largest sample of any of the levels (n = 43). Cattle, sheep or goat, small ungulate and large ungulate were identified (Table 2.51). The sample is too small to construct body part profiles, but it must be noted that remains from at least two sheep or goats are present. The remains are fairly fragmented, with three quarters of the sample less than 10 percent complete, yet three whole elements are also present (Table 2.51). The sample has fairly extensive environmental damage (28 percent) but there is no evidence of animal alteration. One specimen is burned and two pieces show signs of human butchering (Table 2.51). Both of the butchered remains are cattle, and correspond to the chuck cut (Ashbrook 1955) (Table 2.52). In terms of cost-efficiency considering price per pound and pounds of edible meat per cut, following Lyman (1987), chuck cuts are among the most cost-efficient cuts of beef. Age estimations based on tooth eruption and long bone fusion were possible for seven elements (data from Schmid 1972 and Silver 1970, in

Reitz and Wing 1999) (Table 2.53). Four long bones and two teeth/tooth rows could be aged for sheep or goat; however, due to the overlap in the age ranges, all of the remains could belong to the same individual that was between 18 and 24 months old. One cattle tooth row belonged to an animal older than 48 months. That the animal reached adulthood indicates that it was likely used for breeding, milk, or as a draft animal and was not simply raised for food.

Stratum 1013. Stratum 1013 (similar to Stratum 127 alluvium discussed above) is an alluvial level that overlies Stratum 1014. Only 10 bones were identified for this level, but cattle, sheep or goat, house cat, small ungulate, and large ungulate are all present (Table 2.51). The remains are highly fragmented, with the exception of one complete element. Half of the specimens have environmental damage, and one bone shows carnivore gnawing. Though none of the bones show signs of burning, two specimens have human butchery damage. A sheep tibia is cut through, corresponding with the modern leg cut (Ashbrook 1955) (Table 2.52). The cut seems to have been done by a tool other than a mechanical saw, which may indicate in-home butchery. No long bone epiphyses or teeth were recovered so age of death could not be assigned for any of the individuals.

Strata 1015 and 1019. Stratum 1015 and 1019 are alluvial levels from BHT 133; about 50 meters from the other areas under discussion. Only five specimens were identified from these levels, all of which are small ungulate. The remains are highly fragmented (with only one complete piece) and none show evidence of environmental, animal, or human alteration (Table 2.51). No age ranges could be established.

Stratum 1024. Stratum 1024 is an alluvial level from an XU 1016 along BHT 164 near the area where Stratum 1013 and 1014 were defined. Only nine specimens were identified, and include cattle and sheep or goat, as well as small and large ungulate (Table 2.51). The remains are highly fragmented, with only one specimen more than 10 percent complete. A third of the sample has environmental damage, but no animal or human alterations were recorded. Age of death could not be determined for any of the individuals.

Post-abandonment Fill

Strata 1011 and 1012. Stratum 1011 and 1012 are post-abandonment overburden levels with extremely small faunal samples (n = 2 and 3, respectively). This small sample reflects several different animal species, including cattle, sheep or goat, chicken, and small ungulate (probably sheep or goat) (Table 2.51). Three of the specimens are highly fragmented and the other two are moderately fragmented. No animal damage is evident on any of the remains, and one specimen shows signs of burning (Table 2.51). A cattle rib has environmental damage, as well as evidence of butchering that corresponds with the modern rib cut (Ashbrook 1955) (Table 2.52). No long bone epiphyses or teeth are present so age of death could not be assigned for any of the individuals.

Conclusions

The small sample size is a limiting factor in drawing broad conclusions about LA 149912. A basic observation is that none of the analyzed specimens belong to wild fauna, which is different than the other acequia contexts from the railyard. There are no obvious differences between the different stratigraphic levels, again because of the small sample. Burning and carnivore damage are relatively infrequent, but environmental alteration is common. Though a large portion of the sample shows environmental degradation, the majority of the damage is exfoliation caused by exposure. None of the remains are rounded, which is expected in an alluvial system as artifacts bounce downstream. That the system was low-energy is a possible explanation to explain this observation. In the entire site, only four cuts of meat were observed, though it is worth noting that the three portions of beef were cut with a saw, which was likely mechanical, possibly indicating store-butchering. The cuts of beef are moderately to highly cost-efficient. The portion of sheep was cut with an implement other than a mechanical saw, which may indicate home-butchering. The sample size is too small to confirm or refute this hypothesis, and since the sample context is an acequia, it is impossible to know who threw the remains in the channel so socioeconomic status cannot be ascertained.

Chipped Stone
James L. Moore

Seventeen chipped stone artifacts were recovered from a variety of excavation units and strata at LA 149912, as shown in Table 2.54. All but one of these artifacts came from 1 by 1 m grid units, the exception was recovered from a mechanically excavated trench (BHT 171) and could not be assigned to a specific stratum. All artifacts in this assemblage were made from varieties of chert, including unsourced chert (n = 12), Madera chert (n = 3), Pedernal chert (n = 1), and silicified wood (n = 1). Angular debris was the dominant artifact type (n = 8; 47.06 percent), followed by core flakes (n = 7; 41.18 percent), a drill (n = 1; 5.88 percent), and a core (n = 1; 5.88 percent). Other than the drill, none of these artifacts showed any signs of use-wear. Cortex was noted on 5 artifacts, including 4 generic chert and 1 Madera chert. In all cases the cortex is waterworn, showing that these materials were obtained from secondary gravel deposits.

No evidence of platform modification was noted on any of the flakes. Most of the flakes (57.14 percent) are whole (n = 4), with the remainder consisting of proximal (n = 1) and distal (n = 2) fragments. One core flake exhibits evidence of thermal alteration in the form of luster variation, indicating that it came from a piece of rock that was worked after being thermally altered. Thus, the thermal alteration appears to have been purposeful.

It seems likely that these artifacts were transported and deposited at LA 149912 by channel flow. Indeed, most of the strata shown in Table 2.54 represent soils occurring within or near the base of the acequia channel, confirming this origin. These artifacts washed into the active or in-filling acequia channels from adjacent Late Spanish Colonial- or Territorial-period deposits and were carried downstream to the locations in which they were found. Since most of the native sherds recovered from these excavation units are of historic derivation, the same is probably true of the chipped stone artifacts, though a prehistoric origin certainly cannot be ruled out for some.

Archival Documentation

In his 1988 acequia study, D. H. Snow (1988:16) attributed the current bed of the Acequia Madre (LA 120957) to the original course of the Arroyo de los Tenorios and stated that it was taken over by the Acequia del Pino and renamed the Acequia Madre in the twentieth century. Other map evidence seemingly contradicts this assertion. An 1880 land ownership map (Fig. 2.55) compiled by Scheick et al. (2003) shows the Arroyo de los Tenorios as crossing the Railyard Park parcel well to the north of the current Acequia Madre, in nearly the exact location of LA 149912. This channel (ostensibly the original Arroyo de los Tenorios) is probably also the one marked "arroyo" (between the Ortiz and Seligman tracts) on an 1880 map of the station grounds (Fig. 7.7; illustrated by D. H. Snow [1988]). Further, an apparently unnamed "arroyo" is depicted on Gaynor's 1892 map (Fig. 2.57; D. H. Snow 1988) crossing the AT&SF tracks midway between the Arroyo del Pino and (confusingly) the "Arroyo Tenorios" (i.e., Acequia Madre), in about the location of LA 149912. Based on OAS excavations and his own research, Snow suggests a split course for the acequia. The northern lateral under discussion would have probably shared Arroyo de los Tenorios. The southern lateral (LA 120957) may have paralleled Arroyo San Antonio. The course of this channel can then also be projected westwardly across the railroad tracks to meet up with a channel marked as the Arroyo de en Medio on an 1898 map (Fig. 7.3; D. H. Snow 1988). The water course may have flowed down the route of present-day Camino Sierra Vista Street and then been diverted to supply a former pond and icehouse evident on White's 1898 land ownership map (Fig. 7.3; D. H. Snow 1988). This western waterway is also labeled the Arroyo de las Cruces on a 1901 map (Fig. 2.59; D. H. Snow 1988), which matches well with Scheick et al.'s (2003) Arroyo de las Crusitas [sic] appellation east of the tracks. The alignment of this arroyo west of the tracks also appears to have served as the east–west property boundary line for the tract immediately south of the old Ortiz Body Shop (Figs. 2.61, 4.28; Wenker 2005b; D. H. Snow 1988), the southern edge of Block 123 on the 1912 King's map. Note that the identified southwestern extent of LA 149912 ends directly across the tracks from that property boundary (Fig. 2.35).

It appears from this discussion that the original Arroyo de los Tenorios (east of the tracks) and the Arroyo de en Medio and the Arroyo de las Cruces (west of the tracks) were originally one and the same channel, and that the original Arroyo de los

Tenorios channel east of the tracks (the segment that is now recorded as LA 149912) was abandoned and the flow was diverted southwardly into the current course of the Acequia Madre (LA 120957) at some time between 1880 and 1892. If this is correct, it would stand to reason that the ice-house would have eventually gotten its water from another source. By 1919 the New Mexico State Engineers office estimated that approximately 8.8 percent of cropland in King's Block 123 was irrigated by acequia waters (Table 7.1). This estimate suggests that corn and beans irrigated in this area were being watered by one of the ditches that crossed the southern railyard area. This archival reconstruction does not support the archaeological data suggesting that the channel was transected and closed off by the 1879 construction of the AT&SF tracks. Because no culvert was located during excavation it is reasonable to assume that water was diverted from elsewhere, possibly from watercourses to the south.

In his 1988 acequia study, Snow was unable to identify an origin for the Arroyo de en Medio, stating it apparently started just east of the present railroad tracks and just west of Cerrillos Road at Hickox Street. The Acequia Madre ditch commissioner has opined that the Arroyo de en Medio would have drawn off of the Arroyo de los Tenorios west of the AT&SF railroad line (Phil Bové, personal communication, December 29, 2004). If the above reconstruction is accurate, it can explain D. H. Snow's earlier inability to identify an origin of the Arroyo de en Medio, because after its source east of the tracks (the Arroyo de los Tenorios) was shut down and shifted to the south, the Arroyo de en Medio/de las Cruces channel would have been denied waters, and would have been obligated to draw from a lateral diverted from the newly named Acequia Madre once it crossed over to the west side of the tracks.

SUMMARY

The data-recovery program has revealed that LA 149912 appears to represent the course of the historical Arroyo de los Tenorios. The western portion of the site (Area A) provides good evidence of the presence of a natural arroyo that was adopted into the irrigation system sometime in the early nineteenth or, possibly, the eighteenth century by using the arroyo bed as a convenient water channel and then, using an earthen berm, diverting the waterway into a manmade acequia channel to achieve the desired course. Excavation in Area B to the east recovered morphologic and stratigraphic data about the upstream end of the channel in the project area.

Artifacts analyzed from LA 149912 channel fill provide consistent evidence of Santa Fe Trail and probably Territorial-era Euroamerican artifacts eroded from upstream domestic context. Somewhat high relative frequencies of Santa Fe Trail–era ca. 1820–1840 Euroamerican artifacts to Pueblo ceramics could indicate relatively quick adoption of imported goods by upstream users or may reflect population aggregation along Arroyo de los Tenorios during that time.

Pueblo ceramics were derived from components dating to the late Spanish Colonial or Territorial periods. Most chipped stone artifacts were recovered from within or near the channels base and were predominantly unutilized chert angular debris and core flakes possibly derived from the same context as ceramics. Fauna, also predominantly from the base of the channel, was exclusively from domesticated species. Butchering marks on beef cuts, though rare, were likely mechanical and indicative of store-butchering and moderately to highly cost efficient cuts of meat. One leg cut from a sheep appears to indicate home butchery. Analyzed fauna exhibited exfoliation caused by exposure rather than rounding typical of stream context, possibly indicating erosion from nearby context or low velocity stream flow. All other artifact types recovered from the watercourse were water worn and were clearly eroded from upstream deposits. This is curious because bone is typical domestic refuse seen in midden deposits throughout Santa Fe, and one would think that some portion of the assemblage should have been contributed from the same deposits as ceramic and lithic artifacts.

Geomorphology suggests a waterway with low velocity, low volume water flow and stratum contributed by slopewash from adjacent lands. Hall's documentation of the acequia suggests similar conditions along the natural watercourse which is filled with fine grained sediment rather than coarse grained sand and gravels usually observed in modern arroyos.

Archival research suggests that Arroyo de los Tenorios, Arroyo de en Medio, and Arroyo de las Cruces are the same waterway and that the ditch

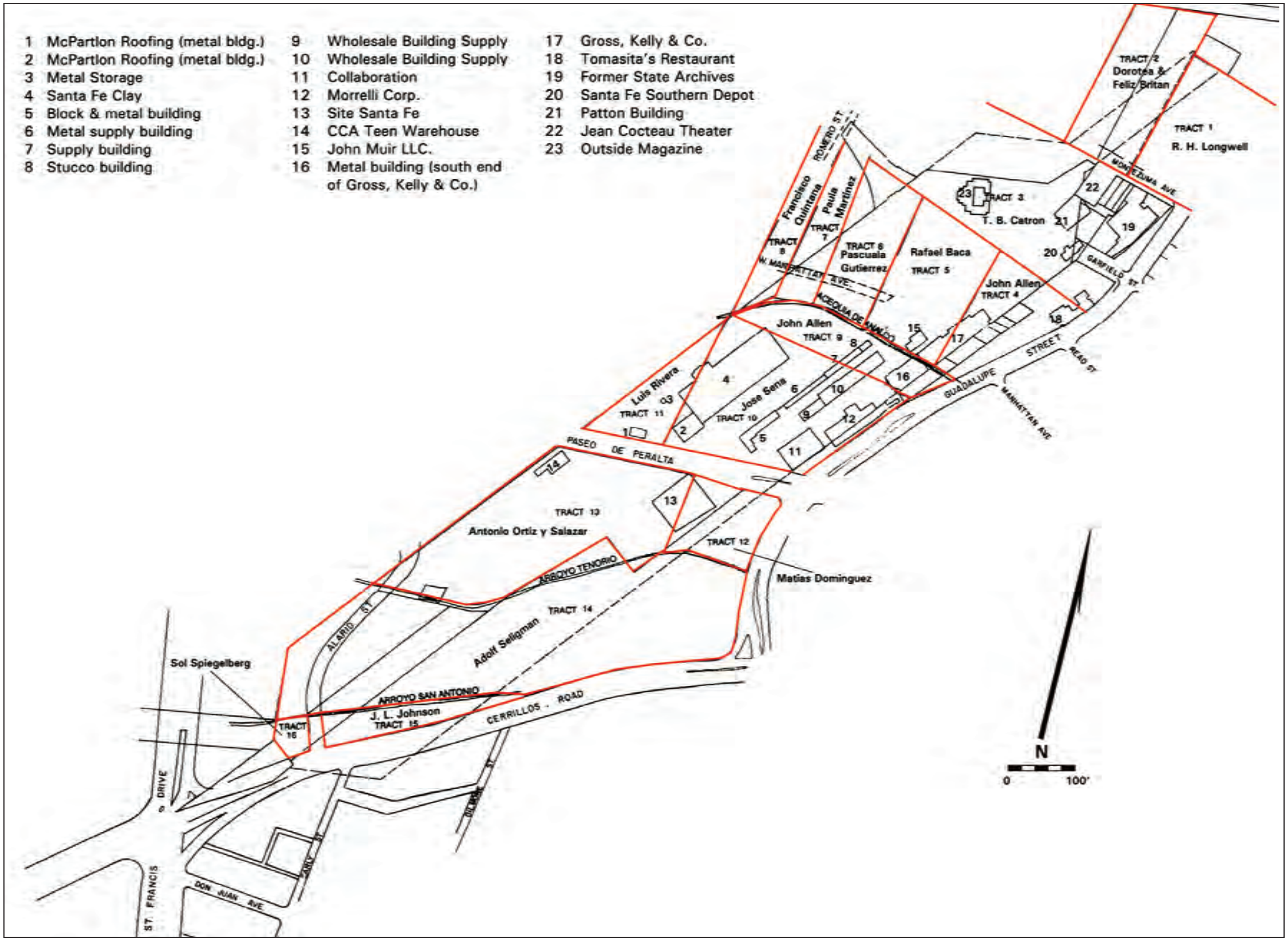


Figure 2.55. Land ownership of the future railroad yards, 1880. Map adapted from Smith Williamson & Associates' Site Plan for Archaeologist, Catellus Development Corp., Project No. 3565 (9/91), and the Plat of Survey prepared for the Catellus Railyard and Baca Street Property, sheet 2 of 6 (Scheick et al. 2003, Figure 3.1).

Figure 2.57. 1892 map of Santa Fe, New Mexico, by P.O. Gaynor (Museum of New Mexico History Library [MNMHL], History Files n.d.; D. H. Snow 1988, Figure 15).

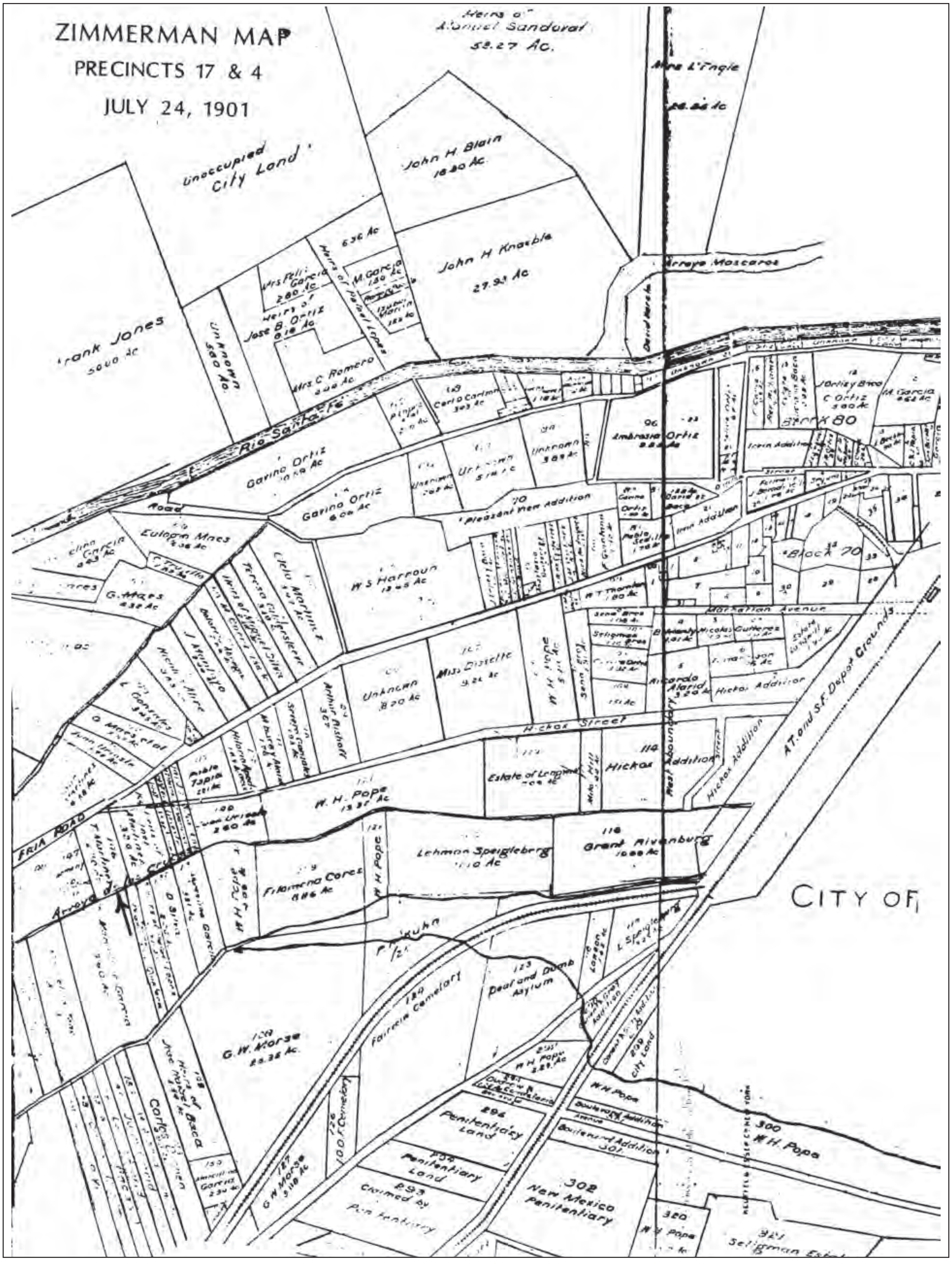


Figure 2.59. 1901 Zimmerman map, precincts 17 and 4 (note Arroyo de la Cruces on the left) (MNMHL, History Files n.d.; Snow 1988, Figure 18).

Figure 2.61. Official 1924 map of Santa Fe, New Mexico, showing lot, block, and house numbering, southwestern portion. Compiled from King's official map and subsequent data adopted by the City Council. (CPWD; Snow 1988, Figure 8c).

was abandoned and water flow was diverted south to the Acequia Madre sometime between 1880 and 1892. Though analysis preformed on Euroamerican artifacts recovered from alluvium seems to corroborate archival sources and challenge channel closing by AT&SF by track construction in 1879.

Recommendations

Excavations at LA 149912 followed the procedures outlined in the data-recovery work plan (Wenker 2005c) and recovered the requisite data to address relevant aspects of the project's research design (Wenker, Post, and Moore 2005). Recommendations remain unchanged from those recommended by OAS and approved by both ARC and CPRC during both the projects clearance phases (Wenker: 2005E and 2005F). The data-recovery program recovered morphologic and stratigraphic data about both acequias and arroyo channels, and a sizeable artifact assemblage from the acequia sediments. The area of the site within 200 ft of the southeastern side of the AT&SF railroad tracks and siding is not likely to yield additional important information beyond that already recovered. No further impact-mitigation archaeological fieldwork is recommended for the site prior to the start of, or during, construction.

LA 120957, Acequia Madre de Santa Fe

Chris T. Wenker
revised by Jessica A. Badner

Introduction

One of the last operable irrigation ditches in Santa Fe, the Acequia Madre de Santa Fe (as it is currently known by the Ditch Commission), crosses through the project area. The segment of this acequia that crosses through the Railyard Park was recorded during a previous survey as LA 120957 (Fletcher 1998; Figs. 2.1a, 2.1b, 2.64). Recent testing in the Railyard Park (Wenker 2005b) also examined this site, revealing buried, earlier channel deposits paralleling the edge of the current channel.

The acequia's course extended across two project parcels that were assessed sequentially. The longest segment ran through the Railyard Park parcel (bounded by Cerrillos Road to southeast and Alarid Street to the west) measured approximately 220 m in length and was the focus of testing and excavation discussed below. A shorter downstream section conveyed water beneath Alarid Street by a metal culvert and then coursed along the Alarid Street parcel project boundary. This segment was recorded after excavation to the north was completed. It was not excavated because of its proximity to the AT&SF railroad track spur immediately to the south.

Site Location

The segment of the Acequia Madre that crosses through the project area is roughly 340 m (1115 ft) in length (Fig. 2.64). The modern expression of this water-conveyance feature consists mainly of an earthen-walled sub-grade channel, generally measuring 1 to 3 m (3.3 to 10 ft) wide and 1 to 1.5 m (3.3 to 5 ft) deep. At its eastern end, the acequia enters the project area through a modern culvert underneath Cerrillos Road, after which the waterway flows through a short open channel. This eastern channel segment is partially faced with rock retaining walls.

The acequia then enters a historic wooden culvert that was originally built to allow the New Mexico Central Railway tracks (LA 149911) to cross over the channel. The western end of the wooden box culvert feeds directly into a modern corrugated, galvanized steel culvert that conveys the water further (approximately 50 m) underground. At the western exit of this steel culvert, the waterway flows into another long, open earthen channel for approximately 100 meters. A short concrete culvert conveys the channel water under a dirt road crossing, and the open channel continues westward to a pair of modern steel culverts that direct the waterway back underground as the acequia exits the Railyard Park under the existing railroad tracks and then Alarid Street. The modern channel then re emerges on the Alarid parcel paralleling the AT&SF railroad tracks for approximately 40 m and then hooks to the north, leaving the project area where it continues beneath St. Francis Drive and continues west paralleling Cerrillos Road. Prior to this project, the site was only known to consist of the extant channel; the buried channels, deposits, other features, and artifacts were not visible on the modern surface.

Data Recovery Procedures

Data-recovery activities at LA 120957 were conducted between March 3 and April 7, 2006. Further work was conducted adjacent and to the southwest on the Alarid project parcel in June of the same year. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker 2005c). Feature, stratum, and excavation unit numbers are not always continuous from 1 to *n*, because in many cases the designations from the testing projects (Wenker 2005a, b) were maintained to provide consistency in the provenience designations.

The excavations described in this report revealed that the acequia was once substantially wider and deeper than at present. A section of a buried lateral ditch was also tracked for a short distance, although recent disturbances truncated much of that feature. The northeastern site area covered a corridor roughly 15 m wide (49 ft), and included a total of approximately 3300 sq m (35,522 sq ft). To the southwest (within the Alarid parcel) the channels course ran along the project boundary and only the modern channel base and the southern bank were within project limits. The site boundary corridor, based on the modern channel width, and a buffer that estimates the underlying buried channel narrowed to 6 m in width and continued for an additional 50 m. In all approximately 340 linear meters of the acequia were documented. Backhoe trenching and hand excavation was conducted in the northern Railyard Park but not in the Alarid parcel because of the proximity of the AT&SF track spur (LA153441) to the acequia swale.

Excavation yielded abundant artifact assemblages. Preliminary field counts derived from PD logs report 23,943 items for the entire site segment; see Table 2.55). Euroamerican artifact analysis indicates that much of the deposition in the buried channel deposits probably postdates the 1879 arrival of the Atchison, Topeka & Santa Fe Railway. Infilling through natural aggradation and purposeful deposition continued through the twentieth century.

Along the open sections of this in-use irrigation channel, the commissioner of the Acequia Madre de Santa Fe requested that, during the archaeological work, no deep trenching or excavation units approach within 3 m (10 ft) of the bank of the acequia (Phil Bové, personal communication, 2005). These proximity limitations precluded full exposure of what proved to be deeply buried archaeological deposits along much of the site's length, although several shallow backhoe scraping units were dug to within 1.5 m (5 ft) of the northern bank at the eastern end of the site. In the areas where the acequia flowed through culverts, however, mechanical and hand excavations were allowed to proceed up to the edge of the culvert, providing good views of the deeply buried channel cross-sections.

Various types and sizes of excavation units were used to expose and define the plan view and cross sections of the main acequia channel, the lateral channel, and their deposits (Fig. 2.65; Tables 2.56, 2.57, 2.58, 2.59). Eight backhoe trenches (BHTs 137, 143, 145, 147, 148, 156–158) from the testing phase were re-excavated and 15 new backhoe trenches (BHTs 198-212) were excavated to gain cross-section views of the channel and associated deposits. Most of these backhoe trenches were excavated to standard 90 cm (3 ft) widths, but several (BHTs 156, 158, 201, 206, 207) were dug to widths of 2.5 to 5.5 m (8 to 18 ft) to allow full exposure of the deeply buried feature deposits. Similarly, three other trenches (BHTs 145, 147, 198) were dug with broadly sloped side walls on one side to allow deeper exposures on the remaining vertical trench wall (the west walls of BHTs 147 and 198 were sloped back, as was the east wall of BHT 145; the sloped edges are not depicted on Fig. 2.65).

Four rows of hand-dug 1 x 1 m excavation units (comprising XUs 2–6, 8–26) were placed along selected backhoe trenches to excavate the fill from within the main acequia channel for artifact recovery and sediment evaluation. The number of 1x1 m excavation units placed along each trench was dictated by the overall width of the channel deposits exposed in the trench. Three other XUs (1, 7, 27) were used to sample fill from the acequia lateral and another water channel feature (Features 1010 and 2, below). Mechanically excavated scraping units (SCUs 1–5) were dug between some of the eastern trenches to expose the top of the acequia lateral (Feature 1010) and to search for diversion features (such as headgates) or other features.

The site was visited by a professional geomor-

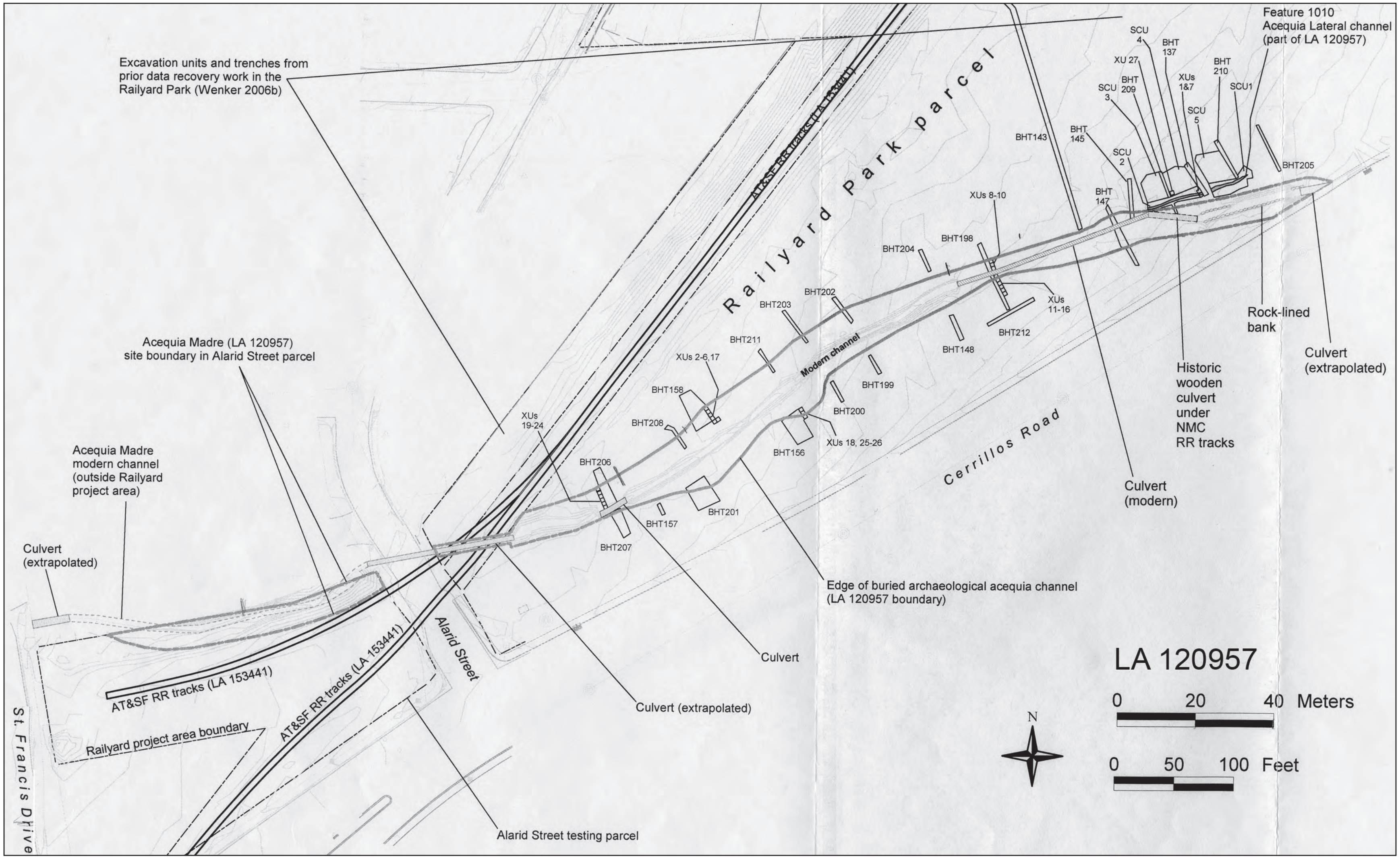


Figure 2.64. LA 120957, site map. Note the Acequia Madre irrigation ditch as it crosses through the Railyard Park and the Alarid Street parcel.

phologic consultant (Dr. Stephen Hall, Red Rock Geological Enterprises) during the excavation. The geomorphologist recorded field observations on channel geometry and sediment characteristics, and recovered fill samples for later sedimentological analysis. Pollen sediment samples were also taken in a stratigraphic column from one exposure of the acequia fill. The site excavation was also visited periodically by the Acequia Madre ditch commissioner.

Site Strata

A thin veneer of sediment capping the channel and the historic ground surface of LA 120957 consisted of purposefully introduced overburden. This modern deposit, Stratum 1, was generally dark brown silty loam with abundant inclusions of base coarse gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving surfaces in the area and was 5 to 30 cm thick. Stratum 2, a project-wide historical overburden deposit, was present across much of the excavated areas of this site, and was occasionally identified as one of the channel-fill deposits excavated from the acequia. Stratum 2 was generally a dark gray or black sandy loam deposit containing abundant inclusions of coal and cinders and historic refuse (glass, metal, etc.), and was often approximately 5 to 35 cm in thickness. This sediment was probably fill brought to level the historical railyard or was incidentally or purposefully dumped into the acequia channel. Stratum 3 was the underlying natural substrate, a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. The occasionally underlying Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed medium crumb structure. Its color ranged from light yellowish brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown to brown in color. Clasts frequently exhibited caliche skins, and the overall stratum was weakly cemented with calcium carbonate. Other strata identified during the excavation are noted below in the feature descriptions.

Generally, the fill of Stratum 1 was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill was screened through 1/4-inch mesh.

Feature Descriptions

During the testing project (Wenker 2005b), four trenches at LA 120957 revealed apparent early acequia channels to the north and south of the current channel, indicating either that the original channel was much wider and deeper than the present ditch, or that multiple, meandering channels were present. The features were large, basin-shaped depressions, generally greater than 1.5 m in width and 1.2 m in depth (the bases of the channels extended downward beyond the base of the excavated testing trenches, and the full extents of the features could not be determined at that time). Upper fill types generally consisted of churned deposits of introduced overburden, but the lower extents of the channels contained fine to coarse laminated sands, indicating alluvial origins.

A single small buried lateral ditch was also identified during testing. The orientation of this small basin shaped channel appeared to diverge slightly to the north of the modern channel, and its size and location suggested that it represented a lateral ditch. This channel contained intact alluvial, laminated silts and sands in its lower extent, but the feature had been capped by an apparent overburden deposit and by laminated deposits of fine sands and silt from overbank flows or clean-out spoils derived from the current Acequia Madre channel (which was called Feature 1026).

Data-recovery excavations revealed that the buried channels flanking the Acequia Madre represented the edges of a single, broad channel (Feature 1022) that was substantially wider and deeper than the current waterway (up to 16 m [53 ft] wide and 2.75 m [9 ft] deep). The buried lateral ditch (Feature 1010) was also re-exposed and tracked for a short distance, but its origin, destination, and overall course could not be reconstructed.

Feature 1022, the Buried Acequia Madre Channel (including Feature 1)

Originally the LA 120957 testing trenches revealed four channel exposures that were assigned four separate feature numbers (1022, 1023, 1040,

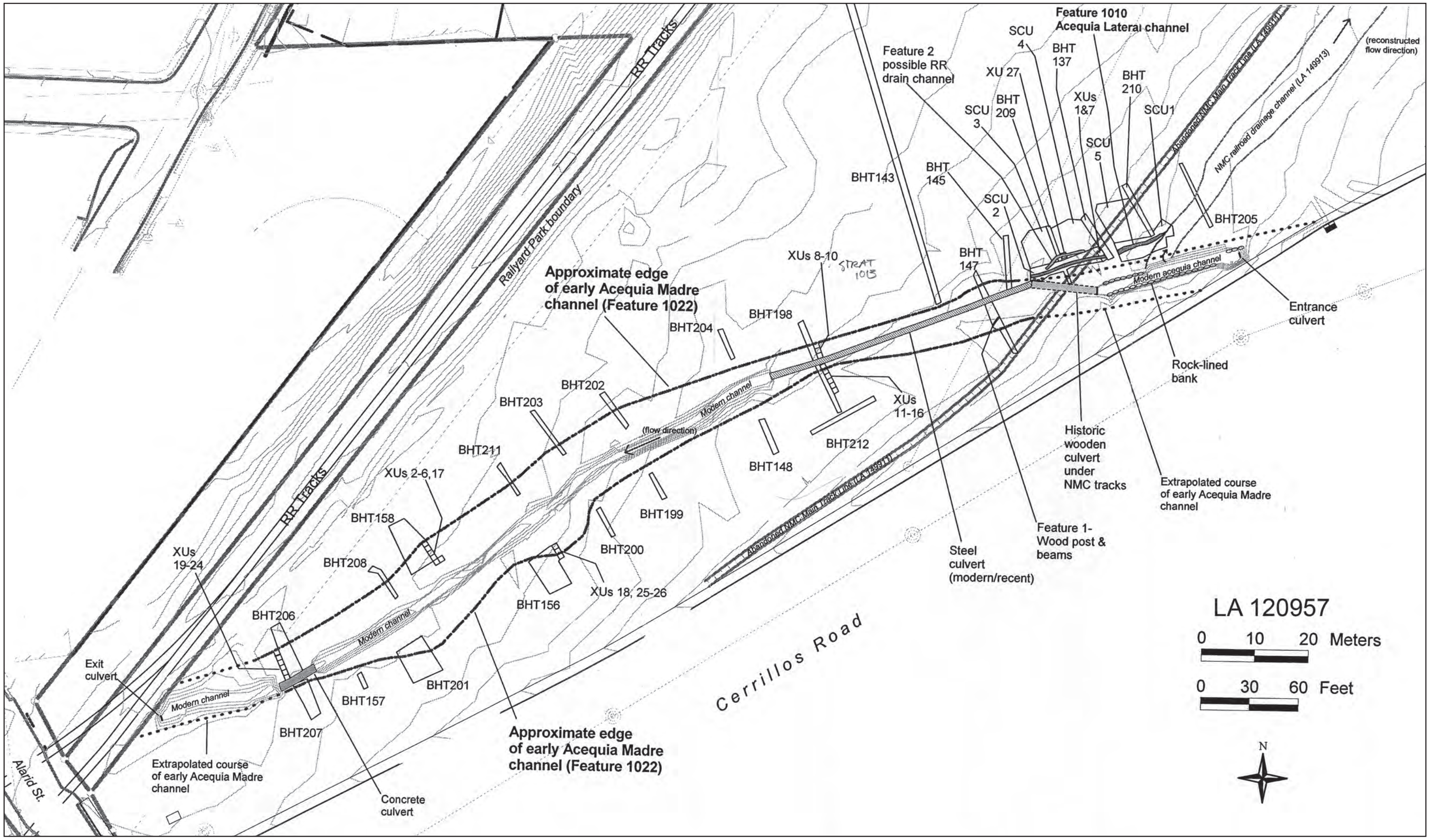


Figure 2.65. LA 120957, detail of site east of Alarid Street showing the modern channel in relationship to the excavated acequia.

1042; Wenker 2005b). Because it is now known that these exposures represented parts of a single large channel, the first feature number that was originally used is now assigned to the entire buried water channel. The following feature descriptions generally track the trench exposures from east to west across the length of the site, following the direction of stream flow in the acequia.

The easternmost cross section through the buried Feature 1022 channel deposits was in BHT 145, a testing trench that was re-excavated and expanded during data recovery, although it was only excavated north of the modern steel culvert. Accordingly, this trench only exposed the northern section of the channel, and did not reach the central portion of the channel. The feature exposure in BHT 145 was generally similar to the exposure of BHT 147 immediately to the west, and the following description of the northern end of BHT 147 also applies to BHT 145.

BHT 147, also a testing trench that was re-excavated and expanded during data recovery, crossed both sides of the steel culvert and exposed one of the few full, continuous cross sections of the buried acequia at the site (Figs. 2.66, 2.67). During excavation, the western trench wall was sloped back, leaving the eastern wall intact for documenting the cross-section. No hand excavations were conducted along BHT 147, so the deposits were not assigned stratum numbers, and are instead identified here with alphabetic descriptors (e.g., Stratum "A").

The upper part of the cross section documents the recent disturbance occasioned by the installation of the steel culvert, which was set into a broad, deep trench that had been excavated into the previously existing water channel and then backfilled with a deposit of reddish-brown gravelly coarse sandy loam. This "bedding sand" was also clearly evident along the culvert in BHT 145 and in the western end of SCU 2, at the eastern end of the culvert (Fig. 2.65). To the west, in BHT 198, the fill around the culvert differed slightly (discussed below). The Acequia Madre ditch commissioner did not recall the construction date of this culvert, but felt that it was in place at least by the early 1960s (Phil Bové, personal communication, 2006).

BHTs 145 and 147

Channel Fill. In the base of Feature 1022 in BHT 147 at LA 120957, the bulk of the channel was filled with a highly variegated deposit (Stratum A) with many internal laminations and banded lenses that ranged from extremely gravelly, stony, and cobbly coarse sand to fine sand with no inclusions, generally brown or light brown in color. Overall, this deposit contained common, medium to large inclusions of rusted metal fragments (especially large in the very base of the channel); as well as common, medium to large saw-cut mammal bones; few, medium bottle glass shards; few Euroamerican ceramic sherds; few broken ceramic tiles; few, medium to large fired brick fragments; and common, small to medium coal chunks and clinker fragments. Some artifacts were highly stream-rounded while others were not, indicating both local deposition as well as transport from upstream locales. Stratum A evidently represents a high-velocity period of water flow in this large, deep channel, the base of which appears to lay roughly 2.5 m (8 ft) below the surrounding historical ground surface represented by the top of Strata 3 and 4 to the north and south. The bottom of Stratum A south of the unexcavated culvert balk was relatively flat, and given the upward-sloping edge of Stratum A.1 (see below) just north of the culvert, the basal, central axis (thalweg) of the original channel was probably marked by the bottom of Stratum A as exposed in this trench. The maximum upper channel width, as marked also by the sterile Strata 3 and 4 ground surfaces, was approximately 9.6 m (32 ft) across. Given the abundant presence of coal and clinker, the Stratum A deposits all appear to post-date the 1880 arrival of the Atchison, Topeka, and Santa Fe (AT&SF) railway.

Stratum A.1. Identified only north of the culvert, Stratum A.1 was considered to be a variant of Stratum A, but was segregated due to slight variations in color and texture (possibly due to its lateral position in the channel). This deposit consisted of brown, poorly sorted, very gravelly and stony coarse sand, containing few, medium, well-sorted lenses of sand. The coarse sand also contained few, medium pieces of rusted metal; few, medium to large brick and concrete fragments; few glass shards; and few, medium to large coal chunks.

Stratum B. On the northern edge of the channel, Stratum A was overlain by Stratum B, a brown, unsorted, very gravelly, stony coarse sandy loam that contained few, prominent, large mottles of sterile Stratum 4 material, as well as few inclusions of metal, glass, brick, and coal chunks. The lower contact with Stratum A was clear and the upper boundary to the culvert trench was abrupt. The churned nature of the fill indicates that Stratum B represents a purposeful backfill deposit, possibly introduced during channel modifications (see below), although the disturbances from the culvert trench prevent further evaluation of the stratigraphic relationships with other channel deposits.

Stratum C. Along the southern edge of the channel, Stratum A was laterally abutted by Stratum C and a wooden beam from Feature 1. Stratum C consisted of a yellowish-brown sandy loam containing extremely abundant, medium clinker fragments and few, medium coal chunks as well as few, medium to large rusted metal chunks. This unsorted, clinker- and coal-rich deposit mostly lay south of a flat-lying wooden beam (part of Feature 1), although an apparent slumped zone of Stratum C intruded northward beyond the beam into Stratum A. The boundary between Strata A and C was gradual, possibly indicating an area of mixture between the deposits.

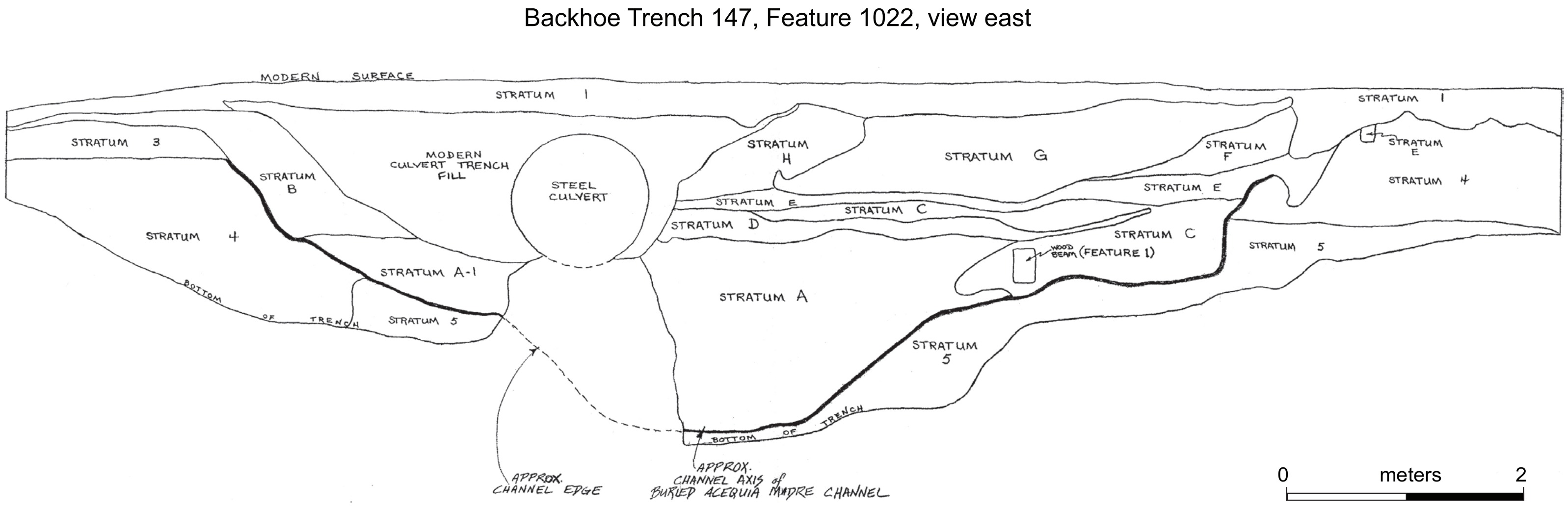
Feature 1. A wooden beam, 11 in high and 5 in wide (28 by 13 cm) in cross section, extended along a roughly northeast-southwest orientation (Fig. 2.65) for about 1.9 m (6.3 ft), although the beam extended an unknown distance farther to the northeast. Two vertical wooden posts (approximately 18 cm [6 in] across; Figure 2.67) had been installed along the northwestern edge of the flat-lying beam, but the posts did not rise above the level of the top of the beam. Together, Stratum C and Feature 1 may represent an early construction episode in the channel of the Acequia Madre waterway.

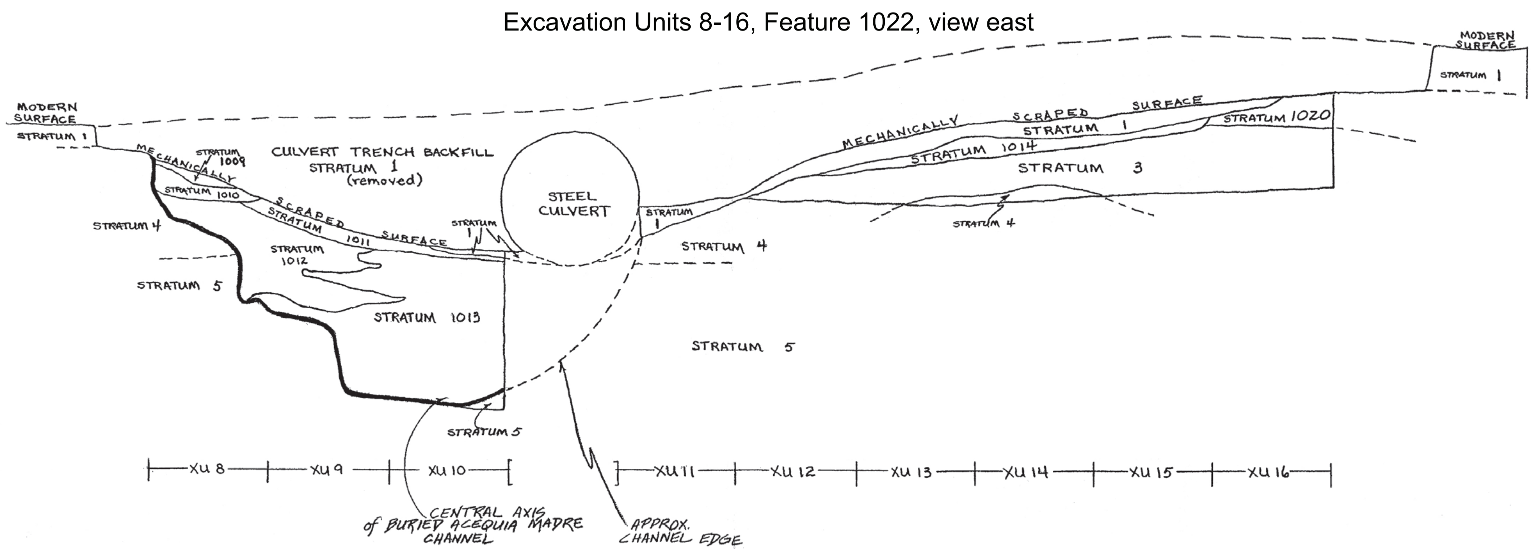
Several aspects suggest a relationship with the NMC railroad tracks. The wooden assembly of posts and beams is oriented along an axis roughly in line with the NMC railroad tracks (LA 149911), which passed roughly 6 m (20 ft) to the southeast. The beam was also oriented toward the western end of a wooden box culvert which guided water beneath the NMC tracks (Fig. 2.65). The Stratum C deposit mainly occupied the southwestern side of the Feature 1 structure, on the same side as the railroad tracks. Stratum C may therefore represent an early construction fill deposit that was intended to narrow, channelize, or redirect the flow in this waterway away from the base of the railroad track bed at the culvert's exit. The wooden beams and posts along the northern downslope edge of the Stratum C deposit may represent a low retaining wall built along the toe of the sloping construction fill. If this interpretation is correct the construction of Feature 1 and deposition of Stratum C would post-date the ca. 1900–1903 construction date of the NMC tracks (Wenker 2005b).

Alluvium. Strata A and C were then overlain by a series of alluvial deposits. Stratum D, a brown sandy silt with common, large, distinct laminated lenses of coarse sand, contained few, medium metal fragments, and few, small to medium coal chunks and clinker fragments. This deposit evidently represented a medium- or low-velocity period of water flow. Much of Stratum D was overlain by a thin layer of Stratum C material, possibly indicating some alluvial disturbance and reworking of the Stratum C fill or another construction episode. Stratum E then overlay these deposits. This sediment consisted of brown sandy silt with common, large, distinct laminated lenses of coarse sand, similar in appearance and probable origin as Stratum D. Stratum E overlay the construction fill of Stratum C, possibly indicating that maintenance of the Feature 1 diversion feature had halted by this time.

Construction fill. These alluvial deposits were then capped by a series of apparent construction fill deposits that sequentially narrowed the shallow, broad channel that had been formed by the preceding periods of infilling. Stratum F, a dark grayish-brown sandy loam, contained common, medium, prominent mottles of sterile Stratum 4 sediment as well as few, medium coal chunks and clinker fragments. Although the southern edge was truncated by a modern Stratum 1 intrusion, Stratum F appears to represent an initial construction fill deposit intended to move the southern edge of the Acequia Madre channel northward.

Strata G and H represent the second and third fill episodes, respectively, that further narrowed or redirected the southern channel edge. Stratum G consisted of brown, very hard, gravelly clay loam containing few, fine coal fragments. Stratum H was a reddish-gray sandy loam containing common, fine coal fragments. Stratum H represents the final identifiable construction fill deposit in this exposure, and its northern margin was truncated by the excavation of the steel culvert trench, which also removed the actual water-bearing channel that would have operated concurrent with the Stratum H deposit.





Figures 2.66, 2.68 LA 120957, top (Fig. 2.66): BHT 147, east wall, cross-section view of Features 1022, the buried Acequia Madre channel, and Feature 1, a wooden beam structure; bottom (Fig. 2.68): BHT 198, XUs 8–16, east wall, cross-section view of Feature 1022, the buried Acequia Madre channel.

Figure 2.67. LA 120957, composite view of BHT 147, east wall, showing Feature 1022. Feature 1, a wooden beam structure, is visible in plan and profile at middle right.

BHT 198

The next trench to the west (BHT 198) also crossed Feature 1022 at a point where the modern channel is contained in the steel culvert, so a fairly complete cross-section view was obtained (Fig. 2.68). A row of nine 1 x 1 m excavation units (XUs 8–16) was dug along the eastern trench wall to sample the deeply buried acequia deposits (Fig. 2.69). Modern Stratum 1 deposits were relatively thick and extensive in this area. Dark brown gravelly loam trench backfill deposits (Stratum 1009) were also banked against the steel culvert, although no clear culvert trench was evident. Mechanical scraping excavations removed most of the Strata 1 and 1009 fill from over the row of XUs before hand excavation began.

Acequia Channel fill. The buried Feature 1022 channel mainly existed on the north side of the culvert. In this area, the base of the buried channel was filled with Stratum 1013, a massive, poorly sorted deposit of strong brown, very gravelly, stony, coarse sand that contained common, fine to medium coal chunks and clinker fragments and few to common inclusions of metal, glass, Euroamerican ceramics, and many other artifact classes (Table 2.55; see also artifact analysis below). The bottom of Stratum 1013 slightly north of the culvert's centerline exhibited a slight basin shape, suggesting that the bottom of the original channel lay at this level. Stratum 1013 represents a high-velocity period of water flow in the base of the channel, similar in most respects to Stratum A in BHT 147 just upstream. As in Stratum A, artifact types from Stratum 1013 suggest a late nineteenth- or early twentieth-century period of deposition.

Along its northern edge, Stratum 1013 exhibited an exceptionally irregular horizontal boundary with adjacent and overlapping, interdigitated lenses of Stratum 1012, a yellowish-brown fine sandy silt that also contained common, fine to medium coal chunks and clinker fragments and few to common inclusions of metal, glass, and other artifact classes.

Stratum 1012 probably represents a medium- or low-velocity water flow along the edge of the channel. The sediments of Strata 1012 and 1013 apparently aggraded concurrently.

Stratum 1011 overlay these deposits. This deposit was a brown silt with fine-to-medium coal chunks and clinker fragments and few to common inclusions of metal, glass, and other artifact classes. Stratum 1011 probably represents a medium- or low-velocity water flow through the channel. The uppermost intact deposit was represented by Stratum 1010, a brown gravelly clay loam containing relatively sparse historical artifacts. The high, lateral position of this deposit indicates that it may have been a late channel-modification fill episode. Any other channel-fill episodes above this deposit were apparently removed during the installation of the steel culvert.

Parallel channel or gully fill. On the south side of the culvert, no definitive deposits of Feature 1022, the buried acequia channel, were located. A set of superimposed sediments containing artifacts was excavated from the XUs along the wall of BHT 198, but these sediments were apparently situated in a shallow trough-like depression that was aligned parallel with the eastern wall of the BHT and the western edge of XUs 11–16. Due to this circumstance, these sediments did not extend eastwardly to the eastern wall of the XUs, and hence they are not fully depicted in Figure 2.68. These sediments included an upper layer of Stratum 1014 (gray fine silt with few artifactual inclusions), underlain by Stratum 1015, a reddish-brown clay loam with few, fine charcoal flecks. Along the eastern edge of the XUs, and in the southernmost XU, Stratum 1015 directly overlay the Stratum 3 natural substrate. Stratum 1016, a light yellowish-brown fine sand with few artifactual inclusions, was positioned between Strata 1015 and 3 along the western edge of the XUs. Stratum 1017, only present in the XU immediately south of the culvert, consisted of yellowish-brown silt with common, medium caliche chunks resembling sterile Stratum 4 material. The unsorted, churned nature of this deposit suggested that it was an introduced deposit, possibly as part of a channel modification episode as observed elsewhere on the site.

The linearity of the Strata 1014–1017 deposits suggested that they occupied a channel or gully that may have entered the main acequia channel from the south, but no sign of a natural or cultural waterway was observed in BHT 212, dug perpendicular to the south end of BHT 198. These relatively anomalous sediments, being separate from the main acequia channel deposits and of unclear origin, provide little information relative to the development of the Acequia Madre.

Western Trenches

Additional backhoe trenches dug farther to the west were prevented from approaching within 10 ft of the open central water channel now exposed as it exited the steel culvert west of BHT 198 Hence, most of these trench alignments straddled the watercourse and served only to track the edges of the Feature 1022 buried channel. On the north, BHTs 204, 202, 203, 211, and 208 revealed the general course of the channel edge, as did BHTs 148, 199, 200, 201, and 157 on the south. Additional hand excavation was conducted along BHT 158 on the north and BHT 156 on the south, although only limited exposures of the channel were available in these trenches.

BHT 156

On the south, along BHT 156, three XUs (18, 25, 26) were used to sample the fill from the southern edge of Feature 1022 (Fig. 2.70). Along this trench, the channel base was filled with overlapping, interdigitated lenses of yellowish-brown fine silty sand (Stratum 1028) and yellowish brown, gravelly and stony sand (Stratum 1029). Stratum 1029 contained fairly abundant historical artifact inclusions (Table 2.55). Intermixed among these overlapping alluvial deposits were also found lenses of reddish-brown clay loam with few, fine to medium caliche chunks (Stratum 1030), which appeared to represent periodic episodes of slumped or washed-in material from the adjacent sterile substrate of the channel's bank or the surrounding ground surface. The combination of these three strata indicate a fairly lengthy aggradative sequence that included sequential high-flow (Stratum 1029) and medium- or low-flow (Stratum 1028) events interspersed with periods of lateral infilling (Stratum 1030) from colluvial or sheetwash deposition from the local ground surface or channel banks. These channel deposits were all buried in BHT 158 by a massive, churned deposit of historical Stratum 2 fill containing common bricks, concrete, coal, and clinker fragments, indicating a

Figure 2.69. LA 120957, view of XUs 8–10, east wall, showing the deeply buried channel of Feature 1022 below the modern steel culvert.

relatively sudden infilling event that may have been purposefully conducted to modify this southern bank of the old acequia.

Because of the limited horizontal exposure, it cannot be determined if the bottom of Stratum 1029 represents the true base of the original water channel in this location. Still, the approximate depth and width of the original channel at the BHT 158/211 crossing can be roughly compared to that of the modern channel (Fig. 2.70). Upstream, the trenches with the steel culvert (BHTs 147 and 198) suggested that the modern channel had become constricted, but the BHT 158/211 exposure clearly demonstrates that the modern irrigation channel occupies a much narrower and somewhat shallower cross-sectional area than the earlier channel. Further, the basal elevation of the modern channel has also risen, indicating that some change to the overall stream gradient has occurred.

BHT 158

This overall change in gradient was also observed in BHT 158 a section of the northern edge of the buried channel was excavated in six XUs (2–6, 17) along BHT 158 (Fig. 2.71). Along this trench the channel base was filled with a highly variegated deposit (Stratum 1006.1) with many internal laminations and banded lenses, generally consisting of yellowish brown, very gravelly, stony coarse sand that contained fairly abundant historical artifact inclusions (Table 2.55). Overlapping and interdigitated with the Stratum 1006.1 deposit was a yellowish-brown fine silty sand deposit (Stratum 1006), also with many internal laminations and banded lenses and moderate quantities of historical artifact inclusions. Intermixed among the northern edges of these two overlapping alluvial deposits were also found lenses of pale brown clay loam with few, fine to medium caliche chunks (Stratum 1007), which appeared to represent periodic episodes of slumped or washed-in material from the adjacent sterile substrate of the channel's bank or the surrounding ground surface. Capping this series of channel fill deposits was Stratum 1008, another series of laminated lenses of yellowish-brown fine sand and silty sand containing few, fine to medium clinker fragments and few artifacts. The sum of these strata indicate a fairly lengthy aggradative sequence that included a temporal progression from high-flow (Stratum 1006.1) to medium- or low-flow events (Strata 1006 and 1008) interspersed with periods of lateral infilling (Stratum 1007) from local colluvial or sheetwash deposition.

These channel-fill deposits were then capped by a series of apparent construction-fill deposits that sequentially narrowed the shallow, broad channel that had been formed by the preceding periods of infilling. Stratum 2, a brown sandy loam containing historical artifacts appears to represent an initial construction-fill deposit intended to move the northern edge of the Acequia Madre channel southward. Stratum 1018, a series of laminated, brown fine sands, apparently represents a period of medium- or low-flow alluviation in the channel after Stratum 2 was deposited. Stratum 1019, a gravelly and stony deposit of brown loam, may represent another construction-fill deposit to further narrow or modify the channel edge.

Again, because of the limited horizontal exposure, it cannot be determined if the bottom of Stratum 1006.1 represents the true base of the original water channel in this location. Still, the scale of the original channel in BHT 158 can be roughly compared to that of the modern channel (Fig. 2.71), further indicating the reduced cross-sectional area of the modern channel and the elevational rise in its basal, central axis.

Dr. Stephen Hall (Red Rock Geological Enterprises) assessed BHT 158 acequia exposure identifying three channel deposits shown in Figure App1a.9. Stratigraphic units named by Dr. Hall roughly correspond to strata shown in Figure 2.71. Hall's designations "silty sand 1 through 3" correspond to three identified channels discussed by him in the Geology of Acequias section in this report. "Silty sand 1" corresponds to Stratum 1006 documenting the earliest acequia channel dug into Stratum 4. "Silty sand 2" to Stratum 106 and 1008, and "silty sand 3" at the top of the stratigraphic sequence and associated with a berm to Stratum 1018. Hall noted an A horizon soil on top of "silty sand 2" and suggests that the elapsed time between middle and latest channel deposits was approximately 50 years. The early channel was buried by younger mixed sediments suggesting an active and continuous infill sequence.

BHTs 206 and 207

The last exposure of the buried Feature 1022 channel was obtained along two trenches (BHTs 206, 207) that were dug across a culvert crossing at the western end of the site (Figs. 2.65, 2.72). The southern portion of the cross section revealed that the culvert installation had apparently disturbed the channel deposits, and that all of the intact feature fill lay north of the culvert. Accordingly, a row of six XUs (19–24) was excavated along the western trench wall of BHT 206 (Fig. 2.73).

Two sequential, superimposed channels are present in this exposure. The lower, earlier channel was located slightly north of the second, later channel, which truncated most of the earlier channel, moved the axis of the waterway southward, and cut deeper into the natural substrate.

Early Channel. The earlier channel contained Stratum 1025 in its base, a strong brown, very gravelly, stony, coarse sand deposit that contained few, fine coal chunks and clinker fragments as well as quantities of historical artifacts dating to the late nineteenth or early twentieth centuries (Euroamerican artifact analysis, below; Table 2.55). This deposit directly overlay the sterile Stratum 5 substrate. Because of the limited horizontal exposure of this channel, it cannot be determined if the bottom of Stratum 1025 truly represents the base of the early channel, but its basin-shaped lower boundary suggests that this may have been the central axis of the first channel.

Stratum 1025 was overlain or abutted by three additional deposits related to the first channel. Stratum 1024 was a fairly homogeneous, massive, dark yellowish-brown clay loam of alluvial origin. Stratum 1026 was a strong brown clay loam with few, fine to medium caliche mottles. Its churned appearance suggested that it lacked alluvial origins and the deposit lacked historic artifact content. These deposits overlay a thin, lateral deposit of Stratum 1027, a strong brown gravelly and stony clay loam that may have been an extension of the main alluvial deposit of Stratum 1025. Stratum 1026

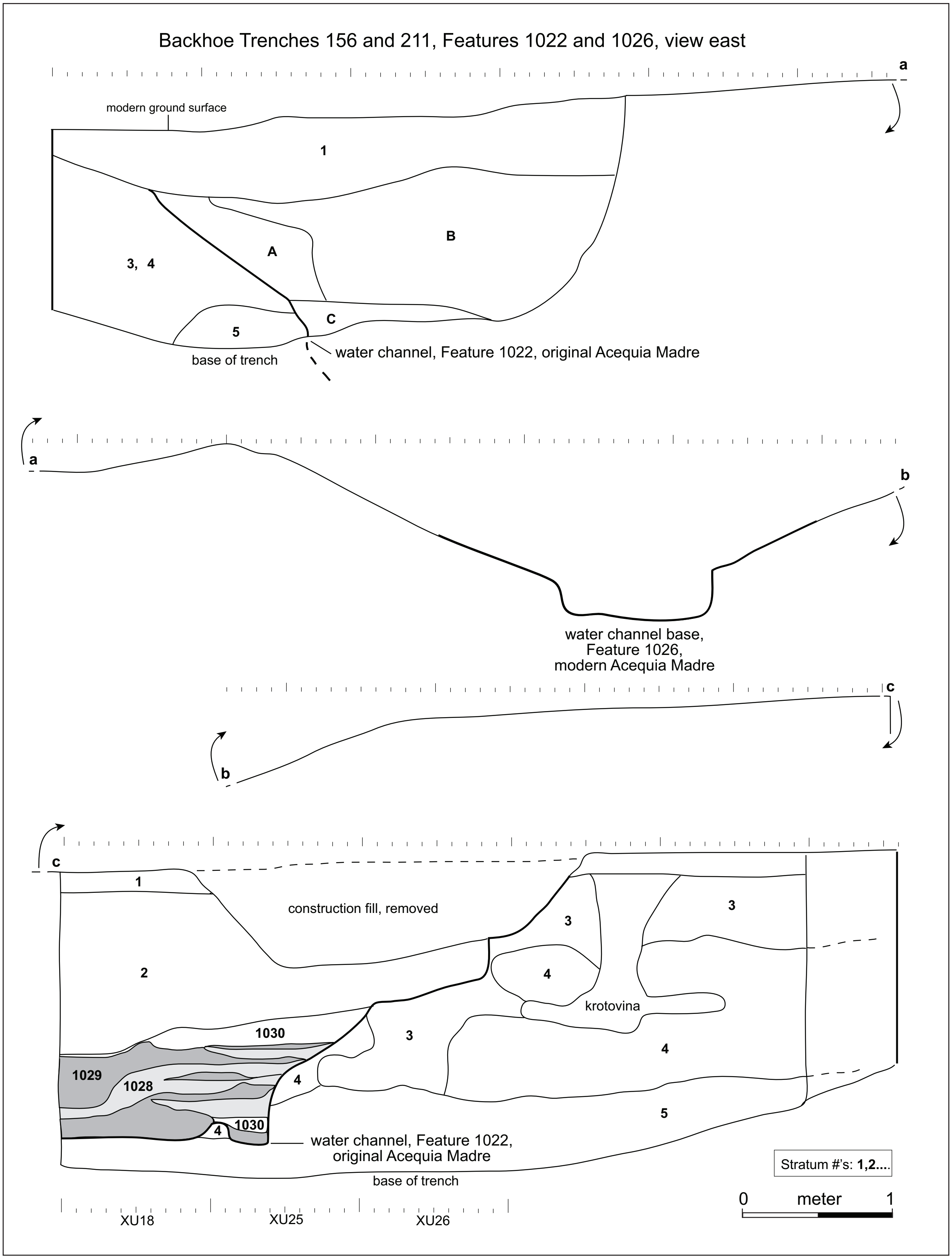
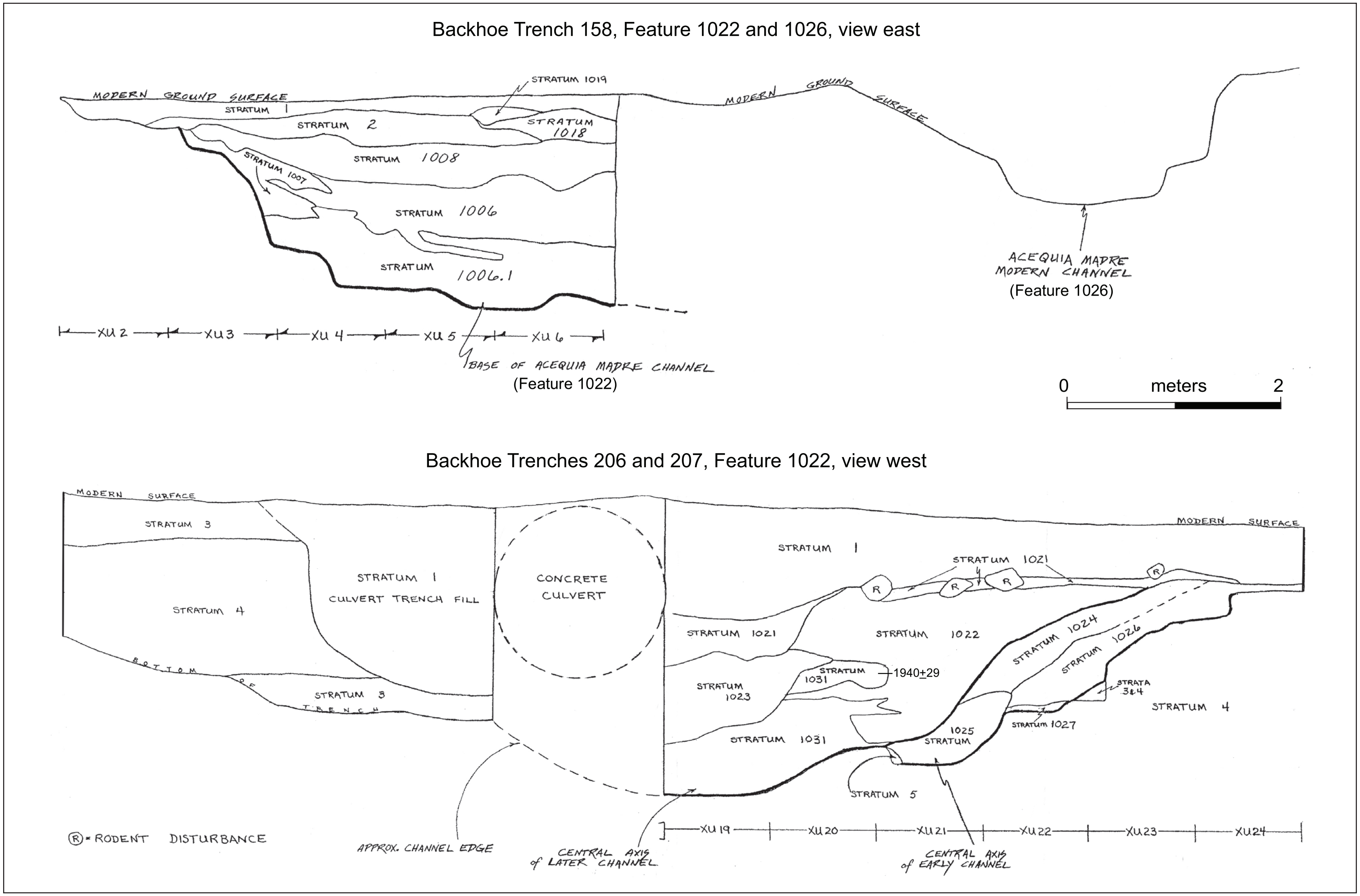


Figure 2.70. LA 120957, along BHTs 156 and 211, east wall. Combined cross section and profile views across Feature 1022, the buried Acequia Madre channel, and Feature 1026, the modern Acequia Madre.



Figures 2.71, 2.72. LA 120957, top (Fig. 2.71): BHT 158, east wall. Combined cross-section and profile views across Feature 1022, the buried Acequia Madre channel, and Feature 1026, the modern Acequia Madre; bottom (Fig. 2.72): Cross-section view of Feature 1022, the buried Acequia Madre channel, along the western wall of BHTs 206 and 207.

may represent a purposefully introduced construction fill or an eroded colluvial deposit from adjacent areas of the bank and surrounding ground surface. That deposit was then overlain by continued low-velocity flow in the channel (represented by Stratum 1024). The southern margins of Strata 1024 and 1025 were then apparently truncated and stripped away, forming the bank of the later channel.

Later Channel. The base of the second channel was filled with Stratum 1031, a highly laminated deposit of dark yellowish brown, very gravelly, stony, coarse sand that contained common, fine to medium coal chunks and clinker fragments and abundant inclusions of metal, glass, Euroamerican ceramics, and many other artifact classes (Table 2.55). The bottom of Stratum 1031 was fairly flat, but given the upward-sloping edge of the sterile substrate on the southern side of the culvert (Fig. 2.72), the bottom of the original channel was probably marked by the bottom of Stratum 1031 in these XUs.

In the presumed central portion of the late channel, Stratum 1031 was overlain by Stratum 1023, a laminated, light brown gravelly coarse sand deposit that contained common, large chunks of concrete as well as abundant historical artifacts. Overlying that deposit was Stratum 1021, a brown to dark brown silt deposit containing common artifactual inclusions. Stratum 1021 abutted the northern edge of the concrete culvert and may represent a fill episode related to the construction or installation of the culvert (artifact analysis may assist in determining the nature of this deposit).

In the lateral, northern reaches of the second channel, Stratum 1022 represented a relatively homogeneous, laminated alluvial deposit of dark yellowish-brown silty loam interspersed with lenses of fine sand. This sediment abutted and interfingered with the central channel deposits of Strata 1031 and 1023 to the south, indicating a series of sequential alluvial events in the channel. Stratum 1021 caps, and, at the southern end, appears to cut into Stratum 1022, further suggesting a recent date for the Stratum 1021 deposits. The entire breadth of the channel was finally capped by a thick deposit of modern Stratum 1 overburden related to the construction of a dirt road across the top of the culvert.

Feature Summary

Across the length of LA 120957, the stream gradient of the buried Feature 1022 channel can be reconstructed from trench exposures at the eastern and western ends of the site. As noted above, although the unexcavated culvert balks at each location preclude the full exposure of these channels, the available data indicate that the bottom of the channel was at least partially exposed in each trench (or it was certainly not much deeper). At BHT 147, the base of the buried channel lay at an elevation of 2114.25 m (6936.43 ft) above mean sea level (amsl). In the BHT 206 exposure, the base of the second, buried channel lay at an elevation 2112.41 m (6930.39 ft). These trenches were separated by a length of 149 m (489 ft), as measured down the channel. The 1.84 m (6 ft) drop in elevation over that distance equates to a stream gradient of 1.2 percent. This gradient compares favorably with that of the modern, much shallower channel of the Acequia Madre (see Feature 1026, below).

In sum, it appears that the channel course now known as the Acequia Madre once existed as a much larger, deeper waterway than at present. Artifacts and inclusions in the basal deposits indicate an initial late-nineteenth century infilling date, at the earliest. Although the lowest deposits in this buried channel indicate a relatively high-energy water flow regime, the upper, later sediments consistently point to a generally slower stream flow environment. These changes were accompanied by purposeful infilling along the channel edges through the twentieth century to narrow, realign, or straighten the waterway. Additional geomorphic analysis may shed additional light on aspects of the stream flow in this managed waterway.

Feature 1010, the Buried Lateral Acequia

Originally identified during testing in BHT 137, Feature 1010 at LA 120957 represents a small, discrete, buried water channel paralleling the northern edge of the Acequia Madre at the eastern end of the site (Fig. 2.65). At its original discovery location, the feature appeared as a small U-shaped channel that had been dug into natural substrate, and contained intact alluvial, laminated silts and sands in its lower extent. The feature measured generally 80 cm (2.6 ft) in width, 37 cm in depth (1.2 ft; measured from the top of the intact surrounding natural substrate that

Figure 2.73. LA 120957, view of XUs 19–24, west wall.

would have formed the historical ground surface), and it could ultimately be tracked over a distance of 26.4 m (87 ft).

After the testing trench was re-excavated, two 1 x 1 m excavation units (XUs 1, 7) were dug next to BHT 137 to obtain artifact samples from the channel fill (Table 2.55). In the two XUs and elsewhere in the feature, two main depositional units were identified (Fig. 2.74). The upper fill consisted of Stratum 1004, an overburden deposit of brown, laminated fine sand and silt, this was the only stratum containing Euroamerican artifact content and was apparently derived from overbank flows or redeposited clean-out spoils from the nearby Acequia Madre channel.

In the east wall of BHT 137, these overbank deposits buried the lateral ditch and the surrounding historical ground surface, and were then in turn overlain by a railroad tie from the NMC main track line. This clear stratigraphic sequence of depositional and construction events indicates that the Stratum 1004 overbank sediment from the Acequia Madre predates the construction of the railroad (ca. 1900–1903) but post-dates the abandonment of the small water channel identified as Feature 1010.

It was originally thought during testing that the lateral was oriented toward the west or northwest, but additional trenching (BHTs 137, 143, 145, 209, 210) and mechanical scraping (SCUs 1–5) revealed that the lateral ditch generally parallels the current Acequia Madre. The five SCUs exposed the entire plan view of the extant section of this lateral, providing a clear view of its size and orientation (Fig. 2.75). After the scraping was complete, four small test-trenches were also hand-dug into the channel to gauge the feature dimensions along its length.

The eastern end of the channel was truncated by the presence of a historical, intrusive, artificial drainage channel (Feature 1020, part of LA 149913). The lateral was not observed east of that drainage channel (e.g., in BHT 205), and modern utility corridors and sidewalks prevented any further work in areas farther to the east. The western end of the lateral channel was truncated by the edge of the recent, intrusive trench containing the steel culvert (described above). In this area, the lateral closely approaches the projected edge of the presumably earlier, buried acequia channel (Feature 1022). No further exposures of the lateral were discovered west of this point, suggesting that the lateral may have actually fed back in to the main channel in this vicinity.

Lateral Channel Fill. The lower deposit in Feature 1010, Stratum 1005, at LA 120957 consisted of light brown sandy loam with few, fine charcoal flecks. This loamy deposit contained common, large, prominent lenticular mottles of laminated, light brown medium sand from periodic, repeated high-energy stream flow episodes. Though sparse historical artifact inclusions were recorded in soil descriptions, only animal bone was recovered from excavation units and analyzed A sediment sample was retained from the lowest sand lens and was sent for photon-stimulated luminescence (OSL) dating. Results indicate an age of 170± 15 years suggesting a date ca. AD 1830. Stratum 1005 also contained large, prominent lenticular mottles of natural substrate material from Stratum 4, including small caliche chunks, positioned at varying depths along the lateral margins of the channel. These inclusions appeared to represent periodic episodes of slumped or washed-in material from the adjacent sterile substrate of the channel's bank or the surrounding ground surface, indicating periods of disuse or substantially reduced flow while the channel was infilling.

Geomorphologic assessment conducted by Dr. Stephen Hall is discussed in Appendix 1.1 of this report. His assessment indicates that the channel is "weakly bedded and poorly sorted" indicating slow discontinuous water flow, suggesting that sediment was derived from low channel flow and slope wash. Pollen recovered from strata adjacent to the OSL sample; approximately 7 cm above the channel's base (Fig. App1a.11) was dominated by pine, Asteraceae, and Cheno-am. No cultigens were present. Another lens sampled approximately 25 cm above the channels base contained the same species with additional elm and possible Russian Olive indicating deposition in the late nineteenth century after the introduction of these species to the Santa Fe area.

Elevations measured along the channel confirm that the stream flow was directed to the west. At the easternmost end, the base of the channel lay at an elevation of 2116.78 m amsl (6944.73 ft), and at its western end, the channel base lay at 2116.44 m

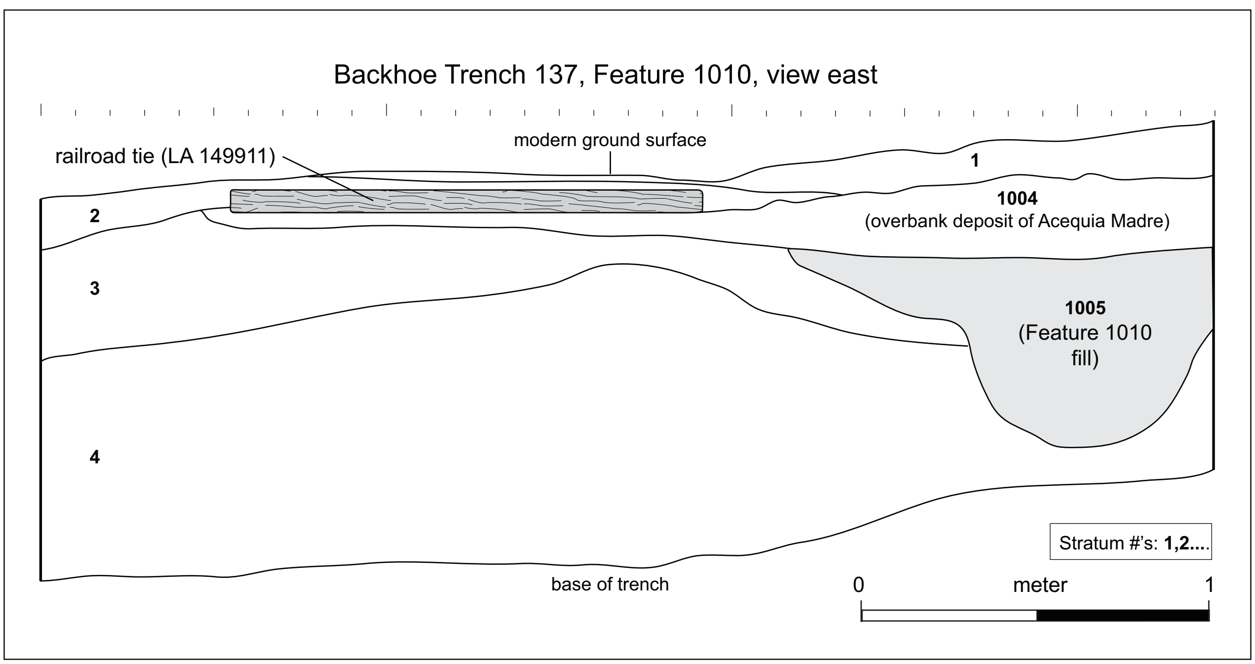


Figure 2.74. LA 120957, BHT 137, east wall, cross-section view of Feature 1010.

(6943.62 ft), a drop of 34 cm (1.1 ft) over 25 m (82 ft) of channel length. This 1.4 percent gradient is similar that calculated for the buried and extant channels of the main Acequia Madre (see above). Given its flow direction and orientation, this lateral acequia may in fact represent a drain or a water-return channel from field locations upstream.

Feature 2

During the excavation of BHT 209 and SCUs 2, 3, and 4 at LA 120957, another apparent linear water channel was exposed in plan view and cross section. This water channel, identified as Feature 2, was in many respects similar to nearby Feature 1010. Feature 2 was a very shallow, basin shaped channel that measured generally 55 cm (1.8 ft) in width and 7 cm (3 in) in depth below the adjacent sterile ground surface. This feature could be tracked in a gently curving arc across the SCUs for a distance of 8.4 m (28 ft). After being exposed in plan view by scraping, the channel contents were sampled by the excavation of XU 27. The channel fill consisted of soft brown sand and loamy sand with poorly sorted lenses of sand, indicating alluvial origins. The fill contained few, fine clinker and coal fragments as well as few, fine caliche chunks, rusted metal fragments, and few artifacts (Table 2.55). Elevations measured along the channel indicate that both the east and west ends slope downward toward a central low point just west of BHT 209. This characteristic, in conjunction with the presence of coal and clinker in the fill, suggest that Feature 2 did not function as an irrigation channel, but instead may be a railroad-era drainage channel or an incidental furrow or depression from railroad track construction.

Feature 1026, the Modern Acequia Madre

The modern expression of this water-conveyance feature at LA 120957 consists mainly of an earthen-walled sub-grade channel, generally measuring 1 to 3 m (3.3 to 10 ft) wide and 1 to 1.5 m (3.3 to 5 ft) deep. The walls of the channel are relatively steep-sided, and the thalweg follows a fairly flat channel base. The acequia segment crossing through the project area measures roughly 220 m (722 ft) in length (Fig. 2.65). The banks of the acequia are commonly flush with the surrounding grade; in some places low levees along the top of the bank (perhaps formed of clean-out detritus) rise no more than 1 ft above grade. At its eastern end, the acequia enters the project area through a modern culvert, after which the waterway flows through an open earthen channel 28 m (92 ft) in length. This eastern channel segment is partially faced with retaining walls built of river cobbles cemented in concrete.

The acequia then flows through a 12.3-m-long (40 ft) subterranean, historic wooden culvert that was originally built to allow the New Mexico Central Railway tracks (LA 149911) to cross over the channel. The western end of the wooden box culvert feeds directly into a modern corrugated, galvanized steel culvert that conveys the water further underground for another 51 m (167 ft). After exiting the culvert, the waterway flows into another open earthen channel that is 100 m (330 ft) long. A short (7.5 m; 25 ft) concrete culvert conveys the channel water under a dirt road crossing, and the open channel continues westward another 23 m (75 ft) to a pair of modern steel culverts that direct the waterway back underground as the acequia crosses under the railroad tracks at Alarid Street and exits the Railyard Park.

Across the length of LA 120957, the stream gra-

Figure 2.75. LA 120957, excavated view of Feature 1010, a buried acequia lateral.

dient for the modern acequia channel can be reconstructed from points at its eastern and western ends in the Railyard Park. At the eastern end of the project, the base of the modern channel lay at an elevation of 2116.18 m (6942.76 ft) amsl. However, this location was situated in a shallow plunge pool below the base of the entrance culvert, providing an excessively deep basal measurement. Twelve meters (39 ft) downstream from the entrance culvert, the channel base rises slightly and then commences to consistently drop downward to the west. At that small rise, the channel base elevation lay at 2116.36 m amsl (6943.35 ft, which will be used in this gradient calculation). At the western end of the project, at the exit culvert, the channel base lay at an elevation of 2113.17 m (6932.88 ft). These points were separated by a distance of 210 m (689 ft), as measured down the channel. The 3.19 m (10.5 ft) drop in elevation over that distance equates to a stream gradient of 1.5 percent, which is slightly steeper than that of the underlying buried channel.

Artifact Proportions

Examination of artifact percentages at LA 120957, although conducted for other acequias reported in this volume, was fairly uninformative. At other acequia sites comparative percentages of Pueblo ceramics and Euroamerican artifacts (a combination of materials including metal, glass, Euroamerican ceramics, plastic, and rubber) to the entire artifact assemblage were calculated per stratum using initial artifact counts from data recovery (see Table 2.55). These artifact types were selected because their classifications inherently imply limited (albeit wide) date range. Derived from field specimen data, which report the full assemblage as opposed to sampled context, artifact percentages for each stratum can be compared to values from dated context. At some sites (LA 146407 and LA 146408) this exercise provided evidence that less material associated with historic-era refuse was moving downstream during earliest depositional sequences.

At LA 120957 percentages of Native American ceramics to the complete assemblage as reported from field collection logs were consistently less than .1 of a percent indicating that the contribution of Pueblo ceramics from an upstream context (or for that matter any context) is extraordinarily small. No other watercourse lacked contribution of native ceramics to this extent suggesting contextual differences in stream flow, possibly more intensive and thorough acequia maintenance, more recent surviving alluvial deposits. Historic-era refuse is preeminent in all deposits except channel fill from Feature 1010, which contained only bone.

Euroamerican Artifacts
Matthew J. Barbour

LA 120957 represents a section of the Acequia Madre within the Santa Fe Railyard project area. The Acequia Madre is thought to be the largest and oldest ditch in the Santa Fe area. A total of 18,606 Euroamerican artifacts were collected from LA 120957 of which 2,810 (15 percent) were subjected to intensive analysis. The vast majority of these materials (n = 2,762) were analyzed from within the Acequia Madre proper (Feature 1022). However, a small number (n = 48) were associated with overbank flow or clean out spoil from the nearby Acequia Madre although fill had been redeposited in a small lateral (Feature 1010). Table 2.60 summarizes the distribution of Euroamerican material culture by category, type and function for each stratigraphic layer of LA 120957.

Euroamerican artifacts associated with the main channel, Feature 1022, were distributed across 15 strata (Table 2.60). Stratum 1025 represents the lowest alluvium identified within the channel (Wenker 2006:12). Four hundred-seventy Euroamerican artifacts were analyzed from this context. These materials consisted primarily of small water worn unassignable items (n = 272, 58 percent) such as unidentifiable can and bottle glass fragments and small fragments of ferrous scrap metal. The can and glass fragments (n = 47, 10 percent) could represent indulgence-related items, which are likely underrepresented in the assemblage. Domestic products accounted for 11 percent (n = 50) of the overall assemblage. When viewed in light of the large quantities of unassignable materials, likely associated with indulgence related items, it is possible that many of these materials represent secondary refuse associated with upstream residential consumption and discard pattern. There are no artifacts that can be tied directly to the Santa Fe Railyard within the assemblage, and construction and maintenance artifacts (n = 87, 19 percent) are within the range of what is expected within domestic refuse (Rathje and Murphy 2001:104).

Of the 50 domestic artifacts analyzed, 44 were dinnerware fragments of which 8 were an unspecified majolica polychrome. These sherds may represent Aranama Polychrome (1750–1800, Deagan 1987:29) and likely date to the mid- to late-eighteenth century. However, the overwhelming majority of artifacts with Stratum 1025 suggest deposition in the late nineteenth or early twentieth century. These materials include wire nails (n = 10, 1850+, Nelson 1968:3), decal pottery motifs (n = 1, ca. 1890+, Majewski 2008:4), bottle glass produced by a two-piece bottle mold (n = 2, 1840–1920, Lorrain 1968:39–40) and electrical materials (ca. 1870+). Unfortunately, no manufacture marks or brand names were identified that would tie the assemblage to a specific decade.

Upper alluvium (Stratum 1006, 1008, 1011, 1012, 1013, 1022, 1024) follows similar patterns to those witnessed into Stratum 1025. All strata appear to represent assemblages associated with upstream residential consumption and discard and all appear to date to the very late nineteenth or early twentieth century. Many of the materials found in each stratum were designated unassignable due to their small water worn nature. By the time the channel had aggraded to Stratum 1013, manufacturer marks within the stratum, such as Owens-Illinois (1929+, Toulouse 1971:403–406), place deposition firmly in the early to mid-twentieth century. The mean bottle glass manufacture date for Stratum 1013 is 1940 (std. deviation 29 years). It is unclear if by the 1940s, the channel was still being utilized for agricultural purpose or if storm water laden with silts and clays is to blame for further sediment accumulation.

Artifacts in overlying strata associated with abandonment (Stratum 2, 2.1) and modern (Stratum 1009, 1021) construction debris are too few in number and lacking in manufacturer marks to place ultimate abandonment of the Acequia Madre. However, it would appear likely given materials in Stratum 1013 that the channel was still holding water until sometime in the mid- to late-twentieth century.

Euroamerican artifacts (n = 48) from Stratum 1004 consisted almost entirely of fire-hardened brick (n = 6) and cement mortar (n = 38) fragments. These artifacts suggest the channel overburden dates to the late nineteenth or twentieth centuries as many buildings were constructed of adobe before this time. However, none of the artifacts can be linked to a specific period. Fill excavated from the lateral could not be assessed, because it lacked Euroamerican artifacts. Euroamerican artifact distribution across functional categories is completely different within Stratum 1006 compared to the main channel. Whereas materials in the primary channel are associated with residential consumption and discard, artifacts from the lateral overburden are almost exclusively associated with building construction or demolition. This difference may be the result of sample size.

In summary, while the Acequia Madre was likely in use during much of the Spanish Colonial Period, Euroamerican artifacts suggest that no discrete deposits can be associated with the seventeenth or eighteenth centuries. While some eighteenth-century materials (e.g., majolica) can be found in the base of the channel, these objects are interspersed with materials clearly associated with the late nineteenth century and may represent artifacts associated with upstream residential consumption and discard. Materials from these earlier periods were likely removed during perennial cleaning of the channel. Much of the alluvium within the channel appears to have accumulated in the early twentieth century. However, it is unclear if this accumulation is associated with agricultural use of the ditch or simply artifacts washed in by storm water runoff. Aggradation of the channel to the level of the current ground surface likely occurred sometime in the mid- to late twentieth century. Fill that caps the lateral, Feature 1010, is likely contemporaneous with the alluvium found in the primary channel, Feature 1022, but this could not be proven through Euroamerican artifact analysis.

Fauna

Britt M. Starkovich

The faunal sample for LA 120957 is small, with 454 analyzed specimens. Included in this sample are Feature 1022, a historic variation of the acequia, and Feature1010, a small lateral channel.

The assemblage is mostly composed of domestic fauna, including dog, house cat, sheep/goat, pig, cattle, and chicken (Table 2.61). Distinguishing small fragments of sheep and goat is often not possible, so such unspecified species were assigned to a generalized "sheep/goat" category. About half of the remains could only be identified to different classes of ungulate, though the "small ungulate" and "large ungulate" categories likely represent sheep/goat and cattle, respectively. Overall, the assemblage is highly fragmented, with 85 percent of the remains less than 10 percent complete. Thirty percent of the specimens exhibit environmental damage, and animal alterations are uncommon (Table 2.61). Processing damage is present on over 20 percent of the bones, but burning is uncommon (Table 2.61). Butchery patterns correspond to meat cuts still used today (Ashbrook 1955). The sample size is small, but some basic observations are possible.

Feature Assemblages

Feature 1010. Feature 1010 at LA 120957 is a pre-twentieth century lateral acequia channel (Wenker 2006). The sample is extremely small (n = 8) and is composed entirely of domestic fauna (Table 2.61). All of the specimens are less than half complete, and five of the bones are weathered. None of the fauna has evidence of animal damage, burning, or human processing. Because of the small sample size from Feature 1010, comparisons with Feature 1022 are not possible.

Feature 1022. Feature 1022 is one of the many superimposed channels of the Acequia Madre (Wenker 2006). It contains the larger sample of the two features (n = 446), and though it is dominated by domestic fauna, some wild species are also present, including pocket gopher, cottontail, and mallard (Table 2.61). Fifty-nine percent of the remains are small ungulate or sheep/goat, and 29 percent are large ungulate or cattle. The feature sample is highly fragmented and about 30 percent of the bones have environmental alterations, exfoliation and root etching in particular. The large amount of exfoliation indicates that the remains were not buried quickly after they were discarded, and the root etching is consistent with a wet environment with much plant growth. Only one bone is rounded, which is surprising since the sample comes from an acequia. It is possible, however, that the acequia was low energy, or certain stratigraphic levels were buried quickly after they were deposited. Animal alteration and burning are uncommon, and occur on less than three percent of the remains (Table 2.61). Processing damage is fairly common, and the most frequently observed cuts are saw marks on one or multiple areas of each butchered specimen (Table 2.61).

Species Utilization

Evidence of human taphonomic processes, such as butchery patterns, are informative when interpreting a faunal assemblage. It is also important to consider the selection of specific animals for consumption, which can be understood by looking at the age profiles of the animals at the site. Because LA 120957 is an historic site, an analysis of body part profiles in the classic sense is not necessarily the best strategy. In historic times, meat was often purchased as specific cuts, evidenced by smooth, well-formed saw marks that were likely made by butchers. Because meat was acquired in this way, body part profiles that examine specific elements are not as useful as those that consider historic meat cuts.

Historic cuts of meat are useful for understanding the economic situations of people depositing the remains. Since LA 120957 is an acequia, it is not possible to ascertain exactly who deposited the animal bones, and the sediments likely do not represent the trash deposits of a single household. Despite this, there may be some trends in the meat cuts found at the site. Schulz and Gust (1983) construct a ranking system for meat cuts based on the relative price of beef at the turn of the nineteenth century in Sacramento, California, that has been widely applied to other historic faunal data sets in the western United States. Following this system, most of the cuts of beef at LA 120957 were expensive (n = 19) or moderately priced (n = 12), followed by cheap cuts (n = 2) of meat. Though this price-based construction is useful, Lyman (1987) argues that simple price rankings may not accurately reflect the economic standing of the people who deposited the remains. Rather, cost-efficiency based on price per pound and pounds of edible meat for each beef cut was likely a more logical construct for the price-conscious consumer. In terms of cost efficiency, the majority of the butchered remains from LA 120957 were from highly (n = 16) and moderately cost-efficient cuts of meat (n = 14). Only a small fraction of the remains came from the least cost-efficient cuts of beef (n = 3) (Table 2.62), and one of these cuts came from a stratigraphic level that was deposited after the abandonment of the acequia, so it is not associated with any of the features. From this discussion, it is clear that the people depositing animal remains in the Acequia Madre bought the most cost-efficient and moderately cost-efficient cuts of beef almost exclusively, indicating that they were probably not on the higher end of the economic scale.

The ages of animals utilized at an historic site indicate what kinds of meat were being eaten; for example, if lamb or mutton was preferred, or if veal was eaten instead of older cattle culled after they were no longer useful for milk or breeding. Animal age can be determined by the fusion of long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). Summarized age data for LA 120957 are presented in Table 2.63.

Based on fusion data (Table 2.63), Stratum 1006 contains a sheep/goat younger than 28 months, and based on tooth eruption, one older than 21 months. It is unclear if the two elements belong to the same animal, or two different individuals. These ages are consistent with an animal, or animals, raised for meat. Stratum 1011 contains the remains of a sheep/goat older than six months, which is not very instructive for understanding the age of death as the particular element fuses at such an early age. Fusion data for Stratum 1013 are indicative of at least one sheep/goat older than 15 months, and at least one younger than 42 months, though all of the elements may belong to the same animal. This animal, or animals, fall in the age range of sheep/goat raised for meat, although they were likely consumed as mutton as opposed to lamb. At least two cattle are represented in Stratum 1013, one younger than 42 months and one older than 84 months. The younger animal was the prime age for producing milk and breeding, and the older was likely culled when it was too old to be used for breeding or drafting. Stratum 1022 contains at least one sheep/goat older than 18 months that was consumed during adulthood. Tooth eruption data indicates that a sheep/goat younger than 24 months was present; it is unclear if the teeth and long bones belong to the same animal. One cattle bone belonging to an individual younger than 108 months was found, but this upper age limit is too broad for any conclusions to be drawn. A portion of a pig younger than 24 months is present, indicating an animal slaughtered when it was prime for eating. Stratum 1024 contains a sheep/goat older than 18 months and a cattle vertebra belonging to an individual older than 84 months. The sheep/goat was slaughtered in adulthood, possibly when it was prime eating, and the cattle was an older individual likely used as a draft animal or for breeding. Tooth data from Stratum 1025 indicate the presence of a two sheep/goats, one older than 12 months, the other younger than 24 months. A pig older than 6 months is also present. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The sample from LA 120957 is small, but informative. The majority of the remains belong to sheep/goat and cattle, which makes sense in the context of an historic site. Based on cut marks, most of the butchery was not done in the home, indicating the cuts of meat were likely bought. The majority of the cuts of beef are among the highest and most moderate in terms of cost-efficiency that were available, so the people depositing the remains were likely at the lower-middle end of the economic scale. Most of the animals that were consumed were of prime butchering age, though some of the individuals were older. Overall, the assemblage is fairly typical of an historic acequia site, in species representation, taphonomy, and butchery patterns. Unfortunately, because the site is an acequia, it is impossible to know exactly who deposited the remains, so further interpretations cannot be made.

Pueblo Ceramics

C. Dean Wilson

Most (89.7%) of the 58 native sherds from LA 120957 were assigned to historic pottery types (Table 2.64). Prehistoric types identified include six (10.3%) Plain Gray Body and two (3.4)% prehistoric red-slipped glaze ware sherds. The presence of this glaze ware pottery indicates material derived from Classic period contexts. Historic pottery types identified include Black-on-cream Undifferentiated (10.3%) Historic White Cream Slipped Unpainted (1.75), Tewa Buff Differentiated (22.4%), Tewa Polished Gray (24.1%), Tewa Polished Black (13.8%), Smudged Interior Mica Slipped Exterior (8.6%), and Unpolished Micaceous Slip (1.7%). These distributions indicate that most of these ceramics were originally from contexts dating to the Late Colonial or Territorial periods.

The fact that most of the native pottery from this site was redeposited from nearby contexts is indicated by the rounded shape, abraded edges and other wear indicative of transport by water on majority (81%) of the sherds assigned to both historic and prehistoric types. Because of this wear, the majority (56.9%) of these sherds could not be assigned to a distinctive vessel form category. The majority of sherds (56.9) were of indeterminate vessel form. (Table 2.65).

Chipped Stone Artifacts

James L. Moore

Forty-one chipped stone artifacts were recovered from a variety of excavation units and strata at LA 120957, as shown in Tables 2.66 and 2.67. This assemblage is dominated by cherts, which comprise 95.12 percent of the total (25 unsourced chert, 13 Madera chert, and 1 Pedernal chert). The two remaining artifacts were made from Polvadera obsidian and quartzite (2.44 percent apiece). Core flakes were the dominant artifact type (n = 24; 58.54 percent), followed by angular debris (n = 16; 39.02 percent), and strike-a-light flakes (n = 1; 2.44 percent). The latter is the only artifact that can be assigned any sort of date, and is of historic derivation. Other than this specimen, no other artifacts showed signs of use-wear. Cortex was noted on 7 artifacts, including 2 chert, 3 Madera chert, 1 Polvadera obsidian, and 1 quartzite. In all cases the cortex is water-worn, showing that these materials were obtained from secondary gravel deposits.

No evidence of platform modification was noted on any of the flakes. Most of the flakes, including the strike-a-light flake, were whole (n = 11), with the remainder consisting of proximal (n = 2), distal (n = 9), and lateral (n = 3) fragments. The only evidence of thermal alteration was on a single piece of angular debris, which was lustrous, indicating that it was originally part of a larger objective piece that was reduced after being thermally altered.

Considering the amount of rounding and wear on the ceramic artifacts from this site, which indicates mechanical transport down the acequia from elsewhere, there is a high probability that the chipped stone artifacts were also transported and deposited at LA 120957 by stream flow. Indeed, most of the strata shown in Table 2.66 or 2.67 represent sediments occurring at or near the base of acequia channels, confirming this origin. These artifacts mostly washed into the active or in-filling acequia channels from adjacent Late Spanish Colonial or Territorial period deposits and were carried downstream to the locations in which they were found. Since most of the native sherds recovered from these excavation units were of historic derivation, the same is probably true of the chipped stone artifacts, though a prehistoric origin certainly cannot be ruled out for some.

Archival Documentation

The documentary evidence of LA 120957's use history is complicated by several factors. First, D. H. Snow (1988:17) points out that, historically, the terms acequia and arroyo were often used interchangeably to refer to either manmade or natural water-conveyance channels, and second, that acequia/arroyo systems often change names [in the archival records], seemingly at random, a fact which makes it difficult to trace them, either in the documents or on the ground (D. H. Snow 1988:17). D. H. Snow 1988:16; Chapter 7, this report) asserts that, in the late nineteenth century, the Arroyo de los Tenorios, which originated at the head of what is now Arroyo Tenorio Street, proceeded west eventually crossing the railyard in two laterals. The north lateral ran down what today is Camino Sierra Vista Street, possibly providing a portion of its waters to an ice-house pond (see also D. H. Snow, Chapter 7, this report). Its southern course is mapped by Snow as proceeding through the railyard parallel to what is now Cerrillos Road.

Another parallel of the Acequia Madre, Acequia del Pino, documented by Snow to the north, ran down Paseo de Peralta to Hickox Street and westwardly to the Agua Fria ditch until the early twentieth century (Fig. 2.2b). At some time, the flow of this channel was then diverted into the current channel (taking over the old Arroyo de los Tenorios), and was tagged with the more economically significant name Acequia Madre. Today the current watercourse is diverted from the Santa Fe River just east of East Alameda Street near its intersection with Lower Canyon Road.

Scheick et al. (2003:60–61) reports that Snow's

Acequia del Pino appellation was misapplied and that this channel is rightly referred to as the Arroyo de San Antonio which predated it. This difference of opinion could be based on interpretation of a nineteenth-century survey by William White (1886 Alameda Additional and Adjacent Lands) and the 1898 Grant of Juan F. Rodregues (D. H. Snow 1988:Figures 12c:103, 20:111) referenced by Snow in his discussion of south side acequias (D. H. Snow 1988:14) but Scheick et al. (2003) is not specific. In addition to depicting Arroyo San Antonio the William White survey shows a watercourse named "Arroyo Acequia and Pino" parallel and to the south of Arroyo San Antonio. In Chapter 7 (this report) Snow reports Arroyo San Antonio as the course of the current Acequia Madre south of the railyard, as he did in 1988. Evidently the history of this channel's use life and its external relationships with other channels in the system require additional clarification. In light of Snow's current research and excavation completed during this project that clarification may not be immediately forthcoming.

Summary

Excavation at LA 120957, adjacent to the section of the contemporary Acequia Madre de Santa Fe, one of Santa Fe's last operable irrigation ditches, confirms the presence of a previous, much wider and deeper ditch alignment underlying the current acequia. Exposures of this alignment confirmed the presence of a waterway measuring up to 16 m wide and 2.75 m deep. Soil profiles of the initial large watercourse showed evidence of bank modification to accommodate NMC track alignments (Feature 1) as well as modifications to narrow the banks of the original channel. The progression along the acequia's course of walled acequia segment, to historic wooden culvert followed by steel culvert installation immediately downstream indicate recent incremental changes to the modern channel that may reflect patterns of acequia management in the nineteenth and early twentieth centuries. Based on culvert installations recorded at other sites (see LA 146407 and LA 146408) the wooden culvert installed to convey water beneath the NMC tracks was likely installed between 1900 and 1903 and it is reasonable to assume that the wide deep channel would have been constricted before the culvert's installation. This could be the origin of the rock-lined bank recorded in the northeastern railyard parcel though there is no archaeological evidence to suggest this.

Artifacts analyzed from what is thought to be the central axis of the first channel (Stratum 1025 BHT 206 and 207) provide evidence of domestic refuse with dates assigned to the late nineteenth and early twentieth-century. These deposits likely derive from upstream locales. Assemblages from upper alluvium were assigned to the late nineteenth or early twentieth-century. Artifact content from Stratum 1013 was particularly modern with a mean bottle glass manufacture date of 1940 and an assemblage containing plentiful construction and indulgence items. It is unclear if this late date is due in part to culvert installation, but it is equally plausible that the deposits result from periodic flooding and refuse disposal that may have taken place in the 1940s filling the channel. This may provide a partial explanation for a difference in grade recorded for the modern and archaeological channels. The historic channel has a slightly less steep gradient (1.2 percent) than that recorded for the modern waterway (1.5 percent). If the channel aggraded as a result of a mixture of flooding and refuse disposal or if the waterway was experiencing diminished stream flow as a result of water impoundment by PNM (Plewa 2009; D. H. Snow, Chapter 7, this report) the slightly steeper grade in the more restricted modern channel may have become necessary to facilitate water movement and prevent silting. Evidence of silt deposits, the result of slow moving stream flow, were recorded by Dr. Stephen Hall in BHT 158. Hall's analysis indicates final filling of upper strata took place in approximately 50 years.

Feature 1001, a lateral recorded in the upstream acequia was abandoned before the Acequia Madre filled. Sediments from the lateral submitted for OSL dating provided a date of 1830 ±15 years. Strata overlying the sampled horizon contained pollen from Russian Olive, a species that was probably not introduced to the area until the late nineteenth century. Overbank flow from the Acequia Madre contained Territorial-era construction debris that predated track installation, which took place some time between 1900 and 1903, indicating that the lateral finally infilled during the late nineteenth century.

Other than a smattering of majolica and Pueblo ceramics, artifact assemblages recovered from all contexts provide limited evidence of upstream erosion of earlier deposits as a contribution to the overall artifact assemblage which is dominated by Statehood-era refuse from neighborhoods upstream. Relative frequencies of Pueblo ceramics to Euroamerican artifacts from all watercourse strata were exceptionally low, typical of frequencies calculated for overburden at other acequia sites within the project area. This may reflect a cycle of constant and through maintenance devoted to a major waterway. Excavation was unable to identify spoil from yearly cleaning suggesting that refuse from upstream may not have accumulated in the channel's base before it started to aggradate. Any refuse from channel maintenance could have been washed away as implied by overbank flows and basal deposits attributed by Wenker to a combination of high-velocity water flow and periodic refuse disposal.

Recommendations

Excavations at all acequia sites investigated at the Santa Fe Railyard, LA 120957, followed the procedures outlined in the data-recovery work plans (Wenker 2005a–c) and recovered the requisite data to address relevant aspects of the project's research design (Wenker et al. 2005). Recommendations remain unchanged from those recommended by OAS and approved by both ARC and CPRC during both the projects clearance phases (Wenker 2006, 2006b)

The portion of the Acequia Madre passing through the Railyard Park (LA 120957) and adjacent Alarid Street parcel of the project area was recommended as being eligible for the NRHP under Criterion 'a' for its significant contribution to the broad patterns of Santa Fe's history. The site was also recommended as being eligible under Criterion 'd' for the information potential contained in the buried archaeological deposits.

Recommendations remain unchanged from those offered and accepted by HPD and ARC for preliminary testing at the Alarid parcel (Wenker 2006a) and data recovery reporting in the Railyard Park parcel (Wenker 2006b). Archaeological data-recovery excavations encompassed the majority of extent of LA 120957 within the project area. Though a 50 m segment south of the Railyard Park was not excavated, work on the northern section reported above was proposed sufficient (Wenker 2006a) to mitigate any adverse site impacts that may arise from further construction. The excavations at this site followed the procedures outlined in the data-recovery work plan (Wenker 2005c), and the requisite data to address relevant aspects of the project's research design (Wenker et al. 2005) were recovered. The site area is not likely to yield additional important archaeological information beyond that already recovered and no further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction.

The modern channel of the Acequia Madre, the component considered eligible under NRHP Criterion 'a,' has been retained and incorporated in the Railyard Park, although substantial excavation and realignment occurred along its length. The treatment of the modern channel is being monitored and approved by the Acequia Madre de Santa Fe commission to ensure the continued viability of the Acequia Madre in the current irrigation system. As long as these activities do not impair the current functionality of the modern water-conveyance channel, and are conducted with approval of the ditch association, these modifications should not affect the site's eligibility status under Criterion 'a.'

LA 146418, an Unnamed Acequia Along Cerrillos Road

Chris T. Wenker and Charles A. Hannaford, revised by Jessica A. Badner

Based on previous testing results (Wenker et al. 2005b), LA 146418 was thought to represent an unnamed water-conveyance ditch. The present data-recovery excavations supported this conclusion based on morphology and sediment characteristics. Feature 97, the acequia channel, was the primary feature at this site and was apparent as a broad, shallow, basin-shaped channel extending some 125 m across the project area (Figs. 2.76, 2.77). The channel was filled with a variety of laminated alluvial sediments that were overlain by colluvial and minor additional alluvium as well as introduced overburden. Mechanical scraping units failed to locate any diversion features or lateral channels. However, segments of three smaller sand-filled channels (Features 1, 96, 98) that were positioned stratigraphically higher in the site deposits are interpreted as naturally formed water channels that crossed the area well after the acequia was abandoned and infilled. Artifact recovery rates were relatively low (n = 175 for the entire site; Table 2.68).

Prior to this project, most of the site was buried under asphalt and dirt parking lots and a stucco building. No features or artifacts were visible from the surface.

Site Location

The acequia segment crosses through the Baca Street parcel of the railyard project area. This parcel area is the southernmost railyard parcel and is physically separated from the Railyard Park, located .075 mile to the north. The 125 m (410.10 ft) length of acequia exposed during excavation ran roughly parallel to Cerrillos Road trending north at its western exposure closest to Baca Street where it is inset from the street by approximately 15.24 m (50 ft). The acequia segment was 300 m (984.25 ft) southeast of LA 146413, a series of modern refuse pits.

Excavation Sequence

Data-recovery activities at LA 146418 were primarily conducted between March 21 and April 13, and geomorphic examinations and sediment sampling were completed by May 6, 2005. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker et al. 2005). Feature and excavation unit numbers used at this site are not continuous from 1 to n, because the designations from the testing project (Wenker 2005a) were maintained to provide consistency in the provenience designations.

Various types and sizes of excavation units were used to expose and define the plan view and cross sections of the acequia channel and its deposits (Fig. 2.77). Backhoe trenches were excavated across the channel at an angle perpendicular to the long axis to gain cross-section views. Rows of hand-excavated 1 by 1 m excavation units were placed along selected backhoe trenches to excavate the fill from within the channel for artifact recovery and sediment evaluation. The number of 1 by 1 m excavation units placed along each trench was dictated by the overall width of the channel deposits. Mechanically excavated scraping units were dug between the trenches to expose the top of the acequia and to search for diversion features (such as headgates) or other subsidiary channels. Two additional hand-dug excavation units were placed over one of the later sand-filled channels overlying the acequia channel.

Generally, the upper fill of Stratum 1 was excavated in full-cut hand and mechanical excavation units and was not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. All other hand-excavated fill was screened through 1/4-inch mesh.

Site Strata

The modern ground surface of LA 146418 was formed of Stratum 1, a modern deposit of dark brown silty loam with abundant inclusions of basecourse gravels, asphalt, and modern refuse. This 5 to 50 cm thick deposit was probably an admixture of recent refuse disposal mixed with gravel and fill brought in to level the driving surfaces in the area. Stratum 3 was the underlying natural substrate consisting of a hard deposit of reddish-brown clay loam with mottles of caliche inclusions. Stratum 4, also a sterile substratum, was a soft to slightly hard, gravelly sandy silt with a weakly formed medium crumb structure. A variety of other channel-specific strata identified during the excavation of the acequia deposits are noted below in the feature descriptions.

Stratum 100 was an 8 cm thick deposit of brown sandy clay loam containing coal clinkers, metal, glass, and plastic (Table 2.68) that was observed only in BHTs 6 and 7 (Fig. 2.77). Stratum 100 was similar to Stratum 1 and was interpreted as a deposit associated with the use or demolition of the nearby 1950s Texaco Inc. oil distributorship (Site LA 146416; see this volume). Stratum 101 was a dark brown, gravelly, silty clay loam that was identified in trenches along much of the channel's length. Stratum 101 averaged about 20 cm in thickness, and the sediment was usually positioned immediately under the disturbed Stratum 1 overburden. Cultural inclusions consisted of charcoal flecks, coal, clinkers, glass, metal, Euroamerican ceramics, and faunal bone (Table 2.68). Again, Stratum 101 is similar to Stratum 1 and may be associated with the recent (but pre-parking lot) ground surface. Most (n =

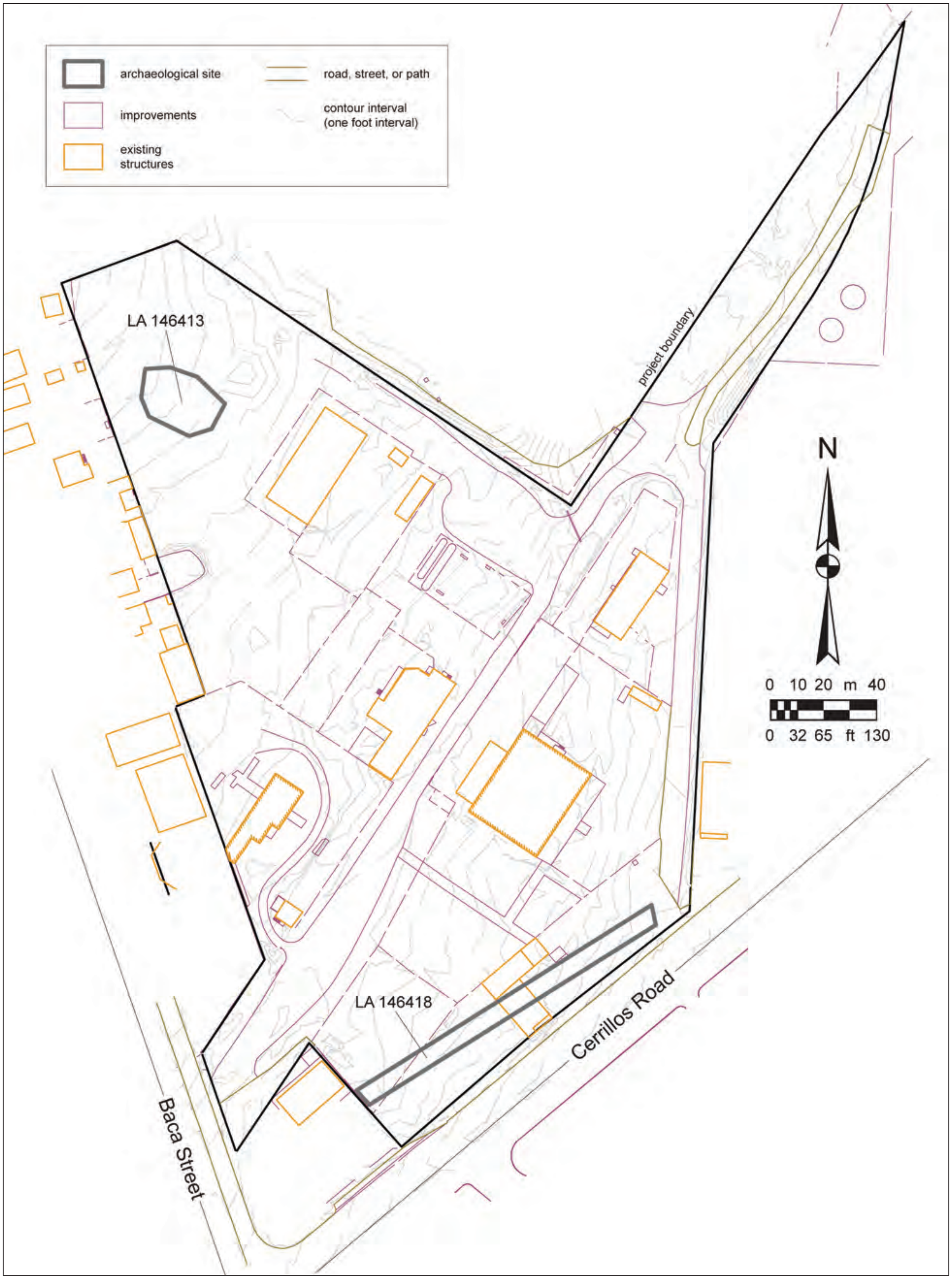


Figure 2.76. Baca Street sites.

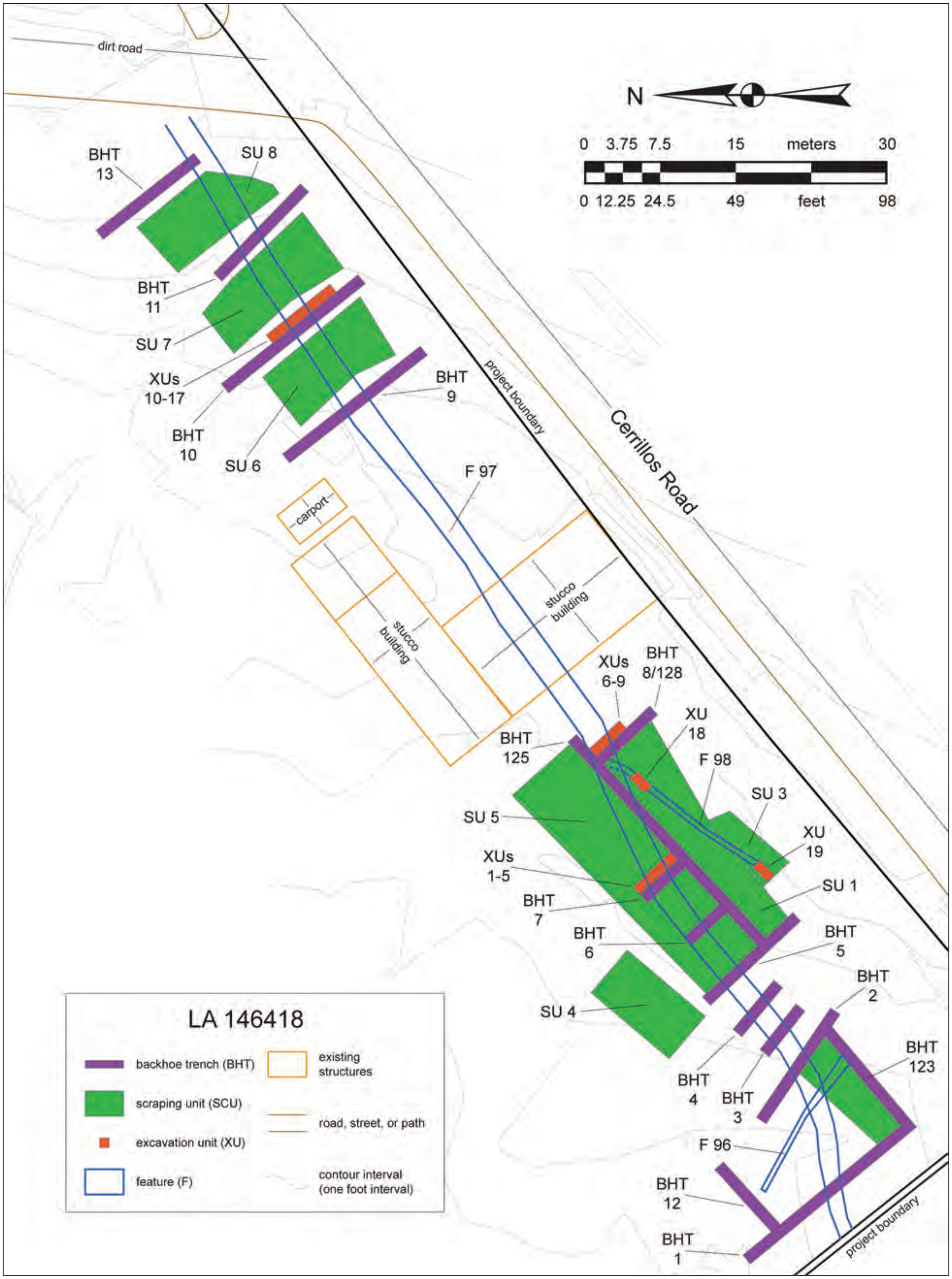


Figure 2.77. LA 146418, site map.

107) of the site's artifacts were recovered from the upper Strata 100 and 101 contexts (Table 2.68).

Feature 97, Acequia Channel

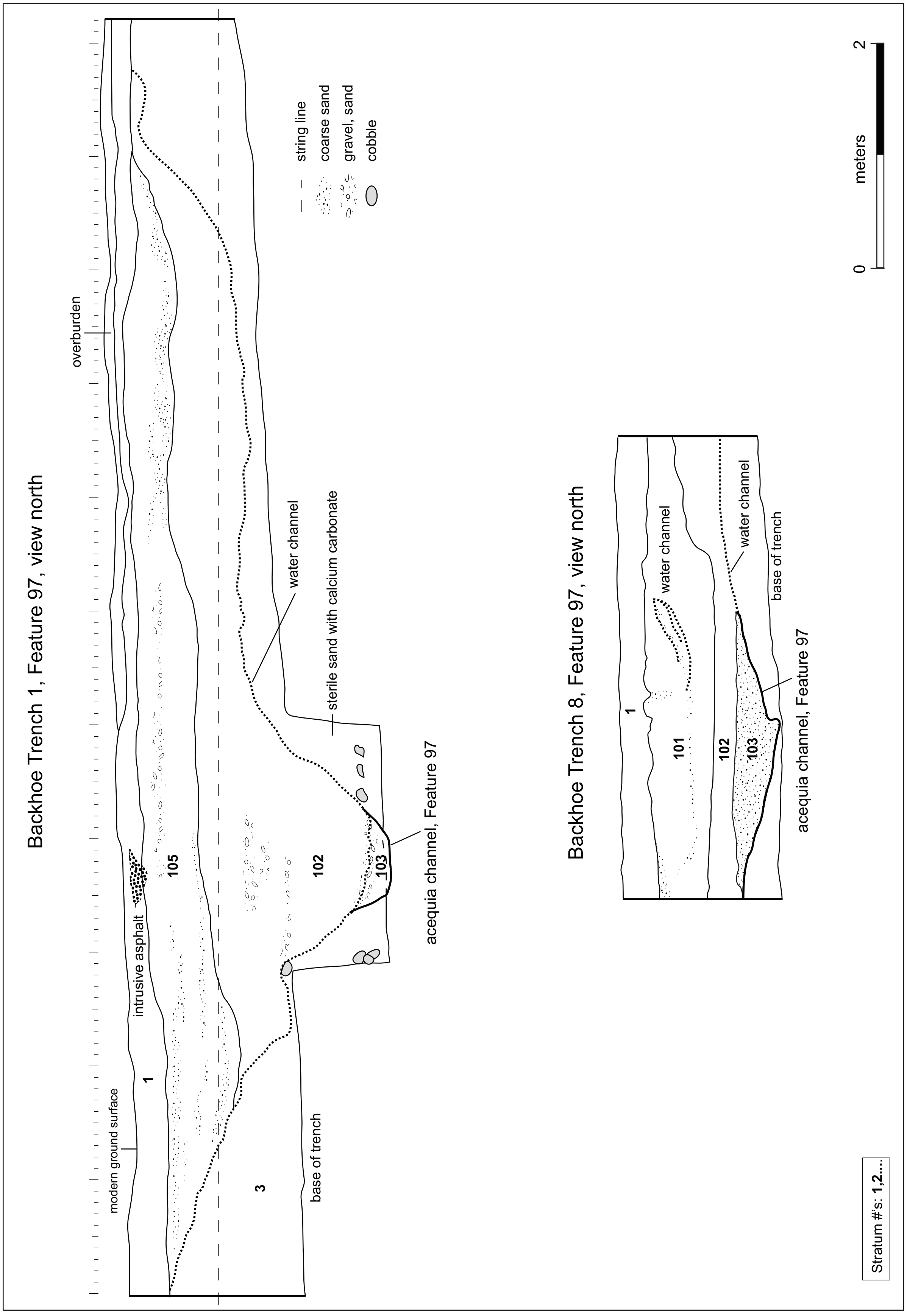
Feature 97, LA 146418, is the acequia channel, extending some 125 m across the project area. The channel is apparent as an irregular, basin-shaped, linear depression that is in places over 2 m in width and 1 m in depth. The buried acequia deposits appear to occupy the base of an even broader linear channel that reaches to 5 m in width and 85 cm to 2 m in thickness (Figs. 2.77, 2.78, 2.79, 2.80, 2.81, 2.82). The horizontal extent of Feature 97 was exposed by nine mechanically excavated SCUs (1–9) of various sizes and the cross section was exposed and recorded in 13 backhoe trenches (BHTs 1–11, 13, 125). Three rows of hand-excavated 1 by 1 m excavation units (XUs 1–17) were placed along selected backhoe trench faces to excavate the fill from within the channel for artifact recovery and sediment evaluation. Artifact recovery rates were exceptionally low (n = 129 items; Table 2.68).

The channel was excavated into the sterile Stratum 3 and 4 substrate and was filled with a variety of alluvial and colluvial (and anthropogenically introduced) sediments. Generally, the base of the channel was filled with Stratum 103, a deposit of cobbly and gravelly coarse sand that indicates a high water-velocity depositional regime. This was followed by Stratum 102, a silty loam that indicates that slower moving water, or colluvium, finally filled the channel. Finally, various post-abandonment deposits capped the channel (including Strata 1, 100, 101, and 105–108, some of which were purposefully introduced overburden). Sediment descriptions are provided below.

Feature 97 Fill. Stratum 103 was a 20 cm- to 40 cm-thick layer of brown, gravelly, and pebbly coarse sand that was confined to the base of the channel (Figs. 2.78, 2.79, 2.80). The channel surface beneath this deposit was frequently marked by irregular cavities filled with this sandy fill, suggesting that turbid, swirling erosional action had scoured and reworked the base of the original acequia channel. Artifact content was limited to a single faunal bone (probably from a cow) from one XU (Table 2.68). A sediment sample was recovered from this deposit for potential photon-stimulated luminescence dating of the initial abandonment infilling deposit provided a single-grain OSL age of 376±31 before 2007, dating the deposit to approximately AD 1631 (Berger et al. 2009:397).

Stratum 102 was a 50 cm to 1.40 m thick deposit of slightly hard brown silty loam. Stratum 102 is the capping deposit in the acequia channel and constitutes one of the primary fill units (Figs. 2.78, 2.79, 2.80). Fill contained four Tewa Polychrome Painted Undifferentiated Two Slips (n = 4; 80 percent). These sherds tentatively indicate a Late Colonial or Territorial period component though they are likely redeposited by stream transport from an unknown upstream source. This stratum consistently overlay the Stratum 103 sand and filled the broad basin of what is inferred to represent the original acequia channel. Occasionally Stratum 102 also overlay the level of the historical ground surface, which gradually sloped upward from the eastern and western margins of the buried acequia channel (Fig. 2.78). The deposit is interspersed with flat-lying, lenticular, well-sorted sand lenses ranging from 1 to 6 cm in thickness, as well as apparent colluvial material derived from the Stratum 3/4 substrata. During the accumulation of this deposit, downstream flow had apparently largely been halted in the acequia channel. Colluvial deposition from adjacent deposits lateral to the ditch, combined with occasional minor alluvial episodes (possibly from runoff naturally following the linear acequia depression) appear to have deposited this stratum. Occasional charcoal flecking was noted in the deposit, but its artifact content was sparse, including only four historic Tewa Polychrome ceramics from one XU (Table 2.68).

Post-abandonment Fill. Finally, several thick colluvial and alluvial deposits characterize the post-acequia filling of the channel's course. The buried acequia deposits described above appear to occupy the base of a broader linear channel, indicated by an irregularly basin-shaped depression that appears to bracket or contain the northwestern and southeastern margins of the actual acequia channel alignment (e.g., Figs. 2.78, 2.80). This overall broad channel may have formed during the period of the acequia's use-life, or it may have formed subsequent to the acequia's abandonment and then become infilled by the alluvial and colluvial deposits described below. These various post-abandonment sediments covering the acequia fill also commonly overlay the level of the historical ground surface,



Figures 2.78, 2.79. LA 146418, top (Fig. 2.78): BHT 1 profile, Feature 97; bottom (Fig. 2.79): LA 146148, BHT 8 profile, Feature 97.

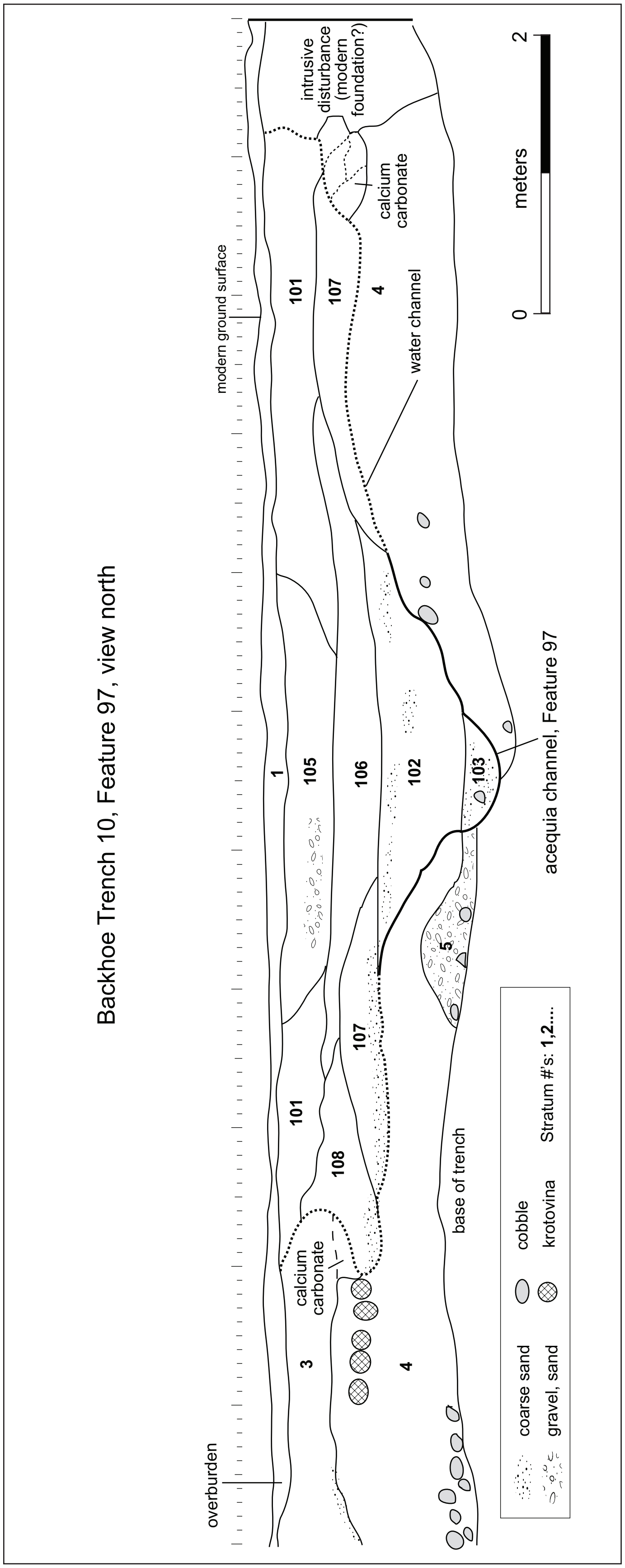


Figure 2.80. LA 146418, BHT 10 profile.

Figure 2.81. LA 146418, BHT 8/128, Feature 97, exposed in the base of the excavation to the left of the scale bar. Feature 1 is a small sand-filled channel 30 cm below the modern surface.

Figure 2.82. LA 146418, Feature 97, as excavated in BHT 10, facing northwest.

which gradually sloped upward from the southeastern and northwestern margins of the buried acequia channel. The overall thickness of these post-abandonment sediments was enhanced by a relatively thick layer of modern parking lot gravel (Stratum 1, up to 50 cm thick) spread across the site area.

Modern overburden. Stratum 105 was located below Stratum 1 in several exposures across the entire site (e.g., Figs. 2.78, 2.80). The sediment was a light brown, gravelly, sandy clay mottled throughout with laminated, flat-lying, fine sand lenses that indicate periodic episodes of minor alluviation. Stratum 105 was about 40 cm thick. The fine matrix and associated sandy laminations suggest a low-velocity flow regime, possibly forming puddles or ponds in the old channel depression. Cultural content included sparse charcoal flecking, metal, and faunal bone (Table 2.68).

Stratum 106 was a hard, dark brown, gravelly silty clay loam. The sediment appeared as a 30 cm thick layer in backhoe trenches in the northeastern end of the site (BHTs 9–13). This deposit stratigraphically underlay Strata 101 and 105 (e.g., Fig. 2.80) but was still positioned over the Feature 97 channel-fill deposits. Occasional sand laminations within the deposit are suggestive of occasional alluviation, but colluvial deposition appears to have primarily deposited this stratum. The sediment contains a few charcoal flakes, faunal bone, and decayed wood or root fragments.

Stratum 107 is unique to BHT 10 (Fig. 2.80), and is apparent in two separate exposures along the northwestern and southeastern upper margins of the acequia channel. The deposits overlay the sterile Stratum 4 substrate. This hard, brown silty clay loam contains large caliche inclusions, suggesting it is a reworked sterile Stratum 3 or 4 deposit. No artifacts or cultural inclusions were noted. Stratum 107 may be related to colluvial slump from the margin of the banks outside and above the abandoned acequia channel.

Stratum 108 is also identified only in BHT 10. The slightly hard, yellowish-brown silty loam contains no cultural inclusions. The deposit partially overlay Stratum 107, above the northwestern bank of the abandoned acequia. Stratum 108 undercut the natural sterile Stratum 3 to the northwest, and, like Stratum 107, is also apparently related to colluvial slumping of the the natural channel bank outside and above the abandoned acequia channel.

Post-Abandonment Water Channels

At LA 146418, segments of three small sand-filled channels (Features 1, 96, and 98) were observed in stratigraphically late site deposits, well above the acequia channel deposits (Feature 97, described below). These small sandy channels are interpreted as naturally formed water channels that crossed the area after the acequia was buried.

Feature 1. Feature 1, newly identified during the data-recovery phase, is a segment of a small sand-filled channel that was exposed along the northeastern edge of the row of XUs 6–9 (Figs. 2.77, 2.81). The channel was oriented along the same axis as the northeastern edge of the XUs, and so a strip of the southern half of the channel was exposed as it crossed through the northeastern-most edge of each excavation unit. Fill from the feature was sampled and screened separately in a stratigraphic excavation. The fill was defined as Stratum 104, characterized as soft, grayish brown, gravelly sand. Recovered artifacts were small and likely transported by water. They included bottle glass, nails, window glass and a Motor Oil tag (ca. 1940). The exposed segment of the small channel is 4 m long, at least 30 cm wide (probably 60 cm overall), and 20 cm deep. The top of the channel just underlay the disturbed Stratum 1 overburden. Feature 1 is interpreted as a small natural, very recent run-off channel following the general course of the natural topographic lay of the land.

Feature 96. Feature 96 is a segment of a small sand-filled channel that was originally exposed in BHTs 123 and 124 during the testing phase. At that time the feature was assigned to site LA 146416 (Wenker 2005a). A segment of the top of the feature was again exposed in SCUs 2 and 9 during the present data-recovery program (Fig. 2.77). The exposed segment was over 16 m long (its total length is unknown), and the channel displayed a width of 1 m and a thickness of 25 cm. The small channel had an irregular basin-shaped profile and was cut into the sterile Stratum 3 substrate. The fill consisted of a reddish-yellow, fine- to medium-grained sand with few charcoal flecks but no apparent artifacts. The small channel was capped by Stratum 2 coal and cinders in BHT 124. The channel crossed over the top of the buried acequia (Feature 97), and Feature 96 appears to be another small natural run-off channel following the general course of the natural topographic lay of the land. No additional excavations were conducted.

Feature 98. Feature 98 is a small sand-filled channel that was originally identified during the testing phase in BHT 8/128 and in an excavation unit (XU 45). At that time, the channel was thought to represent a late manifestation of a natural arroyo or water channel that followed the course of the underlying acequia. During data-recovery, this channel was horizontally exposed in SCUs 1 and 3 (Figs. 2.77, 2.83). The exposed channel segment is about 25 m long with a width of 60 cm and a thickness of 5 to 10 cm. The channel fill was sampled by two 1 by 2 m excavation units XUs 18 and 19. The fill, a dark brown, coarse, pebbly sand, was screened through 1/4-inch mesh. One historic micaceous ware sherd was recovered from the fill in XU 19. (During testing XU 45 had previously yielded six faunal bones from this feature).

Feature 98 is probably a small natural run-off channel. The feature follows a course that does not conform to the natural topographic slope, nor to the course of the underlying acequia (Fig. 2.77). The channel is aligned along the slope of the land rather than down the natural flow line. In XU 18 at the northeast, the base of the channel lay at an elevation above sea level of 2099.55 m. In XU 19 at the southwestern end of the exposure (roughly 16 m away), the base of the channel lay at an elevation above sea level of 2099.45 m, indicating a southwesterly flow direction with a gradient of roughly 0.6 percent. Although this channel post-dates the burial of the nearby acequia, the general correspondence in flow direction suggests that some cultural factor dictated the Feature 98 channel's operation. The correlation in flow direction with the alignment of Cerrillos Road (previously a wagon road, see Gilmer's 1846 map [Deyloff 2004:13]) may indicate that Feature 98 was a drainage feature for the roadway.

Artifact Proportions

Comparative percentages of LA 146418 Pueblo ceramics and Euroamerican artifacts (a combination of materials including metal, glass, Euroamerican ceramics, plastic and rubber) to the entire artifact assemblage were calculated per stratum using initial artifact counts from data recovery (Table 2.68). These artifact types were selected because their classifications inherently imply limited (albeit wide) date range. Derived from field specimen data, which report the full assemblage as opposed to sampled context, artifact percentages for each stratum can be compared to values from dated context. At some sites (LA 146407 and LA 146408) this exercise provided evidence that less material associated with historic-era refuse was moving downstream during earliest depositional sequences.

At LA 146418 artifact frequencies from all strata are low. Fewer than 100 artifacts were recovered from both Stratum 100 and Stratum 101, purposely introduced modern overburden. All artifacts from both strata were historic-era refuse. Basal alluvium from Feature 97, with an OSL date corresponding to approximately 1630 AD contained a single bone. One ceramic was recovered from Stratum 102 above. The only other context in which native ceramics were present was in Features 98 (n = 1), where they accounted for the total assemblage. Low artifact content when compared acequias excavated in the Railyard Park farther to the northeast is undoubtedly a result of the site locations distance from urban context until after World War II. Sampling bias is undoubtedly a factor in evaluation of these strata.

Euroamerican Artifacts
Matthew J. Barbour

A total of 150 Euroamerican artifacts were recovered from LA 146418. All were subjected to intensive analysis. Table 2.69 summarizes the distribution of Euroamerican material culture by category, type and function for each extramural stratigraphic layer and Feature 97 filling episode.

Feature 97 is a large acequia channel that possibly dates to the founding of Santa Fe. Luminescence dating of the lower alluvium suggested the material was buried roughly 400 years ago (Berger et al. 2009:392–393). No Euroamerican artifacts were recovered from this lower alluvium (Stratum 102 and 103) and as a result, it impossible to refute or reinforce the date provided through trapped charge dating.

The upper alluvium (Stratum 105) and Feature 1 (Stratum 104) contained small quantities of early to mid-twentieth century artifacts (ca. 1940). How-

Figure 2.83. LA 146418, Feature 98, in SCUs 1 and 3, facing northeast. The excavated section in XU 19 lies in the right foreground, and the channel extends to the right of the scale bars in the background.

ever, these strata rest over a meter above the dated deposits. Euroamerican artifacts identified within the more recent alluvium included wire nails (n = 7, 1850+, Nelson 1968:3), a Standard Oil Company tag (n = 1, 1936–1949), machine-manufactured bottle glass (n = 4, 1904+, Lorrain 1968:43). Based on the small quantities of artifacts and diminutive artifact size, these cultural materials were likely transported into and through the ditch system by fluvial action and do not represent purposeful infilling. Some of these artifacts, such as the oil tag, may have washed in from the nearby stockyard and loading ramp associated with the New Mexico Central Railway.

Extramural fill residing outside and above the acequia consists primarily of modern mid- to late twentieth century Euroamerican artifacts. Artifacts, such as plastic straws (n = 3, 1960+), suggest that the ditch may not have been buried by the present ground surface until sometime in the 1970s or 1980s.

Fauna

Britt M. Starkovich

The faunal assemblage from LA 146418 is extremely small, with only five analyzed specimens. The site is a man-made, unnamed acequia channel the basal deposit may date to the seventeenth century. The five faunal bones came from four different stratigraphic levels from the acequia fill: Stratum 103, a high-energy depositional level of coarse, gravelly sand at the base of the channel, Stratum 106, a post-abandonment colluvial level with occasional low-energy alluvial inclusions, Stratum 105, a post-abandonment low-energy alluvial deposit below the uppermost Stratum 1, and 101, a post-abandonment level directly below the surface, possibly associated with the recent (pre-parking lot) surface (Wenker and Hannaford 2005a, c). Stratum 105 contained two specimens and the other three levels each contained one. Attempts were made to identify specimens to the level of species, but in some cases they could only be identified to general size classes. The remains include cattle, small ungulate, and large ungulate. The latter two categories are likely sheep or goat and cattle, respectively, so all of the remains are probably from domesticated species. The sample size is so small that no patterns can be inferred.

Stratigraphic Units

Stratum 103. Stratum 103 is the basal level of the channel, probably deposited by fast-moving water. A portion of a cattle vertebra was found in this level and, based on epiphyseal fusion (from Schmid 1972 and Silver 1970, in Reitz and Wing 1999) belonged to an individual younger than nine years of age. The specimen was cut through with an implement other than a mechanical saw, so it may have been butchered in-home. The cut corresponds to the modern short loin cut (Ashbrook 1955).

Stratum 106. Stratum 106 is a post-abandonment level below Stratum 101 and 105. It is primarily a colluvial deposit, with some small areas of alluviation. One fragmented (less than 10 percent complete) large ungulate specimen was recovered. The specimen showed no signs of human, animal, or environmental alteration.

Stratum 105. Stratum 105 is a low-velocity alluvial deposit directly underlying the surface Stratum 1. The level contained two highly fragmented (less than 10 percent complete) small ungulate bones. One exhibited exfoliation from environmental exposure, and neither showed signs of human or animal alteration.

Stratum 101. Stratum 101 is directly below the disturbed overburden of Stratum 1 and similar in composition to that stratum. It contained one fragmented (less than ten percent complete) small ungulate bone that did not exhibit evidence of human, animal, or environmental alteration.

Conclusion

The sample size of 5 is so small that no conclusions can be drawn from the faunal remains of LA 146418. The only observations are that all of the specimens were likely from domestic fauna, and human processes and environmental alterations were both apparent on some of the remains.

Native Ceramics
C. Dean Wilson

The five native sherds identified from LA 146418 reflect historic types, and include Tewa Polychrome Painted Undifferentiated Two Slips (n = 4; 80%) and Polished Interior with Mica Slip (n = 1; 20%). These sherds may indicate a Late Colonial or Territorial period component. None of these sherds were modified, and all represent jars.

Archival Documentation

Lt. J. W. Gilmer's 1846–1847 Plan of Santa Fe (Deyloff 2004:13) depicts an "irrigation canal" following a northeast–southwest course along the southern end of the general Baca Street project area. A later plat of Santa Fe from 1877 (Deyloff 2004:22) again depicts an "acequia" following a northeast-to-southwest course along the southern end of the Baca Street project area. Deyloff (2004) also points out that, prior to the ca. 1900 arrival of the railroad to the Baca Street parcel, the area was primarily agricultural in nature. This use is readily apparent from the expansive fields plotted on historical maps (Deyloff 2004:13, 22) in the area northwest of present-day Cerrillos Road. The use of a gravity-fed irrigation system such as an acequia would have required that these fields be irrigated from a water supply to the southeast of the fields, precisely where this feature is located.

D. H. Snow (Chapter 7, this report) suggests that LA 146418, which aligns approximately with Alta Vista Street, may be a lateral from the Luisa Street segment of the Acequia Madre (i.e., Ditch 11 on the 1910 hydrographic report, in D. H. Snow 1988: Sheet 21) before crossing Pacheco Street (C. T. Snow, in D. H. Snow, Chapter 7, this report). The ditch apparently eventually emptied into the "los Pinos" lateral of the Acequia Madre west of the Indian School.

Summary

Feature 97 at LA 146418 contained exceptionally low counts of artifacts recovered from the channel-fill deposits, especially when compared with prior acequia excavations in the North Railyard (Wenker and Hannaford 2005b). This coupled with a seventeenth century date for basal deposits suggest an earlier waterway than originally reported by Wenker in 2005. A single faunal bone identified as that of a cow indicates post-Columbian age for the commencement of channel infilling. The dearth of other contemporary material in the channel may indicate that upstream sources of cultural detritus were extremely limited or far away in comparison to acequia sites in closer proximity to Santa Fe's historic barrios. Low artifact frequencies could reflect cultural practices that prevented refuse from being introduced to the acequia channel, or both factors may have been in effect. The feature identified as the acequia channel was contained within the base of an overall broad channel that was cut into the sterile Strata 3 and 4. The origin of this broad channel, and its functional and temporal relation to the basal deposits that define the acequia, are unclear. The overall broad channel may have been narrower during the period of the acequia's use-life, and post-abandonment erosion may have then widened the overall swale. This process would have also provided the source for some of the presumed colluvial and minor alluvial fill that overlay and capped the basal acequia deposits.

That the acequia channel is the result of cultural action rather than natural stream flow is borne out by its alignment along the natural topographic slope of the land, rather than down the direction of natural stream flow (Fig. 2.77). The base of the channel at the northeastern most identifiable exposure (in BHT 11) lies at an elevation above sea level of 2099.73 m. At the southwestern end, in BHT 1 (roughly 113 m away), the base of the channel lies at 2097.00 m, indicating a southwesterly flow direction with a gradient of roughly 2.4 percent. This flow line strongly diverges from the natural topographic slope of the local modern land surface, which is oriented to the northwest at a gradient of roughly 2.6 percent (Fig. 2.77). If the channel was a natural waterway, one possible explanatory hypothesis for this southwesterly flow direction is that the modern topography does not reflect the historic topography. However, no indications of such substantial or wide-scale historic or recent modification of the topography were noted during testing in the Baca Street parcel (Wenker 2005a), indicating that the present topography fairly represents that which would have been present historically.

The data recovery program revealed that the fairly lengthy segment of this ditch crossing through the Baca Street parcel contained no diversion features or lateral channels. However, segments of three smaller sand-filled channels (Features 1, 96, and 98) were positioned higher in the fill and are interpreted as naturally formed water channels crossing the site area. Artifact content from the various deposits was very low and provide little interpretive information about the acequia's use-life. The ditch's specific external relationships to other ditches, laterals, or fields are unknown. The data recovery program has recovered substantial morphologic and stratigraphic data, but only a meager artifactual assemblage, from the site.

Recommendations

LA 146418 recommendations remain unchanged from those offered and accepted by ARC and the CPRC during initial data recovery reporting. The site area is not likely to yield additional important information beyond that already recovered. No further archaeological investigations are recommended for the site as part of the data-recovery program.

SYNTHESIS: Acequia Sites in the Santa Fe Railyard Project Area

Jessica A. Badner

Introduction

Santa Fe's irrigation system is arguably one of the oldest in New Mexico. Established in1610 when colonists relocated from San Gabriel it is predated only by a system installed by Oñate in 1598 and native American water diversion documented in various scouting forays by the Spanish before colonization began in earnest. The following discussion relies on a review of *The Historic Significance of and Management Recommendations for Preservation of Acequia Systems,* by Neal W. Ackerly; *Irrigation in the Rio Grande Valley, New Mexico: A Study of the Development of Irri-*

gation Systems Before 1945, by Frank E Wozniak; *Iberian Origins of New Mexico's Community Acequias,* by Jose A. Rivera and Thomas F. Glick; and *A Trickle Runs Through It: An Environmental History of the Santa Fe River, New Mexico,* by Tara Plewa. For more comprehensive discussion of acequias in New Mexico and the Santa Fe River's history and hydrology the reader is referred to these exhaustive and excellent sources.

Background

There is substantial evidence for pre-contact crop irrigation in New Mexico. In his account of the 1583 Espejo expedition, Luxán reported "irrigated cornfields with canals and dams, as if built by Spaniards" and near Hawikuh, cornfields irrigated with two canals that stemmed from a marsh. Seven years later Sosa reported irrigation at six Tewa pueblos along the Rio Grande as far north as San Juan Pueblo (Ackerly 1996:6), now Ohkay Owingeh, which Oñate occupied in 1598 with plans to build a town to be named San Francisco de los Españoles. Though plans for the new town were abandoned, one of his first acts was to marshal 1500 Pueblo laborers from the area to begin construction of a large irrigation canal (Rivera and Glick 2002:3, Hammond and Rey 1953:322–323 in Wozniak1987:17). Wozniak speculates that Sosa's favorable report, and the potential for irrigation agriculture (possibly made easier by a population familiar with water diversion) influenced Oñate's decision to march straight for the Tewa region and to establish the first Spanish settlement at the confluence of the Rio Grande and Rio Chama (Wozniak 1987:17).

For the Spanish, acequia systems were core infrastructure, built before almost anything else. Technology used to build the systems was a transmission and modification of knowledge from oldest of world cores to the farthest imaginable periphery. Acequia construction in New Mexico was derived from Islamic tradition and transplanted from Spain to the New World, then likely melded with irrigation or construction techniques used at many of the surrounding Pueblos (Rivera and Glick 2002; Simmons 1972). The typical irrigation system based on historical accounts as summarized by Wozniak (1987:85), Ackerly (1996:16), D. H. Snow (1988), and Rivera and Glick (2002:5) was constituted of one or two main ditches or acequia madres diverted from a natural stream. These main watercourses then ran parallel to the river at near the highest elevation of arable land, enclosing it and eventually returning to the stretch of river at the community's base. The acequia madres brought water to a series of smaller contra ditches that conveyed water to a field system within a land grant. A network of laterals (*sangrias*) then irrigated individual fields.

Construction of new systems was mandated by the governor and use influenced by Iberian law which was in part derived from Islamic codices, designating the ditch and the water it carried as common property, to be used and maintained by all adjacent land owners who contributed labor to the system. Users established rules for equitable water distribution that included restricting amounts taken by upstream irrigation and apportionment by time or other allotments. Medieval Spanish ordinances codified in Valencia in 1435 establishing a water boss, or *acequiero,* and defined his rights and responsibilities. These duties were similar to those of the mayordomo in New Mexico today (Rivera and Glick 2002:8). Though initially unregulated "customary law" that guided administration of community acequias eventually developed "in maturity and sophistication" and the acequia eventually enjoyed the status of *persona jurdíca* and the "full protection of Hispanic law" (Rivera and Glick 2002:8–9). Procedures derived from these regulations were retained by the Kearney Code of 1846 (30th Congress, 1st session, 1848, in Wozniak 1987:89). Subsequent Territorial legislation (1874) recognized the importance and solidified legal rites of acequia systems as "quasi-political entities with rights to eminent domain" (Ackerly 1996:26). By 1895 acequia communities had become corporate entities (Plewa 2009:248)

Acequia system construction in the New World empire maintained its importance throughout the Spanish tenure. System construction took place in areas under Spanish political, religious, and military control at a rate estimated by Ackerly of about 2.3 canals per year between the first Spanish colony and the Pueblo Revolt in 1680. By 1700 approximately 62 acequia systems were likely functioning in New Mexico. Between 1700 and 1800 the average construction rate was a little more than one system per year. This expansion maps the extension (and periodic contraction) of Spanish control over its northern border (Ackerly 1996:9), though native farmers had used water diversion to supplement local crops, old world species and farming techniques were dependent upon supplemental water.

Acequias were the linchpin that secured agricultural subsistence in the Spanish Colonial northern borderlands. The need for accessible water to cultivate bottomland was a primary concern in grants of land by the Spanish government and a requirement of inspection by the Acalde Mayor before a land grant was finalized. Because the emphasis of Spanish Colonial policy was not economic prosperity, but successful colonization and the defense of New Spain small subsistence farms created by this system were not expected to and never did produce significant agricultural surplus, (Wozniak 1987:23–25). Even if they had, opportunity to sell their yield to anyone but the local community may have been limited or difficult due to lack of transportation infrastructure. During his inspection of the newly acquired U.S. Territory in 1854 General George McCall identified the lack of transportation facilities as main factor limiting agricultural expansion and contributing to the lack of surplus production. His sentiments echoed Pedro Bautista Pino's observations made in 1812 and those of Fray Juan Augustine Morfi's assessment made 90 years earlier.

Despite being one of the earliest acequia systems constructed in New Mexico, Santa Fe's is clearly not the largest in terms of acreage watered. General McCall's inspection of Territory of New Mexico in 1852 indicates that approximately 5,000 acres were cultivated along the Santa Fe River. This in comparison to the 20,000 acres farmed around Las Vegas (Frazer 1968:95 in Ackerly 1996). Furthermore Santa Fe's system has a long history of cyclical water scarcity. The needs of the population surpassed the river's carrying capacity early on. This is corroborated by modern tree ring studies and environmental assessment and is referred to repeatedly in various surviving documents. In 1666, drought caused a food shortage, and supplies had to be imported into Santa Fe (Scholes 1942 in Plewa 2009:127). In 1696, following the Pueblo Revolt, Governor de Vargas gave permission for settlement of the Santa Cruz land grant because water for irrigation was insufficient to support Santa Fe's growing population (Rivera and Glick 2002:4) In 1716, Capitan Siego Arias de Quiros petitioned to use cienega water for irrigation because "the scarcity of the water that comes from the river is known" (SANM I 169, Reel 8, Frame 151 in Plewa 2009:134) Fray Francisco Atanasio Dominguez, assigned to access New Mexico's missions in 1776 commented:

> it [the Santa Fe River] is usually insufficient in the best season for irrigating the farms, because there are many of them [acequias] it does not reach the lowest ones, for the first being higher up, keep bleeding it off with irrigation ditches and only in a rainy year is there enough for all. (Ackerly 1996:10)

Plewa's "Predicted River Carrying Capacity for Irrigated Agriculture," in which she uses estimated stream flow over a 368-year time span, calculated from tree ring data from Arroyo Hondo (Rose, Dean, and Robinson 1981 in Plewa 2009) to estimate potential for irrigated field acreage, illustrates the problem of cultivation in the Santa Fe River shed. The model estimates annual yearly predicted flow (as opposed to events measured only during the growing season) and has limitations based on tree ring data sensitivity (Plewa 2009:121–124). Though it does not measure contributions from springs a constant has been added to account for contribution from the cienega. Flood events caused by seasonal thunderstorms are not accounted for. The model assumes all water is used year round and only for irrigation. The swings calculated in predicted river flow and resultant carrying capacity are correlated with El Niño events. For any given time period they track a 500-1,000 acre difference in carrying capacity of the Santa Fe River drainage in the space of less than 5 years. River flow in driest years supported only 750 acres (two standard deviations below the mean) while wettest years (two standard above the mean) estimate 2800 acres of irrigable land. A quick look at Z–scores of annual River Flow values (Plewa 2009:126, Figure 5.K) and predicted river carrying capacity (Plewa 2009:134, Figure 5.O) for the period between 1790 and 1912 indicate nine very dry years two standard deviations below the mean. These years are grouped in two intervals of widely varying carrying capacity from about 1816 to 1848 and again from 1880 to 1912, with a more constant period from about 1856 to 1884. During the worst year, 1904, the estimated carrying capacity of the water shed was reduced to 557 acres but other particularly bad years preceding that drought (as extrapolated from Plewa's graph) included 1816 with a 780 acres capacity, 1833 at 696 acres and about 1849 at 863 acres. These intervals experienced associated wet periods (all one standard deviation above the mean) with years in which carrying capacity grew to over 2,100 acres (1866, 2590 acres; 1842, 506 acres, and ironically, 1848, 2,952 acres, potentially indicating a more than doubling of the water sheds capacity in one year). In addition to these swings, flooding in the river is well documented (D. H. Snow, Chapter 7, this report; Plewa 2009). Farmers would have had to come up with strategies to deal with a fickle water supply and residents may have had to either store or import food.

Decline of the acequia system began slowly with the opening of the Santa Fe Trail and the resulting increase in Santa Fe's population. The impact was less tied to events in the city's barrios, than to the effect of population increase the watershed's upper reach. Timber cutting, beaver trapping, tens of thousands of grazing goats in the 1830s, and fires caused by recreation removed understory and decimated beaver dams leaving no barriers to sediment as it eroded from the hillsides during thunderstorms. The result was flash flooding with silt-laden waters that increasingly damaged downstream infrastructure. In 1874 a destructive flash flood carrying debris from the upper reach swept through Santa Fe, ripping out fencing and uprooting fields (Plewa 2009:228–229).

In 1870 Santa Fe's County Commission gave Santa Fe Water and Improvement Company the right to build dams, impound and distribute water and create electricity. In 1880 the first dam was built, but was small enough that once it filled acequias were supplied with water. By about 1890 Santa Fe residents who could afford the upfront costs of a hook up began to enjoy running water and demand increased with population growth Two Mile Reservoir, the dam had immediate effects on river flow disrupting water flow in the acequias. (Plewa 2009:245–250). By 1914 the citizens of Santa Fe petitioned the state engineer for adjudication in hopes that the Public Service Company of New Mexico would be forced to recognize their water rights and release impounded water. The resulting survey conducted by the state engineer indicated irrigation of 1,200 acres. A court battle ensued and impoundment continued to restrict water available to downstream users. By the end of WWII many fields were dry and lay fallow. In 1930 approximately 800 acres were irrigated, by 1950 the area had decreased to about 650 acres (Plewa 2009:251).

Seven acequias were excavated within the project boundaries of the Santa Fe Railyard. Archaeological excavation and associated research conducted at theses sites was undertaken to address questions posed in *Research Domain 1: The Spanish Colonial- to Late Territorial-Period Acequia and Field System at the Santa Fe Railyard* (Wenker et al. 2005:92–105). Questions of chronology, sequence, and function and structure are addressed after a brief overview of acequias excavated in the project area.

Acequias Overview

Acequias excavated at the Santa Fe Railyard have been described by D. H. Snow as laterals of the Acequia Madre. The courses of many of these arteries traced paths that parallel what are now many of Santa Fe's modern roads. Snow provides a detailed discussion of the individual ditch pedigrees based on archival research (Chapter 7, this report). Table 2.70 summarizes the acequias' excavated dimensions, and results of artifact analysis from fill. They are summarized below from north to south and mapped in Figure 2.1b.

Acequias LA 146407 and LA 146408, located in the northern project area, were vertically superimposed and then branched. Their routes likely correspond to archival documented courses of the Acequia de Diego Romero and the Manhattan Street Ditch, respectively (D. H. Snow, Chapter 7, this report). At LA 146407, complete lack of Euroamerican artifact content in basal fill as compared to assemblages recovered from similar context at other acequia sites (Table 2.70) suggests a pre railroad date, possibly as early as the mid-eighteenth century. Superimposition of the Urrutia map rectified by Tara Plewa to the modern Santa Fe watershed and shifted to match the corner of La Castrense, which was both mapped by Urrutia and still visible from the air in the form of surviving property lines (Badner n.d.), provides tantalizing, though potentially misleading, evidence that Acequia de Diego Romero may have much older antecedents. A wooden culvert installed beneath the AT&SF railroad tracks to carry the superimposed Manhattan Street Ditch waters indicates that Acequia de Diego Romero was likely abandoned and filled by 1880. Waters diverted from the Manhattan Street Ditch continued to carry water for fields west of the AT&SF tracks into the twentieth century.

Ditch laterals excavated at LA 146402, were not given separate site numbers, they are comparatively smaller than acequias discussed in this section and likely functioned as sangrias, watering nearby fields and simultaneously delineating site boundaries. At the project area's western boundary, the excavated section of the Manhattan Street Ditch appears to have transitioned to provide a similar function.

LA 149909 and LA 146410 are likely the archivally documented Acequia de los Pinos (aka Acequia Madre) or a nearby lateral of that ditch (D. H. Snow, Chapter 7, this report), the course of which ran down, or potentially paralleled what is now Paseo de Peralta. At LA 149909 artifact content recovered from basal deposits indicated the Territorial-era artifacts were not included in lowest alluvium, suggesting a late eighteenth-century construction date. Evidence for this early date in the acequias western section (LA 146410) has been obliterated by numerous early twentieth-century modifications including copious amounts of bottle glass.

Evidence of the acequias truncation by AT&SF railroad tracks is interesting in light of 1874 Territorial statute "recognizing acequias as quasi-political entities that could assert rites of eminent domain" (I. Clark 1987:26–27, in Ackerly 1998:26). State Statute codified by 1884 specifically required railroads and telegraphs to restore right of ways to

> such stream, watercourses, streets, avenues, highways, railways, canals, ditches and flumes, so intersected to their former state as near as may be, so as not to unnecessarily impair their use or injure their franchises.—New Mexico Statute Section 1206-6665 C.L 1884, Title XXXIX chapter IV—Railroads

If the acequia's flow was interrupted before the law was enacted it may demonstrate the necessity of clarification when a corporate entity was involved.

Intact deposits of upper acequia fill indicate abandonment by 1880-1900 as indicated by bottle glass. Recovery of corn pollen in association with Territorial-era refuse supports archival documentation of the area's upstream agricultural use until railyard development.

LA 149912 Arroyo de los Tenorios is likely the same watercourse as Arroyo en Medio and Arroyo de las Cruces (*see* LA 149912 summary). Excavation of this channel provides an interesting example of natural diversion for "beneficial use." The 15 m wide arroyo provided the bed for a meandering watercourse approximately 4 m wide. The constructed channel was redirected and its flow restricted to similar dimensions. Both upper fill and lower alluvium contained artifacts consistent with residential refuse from upstream context postdating 1821. Abandonment fill exhibits an increase in items that are potentially industrial. Based on Euroamerican ceramic analysis, the assemblage may date to ca. 1885. This corroborates the assertion based on archival evidence that the acequia's course was diverted by the railway to the current course of the Acequia Madre sometime between 1880 and 1892.

LA 120957, Acequia Madre de Santa Fe, is one of Santa Fe's last operable and oldest irrigation ditches, designated Ditch 11 in the 1914 Santa Fe Hydrology Study, with a priority date from "time immemorial and prior to 1680," established by the state engineer (D. H. Snow 1988:35) and is nominated to the *National Register of Historic Places* (Historic Santa Fe Foundation 1892:56, in D. H. Snow 1988:36).

Not surprisingly this ditch is one of the widest and deepest. It is also one of the best maintained, and is, as a consequence, extensively reworked. This constant maintenance, which ultimately included restriction of the channel and grade change from 1.2 to 1.5, resulted in an assemblage of Statehood-era residential trash, without earlier contributors. The assemblage from lowest alluvium dated from the late nineteenth to early twentieth centuries and ironically provided relative frequencies of Pueblo ceramics to Euroamerican artifacts most commonly associated with modern overburden in other context. The late artifact assemblage could also reflect a population boom in the newly constructed neighborhoods through which the acequia ran as Santa Fe grew. In addition to archival sources, archaeological evidence of earlier use is provided by an abandoned lateral with an OSL date of 1830±30 years.

The section of LA 146418 excavated within the Baca Street project area was located approximately a mile downstream of the named acequias previously discussed above and is of the best preserved and potentially, oldest intact watercourses encountered within the project area. Unlike acequias excavated in the Railyard Park, which may have been used for periodic irrigation or at least to carry storm runoff until the second World War, this unnamed acequia was abandoned and capped by 1940. No artifacts were recovered from the lowest channel the assemblage from upper alluvium contained late Spanish Colonial and Territorial-era ceramics. An OSL sample from basal deposits context dated to approximately 1630 (Berger et al. 2009). If accurate, this uncorroborated date provides tentative evidence of irrigation predating the Pueblo Revolt.

Chronology and Sequence

Questions of chronology and sequence are persistent bugaboos in the documentary shell game Santa Fe acequia system presents to archaeologists and historians. D. H. Snow (Chapter 7, this report) enumerates difficulties encountered during research as; lack of readily identifiable property boundaries and other features, inability to identify many of the former land owners, spotty deed recording, and lack of reliable lot size measurements. On a system wide level, many acequias mentioned in Spanish Colonial documents lacked a formal name. Furthermore common names used during the Territorial period were not used in the 1914 state engineer's hydrology report, and are often lost to the vagary of time, multiple appellations and subsequent ditch realignments.

Based on dating of disparate acequia segments, excavation has provided evidence for continuous use of the west side Santa Fe acequia system within the project area. Earliest potential use is provided by an OSL sample taken from an unnamed ditch (LA 146418) that dates sediments to before the Pueblo Revolt in 1680. Ceramics from upper alluvium indicates the ditch was infilling no earlier than the late Spanish Colonial or U.S. Territorial-era approximately 1860. Whether the given segment was continuously or periodically in use during this estimated 200 year time span is unknown. Further to the north, a lack of historic artifact content and high incidence of pueblo ceramics in lowest alluvium of Acequia de Diego Romero (LA 146407) hints at Spanish Colonial-era use, but lack of Euroamerican residential trash washed from upstream, is at best, a negative proof of more recent stream flow. Evidence for simultaneous or later use is suggested by an OSL sample obtained from an abandoned lateral of the Acequia Madre main channel that dated to approximately 1831. Arroyo de los Tenorios (LA 149912) exhibits evidence of Mexican-era and later stream flow in the form of residential refuse from upstream context, dating to approximately 1821 and abandonment by approximately 1885. So does Acequia de los Pinos, with Euroamerican artifact content from lowest channel deposits with an artifacts dating ca. 1850, and possibly before, interspersed with more modern refuse. Of course, any of the dates derived from artifacts are from secondary context and are dependent on erosion from upstream potentially dating contributions from early middens. Interestingly, early artifact content may be a better predictor of an acequia's early abandonment and relative protection than of its continuous use.

Though dates derived from artifact assemblages are probably insufficient to determine specifically when the acequias were used in relationship to each other, a combination of artifact analysis, relative dating and archival research suggests that the unnamed arroyo near Baca Street (LA 146418), Arroyo de Diego Romero (LA 146407), and Acequia Madre vie for contention as some of Santa Fe's earliest watercourses and that the rest of them exhibit staggered contemporaneity. The Manhattan Street Ditch excavation (LA 146408) potentially demonstrates decline of a major ditch's water load and conversion into a sangria as fewer users used the ditch in the twentieth century. But abandonment of some ditch segments is evident early on. The unnamed acequia (LA 146418) was abandoned, probably by the late eighteenth or early nineteenth century and completely infilled and possibly forgotten by 1930. An acequia madre lateral was abandoned by 1880, possibly before.

Over all, excavations document the tendency for abandoned ditch segments to be left open. Although there is some evidence of relatively rapid infill at (LA 120957 geomorphic evidence indicates a 50-year time span) this time frame is dependent on multiple factors and cannot be used as a proxy for other watercourses. Archaeological evidence provides good indication that the south side acequia system was at least partially active from late eighteenth century until at least 1930, but construction and maintenance of specific acequias was a dynamic process. Infill sequences indicate abandonment of some older Acequia Madre laterals, and possibly construction of new ones. In short, a dynamic system, responsive to fickle seasonal rainfall and cyclical flooding in the Santa Fe River basin.

Acequia segments and the cultivated field at LA 146402 are probably contemporaneous. The question is, to what era. Archival documentation compiled by D. H. Snow (Chapter 7, this report) indicates the area was cultivated from the early seventeenth through the twentieth centuries. Corn pollen recovered from a stratum containing Territorial-era artifacts at LA 149912 indicates that crops were raised in the near vicinity. A postcard shows cultivation ca. 1930 (Fig. 7.13). Though the filed segment was not dated, a hoe recovered from an adjacent midden suggests that a nearby field was cultivated in the mid eighteenth century and it is reasonable to suppose, given braided sangrias excavated at LA 146402 that water was delivered from an acequia madre lateral, possibly Acequia de los Pinos.

Evidence of organic system growth or re-alignment that predates the railroad is limited. Arroyo de los Tenorios, was a natural arroyo modified to divert water. Whether this is evidence of system "growth" in the sense of a permanent modification created to serve more users in perpetuity or the realignment of an arroyo to capture surplus waters in periodic wet years is unknown. The most consistent archaeological evidence of modification and realignment to the acequia system is provided by modifications presumably undertaken by AT&SF and the NMC to preserve the channels' flow. Modifications to acequias to accommodate various railroad tracks and berms are documented at many of the railyard acequia sites. Acequia Madre's 16 m wide channel was narrowed to accommodate the NMC main track. Subsequent modifications have included culvert installation and channel constriction. The course of the Manhattan Street Ditch (LA146408) was superimposed over the presumably abandoned Acequia de Diego Romero (LA 146407) and a wooden culvert was installed in an earlier watercourse to convey waters beneath the tracks by the NMC in 1900. Earlier modifications appear to include planking, possibly to guide the acequias flow (LA 146408). Arroyo de los Tenorios (LA 149912) may have been truncated by AT&SF track construction though archival evidence seems to indicate that the watercourse was diverted between 1880 and 1882.

Changes in land tenure in the neighborhood as part of a response to a changing core, as defined by Wallenstein appear to have been gradual. An archival evaluation of sixteen land tracts conducted by Hordes and Payne (1991) and reevaluated by D. H. Snow in this volume indicate that (regardless of accuracy of early grants) eight or nine of the tracts in the project area were owned by local families who sometimes sold land to relatives until 1868 at the earliest. Six of the 14 tracts were sold to Anglos three to owners with Spanish surnames, presumably as investment property before being acquired by the AT&SF in 1879–1880.

The research design anticipated excavation of a series of brush diversion structures potentially giving rise to traceable lot boundaries; this has not been the case. Although two diversions were identified there were not enough encountered to track regular intervals along the excavated acequias. Contribution of artifact content by households in the surrounding barrios is not sufficiently different to conclude that residents along any one watercourse were more or less prosperous. The transformation from Mexican to U.S. Territory didn't, in itself, appear to have an immediate effect on land tenure on the southern acequia system. Although land within the system undoubtedly changed hands, possibly as part of a flawed adjudication process, the use to which it was put, namely agriculture seems to have changed slowly, regardless of who owned it. In an arid climate the water right was still essential. The coming of the railroad, enabled by New Mexico's new status as a U.S. territory, ushered in a new era of industrial infrastructure and investment installed into the already existing neighborhood.

Function and Structure

The dynamic nature of acequias complicates any statements about their original morphology or final iterations difficult to assess. Was a ditch originally constructed to be a major waterway or did the channel widen and deepen over time? Can stratigraphy, demonstrate this subtractive process? Conversely was a wide, deep ditch constructed as such, or is its dimension the product of maintenance? What is the "actual size" of a ditch and how do we distinguish maintenance intent? Prior to excavations at the railyard few acequias in the "south side" system as defined by D. H. Snow had been subject to archaeological investigation. Previously recorded acequia sections, mostly documented during pedestrian survey are summarized in Table 2.71. During the railyard testing phase, LA 146407, LA 146408, LA 146410 (and by extension LA 149909), and 146418 were distinguished by their size and depth some of the main supply ditches that ran through the Barrio de Guadalupe, and as such, they are potentially comparable. From earlier descriptions it is clear that ditch stratigraphy and morphology is among the most salient and complex of the exposed channels. This holds true for almost any sample point along a given channel's length. Table 2.70 summarizes each channel's width, depth, and maximum dimensions.

LA 146407 (Acequia de Diego Romero) profiles show a shallow channel, 2 to 8 m wide and less than 1 m in depth with sloping sidewalls with variable strata indicative of channel braiding. LA 146408 was then excavated into this wider channel. Its profiles show a constrained watercourse, more uniform in width (1.5–2 m) and depth (.5) into which wooden culverts were built. Towards the west edge of the railyard the channel veers to the north leaving the bed of LA 146407 and is cut into natural substrate. From this point on the watercourse narrows to .5–1m wide and the cut bank becomes steep and well defined exhibiting simple stratigraphy as the smaller channel is clearly functions as a sangria. This sangria is comparable in size, though more formal in structure, to Features A, B, and C braided watercourses that watered adjacent fields.

LA 146410 and LA 149909 (Acequia de los Pinos) are separate stretches of what historically, was likely one waterway. Profiles of LA 149909 show a somewhat well-defined channel, generally measuring from 2.10 to 3.34 m in width at its base and .65 to 1.1 m in depth with a stepped cut bank. LA 146410 was apparently an arroyo modified as an acequia and constricted to form a channel approximately 1.5 m wide and approximately .40–.60 m deep within the original 5 m wide channel. Its banks were sloping and its fill was modern refuse. But the section also exhibits a rock pile that was likely a rock and brush diversion feature shunting waters to the northwest. The features predominance of modern trash suggests that it was constructed in the last half of the twentieth century and attests to the long term use of this simple diversion strategy.

LA 149912 (Arroyo de los Tenorios) was also altered in a similar manner, when the arroyo veered away from the objective of acequia construction it was banked, and the next segment of the ditch was excavated in the desired direction exhibiting a narrower, well defined and less meandering waterway. LA 149418 an unnamed acequia, and possibly the oldest intact watercourse, was a basin shaped, approximately 2 m wide 1 m deep and excavated into a broader channel up to 5 m in width.

Nesting of smaller watercourses into a larger preexisting channel is seen repeatedly, though not predictably, in the south side acequia system. This tendency seems to be both the result of the builders taking advantage of pre-existing landscape features and of repeated ditch realignment, maintenance and possibly, in the ditches later use life, the effects of storm runoff. LA 120957,the course of the Acequia Madre best exemplifies this pattern. The ditch had a maximum width of 16 m, infilled both naturally and culturally, resulting in a narrower ditch with a steeper gradient.

Both incidences of water diversion to smaller channels are modern but implemented with simple Colonial or pre-Colonial technology well into the twentieth century. Any changes in land tenure signaled by changes in irrigation practice are exhibited by system-wide changes rather on the scale of any one watercourse. Acequias that served the neighborhood during the railyard-era exhibit modifications that allow them to interact with the area's growing infrastructure, but clear signs of immediate abandonment caused by industrialization (except perhaps the possible truncation of Acequia de los Pinos by a railroad berm/or cut) are not evident. Rather, declining use in the 1900s seems to be marked by slow attrition as other contributing factors such as Santa Fe's well-documented drought cycle, upstream impoundment for a municipal water system, and changing economy and commerce (enabled by the railroad) impacted the feasibility and desirability of farming on the south side. Evidence of this change can be seen by the realignment of Acequia de Diego Romero (LA 146407), abandonment or realignment of Arroyo de los Tenorios (LA 149912), and the presence of a possible basin at LA 146402, which may provide evidence of water impoundment as a reaction to system degradation experienced in the 1900s. The use of water boxes well into the twentieth century indicates that after railroad construction, water was still available to a few downstream users.

In addition to evaluation by archaeologists, sediments from several acequia exposures were evaluated by Dr. Stephen Hall (Red Rock Geological Enterprises). Unfortunately, particle-size analysis employed to evaluate channel flow characteristics did not provide information that greatly illuminated the particulars of acequia irrigation within the project area (Hall, Appendixes 1.1a and 1.1b, this report). Hall found that railyard acequias were generally dish-shaped with gently sloping sides suggesting slow water flow. Channel fill was weakly bedded. Poor sorting and gravely texture of the acequia channel fills indicated that water moved slowly and was generally low volume. Infill sediments were predominantly fine textured indicating that they derived from slope wash. Geological information on trash bearing sediments did not help define the origin or history of the deposits.

Hall also calculated streamflow volume using the Manning equation, which calculates stream discharge by time using ditch volume derived from profile drawings and exact slope grade (Hall, Appendixes 1.1a and 1.1b, this report; Table App1a.1) Slope grade was calculated for LA 146412 Acequia de los Tenorios and flow for the other watercourses is calculated in proxy using the slope of the current Acequia Madre for the other ditch segments. Though this approach does not provide actual units of water used for irrigation from any one particular acequia, it does provide maximum amount of water each acequia segment could hold. Hall refers to this unit as "potential discharge" which in light of Hall's findings regarding sedimentation and archival sources documenting periodic water scarcity for irrigation in Santa Fe (Hall, Appendixes 1.1a and 1.1b, this report; Table App1a.1), could be also looked at as "planned for" or "hoped for" discharge.

Several factors make estimations of the south side system's irrigation potential problematic. The first factor is use of a slope proxy to calculate acequia's discharge rates. The second is "potential discharge" which assumes the acequia to be completely full and does not take into account sedimentation or hydrological control gained by widening or constricting a channel's flow. The third factor is actual hours of irrigation. For instance, Hall observes that Acequia de los Tenorios (LA 146412, Feature 1007) widened as it moved away from its diversion point at the arroyo. He speculates that this widened segment would have helped to slow water velocity for further diversion. The calculated value for the Arroyo de los Tenorios discharge rate of 13.6 cubic m/sec, exceeding that of the Santa Fe River flow. However, the maximum discharge of the narrowest excavated segment is 1.17 cubic m/sec or approximately 3.42 acre ft per hour. At this rate, assuming constant flow the volume of water would exceed the mean annual discharge of the Santa Fe River between 1914 and 1951 (Spiegel and Baldwin 1963:Table 21) in 82 days. At an application rate of 4.5 acre feat per irrigated acre estimated by the state engineer (Plewa 2009:133) and assuming maximum flow and lack of sangrias, the acequia could irrigate a one-acre plot in about 1.3 hours. Similar values are calculated for Acequia de los Pinos which becomes more constricted downstream, possibly indicating that water was drawn off the ditch in the western ditch segment (though possible modification at LA146410 could complicate this assessment).

A linear regression presented by Hall (Fig. App1b.2) shows the positive relationship between channel area and calculated discharge but also indicates clustered channel area and discharge rates common to both Acequia de los Tenorios and Acequia de los Pinos (LA 149909 and LA 146410). The median discharge rate for all reported watercourses is 2.86 cubic m/sec, and the linear regression reflects this value. Six of the reported ditch segments had estimated maximum discharge rate of from 2.8 to 3.8 cubic m/sec and represented segment of all of the measured watercourses except for sangrias. All values for the unnamed acequia cluster in this group suggesting that acequias built to handle this maximum flow were standard, and possibly modified in order to further control various aspects of hydrology necessary for irrigation as values calculated for laterals off the Manhattan Street Ditch (.40 cubic m/sec) and Acequia Madre (.16 cubic m/sec) suggest. Irrigation of a one-acre field from these laterals is calculated at from about four to nine hours.

Estimates of irrigation potential for the area may be gleaned from records of the state engineer which reports irrigated crops under irrigation as percentages of a blocks calculated acreage (Table 7.1). The state engineer measured "the area of average section" of ditch 11 as 4.4 sq ft (.12 cubic m) with a slope of .009 ft/ft (.0027) and a capacity of 17 cfs (converted to .50 cubic m/sec) but a maximum discharge in May of 501.92 second ft (14.21 cubic m/sec). The acequia watered 122.7 acres within the cities' grant boundaries (Table 7.1).

Conclusion

Irrigation success along the Santa Fe River was dependent on both cultural and natural factors including available labor, community custom or law, time, and river discharge. Hours on the ditch necessary to irrigate were assigned by the mayordomo who, with the consensus of the community and roots in both Islamic and Iberian law, was (and today still is, in many communities) deputized to control the division of communal labor as well as water apportionment. Throughout Santa Fe's history, labor to irrigate any individual field was dependent on both family and community ties and potentially, wealth. Any river's discharge is influenced by a host of conditions specific to its watershed. The acequia's construction is necessarily responsive to those hydrological and geological factors too numerous to innumerate here, but which are clearly affected by yearly precipitation cycles. The construction and maintenance of any one acequia system then, is a response to both cultural and natural factors in concert, which, together determine cross section dimensions and ditch grade.

Although a combination of artifact analysis, OSL dating, and archival research to tentatively identified the earliest ditches as LA 120957 (Acequia Madre), LA 146407 (Acequia Diego Romero) and LA146418 (unnamed). The others have rough dates and estimates of contemporaneity. Excavation provided limited data to examine changes in land tenure from Spanish Colonial to Mexican or to U.S. Territorial control. Physical evidence of Santa Fe's acequias as an urban system may reside in the existence of restricted water courses that evolved in the nineteenth and twentieth centuries to convey water to isolated fields and is certainly evident in subterranean water boxes that guided water beneath railroad rights of way Changing land tenure was gleaned from deed records for land within the project area which show a gradual change in land use from about 1868 with sale of land tracts to non-native New Mexicans (D. H. Snow, Chapter 7, this report) potentially indicating an increase in emigration, land speculation, and shift from subsistence agriculture to market economy. The effect of this shift on the acequia system's physical layout may have been blunted by the historic inability of farmers to easily transport goods to distant markets and a resulting lack of surplus production, which was certainly affected by the river's carrying capacity. Evidence for fallow fields is documented, and it may be that some segment of the farming population had to diversify economic strategies in various years to get by. Those users likely had more recent water use claims under the law of prior appropriation, were located near the river's southern reach, or lacked access to enough labor to draw sufficient water from a given ditch during the agreed upon time allotment.

U.S. military occupation in 1846 provided economic opportunities for residents that had been previously unavailable. With the construction of the Fort Marcy Presidio, wages increased (D. H. Snow, Chapter 7, this report). The positive effect on wage labor and a somewhat fickle water supply may have convinced those with less robust water rights to follow other pursuits. This trend culminated with absence of readily available labor for field cultivation during World War II.

Evaluation of the effect of political and socioeconomic change on Santa Fe's acequias within a world system framework is interesting. On one hand, the concept for and imposition of acequia dependent agriculture, the systems lay out and governance by Iberian law and custom imported by the Spanish to this area of the New World fits the model of, colonization and military control described by Wallerstein. But as D. H. Snow points out (Chapter 7, this report) the framework depends on economic production that harvests some form of transferable commodity (more tangible than soles) for the colonizers. Though the colony may have been a military periphery in the mid-1700s, New Mexico produced no surplus and was an economic drain on Spain's coffers. Its colonization from an economic standpoint was completely antithetical to any rational economic goal. As a result, for 200 years New Mexico, was all but isolated from European trade networks by Spanish policy and geography. The Territory became a black hole in Europe's socioeconomic Colonial map and a technological and economic backwater. In Wallenstein's model, on the periphery under the most optimistic of definitions.

New Mexico' s reentry to the world economy began with Santa Fe Trail trade and slowly continued on the path with incorporation into the U.S. Territory. With opportunity brought by an infusion of foreign money and technology the population began to diversify its economic activity. Santa Fe's acequia system slowly became a victim of a combination of population pressure, technological advances spearheaded by the industrial revolution (not experienced in the Spanish colonies) and corporate interests that gained a foothold in the new U.S. Territory.

3 | Atchison, Topeka and Santa Fe Railway Sites

Overview

Jessica A. Badner

The Atchison, Topeka and Santa Fe Railway (AT&SF) is one of the storied transcontinental railroads that opened the western United States to mass immigration from the east and west coasts enabling and driving a profound change in the nation's population dynamics. Although Santa Fe provided a namesake for the railroad, the line serving the City Different was a spur financed by local business interests (C. T. Snow 2003).

Although the Denver and Rio Grande Railway (D&RG) shared what is now the North Railyard with AT&SF by 1900, the buildings and much of the infrastructure excavated during this project have their earliest associations with the AT&SF. The railroad complex was installed into Barrio de Guadalupe changing the previously agrarian neighborhood forever. LA 146402 contains three main site components spanning a 200- to 250-year time span that represent Spanish Colonial neighborhood use, agricultural activity, and later railroad use from the late months of 1879 to approximately 1960. Three archaeological sites LA 146402, LA 146403, LA 146404, and LA153442 located in proximity to each other comprise the core of the earliest excavated railroad infrastructure, and although treated as separate sites, they contain temporally associated structures and sidings (Figs. 1.1, 1.3, 3.1a, 3.1b).

Following the testing phase, both LA 146402 and LA 146403 were recommended as "eligible" for the National Register of Historic Places under Criterion 'd.' Further investigation was undertaken to define the nature and extent of the architecture, the agricultural field, and the midden deposits and to expose structural components. LA 153441 contains existing standard gauge AT&SF tracks that have been continuously maintained since 1880. The sites as described were recommended as eligible for the National Register of Historic Places under Criteria 'a' and 'c' because they embody and create the distinctive character of the railyard. Work at these sites was conducted under New Mexico State Historic Preservation (HPD) and City of Santa Fe Archaeological Review Committee (ARC) approved data recovery plan (Wenker et al. 2005). Testing at LA 146404 exhausted site potential and no further work was recommended by OAS.

An additional three archaeological sites that contain AT&SF infrastructure—in the form of a possible loading dock (Feature 58, LA 146409), stockyards (Feature 74, LA 146411), and power distribution lines (LA 153442)—are reported in Chapter 6; they are reported there because the majority of cultural features encountered in those locations were associated with modern industrial use along Cerrillos Road.

Chapter 3 reports on three cultural temporal components: a Spanish Colonial- to Mexican-period midden, agricultural field and acequia deposits, and AT&SF infrastructure. Excavation results are presented by site. LA 146402 is presented in three sections with earliest temporal field and acequia components discussed first followed by a summary. AT&SF components are then presented in the last section and summarized together. Artifact analysis data pertinent to dating and functional interpretations of LA 146402 are presented in this chapter. Synthetic reports on the project level and specifics of analytical criteria are presented in Chapter 7.

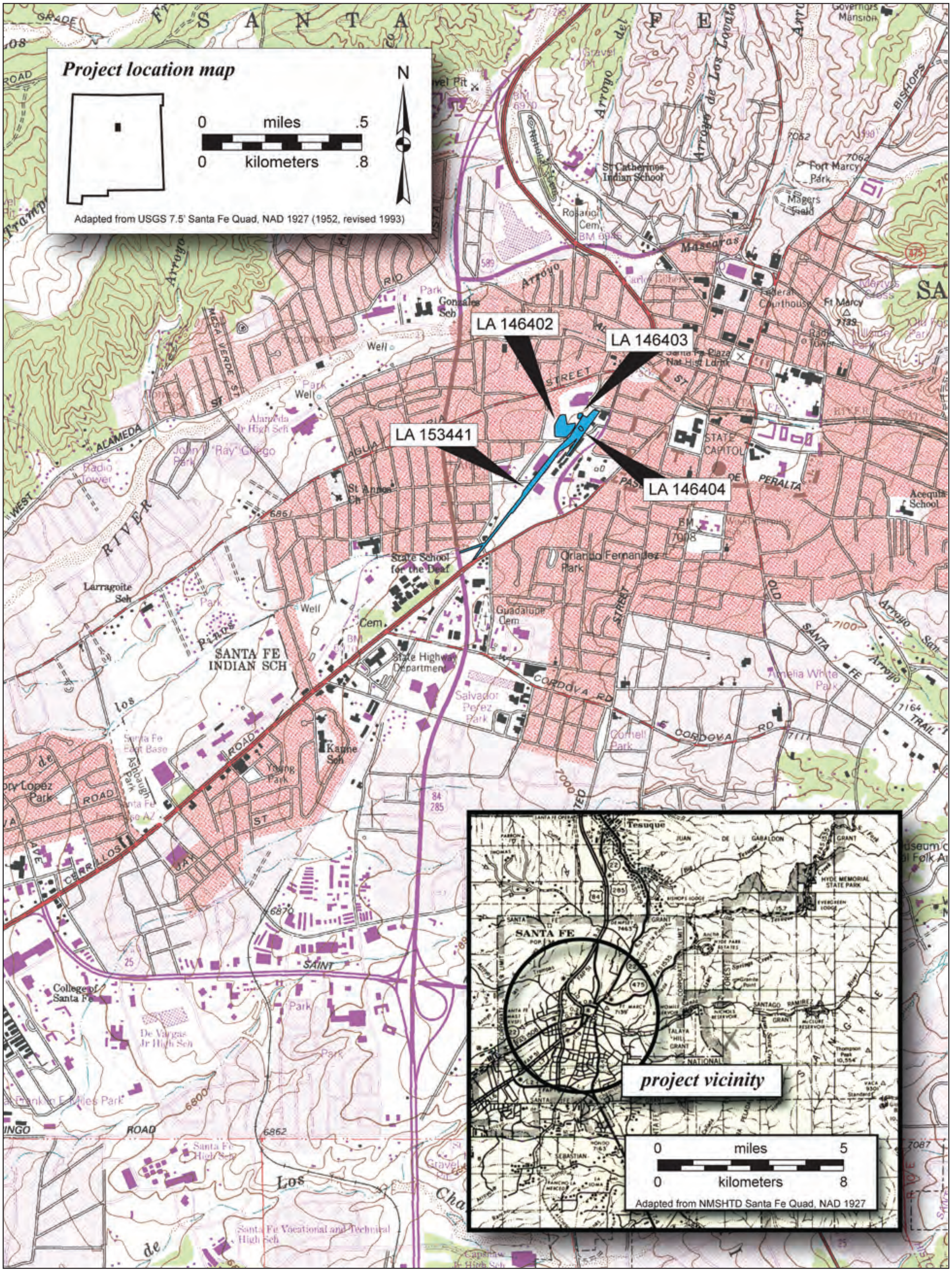


Figure 3.1a. Location of AT&SF sites at the Santa Fe Railyard: LA 146402, LA 146403, LA 146404, and LA 153441.

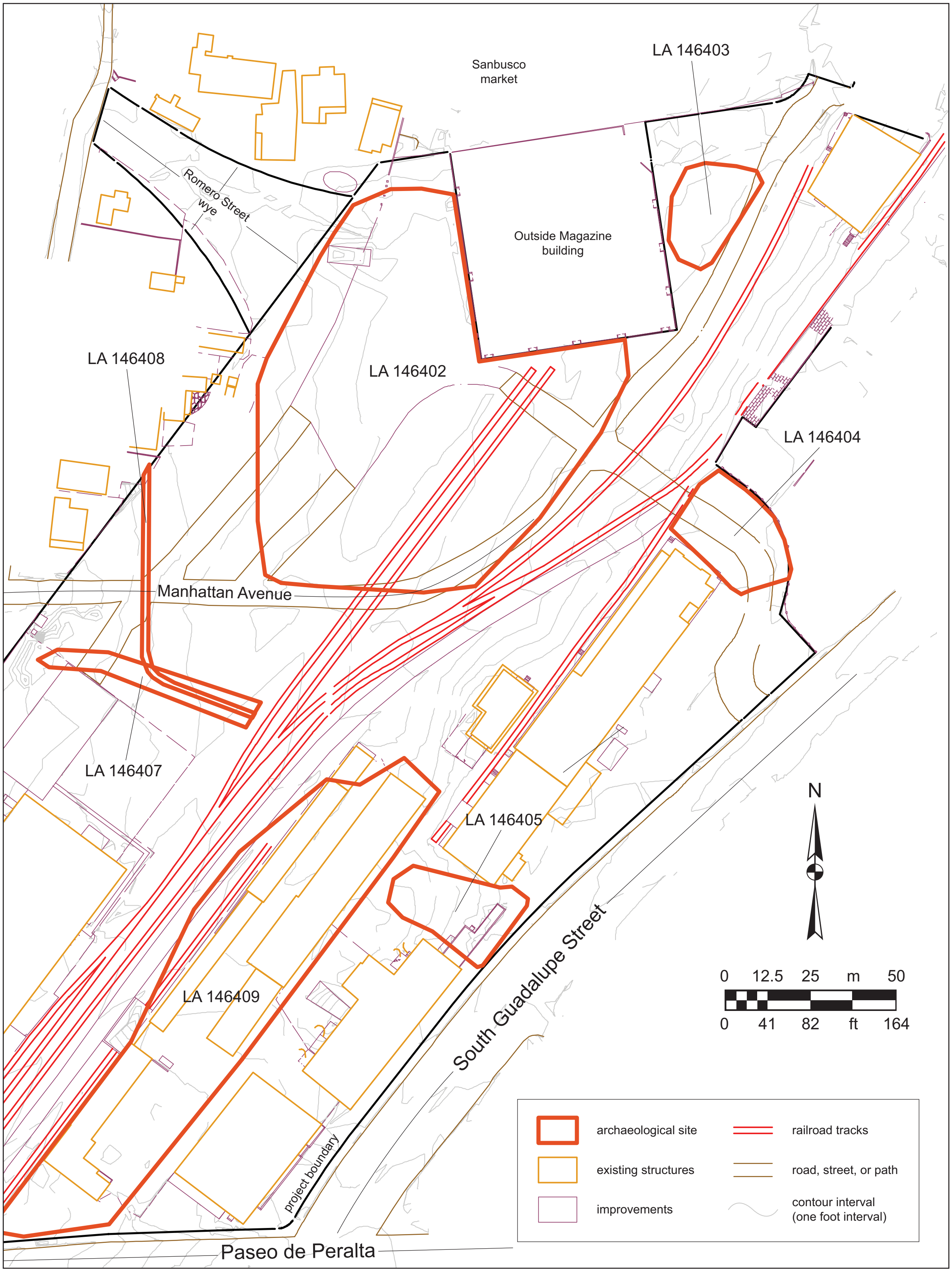


Figure 3.1b. Location of AT&SF sites at the Santa Fe Railyard: LA 146402, LA 146403, LA 146404, and LA 153441.

LA 146402

Chris T. Wenker, Rick Montoya, and
Jessica A. Badner
revised by Jessica A. Badner

Introduction

Excavations at LA 146402 revealed foundations of nine structures built by the AT&SF from 1879–1880 through the mid-twentieth century and associated with components exposed in LA 146403 to the north. Excavation also exposed ancillary infrastructure both directly associated with the early AT&SF structures and other later railroad infrastructure that was installed as the railyard grew and changed. These included a series of railroad tie impressions indicating realigned and removed sidings, coal pits, utility lines, and postholes. Remnants of previous neighborhood land use were indicated by the presence of artifact-bearing cultural deposits comprising a Spanish Colonial- to Mexican-period refuse midden, as well as an agricultural field with intact water-conveyance features.

Prior to this project the site was used as a dirt- and gravel-surfaced automobile parking lot immediately south of the Outside Magazine building and the Sanbusco Market Center. Aside from some railroad ties, the only feature that was visible on the modern surface was a 15 ft long section of one of the masonry walls of the engine house (Structure 3, see below).

Site Location

LA 146402 was in the North Railyard (Figs. 1.2, 1.3, 3.1a, 3.1b, 3.2) on City of Santa Fe land. Based on the distribution of features and deposits identified during the testing and data-recovery phases, the site measures about 111 m north–south by 96 m east–west and covers approximately 7750 sq m area. The site was located immediately south and west of the current Outside Magazine (400 Market Street) property and was bounded on the south and east by West Manhattan Avenue. Nearby excavated sites with AT&SF components included the AT&SF well and water tower (LA 146403) 50 m to the north, and a twentieth-century pit (LA 146404) 50 m to the east. The probable course of the Manhattan Street Ditch (LA 146407 and LA 146408) ran south of the site boundary.

Excavation Sequence

LA 146402 was initially tested through the excavation of 23 backhoe trenches (Fig. 3.3) that crossed through the current excavation area. Two backhoe stripping units and 26 one-meter-square excavation units (XUs) (Fig. 3.4) were also excavated at this site to evaluate the deposits, features, artifact content, and condition. Data recovery was recommended on the basis of the stratigraphic integrity and data potential of a large midden, proximity of field deposits to the midden, and complex and intact array of structure foundations and associated features related to the post-1879 arrival of the AT&SF rail line (see Table 3.1 for feature number concordance between testing and excavation phases and Fig. 3.2 for structure locations).

Data recovery work at LA 146402 started on April 13, 2005, and continued until July 1, 2005. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker et al. 2005). Feature, stratum, and excavation unit numbers used in this project are not always continuous from 1 to n, because in many cases the designations from the testing project (Wenker 2005a) were maintained to provide consistency in the provenience designations. Structures and nonstructure (NSTR) study units identified at this site are listed in Table 3.1 and associated features are described in the following discussions.

Various excavation units are summarized in Tables 3.1 and 3.2 and were used to expose and define architectural foundations, but few features containing intact cultural deposits were encountered. Generally, the upper fill and overburden of Strata 1 and 2 were excavated in full-cut hand and mechanical excavation units to expose the various subsurface foundations and to scrape around structures in search of additional features (Fig. 3.5). The extent of peripheral scraping around some of the structures was occasionally limited by the presence of buried utilities, paved roadways, or railroad tracks. In most cases these upper deposits were not systematically screened or sampled because of the mixed

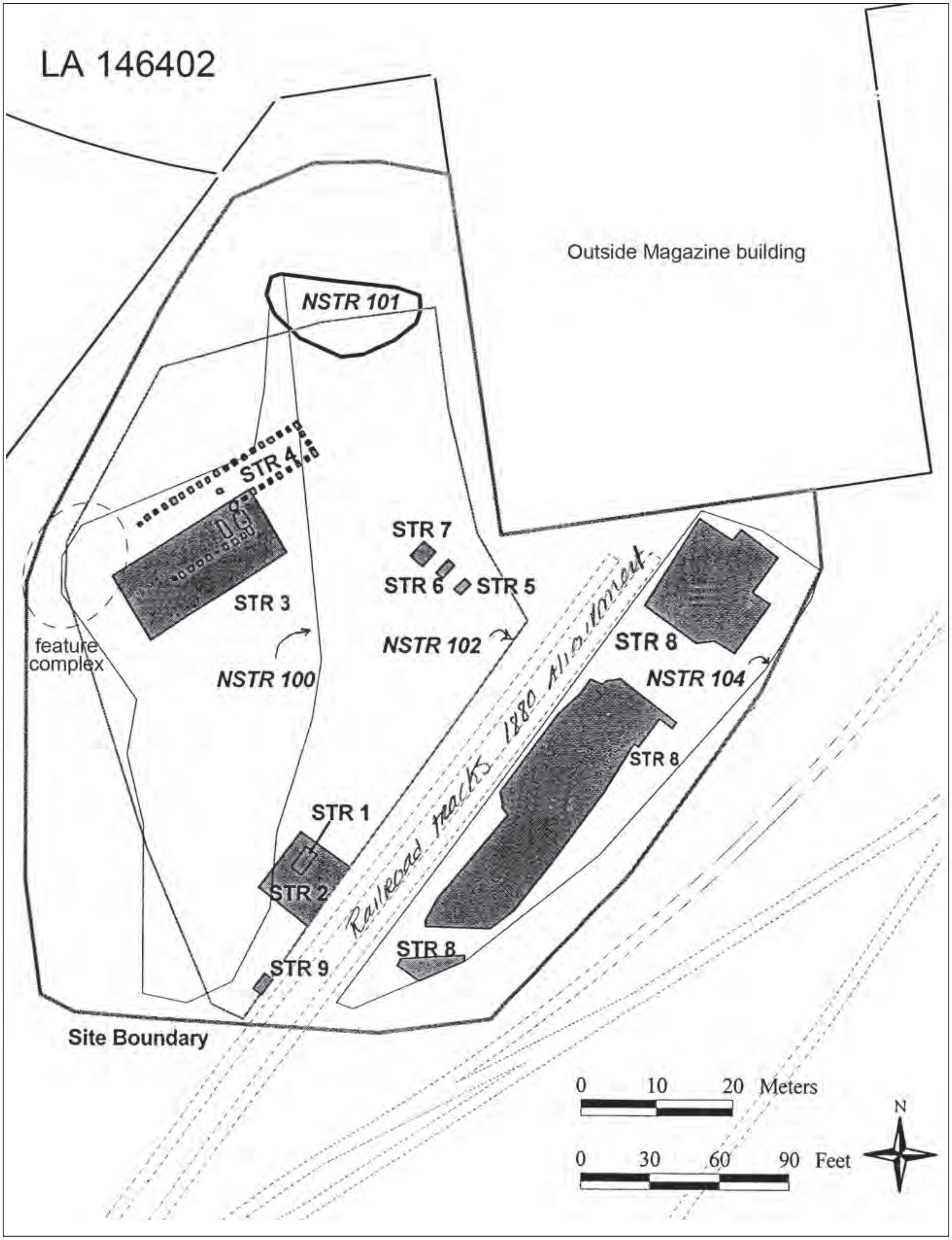


Figure 3.2. LA 146402, site map, showing the locations of structures and non-structural study units across the site.

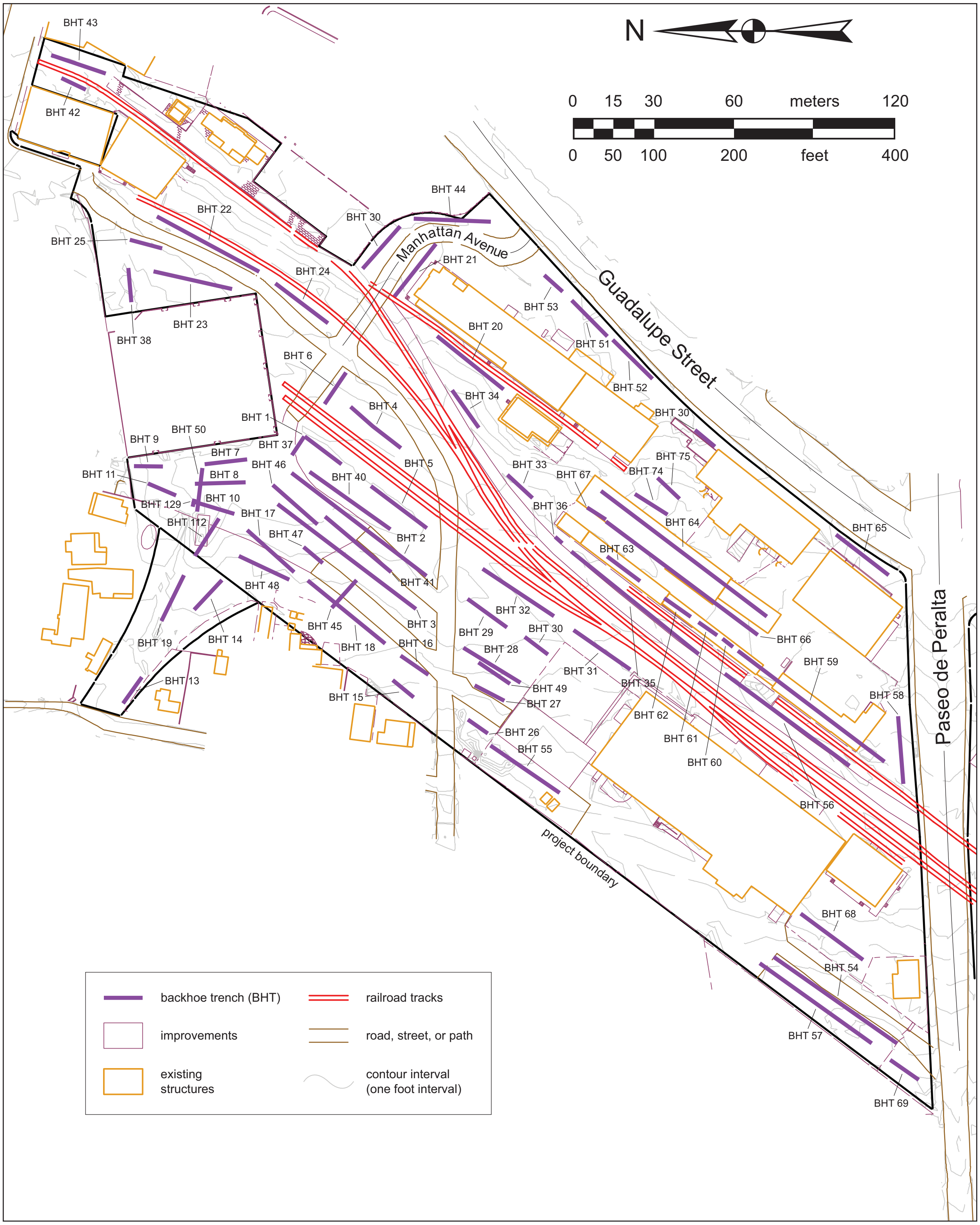


Figure 3.3. BHTs excavated in the North Guadalupe parcel during the testing phase of the Santa Fe Railyard project.

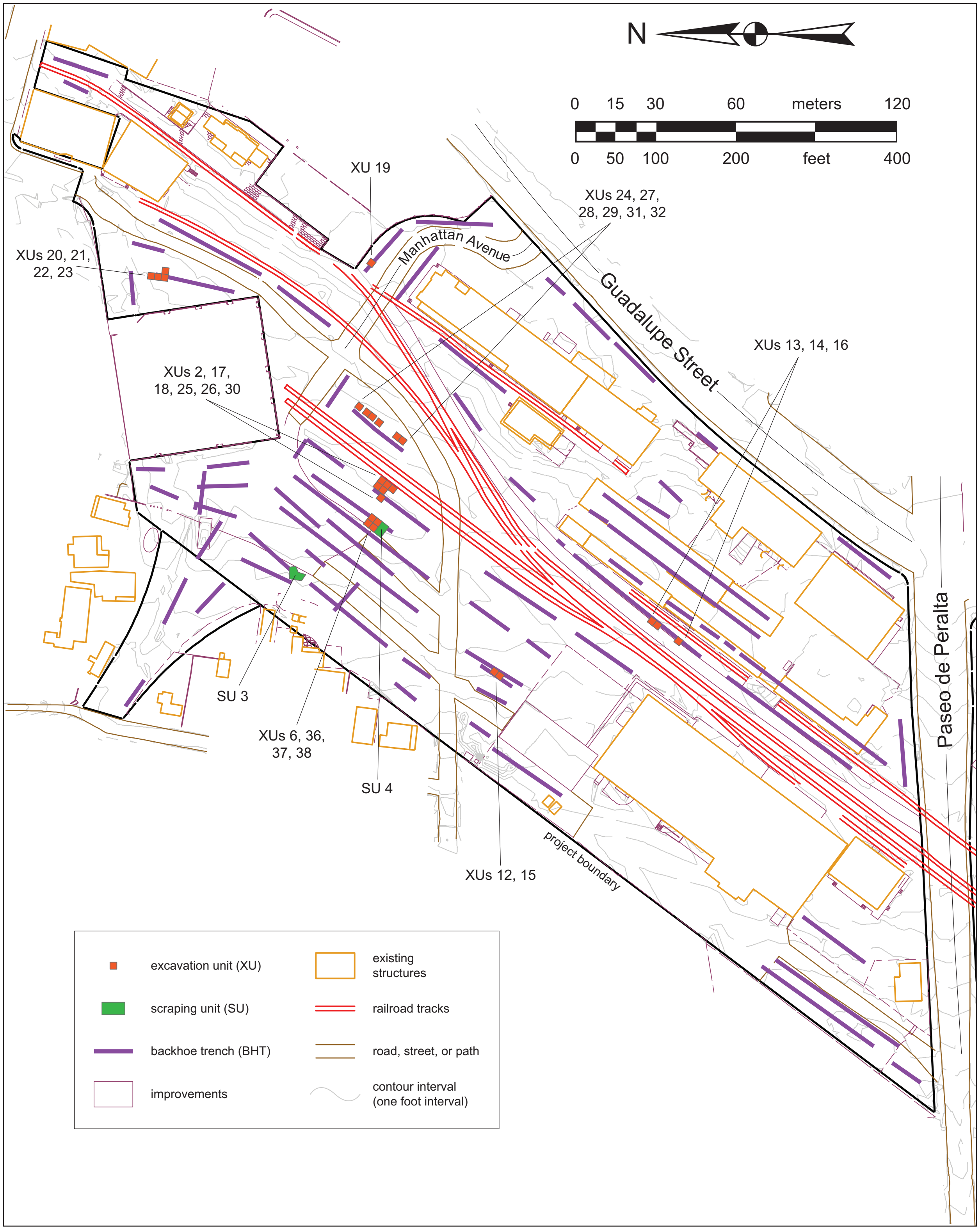


Figure 3.4. Scraping units (SCU) and excavation units (XUs) excavated in the North Guadalupe parcel during testing phase of the Santa Fe Railyard project. Testing unit numbers depicted on this map may be duplicated within site boundaries during project excavation.

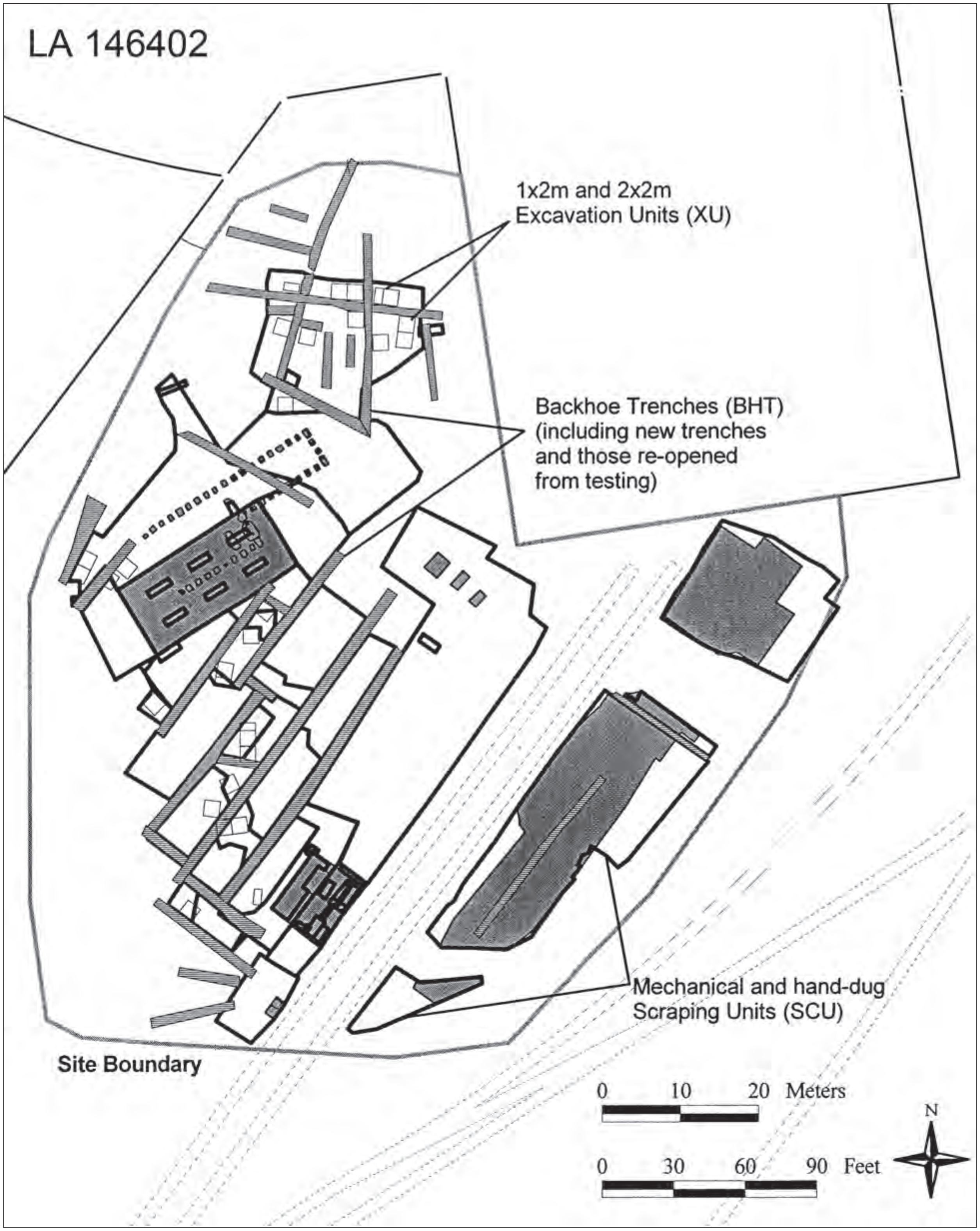


Figure 3.5. LA 146402, site map, showing the extent of data recovery excavations across the site.

and redeposited nature of the fill. Specific screened proveniences, such as those in the midden and irrigation features, are discussed in the study unit descriptions. Artifacts from excavated contexts are summarized in tables introduced in each study unit discussion.

Most archaeological work at the AT&SF structures and features focused on mechanical and manual feature excavation and architectural documentation. The Spanish Colonial midden component was primarily investigated by the excavation of backhoe trenches to define its horizontal and vertical extent and by the excavation of grid units to recover a screened sample of the midden's artifact content. The pre-railroad field-irrigation component was primarily investigated by backhoe trenching and mechanical scraping to determine the horizontal extent and orientation of the water channels. The irrigation component was also explored by the excavation of grid units to expose features, recover a screened sample of the channel artifact content, and to recover botanical samples.

Site Stratigraphy

Most of the sediment that filled and capped the structures and the surrounding historical ground surface consisted of purposefully introduced overburden. Stratum 1 was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This fill was brought in to level the driving surfaces in the area and was 5 to 30 cm thick. Stratum 2 was a black sandy loam deposit containing abundant inclusions of coal and cinders and historic refuse (glass, metal, etc.) and was approximately 5 to 35 cm thick. This fill was brought in to level the historical railyard. Stratum 3, an underlying sterile substrate, was a massive, very hard deposit of reddish brown clay loam with few faint mottles of caliche inclusions. The intermittent and underlying Stratum 4 was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed, medium crumb structure. Its color ranged from light yellowish brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5, which consistently formed the basal substrate, consisted of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that was light yellowish brown to brown in color. Clasts frequently exhibited caliche skins, and the overall stratum was weakly cemented with calcium carbonate. Other strata identified during the excavation are noted below in the feature or structure descriptions. All soils are described using standard Munsell soil color terminology and specific colors are defined in Table Appendix 1.1

Feature Descriptions

Three main site components were identified at LA 146402: 1. a Spanish Colonial to early Mexican-period refuse midden (NSTR 101); 2. a series of pre-railroad agricultural features; and 3. a complex of structures and features from AT&SF use of the railyard during the late nineteenth and mid-twentieth centuries (Table 3.1). The following site discussion focuses on the oldest components first (i.e., midden, irrigation features) and concludes with the most recent components (i.e., AT&SF infrastructure and modern features). Because some of the site components were superimposed or spatially proximate, some scraping unit (SCU) excavations simultaneously served the multiple purposes of locating and exposing both railroad-era and pre-railroad-era material, so references to those excavation units are occasionally repeated among the study unit descriptions.

Spanish Colonial Midden (NSTR 101)

NSTR 101 was a study unit that contained Spanish Colonial– or early Mexican–period refuse. The midden occurred within a 155 sq m area, but its northern extent was impacted by a utility corridor that truncated the deposit (Figs. 3.5, 3.6). The artifact assemblage recovered from the midden was unrelated to any railyard activity but could be culturally and functionally associated with late seventeenth- to early eighteenth-century midden deposits located to the north of the project area near the Outside Magazine building (400 Market Street) and excavated by Deyloff (1999).

Excavation Sequence

This site component was discovered during testing, and was sampled during excavation. During testing, five backhoe trenches (with BHTs 8, 10, 11, 50, 129) exposed midden profiles. Preliminary sampling was conducted with four hand-dug 1

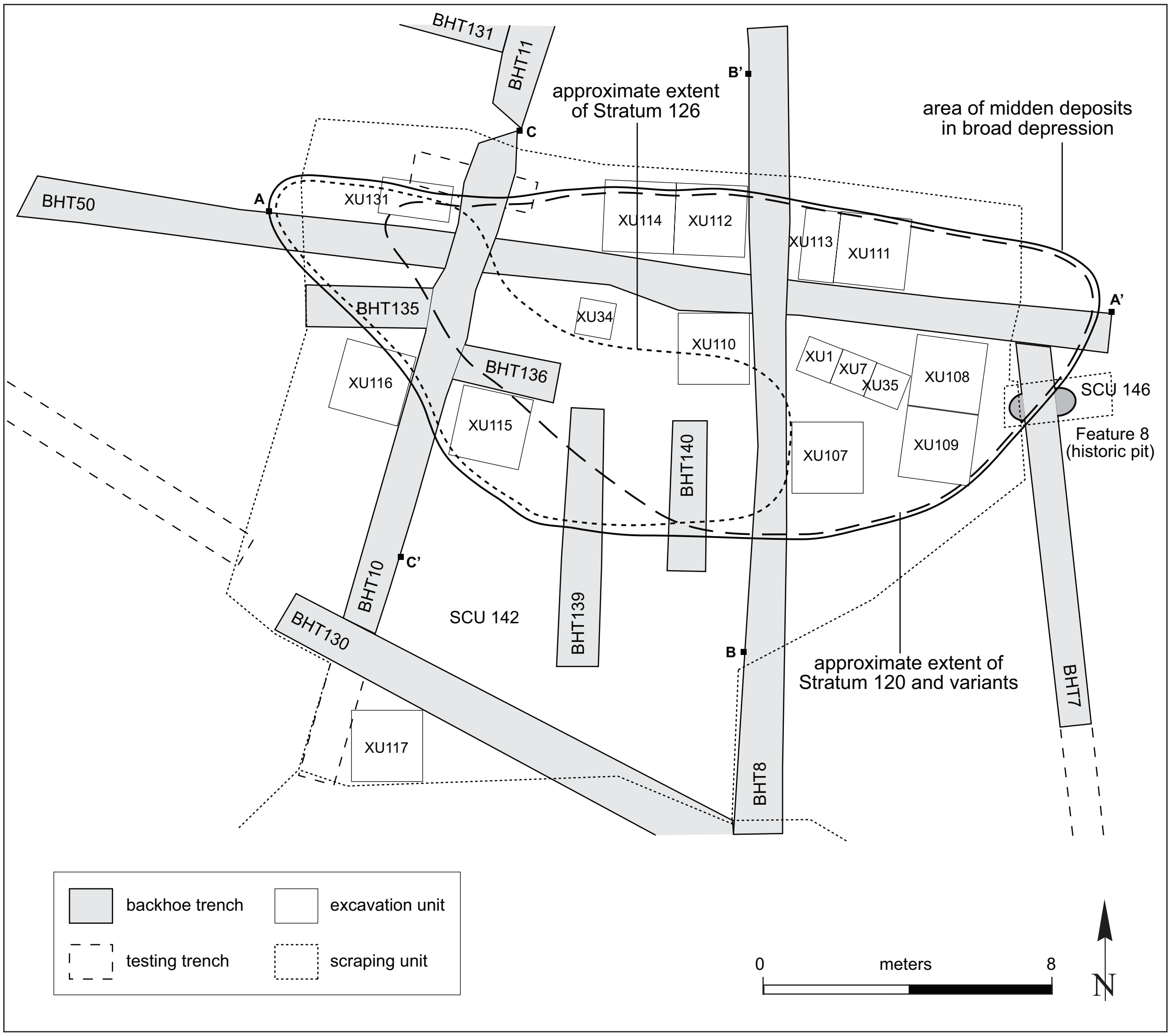


Figure 3.6. LA 146402, NSTR 101, overview and excavation map, showing the extent of the pre-railroad midden deposits.

x 1 m test units (XUs 1, 7, 34, 35; Wenker 2005). Test units removed Stratum 1 in 20 cm levels, underlying midden strata were excavated in 10 cm levels and screened with 1/4-inch screen.

During data recovery, the trenches were reopened and extended, and the entire area was exposed with SCU 142. Four new, short backhoe trenches (BHTs 135, 136, 139, 140; Figs. 3.6, 3.7) were excavated in addition to testing trenches mentioned above to provide additional views of the study unit stratigraphy. Ten hand-dug excavation units were investigated. The majority (XUs 107–112, 115) were 2 x 2 m grid units. XU 113 was a 1 x 2 m unit, as was XU 131, which sampled both midden and NSTR 100 acequia deposits. Additionally, BHTs 130, 131, and 138, and XUs 116 and 117, on Figure 3.6, were dug to track a water channel (Feature 445) related to NSTR 100, and are discussed below.

The 10 hand-excavated units covered 32 sq m, equaling approximately 21 percent of the total midden area (not counting the units from testing). Overburden (Stratum 119) was removed in 20 cm levels and midden deposits were excavated in 10 cm levels. Dimensions and depth of excavation units (XU and SCU) and backhoe trenches (BHT) investigated during excavation are summarized in Tables 3.1 and 3.2.

No other features related to the midden component were encountered. Several intrusive railroad and modern-era features adversely impacted a sizeable portion of the midden and a cluster of recent or modern tree planting pits (n = 6) and small trenches (n = 2) these included Feature 8, a refuse pit recorded in NSTR 102 (see discussions of NSTRs 102 and 103, below). Artifact classes and samples recovered from NSTR 101 (n = 10,056 items) are listed in Table 3.3.

Location

NSTR 101 was located at the northern end of the site, north of the AT&SF loading dock (Structure 4) and 10 m west of the Outside Magazine property. The midden was spatially, but not temporally associated with a water channel (NSTR 100) and modern tree planting and refuse pits (NSTRs 102, 103). The deposit's maximum dimensions were 22 m east west by 11 m north to south and ranged from .45 to .80 m in depth. The cultural deposit was covered by a layer of overburden (Stratum 119) that was up to .40 m thick in addition to Strata 1 and 2 which capped the midden with an additional .40 m of fill. When excavation was complete, it became evident that the midden, as estimated during testing, was incorrectly plotted and was approximately half of its original estimated length. The cultural deposit in BHT 11 that extended the midden boundary to the north was determined during data recovery to represent an unassociated deposit of charcoal-flecked topsoil or field fill (possibly equivalent to Stratum 19, below).

Structure

Trench profiles indicated that the midden deposits occupied a broad depression that appears to have been excavated into Stratum 3. This pit (Figs. 3.6, 3.7, 3.8) which may have been excavated to mine the Stratum 3 material for adobe, measured roughly 22.5 m east–west by 9 m north–south (covering about 155 sq m), and approached.80 m in depth, although the base of the pit proved to contain multiple sub-basins. The western, eastern, and southern margins of this pit, as evidenced by the margins of the various midden strata contained within it, were marked by gradually sloping edges that formed a broadly basin-shaped depression along those axes (Figs. 3.9, 3.10). The northern edge of the depression and the midden was marked by a clearly defined east-west subterranean ridge or rise of Stratum 5, very gravelly and cobbly coarse sand (Fig. 3.11).

Depositional Sequence

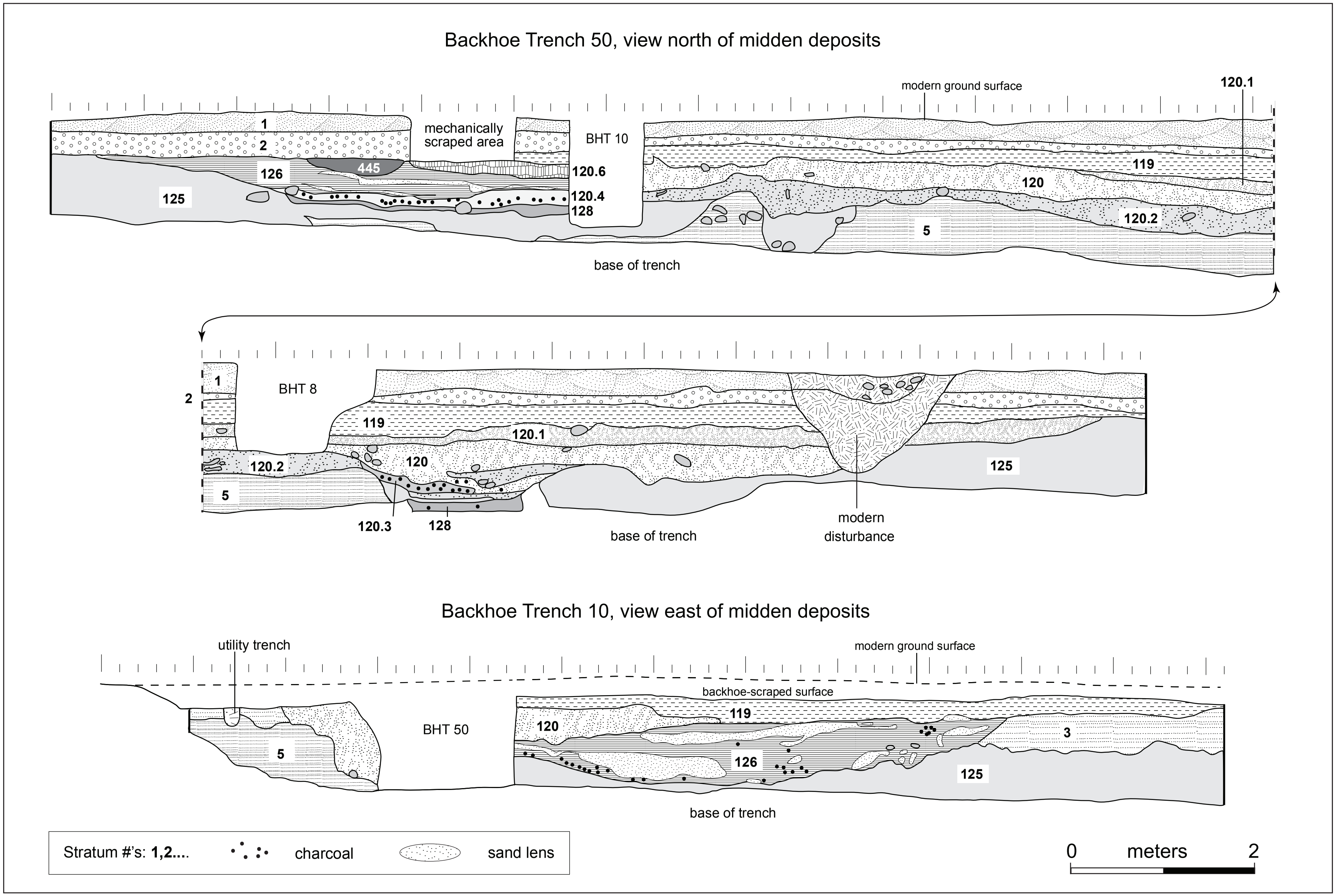
Several sequences of infilling were evident among the midden strata in this broad depression. An early series of deposits (e.g., Strata 126, 128) consisted primarily of alluvial silts and fine and coarse sands. These earliest depositional episodes filled the western half of the depression and proved to contain the fewest artifacts in the overall study unit. The main set of actual midden deposits (defined as charcoal-rich, gray silt and clay with abundant artifacts) was identified as Stratum 120, which was subdivided into a number of members that appeared to represent spatially and stratigraphically discrete depositional episodes.

Stratum 120 and its subdivisions (summarized in Table 3.4) mainly occupied the central and eastern extent of the large depression. Nearly the whole study unit was capped with charcoal-flecked sediment (Stratum 119) with lower artifact frequencies, which may represent a post-abandonment accumulation of topsoil, or, possibly, field fill similar to that observed in NSTR 100 (discussed below).

Stratum 119. Stratum 119, post-abandonment topsoil was a light brown, gravelly, silty clay loam, with few, fine charcoal flecks throughout; the sediment had a massive structure, was slightly hard, and showed a wavy, sharp to clear boundary to Stratum 120 underneath. Generally 20 to 28 cm thick, Stratum 119 was buried directly underneath Strata 1 and 2. Horizontally, this sediment covered most of the area of Stratum 120, and on the south this deposit extended across the sterile substrate for several additional meters past the edge of Stratum 120. Pueblo ceramics made up 94 percent of the artifact content from this deposit. This high frequency likely reflects artifact condition (i.e., higher incidence of small sherds) as well as artifact content. Native-made ceramics are predominated by Historic wares Red Utility, Tewa Polychrome, and Micaceous Polished followed by Unpolished micaceous wares and Plain and Indeterminate Glaze wares. Trace gray wares were also recovered. Other artifact content included plentiful animal bone and lesser amounts of Euroamerican artifacts (glass and metal) that reflected an emphasis on construction and maintenance activities probably during the

Figure 3.7. LA 146402, NSTR 101, pre-railroad midden, final excavation overview.

Figure 3.8. LA 146402, NSTR 101, Spanish Colonial– and Mexican–period midden.



Figures 3.9, 3.10. LA 146402, top (Fig. 3.9): NSTR 101, cross section of midden deposits along BHT 50, north wall; bottom (Fig. 3.10): NSTR 101, cross section of midden deposits along BHT 10, east wall.

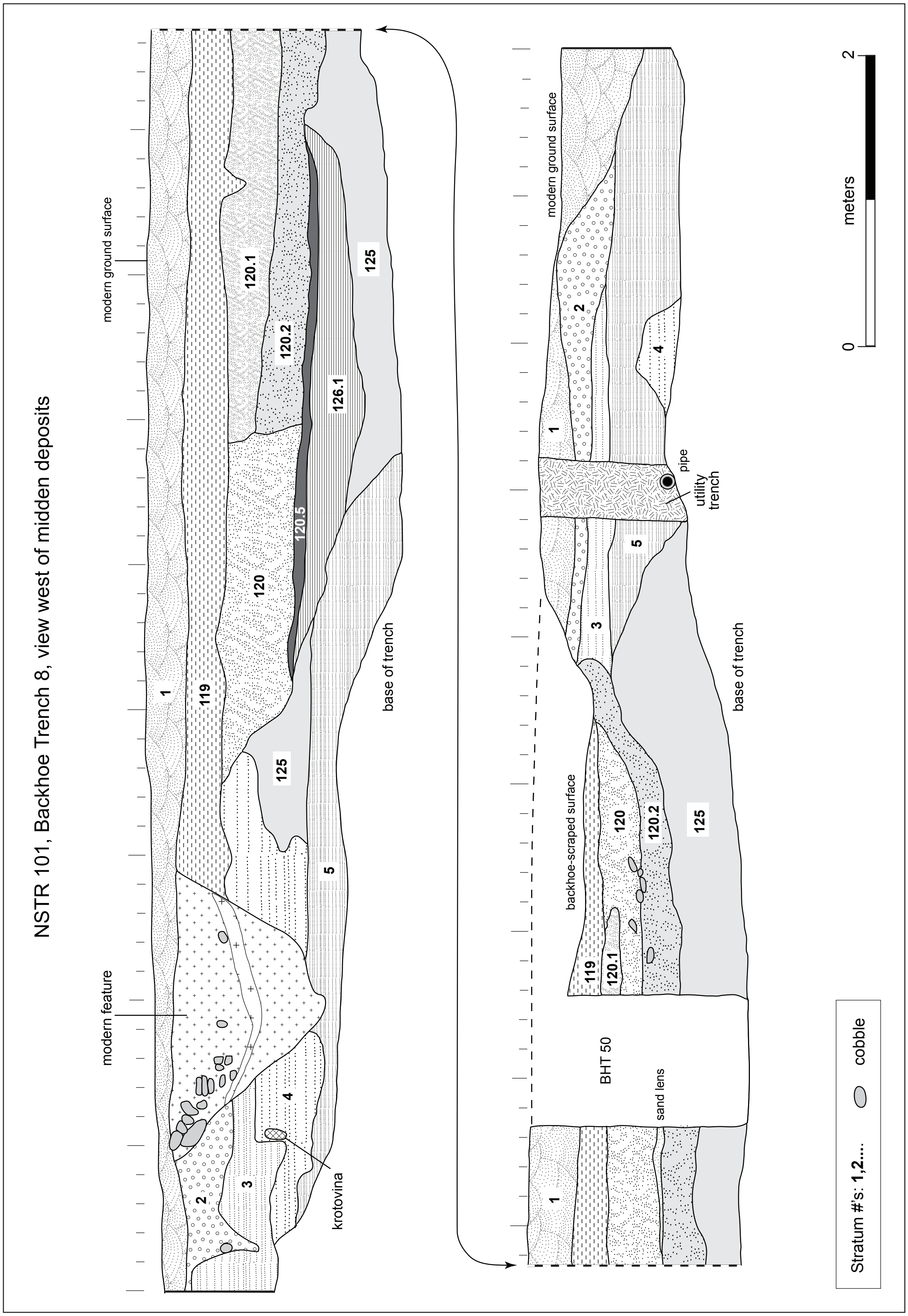


Figure 3.11. LA 146402, NSTR 101, cross section of midden deposits along BHT 8, west wall.

Mexican period. Euroamerican pottery was predominantly white ware but also included ironstone and annular ware Puebla Blue-on-white and Tumacacori Polychrome majolicas. The fauna assemblage was largely made up of sheep/goat bones. Flaked stone was predominantly chert core flakes with one strike-a-lite flint and one strike a-lite flake. Ground stone items were also recovered. Inclusions of glass coal, and clinker and trace plastic indicate some mixing with later deposits.

Stratum 120. The deposit identified as Stratum 120 proper was typically a yellowish brown to dark yellowish brown silty clay loam, with few to common, fine to medium charcoal flecks; the sediment was hard, with small to medium subangular blocky peds that added a granular appearance to the deposit. Deposits that were not otherwise subdivided into one of the constituent members of this overall stratum were simply identified as Stratum 120; hence this designation included the generalized midden fill aside from the discrete lenses described below. Native ceramics were common in this deposit, as was animal bone most of which was sheep/goat followed by cow. Trace cottontail; horse and chicken were also identified. Native ceramics were mostly Historic wares dominated by red utility wares followed by Tewa Polychromes, micaceous Polished and Historic buff utility wares. Analyzed Euroamerican artifacts included Puebla Polychrome majolica, Mexican Rey ware, and white ware. Slag and clinkers and building material including a brick were also recovered. Other artifacts included flaked stone and ground stone items (including a mano), and mineral fragments. Low counts of glass and metal were also present. Highest artifact frequencies were recorded in the stratums upper levels. This may be due to an association with Stratum 120.1.

Stratum 120.1. The subdivision of Stratum 120.1 was defined as an upper variant of Stratum 120 that contained common to many, fine to medium charcoal inclusions. This deposit, a yellowish brown clay loam, was roughly 13 to 22 cm thick, and occupied an area measuring roughly 5 m north–south by 9 m east–west, centered around the BHT 8/50 intersection. Stratum 120.6 (see below), which occupied an equivalent stratigraphic position to the west of BHT 10, appeared to be related to Stratum 120.1. This stratum had some of the highest artifact frequencies recorded for the midden. Pueblo ceramics were common and ware groups were similar in frequency and type to those reported in Stratum 120. Fauna, also common, was predominately made up of sheep/goat bones ; cow, trace chicken and pig was also identified. Chipped stone was more common it this sub stratum than in others. Analyzed lithics were predominantly chert core flakes and angular debris. Euroamerican artifacts included a piece of copper, a square-cut nail, majolica sherds, and pieces of possible slag. Window glass and small amounts of metal were also present.

Stratum 120.2. Stratum 120.2 represented a lower subdivision of Stratum 120 that contained many to common, fine to medium charcoal inclusions, few medium pieces of burned earth, and abundant artifacts. Stratum 120.2, a yellowish brown clay loam, was generally 15–26 cm in thickness, and underlay Stratum 120 proper across most of an area measuring roughly 5.5 m north–south by 11 m east–west along the extent of BHT 50 east of BHT 10. Charcoal and artifact inclusions were less common throughout the western half of this stratum. Stratum 120.2 constituted the basal deposit of the midden across most of the area. Stratum 120.4 (see below), occupied an equivalent stratigraphic position to the west of BHT 10, and may be related to Stratum 120.2 but 102.4 exhibited fewer indications of a nineteenth-century component or intrusion. Pueblo ceramics (predominantly Tewa Polycrome and micaceous utility wares) were common in this deposit, as was animal bone. Cow and sheep/goat are equally represented in the faunal assemblage.

Other artifacts included shaped sherd discs, pieces of copper, majolica sherds, flaked stone items, metate fragments and other ground stone tools, a glass bead, pieces of possible slag, adobe, plaster and mineral. Botanical remains include apricot and corn. Very low frequencies of glass were present in elevations above 2119.60. Glass in this deposit seems to be consistently associated with trace amounts of chipped stone. Indications of a nineteenth century component above Level 6 or potential later intrusion included parts of a porcelain doll and possible charred tumbleweed.

Stratum 120.3. Stratum 120.3 was a yellowish brown clay loam positioned beneath Strata 120 and 120.2 in XUs 111 and 113. It contained abundant, fine to medium charcoal inclusions, abundant artifacts, and common, medium to large pockets of nearly pure ash, and common medium pieces of burned adobe. This sediment occupied a small depression in the base of the overall midden depression and was underlain by another variant of Stratum 120.2 as well as a deposit of Stratum 128 (see below). Animal bone was most common followed by native ceramics. Fauna is predominantly sheep/ goat bone. Analyzed native ceramics included: Historic Red and Buff utility wares, Tewa polychrome and one heavily sooted micaceous smudged utility ware. Euroamerican artifacts were limited to one piece of Majolica. Archaeobotanical samples includes chile seeds and ponderosa pine needles.

Stratum 120.4. Stratum 120.4 occupied a small section of the midden west of BHT 10, north of BHT 50. This sediment, a brown loam with relatively abundant artifacts and common, large charcoal flecks deposited in laminated bands (indicative of some minor alluviation), was 11 to 20 cm thick. The stratum boundary showed an abrupt to sharp contact with overlying alluvial Stratum 126. A basal deposit of coarse sand along the western limit of this deposit indicates some alluvial activity prior to this stratum's deposition. Although Strata 120.4 and 120.2 (immediately to the east of BHT 10; Fig. 3.9) share similar stratigraphic positions within the overall midden, the close association of Stratum 120.4 with Stratum 126, the evidence of alluviation within Stratum 120.4, and the different color and texture, set the two apart. Pueblo ceramics and animal bone were relatively common in this deposit. Native-made ceramics were predominantly Historic red utility wares with equal frequencies of Historic Buff Utility wares, micaceous polished and unpolished wares, Tewa Polychrome, and Indeterminate Glaze wares. Unlike stratum 120.2 the faunal assemblage is dominated by cow. Euroamerican artifacts were predominantly domestic goods. Other notable artifacts included a shaped majolica sherd and other pieces of majolica and stoneware. No nineteenth-century artifacts content were encountered and native ceramic analysis from lower context in XU 131 suggests a strong late eighteenth century date.

Stratum 120.5. Stratum 120.5 was a variant of Stratum 120 apparently reworked by alluvial action during Stratum 126 deposition (see below). Stratum 120.5 (possibly deriving from Stratum 120.2 or 120.4), was located beneath Stratum 126 in XU 115 and BHTs 135 and 139 and on top of Stratum 126 in XU 110 and BHT 8. Pueblo ceramics, animal bone, and flaked and ground stone items were present in this deposit. Analyzed native ceramics included large pieces of black micaceous utility ware. One Euroamerican artifact, a possible Mexican Redware was recovered. Artifact frequencies were moderate.

Stratum 120.6. Stratum 120.6 was a dark yellowish brown cobbly sandy loam with common, fine to medium charcoal inclusions, which showed a clear, flat lower contact with Stratum 126. This stratum, restricted to the area north and east of BHTs 50 and 10, is similar in composition, content, and stratigraphic position to Stratum 120.1 far to the east. Artifacts were predominantly native ceramics dominated by Tewa Polycrome, glaze on red, and micaceous utility wares. The analyzed faunal assemblage was dominated by cow bones. Other than one piece of metal, no Euroamerican artifacts were recovered.

Stratum 125. Stratum 125 a yellowish brown, pebbly, fine silty loam, exhibited many large white mottles of calcium carbonate precipitate. This nearly culturally sterile substrate commonly overlay the Stratum 5 cobbly gravel, and may represent a local variant of Stratum 4, a caliche-rich substrate identified across much of the rest of the project area (see above). One Historic Polished micaceous ware and one red utility ware and a chert core flake were recovered from the deposit.

Stratum 126. Stratum 126 was a highly variegated deposit consisting of a main matrix of dark yellowish brown hard sandy clay interspersed with many large-banded lenses of strong brown medium and coarse sand that occupied varying levels throughout the sandy clay matrix. The mottled, laminated clay contained few, fine charcoal flecks, and the stratum contained artifacts throughout. The laminated nature of this stratum (both the laminations within the clay, and the interdigitated clay and sand lenses) strongly indicates an alluvial depositional regime of alternating high- and low-turbidity. No discrete source of the flow could be pinpointed; no acequia channels feed into this area Feature 445, which crossed along the western edge of the midden, stratigraphically post-dates Stratum 126. Stratum 126 formed the main basal deposit across an elongated area along the western and southern edges of the overall midden depression (Figs. 3.6, 3.10). Pueblo ceramics and animal bone were relatively common in this deposit. Frequencies of sheep/goat to cow bone were roughly equal, 5% of the assemblage was butchered. Native ceramics (n = 52) was predominately made up of Historic red utility wares, followed by Historic micaceous polished. Other artifacts included one core flake, and an unidentifiable scrap of metal. Euroamerican artifacts were limited to Puebla Blue on White Majolica and Chinese porcelain. One piece of plastic or rubber was reported. Artifacts were small, ceramics water-warn.

Stratum 128. Stratum 128 was brown silty clay with few, fine charcoal flecks and few artifacts. This deposit underlay Stratum 120 and its variants in several areas of the base of the overall midden depression. This sediment lacks the charcoal content, gray color, and artifact inclusions of the overlying Stratum 120, and may be related to an initial infilling episode of the depression. Artifact frequencies were low, with animal bone more common than native ceramics; near equal proportions of sheep/goat and cow are present. Bone is fragmentary and burned, but few signs of human butchery and 7 percent carnivore damage. Other artifacts included trace flaked and ground stone, cut or forged nail fragments and unidentifiable dish fragments.

NSTR 101: Summary

Some of the relationships among midden strata remain unclear. For example, the unfortunate placement of the intersection of BHTs 10 and 50 truncated the northeastern edge of Stratum 126 and removed some of the necessary cross sections to allow the relationships among Strata 120.2, 120.4, 120.6, and 126 to be fully understood. Still, the known horizontal and vertical relationships of these strata suggest the following sequential reconstruction.

A large, broad pit was created during the excavation of an abundant quantity of Stratum 3 fill (perhaps for adobe brick construction at a nearby farmstead; D. H. Snow, Chapter 7, this report). The basal portions of the overall pit then received small quantities of cultural refuse, forming deposits such as Strata 128, 120.3, 120.4, and in some areas, 120.5. Potential evidence for a hiatus or gradual filling is furnished by fauna with a higher incidence of carnivore damage than other deposits in Stratum 128. It is unlikely that the entire pit was excavated and exposed before the first refuse dumping started, so these basal cultural deposits are probably not strictly contemporary. The western portion of the overall pit was probably excavated early in the sequence, because the refuse in the basal section of that area was reworked and largely buried under the thick alluvial deposits of Stratum 126 (Figs. 3.6, 3.9), the northeastern edge of which was in turn buried under part of Stratum 120. The eastern portions of the midden fill were then probably introduced, starting with Strata 120.3, a discrete dumping episode, possibly of spoil from a fireplace clean out and later by 120.2, which represented the accumulation of refuse densely packed with artifacts and building debris. Predominance of Stratum 120 probably represents a lengthy hiatus (at least as marked by the decrease in charcoal and artifact inclusions), which was followed by another period of relatively intensive use represented by Stratum 120.1.with artifact content that indicates Mexican Period refuse. Stratum 119 then probably represents a post-abandonment period accumulation of twentieth-century refuse likely associated with railyard activities topsoil or a capping deposit.

Artifact analysis from lower strata (discussed below) suggest that the earliest deposits date to the mid eighteenth century and native ceramics from the early XU 113 and XU 111 stratum 120.3 and 120.2 assemblage in particular support a scenario in which glaze wares from an earlier Spanish Colonial component or curated context were disposed of in the open pit. More generally, the native ceramic assemblage suggests a mid-eighteenth century occupation with native ceramics predominantly contributed by northern Tewa potters, or perhaps Hispanic potters. Vessel forms indicate a predominance of cooking and serving dish forms specifically Tewa Polychrome serving bowls and micaceous cooking vessels. These have polished and sooted exteriors that imply preparation of traditional Spanish foods, such as soup or stew. In the earliest context both cow and sheep were likely butchered at home, and although all ages of animal were recovered sheep tended to be butchered at a younger age. Two large metates recovered from the lower context indicate local grain processing both with coarse- and fine-grained implements suggesting processing of both cultigens and wild grains. This activity may have supplemented already ground wheat stores in the winter, reflect processing of gathered grains or may indicate that residence were unable or unwilling to pay for grain milling. Euroamerican ceramics recovered from lower fill corroborate the early eighteenth-century date assigned to the midden using native ceramics with a mean ceramic date of 1738. Within the Euroamerican assemblage high relative frequencies of imported serving dishes from central Mexico, small amounts of porcelain and ferrous mettle hint at a not overly affluent population perhaps with some affiliation with Indio or mestizo heritage or affiliation (Barbour 2010:213)

Artifacts from upper strata reflect a Mexican-period component with both recognized and undetected nineteenth and twentieth disturbance. The artifact assemblage reflects both domestic and farming (a single hoe) and industrial activities reflecting a change in land use from agricultural to industrial.

NSTR 101: Archival Research

Detailed archival research of tracts in the project area vicinity have been previously presented in two reports conducted by Southwest Archaeological Consultants, Inc. Archival research for excavations conducted at Sanbusco Market Center, directly north of the project area was conducted by Hordes and Beninato and reported in An Early Eighteenth-Century Occupation Along the Camino Real: Results of Archaeological Investigations and Archival Study of Sanbusco and 544 Aguafria Street, Santa Fe County, New Mexico. Adjoining railyard tracts 3, 5, and 6 have been researched by Hordes and Payne and reported in Archaeological Resources of "La Otra Banda del Rio" City of Santa Fe Railroad Properties. Both discussions address the particulars of land ownership, sales and inheritance for the surrounding area as traced through numerous and varied sources. Although there is no surviving land-claim documentation, excavations at Sanbusco suggest the project area was likely inhabited around 1695, during the resettlement of Santa Fe. The first documented land ownership is provided by land grant documents issued to Tomas de Tapia and Felipe Tafoya, 47 years later, in 1742. Although the grants cannot be precisely located, they were both bounded by the Camino Real (Agua Fria Street) to the north and by the "camino de los carros" (Cerrillos Road) to the south. Hordes and Payne have interpreted that surviving documentation to indicate that a lineage of the Tafoya Altamirano family owned land in the northern part of the railyard near the midden excavated adjacent to another eighteenth-century deposit (NSTR 101) underneath the building that currently houses Outside Magazine.

D. H. Snow disagrees with this interpretation (Chapter 7, this report), stating that the identified land grant bounded by "camino de los carros" was located just south of the railyard project area. Regardless of the family lineages involved, records from a sedition trial in 1756 suggest that the neighborhood vicinity either here or to the south was occupied by an extended family.

The 1766 Urrutia map and the 1846 Gilmer map corroborate that project area's use as agricultural land and indicate that, as was the custom in Colonial Santa Fe, farmers placed their dwellings in close proximity to their fields creating a landscape of fields punctuated by scattered homes. The licensure of the Guadalupe Church in 1795 and its subsequent construction suggest neighborhood coalescence as large tracts of land were subdivided by inheritance and sale.

By 1823, Mexican-period census and tax records indicate that 53 families were living in the barrio. The neighborhood was occupied by tradesmen and farmers.

Field-Irrigation System (NSTR 100)

NSTR 100 encompassed the extramural historical ground surface, soil deposits, water channels, and rock features that constitute the pre-railroad field and irrigation component of LA 146402 (Fig. 3.12; Table 3.5).

Excavation sequence. This site component was discovered during testing by a number of backhoe trenches, scraping units, and excavation units. These excavations were reopened during the data recovery work, and the area was then exposed mainly by the excavation of additional scraping units, which were dug in two phases. SCUs 100, 107–109, 122, 124, 137, 142, 151, and 152 removed the recent and historic overburden to expose the top of the remaining intact pre-railroad cultural deposits. The second phase of scraping in this study unit involved SCUs 149, 150, and 153–160, which revisited some of the previously scraped areas by removing pre-railroad cultural deposits to expose the tops of the intact water channels and to explore for additional features within and at the base of the field deposits. Nineteen hand-dug excavation units (four 1 x 2-m and 15 2 x 2-m units, including XUs 100, 102, 103, 105, and 116–130) were also used to further explore feature morphology and contents. NSTR 100 included 21 features, although some of the alluvial channels that were assigned different feature numbers among the various excavation units probably constitute the same overall channel (see below).

The overall area covered by the features and adjacent or associated deposits includes roughly 825 sq m. The upper-level scraping units exposed a total of 1469 sq m, although not all portions of these scraping units were tied specifically to field- or irrigation-feature exposure. The lower-level scraping units, which were focused on field-feature exploration, covered a total of 427 sq m. The hand-dug excavation units encompassed an additional 68 sq m, bringing the total excavated area that targeted the irrigation-related features and deposits to 495 sq m, equaling roughly 60 percent of the study unit's surface area.

Description. The most common and prominent feature type found in this study unit consisted of a series of water-transport channels filled with alluvial sediments, most commonly coarse sand. These features had been observed during the testing phase as elongated deposits of sand lenses in the backhoe trenches (which were then called Stratum 11 or 15; Wenker 2005), but their actual morphology could not be discerned at that time because the trenches had intersected the nearly north–south water channels at oblique angles, obscuring the features' true nature. When the backhoe trenches were re-excavated during the data-recovery phase, and the overburden between the trenches was excavated down to the tops of the sandy lenses, the linear nature of the sand-filled portions of the channels became apparent.

Some of the individual channels were then targeted with hand-dug excavation units and additional perpendicular backhoe trenches. Channel segments that were exposed within hand-dug excavation units were assigned feature numbers. Channels that were exposed through mechanical scraping or in backhoe trenches were mapped and representative exposures were profiled. The discontinuous nature of the channel-fill deposits occasionally obscured some of the relationships between different channel exposures. In some cases, a channel that was intersected in one trench wall could not be confidently traced to the opposite trench wall. Overall, however, some consistent channel alignments could be tracked across multiple exposures and associated with specific features that were excavated in the hand-dug units. The channels that were tracked in this manner are labeled A through C on Figure 3.12. Channel A includes two short segments that were excavated in grid units and assigned separate feature numbers (Feature 456 in XUs 119 and 120, and Feature 553 in XU 128). Channel B assigned to Feature 458 in XU 125 and Feature 459 in XU 122, and Channel C includes segments identified as Feature 208 in XUs 103 and 105, as Feature 457 in XUs 102 and 125, as Feature 460 in XU 122, and as Feature 534 in XU 123.

Channels were tracked through NSTR 101 were assigned to three main areas south, north and west of Structure 3 (the AT&SF engine house foundations built in 1880). This tripartite spatial division of the study unit also hinges around a relatively large, buried rock cluster (Feature 533) immediately south of Structure 3 that appears to have served as a diversion point or water-control device (Fig. 3.12).

Feature 533. Feature 533 was a series of three cobble clusters that made up a single water diversion feature. Two small cobble berms constructed of groupings of 8 to 20 large river cobbles measuring from 20–35 cm in diameter were placed on either side of Feature 532 to divert water flow along the course of the north–west running Channel C (Figs. 3.13, 3.14, 3.15). The two aligned cobble piles (measuring 1.25 by .35 and .60 by .30 m) effectively reinforced the acequia bank and restricted the water channel opening from.65 m at the feeder ditch to .25–.30 m at the smaller sangria opening. A larger cobble mound constructed of comparably sized cobbles was located on the west bank of Channel C (Feature 534). The pile measured 1.35 by 1.40 m and was located just over 1.5 m north of the diversion point. A narrow (.35 m wide) berm spanned the distance between the diversion point and this large pile, which may have restricted water flow in the larger ditch. This permitted water to pool in the main channel allowing the water level to rise so that it could be effectively diverted into the Feature 532 sangria. The pile could have also provided surplus rock for closing down the west-flowing diversion.

South Area

The series of channels that approaches Channel A (Feature 533) from the south presumably drew off of LA 146407 or the Manhattan Street Ditch just to the south of Manhattan Avenue, roughly 50 m

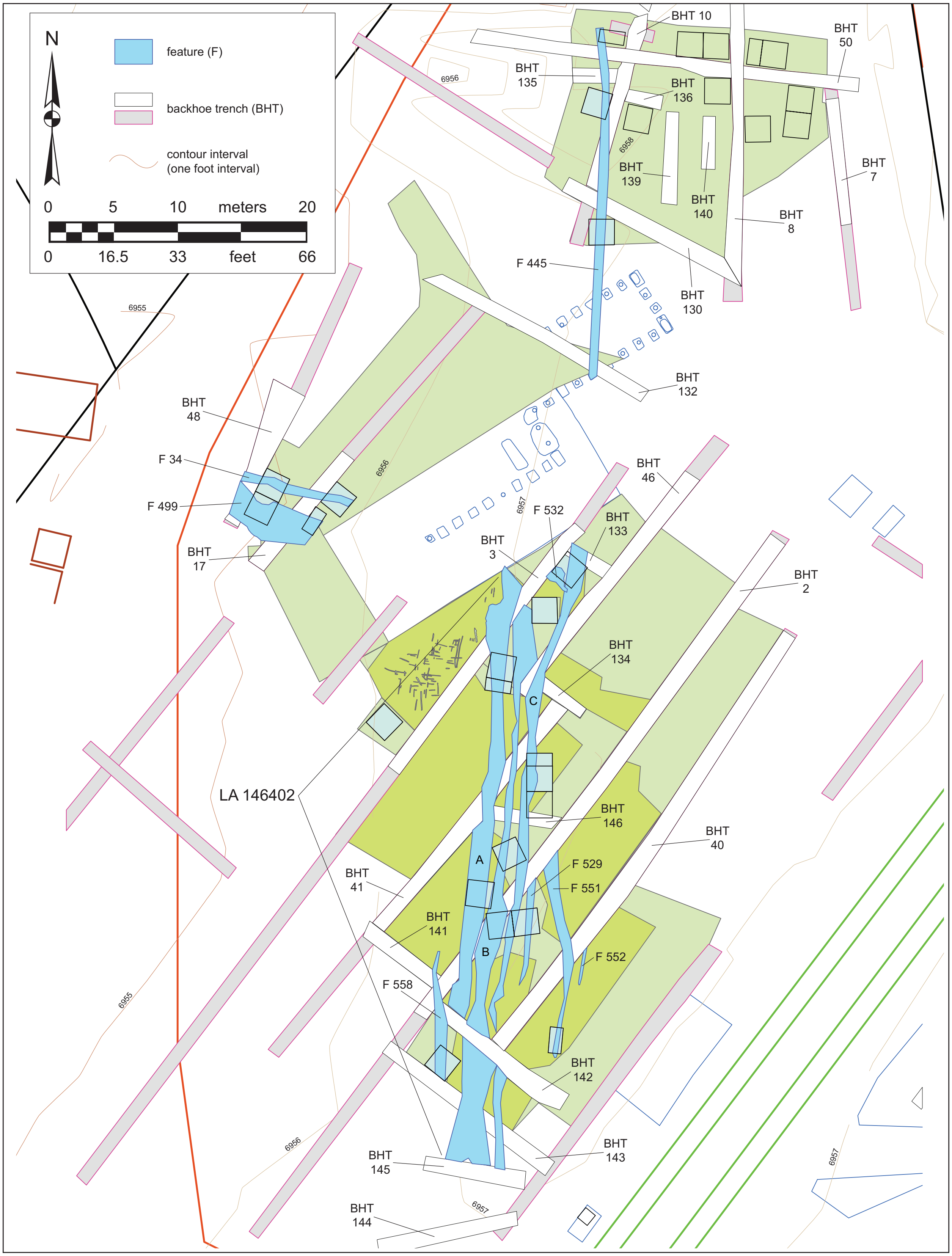


Figure 3.12. LA 146402, NSTR 100 overview and excavation map, showing the extent of the pre-railroad agricultural irrigation features and deposits.

(165 ft) past the perimeter of LA 146402 (Wenker and Hannaford 2005a). The presence of a broad single channel at the south end of the study unit (in BHT 145, Fig. 3.16) presumably reflects the fact that this was the end closest to the acequia, and that the channels generally shared a common course up to this point (BHT 144 to the south was too badly disturbed to provide any clarification). As the channels extended northward, the visible alignments gradually segregated into at least three separate, main but parallel channels (Channels A, B, and C; Fig. 3.17), and discontinuous channel segments (e.g., Features 529, 551, 552, and 558) that orient roughly toward the Feature 533 rock pile (Fig. 3.12). Two of the three main channels (A and B) end at or near the Structure 3 foundation and do not continue north of that building. The third channel (C) passed by the rock diversion feature (Feature 533) and apparently continued toward the midden to the north (possibly to become Feature 445). A poorly preserved remnant side channel (Feature 532) extended westward from Feature 533 toward the two channels west of Structure 3 (Figs. 3.12, 3.13). The three southern channels (A–C) occasionally exhibited superimposed edges in some of the hand-dug excavation units (e.g., Feature 457 overlay part of Feature 529 in XU 102; Fig. 3.18). Analyzed Euroamerican artifacts from the three separate channels are dominated by domestic dinnerware, mostly made of white-bodied earthenware. Small amounts of majolica and porcelain were recovered from Ditch A and trace window glass from Ditch C. Though all assemblages date to the early to mid-nineteenth century artifact content tentatively suggests that Ditch C could have been the last in use.

Features 99 and 100. Features 99 and 100 were, two narrow sand-filled channels, previously reported during the testing phase and mistakenly identified as field fill. They were later identified as sand within sediment filling two of the larger overall channels in this area (Features 457 and 529). During the testing phase, a second main field-related deposit that accompanied the coarse sand was identified. This deposit, variously called Stratum 7 or 16 during the testing, was interpreted at that time as an anthropogenic topsoil or field-fill deposit, through which the sandy lenses of Stratum 11 were interspersed. Hand-dug excavation units excavated during the data-recovery work revealed that the water-conveyance channels, which were most clearly evidenced by their coarse sandy contents, also contained substantial deposits of finely laminated silt and more massive deposits of sandy loam. Some of these types of channel-fill deposits were probably mistaken during the testing as field-fill deposits (Stratum 7/16). However, legitimate field-fill sediment was also observed in other areas adjacent to some of the known channels, and the channels were occasionally capped by Stratum 7/16 fill, a consolidated yellowish brown silty clay loam.

West Area

To the west of Structure 3, a pair of channels (Features 34, 499; Figs. 3.12, 3.19, 3.20) with relatively steep gradients flowed westward, directly down the natural topographic slope. These channels' alignments also projected eastward toward Feature 533, although Structure 3 intervened and these features could not be directly connected to the diversion feature.

To the north of Structure 3, a single channel (Feature 445) was fairly well defined as it extended north from Feature 533 (Figs. 3.12, 3.21), but as this channel crossed along the top of the western edge of the pre-railroad midden deposits farther north (NSTR 101, see above), the feature became broader, thinner, and indistinct, and eventually could not be tracked.

Feature 554 and 555 were two small rock clusters (Figs. 3.22, 3.23), both were roughly 1 by 2.5 m across, were present near the southern end of the study unit, and situated in the field fill among the braided channels. Neither could be definitely associated with a particular channel and no clear diversion to a branching watercourse was observed in association with either feature. They may have been water management features or field markers.

Field Deposits

Field deposits were observed throughout a discontinuous area extending from BHT 133 on the north to BHT 145 on the south, and from SCU 151 on the west to SCU 150 and 158 on the east (this sediment was not encountered in SCU 157 or in other BHTs east of that unit). These field-fill or topsoil sediments were sampled during water channel excavation during data-recovery, and an additional hand-dug excavation unit (XU 129) specifically targeted this field fill in a location removed from the channels. A more dispersed, less well-defined anthropogenic topsoil was also observed throughout

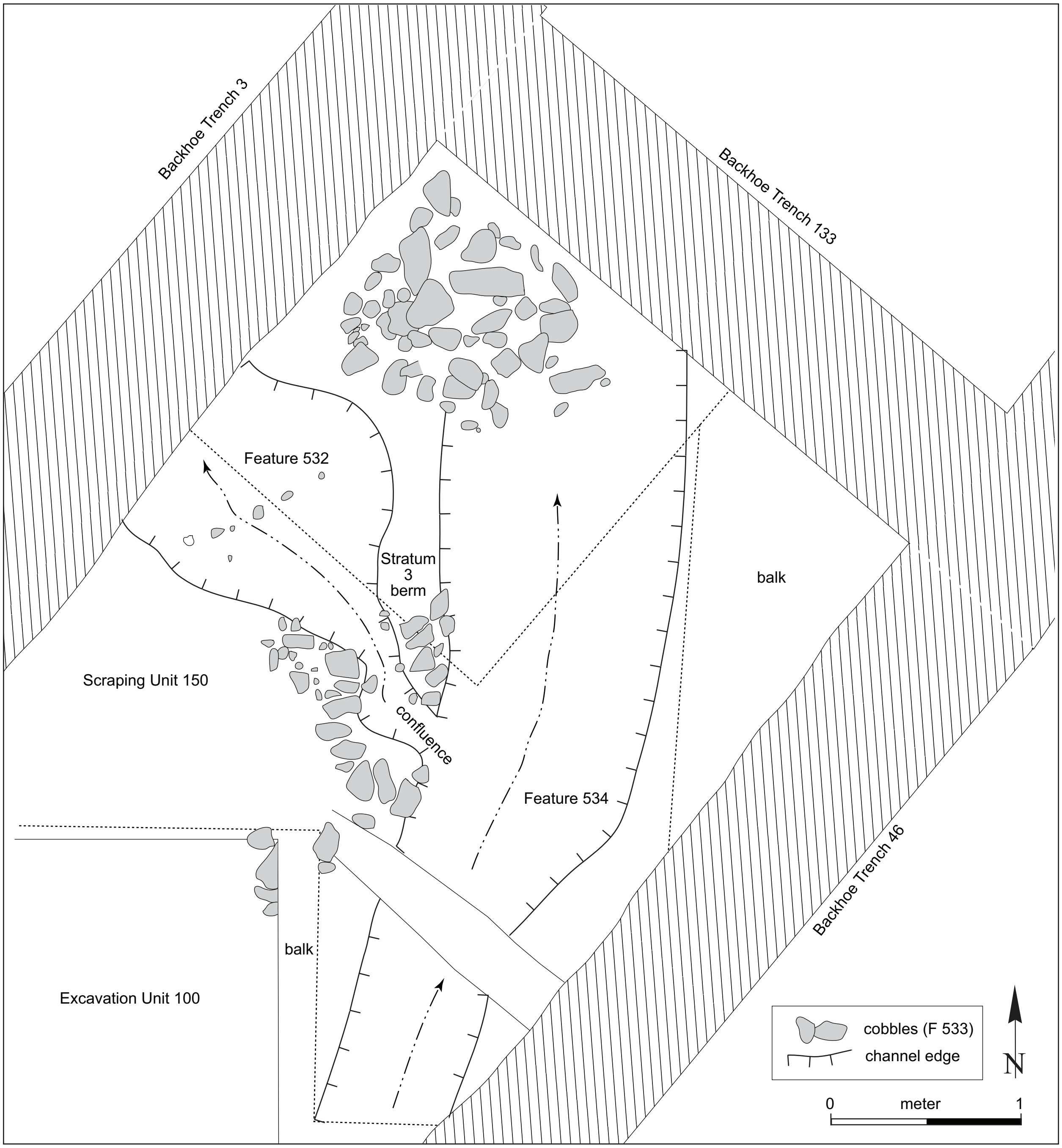


Figure 3.13. LA 146402, NSTR 100, excavation map of Feature 533, a rock pile/water-diversion feature, and Features 532 and 534, nearby water channels.

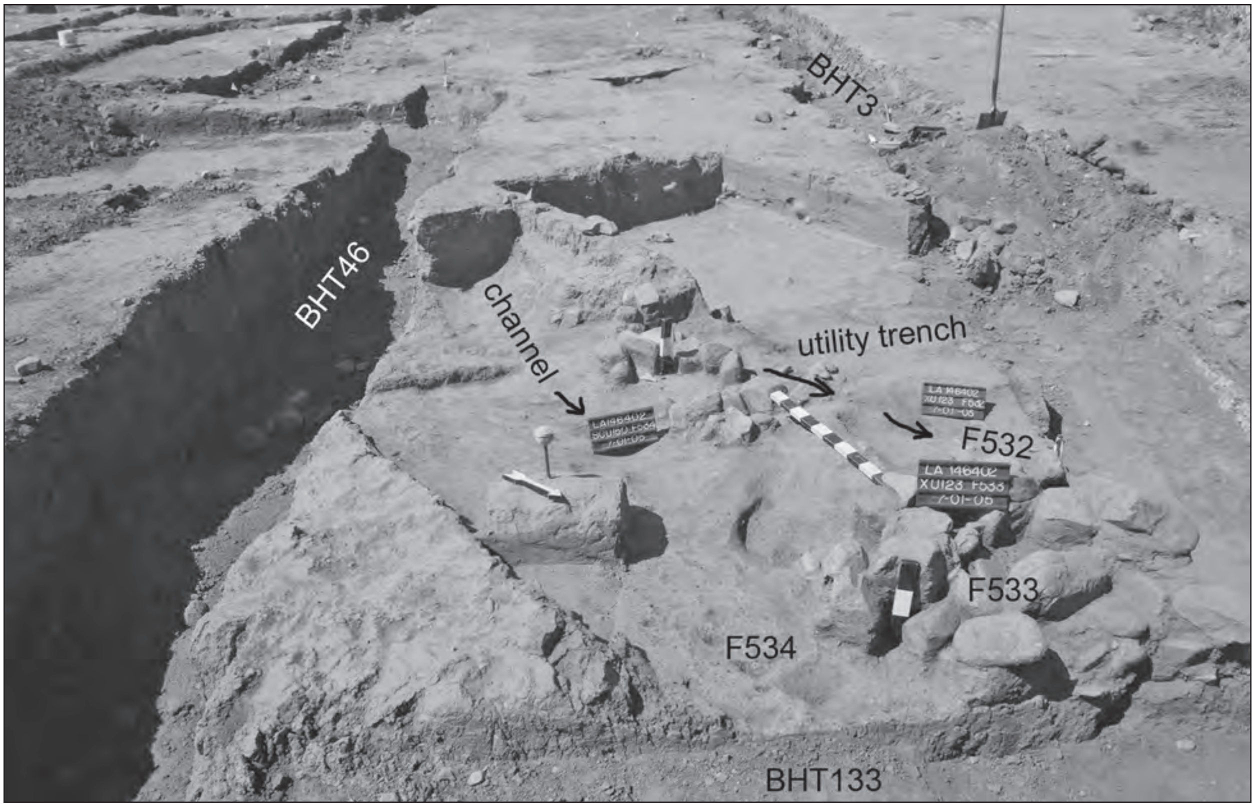
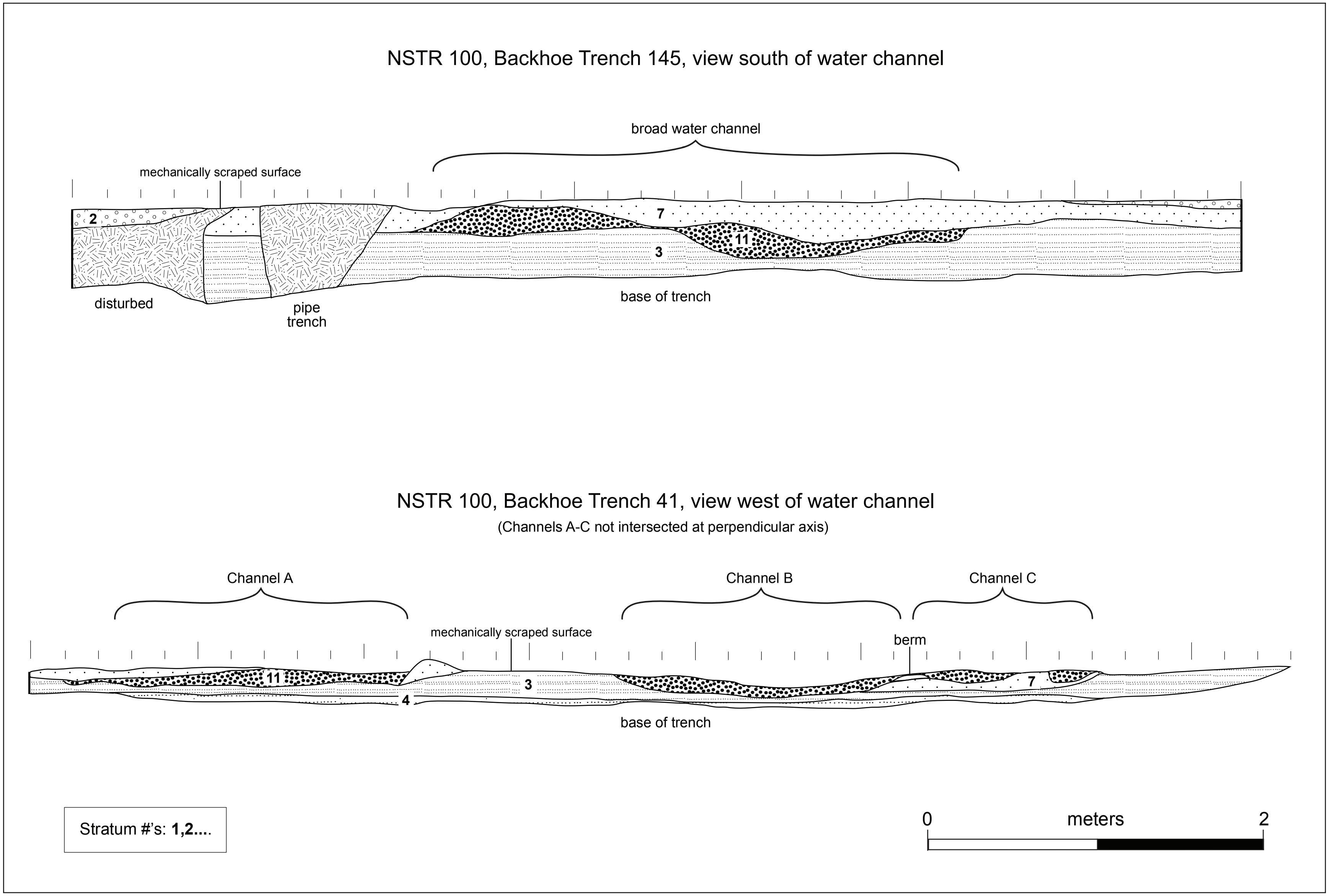
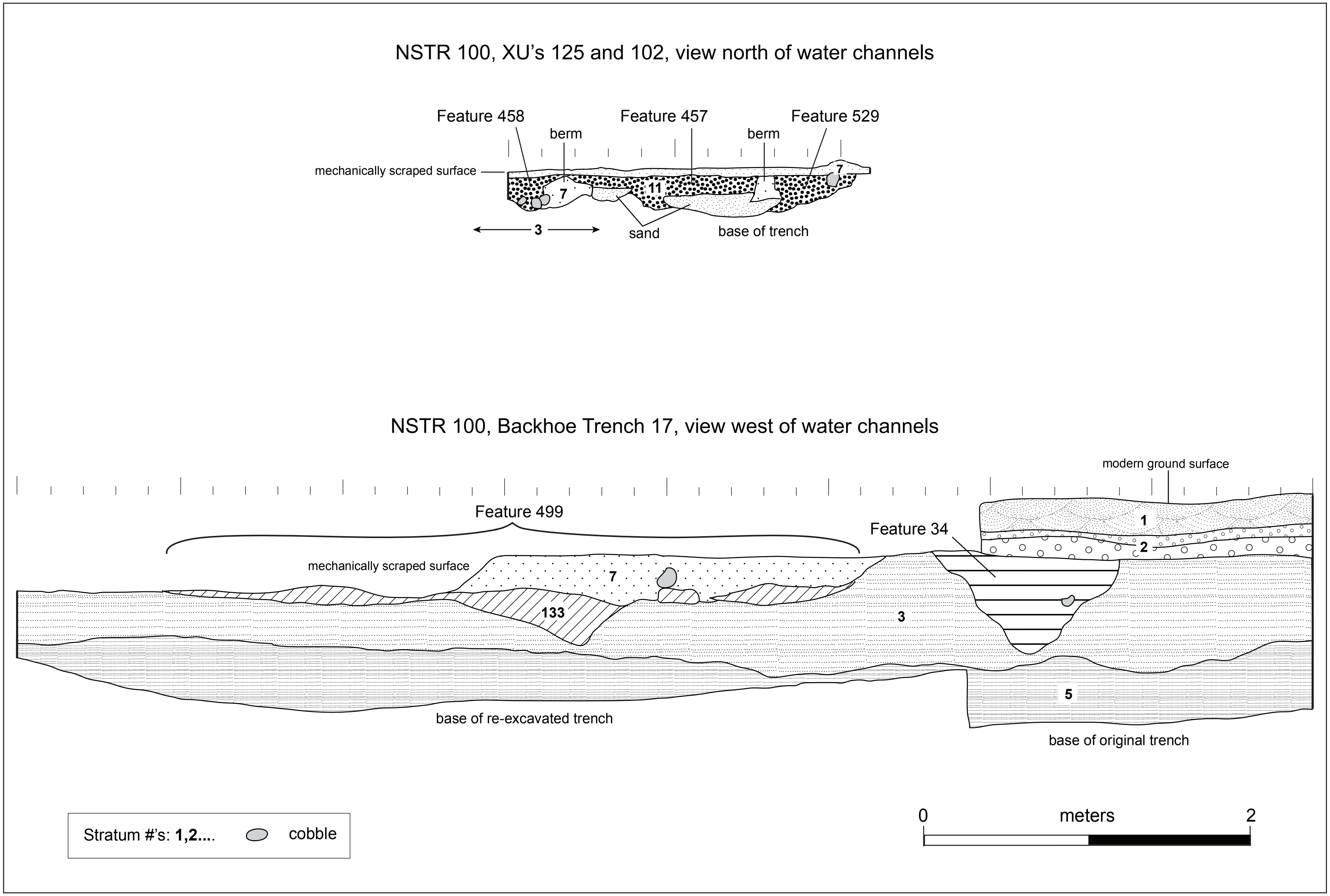


Figure 3.14. LA 146402, NSTR 100, depicting the rock pile/water-diversion feature (Feature 533).

Figure 3.15. LA 146402, NSTR 100, Feature 533, a rock pile/water-diversion feature.



Figures 3.16, 3.17. LA 146402, top (Fig. 3.16): NSTR 100, cross section of water channel along BHT 145; bottom (Fig. 3.17): NSTR 100, cross section of water channels along BHT 41.



Figures 3.18, 3.19. LA 146402, top (Fig. 3.18): NSTR 100, cross section of water channels in the northerwall of XUs 125 and 120; bottom (Fig. 3.19): NSTR 100, cross section of water channels along BHT 17.

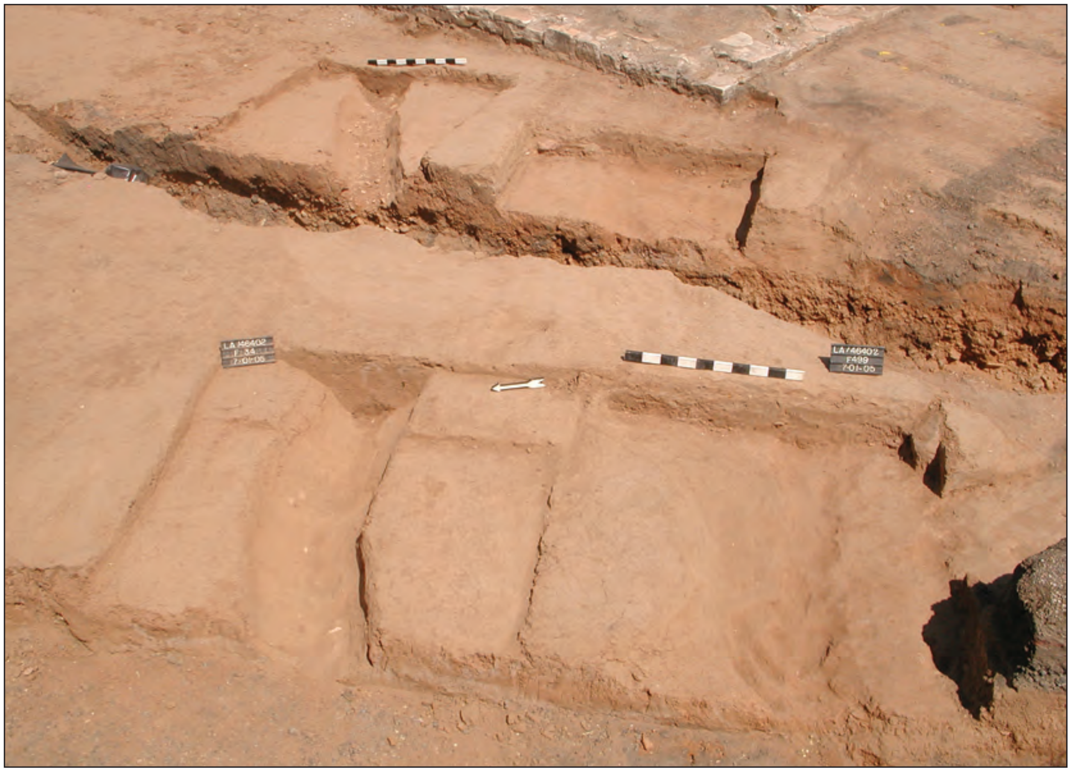


Figure 3.20. LA 146402, NSTR 100, water-channel Features 34 and 499, at the southeastern corner of Structure 3.

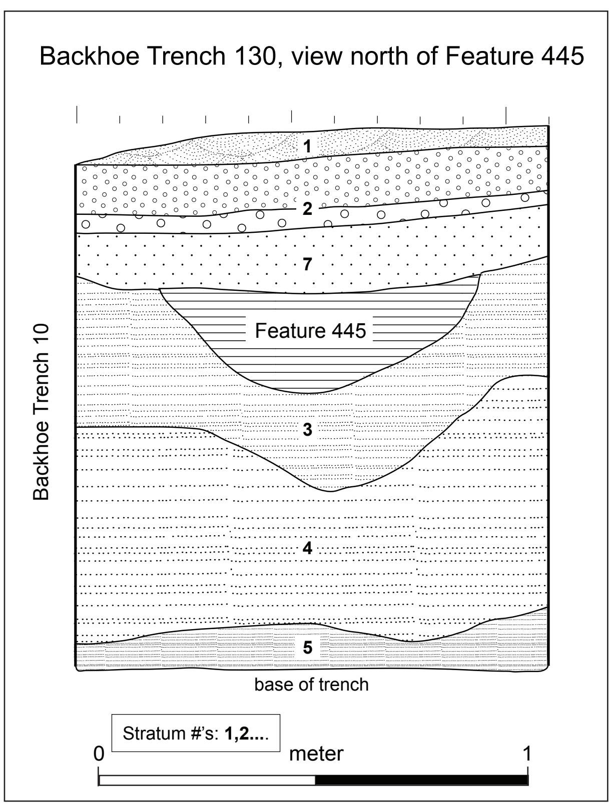


Figure 3.21. LA 146402, NSTR 100, cross section of water channel along BHT 130.

the central portion of LA 146402. This deposit consisted of an upper member of the Stratum 3 (the hard reddish-brown clay) that was distinguished by the presence of sparse, fine charcoal flecks. This type of charcoal-flecked Stratum 3 deposit was present in the area between Structure 3 on the west and SCU 136 on the east, and from the northern end of BHT 46 to the southern end of BHT 40. Mechanical scraping in this particular material revealed no artifacts or features.

Two features provide physical evidence an agricultural field in this study unit. In one scraping unit adjacent to the southeastern end of Structure 3 (SCU 149), a relatively discrete deposit of the Stratum 7/16 field-fill sediment was mechanically removed to reveal an abrupt lower boundary with the underlying Stratum 3 substrate. At the level of this contact, a series of narrow, shallow, linear furrows (Feature 538) was exposed (Figs. 3.12, 3.24). The furrows generally measured between 3 and 6 cm in width, 20 to 150 cm in length, and 1 to 2 cm deep. These plow scars, which contained Stratum 7/16 fill, were aligned along north–south and east–west axes, generally parallel and perpendicular to the water-channel alignments. This furrow complex is interpreted to reflect field-plowing activities. Plowing is indicated by the furrows or marks left by plowshares as they scratched into the very top of the underlying sterile sediment. The orientation of the furrows indicates that plowing directions were mainly oriented north–south, parallel with the main water channels (A–C), with fewer plowing passes dug along east–west lines. This feature was also encountered a short distance east of SCU 149, but could not be traced to the south in SCU 151. Another much smaller set of north–south-oriented furrows (Feature 546) was exposed in SCU 154; these furrows were not dug into sterile substrate but were present within the field-fill deposit at the same level as the top of an adjacent water channel (Feature 552). These observations indicate that the type of agriculture pursued in this area involved fields rather than orchards or small, subdivided garden plots.

As indicated in Table 3.6, preliminary artifact counts recovered from controlled excavations within the channel and field deposits (n = 4696 items) consisted primarily of faunal elements (e.g., cow and sheep bone) and Native-made ceramics, many of which exhibit highly rounded edges from extensive alluvial transport and saltation. Metal, glass, and Euroamerican ceramics were also present in lower numbers. Nine pieces of chipped stone were recovered and analyzed from the field and irrigation deposit. The only datable piece of chipped stone in field context was a quartzite strike-a-light flint made of angular debris. Coal and clinkers were not common inclusions in field fill, and were absent from most excavated contexts.

NSTR 100: Summary

Artifact content from the field and irrigation system (see below) strongly indicates a pre-railroad-era use for this field, but the period of its earliest development remains undetermined. Although the multitude of merging and diverging channels following a common alignment, super-positioning suggests sequential development, rather than the contemporary formation of these channels. Artifact content provides very little indication of sequence—except to indicate that all channels likely started to aggrade between about the 1850s and 1880s. The presence of multiple channels that were periodically renewed along slightly different courses may indicate that this north–south corridor marks a prescribed alignment, possibly defined by, or defining, a property or field boundary or other political or legal demarcation. The now-destroyed point of the channels divergence could mark a field corner.

Although archival research by D. H. Snow (Chapter 7, this report) and by Hordes and Payne (Scheick 2003) differs as to details concerning names and family lineages of early residents of the area, they do agree that farming took place in the vicinity in the mid-eighteenth century. Whatever the name of the residents, midden fill excavated in NSTR 101 would seem to indicate that one of these habitations was nearby.

A sample of lot measurements from Colonial- and Territorial-period planting grants south of the Santa Fe River researched by D. H. Snow (Chapter 7, this report) indicates that grants averaged 5 acres and were longest along their north to south axes, which matches the predominant orientation of documented plow furrows. Lot dimensions reported by Snow for two lots granted in 1774 and 1775 were: 385 by 286 ft and 471 by 153 ft, ranging from 2.57 to 1.78 acres. By 1914, 14 parcels west of the railyard were, on average, three acres in size. Crops recorded by the 1914 hydrographic survey as summarized by

Figure 3.22. LA 146402, Feature 554, cobble feature.

Figure 3.23. LA 146402, Feature 555 cobble feature.

Figure 3.24. LA 146402, NSTR 100, SCU 149, Feature 538 partial overview, showing plow furrows in the top of Stratum 3 sterile substrate.

D. H. Snow in Chapter 7 (this report), were wheat and corn. Temporal components represented by the particular field excavated at LA 146402 can only be assigned to a wide date range given the acequia artifact assemblages and the intrinsically churned nature of plowed deposits. The field could have been cultivated during any time between 1700 and 1880 or later.

Atchison, Topeka and Santa Fe Railway Infrastructure, LA 146402

Constructed in 1879/1880 the Atchison, Topeka and Santa Fe Railway (AT&SF) infrastructure was made up of nine building foundations and two extramural study units that contained numerous railroad-related features superimposed on the earlier acequia and field component previously discussed (Table 3.1). These buildings included: the AT&SF depot, later a freight warehouse; two loading docks; a freight scale; three privies; a water crane; remnant track alignments; pits; and utility pipes. In addition to these facilities, the North Railyard included LA 146403, a well and water tower located to the north, and LA 146404 and LA 153442, which were segments of track.

Structures 1 and 2: Freight Scale and Loading Dock

Two architectural features identified during the excavation were Structure 1 and Structure 2. Built of concrete, Structure 1 was the subterranean housing for the freight scale. Structure 2 was the surrounding building and loading dock, which were probably remodeled to house the freight scale. Because Structure 2 was remodeled to accommodate the freight scale and the two structures uses were interrelated, the following discussion is presented in order of their construction sequence. Structure and feature dimensions are summarized in Table 3.7.

Structure 2: Loading Dock

Structure 2 consisted of the stone masonry and wood foundations of an apparent loading dock located adjacent to the west side of the 1880 railroad tracks (Figs. 3.2, 3.25), across from the south end of the first AT&SF depot (Structure 8). The dock was remodeled at least once. The structure originally consisted of one room along the tracks that was later expanded by the addition of a second larger room to the west. Structure 2 contained Structure 1 within its outer walls.

Excavation Sequence

This structure was first encountered during testing as a single masonry wall in BHT 5 (originally recorded as Feature 21). At that time, the structure was initially exposed by XUs 17, 18, 25, 26, and 30, with equivocal results (Wenker 2005). During data recovery, the testing units were re-excavated, and the tops of the foundations were then fully exposed in SCUs 100 and 101 (Figs. 3.26, 3.27). SCUs were excavated with mechanical equipment to remove .30 m (98.42 ft) of overburden (Stratum 2). The interior details of the structure were then exposed and defined by a series of 15 hand-excavated scraping units (SCUs 102–106, 110, 127–129, 131, 134, 135, 138, 139, 140; Fig. 3.26). These SCUs were placed to reveal selected portions of the foundation walls and features (sizes and locations are summarized in Table 3.7 and in Figure 3.26), as well as to expose construction details and cross-sections of the structure. Four of these units (SCUs 102, 105, 106, 110) were excavated in .10 m levels and 1/4-inch screened to obtain an artifact sample from the fill surrounding the stone foundations and associated wooden sill plates (n = 213 items were recorded in preliminary artifact tallies; Table 3.8). Loose coal and cinders identical to the overburden (Stratum 2) completely filled the structure.

Description

Based on masonry wall abutments and elevations, two construction episodes were apparent. Room numbers were assigned to each built space. Room 2.1 was the first room built. It measured 9.2 m by 2.6 m (30.18 by 8.5 ft). Room 2.2 expanded on Room 2.1. This addition extended the structure 5.52 m (18 ft) to the west and appeared to raise the floor level. The new western foundations were consistently .18 to .23 m (.5 to .75 ft) higher than the original Room 2.1 walls. This later elevation matches that one for the presumed freight scale (Structure 1), suggesting a temporal and functional relationship between the scale and Room 2.2. As part of this remodeling event, Room 2.1 may have been improved or raised to match elevation of the Room 2.2 addition original foundations (e.g., Features 203, 261, 205).

Initial construction methods that reflected a formulaic building approach were primarily comprised of two rows and two to four courses of dry laid sandstone block placed in a shallow footer trench that was dug into sterile substrate. The bases of the masonry walls were variably constructed into Stratum 3 or 5, following the natural contour of the natural subsoils. Site preparation apparently entailed grading the site below the level of the railroad tracks before the structure was built. Wooden sills or base plates, consisting of .10 by .15 m (4 by 6 in) Douglas fir timbers, were placed on top of the masonry foundations and secured with large nails. Individual beam lengths and corner abutments were difficult to discern because the wood was badly rotted and exceedingly friable. Remodeling techniques appear to have been more ad hock than original construction and involved scavenging some of the original foundation's rock to expand and raise the structure's elevation. In addition to building foundation segments onto sterile substrate, cobbles were also placed in fill and onto old footers. The construction sequence is described below by room.

Room 2.1

Room 2.1 was the eastern room in Structure 2. Based on its proximity to the 1880 railroad tracks, and the wall abutments, this room was probably the first Structure 2 space. Measuring 9.2 m (30.18 ft) long and 2.6 m (8.53 ft) wide, the long axis of this room paralleled the tracks (northeast-southwest). The space was defined by four masonry foundations (identified as Features 202, 203, 205, and 259). All of the sandstone foundations were set into a .05 to .07-m-deep (2 to 3 in) footer trench dug into Stratum 5. The masonry walls were constructed of two to four courses of stone- and cobble-sized sandstone slabs and blocks. Wooden base plates or sills were installed along the tops of all the Room 2.1 foundations; these sills were placed at a uniform elevation

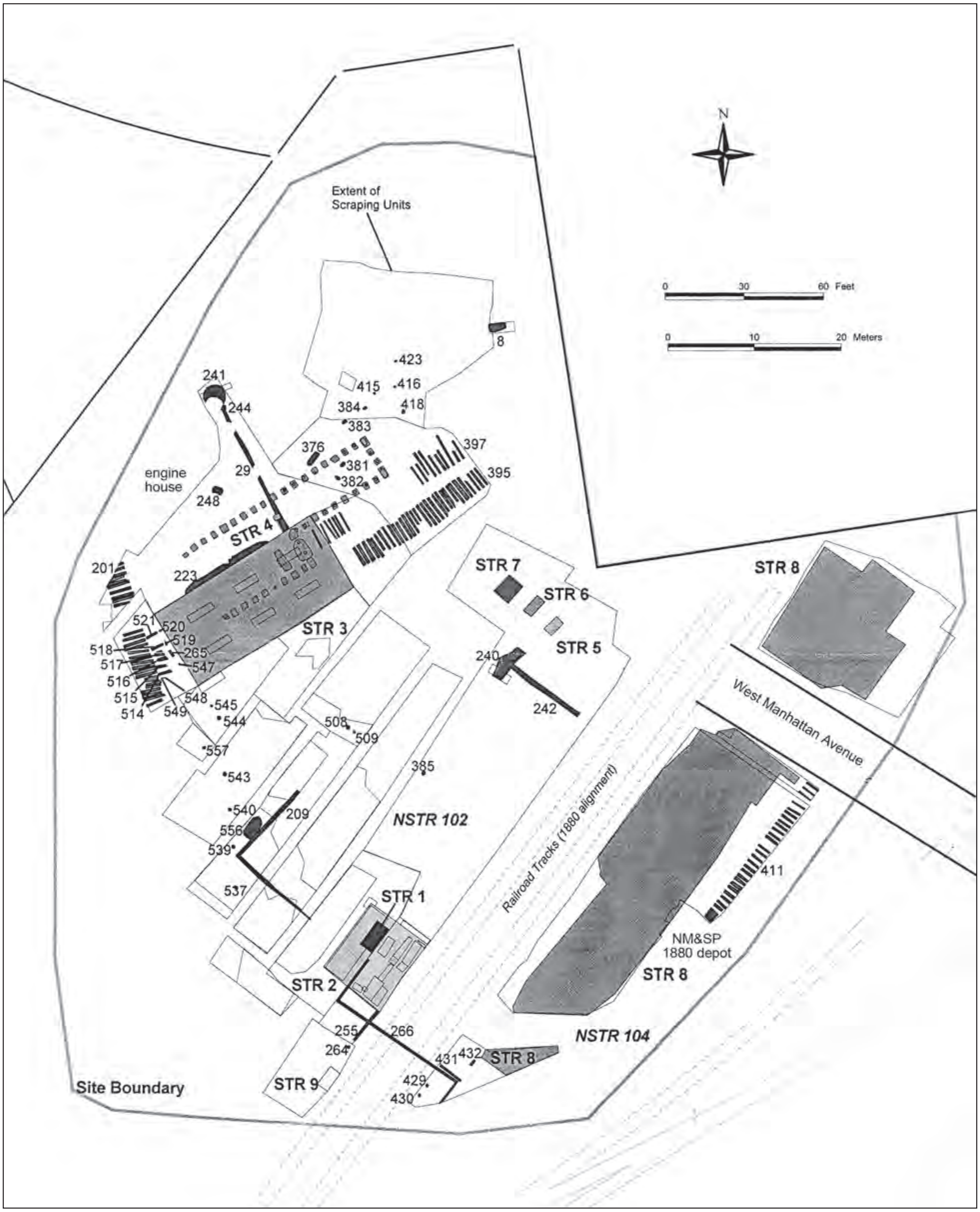


Figure 3.25. LA 146402, overview map of the AT&SF structures (Structures 1–9) and extramural areas (NSTRs 102, 104) and features.

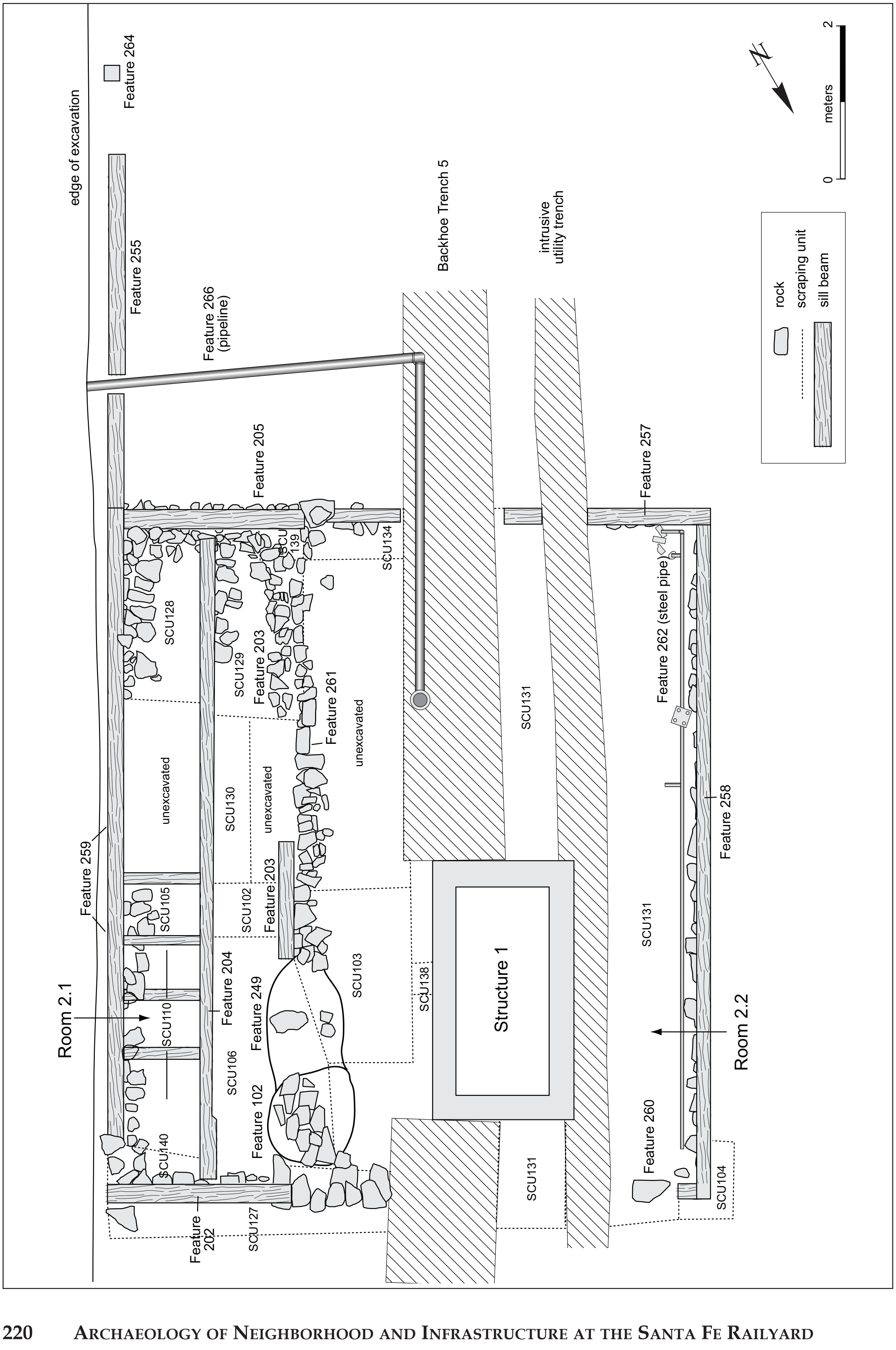


Figure 3.26. LA 146402, Structures 1 and 2, overview and excavation map.

Figure 3.27. LA 146402, Structures 1 and 2, final excavation overview.

but were degraded and had been partially removed by modern refuse pits (e.g., Features 102 and 249).

The four foundations of Room 2.1 were assigned feature numbers (Table 3.7) and are discussed below. Features 202 and 205 were assigned to north and south foundations. Features 203 and 259 were assigned to west and east foundations.

Feature 202. The north foundation, was 2.06 m (6.75 ft) long, .32 to .35 m (12.5 to 14 in) wide, and .24 m (9.5 in) high. Constructed of irregularly fractured sandstone blocks ranging in size from .20 by .12 by .09 m (.66 by .39 by .29 ft) to .26 by .21 by .12 m (.85 by .69 by .39 ft), the foundation was two rows wide and two courses high, this foundation was bonded with Feature 259 (the eastern foundation) and abutted Feature 260 (a Room 2.2 foundation that continues west past the western end of Feature 202). A rotten wooden base plate spanned this foundation segment and was nailed into the underlying masonry. Evidence for later remodeling is provided by leveling stones placed to support the new (but now absent) Structure 2.2 north sill plate.

Feature 203. Feature 203, the west foundation of Room 2.1, was 9.1 m (29.9 ft) long, .60 m (2 ft) wide, and .43 m (1.4 ft) high. Intrusive, recent pits (Features 102, 249) truncated much of the foundation's northern end, obscuring its relationship to Feature 202. This segment was constructed of two to three courses of stone laid two rows wide. Stones ranged in size from .20 by .12 by .09 m (.66 by .39 by .29 ft) to .26 by .21 by .12 m (.85 by .69 by .39 ft). A fragmentary 1.3 m (4.26 ft) long section of wooden baseplate was present. This base plate paralleled Feature 261. This foundation was later augmented during Room 2.2 construction and bonded with Feature 261. Reported wall elevations reflect this remodeling episode.

Feature 205. Feature 205 the south foundation of Room 2.1, measured 2.5 m (8.2 ft) long, .70 m (2.3 ft) wide and .60 m (2 ft) high. The foundation was originally two courses high and two rows wide, but the interior row's top course was partially scavenged resulting in a jumbled appearance that initially appeared to indicate hasty construction. Despite this disturbance the base plate was still intact and rested on the undamaged exterior row of cobbles; this sill was attached to the masonry at the southeast corner with nails. Feature 205 was bonded at its east and west ends to the other Room 2.1 foundations.

Feature 259. Feature 259, the east foundation of Room 2.1, and was the closest to the railroad tracks located 2.80 m (6 ft 10 in) from the existing track. The foundation was 9.16 m (30 ft) long, from .48 to .63 m (1.6 to 2.1 ft) wide, and was .38 m (1.3 ft) high. The foundation was placed into a .06 m (2.4 in) deep footer trench excavated into Stratum 5. Although the foundation may have been originally constructed of two rows of rock stacked two courses high, rock from the top interior course was apparently scavenged, leaving gaps in the foundation. The base plate rested on the intact exterior row of cobbles. This wall was bonded to Features 202 and 205 to the north and south.

Feature 204. One long beam spanned the north–south central axis of Room 2.1. The beam was 9.2 m (30.2 ft) long; accurate width and thickness measurements were difficult to obtain because the beam was degraded, but it measured more than .15 m (6 in) wide and, based on the remaining wood (.07 m [3 in]) and nails protruding an additional .07 to .15 m (3 to 6 inches), it could have been about .15 m (6 in) thick. This beam was not supported along its length by any interior piers, but rested directly on Stratum 2 fill. This observation suggests that the exterior masonry walls were first built upon the sterile substrate, the interior was filled with coal and clinker to the top level of the walls, and this central beam was then placed on the top of the fill to span the room. This construction sequence is supported by the vertical distribution of artifacts in the screened SCUs in this room (Table 3.8), which indicates that nearly the entire assemblage was recovered from the uppermost fill (Level 1), immediately under the floor. The lowest coal and clinker deposits lacked artifact inclusions, indicating its origin and use strictly as construction fill. This long central beam probably served as a central floor support, because SCU 110 contained remnants of four additional boards spanning the space between this beam and the eastern masonry wall that resemble floor joists. These joists were centered .75 m (30 in) apart. This beam-and-joist array is the only evidence of potential floor support in Structure 2; no intact floor planks remained.

Room 2.2

The western addition to Structure 2 was identified as Room 2.2. North-to-south dimensions remained virtually unchanged (9.20 m [30.18 ft]), but the extension of this room 5.52 m (18.11 ft) to the west more than doubled the original structure's size, creating a pair of rectangular rooms or a single nearly square room or platform. The south, north, and east foundations (Features 257, 260, and 261, respectively) represent additions to and modifications of some of the original masonry walls of Room 2.1. As discussed above original foundations were partially dismantled. The sandstone block scavenged from these walls was likely employed to expand the structure, completing foundations discussed below.

Both north and south foundations were installed on the gradient that sloped towards the nearby tracks. The original structure was narrow enough to clear the elevation difference, but the new, widened foundations spanned a .56 m incline (Fig. 3.28, Profile B). Because the original building foundations were .16 m (.5 ft) below the top of this grade the base of the newly remodeled western wall (Feature 258) was excavated roughly .16 m (.5 ft) into the sterile substrate. The eastern ends of the north and south walls were built up to match the same grade as the western wall. As in the original room, wooden base plates or sills were installed on top of the foundation masonry in Room 2.2. These sills, plus the elevated grade of Room 2.2, produced walls that lay about .20 m (0.6 ft) above the original foundation of Room 2.1. Modifications to Room 2.1 indicate that the walls of the eastern room were built up to the level of the new western room and to the freight scale (Structure 1) housed in the newly remodeled building. For example, the top of the base plate in the southwest corner of Room 2.2 lay at precisely the same elevation as the top of a modified section of Feature 205, in the southeast corner of Room 2.1, where three intact masonry stones were present in positions directly upon Stratum 2 at the eastern end of the wall (Figs. 3.26, 3.28).

Feature 257. Feature 257, the south foundation of Room 2.2, measured 5.40 m (17.7 ft) long and approximately .30 m (1 ft) wide, and ranged in height from .11 to .48 m (4 to 19 in). West of BHT 5, Feature 257 consisted of a single row and course of stones set into Stratum 3. Cobbles were set perpendicular to an overlying wooden base plate, which ran the length of the new foundation segment. This was the same construction technique used in Feature 258 discussed below. East of BHT 5, the foundation consisted of a single row and course of stones set in a deposit of Stratum 2 that served to maintain the wall's elevation (Fig. 3.28). At its eastern end, this wall consisted of a stack of four courses that abutted the exterior of the southwestern corner of Room 2.1. The addition was bonded with Features 261 the reconstructed center wall and with 205 the Room 2.1 foundation wall to the north, both of which were apparently dismantled and then reconstructed at the juncture to accommodate the remodel. Further to the west, at the structure's corner three sandstone blocks stacked on the interior room fill just north of Feature 205 raised the room corner elevation to match that of Feature 257.

Feature 258. Feature 258, the west foundation of Room 2.2, measured 9.35 m (30.7 ft) long, .25 m (10 in) wide, and .30 m (1 ft) high, placing the top of the wooden sill plate just below grade. The masonry portion consisted of a single row and course of stones (.50 x .10 x ±.25 m), set in the bottom of a shallow footer trench that extended up to .30 m west of the edge of the wall. At irregular intervals (.76 to .97 m, 30 to 38 in) an elongated cobble footing was set perpendicular to the sill plate and protruded .05 to .19 m (2 to 7 in) inwardly, forming a series of ledges that may have supported floor joists (Figs. 3.26, 3.27). This construction technique was also used to build the western segments of Features 259 and 260.

Feature 260. Feature 260, the north foundation of Room 2.2, measured 5.0 m (16.4 ft) long, .50 m (1.6 ft) wide, and between .15 and .50 m (6 to 20 in) high. As with Feature 257, the eastern end was more substantial than the west, because the east end was built up to raise the grade of the overlying structure. West of BHT 5, Feature 260 consisted of a single row and course of stones set into Strata 3 and 5. At its eastern end, this footing consisted of five courses that abutted the exterior of the western end of Room 2.1 and bonded with Feature 261, the Room 2.2 foundation to the south.

Feature 261. Feature 261, the eastern foundation of Room 2.2 also represents a rebuilt version of Room 2.1's original western wall (Feature 203). Feature 261 measured 9.1 m (29.9 ft) long, .30 m (1 ft) wide, and 25 m (10 in) high. The base of this foundation consisted of two rows and two courses of sandstone masonry abutted to the entire western side of Feature 203 (Room 2.1's western wall). The upper level of Feature 261 extended above the top sill level of adjacent (and parallel) Feature 203, and part of the upper course of Feature 261 overlapped that of Feature 203, bonding the tops of the walls together.

Features 262 and 266. Feature 262, the only features associated with Room 2.2, were a pair of parallel 1 3/4 in diameter (.044 m) steel pipelines extending along the interior base of Room 2.2's western wall (Fig. 3.26). Both pipes exhibit several copper or brass fittings and valves. This feature, along with Feature 266 (another pipeline outside the building), indicates that the Structure 1–2 complex was once served with water (or, possibly, gas).

Structure 1: Freight Scale

This structure consisted of a rectangular concrete foundation, possibly for a freight scale, located 6.4 m (21 ft) west of the 1880 rail line and inside Structure 2 (Figs. 3.2, 3.25). Given its spatial association, its orientation, and a similar upper elevation level, Structure 1 appears to have been a later addition to the Structure 2 loading dock that surrounds it.

Excavation Sequence

Structure 1 was initially exposed during testing in BHT 5 (recorded as Feature 20) and it was sampled at that time with a 1 x 1 m unit (XU 17; Wenker 2005). Artifacts obtained during testing in XU 17 provided a sufficient sample to render further sampling of this post-abandonment refuse unnecessary (Wenker 2005).

During data recovery, the structure's top was fully exposed by SCU 100, which removed approximately .30 m of overburden (Stratum 1 and 2), and by BHT 5, which exposed the exteriors of the north and south walls and the underlying substrate. Data-recovery work originally involved re-excavating XU 17 and removing fill from the east half of Structure 1 to expose a north–south cross section. Stratum 2 fill was removed from the northeast quadrant to the concrete floor, but in the southeast quarter, archaeologists encountered loose asbestos .10 m beneath the top of the wall. Archaeological excavation ceased, and an asbestos remediation team removed all remaining structure fill for offsite disposal, leaving the foundation intact for architectural documentation.

Stratigraphy

Feature fill (Stratum 2) was black, loose sandy loam with small stone and gravel, and contained abundant coal and historic refuse including shards

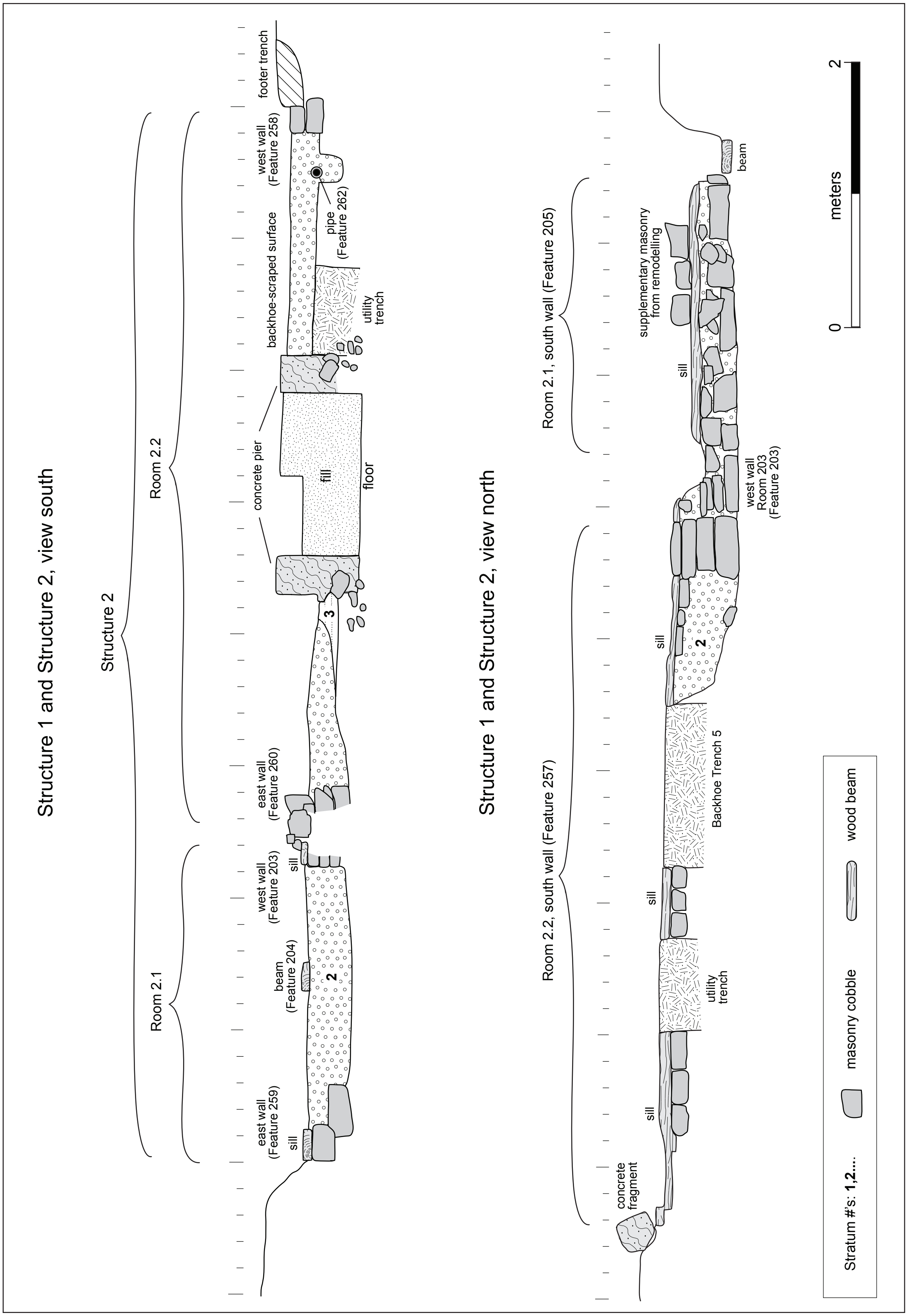


Figure 3.28. LA 146402, Structures 1 and 2, cross-section and elevation views.

of glass, metal, plastic, ceramic sewer pipe, metal pipe, tar paper, and ceramic tile. This material appeared to have been deposited during Structure 2 demolition, because the churned, refuse-rich deposits contained abundant coal and construction debris that extended all the way to the concrete floor.

Description

Structure 2 was located in Structure 1's northwestern corner, within Room 2.2 (Figs. 3.26, 3.27). The exterior of this foundation measured 3.43 m (11.25 ft) long (north to south) and was 1.81 m (5.94 ft) wide. The interior floor space measured 2.84 m by 1.22 m (9.3 by 4 ft), and the sub-grade concrete floor lay .62 m (2.03 ft) below the tops of the walls, which rose from .20 to .30 m (0.6 to 1 ft) above the surrounding sterile substrate (Fig. 3.28, Profile A). The concrete foundations were form-poured in place, and were installed in a rectangular pit excavated into Stratum 3 and Stratum 5. A base course of angular limestone cobbles and stones was incorporated into the base of the foundation, and the floor was made of poured cement smoothed over a base course of coarse gravel. Based on seams between the poured courses, the northern and southern walls were poured using different forms from those used in the east and west walls. The north and south walls were poured in four .16 m (6.3 in) high courses forming walls that were .18 m (7.1 in) thick. The east and west walls were poured in three .20 m high courses forming walls that were .30 m (12 in) thick. The tops of both the east and west walls exhibited a .08 m (3 in) deep, .03 m (1.2 in) wide, 1.17 m (46 in) long interior lip that was formed when the wall was poured. Two .05 m (1.75 in) metal pipes had once been installed through the north wall, but only two mortar patches remained in their places. The structure floor sloped .02 m downwards from the northern end to the southwest corner. A single irregular hole (Feature 256) was located in the northeastern corner (Fig. 3.26).

Feature 256. Feature 256 was a small hole in the floor, located .10 m from the north and east walls. The feature was .10 m (4 in) in diameter and more than .18 m (7 in) deep. Probably formed during the original floor construction, the hole continued down through the structure's base course. Chisel or pick marks along the eastern rim indicate that the hole may have been slightly enlarged during the structures use.

No artifacts were recovered from Structure 1 during data recovery. All material in the foundation was post-abandonment refuse, and a sufficient sample was obtained during testing. The data-recovery excavation indicated that the steel pipes that were encountered during testing were in fact components of the post-abandonment fill and were not intact or in place, as originally thought.

Extramural Features

Feature 266. The pipeline that was assigned Feature 266 (see NSTR 102, below) crossed under the railroad tracks south of Structure 2 and was observed during the testing to turn north toward Structure 1 in BHT 5, where the pipe ended in a vertical stub. This pipe consisted of an approximately 2 in (.05 m) diameter steel pipe wrapped in asbestos, which was then encased in a series of jointed ceramic sewer pipes. The purpose of the sewer pipe casing is unknown; it may have served to insulate the pipe within.

Feature 255. Feature 255 was a badly rotted, partly burned, 6 in (.15 m) wide wooden beam (Feature 255) that extended 4.6 m (15 ft) southward from the southeastern exterior corner of Structure 2 (Fig. 3.26). This beam, which contained one square-cut nail, rested upon the sterile Strata 3 and 5 substrate and was encased in Stratum 2 fill.

Feature 264. Feature 264, a wood post remnant, protruded from the sterile substrate approximately 1 m past the end of Feature 255. The Structure 9 post (discussed below) lay south of the Feature 264 post.

Structure 3: Engine House

Structure 3, the foundations of the AT&SF engine house, were located on the western edge of the site (Figs. 3.2, 3.25). The structure foundations delineated nine separate rooms or cells (Fig. 3.29), two of which were marked by sub-grade floors (Rooms 3.03 and 3.07; Figs. 3.30, 3.31, 3.32). These two subterranean cells apparently served as the engine-repair bays. Railroad track alignments approached both of these bays from the northeast (see NSTR 102, below). Other features in this structure (Table 3.9) consisted of a set of railroad ties in the western repair bay (Feature 207), a wood-lined pit that may have been a furnace or equipment foundation (Feature 224, Fig. 3.33), two pits or postholes (Features 225 and 233) and a sub-floor channel (Feature 238). An extramural plaster or jaspé concentration (Feature 223) abutted the exterior of the northwestern wall.

Excavation Sequence and Stratigraphy

Structure 3 was initially discovered (and called Feature 1) during the testing phase in BHT 3 and 47, and the feature was tested with XU 3 (Wenker 2005a), which, coincidentally, was excavated in the western repair bay (Room 3.03). During data recovery, the top of the entire structure was fully exposed by SCU 161, which removed approximately 1 to 10 cm of Stratum 1 and 2 overburden, revealing the tops of the walls and the earthen floors of the at-grade rooms. Stratum 2 was then mechanically removed from the interiors of the two repair bays (Rooms 3.03 and 3.07) down to the top of the lower ledges (discussed below). The floor-level fill of the repair bays was sampled by the excavation of three SCUs within each bay (involving SCUs 112, 114, and 116 in Room 3.07 and SCUs 117, 119, and 121 in Room 3.03). These SCUs, which were dug in stratigraphic levels and 1/4 inch screened, removed the rest of Stratum 2 and Stratum 39 to expose the dirt floors in the stalls. Stratum 2 was the post-abandonment fill that was intentionally used to fill the structure after its abandonment. Stratum 39 was a 10-cm-thick deposit of very dark gray, gravelly, silty loam containing approximately 20 to 30 percent coal and cinder inclusions in addition to metal, glass, bone, and Euroamerican ceramics; this stratum appeared to be fill accumulated from the utilization of the structure over time. Excavations also took place in Rooms 3.04, 3.06, and 3.08, wherein one-half the cells' fill was excavated to the interior bases of the masonry to investigate the construction of the walls. The fill from these rooms' excavations consisted of redeposited Stratum 3, which contained no artifacts. This redeposited Stratum 3 had apparently been excavated during the building construction and was then used to refill the cells to the top level of the walls, forming a dirt floor in each cell. Initial artifact tallies from Structure 3 (n = 3235 items) are listed in Table 3.10.

Description

The foundation for the engine house was rectangular, with its long axis oriented northeast–southwest and measured about 21.35 m (70 ft) long by 9.75 m (32 ft) wide (Fig. 3.29). The exterior foundation walls extended roughly 50 cm (1.6 ft) below the surrounding historic ground surface, while the interior of the engine bays extended to 1.2 m (3.9 ft) in depth. The exterior walls were mainly built of coursed cut sandstone rubble blocks and slabs (ranging in size from stones to large cobbles) with minor quantities of limestone blocks and unshaped river cobbles. The sandstone was identical in type to that observed at the AT&SF well and water tower foundations (LA 146403; Wenker and Hannaford 2005a) as well as the loading dock (Structure 2) and depot (Structure 8) at this site, and presumably derived from the same source (a quarry near Lamy). The masonry was cemented with sand-and-lime mortar. The construction of the repair bay walls differed from the construction of the outer structural walls. The repair bay walls consisted of cut, squared blocks and slabs, entirely of sandstone, that were set in a random ashlar pattern (Fig. 3.34) that was pointed (and occasionally plastered) with sand mortar. All of the of the repair bays' walls exhibited a 15 to 20 cm (5.9 to 7.9 in) wide basal step, two to three courses high, that broadened the bases of the walls and narrowed the interior floor spaces (Fig. 3.30).

Rooms 3.03 and 3.07. The repair bays foundations, Rooms 3.03 and 3.07, each measured 15.10 m (49.54 ft) in length and 2.20 m (7.22 ft) in overall width, and averaged 1.05 m (3.44 ft) in depth (although the original depth of structure foundations, as measured at the intact portion of the north end of Room 3.07, approached 1.2 m [3.9 ft]). The interior walls, as noted above, consisted of well-faced sandstone masonry, and the floors consisted of black-stained silty clay. The floor surface at the base of the bays, between the basal steps, measured only 1 m (3.3 ft) in width. A metal pipe crossed through the middle of Room 3.07, about 40 cm above the floor.

Rooms 3.02, 3.04, 3.06, and 3.08. Rooms 3.02, 3.04, 3.06, and 3.08 were at-grade, dirt-floored cells located at the northern and southern ends of both of the subterranean repair bays (Fig. 3.29). These rooms each measured about 2.20 m (7.22 ft) in length and 1.20 m (3.94 ft) in width. The southern wall of Room 3.02 (i.e., the northern wall of repair bay Room 3.03) had been destroyed during the construction of Structure 4, a loading dock constructed after the engine house fell into disuse (see discussion below). The top of the walls of Room 3.02 exhibited an intact coping of mortar, indicating that these walls were still intact to their original height. A single intact wooden railroad tie lay across the Room 3.02 walls (although this was probably not an original tie, see NSTR 102 discussion below). Both of the northern rooms (3.02 and 3.06) were evidently once traversed by railroad tracks, because a pair railroad tracks approaches these rooms from the

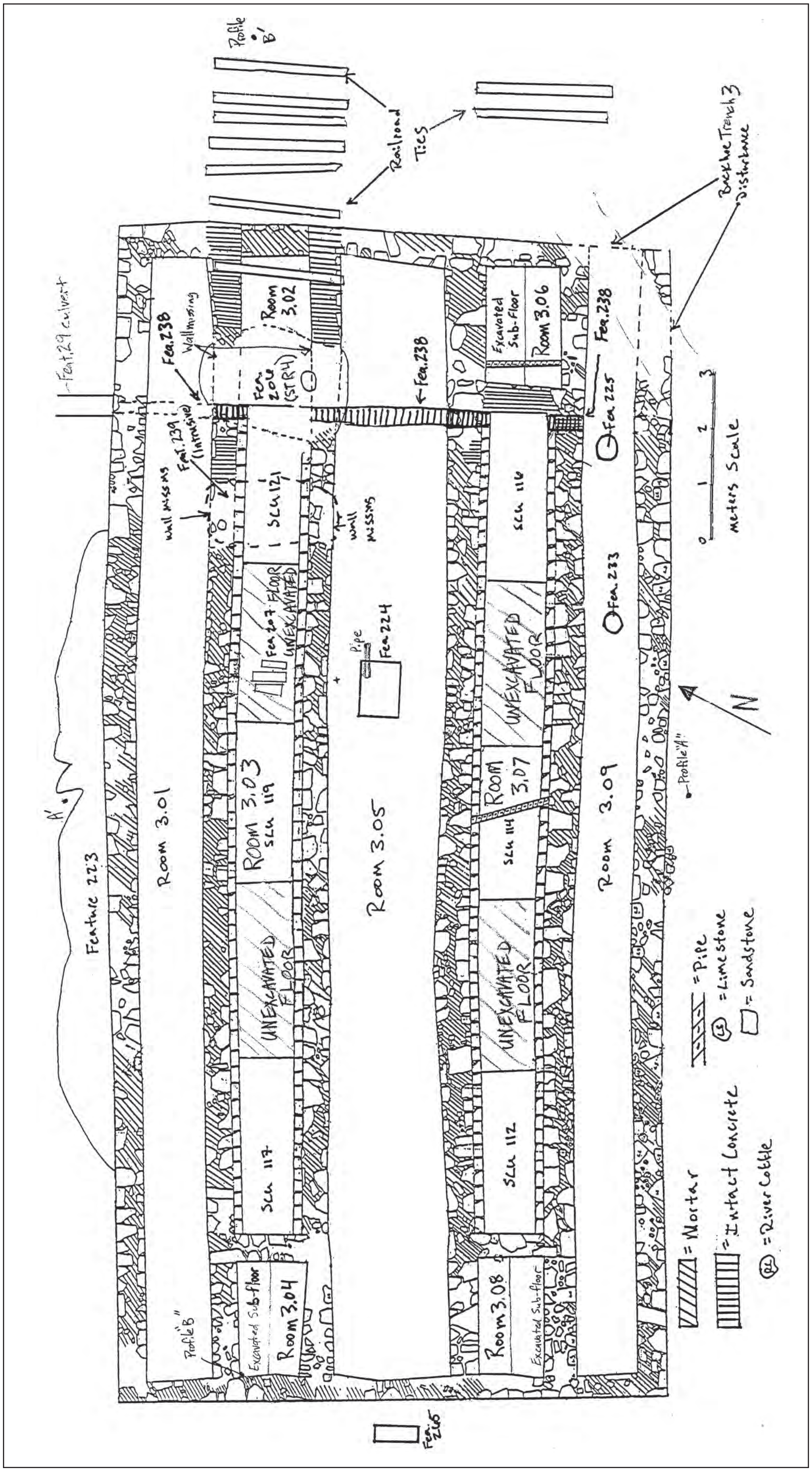
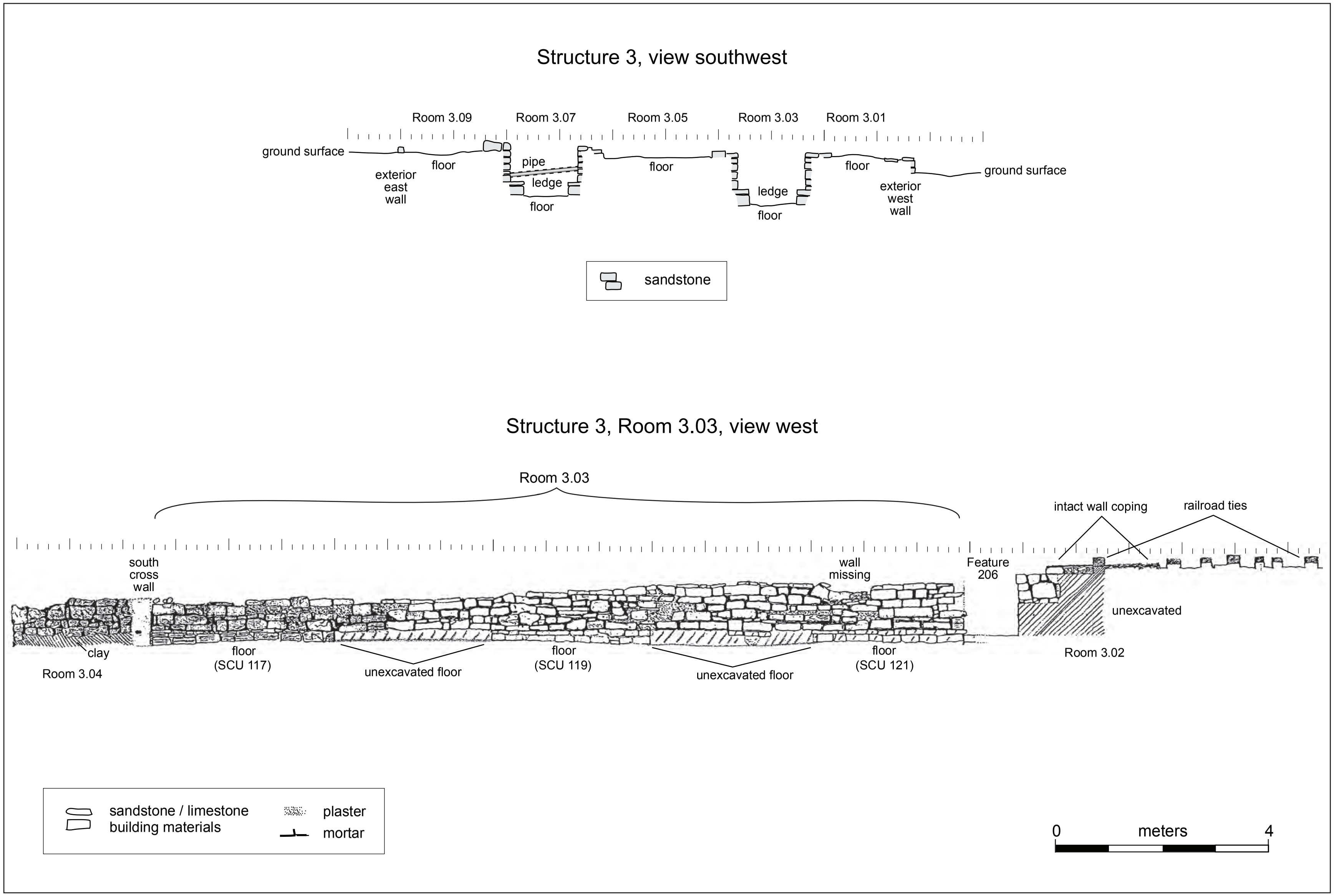


Figure 3.29. LA 146402, Structure 3, final excavation map.



Figures 3.30, 3.34. LA 146402, top (Fig. 3.30): Structure 3, profile view along a southeast–northwest axis; bottom (Fig. 3.34): Structure 3, elevation view of the interior of Room 3.03, west wall.

Figure 3.31. LA 146402, Structure 3, final excavation overview.

Figure 3.32. LA 146402, Structure 3.

Figure 3.33. LA 146402, Structure 3, Feature 224.

northeast. The tracks apparently ran through Rooms 3.02 and 3.06 and extended into the building, over the repair bays, and presumably ended at Rooms 3.04 and 3.08 on the building's south side. A similar layout of tracks over subterranean bays is apparent in the Rio Grande Southern Railroad's engine house at Rico, Colorado (Figs. 3.35, 3.36, 3.37)

Feature 207 (Fig. 3.38) consisted of a cluster of three short sections of railroad ties, with tie plates affixed that were embedded in the upper levels of Stratum 2 in Room 3.03. The ties were positioned across the long axis of the bay. Similar beams spanning the tops of subterranean repair bays are noted at the aforementioned engine house in Rico, Colorado. Because the ties in Room 3.03 were embedded in Stratum 2, however, they may have been introduced to their present location after the structure was abandoned. Alternately, the room could have been filled with Stratum 2 while the ties were suspended across the bay, but the ties were severely deteriorated, and there was no indication that they were ever actually attached to the walls of the bay.

Feature 238 consisted of a subterranean, masonry-lined tunnel or culvert that crossed through the northwest-southeast axis of the structure along the northern edges of the two repair bays. The tunnel measured 32 cm high and 50 cm wide; the base of the tunnel lay at the same level as the top of the ledge or step on the repair bays' walls. On its eastern end, this tunnel extended 50 cm under the east wall of Structure 3.07, where it ended at a vertical earthen face. This masonry tunnel extended underneath the floor of Room 3.05, connecting Rooms 3.07 and 3.03, and it continued westward through the western wall of Room 3.03, although this section had been disturbed by Feature 206, an intrusive posthole. Outside the building, a small, masonry-framed exit box connected the tunnel to a buried wooden culvert (Feature 29) that led to a rock-lined cistern (Feature 241, see NSTR 102 discussion below). This feature complex evidently served to drain fluid out of the engine bays, but the operation of this process is speculative. Because the base level of the tunnel lies about 30 cm (1 ft) above the actual floor of the bays, the tunnel could not have passively drained liquid out of all of the bays.

Figure 3.35. Rio Grande Southern Railroad's engine house at Rico Colorado (courtesy Fort Lewis College).

Figure 3.36. Rio Grande Southern Railroad's engine house at Rico Colorado (courtesy Fort Lewis College).

Figure 3.37. Rio Grande Southern Railroad's engine house at Rico Colorado (courtesy Fort Lewis College).

Figure 3.38. LA 146402, Structure 3, Feature 207.

Instead, because the tunnel lies at the same level as the top of the ledge, the ledges may have been related to the drainage system. Gutters or pipes were likely placed along the ledges to collect, divert, and drain liquid out of the bays, through the tunnel, and out to the Feature 29 culvert.

Rooms 3.01 and 3.09 (the main western and eastern cells, respectively) measured about 20.4 m (66.9 ft) in length and 1.15 m (3.8 ft) in width (Fig. 3.29). Their exterior walls were the exterior building walls, while their interior-facing walls were marked by the exterior walls of the repair bays. Their at-grade floors consisted of a redeposited Stratum 3 dirt surface. Two pit features Figure 3.39 (Features 225, 233; both possible shallow postholes measuring 35 cm in diameter and 25 cm in depth) were located in the northern section of Room 3.09.

Room 3.05, an at-grade, dirt-floored cell between the two repair bays, measured 20.35 m (66.76 ft) in length and 2.05 m (6.73 ft) in width. Its northern and southern walls were the exterior walls of the building and its eastern and western walls were marked by the interior walls of the repair bays. Feature 224, excavated near the center of Room 3.05, was a straight-walled, rectangular pit measuring 1 m (3.3 ft) in length by 80 cm (2.6 ft) in width and 70 cm (2.3 ft) in depth. Except for the northern side, the walls and perimeter of the base of the pit were framed with wood planks, but the center of the pit was a concave earthen surface. The northern end was badly disturbed by an intrusive posthole (Feature 234, Structure 4). A short section of flat-lying cast-iron pipe extended into the northwest quadrant of the feature at floor level. The function of this wood-lined feature remains unclear; it may have been the location of a furnace or stove, or a seating for a piece of machinery.

Feature 223. Outside the northwestern wall of Structure 3, a linear, mounded deposit of jaspé or plaster abutted the exterior of the structure. This linear deposit of construction material measured 11.30 m in length by 1.03 m in width and was 28 cm thick. Stratigraphically this plaster lens was positioned within Stratum 2, being both covered by and lying upon this coal- and clinker-rich deposit. The Feature 223 deposit could have derived from eroded wall material from the outside of Structure 3, but its position within a presumed post-abandonment deposit suggests it was probably related to the use of overlying Structure 4 (discussed below).

<u>Structure 3 Extramural Features</u>

Extramural features adjacent to Structure 3's northwest and southwest walls were excavated in NSTR 102 (see below) but are directly associated with the building. Excavation sequences for these features and summary tables are presented below with NSTR 102 and 104.

Drain pipe and Cistern, Feature 29. Feature 29 was a subterranean, wood-lined culvert that extended northwestward from the northwestern wall of Structure 3 (Fig. 3.40). This culvert connected with Feature 238, a sub-floor drainage channel inside the building (see above). Roughly 18 m (59 ft) outside the building, Feature 29 fed Feature 241 (Fig. 3.41), a circular, subterranean, rock-filled cistern with a wood-plank roof. The juncture of Feature 29 with Feature 241 (Fig. 3.42) was badly disturbed by a modern pit (Feature 243), but a small clinker-filled pit with an apparent sheet-metal lining (Feature 244) may also have been related to the junction of the cistern and culvert.

Porch. A centrally located wooden plank (Feature 265; Figure 3.25 and the foreground in Figure 3.31) flanked by possible postholes (Features 519, 520, 547–549) indicates that some type of structure (e.g., a porch or ramp) may have existed outside the southern wall of Structure 3 (Fig. 3.25). An array of probable railroad tie impressions (Features 514–518, 521) could have served as supports for a raised floor. This set of features implies that Structure 3 had a southern entrance, although no steps, sill, or other signs of such a feature were observed in the building's masonry wall.

Structure 4: Loading Dock

Structure 4 was defined by a series of massive postholes that partially overlapped Structure 3 (Figs. 3.2, 3.25). The posts outline a broad "L"-shaped area, open to the south that marked the footprint of a loading dock built over the demolished remains of the engine house (Figs. 3.43, 3.44). The structure measured 25.5 m (83.7 ft) long and was 9.6 m (31.5 ft) wide at the southwestern end and 5.4 m (17.7 ft) wide at the northeastern end. The feature was exposed in plan view by the excavation of Scraping Units 122, 123, 130, and 161. Five of the features were hand-excavated.

The edges of the structure are marked by an outline of postholes, each spaced roughly 1.3 m (4.3 ft)

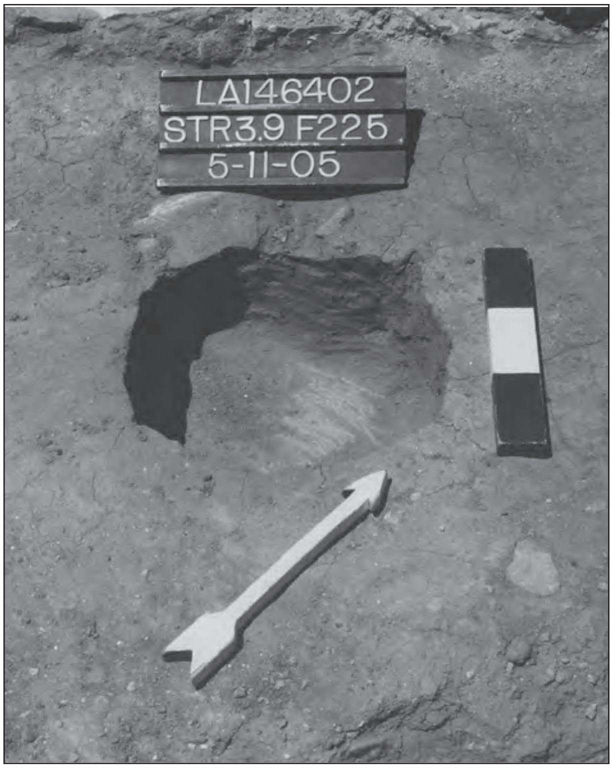


Figure 3.39. LA 146402, Structure 3, Feature 225.

Figure 3.40. LA 146402, Structure 3, Feature 29, drain pipe and cistern.

Figure 3.41. LA 146402, Structure 3, Feature 241, wood laid over a rock-filled cistern.

Figure 3.42. LA 146402, Features 29 and 241, plan view.

apart. The 45 features constituting this structure are listed in Table 3.11. Feature 206 actually comprises two separate posts, while Feature 239 appears to have been an unfinished posthole, providing a total of 45 support posts for the dock.

Excavation sequence

Five of these features (Features 206, 234, 236, 237, 239) were completely excavated; recovered artifacts (n = 809 items) are listed in Table 3.12. Features 236 and 237 were selected for excavation because they appeared to be representative of the typical types of posts in the general array. Both of these were roughly square pits that measured roughly 70 cm (2.3 ft) square and 90 cm (3 ft) in depth. Both of these square postholes were filled with pale brown sandy clay with coal and clinker (a variant of Stratum 2). Each also exhibited a roughly 30-cm-diameter (1 ft) circular socket that was left from the post that once occupied the center of the posthole; the post socket was also filled with dark gray Stratum 2 material. Apparently, the posts that once occupied these features were removed without substantially disturbing the postholes.

Description

Based on surficial assessments, the characteristics of Features 236 and 237 apply to most of the remaining features in this structure. The northeastern outside-corner posts, however (Features 367, 370, 389), were slightly larger than the general wall posts (ca. 1.25 m [4.1 ft] long by 70 cm [(2.3 ft] wide), and exhibited elongated post-socket impressions, suggesting that dual or oversized posts may have occupied those features. Elsewhere, Features 250 and 251, at the inside corner of the "L," identify two posts that occupied the same posthole. Feature 251 consisted of the chopped-off stub of a 30 cm-diameter (1 ft) post still in the hole (the only remaining post in this structure), while Feature 250 included the encompassing irregularly shaped posthole and a second clinker-filled post socket within the overall hole.

Features 234, 239, and 206. Among the other features that were excavated, Feature 234 consisted solely of a post socket that was exposed during the excavation of Feature 224 in Structure 3. Feature 234 had been dug into the northern wall of the earlier pit feature, and the post socket did not occupy a large square hole typical of many of the other features. Elsewhere, Feature 239 was a broad, shallow, basin shaped pit that straddled the upper walls of both sides of Room 3.03; this feature was excavated to explore its role as a possible disturbance to the masonry walls of that room. A rotted wood beam in the western end of this pit resembled a small post, but its position is out of line with all other main supports of Structure 4. Feature 239 may have been an abandoned, preliminary, or alternate version of Feature 206, just to the northeast. Feature 206 was entirely excavated because it was investigated as another disturbance factor to Structure 3. This feature consisted of a large, deep, oval pit that was coincidentally placed directly over the entire northern and part of the western wall of underlying Room 3.03 (Fig. 3.29). This unfortunate circumstance required that these masonry walls were completely dismantled prior to the installation of the posts; the loading dock's orientation apparently did not allow these posts to be moved to an alternate location. Once the walls were demolished and the posts were set in the hole, most of the pit was then backfilled with the loose rubble from the walls. The pair of posts that once occupied Feature 206 had been removed, but their basal sockets were visible as basin-shaped impressions at the very bottom of the pit.

Structures 5, 6, and 7: Outhouses

Structures 5, 6, and 7 were a series of pits that marked the location of three outhouses, or privies, that served the railyard from its construction until well after water and water closets were installed into the newly constructed depot in 1909 (C. T. Snow 2003:53). Although details of the superstructure construction do not remain, refuse within the outhouse vault provided three rich and distinct Euroamerican artifact assemblages with which to evaluate discard patterns associated with industrial settings.

Structure 5

Structure 5 consists of the pit of an outhouse built on the west side of the railroad tracks, east of the northern end of the engine house. This structure is one of three adjacent outhouses in this location (Structures 6, 7, below; Figs. 3.2, 3.25, 3.45).

Excavation sequence

Structure 5 was originally located during the testing phase as Feature 49 (Wenker 2005a), which was exposed in BHT 37. That trench removed a roughly 60 cm-wide, 70 cm-deep section along the entire southern wall of the structure, but the trench

Figure 3.43. LA 146402, Structure 4, overview map with Features 397 and 395, railroad track alignments.

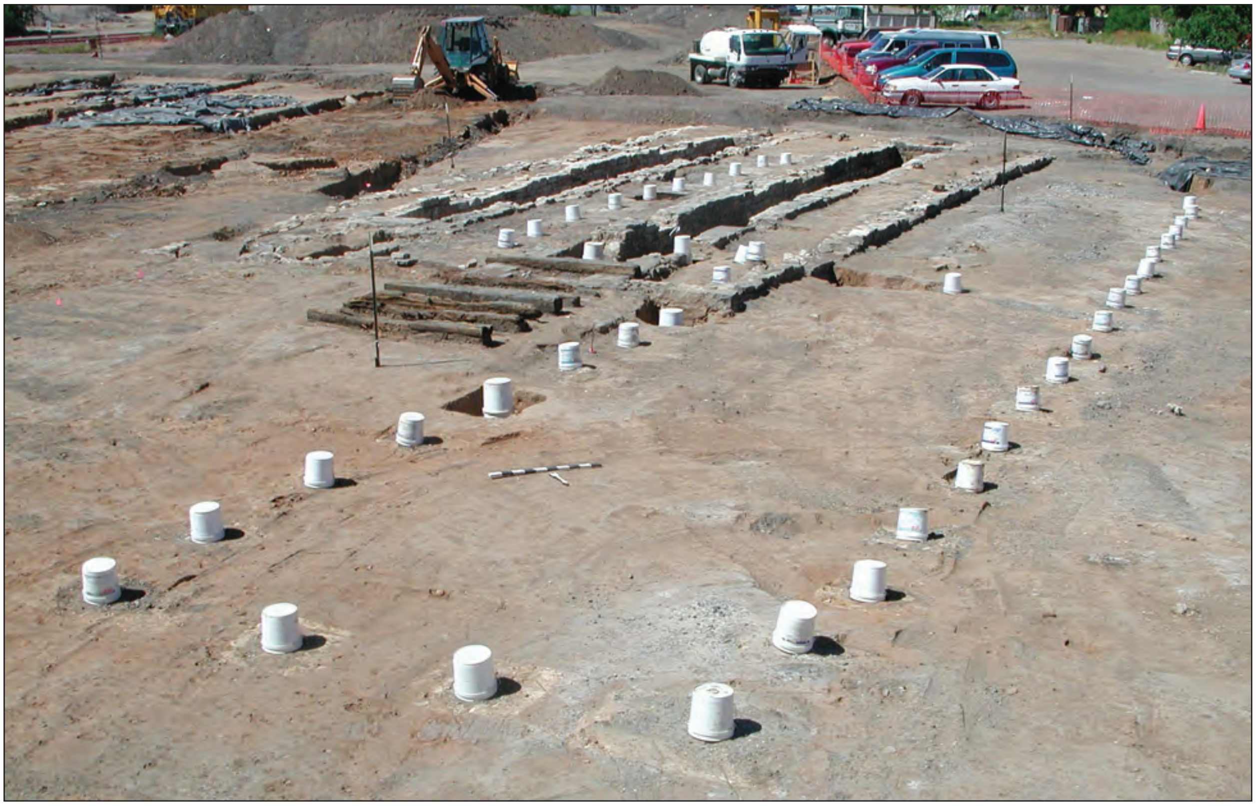


Figure 3.44. LA 146402, Structure 4, overview.

did not impact the lowest, intact structural fill contents. During data recovery, that BHT 37 was re-excavated, the outline of the structure was exposed by mechanical scraping of Stratum 1 overburden (as part of SCU 136). The structure was divided into halves, and the southern (previously impacted) half was excavated in eight 20 cm-thick arbitrary levels. After the cross section was documented, the northern half was removed by excavating the fill in stratigraphic layers. All fill was screened through 1/4-inch mesh. Structural documentation included elevation and plan view drawings and overview photography.

Description

The outhouse pit consisted of a rectangular hole, along a north–west oriented axis. It measured 1.22 m (4 ft) wide by 2.14 m (7 ft) long by 1.53 m (5 ft) deep (measured below the uppermost intact rim of the pit, buried underneath Stratum 1). No signs of a superstructure or encircling foundation were present. The pit walls were lined with a lumber frame made of 2 x 10-in boards. The western and eastern walls exhibited three vertical boards (one at each end and one in the center) that supported at least six horizontal boards. The northern and southern walls were only framed by horizontal boards. The base of the pit was unlined, and consisted of loose sand and gravel of Stratum 5. Several loose boards were found on the pit base, as well as, in the general pit fill.

Stratigraphy

Eight stratigraphic layers were identified in the structure's fill (Fig. 3.46). Stratum 1 (modern parking lot material) capped the structure. The underlying three layers (Strata 106, 107, and 108) were gray to dark grayish brown sandy loam or sandy clay loam deposits with abundant coal dust and clinker fragments. These deposits probably were fill brought in to purposefully bury the outhouse depression after its abandonment. Stratum 106 also contained abundant fragments of white jaspé or plaster construction material and abundant shards of white glazed stoneware from a bathroom fixture (possibly a toilet seat?) and window glass. These inclusions may be related to the superstructure, although their relatively high stratigraphic position indicates a late deposition episode in the filling sequence. The three strata underlying the coal/clinker-rich depos-

Figure 3.45. LA 146402, Structures 5, 6, and 7, final excavation overview.

its consist mainly of a strong brown silty clay loam (Stratum 109) or yellowish-brown sands (Strata 110 and 111), all of which may be introduced fill purposefully capping the basal deposits. The lowest pit fill (Stratum 112), a 25 to 35 cm thick deposit of very dark brown silty clay with abundant organic inclusions, represents the use-related deposit in this structure. The depressed, basin-shaped upper boundary of Stratum 112 may indicate that some outhouse fill was occasionally removed during clean-out work, suggesting that the recovered artifacts may not represent the complete assemblage that was accumulated during the structure's use-life.

Table 3.13 summarizes initial counts of the recovered material from Structure 5 (n = 8863 items. The artifact count of 5,339 reflects an extraordinary amount of glass in the assemblage. From the total assemblage, 1,244 Euroamerican and faunal artifacts from selected contexts were subjected to analysis. As noted above, only those items from Stratum 112 (the lowest deposit) can be confidently ascribed to a primary refuse-discard archaeological context. All of the overlying deposits must be assumed to be mixed with some amount of post-abandonment materials.

The basal deposit in this structure yielded at least 35 whole bottles; most were beer and alcohol bottles but one small octagonal bottle was a perfume bottle embossed "PARIS." Mean bottle-glass manufacture dates obtained from Euroamerican analysis (discussed below) indicate the privy was constructed in 1880 when the first tracks were established.

Indulgence and industrial items make up the bulk of the assemblage's assignable artifact content. Hard liquor (whiskey and gin) containers were the predominant bottle types. Shards of at least two large (ca. 6 in across and 10 in tall), straight-sided, flat-bottomed glass beakers were recovered, associated with matted blue mineral or chemical deposits. These beakers were apparently containers for wet-cell batteries (Barbour, Chapter 7, this report), which were widely used on railroads to energize track and signal circuits.

Other notable material from the structure included at least 10 brass lamp burners, possibly deriving from oil or kerosene signal lanterns used along the railway. Association with industrial use is supported by the small fauna assemblage, which had low incidence of domesticated food animals, and contained partial skeletons of a puppy, a Canada goose, a pigeon or dove, and a fish. Among its other uses this privy was used as a dump for railyard-related industrial waste.

Structure 6

Structure 6 was the pit of an outhouse built on the west side of the railroad tracks, east of the northern end of the engine house. This structure is one of three adjacent outhouses in this location (between Structures 5 and 7; Figs. 3.2, 3.25, 3.45).

<u>Excavation sequence</u>

Structure 6 was newly discovered during the data recovery phase when the outline of the structure was exposed by mechanical scraping of Stratum 1 overburden in SCU 136 around Structure 5. Structure 6 was divided into halves, and the southern half was excavated in seven 20 cm thick arbitrary levels, all of which were 1/4-inch screened. After the cross-section was documented, the northern half was removed by excavating the fill in stratigraphic layers. The upper three depositional layers, being

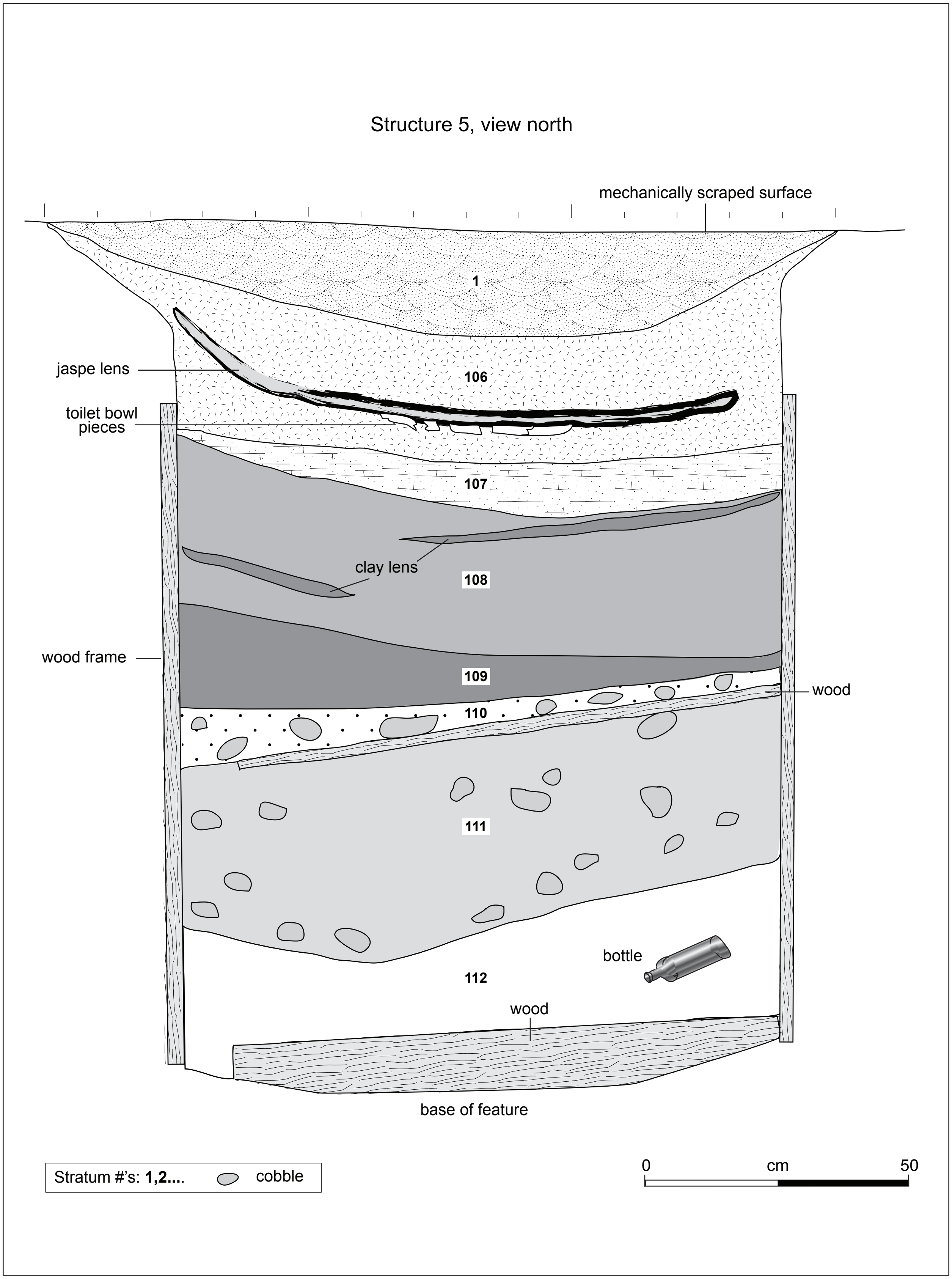


Figure 3.46. LA 146402, Structure 5, cross-section view.

post-abandonment fill, were removed from the northern half without screening. The lowest deposit in the northern half, which was the primary refuse-discard deposit, was subdivided into four internal levels and 1/4-inch screened. Structural documentation included plan view drawings and overview photography.

Description

The outhouse pit consisted of a rectangular hole, with a long north–west access. It measured 1.10 m (3.6 ft) wide by 2.40 m (7.9 ft) long by 1.53 m (5.2 ft) deep (measured below the uppermost intact rim of the pit, buried underneath Stratum 1). No signs of a superstructure or encircling foundation were present. The pit walls were unlined, and consisted of the natural Stratum 3 and 5. The base was also unlined and consisted of loose sand and gravel of the Stratum 5.

Stratigraphy

In addition to the Stratum 1 (modern parking lot material) that capped the structure, four stratigraphic layers were identified in the structure's fill (Fig. 3.47). The upper layer (Stratum 121) was a very dark gray sandy loam with abundant coal dust and clinker fragments, which probably represents fill brought in to purposefully bury the outhouse depression after its abandonment. Stratum 121 also contained occasional fragments of jaspe. The two strata underlying the coal/clinker-rich deposits consist mainly of a strong brown silty clay loam (Stratum 122) and gray sandy loam (Stratum 123), which may be introduced fill purposefully capping the basal deposits. The lowest pit fill (Stratum 124), a 45 to 130-cm-thick deposit of dark brown silty clay with abundant organic inclusions, represents the use-related deposit in this structure. The depressed, basin-shaped upper boundary of Stratum 124 may indicate that some outhouse fill was occasionally removed during clean-out work, suggesting that the recovered artifacts may not represent the complete assemblage that was accumulated during the structure's use-life.

Table 3.14 summarizes an initial inventory of the recovered material from Structure 6 (n = 433 items). Of these a total of 313 Euroamerican and faunal artifacts from selected context were subjected to analysis. As noted above, only those items from Stratum 124 (the lowest deposit) can be confidently ascribed to a primary refuse-discard archaeological context. All of the overlying deposits must be assumed to be mixed with some amount of post-abandonment materials.

The basal deposit in this structure yielded at least 65 whole bottles, mostly beer and alcohol bottles. Mean bottle-glass manufacture dates obtained from Euroamerican analysis from selected context (discussed below) indicate the outhouse was used in the 1910s. Like Structure 5, the artifact assemblage indicates continued industrial waste disposal, with wet cell batteries previously noted also present in this assemblage. Indulgence items were also common including alcohol bottles and a glass medical syringe. Other notable material from the structure included at least four shoes (women's, men's, and children's), a metal drinking cup. Analyzed fauna indicates more emphasis on food consumption. Cow, pig goat and turkey bone were identified along with domestic rabbit.

Structure 7

Structure 7 was the pit of an outhouse built on the west side of the railroad tracks, east of the northern end of the engine house. This structure is last of three adjacent outhouses constructed in this location (Figs. 3.2, 3.25, 3.45).

Excavation sequence

Structure 7 was discovered during the data recovery phase when the outline of the structure was exposed by mechanical scraping of Stratum 1 overburden in SCU 136 around Structures 5 and 6. Structure 7 was divided into halves, and the southern half was excavated in eight 20-cm-thick arbitrary levels, all of which were 1/4-inch screened. After the cross section was documented, the northern half was removed by excavating the fill in stratigraphic layers. The upper two depositional layers, being post-abandonment fill, were removed from the northern half without screening. The lowest deposit in the northern half, which was the primary refuse-discard deposit, was subdivided into three internal levels and 1/4-inch screened. Structural documentation included plan view drawings and overview photography.

Description

The outhouse pit consisted of a rectangular hole, with its long axis oriented north–west. It measured about 1.70 m (5.6 ft) wide by 2.46 m (8.1 ft) long by 1.63 m (5.3 ft) deep (measured below the uppermost intact rim of the pit, buried underneath Stratum 1),

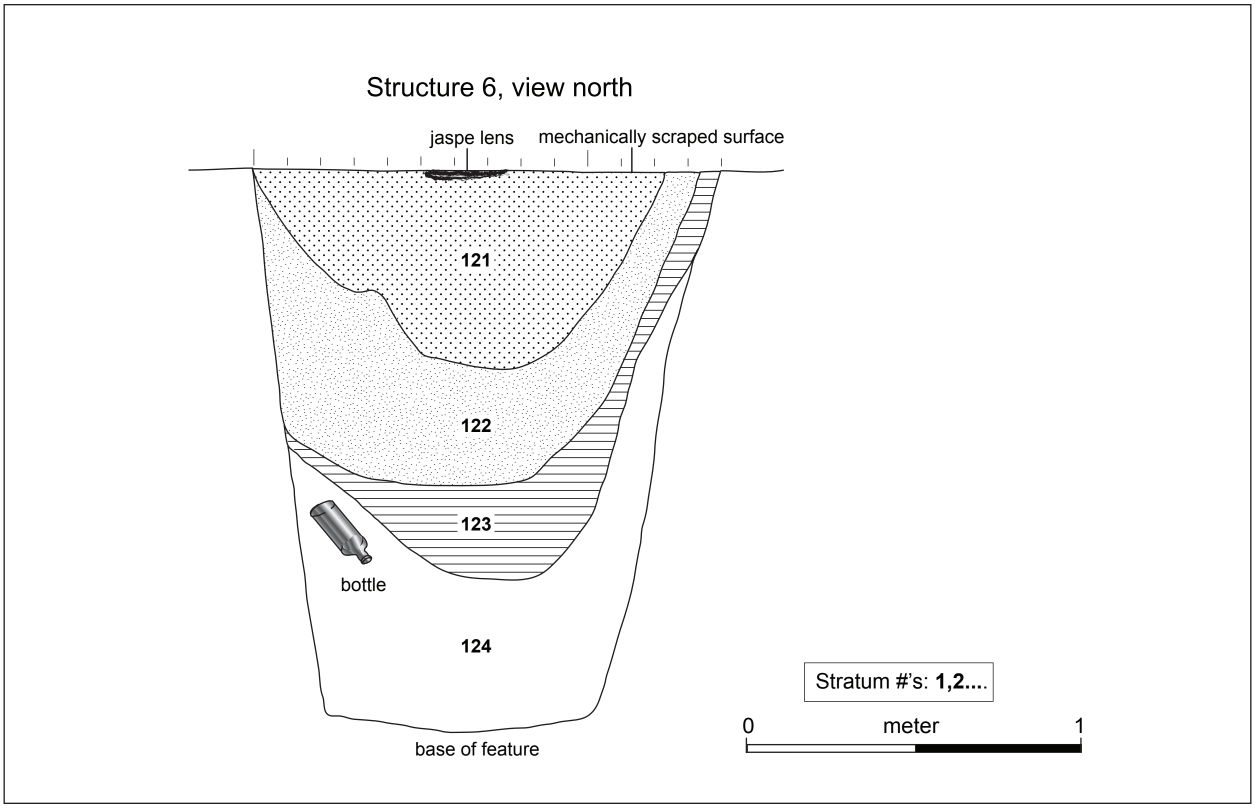


Figure 3.47. LA 146402, Structure 6, cross-section view.

making this the largest of the three outhouse pits. No signs of a superstructure or encircling foundation were present. Although no intact boards were observed, the presence of charred wood fragments throughout the fill and adhering to the pit walls may indicate that the hole was lined with a lumber frame as observed in Structure 5 (above). The base of the pit was unlined, and consisted of loose sand and gravel of the Stratum 5.

Stratigraphy

In addition to the Stratum 1 (modern parking lot material) that capped the structure, three stratigraphic layers were identified in the structure's fill (Fig. 3.48). The upper layer (Stratum 116) was a very dark gray sandy loam with abundant coal dust and clinker fragments, which probably represents fill brought in to purposefully bury the outhouse depression after its abandonment. Stratum 116 also contained abundant inclusions of jaspe or plaster, shards of white glazed stoneware from a bathroom fixture (possibly a toilet seat or commode?), and a dense layer of bricks and brick fragments (n = ca. 1200). Three different brick types were present: low-fired cored (three-hole) bricks, high-fired unmarked paver bricks, and high-fired pavers embossed with "Coffeeville," indicating a Kansas origin. Many of the bricks had mortar adhesions, indicating they had been used and dismantled before being deposited in Structure 7. The Coffeeville bricks were also common in the fill of the AT&SF depot foundation (Structure 8, below). As in Structure 5, this upper deposit in Structure 7 may be related to the outhouse's superstructure. The relatively high stratigraphic position indicates a late period of deposition in the filling sequence. The stratum underlying the brick-rich deposit consisted mainly of a strong brown silty clay loam (Stratum 117), which may be introduced fill purposefully capping the basal deposits. The lowest pit fill (Stratum 118), a 30 to 100-cm-thick deposit of dark brown silty clay with abundant organic inclusions, represents the use-related deposit in this structure. The depressed, basin-shaped upper boundary of Stratum 118 may indicate that some outhouse fill was occasionally removed during clean-out work suggesting that the recovered artifacts may not represent the complete assemblage that was accumulated during the structure's use-life.

Table 3.15 summarizes the recovered initial inventory of material from Structure 7 (n = 1909 items). Euroamerican and faunal artifacts from selected context were subjected to analysis. As noted above, only those items from Stratum 118 (the lowest deposit) can be confidently ascribed to a primary refuse-discard archaeological context. All of the overlying deposits must be assumed to be mixed with some amount of post-abandonment materials.

The basal deposit in this structure yielded at least 134 whole bottles, mostly beer and alcohol bottles. Mean bottle glass manufacture dates from selected context indicate the outhouse was used around 1921. This date is corroborated by an Indian Head/Buffalo nickel of indeterminate mint with a date range of between 1910 and 1938.

Unlike the two earlier outhouses Structure 7 does not show a pattern of industrial waste disposal. Indulgence items remained common indicating continued whisky, bear and wine consumption. A spark plug part was identified from primary fill. Other notable material from the structure included shoes, coins, a toothbrush a marble, and most spectacularly a phenolic resin (Bakelite) handle of a small-caliber revolver (possibly a .22 or .32). Fauna was made up a small assemblage (n = 22) of ungulate, cattle, chicken, and rabbit bone, with the highest butchery rate of all the privies.

Structure 8 Complex: AT&SF Passenger Depot and Freight Warehouse

The Structure 8 complex was the remaining foundation of the original AT&SF passenger depot (constructed in 1879–1880), which was later transformed into at freight warehouse. Although the southernmost end of the southern loading dock was found, the northern extent of the structural complex extended beyond the northern limits of the excavation, out of the project area. Archival documentation (Scheick et al. 2003) supports this inference. The building complex was located along the eastern side of the 1880 railroad tracks, at the eastern end of the site (Figs. 3.2, 3.25). Remains of the remodeled structure consisted of a forest of sandstone masonry piers, wooden plank footers, postholes, pits, earthen construction deposits, concrete pads, and other wooden and metal construction

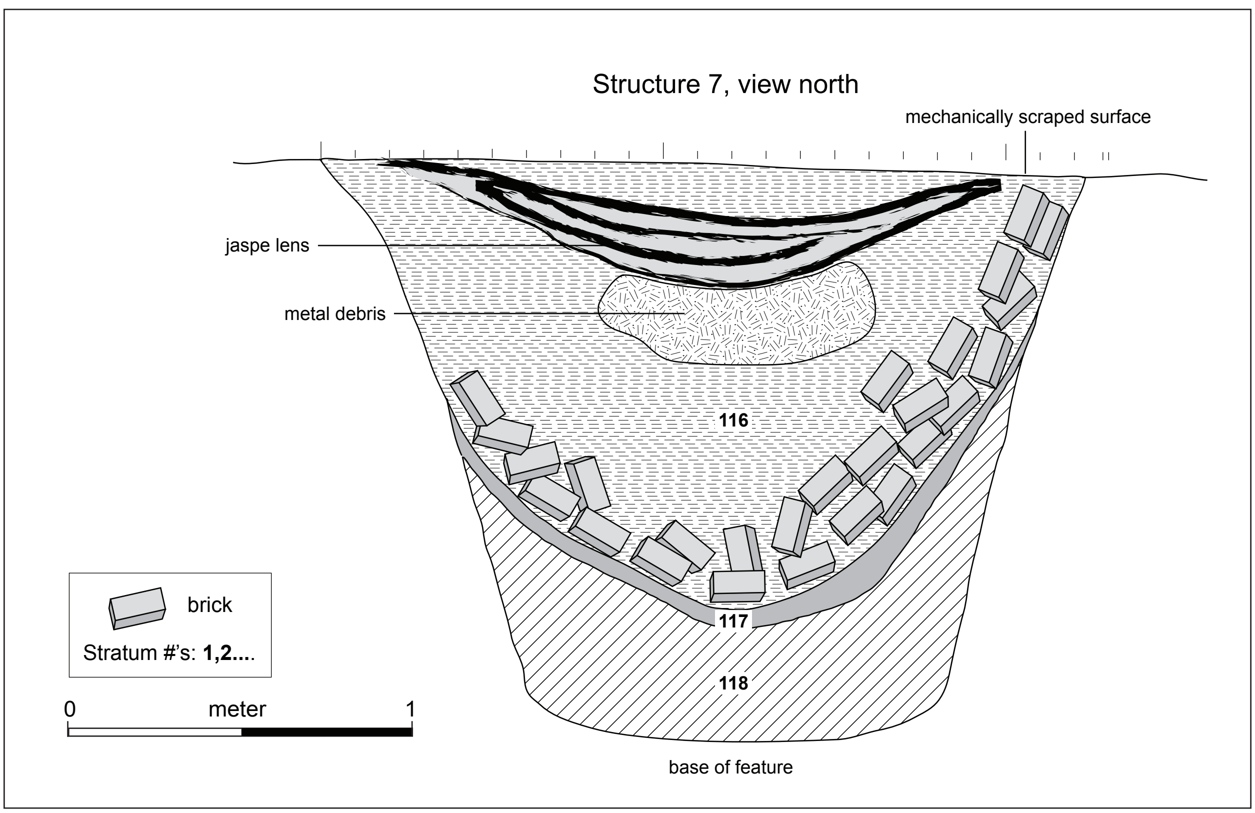


Figure 3.48. LA 146402, Structure 7, cross-section view.

elements (Figs. 3.49, 3.50, 3.51, 3.52, 3.53). Two areas were identified within the Structure 8 footprint. Structure 8a was represented by a 39.92 by 11.58 m (131 by 38 ft) area of masonry piers was probably the original depot. Structure 8.1 was a broad rectangular deposit of hard reddish-brown clay installed within a wooden frame south of the masonry. The clay pad likely predates installation of the freight depot, likely defined by a series of supplemental supports that augmented the original masonry footings and covered a 23.46 by 8.53 m (77 by 28 ft) area of the Structure 8 complex.

Excavation sequence and Stratigraphy

Structure 8 was initially discovered during the testing phase in BHTs 4 and 6 and identified as Feature 6. At that time, six excavation units (XUs 24, 27, 28, 29, 31, 32) were used to further investigate the structure (Wenker 2005a). During data recovery, the testing units and trenches were re-excavated, but the structure complex was mainly exposed by the mechanical excavation of several large scraping units (SCUs 143, 144, 145, 148; Fig. 3.49) which removed Stratum 2 overburden that capped and encased the structures remaining elements. After the structure's constituent features were exposed in the SCUs, selected examples of representative features or other unique features were fully hand-excavated to obtain information about construction details (n = 9, including Features 326, 333, 341, 345, 353, 356, 403, 426, 428). Several recent or modern features also intruded through the Structure 8 deposits (Features 14, 541, 550; see NSTR 103, discussed below). The excavated area measured 72 m (236 ft) northeast–southwest by 14 m (46 ft) northwest–southeast. Two hundred and three features were identified in the structural a brief description of each individual feature is provided in Tables 3.16 and 3.17. Initial counts of artifacts recovered from Structure 8 (n = 1597 items) are listed in Table 3.18.

Structure 8a

Masonry Piers. The central area of Structure 8 was likely the original construction of the AT&SF Passenger Depot and supports for the surrounding loading platforms. The area was populated by an array of 61 short stone-masonry piers, which were evenly spaced at roughly 2.25 m (7.4 ft) intervals in a rectangular area measuring about 40 m (131 ft) northeast-southwest (parallel with the tracks) by 11.5 m (38 ft) northwest-southeast (Figs. 3.49, 3.50, 3.53). These piers were generally constructed of several courses of stone- or cobble-sized blocks of limestone, sandstone, or river rocks, with abundant sand mortar, set within shallow footer pits (Fig. 3.54). The piers were typically about 60 cm (2 ft) square and extended from up to 45 cm (1.5 ft) above the substrate surface; the pits they were installed in extended downward another 10 to 15 cm (4 to 6 in), producing an overall height for the intact piers of about 60 cm (2 ft). Few of the piers retained their full height, however, having been disturbed during the building's demolition. Those that were intact often exhibited remnants of rotted wooden planks crossing their upper surface. These beams often extended to adjacent piers, indicating that the piers supported a lattice of support beams that presumably supported floor joists of an overlying structure.

Postholes. Twenty round postholes were located within Structure 8. Postholes were most frequently encountered along the structures west edge adjacent to the existing railroad siding and were usually about .46 m (1.5 ft) in diameter (Fig. 3.55). A series of seven (Features 350 to 356) were likely associated with this building episode and presumably supported a platform. Feature 360, which had an intact post mold, indicating vertical supports were about 16.5 cm (6.5 in) wide. Features 353 and 356 were two in a line of seven postholes (Features 350–356) located along the structures west edge adjacent to the existing track siding. Exterior holes were square with round post molds measuring 0.44–0.47 m (approximately 1.5 ft) in diameter suggest standard and repetitive construction. Wooden piers from the holes had been pulled and they had filled with post-abandonment fill (Stratum 2) containing square wire nails, tacks and bottle glass. An amorphous mound of poured mortar lay along the tracks near the southwestern end of these posts.

Plumbing (Features 426 and 399). Other feature types (Table 3.16) located within or near the masonry pier area include three alignments of pipeline trenches, pipes, and associated pipe-risers housed in steel casings.

Feature 399 was a 24 cm (9.5 in) wide L-shaped trench housing a 7.6 cm (3 in) diameter pipe with two 24 cm (9.5 in) diameter vents with loose removable caps, which may have been associated at some point with building heating. Feature 426 (Fig. 3.56) was a square, wood-lined pit surrounded the end

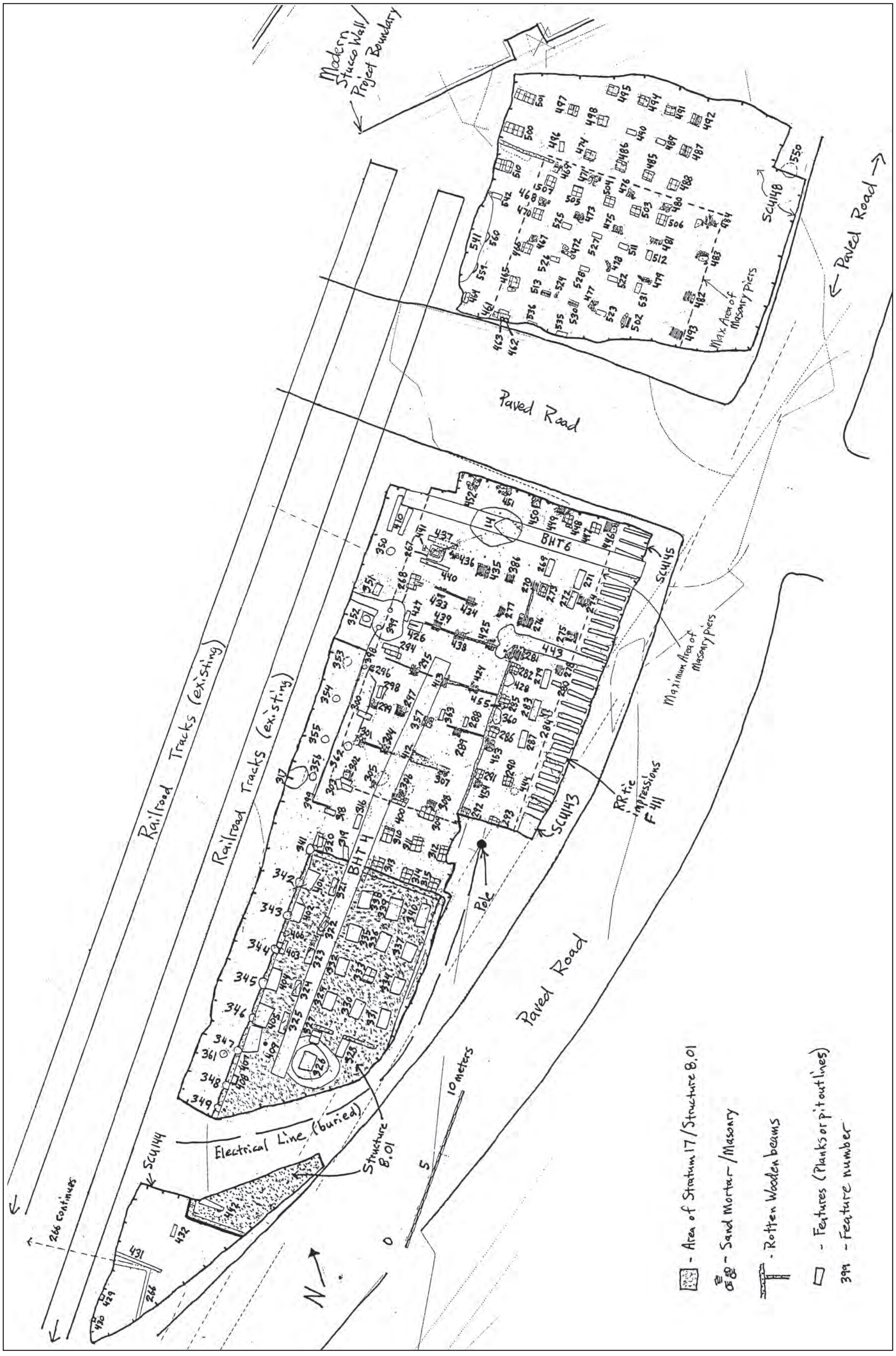


Figure 3.49. LA 146402, Structure 8, overview and excavation map, including NSTR 104 features.

Figure 3.50. LA 146402, Structure 8, depot overview, central structure area, north of Structure 8.01, as exposed in SCUs 143 and 145.

Figure 3.51. LA 146402, Structure 8.01, loading dock overview, northern end of the structure as exposed in SCU 143.

Figure 3.52. LA 146402, Structure 8.01, loading dock overview, depicting the southern end of the structure as exposed in SCU 144.

Figure 3.53. LA 146402, Structure 8, depot overview, depicting the northern structure area as exposed in SCU 148.

Figure 3.54. LA 146402, Structure 8, showing stone piers, facing west.

section of the trench that extended from the Feature 399. The subterranean box was 77.72 by .62 by .35 m (2.55 by 2.03 by 1.14 ft deep); depth included the depth of the pipe trench below it); an associated 6.4 cm (2.5 in) diameter iron pipe was installed into the trench and protruded up into the box. This pipe section was may be may be related to this plumbing complex and may have carried either water or gas. Artifacts recovered from Feature 126 include bottle glass small amounts of crockery as well as bracketing.

Related Features. Other features may also be related to later use of remodeling. For example, in the northern end of SCU 143, in the west-central area of the piers, Feature 267 (Fig. 3.57) consisted of a poured concrete pad measuring about 90 cm (3 ft) square and 11 cm (4.3 in) height. The top of the pad exhibited cement adhesions from a square column of bricks that had once been affixed to the pad. A cluster of bricks that lay immediately north of the pad, was probably spoil from the demolished column. These bricks, embossed "Purington Paver," were manufactured by the Purington Paving Brick Company of East Galesburg, Illinois, which started operation on May 15, 1890. This relatively late date in conjunction with the presence of true concrete, indicates that Feature 267 represents a later addition to the structure. Based on an estimated count of the loose bricks, the column may have once stood at least 78 cm (31 in) high, but its function remains unclear. Bricks embossed with "Coffeeville" were also scattered in this area, and in the excavations at the northern end of the structure (SCU 148).

A pair of railroad tie impressions (Feature 410) also lay near the tracks at the northeastern end of the posts. Five small, nondescript pits, three probable postholes, one small refuse pit, and one unknown pit, were also scattered across the central structural area. Feature 428 was excavated to investigate the nature of one of these small pits, which housed a vertical support, with the anticipation of recovering artifacts from the original construction deposit. Euroamerican artifacts were limited to bottle and can fragments.

Figure 3.55. LA 146402, Structure 8, Feature 356, posthole, facing east.

Figure 3.56. LA 146402, Structure 8, Feature 426, facing west.

Structure 8.1

A discrete area of the structure was defined as Structure 8.01, based on the presence of a broad rectangular deposit of hard reddish brown clay (Stratum 17) that was installed within a wooden frame south of the masonry piers (Figs. 3.49, 3.51, 3.52). This feature, resembling a large poured construction pad (made of earth, however, instead of concrete), measured 23.4 m (77 ft) long (parallel with the tracks) by 8.6 m (28 ft) wide, and the reddish clay filling the pad was 30 cm (1 ft) thick. The clay was unlike any other type of sediment observed in the entire railyard, and was evidently an introduced deposit. The edges were framed with rotted wooden beams. Although the entire pad was not exposed due to modern utility line intrusion and paved roads, all four edges were located. A row of nine large, circular postholes comparable in size to those associated with the Structure 8a and two smaller pits lined the northwestern edge. The function of the clay pad remains unclear; it is possible that the clay surface was covered, because the clay is hydrophilic and would not provide a useful working or walking surface during wet weather. On the other hand Santa Fe's dry sunny climate may have insured a hard baked surface useful for some activity that would require a hard surface that could be swept.

Plumbing. Many sub-features were dug into this hard red clay pad. At the southern end, a railroad tie impression was visible in the surface of the pad. Central to the pad, Feature 326 was a circular pit with a rim and upper lining made of poured mortar. This pit, measuring roughly 2 m (6.6 ft) across and 1.19 m (3.9 ft) in depth contained a 2.5 cm (1 in) diameter-steel pipe in the base that crossed through the southeast and northwest sides. A second pipe of similar size, with a vertical riser, also exited the northwest side. Both of these lines were directed toward Feature 409, a steel shaft housing a pipe that protruded vertically about 2 m (6.6 ft) to the northwest. These attributes suggest that Feature 326 was a plumbed facility such as a hydrant or boiler foundation. The feature had been abandoned and reused. Reuse is indicated by the partial filling of the base of the pit and the installation of several flat-lying creosote-impregnated planks. These planks were identical to

Figure 3.57. LA 146402, Structure 8, Feature 267

those in the array of other pits that studded the rest of the clay pad (and the remainder of the Structure 8 complex, see below).

Structure 8

Structure 8 likely represents the final manifestation of the remodeled freight ware house and associated loading docks. Their construction likely occurred in the 1908 or soon thereafter.

Planks and pits with planks. A series of 110 plank features were encountered during excavation (this includes "square pits" see (Table 3.17). Plank configurations were constructed of from 1 to 5 milled planks of creosote imbued lumber lying flat and usually arranged so that two similar board lengths were placed parallel to form a square footing and then topped with an additional board or boards running somewhat perpendicular to the base (Fig. 3.58), presumably to form a footer. Grouped boards were generally 4 by 10 inches cut to an approximately 2 ft length. These configurations can be classified into those installed in square pits, those lying flat on the ground without any other apparent preparation. Single-plank installations used boards with larger dimensions that were 16.5 in wide by 7 in thick, and were often 3 ft long.

The set of square pits on the clay pad includes 26 features (27 including Feature 326), arrayed in five northeast–southwest rows, spaced at fairly regular intervals of 1.75 to 2.25 m (5.75 to 7. 4 ft) apart. The tops of the features were exposed by scraping, but few were excavated beyond that exposure. Among those that were further excavated were those in the row exposed in cross section in the northwest wall of BHT 5.

Feature 333. Another typical example of this feature type (Feature 333, which was not disturbed by the backhoe trench) was also fully dug by hand to examine its construction details. Feature 333 measured 1.11 m (3.6 ft) long by 70 cm (2.3 ft) wide and was 45 cm (1.5 ft) deep (Fig. 3.59). The pit had been dug through the hard red clay pad into the sterile substrate beneath, and the backfill of the pit was full of disturbed clods of the red clay mixed with clinker-rich Stratum 2. The base of the pit contained two flat-lying creosote-impregnated planks set into the long axis of the pit, with a second shorter plank set across the tops of the basal planks. This construction method was consistently reflected in all of the other square pits with planks that were exposed (in the backhoe trench and elsewhere), although the specific configuration of the planks differed somewhat among each of the pits. These pits with planks (as well as the "square pits" listed in Table 3.16, which certainly represent unexcavated examples of the same feature class) evidently served as footers for vertical pilings that were set upon the planks, although no pilings remained intact anywhere in Structure 8.

Structure 9: Water Crane

Structure 9 was the water crane reported by Scheick et al. 2003. The structure was a rectangular concrete foundation with pipe fittings incorporated into the foundation walls and a square pit at the base. Large concrete slabs recovered from fill may have functioned as doors and possibly as part of the unit's machinery. Located 1.05 m (3.5 ft) west of the existing 1880 west railroad track, approximately 9 m (29.5 ft) south of Structure 2, and across the railroad tracks from the south end of the depot, Structure 9

Figure 3.58. LA 146402, Structure 8, wood planks constructed of from 1 to 5 milled planks of creosote-imbued lumber.

was at the southernmost extent of LA 146402. Structure 9 may have been associated with the Structure 1 and 2 complex (Fig. 3.2).

Excavation Sequence

The foundation was newly discovered during data recovery while scraping SCU 141. Approximately .30 m of Stratum 2 that covered the structure was removed to expose north, south, and west walls. Initial scraping did not expose the eastern foundation, which was only 1.06 m (3.5 ft) from the railroad track. Excavation began with a 1 by 1 m unit (XU 107) placed inside the structure's northwest corner (Fig. 3.60). Artifacts recovered from XU 107 are summarized in Table 3.19. The unit was excavated in 10 cm levels and 1/4-inch screened with the intention of sampling artifact content to the floor. One meter twenty centimeters of fill was removed before several large, redeposited concrete blocks in the fill became unstable and unsafe. The remaining fill and concrete blocks were removed from the whole structure using a backhoe. Structure fill, Stratum 2, was friable dark grey, fine-grained sand, with gravel and coal. Building materials extricated from fill were likely associated with the structure, and indicate that it was deposited during a single demolition episode.

Description

The structure was a 2.46 m (8.07 ft) long and 1.75 m (5.47 ft) wide and 1.96 m (6.43 ft) deep concrete foundation poured in a similar manner to that of the freight scale (Structure 1). The concrete lip was no longer intact, but a .08 m (3.15 in) wide, .06 m (2.36 in) deep groove was evident along the top of the west wall (Fig. 3.61). Nails and rebar protruding from this groove suggest it was the seat for a wooden frame. Side walls were constructed of three courses of form-poured concrete that were apparently prefabricated, lowered into place and mortared together with cement. The foundation wall slabs were poured in .12 to .13 m (4.75–5 in) sections forming .40 m (16 in) high blocks. Walls were stacked and installed against Stratum 3 with a concrete floor was at 1.96 m (6.43 ft) below the structure lip at ground level. Excess mortar used to cement concrete slabs and to cement pipes partially obscured form marks left during slab fabrication. The floor (2.30 by 1.35 m; 7.55 by 4.43 ft) was slightly concave concrete poured over wooden planks exposed in Feature 358

Figure 3.59. LA 146402, Structure 8, Feature 333, facing west.

indicating that they were installed before the floor was poured.

Pipes. Two pipes protruded from Structure 9's walls. In the center of the south wall, an 18 cm (7 in) diameter capped steel pipe protruded 13 cm (5 in) out from the wall approximately .38 m (1.25 ft) above the floor. An arched patch of mortar above the pipe may have indicated a hole left in the concrete wall when the wall was constructed. Beneath the pipe was a .51 m (1.67 ft) long by .40 m (1.32 ft) high slab of form-poured concrete of the same manufacture as the wall slabs. This smaller slab was installed separately and mortared into the wall.

Another steel pipe was located along the west wall/ floor juncture approximately .40 m (1.32 ft) south of the north wall. The .15 m (6 in) diameter pipe protruded from the floor and extended out from the structure's northeast corner exiting the structure at a 50-degree angle toward the northwest as measured from the foundation west wall. The pipe was not capped and its purpose inferred from its location may have been to drain the structure.

Feature 358. Feature 358 was a square opening in the Structure 9 floor (Fig. 3.61). The feature was roughly equidistant from both east and west walls and approximately .45 m (1.48 ft) from the north wall. It was formed when the floor was poured. The feature measured .55 by .56 m (1.8 by 1.84 ft) and was .12 m (4.7 in) deep. At the base of the pit were two .24 m (9.5 in) wide planks, each were .08 m (3.15 in) thick (Fig. 3.62). These planks continued underneath the floor to the east and west. A small test unit indicated that they were placed on another layer of concrete. This opening could have held a large (.46 x .48 x .30 m) concrete block recovered from the fill and may have housed mechanical components associated with structure use.

Concrete Slabs. Two concrete slabs (Fig. 3.63) recovered from structure fill may have been used as doors. Measuring .96 x .74 x .08 m (3.15 ft by 2.43 ft by 3.2 in) each had two handles fashioned of iron rings set .58 m (1.9 ft) apart and a .05 m (1.9 in) lip along one long edge. When the slabs were oriented with handles up, these lips fit to create an overlapping joint. Another large rectangular concrete slab may have fit into Feature 358. This one was .46 x .48 x .30 m (1.51 ft by 1.57 ft by 118 in) with two rebar set .22 m (8.6 in) apart; it may have been the top (Fig. 3.62). The structures lip, which had been demolished, was also redeposited in fill. Broken sections were recovered, and when refit became .22 to .25 m (8.6 to 9.8 inch) wide chunks; one had "remove crown 6-1953" scrawled in chalk along the edge. The origin of these concrete chunks is unknown. The numeric text may refer to June 1953, indicating that this structure was filled sometime after that date.

Railroad Tracks, Refuse Pits, and Pipes (NSTRs 102 and 104)

NSTR 102 encompassed the extramural areas associated with the AT&SF railyard component west of the 1880 tracks (Fig. 3.2, 3.25), including the areas around Structures 1–7 and 9. The area was exposed by the manual and mechanical excavation of Scraping Units 100, 107, 108, 109, 122–126, 130, 132, 133, 136, 137, 141, 146, 151, and 152. Forty-seven features occupy this study unit (Table 3.20). The most important information provided by these features mainly lay in their spatial layout and relationships to other railyard features and structures. No additional excavations were deemed necessary, but their locations were mapped and feature descriptions were recorded.

Railroad Tracks

As illustrated in Figure 3.25, the three remnant alignments of railroad tracks that were identified as features represent part of the original layout of this portion of the railyard. Feature 201, an array of tie beds running past the southwestern end of Structure 3, evidently represents part of the train turnaround that is known today as the Romero Street wye, perhaps Track 9 (Scheick et al. 2003, Fig. 3). No ties remained intact along the Feature 201 part of the alignment; only the clinker- and coal-filled impressions of the tie sockets were uncovered. An associated alignment of postholes and probable postholes (Features 537, 539, 540, 543–545, 557) parallel the eastern side of the projected track alignment southeast of Structure 3.

The two other railroad track beds in NSTR 102 extend northeastward from Structure 3. This is probably the same track alignment documented to the west of the well and water tank documented at LA 146403.

Features 395 and 397. Both Feature 395 (the eastern tracks) and Feature 397 (the western tracks) show some signs of realignment or reuse. Feature

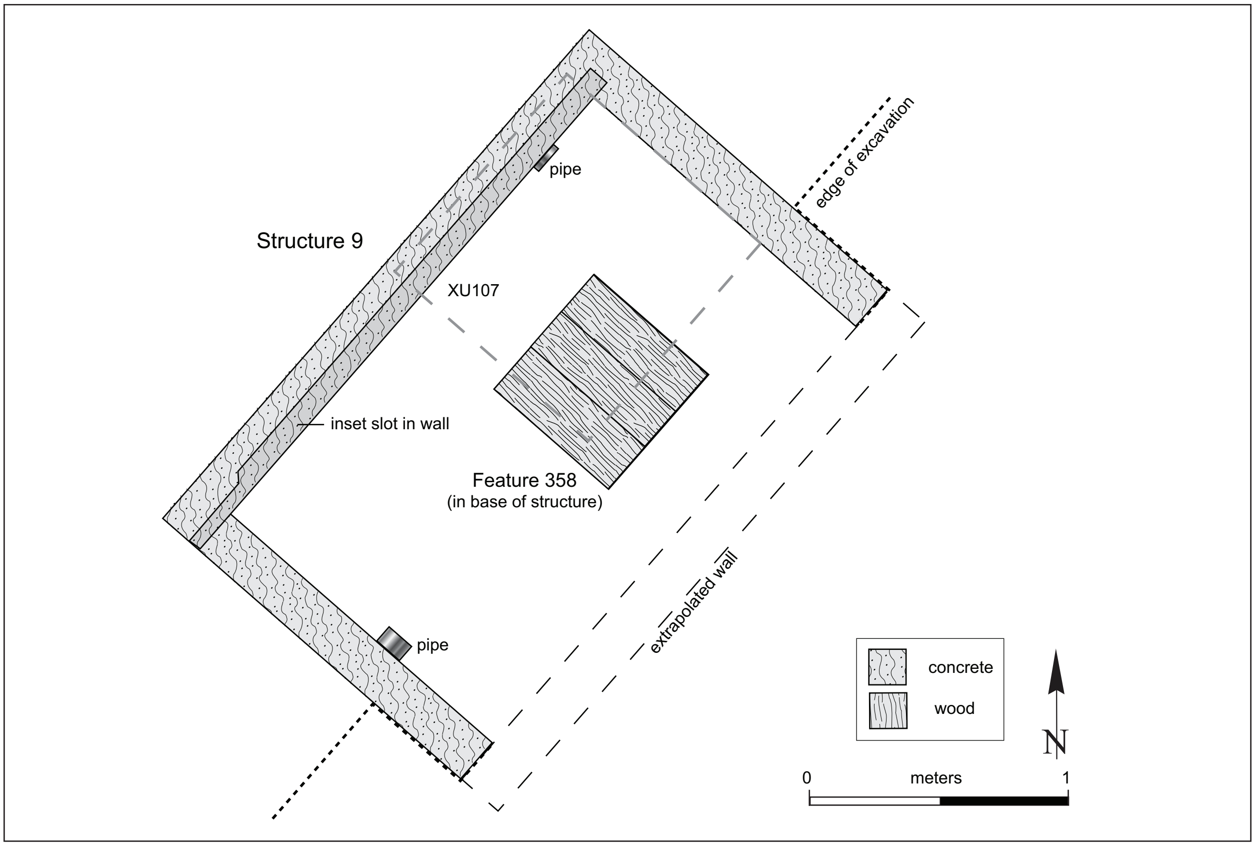


Figure 3.60. LA 146402, Structure 9, final excavation map.

Figure 3.61. LA 146402, Structure 9, interior view with Feature 358 exposed.

Figure 3.62. LA 146402, Structure 9, Feature 358.

Figure 3.63. LA 146402, Structure 9, cement-slab lids recovered from interior fill.

395 consists of a 17 m long section of railroad tracks that approached, but did not meet, the northeast wall of the Structure 3 eastern engine bay. Only four wooden ties farthest from structure foundations remained intact; the rest of this alignment consisted of clinker-filled tie impressions (see Figs. 3.43, 3.64). Two of the wooden ties contained date nails, one from 1934 and from 1942. Most of the clinker-filled tie impressions exhibited two different colors of fill, separated by a clear horizontal break forming a fairly straight line across the impression. These fill breaks follow a consistent alignment representing the western ends of railroad ties that were moved and realigned slightly to the east. The western edges of both the early (western) and later (eastern) alignments of this feature extend directly toward the western ends of the four northern intact ties; probably indicating that only the tracks south of those intact wooden ties were realigned. The western alignment evidently served the engine house (Structure 3), and is probably part of the 1880 railyard infrastructure. The projected course of the eastern tracks would cross over the corner of Structure 3 (although no tie impressions were found there), indicating that this realigned set of tracks probably post-dates the engine house demolition.

Figure 3.64. LA 146402, railroad track alignments; Feature 395 (center foreground) and Feature 397 (right background).

Feature 397, the 19.6 m long western set of tracks, included mostly intact wooden ties. Only two of the northern ten ties in this alignment consisted of clinker-filled impressions, and one of those, by the southern end of BHT 8, is known to have been removed during the testing phase. The southernmost tie actually lay directly upon the intact mortared-wall coping of Structure 3's western engine bay wall. Several clinker-filled, elongated tie impressions extend west of ties in the northern section, but these linear impressions are of unknown function. One of the ties contained a 1942 date nail. Although the alignment of Feature 397 directly approaches the western engine bay of Structure 3, the wooden ties in this line are suspected to represent a later track related to the use of Structure 4, the loading dock that superimposed Structure 3. This interpretation is supported by the spatial proximity of these tracks to the northern, elevated end of the loading dock, and by the date nails in both sets of tracks, indicating that these lines post-date the engine house's demolition.

Structures 1 and 2 Associated Features

Feature 266 was a steel pipeline that appears to have provided service to Structures 1 or 2. This pipeline, which was wrapped in asbestos and then encased inside a series of ceramic sewer pipes, may have been a water-delivery pipe. In BHT 5 (excavated during testing), this buried, flat-lying pipe lay within ca. 3 m (10 ft) of the southern wall of Structure 1. The pipe extended a short distance east of the tracks, passed south of Structure 8, and then turned southwestward. Its origin remains unknown.

Two other extramural features identified south of Structure 2 may be related to the construction or use of that structure. Feature 255 was a construction beam extending southward from the southeastern corner of the structure, and Feature 264 was an upright wooden post. These features were described in the Structure 2 discussion (above).

Structure 3 Associated Features

Drain Pipe and Cistern. Two extramural features related to Structure 3 were partially excavated to obtain information about their morphology and construction. Of these, Feature 29 (see Structure 3, discussed above) was a subterranean, wood-lined culvert (originally identified during testing) that extended northwestward from the northwestern wall of Structure 3. This culvert connected with Feature 238, a sub-floor drainage channel inside the building (discussed above). Roughly 18 m (59 ft) outside the building, A 2-m-long section of the culvert (Feature 29) was excavated in SCU 125 and all fill was 1/4-inch screened (Table 3.21). The top of the rest of the feature was exposed and mapped in SCU 122. The cistern (Feature 241) was also exposed in plan view in SCU 122, and the western half was bisected by mechanically excavating SCU 133 to the top of the planks covering the cistern. After documentation, SCU 133 was further mechanically excavated through the cistern to expose a cross section of the feature, which was then also documented.

Porch or Ramp. A feature complex, consisting of a series of railroad tie (Features 265, 514–518, 521) and posthole impressions (Features 519, 520, 547–549) that may have been the remains of a porch or ramp were encountered between the Feature 201 tracks and Structure 3's southwestern wall (Fig. 3.25) as discussed above. Another extramural feature (Feature 223) related to Structure 3 was a linear, mounded deposit of plaster or jaspé that abutted the outside of the western wall of the building. This feature was described in the Structure 3 discussion (above).

Postholes. In the relatively vacant area south of the outhouses (Structures 5–7), two small clinker-filled pits (Features 508 and 509) with heavily burned, hardened, oxidized rims were exposed in SCU 107. These pits are near Feature 53, another poorly preserved, heavily burned, hardened, oxidized pit that was identified during testing (but was destroyed during data recovery re-excavation). Although Feature 53 could not be assigned to a site component during testing due to an absence of intact fill (Wenker 2005a), its proximity to two other known railyard-related burned features now suggests a similar age. Together these three features may represent postholes of a railyard structure (e.g., fence, transmission line) that burned down or was purposefully incinerated. Feature 385 is another small, circular, clinker-filled pit located just to the east of the three burned pits. Although Feature 385 lacks any signs of thermal alteration, it could represent another component of the possible structure in this portion of the railyard.

Pits and Pipes. Feature 556, a large pit to the west of Structure 2, contained coal and clinkers in its exposed fill. This pit abuts the edge of Feature 209 (a 6.4 cm [2.5 in) diameter steel or iron pipe in a trench that extended toward Structure 2), although its junction with that structure was not exposed. Two other metal pipelines were exposed in SCUs 132 and 136, just to the south of the three outhouses (Structure 5–7); although the pipelines are probably not related to those structures. The pipe extending to the southeast (Feature 242) may be the same sewer pipe that crosses through the middle of Structure 8. The northeast–southwest pipe (Feature 240) extends to points unknown.

In the area north of Structure 3, intermingled among the postholes of Structure 4 and the array of modern features (see below), lay a scattered array of small nondescript pits (Fig. 3.25) that were exposed by mechanical scraping. Of these, Features 248, 376, 381, 383, 384, 415, 416, 418, and 423 represent clinker-filled pits of generally circular or oval shape, with little or no artifact inclusions evident. Feature 382 represented a single small (37 by 49 cm [14.6 by 19.3 in]) refuse-bearing pit, with three brown and aqua bottle glass shards, one eggshell fragment, one whole ink bottle with fully automatic seams and a continuous-thread finish, and several rusted sheet metal fragments exposed in the scraped surface. No further excavation was conducted at any of these features.

NSTR 104

NSTR 104 encompassed the extramural areas associated with the AT&SF railyard component east of the 1880 tracks (Figs. 3.25, 3.49), encircling Structure 8. The area was exposed by the excavation of SCUs 143–145, and 148. Five features were found in this area (Table 3.22).

Railroad Tracks. The most substantial extramural feature in this location was Feature 411, an array of railroad track tie beds running along the eastern edge of Structure 8. No ties remained intact along this part of the alignment; only the clinker-and coal-filled impressions of the tie sockets were uncovered. Although no signs of the track were observed in the northern scraped area (SCU 148), Scheick et al. (2003, Fig. 4.2) indicate that a siding did once pass through this area and continue to the north, indicating that the track bed to the north was probably destroyed prior to this excavation.

Pipes. The other extramural features in NSTR 104 lay in SCU 144, south of the southern end of the loading dock (Structure 8.01). In this area, Feature 266, a pipeline, originally identified on the western side of the tracks, was observed to cross under the tracks and turn to the southwest, continuing an unknown distance beyond the excavated area. Two small square pits in this SCU, Features 429 and 430, may represent postholes. Feature 431 consisted of a long construction beam (resembling a railroad tie in all dimensions save its length, in excess of 2.89 m [9.5 ft]) positioned on the historic ground surface perpendicular to the tracks. Feature 432 was a creosote-soaked plank (similar to those in Structure 8) positioned on the historic ground surface just outside the southwestern corner of the loading dock. The precise functions of these last two construction beams remains unknown.

Recent/Modern Features (NSTR 103)

Twenty-four features located during data recovery across the whole of LA 146402 were identified as being of recent or modern (post-1954) origin based on artifact content or feature type. Some of these were previously identified during testing but were recognized as modern only during data recovery. These features are listed in Table 3.23 and their locations are displayed in Figure 3.65 as well as in relevant study unit maps introduced above. The importance of these features lies primarily in their presence as disturbance factors to other features and structures.

Sixteen of these features, in the area north of Structure 3, consisted of large (ca. 2 m diameter, 1 m deep), circular pits with sloping sides and flat bottoms. Many contain modern refuse as well as rotted wood fragments that resemble tree roots. These pits probably represent a relatively recent episode of landscaping or a tree nursery. Some of these pits (e.g., Features 18, 75, 396, and 420) intruded into the pre-railroad midden deposits (NSTR 101); others (e.g., Features 243 and 246) intruded through structural features (such as the culvert, Feature 29, and rock-lined cistern, Feature 241, associated with the engine house).

Two other trench-like intrusive pits (Features 421, 422) also occupied the central area of the midden deposits (NSTR 101), although neither of these trenches extended downward into the basal midden sediment. Two pits (Features 102, 249) were intrusive to Structure 2, overlapping both sides of the wall between Rooms 2.1 and 2.2 (discussed above).

One large modern pit (Feature 541) was excavated in early June 2005, under the northern end of the 1880 railroad tracks, immediately west of the northern end of Structure 8 (Fig. 3.49). The excavation of this pit, for hydrocarbon-contamination remediation work, did not require specific archaeological clearance under the terms of the MOU (personal communication, Michelle Ensey, HPD, 2005). Informal observations of the remediation pit by the senior author confirmed that the pit impacted three posthole features (Features 542, 559, 560) along the western side of Structure 8, which was excavated in late June when the disturbance pit had been backfilled. Finally, Features 14 and 550 also consist of recent or modern refuse pits that impacted the northern end of Structure 8 (discussed above).

AT&SF Infrastructure Summary

Evidence of sequential construction supports archival documentation of the use history of the 1880 NM&SP (New Mexico and Southern Pacific a subsidiary of the AT&SF) depot Structure 8 complex. The depot was probably constructed near the end of the year in 1879, was later remodeled in 1909 and, then used as a freight warehouse. The 96.3 by 24.3 ft building was constructed of wood on cut stone or cobble foundations. It had four rooms and a single story with a shingle roof. It was built for an initial cost of $2,500 (Scheick et al. 2003:53; Figure 3.66). Scheick et al. (2003) indicate that the western (track) side of the original depot was fronted by a dock or platform that extended well to the north and south of the building, and another possible dock lay immediately north of the building which was remodeled into a freight warehouse in 1909.

The use of stone masonry with sand mortar in pilasters associated with Structure 8a, suggests that this array of stone piers and the associated beams

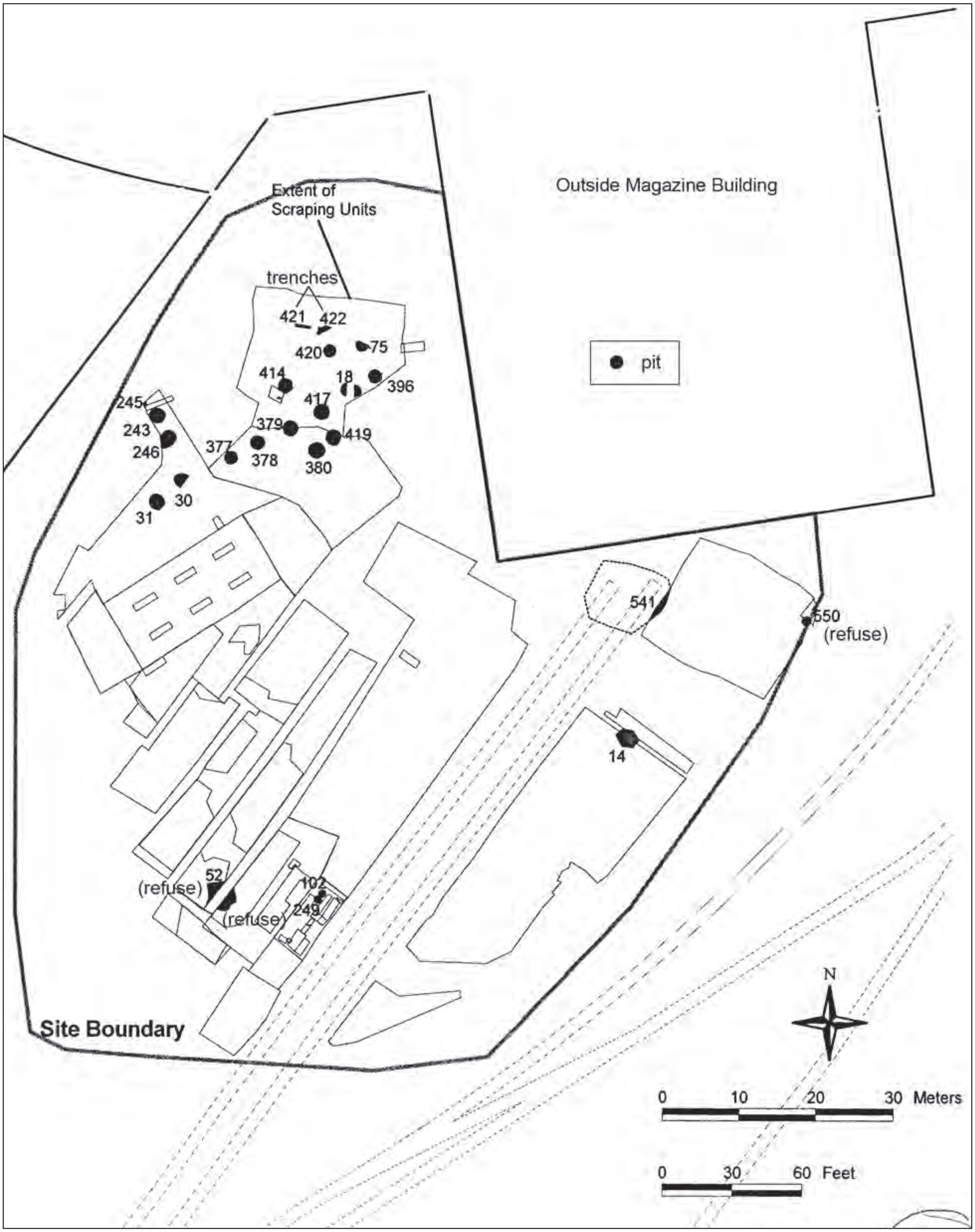


Figure 3.65. LA 146402, NSTR 103 overview, showing locations of intrusive modern and recent features.

marks the location of the original 1879 construction episode. The original building shown to scale on the 1906–1991 map compiled by C. T. Snow (Scheick et al. 2003:53) depicts the original building as the central hachured rectangle. Ancillary loading docks abutting the depot must have been supported on some of the piers which covered a 4 by 11.5 m (131 by 38 ft) area, but it is unclear specifically which piers supported the original station house. The presence of additional postholes and piling footers, described below, suggests that the loading docks around the depot were built using different construction techniques and that when the building was repurposed as a warehouse supplemental infrastructure was added.

Creosote imbued planks documented throughout the Structure 8 complex, are resistant to termite damage. These planks presumably provided a base to vertical supports that were used to augment the warehouse's floor so that the infrastructure could support heavier loads than originally planned for during the original passenger depot construction. In some cases, supports may have also been used to retrofit plumbing, heating and other sub floor systems during the freight warehouse's long life. Pits into which boards are installed are only located on the north and south side of the structure but don't seem to be directly related to the presence or absence of masonry piers, suggesting that some eccentricity of the land form or another factor encountered during construction or remodeling predetermined pit installation or at grade plank placement. In SCU 148, some of the planks were set in pits that were clearly dug into the sides of the preexisting masonry piers, indicating that those planks represent foundations of a later structure.

In Structure 8.1, it is also clear that the square pits were dug into and through the red clay pad and it is likely that the pad was abandoned and the location was reused when wooden piling footers were excavated. If the pad had been originally intended to anchor piling support, it seems more likely that the clay would have been installed around the previously erected pilings and footers instead of requiring builders to hack through a foot of hardened clay during construction. It also stands to reason that there would be a stronger structural association with the clay pad and creosote footers. This observation is supported by Feature 326, the mortar-lined pit with pipes (see above), which had clearly been reused for a plank support, demonstrating that at least some of the planks in Structure 8.01 were later installations.

The Map of the Station Grounds compiled by C. T. Snow (Fig. 3.66) shows a double dotted line with a dot in the center labeled "Park hyd" depicting a presumably nonstructural, but bounded area which likely shows Structure 8.1. The construction date of this area is unclear from the station map. The Station Map of the Denver & Rio Grande Railroad drafted in 1919 and corrected to 1923 (Fig. 3.67) does not depict the construction, nor does the AT&SF Santa Fe Station Map—Tracks and Structures of the AT&SF Station Grounds (Fig. 3.68) from the collection of Joe Brown. This hydrant was apparently supplied by a fire plug on Manhattan Avenue and was connected to the pipeline infrastructure that served a water crane located on the west side of the tracks (see Structure 9, above). If Structure 8.1 is associated with the water crane it is unclear specifically how or when.

Although the particulars of remodeling are unclear, it was common for the AT&SF to replace and reuse early wooden station houses (which were often installed in small communities on a temporary basis for lower initial investment) with more substantial mission style architecture. The latter style was subsequently used at more important stops to promote the tourist trade and provide a cohesive AT&SF image (Riskin 2005). It was also common for the railroad to convert the earlier structure to a freight depot (Riskin 2005:37). Use of creosote-imbued planks to augment support of load bearing posts was documented during excavation of the water tower at LA 146403 to the north, and was likely a common remodeling and maintenance practice used by the AT&SF to shore up or modify infrastructure. The AT&SF Santa Fe Station Map, from the collection of Joe Brown and drafted June 30, 1916, and corrected to 1919, 1925, possibly 1935, and two other illegible dates (Figs. 3.66, 3.68) suggests that the layout of the warehouse changed little from its pre-1909 configuration. The freight warehouse remained in use through the 1940s and may have been demolished in the 1950s (Joe Brown and C. Wenker, personal communication, 2005). The site was thereafter used as a loading dock until sometime in the 1980s (Bob Sarr, Santa Fe Southern Railway, and C. Wenker, personal communication, 2005), but it is unclear if the original loading docks were remodeled or if a new set of docks was constructed.

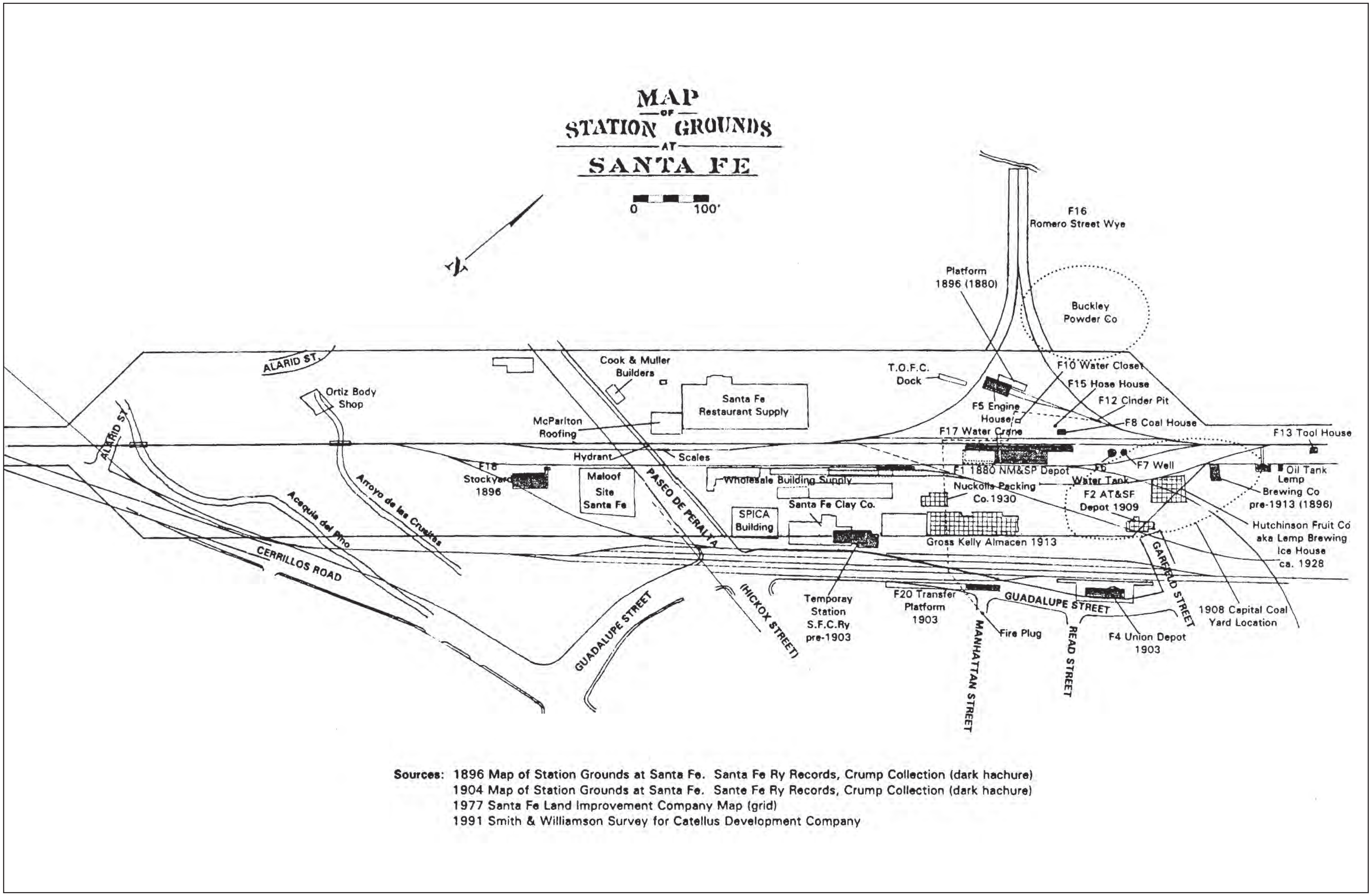


Figure 3.66. Map of the station grounds compiled by C. T. Snow from the Russell Crump collection, 1991. A version drafted by Gloria Vigil was published in Archaeological Resources of "La Otra Banda del Rio," City of Santa Fe Railroad Properties (SW458b, Scheick 2003:51, Figure 4.2). Used with the generous permission of Southwest Archaeological Consultants and Cordelia Thomas Snow, October 15, 2012.

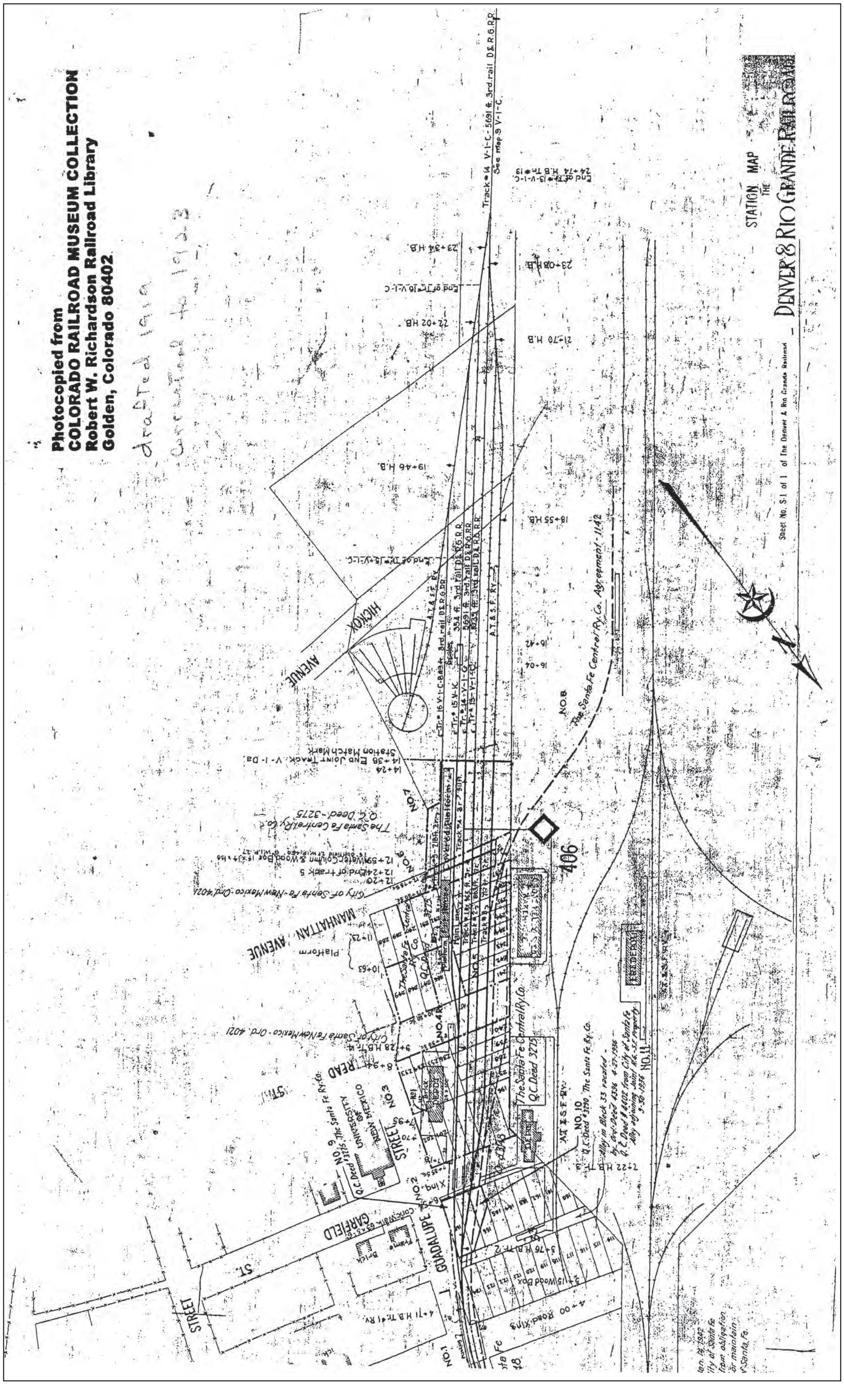


Figure 3.67. Station map of the Denver & Rio Grande Railroad, operated jointly by the D&RG and the AT&SF Railway. Map drafted 1919, corrected to 1923 (courtesy Colorado Railroad Museum Collection, Robert W. Richardson Railroad Library, Golden, Colorado).

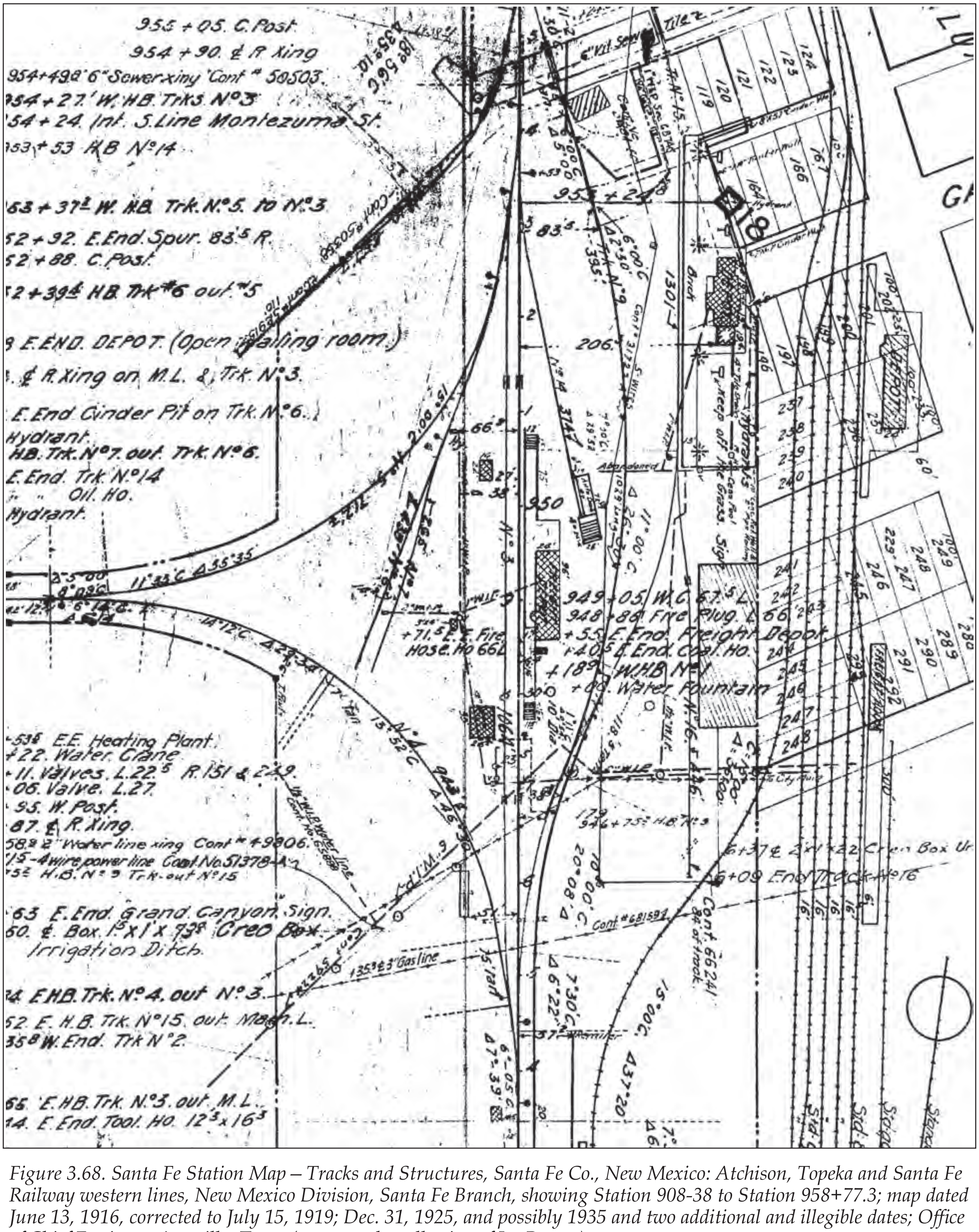


Figure 3.68. Santa Fe Station Map – Tracks and Structures, Santa Fe Co., New Mexico: Atchison, Topeka and Santa Fe Railway western lines, New Mexico Division, Santa Fe Branch, showing Station 908-38 to Station 958+77.3; map dated June 13, 1916, corrected to July 15, 1919; Dec. 31, 1925, and possibly 1935 and two additional and illegible dates; Office of Chief Engineer, Amarillo, Texas (courtesy the collection of Joe Brown).

The Structure 1 and 2 freight scale and dock complex located across from the original AT&SF depot, later the freight dock, is not reported by Scheick et al. (2003) (Fig. 3.66). The AT&SF Santa Fe Station map (Fig. 3.68) from the collection of Joe Brown (a former AT&SF freight manager at the Santa Fe station), does indicate a 7.92 by 10 m (26 by 33 ft) structure on the west side of the tracks, roughly 19.81 m (65 ft) south of the freight depot (Structure 8). The Structure 1–2 complex lies in approximately this location. No function is labeled on the map. This map, drafted in 1916 has had a number of corrections that postdate December 1925 and possibly 1937 making it difficult to derive a date for the structure from the map.

Structure 1 location within a presumed loading dock suggests a freight-oriented function. The top level of the concrete walls matched the top of the remaining wall foundations of surrounding Room 2.2, indicating that the loading dock's floor would have been at or near the level of the top of Structure 1. Although no floor, superstructure, or interior equipment remained in place in Structure 1, the structure is interpreted as a freight scale. The balance beam and other scale apparatus could have been housed in the subterranean interior of Structure 1, and the lip in the tops of the western and eastern walls may have supported part of the scale platform.

Structure 2 location and size suggests that it was originally constructed as a loading dock and was then modified to house the freight scale. The remodeling episode demonstrates an ad hoc modification of more formal original construction built by AT&SF. The use of internally scavenged building materials may indicate a change from architecture dictated by the corporate railroad concern to that of more vernacular construction necessitated by less available funding.

The original loading dock was located across the tracks from the depot and may have also been constructed in 1880, when the depot was built. The scale could have been added in 1909 when the depot was remodeled to handle freight (Wenker et al. 2005c). The structure may have stood till 1977 when the depot was documented as "retired in place" on a property map prepared for the Santa Fe Land Improvement Company. Modern refuse in Structure 1 suggests relatively modern decommission, possibly at or around the same time as Structure 9.

The composite Map of the Station Grounds compiled by C. T. Snow (Fig. 3.66) from 1896–1991 indicates a "water crane" located in the Structure 9 vicinity. Close examination of the map indicates that a fireplug on Manhattan Avenue fed an associated line that continued west at a 45-degree angle underneath a more modern transfer platform built in the current Guadalupe Street right of way. The line then angled a another 45 degrees beneath a series of sidings, and continued beneath the Gross Kelly warehouse and Nuckolls Packing Co. building, to reemerge as a hydrant on the east side of what is depicted on the Station Map of the Denver & Rio Grande Railroad as the east track of the No. 3 siding (Fig. 3.67). However, C. T. Snow's Map of the Station Grounds (Fig. 3.66) shows a series of small circles that may represent hydrants on the west side of the siding at the Structure 9 location. From their the line continues north, hooks around the "water closet" passes the hose house and terminates at a cinder pit south of the engine house.

Structure 9's proximity to railroad tracks and the loading dock (Structures 1 and 2) southwest of the AT&SF depot (Structure 8) indicates that it was infrastructure directly related to the train's daily operation. Although water columns were used in the United States by 1858 (Lester 2008:6), use of rebar-enforced concrete construction suggests a date of at least 1920. A water crane was installed by 1898 (C. T. Snow 1991:64–65, 68), and a 1901 valuation of AT&SF structures (Table 7.5) indicates a water crane at the railyard; whether the apparatus referred to was Stucture 9 is unknown. Despite concrete construction, the "water crane" or water column's basic design does not seem to have changed significantly, even though there appear to have been numerous designs. The apparatus operated on a series of rollers and inclined planes that turned the water spout so that it would always stand parallel with the track when not in use (Lester 2008:8). An illustration of Poages Automatic Water Column from the Railroad Gazette (Fig. 3.69) is very similar to the design of the concrete box observed during excavation. Other designs patented in 1907 and 1919 are illustrated in U.S. Patent Application No. 847,494 (Fig. 3.70) and 958,504 (Fig. 3.71). Location of the potential hydrant on the Map of the Station Grounds (Fig. 3.66) corroborates this structures use as a water crane or water column. Large diameter pipes located in the sides and base indicate water delivery, not gas. Continuation of the above mentioned water line underneath

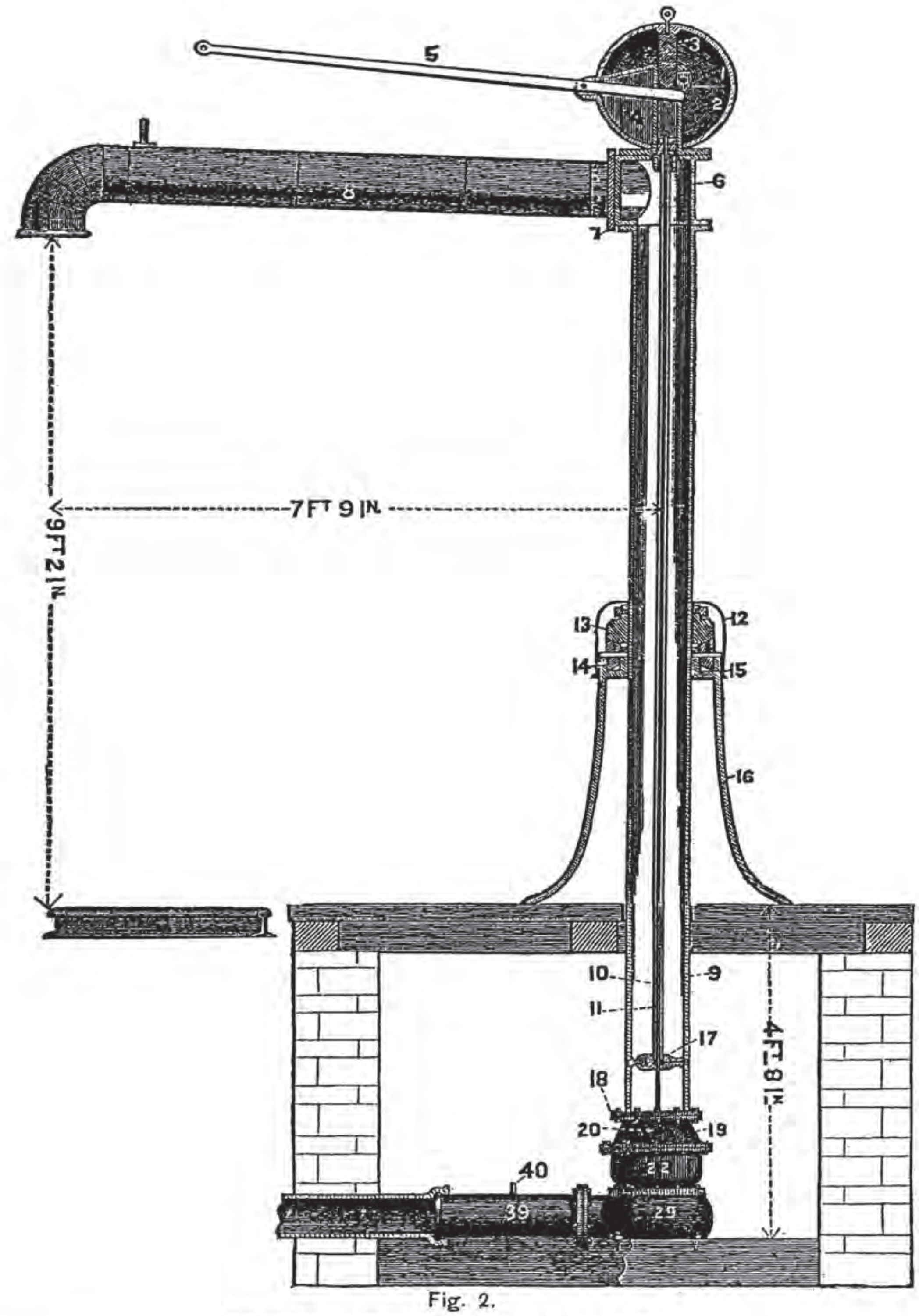


Fig. 2.

POAGE'S AUTOMATIC WATER COLUMN

R&LHS Quarterly 7 Fall 2008 - Winter 2009

Figure 3.69. Illustration of Poage's Automatic Water Column from the Railroad Gazette, September 1883 (reprinted from the Railway and Locomotive Historical Society Quarterly, Fall 2008, vol. 28, #4–vol. 29, #1.

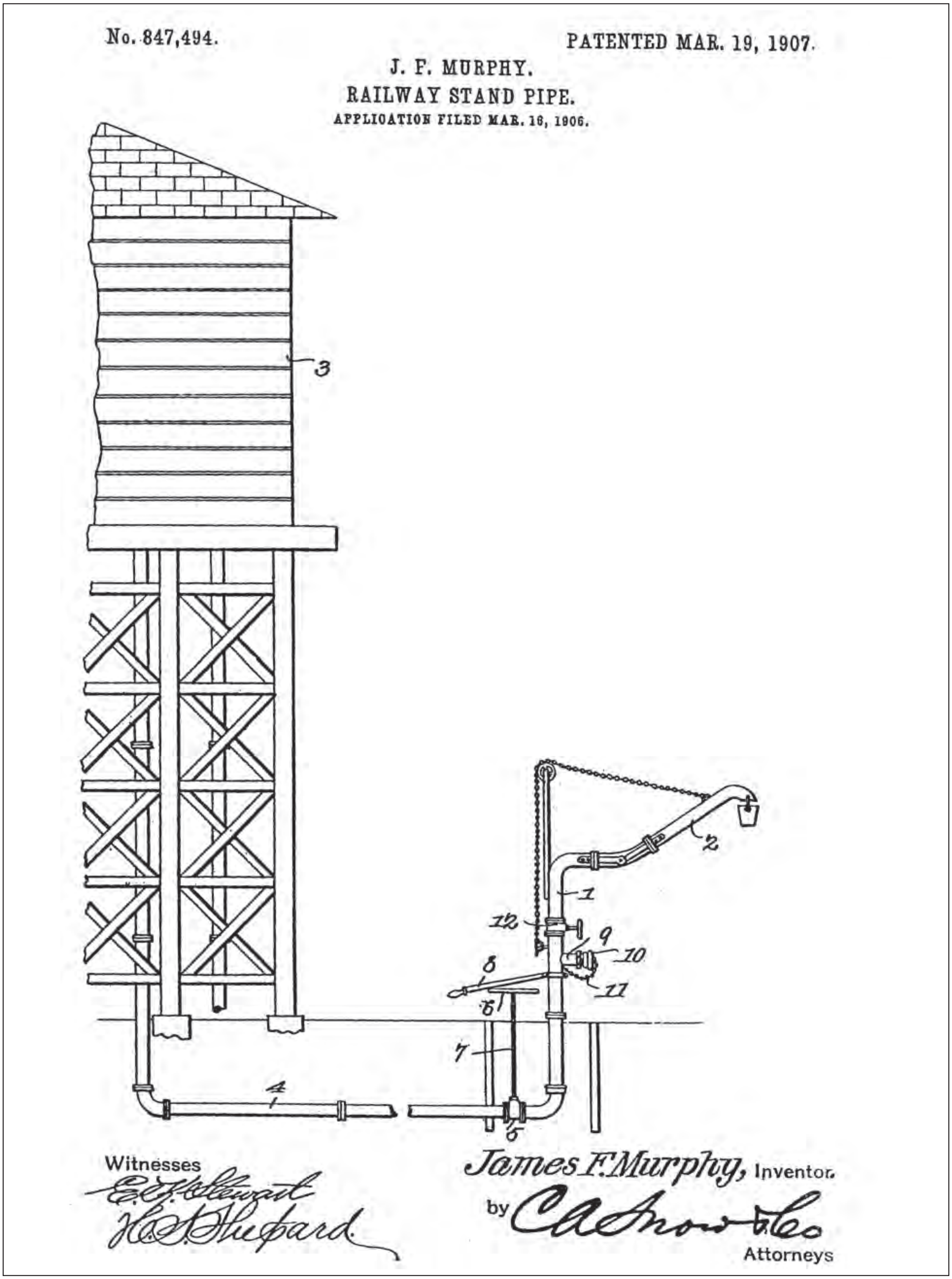


Figure 3.70. "Railway Stand Pipe," U.S. Patent 847,894 (March 19, 1907).

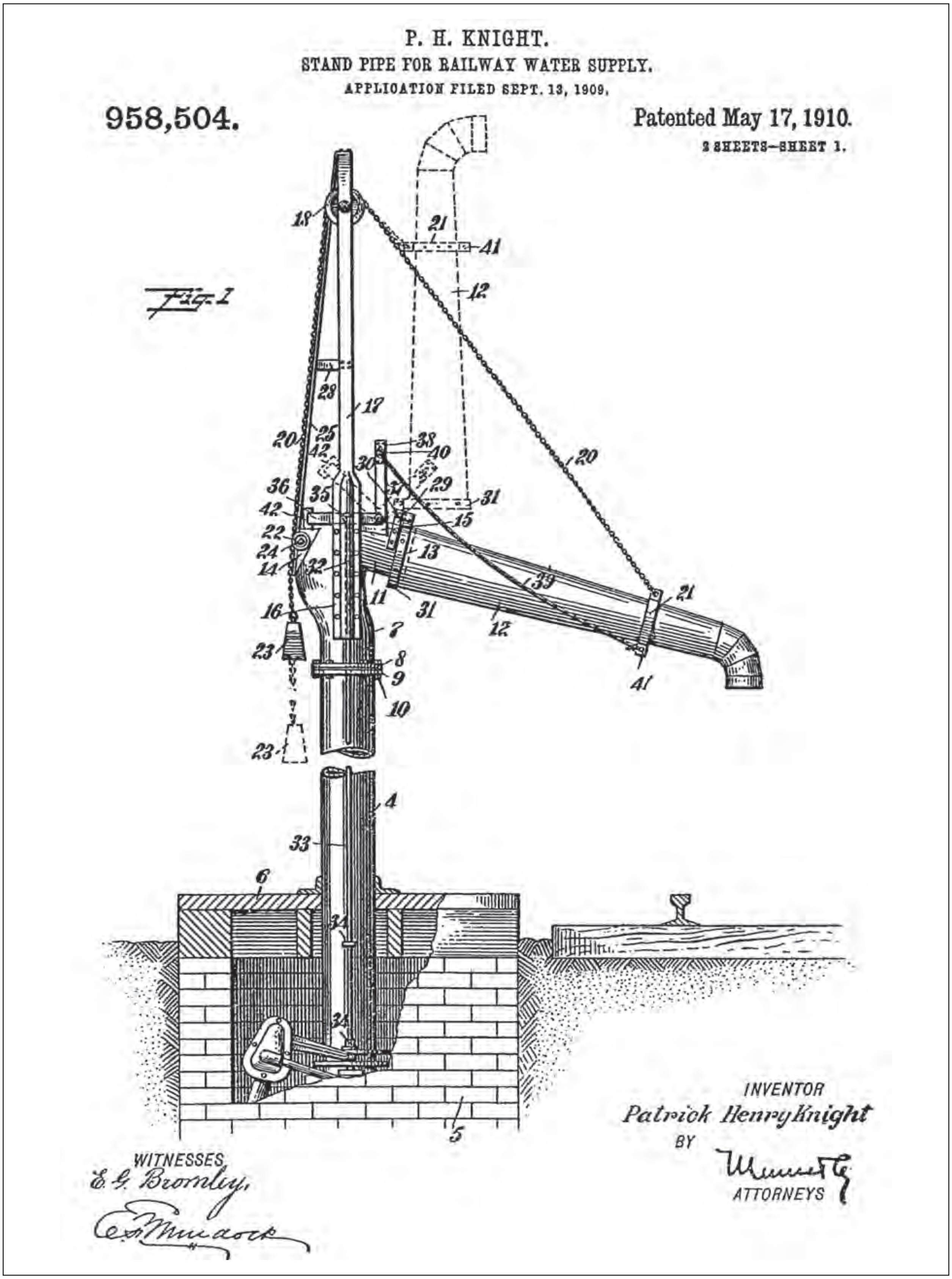


Figure 3.71. "Stand Pipe for Railway Water Supply" U.S. Patent 958,504 (May 17, 1910).

the east track of the No. 3 siding (Figs. 3.66, 3.68) to a location in the corner of the depot/ loading dock juncture named “park Hyd” suggests that the water crane apparatus may have straddled the tracks and had some of its apparatus housed in the clay pad associated with the loading dock (Feature 8.1) across the tracks. The structure’s dismantled edge with “remove crown 6-1953” written on the edge suggests that the feature was slated for demolition along with other railyard infrastructure as part of planned railroad decommissioning. The origin of these concrete chunks is unknown. The numeric text may refer to a June 1953 date, indicating that this structure was filled on or sometime after that date.

According to Scheick et al. (2003), the engine house Structure 3 was built in 1880 and measured 70.3 by 32.5 by 19 ft. Roofed with wooden shingles, the structure had two stalls. According to the 1915 Building Record, the engine house’s condition was fair in that year. Excavation indicates that the structure may have had some kind of porch or entryway for workers built onto its south end just feet from Track 4, the northern track that made up the Romero Street Wye. The engine house is not depicted on the AT&SF Santa Fe Station Map (Fig. 3.68) The map depicts no infrastructure other than a pipeline (possibly water) leading from the general location to the freight depot and loading dock to the former station house area. C. T. Snow’s Map of the Station Grounds (Fig. 3.66) shows the engine house in 1896 and 1904. Interestingly, the Station Map of the Denver & Rio Grande Railroad drafted in 1919 and corrected to 1923 (Fig. 3.67) depicts a structure in the station house location without the loading dock, potentially narrowing the demolition date to sometime after 1923. Subterranean repair bays noted above are likely similar to those depicted in Figures 3.35, 3.36, and 3.37 of the Rio Grande Southern Railroad engine house in Rico, Colorado. Riskin notes that “drop pits” allowed maintenance to train wheels and axles (Riskin 2005:43). Excavation of the New London Engine House (Mascia 2003:16) indicates that the drain apparatus may have been ceramic pipe.

There were three types of station houses commonly built in the nineteenth century and used by small rail lines because they were practical and inexpensive to build. A run-through design, open at both ends was typically built as small yards for quick repairs, the “sub-track type” open at one end with buffers to stop the train and a ”radial track type” which contained an interior turn table. (Mascia 2003:10–11). Archival documentation indicates that the house built by the AT&SF was most likely a “sub track” design.

Postholes for the loading dock (Structure 4) and two remnant track alignments provide evidence for the location of the loading dock. The proximity intact railroad tracks (Feature 397) extending to the northeast of the loading dock, Structure 4, and of remnant track ties with date nails (1937, 1942) indicate that the loading dock was served by this track alignment (see NSTR 102 discussion, above). The single intact tie that overlays Room 3.02 immediately to the east of Structure 4 was probably part of the line serving the dock, rather than a tie of the line serving the engine house, which had been demolished before the dock was built. The “L” shape of the dock also indicates a relationship with the tracks entering from the northeast, because the indented northeastern margin of the dock would allow access to both the end and the side of a flatbed car on the western tracks. The absence of postholes along the southwestern end of the structure indicates that the dock probably ramped downward in that direction and met the ground surface between Features 33 and 229.

Scheick et al. (2003) (Fig. 3.66) note the presence of a “platform” in the location of Structure 4, but on that map the platform is labeled with an “1896 (1880)” date. Scheick et al. (2003:59) also describe two additional twentieth-century loading platforms in the railyard, but their locations are not illustrated. The AT&SF Santa Fe Station Map (Fig. 3.68) does illustrate a set of tracks approaching the Structure 4 platform location from the northeast, but no structure is indicated at the end of the line where Structures 3 and 4 were located. The 1919/1923 Station Map of the Denver & Rio Grande Railroad shows only the station house (Fig. 3.67). Because both sets of railroad track to the northeast of Structure 4 (Features 395, 397) contain 1930s and 1940s date nails (see NSTR 102, discussed above) the Structure 4 loading dock may date to that era.

LA 146402 Artifact Analysis

Contexts selected for analysis at LA 146402 were guided by Euroamerican artifact content of the deposits. The goal of selection was to provide a 20 percent or greater sample of artifacts from each selected context. Because midden deposits were rich and native ceramics recovered during excavation indicated a potential temporal association rarely encountered south of the Santa Fe River in intact refuse deposits, the midden was sampled more intensively than originally planned during analysis. This was done at the expense of some other less productive and potentially more disturbed components.

Analyses preformed on artifacts recovered from LA 146402 are presented below but methodology and synthetic reporting are presented in Chapter 7 of this report.

Euroamerican Artifacts
Matthew J. Barbour

NSTR 100, Ditch Segments

Two hundred ninety-five Euroamerican artifacts were recovered from small ditch segments running across LA 146402. These segments likely represent small channels off more robust laterals or acequias. The segments were identified as Ditch A, B, and C. In addition, several segments could not be linked to a specific ditch and were identified as generic discontinuous segments. Artifacts from these features were analyzed primarily to date the features and characterize the nature of human occupation around these ditch segments during their use.

Ditch A. Euroamerican artifacts from Ditch A (n = 19, Table 3.24) were few in number. However all materials analyzed were collected from alluvial deposition (Stratum 11). These artifacts include an unidentifiable piece of euro-ceramic, small fragments of domestic dinnerware (n = 16), and window glass (n = 2). Dinnerwares consist almost exclusively of semi-vitreous white-bodied earthenware (n = 10). However, small quantities of porcelain (n = 1), possibly produced in Asia, and majolica (n = 3) were also encountered. The majolica fragments were too small to be accurately identified as a specific type. However, it is likely these materials were produced in the seventeenth, eighteenth, or early nineteenth centuries. White-bodied earthenwares were not available in New Mexico before the opening of the Santa Fe Trail in 1821. The combination of these two artifact ceramic types could indicate aggradation within the channel in the early to mid-nineteenth century (ca. 1821–1850). There are no materials that can be linked to the railroad and it seems likely that this ditch segment was abandoned prior to utilization of the area by the Atchison, Topeka and Santa Fe Railway.

Ditch B. Two Euroamerican artifacts were recovered from Ditch B (Table 3.25). These artifacts consisted of a small scrap of ferrous metal and a piece of window glass. The window glass fragment is too small to infer method of manufacture. Window glass is first mentioned at the Palace of the Governors in 1831 (Weber 1974:37–45). It seems likely that most locales in Santa Fe did not have access to this product until the nineteenth century. Therefore, it is plausible to speculate that Ditch B dates to sometime in the 1800s.

Ditch C. A total of 150 Euroamerican artifacts were recovered from Ditch C (Table 3.26). However, the majority (n = 90, 60 percent) was recovered from overburden (Stratum 101) likely associated with large-scale development of the land by the Atchison, Topeka and Santa Fe Railway. The remaining 60 artifacts were found in alluvium (Stratum 11) associated with sediment accumulation when Ditch C was in use. These artifacts consist primarily of domestic products, specifically unidentifiable dinnerware fragments (n = 40). These fragments consist almost exclusively of white-bodied earthenware vessels suggesting deposition in the nineteenth or twentieth centuries. The nineteenth century is more likely as no modern period materials are present and the absence of construction and maintenance materials within the alluvium suggests this channel was in use prior to the establishment of railyard. Hence, it is possible to suggest the ditch's use occurred sometime between 1821 and 1880.

Discontinuous segments. The discontinuous segments (Table 3.27) could not be specifically identified with any particular ditch. However these segments follow a similar pattern to the other small channels. In Feature 499, the overburden (Stratum 7.16) is remarkably similar to Stratum 101 identified in Ditch C. Both contain construction and maintenance artifacts (n = 27). These artifacts likely represent commercial or industrial development of the area by the Atchison, Topeka and Santa Fe Railway. Domestic products (n = 19) are common in alluvial strata (Stratum 7, 11, and 133). These products are primarily white-bodied earthenwares (n = 14). However, five unidentifiable majolica pieces were encountered in the alluvium (Stratum 133) of Feature 499. As in the case of Ditch A, this combination of white-bodied earthenware with earlier majolica pieces may indicate that the channel was in use sometime between 1821 and 1850.

In conclusion, alluvium from all ditch segments consists primarily of household refuse, of which all is unidentifiable dinnerware fragments. The ditches are small in size and it is unlikely that water moving through the channel would be able to exert enough stream power to move even small ceramic fragments very far. Hence, it is very likely that materials found within these channels were discarded by households in the immediate vicinity or just slightly upstream of the project area. There is no evidence of commercial or industrial artifacts until after these channels are abandoned. This suggests an agricultural subsistence base for residents of the project area up until the time of railroad development. However, because the individual ditches lack decade specific diagnostic artifacts it is impossible to identify in which order the segments were used though it seems reasonable to suggest that Ditch A may have been the earliest of the three based on the presence of majolica.

NSTR 101, The Residential Midden

A total of 395 Euroamerican artifacts were collected and analyzed from Non Structure 101, the residential midden. These materials were distributed across 11 distinct strata, but can be categorized into three major depositional episodes. These episodes are identified as Upper Fill, Middle Fill and Lower Fill in Tables 3.28, 3.29, and 3.30.

Lower Fill. The Euroamerican artifacts from the Lower Fill (Stratum 126 and 128) (n = 24) consist primarily of small unidentifiable items (n = 13, Table 3.28). Those artifacts which could be tied to a specific functional category included domestic products, such as unidentifiable dinnerware (n = 4) and bowl (n = 2) sherds, and construction and maintenance materials, such as wrought iron nails (n = 2). The composition of the dinnerware and bowl fragments by ceramic ware is listed in Table 3.29. These artifacts provide for a mean ceramic manufacture date of 1738 (std. deviation 43 years, Table 3.30) and suggest refuse began to accumulate in the pit sometime after the Spanish Reconquest of New Mexico in 1692. The wrought iron nails fit well with an eighteenth century date for the Lower Fill.

Middle Fill. Euroamerican artifacts (n = 114) from the Middle Fill (Stratum 120, 120.02, 120.03, 120.04, 120.05) date slightly later than the Lower Fill assemblage. Dinnerware products (n = 55) from these strata yield a mean ceramic manufacture date of 1752 (std. deviation 44 years). While this date overlaps with the date provided for the lower fill, the average is somewhat higher, which is consistent with the gradual accumulation of deposits over time. Euroamerican cultural materials within the Middle Fill are similar to those encountered in the Lower Fill. A substantial portion of the artifacts fall within the unassignable category (n = 49, 43 percent). Artifacts identifiable to function include domestic (n = 55, 48 percent), furnishings (n = 1, 1 percent), construction and maintenance (n = 6, 5 percent), personal effects (n = 2, 2 percent) and entertainment and leisure (n = 1, 1 percent) products. The presence of small quantities of window glass (n = 5), coal clinkers (n = 33), and brick (n = 1) fragments found within the upper elevations of the Middle Fill (Stratum 120, 120.02) likely reflect some undocumented disturbance. It is also clear that the bisque-porcelain doll fragment recovered from Stratum 120.02 is not related to Spanish Colonial utilization of the midden, as such products date to the mid- to late nineteenth century. Of particular interest were two wire-wound glass beads. The beads were faceted and clear to aqua in color. It is possible these beads are intrusive or heirloom items. However, Pendleton et al. (2009:46–48) describe similar beads gilded in gold at St. Catherine's Island in seventeenth-century Spanish Colonial contexts. In Santa Fe, the only reported gold-gilded clear glass bead recovered was from the Palace of the Governors (Barbour in Post in production).

Upper Fill. Upper Fill (Stratum 119 and 120.01) may date to the Mexican Period. However, as shown in Table 3.30, the mean ceramic manufacture date of 1817 (std. deviation 85 years) has too large a standard deviation to inform upon the stratum with any accuracy. This is largely due to the introduction of late nineteenth and twentieth century materials by recognized and unrecognized disturbance caused by later use of LA 146402 by the Atchison, Topeka and Santa Fe Railway.

A total of 257 Euroamerican artifacts were collected and analyzed from the upper fill. Obvious intrusive artifacts include the light bulb (n = 1) and window glass (n = 6), but many of the artifacts may be associated with this later occupational period. Unassignable artifacts represented the bulk of the assemblage (n = 213, 83 percent), but domestic (n = 28, 11 percent) and construction and maintenance (n = 13, 5 percent) items were also found in significant quantities. One artifact, a hoe, could be directly linked to agricultural production. The artifact's placement within this early nineteenth century context correlates well with Euroamerican artifacts from NSTR 100, the ditch segments, which also appear to have been in use during this time.

Midden Summary

Combined artifacts from the Upper, Middle and Lower fill offer a substantial data set from which to compare eighteenth-century Colonial life in and around the Barrio de Guadalupe with other portions of the Santa Fe Villa and New Mexico Province. For this examination, assemblages were chosen from north of the Santa Fe River at LA 1051, the Baca-Garvisu estate midden (Features 148, 175, 193; Lentz and Barbour 2010), and from LA 67321, the Trujillo House Site located along the Middle Rio Grande at Valencia (Akins 2001). Euroamerican ceramics from the three assemblages and the current project all provide mean ceramic dates within the mid-eighteenth century (Tables 3.31, 3.32). However, LA 67321 may contain a small seventeenth-century component and LA 146402 (NSTR 101) definitely contains a very late Colonial or Mexican-period component dating to the early nineteenth century. Unfortunately, comparable data were not reported for La Puente (LA 54313) in Abiquiu, the Feldman Site (LA 76138) in Pecos, and other sites initially mentioned for comparison in the data recovery plan.

Because of their contemporaneity, these three particular assemblages (LA 1051, LA 67321, and LA 146402) can be used to evaluate the relative wealth of each sites' inhabitants. Inferring wealth based on material culture recovered from the archaeological record can be somewhat problematic. Materialist approaches are subject to many potential biases and conditions, including (but not limited to) deposition patterns, preservation, household composition, and ethno and archaeo-centric biases about value, prestige, and worth. For this interpretation, Euroamerican ceramic types and raw metal weights were used as proxies for household wealth. Transportation and marketing costs for Euroamerican ceramics and metal products were affected by access, increased value, and promoted extreme hoarding and long-term curation (Pierce and C. T. Snow 1999). For most households, metal artifacts and Euroamerican ceramics should not occur as discard, except when used or broken beyond repair or reuse, or if replacements were readily available to a household. By comparison, higher status or more affluent households would have possessed, used, and discarded a wider variety and higher frequency of goods, foods, and implements, since they could afford to replace them (South 2003). Lower-class household assemblages may contain high frequencies of one or two wares, or a low frequency of a variety of non-local or specialized goods. The discarded artifacts may exhibit evidence of reuse or heirloom behavior, i.e., discarded long after they went out of style.

Table 3.31 shows Euroamerican ceramic sherds by ware from LA 146402, LA 67321, and LA 1051. If diversity of Euroamerican ceramic types is used as a measure of relative wealth, LA 1051 is the wealthiest household with 15 different Euroamerican types being represented within the Baca-Garvisu assemblage. LA 67321 and LA 146402 have 12 and 11 types respectively. These numbers would suggest that inhabitants of Valencia and the Barrio de Guadalupe were similar in their economic status. However, the assemblages are compositionally very different.

Porcelain was expensive in the eighteenth century and was imported from the Philippines into Central Mexico where it then was transported by caravan up the Camino Real for sale in the Northern Provinces (Lentz and Barbour 2010). The relatively frequencies of porcelain are highest in LA 67321, even higher than LA 1051, which would seem to indicate that settlers of Valencia were very wealthy or at least had both the financial power and economic access to purchase these goods. However, closer examination shows that 18 pieces may represent a single bowl and cup (Akins 2001:103) whereas the midden at LA 1051 has a minimum number of vessel count of 42 (Lentz and Barbour 2010). Interestingly, both of these assemblages contain set pieces suggesting the financial capability of both groups to possibly purchase a table set (or at least part of one) instead of the opportunistic acquisition of single pieces over time. LA 146402 has a minimum number of one, and the single fragment is so small as to elude identification with a specific vessel form.

LA 146402, on the other hand, has the highest raw and relative frequencies of Indigenous Mexican ceramics (n = 8, 9.1 percent). Indigenous Mexican ceramics were cheap to produce, but like all imports were expensive to transport north. The use of these wares could be associated with cultural identity, i.e., the utilization of these wares may have identified the consumers as mestizo or indio (Barbour 2010:213). Mexican Redware, also known as Aztec Red (Di Peso 1974:949), Colonial Burnished (D. H. Snow , personal communication November 5, 2009) and Mexican Red-Painted Earthenware (Smith 1949; Deagan 1987), was believed to be produced by a variety of Nahua Indian groups including the Mexica, Tlaxcala, Tapaneca, and Alcohua peoples of Central Mexico. The nearby Barrio de Analco is traditionally thought to have been settled by Tlaxcalan Indians (Sze et al. 1988:21). However, Cordelia Snow and Jose Esquibel (Cordelia T. Snow, personal communication November 4, 2009) have found no historic evidence of a Tlaxcalan group ever settling the Santa Fe area. The eight sherds collected from LA 146402 do not indicate the settlement of a specific group within the Barrio de Guadalupe during the eighteenth century but could suggest that one or more of the families settling the area were of mestizo or indio heritage. Similarly, the six sherds found at LA 1051 could be indicative of a similar heritage amongst residents of the Baca-Garvisu estate or servants living on-site.

If non-locally produced ceramics are examined on a more macroscopic level with their locally produced counterparts, it is clear that in all cases locally produced vessel fragments (Pueblo, Apache, Hispanic?) make up the vast majority of dinnerware used by eighteenth-century colonists. Expenses associated with production combined with exorbitant transportation fees made access to Euroamerican ceramic wares difficult and costly. If access to and consumption of non-locally produced dinnerware is used as a measure of wealth, LA 1051 still appears to be the wealthiest of the three locales examined followed by LA 67321 and then by LA 146402 (Fig. 3.72). This would match with the general pattern provided by examining the diversity of Euroamerican ceramic wares.

Metal objects also provide some evidence of wealth, since iron was a scarce commodity during the eighteenth and early nineteenth century. One indication of its value was the practice of willing iron willed to successive generations because of the cost to ship the material north from Chihuahua and the lack of known iron deposits within New Mexico (Pierce and C. T. Snow 1999). Copper was also of some value and was readily smelted from Cerrillos Hills and other locales at San Marcos and Paako Pueblos as well as the Baca-Garvisu House (see smelter, Feature 384, Lentz and Barbour 2010). Figure 3.73 illustrates the quantity of Colonial metal found in the midden at LA 146402 with a similar-size midden sample, four two-by-two meter test units, from LA 1051 Feature 193 based on weight in grams. As projected by the figure, approximately 20 times more cuprous and ferrous metals were encountered in the pit associated with the Baca-Garvisu trash pit (copper = 314 grams, iron = 670 grams) than the midden associated with the Barrio de Guadalupe (copper = 14.2 grams, iron = 28.4). Unfortunately, metal weights could not be determined for LA 67321. However, it is clear from the diagram that inhabitants north of the river had more metal to discard than did their southern counterparts.

In summary while only three sites were used for this comparison, data from these analyses would suggest that inhabitants of the Barrio de Guadalupe were lower on the economic scale when compared to Spanish residents living in Santa Fe north of the river. LA 146402 residents shared more in common with settlers at Valencia in that they had a similar diversity in the number of Euroamerican ceramic wares, but fell behind Valencia in the relative frequencies of imported goods. Furthermore, the ceramic assemblages from both locales were very different with Valencia containing substantial quantities of porcelain, a very affluent and costly ware, and the Barrio de Guadalupe containing the greater quantities of Mexican Redware, possibly indicating the mestizo or indio heritage of residents living south of the Santa Fe River.

It is important to note that the conclusions reached through this limited comparison run counter-intuitive to traditional core and periphery models and the Frontier Model as developed by Moore et al. (2003). If Santa Fe represents the core

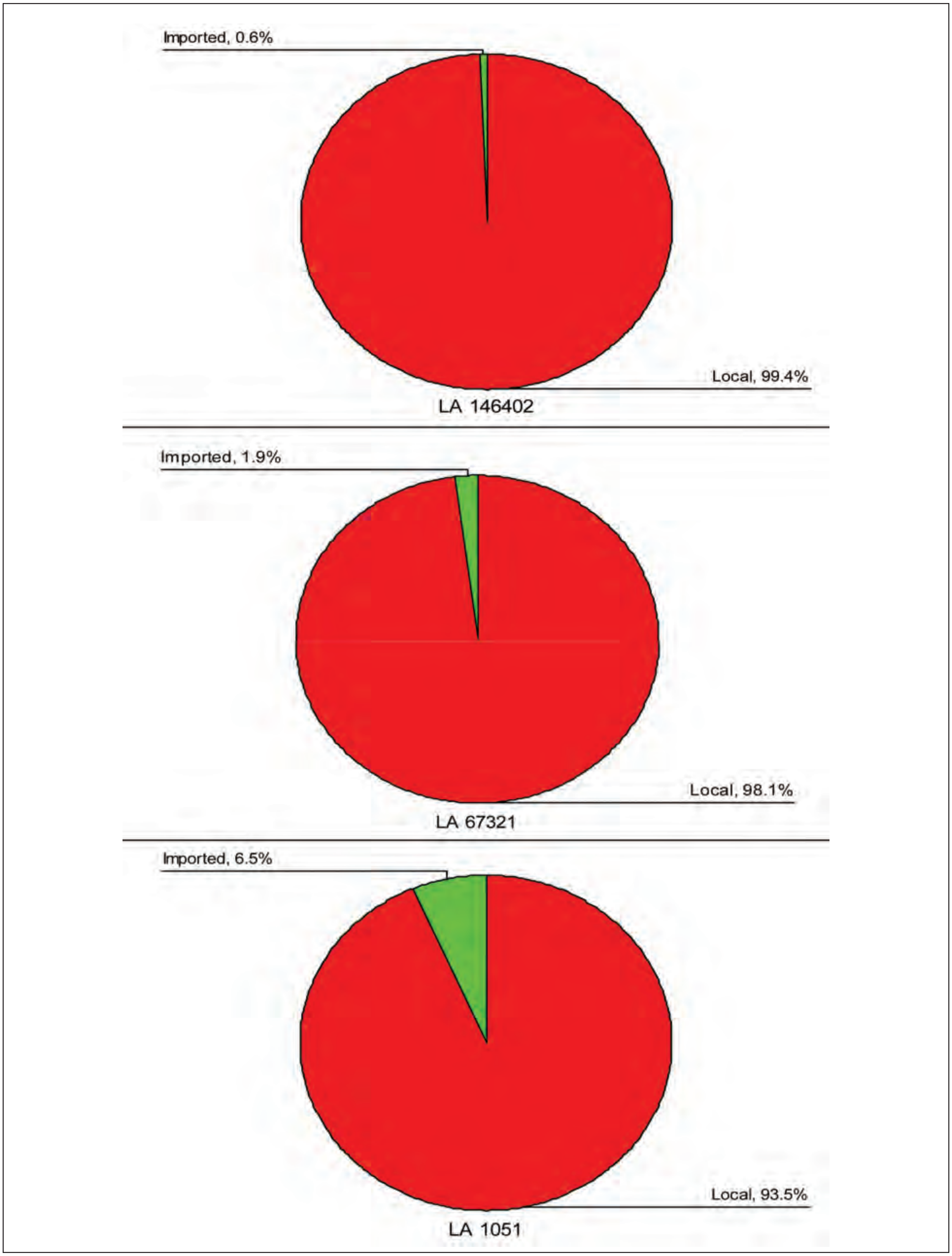


Figure 3.72. LA 146402, LA 67321, and LA 1051: Relative frequencies of imported and locally produced dinnerware fragments.

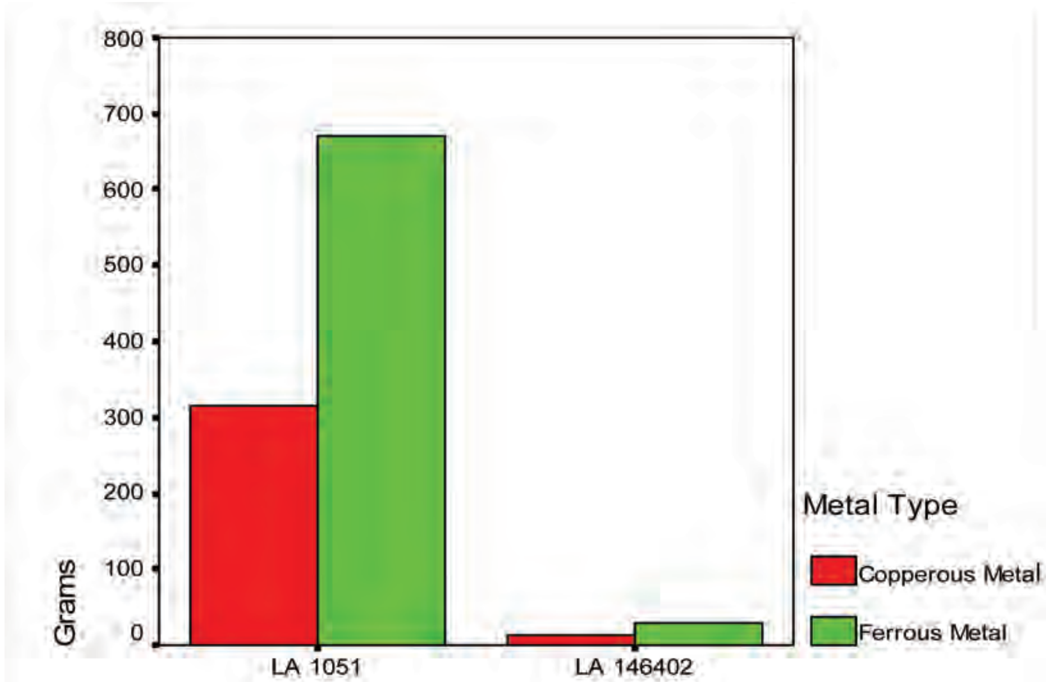


Figure 3.73. LA 146402, Spanish Colonial metal found in the midden, with a similar-sized midden sample from LA 1051 (Feature 193) based on weight in grams.

villa of New Mexico during the mid-eighteenth century, residents within the villa should have greater access to imported materials. This is not necessarily the case. At LA 1051, the inhabitants show both a diversity of wares and a high percentage of imported goods relative to those living elsewhere. Across the river is a different story. Inhabitants of the Barrio de Guadalupe have very little both in the diversity and number of imports. Furthermore as discussed in the Frontier Model, Spanish residents living in peripheral environments should rely more heavily on indigenous products. This is not the case. Settlers at Valencia appear to have greater access to imported products than inhabitants of the Barrio de Guadalupe. However, if examined on a larger level New Mexico as whole fits well within the core and periphery model as inhabitants of New Mexico almost assuredly have few imported luxury items when compared to those living in Central Mexico.

Lastly, these discussions are admittedly limited to a small sample of eighteenth-century Spanish Colonial residential settings within the province of New Mexico. If examined against the general percentage of imported ceramics on Spanish sites on a global scale, all three New Mexico sites examined may look relatively similar and poor when compared to water transport accessible regions such as Florida or Cuba. Conversely if LA 146402 was compared using the same scales with indigenous sites within the Northern Rio Grande, it may appear relatively wealthy as Pueblo populations are even less likely to have appreciable access to imported ceramics and metal goods. Furthermore, these scales of wealth are neither necessarily accurate nor applicable. However, comparing these assemblages offers a first step towards developing a better understanding of socio-economic dynamics within the province.

Structures 5, 6, and 7: The Santa Fe Railyard Privies

The three privies (Structures 5, 6, and 7) encountered at LA 146402 represent waste management facilities used by passenger and railyard workers alike. While the primary purpose of these facilities was to trap and store human excrement, Euroamerican material culture within these self-contained vaults is very different from the materials typically found in outhouses associated with residential occupation. Behaviors visible in the Santa Fe Railyard privies can be directly tied to the industrial landscape that surrounded them in the late nineteenth and early twentieth century. By examining the Euroamerican artifacts from these features one can begin to understand not only the past mindsets as it relates to human refuse but the disposal of caustic industrial waste.

A total of 2,240 Euroamerican artifacts were recovered and analyzed from Structures 5, 6, and 7. This represents only a sample of all Euroamerican artifacts recovered from Structure 5 (14 percent sample), but includes materials both found in the night soil and those collected from post-abandonment fill from all three structures. Euroamerican artifact assemblages from Structures 6 and 7 were analyzed in their entirety.

Structure 5. A sum of 1,190 Euroamerican artifacts was analyzed from Structure 5. Table 3.33 depicts the Euroamerican artifacts recovered from the privy by category type and function. Structure 5 (Tables 3.34, 3.35) appears to be earliest of the three structures investigated (mbd = 1905, std. deviation 7.27 years), but is likely not the first privy constructed to serve the Atchison, Topeka and Santa Fe Railway. Mean dates between privies suggests a lifespan of approximately eight years. It is possible this eight-year lifespan represents the time to fill a privy with excrement or indicates the period in which a privy was filled and cleaned multiple times but the course of roughly eight years of wear and tear on the vault rendered the structure no longer serviceable. In either case, based on the mean bottle glass manufacture dates, it seems likely that if the Atchison, Topeka and Santa Fe Railway first constructed an outhouse when it established the track in 1880, two more outhouses, with mean bottle glass dates of 1888 and 1896, are present in the general area. These structures may be situated underneath Manhattan Avenue, an area immediately north of Structures 5, 6, and 7 that was not investigated by the Santa Fe Railyard project.

Euroamerican artifacts within both the post-abandonment fill (n = 130) and the primary deposit (n = 1,060) are somewhat similar in their overall function-based distributions (Fig. 3.74). In both instances, unassignable artifacts (post-abandonment fill n = 98, 75 percent; primary deposit n = 353, 33 percent) make up the bulk of the assemblage. These materials consist primarily of small unidentifiable bottle glass fragments that likely represent Indulgence, i.e., alcohol related products. Indulgence items (post-abandonment fill n = 11, 8 percent; primary deposit n = 237, 22 percent) are the second most common artifact type found in both the post-abandonment fill and the primary deposit. These materials consist almost exclusively of hard liquor bottle fragments such as whiskey (n = 63) and gin (n = 26). Noticeably absent from the assemblage are the substantial quantities of domestic products (post-abandonment fill n = 3, 2 percent; primary deposit n = 5, <1 percent), such as dinnerware sherds (n = 5), commonly found in privies associated with residential settings.

Further separating the Euroamerican assemblage from Structure 5 with those assemblages linked with residential use are the substantial quantities of transportation (post-abandonment fill n = 1, <1 percent; primary deposit n = 16, 2 percent) and communication (post-abandonment fill n = 6, 5 percent; primary deposit n = 231, 22 percent) items. The communication category is a bit a misnomer in this instance. The majority of artifacts identified within this function-based category are glass shards and other fragments from a crow's foot wet cell battery (n = 236). While these batteries were used primarily to power telegraphs, the batteries were also used by railroads to energize track and signal circuits (www.antiquebottles.com/edison). Transportation artifacts include steam engine parts (n = 16) and a railroad spike (n = 1).

Interestingly, artifacts classified into both the transportation and communication categories were likely intentionally thrown into the privy. One does not go to the bathroom holding several liters of highly corrosive battery acid and then accidentally drop it down the hole. The steam engine parts were also potentially covered in highly caustic materials. Disposal of both types of products within the outhouse may have served as a way to deal with hazardous materials sitting around the railyard.

Structure 6. Euroamerican artifacts from Structure 6 show a similar pattern of hazardous waste disposal within the privy. Once again, substantial quantities of wet cell battery fragments (n = 15) and steam engine parts (n = 1) are found within the excrement-laden deposits. Table 3.36 depicts the Euroamerican artifacts recovered from the privy by category type and function. Glass manufacture

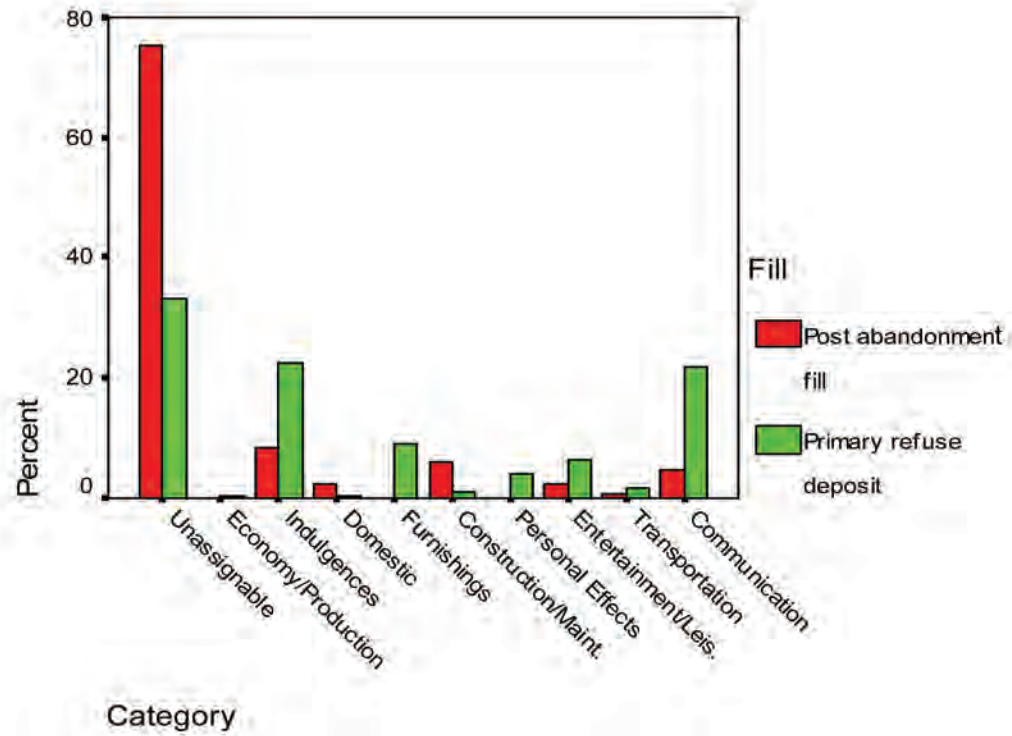


Figure 3.74. LA 146402, Structure 5, relative frequencies of Euroamerican artifacts by function-based category.

mark dates (Table 3.34) suggest final use of Structure 6 occurred in the 1910s (mbd = 1913, std. deviation 10 years, Table 3.35). Euroamerican artifacts from the post-abandonment fill (n = 22) and primary deposit (n = 258) vary in their composition (Fig. 3.75). However, both consist of large quantities of Indulgence artifacts (post-abandonment fill n = 9, 41 percent; primary deposit n = 52, 20 percent). Like Structure 5, small fragments of unidentifiable bottle glass (n = 7) classified within the unassignable category (post-abandonment fill n = 5, 23 percent; primary deposit n = 12, 5 percent) are also likely Indulgence products.

Indeterminate shoe (n = 42) and book or other reading material fragments (n = 38) are plentiful within the primary refuse deposit (Stratum 124) and cause the relative frequencies of personal effects (post-abandonment fill n = 3, 14 percent; primary deposit n = 67, 26 percent) and entertainment and leisure (post-abandonment fill n = 0, 0 percent; primary deposit n = 64, 25 percent) to become exaggerated in Figure 3.75. All 42 shoe fragments, 45 if you count the 3 pieces that can be specifically tied to children's shoes, may represent at most four pieces of footwear; the 38 scraps of paper that make up the book fragments may only reflect a single page of text. However, it is important to note that the reading does not necessarily indicate a literate population, but rather suggests, given its context, the use of the printed material for toilet paper.

Two syringe fragments (mnv = 1) were also encountered. These pieces were coded under the Medicine/Health type of the personal effects category. It is quite possible that the syringe was used for illicit drug related purposes and should therefore be classified as an Indulgence. However, even if so, users of the Atchison, Topeka and Santa Fe Railway privy do not exhibit the sorts of conspicuous consumption of morphine or other opiates that is witnessed further north at the Fort Marcy Military Reservation (Lentz and Barbour 2010). The syringe found in Structure 6, reflects at most an individual with a habit.

Like Structure 5, domestic products (post-abandonment fill n = 1, 5 percent; primary deposit n = 4, 2 percent) are very limited within the assemblage. These objects include fragments of a ferrous metal

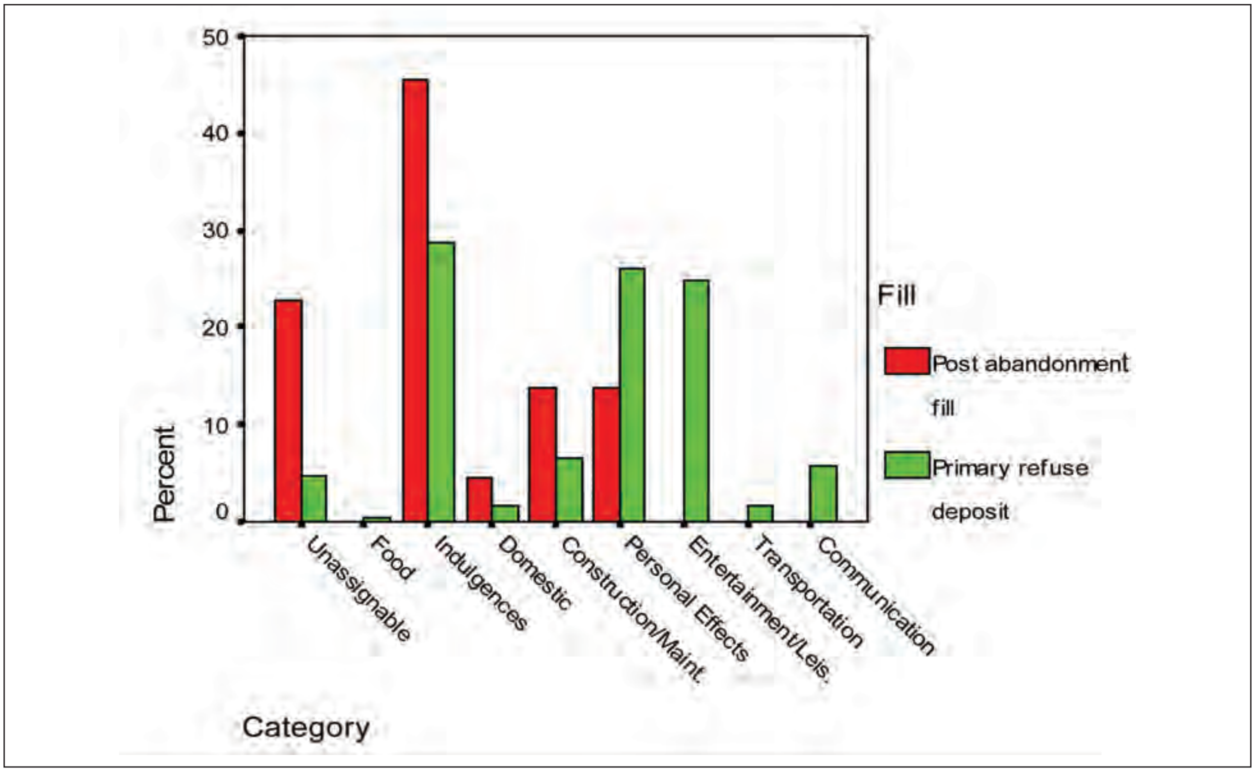


Figure 3.75. LA 146402, Structure 6, relative frequencies of Euroamerican artifacts by function-based category.

pot (n = 3), an unidentifiable dinnerware fragment and a clothespin.

Structure 7. Structure 7 also follows the Structure 5 pattern with domestic products accounting for 1 (n = 1) and 2 (n = 14) percent of the post-abandonment fill (n = 112) and primary deposit (n = 658) respectively (Fig. 3.76). Table 3.37 depicts the Euroamerican artifacts recovered from Structure 7 by category, type and function for each stratigraphic layer. Structure 7 appears to the most recent of the three privies. Bottle-glass manufacture marks (Table 3.34) provide a mean bottle glass date of 1921 (std. deviation of 21 years). The standard deviation is relatively large when compared to the other two privies (Table 3.35), but an Indian Head/Buffalo Nickel (1913–1938, exact mint date could not be determined) was also found in the assemblage. This evidence would seem to further corroborate the assessment that the assemblage dates to this period. Furthermore, the date of 1921 fits well with archival evidence that seems to indicate that many buildings in the Santa Fe Railyard Historic District were connected to the city sewer in 1920 (D. H. Snow and Barbour in Lakatos 2011).

Euroamerican artifacts in Structure 7 depart from patterns visible in Structures 5 and 6 in that there are no hazardous materials within the outhouse. This may be the result of increased awareness of the effects these materials have on the surrounding environment. However, Indulgence (post-abandonment fill n = 6, 5 percent; primary deposit n = 328, 50 percent) and unassignable (post-abandonment fill n = 48, 43 percent; primary deposit n = 115, 17 percent) items still represent the bulk of the Euroamerican artifacts recovered. Car parts (n = 2) also begin to appear in the assemblage. These materials, classified within the transportation category (post-abandonment fill n = 2, 2 percent; primary deposit n = 7, 1 percent), may be linked to the mass production and lower costs of automobiles following the introduction of the Ford Model T in 1908 (McCalley 1994).

One other notable Euroamerican artifact from Structure 7 was a phenolic resin ("Bakelite") handle of a small-caliber revolver (possibly a. 22 or .32). Encrusted portions of the metallic trigger and cylinder were still attached. The artifact could not be found for intensive Euroamerican analysis. Live ammuni-

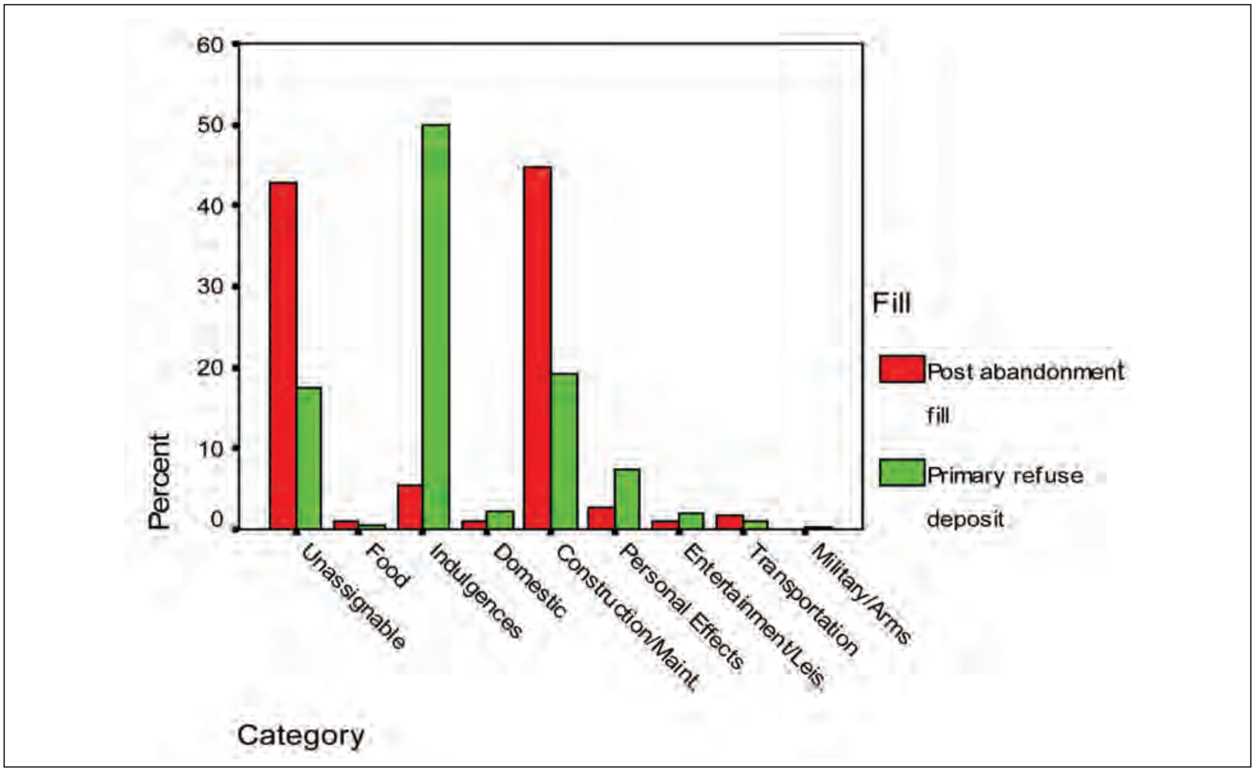


Figure 3.76. LA 146402, Structure 7, relative frequencies of Euroamerican artifacts by function-based category.

tion loaded in the cylinder may have proven to be a hazard if collected. It is possible that the artifact was noted and left in the field.

While Structures 5, 6, and 7 vary some in Euroamerican artifact complexion, combined these structures offer an unprecedented look at the general consumption and discard patterns associated with an industrial setting in the City Different. This data set can be used to examine differences within other sectors of Santa Fe. Figure 3.77 presents the overall relative frequencies of Euroamerican artifacts by function-based category for privies from several archaeological sites with very different settings that are roughly contemporaneous. These include the Fort Marcy Military Reservation (LA 1051, Lentz and Barbour 2010), the Santa Fe Maternal Health Center and nearby apartment renters (LA 156207, Lakatos 2011), and outhouses associated with residents of the Capitol Complex Historic Neighborhood (LA 158037, Barbour in Production). Table 3.38 presents the same information in tabulated form.

While both passengers and workers at the Santa Fe Railyard used the privies, the population that used the outhouse would have been primarily males, businessmen or railyard laborers, outside of residential setting. The users of privies associated with the Fort Marcy Military Reservation would also have been principally male, but the setting would have included a residential component. Conversely, customers of the Maternal Health Center were primarily female as were many of the residents of Quintana Apartment Complex (D. H. Snow and Barbour, in Lakatos 2011). Residents of the Capitol Complex Historic Neighborhood appear to be primarily nuclear families representing a roughly equal mix of males and females in an explicitly domiciliary environment.

It is clear based on Figure 3.77 that Euroamerican artifacts found in privies do not represent homogenous assemblages comprised primarily of things utilized in a bathroom setting. Instead, Euroamerican artifact assemblages appear to reflect both the gender of the privies users and the context in which the privy is located. The male dominated assemblages have considerably more Indulgence related artifacts (LA 1051, 26 percent; LA 146402, 30 percent) in their assemblages than do mixed (LA 158037, 15 percent) or female-dominated (LA 156207, 8 per-

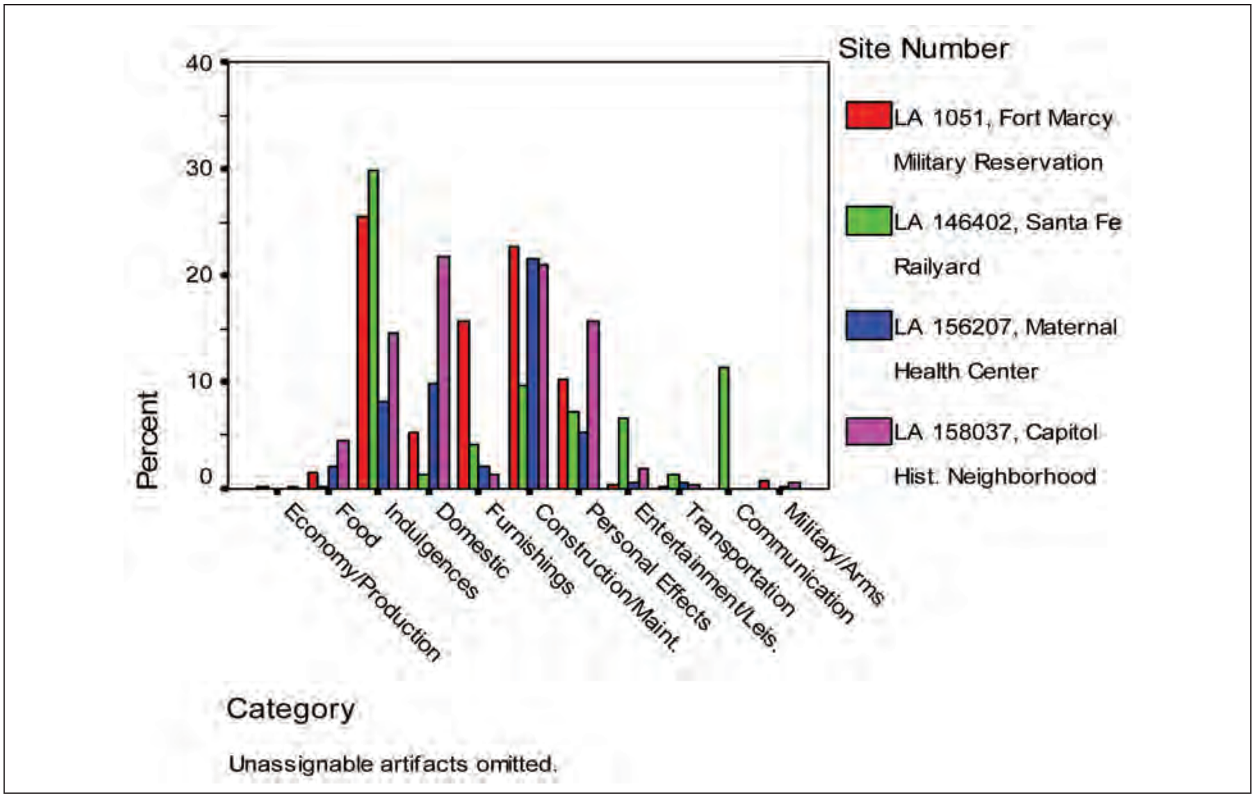


Figure 3.77. LA 146402, LA 156207, LA 1051, and LA 158037, privies, relative frequencies of Euroamerican artifacts by function-based category.

cent) contexts. Residential settings, such as Capitol Complex Historic Neighborhood (LA 15803721, 22 percent), have considerably more domestic artifacts than semi-residential and non-residential contexts.

One apparent outlier within the figure is the high quantities of communication items in the Santa Fe Railyard assemblage (LA 146402, 11 percent). This seems out of place as none of the other contexts have any communication artifacts, but as discussed above, the category comprises primarily wet-cell battery fragments. These artifacts, for the Santa Fe Railyard, represent industrial waste and illustrate that in the an industrial setting materials within the privy may reflect not only use of the privy biological waste, but caustic elements too unsavory to be left on the surface of the site.

Perhaps more interesting, the Maternal Health Center frequented by women has the lowest relative counts of personal effects (LA 156207, 5 percent) which seem to be intuitively wrong as the category includes medicinal, jewelry and grooming items. However, it is important to note the facility catered to the economically disadvantaged, who may have had limited access to non-essential personal effects. Logically, the relative frequency of personal effects should be tied to relative wealth and/or socioeconomic status within the community.

To some extent, such differences are to be expected. It is not surprising after all to see that men consume more alcohol (i.e., indulgences) than women. However, the level at which users of these privies differ in consumption and discard patterns is substantial and may allow for predictive modeling of gender, wealth, and context based on the relative frequencies of Euroamerican artifacts aggregated by each function-based category. Based on the information presented and using the standards and methodology developed by the OAS (Boyer et al. 1994), assemblages with relative frequencies of indulgences above 20 percent in the assemblage were likely contributed by males. If less than 10 percent it seems probable that more females than males are contributing to any given Euroamerican artifact assemblage. A domestic category above 20 percent suggests a residential context. If domestic is below 5 percent, one is likely not dealing with refuse associated with people living on site. It is even possible that in the case of personal effects, a relative frequency at or below 5 percent may indicate consumption and discard by the poorest members of society.

Such assertions may not necessarily be the case. However, the patterns portrayed in these Euroamerican artifact assemblages are fascinating and offer a baseline for future comparative studies. If such patterns were proven valid in the Santa Fe, such predictive modeling could and should be explored on state and nation-wide levels.

Structure 8: The Passenger Depot

Structure 8 at LA 146402 represents the original passenger dock and depot used by the Atchison, Topeka and Santa Fe Railway in 1880. Sometime in the early twentieth century, the depot was converted to a freight warehouse (Wenker et al. 2005:25–26). A total of 1307 Euroamerican artifacts were recovered and analyzed in association with the structure the majority of which was associated with post-abandonment fill (n = 1,136, 87 percent). Table 3.39 presents the Euroamerican artifacts associated with both the original construction of the structure and post-abandonment fill by category, type and function.

Euroamerican artifacts (n = 171) collected from contexts identified with the original construction of the depot (Stratum 129, 129.13, and 131) consist primarily of construction and maintenance items (n = 116, 68 percent). The majority of these materials could reflect products used in the fabrication of the dock in 1880. However, many of the nails associated with these strata appear to have been manufactured from drawn-wire (n = 67) as opposed to machine-cut (n = 12). Wire nails were produced in the 1880s, but were not common in construction until the 1890s (Nelson 1968:10). Furthermore, Euroamerican analysis at LA 146403 (Barbour this report) suggest that many of the structures known to have been built in 1880, such as the windmill (Structure 1) and water tower (Structure 2), were tied together almost exclusively with machine-cut square nails. The overwhelming abundance of wire-drawn nails suggests the artifacts collected from Structure 8 are more likely related to the remodeling of the platform for use as a freight warehouse and are not associated with its initial construction as a passenger depot. Supporting this conclusion is the presence of light bulbs. The light bulb was invented in 1879 by Thomas Edison and was patented for production in an electric lamp in 1880 (Patent No. 223,898), but the product did not gain wide-scale distribution until the twentieth century. It would seem unlikely that a structure built in Santa Fe, New Mexico, the very same year would incorporate such a new technology.

Post-abandonment fill (Stratum 1.2, 2, and 130) can be described at best as a mixture of materials dating from the mid-nineteenth to the early twenty-first century. These materials include objects such as mechanical pencils (n = 1) and mass-produced plastic pens (n = 10) to engine parts (n = 4) and railroad spikes (n = 1). Within the same context (PD 1190.04), mint dates on coins range from 1881 to 1969. Like Euroamerican artifacts collected from the original construction deposits, artifacts from post-abandonment fill (n = 1136) consist of large quantities of construction and maintenance materials (n = 417, 37 percent). However, unlike those previously discussed, the nails (n = 166), window glass (n = 116) and electrical parts (n = 25) found in Strata 1.2, 2, and 130 cannot be tied specifically to remodeling of Structure 8.

Many of the materials may not be associated with industrial use of the project area. The substantial quantities of indulgences (n = 343, 30 percent) could represent refuse associated with the nearby Maloof-owned Coors distributorship. Domestic (n = 36, 3 percent) and personal effects (n = 55, 5 percent) products could have originally come from nearby residential neighborhoods. One artifact of at least some visual interest is a devotional medal constructed of copperous alloy (Fig. 3.78). On one side it reads “In league with the Sacred Heart,” and on the other “Cease! The heart of Jesus is coming, thy kingdom come.” However, both captions are in English and at best the devotional medal was fabricated sometime late in the nineteenth century. It unclear if someone lost the object at the dock or an artifact brought in the fill from elsewhere. As stated above, none of the material culture from these contexts can be used to inform upon historic use of Structure 8.

Native Ceramics
C. Dean Wilson

The midden (NSTR 101) at LA 146402 is the only site component investigated at the railyard project from which a large sample of native ceramics was recovered. Material from this midden is likely associated with a small Hispanic farmstead that from perspective of the native ceramic assemblage appears to have been exclusively occupied during the Late Colonial to Mexican period. Distributions of native types recovered from this site (Table 3.40) may provide clues relating to the time of occupation of this farmstead, as well as the nature of influence and interaction between Hispanic citizens and Pueblo Indians, and the nature and range of activities for which native pottery vessels were used. The following discussion focuses on assigning a date range to the LA 146402 midden assemblage in context with previously excavated post-Pueblo Revolt Spanish Colonial sites in northern New Mexico and in Santa Fe. A more detailed examination and evaluation of the assemblage is reported in Chapter 7 of this report.

Of the 5041 native sherds identified at LA 146402, pottery assigned to prehistoric types are limited to five sherds and include one classified as Smeared Indented Corrugated, three assigned to Plain Gray, and one characterized as Unpainted White. These sherds were probably derived from nearby contexts dating to either the Coalition or Classic period.

The bulk of the pottery types assigned to the assemblage from the midden at LA 146402 support an occupation during the late Spanish Colonial period (Batkin 1987; Harlow 1973; Moore 2001). Tewa series decorated types consist of 11.9% of the pottery from LA 146402. The most common formal decorated pottery type represented is Powhoge Polychrome, which accounted for 31.21% of the historic Tewa series decorated sherds. However, it is likely that the majority of the sherds assigned to other descriptive decorated type categories were also derived from Powhoge Polychrome vessels. Other Tewa series polychrome types identified for this ware include Tewa Polychrome (.7%), Sakona Polychrome (.2% of historic Tewa types), and Ogapoge Polychrome (.1%). A low frequency (3.3%) of the sherds were as-

Figure 3.78. LA 146402, Structure 8, devotional medal: (a) "in League with the Sacred Heart"; (b) "Cease! The heart of Jesus is coming, thy kingdom come."

signed to glaze-ware types (Table 3.41). A very low proportion (.3%) of the total decorated sherds are matte painted polychrome known to have been produced at Santa Ana Pueblo, Zia Pueblo, and Western (Zuni, Acoma, and Laguna) Pueblos.

The earliest forms of historic pottery are represented by three types; a single sherd assigned to Sakona Polychrome, a low but significant frequency of Tewa Polychrome, and glaze ware. Sakona Polychrome, manufacture is usually attributed to the last half of the seventeenth century. Beginning production of the type referred to as Tewa Polychrome was previously assigned to the last quarter of the seventeenth century or early eighteenth century (Mera 1939; Warren 1979). More recent examinations indicate a manufacture span from about AD 1650 to 1760 (Batkin 1987; Moore 2001). Many of the Tewa series polychrome sherds identified during the present study appear to exhibit characteristics transitional between Tewa Polychrome and Powhoge Polychrome suggesting production during the middle to latter half of the eighteenth century.

The identified historic glaze ware sherds in the assemblage raise interesting questions. The end of glaze ware pottery production is usually characterized as having occurred sometime during the first decade of the eighteenth century. My own observations indicate that sites with ceramics that securely date two or three decades into the eighteenth century often contain low frequencies of glaze ware strongly suggesting that this ware continued to be used, if not made, into the eighteenth century. The occurrence of glaze ware pottery in this assemblage could reflect the mixing of pottery from earlier contexts, use of earlier produced heirloom or trade ware vessels, as well as the possibility of late and localized incidents of the production of native glaze ware vessels. The nature and reasons for the co-occurrence of Tewa Polychrome, Powhoge Polychrome, and glaze ware types in historic assemblages is an important issue that I feel is not well understood and has not yet been satisfactorily resolved. This may in part reflect our inability to define sherd-based types covering the continuum of forms associated with decorated types produced during various spans of the late seventeenth and eighteenth century. Intrusive polychrome types identified during the present study represent forms that could have been produced in the late eighteenth or nineteenth centuries.

Another clue concerning the dating of this site is the presence of very small amounts of Ogapoge Polychrome. Forms assigned to this type are characterized by decorations in black organic and red mineral paints. The shift toward the occasional use of such treatments by Northern Tewa potters appears to have occurred during the middle eighteenth century although this type may have been produced into the early nineteenth century. Sherds belonging to this type, however, appear to be quite rare at Spanish sites dating to any period, and its characterization as a form that is transitional between Tewa Polychrome and Powhoge Polychrome seems unlikely. Instead, there appears to be a direct transition between several of the forms assigned to Tewa Polychrome and Powhoge Polychrome. Some of these transitional forms are characterized by thin bands of organic painted decorations over cream paint on surfaces covered with red slips common in Tewa Polychrome, but in bolder designs more characteristic of Powhoge Polychrome. Other sherds contain painted designs over cream surfaces covering the decorated portion of the vessels, but with some motifs reminiscent of earlier forms such as Tewa Polychrome Thus, Ogapoge Polychrome appears to reflect a stylistic variant that was produced during the transition between Tewa Polychrome and Powhoge Polychrome production, but may not have contributed to the continuum of change associated with this transition. One possibility is that vessels assigned to Ogapoge Polychrome represent the production of more traditional Pueblo forms by Northern Tewa potters that were more similar to styles produced by Pueblo potters to the west that were less involved in the production of mass amounts of pottery for Hispanic colonists. It is possible that the distinct feather designs and polychrome painting techniques were applied on traditional vessels intended for use by Pueblo groups, possibly for ritual purposes. This may explain why Ogapoge Polychrome is almost exclusively represented by jars with few bowls found in Spanish Colonial assemblages.

Vessels forms associated with various Tewa tradition types include an unusually wide variety of bowl forms. These include bowls with sharp keels common in bowl forms noted in Tewa Polychrome, a very high frequency of soup plates, dough bowls and shallow bowls commonly associated with Powhoge Polychrome. This wide range of basic vessel forms commonly associated with types occurring during different spans of the Late Colonial period along with decorated styles associated with a similar transition may indicate an occupation mainly spanning the middle to the end of the eighteenth century.

Distributions noted for the utility wares from LA 146402 may also provide clues concerning the dating of this site. A total of 1648 (32.6% of all sherds from this site) were assigned to micaceous types and 2568 (32.7%) were assigned to plain utility ware types. Micaceous pottery includes 1350 sherds (26.8% of all ceramics) assigned to polished micaceous utility ware types, and 298 sherds (5.9%) assigned to unpolished micaceous types. Historic plain ware types are represented by 849(16.8%) sherds assigned to historic buff utility, 1540 (30.5%) sherds assigned to red utility ware types, and 179 (3.6%) assigned to historic gray/black types. This relative high frequency of micaceous in combination with red and buff polished plain wares is common for mid to late eighteenth century assemblages.

Comparative Assemblages

Potential dates for the occupation may be obtained by comparing the LA 146402 assemblage with those from other investigated Hispanic sites in Santa Fe and the Tewa Basin. Similar assemblages were examined from the Sanbusco Street Site (LA 121196) and from several features investigated during recent excavations of the Palace of the Governors (LA 111322). Both sites are in downtown Santa Fe.

Both assemblages from the Santa Fe area had a combination of ceramic types occurring in assemblages from contexts dating immediately after the Pueblo Revolt and reconquest, and to the first half of the eighteenth century (Lang 1999; Scheick 1999). The overwhelmingly dominate decorated type in these assemblages is Tewa Polychrome, while Sakona Polychrome and Ogapoge may occur in very low frequencies. Tewa Polychrome from these contexts tended to be characterized by vessel forms and styles, distinct from those noted in later forms. Powhoge Polychrome is absent. Glaze wares are present in low, but significant, frequencies, and rims are usually represented by Glaze F shapes, which indicate middle seventeenth- to early eighteenth-century manufacture. Utility wares are dominated by Polished Micaceous Utility and Tewa Red polished plain wares. Bowls tend to be deep and both bowls and jars exhibit keels with sharp slopes.

One of the best-dated sites with an assemblage similar to LA 146402 and the other Santa Fe sites is that from the Pedro Sanchez site (LA 65005). The Pedro Sanchez site is a residential site occupied on a Spanish land grant near San Ildefonso Pueblo known to have been occupied from AD 1742 to 1763 (Moore 2001). Almost all of the decorated pottery was represented by Tewa polychrome types. The most common of these is Tewa Polychrome (Levine 2001). Other decorated types identified include Sakona Polychrome, Pojoaque Polychrome, and a single example of Ogapoge Polychrome. Glaze ware types were present in very low frequencies (1%). Utility wares consist of micaceous wares (dominated by highly micaceous and self-tempered forms) and historic plain ware types. Most of the polished plain ware types are represented by Tewa Red. Tewa Gray and Tewa Black occurred in very low frequencies.

The assemblage patterns at LA 146402 may also provide clues for dating features and structures with associated native ceramics recovered during recent investigations at the Santa Fe Community Convention Center (LA 1051), also in the downtown Santa Fe area. At LA 1051 a collection of excavated features and structures appear to have been used and abandoned during the Spanish Colonial period. Due to the presence of a large prehistoric Coalition and Classic period component, most of these features contained a combination of pottery produced during prehistoric and historic periods. For this discussion only historic ceramics are used.

At the earliest of the Colonial period features investigated at the Convention Center ceramic distributions indicate that Tewa Polychrome outnumbers Powhoge Polychrome at 5 to 1. Also indicative of an earlier occupation was the presence of Sakona Polychrome, the high frequency (11%) of glaze ware types, and fairly high frequency of polished red utility ware types. This combination of historic types suggests an occupation that began just after the Spanish reconquest at the end the seventeenth century to the first part of the eighteenth century. Combinations of pottery types from two other Colonial-period contexts at LA 1051 may indicate occupations roughly contemporaneous to that noted at LA 146402, and may reflect a date from the middle to the later part of the eighteenth century, although the presence of Sankawi Black-on-cream in one feature may indicate intrusion of material derived from an assemblage dating before the Pueblo Revolt period. Similarities noted include the joint occurrence of Powhoge Polychrome along with lower frequencies of Tewa Polychrome, the dominance of polished red over polished gray black utility and similar frequencies of glaze ware types.

Combinations of pottery types from two other Colonial-period contexts at LA 1051(Features 148 and 413) may indicate occupations roughly contemporaneous to that noted at LA 146402, and may reflect a date from the middle to the later part of the eighteenth century, although the presence of Sankawi Black-on-cream at Feature 148 may indicate intrusion of material derived from an assemblage dating before the Pueblo Revolt period. Similarities noted include the joint occurrence of Powhoge Polychrome along with lower frequencies of Tewa Polychrome, the dominance of polished red over polished gray black utility and similar frequencies of glaze ware types.

Pottery from two other features at LA 1051 may reflect a slightly later occupation, dating sometime during the very end of the Colonial to the beginning of the Territorial periods, although the small size of these assemblages limits such evaluations. Evidence of an occupation during this time at Structure 6 is indicated by the presence of Powhoge Polychrome along with the absence of Tewa Polychrome and very low frequency of glaze ware types. While Tewa Polychrome sherds were identified from Feature 213, other evidence including a higher number of gray black polished than red polished utility ware and absence of glaze ware may indicate these were intrusive. It is likely that the use of these features mainly dates sometime from the end of the eighteenth to the beginning of the nineteenth century.

Thus, evidence from Colonial-period features excavated at LA 1051 indicates an occupation during the Colonial period that was largely contemporaneous with LA 146402. A few features may date just immediately before and after this time.

Examples of historic contexts from which large samples of native ceramics were recovered that seem to reflect an occupation just after LA 146402 include three Hispanic farmsteads (LA 160, LA 4968, and LA 6579) excavated during the Pojoaque Corridor Project located near Tesuque and Pojoaque Pueblos. These sites were mainly occupied from the very late eighteenth to the early nineteenth centuries. The great majority of decorated pottery from these sites was derived from Powhoge Polychrome. Tewa Polychrome was almost completely absent. Ogapoge Polychrome is present, but very rare. The dominant pottery group at all these sites is represented by Tewa Polished Micaceous types. Tewa Red sherds tend to be fairly rare and are outnumbered by polished gray or black plain wares.

Thus, the combination of pottery from LA 146402 appears to reflect an occupation within a short and distinct period. Across all analyzed contexts in the midden the occurrences of what may be late forms of Tewa Polychrome and early forms of Powhoge Polychrome and the common occurrence of polished micaceous, Tewa Red, and low but significant frequencies of glazeware types indicate components dating sometime during the middle eighteenth century and shortly afterward. This evaluation assumes a relatively short span during which Tewa Polychrome, Ogapoge Polychrome, Powhoge Polychrome and Glaze Ware types can be associated together. Another possibility is that a mixture of material from components spanning the early to late eighteenth century is represented. In either case, this over all assemblage appears to reflect occupations spanning the transition from components dating after the Pueblo revolt and reconquest during which decorated pottery was dominated by Tewa Polychrome to occupations later in the eighteenth century during which decorated pottery was dominated by early forms of Powhoge Polychrome.

A few specific early contexts from midden fill were isolated by excavation unit yielding a subset of 487 sherds. All represent early midden contexts in XUs 110, 111, 113, and 130 below Level 6 (Tables 3.42, 3.43, 3.44). All contexts exhibit high frequencies of Tewa Polished red wares and absence, or near absence, of black utility wares in assemblages where Powhoge Polycrome is either more common, or of equal frequency to Tewa Polychrome. High frequencies of Tewa Polished red wares and absence of black utility wares indicates that mixing with nineteenth century materials is limited in all contexts. The most interesting aspect of these specific assemblages is the additional mixture of glaze wares assigned to each assemblage. Six glazewares were recovered from XU 110, of these six glazewares, three are Glaze F, and probably from historic period context. High frequencies of Powhoge Polycrome suggest a late-eighteenth century date. In XU 113/111 and XU 131 the assemblage supports an eighteenth century date. The role of glaze wares (with end production dates that are typically assigned to 1690) in the midden's deepest swales suggests three possibilities for assigning a date to discrete midden contexts. The first is the presence of an early Colonial component. The second is that glaze ware vessels were curated and later discarded in the deposit. The third is that of prolonged glaze ware production past 1690.

Fauna
Britt M. Starkovich

The faunal assemblage from LA 146402 is the largest of the Santa Fe Railyard sites, with 2527 identified specimens. The site is diverse, and the faunal sample comes from three distinct areas. The majority of the sample is from NSTR 101 (n = 2306), a late Spanish Colonial- or early Mexican-period midden (Wenker et al. 2005c). The rest of the sample is from Structures 5–7, a series of outhouses associated with the AT&SF Railroad and Structure 8, the foundation of the original AT&SF passenger depot. These structures were probably in use from the late nineteenth century through the mid-twentieth century (Wenker et al. 2005). Because NSTR 1 is so different in terms of function and time period, it is treated here separately and will not be directly compared to the portion of the site associated with the AT&SF Railroad.

In the faunal analysis, attempts were made to identify specimens to the greatest precision possible. About 70 percent of the remains could not be identified beyond ungulate body size class, though it is likely that the categories "small ungulate" and "large ungulate" represents sheep/goat and cattle, respectively. Because it is often difficult to distinguish small fragments of sheep and goat, a generalized "sheep/goat" category was assigned for unspecified pieces, though species-specific designations were made whenever possible.

NSTR 1

The bulk of the faunal material from LA 146402 comes from NSTR 1, a Spanish Colonial- or early Mexican-period midden (Wenker et al. 2005c). Different stratigraphic levels were noted, including 119 (post-abandonment fill), 120 (the actual midden, which includes subsets of Stratum 120), 125 (culturally sterile), 126 (main basal deposit), and 128 (intermittent basal deposit). Stratum 120 is broken into at least six substrata, the relationships between which are not entirely clear. Test trenches disrupted the stratigraphy in some parts of the midden so there is a lack of continuity between the eastern and western portions, and some of the subsets of Stratum 120 are discontinuous lenses. Because of this, the substrata are contrasted here as parts of the same unit, though they are presented separately in Table 3.45. Additionally, Stratum 125 only contained one specimen (Table 3.45), so it will not be discussed further here.

Stratum 119. Stratum 119 caps the cultural deposits of the midden, and is thought to be either a post-abandonment level of topsoil accumulation or field fill (Wenker et al. 2005c). The sample includes 411 faunal specimens, all of which belong to domestic species. Small ungulate or sheep/goat makes up the bulk of the sample at 59 percent, followed by large ungulate or cattle, which comprises about 30 percent of the assemblage (Table 3.45). Small amounts of dog and chicken are also present. The remains are very highly fragmented, with about 98 percent less than 10 percent complete. Environmental damage occurs on about6 percent of the specimens, mostly in the form of root etching, and there are no animal alterations (Table 3.45). Burning is common, occurring on about 40 percent of the remains, though only two specimens in the entire sample have evidence of human butchering.

Stratum 120 and Substrata. The main midden deposits defined by Strata 120 and 120.1–120.6 are variable in terms of species composition (Table 3.45) and while some of this may be attributable to sample size, the differences more likely are related to differences in depositional events or periods of site use. Wenker et al. (2005) note stratigraphic similarities on either side of BHT 10 between Stratum 120.1 and 120.6, as well as 120.2 and 120.4, though there are few similarities between the compositions of the faunal assemblages. Throughout the midden small ungulate or sheep/goat and large ungulate or cattle are the dominant species, though in different proportions. Strata 120 and 120.2 have fairly even proportions of large and small-bodied ungulates, while small ungulates or sheep/goat outweigh large ungulates or cattle in Strata 120.1, 120.3 and 120.5. The reverse is true in Strata 120.4 and 120.6 (Table 3.45). A variety of other species are represented intermittently in each of the levels, including squirrel, dog, pig, horse or burro, and chicken, though none occur in significant amounts.

Fragmentation rates are fairly similar in all of the strata, with about 95 percent of the remains less than 10 percent complete. Stratum 120.3 is less fragmented, though the sample is small, and Strata 120.4 and 120.6 are more fragmented (Table 3.45). Overall, environmental damage is uncommon, though Strata 120 and 120.1 have higher incidences of alterations, specifically root etching and exfoliation (Table 3.45). The frequency of animal damage is low throughout the midden, though rates of burning are somewhat variable. For the most part, between 10 and 20 percent of the remains are burned, though in Strata 120.4 and 120.6 over 60 percent of the specimens are burned. Though these strata have small samples, the extreme degree of burning as compared to the rest of the midden makes it unlikely that sample size is biasing the results. Evidence of human butchery is low; in all cases less than five percent of the remains have evidence of butchering.

Stratum 126. Stratum 126 is an alluvial deposit at the base of the western and southern edges of the midden (Wenker et al. 2005c). The faunal sample is fairly small (n = 60) and is made entirely of small ungulate or sheep/goat and large ungulate or cattle in near-equal proportions, with the exception of one pig bone (Table 3.45). About 10 percent of the remains are less than 10 percent complete, but only two specimens have evidence of environmental damage and none were altered by animals. None of the bones are burned and only about five percent of the remains show signs of human butchery (Table 3.45).

Stratum 128. Stratum 128 also underlies the main midden levels designated by Stratum 120 and substrata and may be early infilling of the original depression (Wenker et al. 2005c). The small sample (n = 77) is mostly composed of small ungulate or sheep/goat and large ungulate or cattle, though fragments of eggshell and ground squirrel are also present (Table 3.45). There is a near-even representation of the small and large-bodied ungulates. The remains are highly fragmented, with 96 percent less than 10 percent complete. Only about 3 percent have environmental damage; about 7 percent were damaged by carnivores (Table 3.45). There is a high degree of burning at 64 percent of the remains, but only one specimen has evidence of human butchering (Table 3.45).

NSTR 101 Stratigraphic Comparisons

No striking patterns or outliers are apparent when all of the stratigraphic levels are compared from the Spanish Colonial- or early Mexican-period trash midden. The assemblage is dominated by domesticates, small ungulate or sheep/goat and large ungulate or cattle in particular, though the proportions of these ungulates vary by stratum. Overall fragmentation rates are high and environmental and animal alterations are low. The lack of environmental and animal damage may be the result of rapid burial by trash or sediments shortly after deposition. Burning is highly variable depending on the stratum and ranges from about 10 to 65 percent, and there appears to be no relationship between levels with similar burn frequencies. The differential burning may be the result of different depositional events, for example, the cleaning of a fireplace versus refuse left after a meal. Butchery patterns are fairly consistent throughout the midden, though it must be noted that the frequency of butchering is considerably lower in this area than at other Santa Fe Railyard sites, or in other parts of LA 146402 that were in use at later points in time. In particular, there are no saw or steak cuts that are the hallmark of later historic sites. Because of this, it seems that the trash midden was in use before meat was purchased from professional butchers.

Species Utilization

Understanding butchery patterns and prey selection is integral to interpreting a faunal assemblage. A component of this is evaluating the selection of specific animals for consumption by looking at the age profiles of animals at a site. In this section, the faunal remains from NSTR 101 at LA 146402 are treated differently than those at other Santa Fe Railyard sites, and those from the temporally later part of the site discussed previously. The reason for this is that the lack of saw marks indicates that the animals were butchered in-home, thus rules that apply to a late historic market economy are not necessarily appropriate in this situation.

The results of a body part representation analysis of small and large bodied ungulates (representing sheep/goat and cattle, respectively) are presented in Table 3.46a. These data are difficult to interpret because the sample size is fairly small when divided into strata. Highly fragmented specimens, such as portions of long bone, flat bone, and cancellous tissues are the most common. These general categories are not particularly useful in understanding body part representation because, from a taphonomic standpoint, are more an indicator of fragmentation rate than what elements were actually represented at a site. Of the remains that could be identified to the specific element, axial fragments (including vertebrae and ribs) make up the bulk of the sample, followed by cranial parts. This is probably not significant because more bones make up the axial skeleton than any other portion of the body. Additionally, small cranial fragments tend to be identifiable to element, whereas a long bone shaft fragment of the same size will typically not end up being identified to a specific element, rather it will be placed in the "long bone" category. Overall, these results are difficult to interpret, but specimens from all regions of the body are present, so it is likely that in many cases the people utilizing the midden started out with whole animals. This is not surprising because it was not uncommon for families to keep small numbers of animals when the midden was in use.

Similar protocol was used in determining age at death for ungulates found in the midden as was employed at the rest of the site, and summarized age data are likewise presented in Table 3.46b. Cattle remains found in Stratum 119 can be accounted for by one individual older than six months and younger than 108 months, though more than one animal may have been present. This age range is too wide to be very informative, aside from the observation that it is unlikely that the animal was consumed as veal. A sheep/goat older than 18 months is also present, which may have been culled at the prime age for eating, or as an older animal. Two cattle are present in Stratum 120, the upper age limit of which is 48 months. One individual was younger than 24 months at death and the other was older than 24 months. The younger animal may have been consumed as veal, and the older one was in the age range of cattle used for milk and breeding. Stratum 120.1 contains at least one cattle, older than 24 months and younger than 36. If both elements came from the same animal, this represents an individual in the prime age for milk and breeding. Remains of a sheep/goat older than six months was found in this level, but the age range is too broad to make any inferences regarding how the animal was used. At least one cattle is present in Stratum 120.2. The animal died between the age of 42 and 108 months, which at the youngest is approaching the upper limits of an animal used for milking and breeding. Remains that could be accounted for by a sheep/goat between the age of 15 and 42 months were also found. If these elements were from one animal it was likely slaughtered at the prime age for eating. Stratum 120.3 contained one sheep/goat younger than 42 months, which was either consumed as a lamb, or as a slightly older animal that was still in the prime age for eating. A sheep/goat individual older than 6 months was found in Stratum 120.6. This age range is too wide to make any inferences. Stratum 126 contained a cattle older than 84 months and a sheep/goat younger than 42 months. The cattle is beyond the typical age of eating and may have been used as a draft animal, while the sheep/goat was probably slaughtered as a lamb or older animal still of prime eating age. Finally, a cattle tibia from an individual younger than 48 months was found in Stratum 128, which corresponds to an animal in the prime age range for meat and milk.

NSTR 101: Conclusions

NSTR 101, a Spanish Colonial- or early Mexican-period trash midden, is unique in terms of site use and time period compared to other Santa Fe Railyard sites. Surprisingly, the species represented in the midden are not very different from those found at the other sites. Specifically, the proportion of small ungulate or sheep/goat to large ungulate or cattle is nearly even, and it varies in the different stratigraphic levels of the midden. Animals of all ages occur in the midden, though the sheep/goats tended to be on the younger side. Unlike the structures at LA 146402 or other Santa Fe Railyard sites, all of the midden remains appear to have been butchered in-home without the use of saws. This is not surprising because saws and other metal tools were scarce before the railroad was built in the 1880s.

Structure Assemblage

Structure 5. Structure 5 is the first of three adjacent outhouse pits included in the sample. The small sample (n = 54) contained a partial puppy skeleton, part of a Canada goose, several elements from a single pigeon or dove, and fish, as well as a few fragments of sheep/goat, cattle and chicken. The sample is atypical of other Santa Fe Railyard assemblages in that it contains large portions of small animal carcasses, and very few remains of ungulates (Table 3.45). The fragmentation rate is extremely low, with only 19 percent of specimens less than 10 percent complete, and 56 percent of the sample is complete elements. This is a reflection of the partial skeletons of the small animals, individual elements of which were largely intact. The remains from Structure 5 have no environmental or animal damage, and none of them are burned. About nine percent of the specimens have evidence of butchering, which is low, though not unexpected with the partial skeletons.

Structure 6. Structure 6 is the second adjacent outhouse at LA 146402. The faunal sample (n = 33) includes small amounts of cattle, sheep/goat, pig and turkey (Table 3.45). A partial domestic rabbit skeleton was identified. Fragmentation rates are low, with 21 percent of specimens less than 10 percent complete, and 54% of the remains greater than 75 percent complete (Table 3.45). Fifteen percent of the specimens have environmental damage, and none have animal alterations. About 22 percent of the assemblage has evidence of butchering, but none of the specimens are burned.

Structure 7. The third adjacent outhouse, Structure 7, has a small faunal sample (n = 21) that includes small ungulate or sheep/goat, large ungulate or cattle, chicken, as well as several elements belonging to the same black-tailed jackrabbit individual (Table 3.45). Forty percent of the specimens are less than ten percent complete and thirty percent of the assemblage is complete elements, and there is a fairly consistent range of fragmentation. None of the remains have environmental alterations (though one had adhering tissue), animal damage, or evidence of burning (Table 3.45). About 33 percent of the bones are butchered.

Structure 8. Structure 8 is the remnant foundation of the original AT&SF passenger depot (Wenker et al. 2005c). The faunal sample (n = 113) is dominated by large ungulate or cattle, followed by small ungulate or sheep/goat. A few fragments of dog, pig and chicken were also recorded (Table 3.45). Fragmentation rates are high; 66 percent of the sample is less than ten percent complete. Eighteen percent of the specimens have environmental damage, mostly exfoliation from exposure. Animal damage is uncommon, and none of the bones are burned (Table 3.45). Human processing is evident on 18 percent of the remains.

Structure Comparisons

The structure samples are too small to warrant extensive comparisons, but there are some striking differences, particularly between the outhouses and the architectural structure. The most obvious difference is the species present in the different structures. Structures 5–7 mostly contain partial or near-complete skeletons of small mammals and birds, some of which were probably not consumed. Structure 8, conversely, is composed almost entirely of small and large bodied ungulates. This difference is highlighted by fragmentation rates that are much higher in Structure 8 than in the privies. There are no major differences between the environmental modifications of the four structures, and animal damage is minimal. None of the structure remains are burned, which is significant when compared to the midden area, discussed below. Processing rates are inconsistent and vary from structure to structure regardless of the function of the structure.

Species Utilization

Human taphonomic processes, such as butchery patterns and prey selection, are informative when interpreting a faunal assemblage. The selection of specific animals for consumption, which can be understood by looking at the age profiles of animals at a site, is also instructive. Structures 5–8 at LA 146402 are from the later historic period, so analyzing body part profiles in the classical sense is not necessarily the best strategy for understanding species utilization. In historic times, meat was often purchased as specific cuts, which correspond to cuts still used today (Ashbrook 1955). These meat cuts are visible archaeologically by smooth, uniform saw marks likely made by a professional butcher. Because meat was acquired in this way, body part profiles that examine specific elements are not as useful as those that consider historic meat cuts.

Historic cuts of meat are useful for understanding the economic situations of the people depositing the remains; wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. Schulz and Gust (1983) present a ranking system for meat cuts based on the relative price of beef at the turn of the nineteenth century in Sacramento, California that has widely been applied to historic faunal data sets in the western United States. Following this construction, most of the beef cuts from Structure 8 were moderately priced cuts of meat (n = 5), followed by cheap (n = 3) and expensive cuts of meat (n = 2). However, Lyman (1987) argues that simple price rankings may not accurately reflect the economic standing of people depositing remains. Rather, cost-efficiency based on pounds of edible meat for each beef cut and price per pound is a more logical model to use when interpreting historic meat consumption. In terms of cost-efficiency, there is a fairly even representation of highly cost-efficient (n = 3), moderately cost-efficient (n = 4) and the least cost-efficient cuts of meat (n = 3) in Structure 8. Since Structure 8 is the remains of architecture that were likely accessed by a variety of unknown people, it is not surprising that a range of meat cuts are represented. As discussed above, most of the domestic refuse came from Structure 8. The other structures are not included here, but summaries of meat cuts from Structures 5–8 are presented in Table 3.47.

The ages of animals at historic sites are indicative of what kinds of meat were eaten: for example, if lamb or mutton was preferred, or if veal or older cattle was consumed. Animal age can be determined by the fusion of long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). Age data were only available for Structures 6 and 8, and are presented in Table 3.46b. Three animals with determinable ages were found in Structure 6: a sheep/goat older than 30 months, a cattle younger than 108 months, and a pig between the ages of 12 and 42 months. The sheep/goat is toward the upper limit of animals raised for meat. The age range on the cattle is too broad to make any inferences. The pig, however, was older at the time of death than is normally associated with an animal in the prime age for consumption. Structure 8 contained remains of a cattle younger than 10 months of age, which was likely consumed as veal. Two sheep/goats, one older than 36 months and one younger than 28 months were also present. The older animal is beyond the upper range of animals typically raised for meat, and the younger individual was either consumed as veal, or as a slightly older animal raised for consumption. Remains of a pig between the age of 12 and 42 months were also found. This animal is beyond the age that is desirable for eating. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Structure Assemblages: Conclusions

The faunal remains from Structures 5–7 at LA 146402 are fairly unique, in that they contain little meal refuse. Rather, the species represented are small mammals and birds, both wild and domestic, and include a puppy skeleton, which was probably not consumed. Though the sample is small, the faunal assemblage from Structure 8 is fairly typical of refuse associated with architectural remains at the Santa Fe Railyard. Large ungulate or cattle and small ungulate or sheep/goat comprises the bulk of the sample from the structure. Only a few animals could be aged; those from Structure 6 were all older than prime butchery age, and those from Structure 8 were all ages.

Archaeobotanical Remains
Pamela J. McBride

Archaeobotanical samples were analyzed from NSTR 101 a Spanish Colonial to Mexican period midden and from Structure 6, an outhouse. Four strata from the Spanish Colonial/Early Mexican period midden were examined.

Midden stratum 128 represents the initial infill layer of the midden prior to the use of the area for refuse disposal. The sample from this deposit yielded only ponderosa pine needles that could represent the remains of persistent needles on branches burned for fuel, leaving the needles as evidence of this activity (Table 3.48). To confirm this, it would have been fortuitous to have recovered ponderosa pine wood from this context, but there were no fragments of wood charcoal large enough in the sample to identify.

Plant material from one of the earliest midden deposits (Stratum 120.2) was much more diverse, consisting of both wild and domesticated taxa. Cultivars included two Old World taxa (lentils and wheat) and the most frequently encountered plant remains from the midden: kernels, cupules, and embryos of the New World cultivar, maize. Lentils were a very rare occurrence in early historic assemblages, but recent studies in the Santa Fe area have produced further evidence of this illusive cultivar (discussed below).

Wild plant material consisted of seeds of bulrush (Scirpus), goosefoot (Chenopodium), knotweed family (Polygonaceae), purslane (Portulaca), sage (Salvia), and spurge (Euphorbia). Douglas fir and ponderosa pine needles were also recovered. Although all of the seed taxa have documented economic uses, the recovery of a single burned seed of an invasive species presents questions of cultural integrity. Recovered in the sample from Level 6 of the midden, the seed has morphological traits similar to that of Russian thistle (or tumbleweed), suggesting at least some potential contamination from more recent weed burning or other events that would result in burned plant material that may not represent deposition associated with the Spanish Colonial/Early Mexican period. Tumbleweed was accidentally introduced into this country sometime in the 1870s in a shipment of flax (Martin 1987:43), well past the Spanish Colonial/Early Mexican period. While this does not rule out the possibility that occupants were gathering wild plants for food or medicine, it precludes making conclusions with any certainty. Wood from this stratum was predominately juniper, with one fragment of wood that resembled piñon and one resembling ponderosa pine (Table 3.49). Two fragments of diffuse porous wood were classified as unknown non-conifer and may actually be carbonized root or perhaps from an undetermined riparian taxon.

Another of the earliest midden deposits (Stratum 120.4) contained only maize, bulrush, groundcherry, unknown plant parts, and unidentifiable seeds. Wood was again primarily juniper by weight, followed by piñon and pine with a small quantity of unknown conifer.

Finally, Stratum 120.3 that may represent spoil from a fireplace cleanout or remodel, produced the only chile seeds (another New World cultigen), maize, unknown bark, juniper twigs, and piñon needles. Wild taxa included groundcherry, purslane, and sage. Wood mirrored other strata, but considerably more of the assemblage consisted of cf. ponderosa pine.

In contrast to the midden deposits, maize was absent from the Outhouse 6 sample, which is not very surprising because people normally do not consume cob parts, but rather use shelled cobs for fuel and recognizable kernels normally do not survive the digestive process. However, a relatively large number of blackberry/raspberry, fig, and strawberry seeds were recovered along with chile, watermelon, grape, mulberry, and tomato seeds. Wood was absent from the outhouse deposits.

Macrobotanical material from Outhouse 6 is repetitive of that found in the flotation sample, with more of the most frequently encountered taxa (Table 3.50). Floral remains from another outhouse (Structure 5) consisted of many of the same taxa found in the flotation sample from Outhouse 6 with the exception of peach pits in the northern half of the feature. Half of an apricot pit was identified from Stratum 120.2 of the midden as well as a single maize kernel.

Archaeobotanical Remains: Conclusions

Plant material from the Spanish Colonial/Mexican period midden NSTR 101 reflects a diet composed primarily of Old and New World cultigens, mirroring that found elsewhere in the region. The short list of wild plants recovered may represent residue from burning weeds in fields or the consumption of goosefoot, purslane, groundcherry, and bulrush. Considering the context, the plant assemblage from privies dating to the early twentieth century is understandably different, consisting of seeds from fruits like fig, mulberry, grape, raspberry, strawberry, tomato, and watermelon that resulted from either the consumption of fresh fruit, jam, or cookies. Wood procurement during the Spanish Colonial/Mexican period focused on juniper with minor percent presence of piñon, ponderosa pine, and unknown non-conifer.

Groundstone Artifacts

Karen Wening

Two large metates were recovered from NSTR 101, the Spanish Colonial- to Mexican-era midden and selected for analysis. Both metates from LA 146402 originate from stratum 120.2, which forms the basal deposit over most of the midden area at the site. This charcoal flecked stratum yielded abundant and variable cultural material.

Concave slab metate (PD 1182.7)

The most complete metate was manufactured from dense, well-indurated granite composed mainly of feldspar and quartz minerals. The material outcrops in the Sangre de Cristo Mountains east of the project area, occurring as large angular rocks in the mountains and foothills, and as cobbles in the Santa Fe River gravels. No water worn cortex is present, indicating that the raw material does not originate from an alluvial context, or that the cortex was removed during shaping. While the material is large grained, it is not highly abrasive. The hardness, density, and induration of the granite create a surface similar to quartzite. This material requires considerable effort to shape, but the resulting tool is more durable and produces less granular material in the food or other substance being processed.

This concave slab metate is shaped over most of the surface (Fig. 3.79; including both XS views). However, there is considerable difference in the methods used and the time invested in shaping each portion of the tool. The sides of the metate are the most crudely shaped. Large flakes are removed around the entire perimeter, and the resulting flake ridges are moderately ground to remove sharp edges. This minimal shaping contrasts with the regularity of the use surface. It is evenly rectangular in plan, and evenly biaxially concave in contour, which suggests that the use surface was shaped prior to grinding. This cannot be definitively stated, as grinding obliterates shaping on the use surface. However, the extreme hardness of the material would seem to require some modification to the use surface prior to grinding. This is certainly true of the base of the metate, 3/4 of which is rather heavily ground to a biconvex contour (Fig. 3.79). Only the extreme proximal portion of the base is unshaped.

The use surface is heavily ground to a depth of 8 mm, with the grains sheared flat with the matrix over most of the use surface. The surface is pitted in some areas, but this appears to represent natural granular interstices rather than rejuvenation. Considering the hardness and density of the material, this smooth surface is particularly demonstrative of the heavy use the tool has received. The use surface extends over the full length and width of the metate, though the proximal end is more lightly ground. Use-wear striations and surface contour indicate use of a rocking, reciprocal stroke. This indicates that the stroke was often terminated before the mano had reached the proximal end of the tool.

Only one proximal corner is missing, so the complete dimensions can be determined (37.7 by 20.8 by 8.1 cm; 14,500 grams). No surface adhesions were observed. Charcoal flecks adhere to the bottom of the metate, but the tool does not appear to have been exposed to heat. These charcoal flecks probably adhered to the metate after it was discarded in the refuse area, as the fill of Stratum 120.2 from which the metate was recovered, is charcoal flecked. Stratum 120.2 was the basal deposit of the midden in NSTR 101.

Concave slab metate (PD 1189.3)

This metate (Fig. 3.80) is the more fragmentary of the two. It appears to be a large corner fragment of a subrectangular concave slab metate. It is manufactured from a large angular slab of fine-grained, indurated yellow-brown sandstone. Because the tool is shaped over the entire surface, no cortex remains to determine the status of a riverine or outcrop source. Sandstone outcrops in the pre-Cambrian Magdalena formation of the Sangre de Cristo Mountains, occurring as large rounded boulders up to 1.22 m (4 ft) in diameter (Cabot 1953:91).

The sandstone metate differs from the granite specimen in the more abrasive quality of the material, and the extensive shaping modification. The user of this tool clearly desired a more abrasive use surface than that of the granite metate. This is evidenced by the sandstone raw material and the rejuvenated surface. Though the sandstone is well indurated, it produces more granular material during use, which would become mixed with the processed substance.

The entire tool is shaped. The sides are flaked, pecked and ground to form a smooth, slightly convex surface. The base is more crudely shaped by the removal of large flakes. Projecting areas are moderately ground to create an irregular biconvex surface. The grinding surface attributes indicate that the tool has not received a high degree of use. The surface displays a shallow, biaxially concave contour, which is worn to a depth of only 3 mm (0.12 in). It is rejuvenated, with remaining high spots sheared flat, suggesting that the surface had become quite smooth prior to rejuvenation. Parallel striations indicate that a slightly rocking, reciprocal stroke was employed during use. Grinding wear ex-

Figure 3.79. LA 146402, NSTR 101 (midden), concave slab metate, PD# 1182.7.

tends to both edges of the tool, suggesting that the entire surface was used. However, because the tool is fragmentary, this cannot be decisively stated. No adhesions were observed on the use surface. The metate has not been exposed to heat. Only the thickness is complete (35.7 by 24.0 by 9.4 cm; 12 kg).

Groundstone: Summary

While both tools originated from the same stratum, they occurred within different levels, and therefore may have contrasting cultural affiliations. The sandstone metate is from a fairly secure context, occurring in the lower levels of stratum 120.2 (PD 1189.3, XU 113, level 10). Based on the ceramic assemblage, the lower levels of Atratum 120 are thought to date between 1700 and 1780, associated with Spanish Colonial or early Mexican period occupations.

The granite metate derives from a less secure context in a low area near the center of the midden that was subjected to recurring alluvial disturbance (PD 1182.7, XU 110, level 6). As a result, considerable mixing of strata may have occurred, denoting a less secure context for this tool. Estimated dates for this substrata range between 1700 and 1800, affiliated with the Spanish Colonial period in New Mexico.

Metates were an important kitchen utensil in households from this period. Their occurrence in the household midden is not unexpected. The latter metate fragment was discarded, while still in serviceable condition. This could reflect kitchen cleaning associated with abandonment or wholesale cleaning of a kitchen or cooking area. The sandstone metate fragment reflects discard of a utensil that was no longer functional. Its presence in the midden may reflect normal kitchen maintenance and upkeep.

Chipped Stone Artifacts
James L. Moore

Ninety chipped stone artifacts were recovered from four proveniences at LA 146402 including a midden, a field irrigation system, an outhouse depression (Structure 5), and the engine house foundation (Structure 3, Room 9). The stratigraphic locations

Figure 3.80. LA 146402, NSTR 101 (midden), concave slab metate, PD# 1189.3.

from which these artifacts were recovered are shown in Table 3.51. Each general provenience is discussed separately to provide a fuller understanding of the contexts in which these artifacts were found.

Field Irrigation System

Ten chipped stone artifacts were recovered from the field irrigation system investigated at LA 146402 (NSTR 100). Nine specimens were found in irrigation channel sediments, and one came from field deposits. This assemblage is dominated by cherts, which comprise 70.00 percent of the total (3 unsourced chert and 4 Madera chert). The three remaining artifacts are made from unsourced obsidian, Polvadera obsidian, and quartzite (10.00 percent apiece). Core flakes are the dominant artifact type (n = 6; 60.00 percent), followed by angular debris (n = 3; 30.00 percent), and strike-a-light flints (n = 1; 10.00 percent). The latter is the only artifact that can be assigned a date, and is of historic derivation. Other than this tool, only the unsourced obsidian core flake showed signs of use (unidirectional wear on one edge) and may have been used for scraping. Only the quartzite strike-a-light flint retained any cortical surface, and that cortex is waterworn, suggesting procurement from secondary gravel deposits.

No evidence of platform modification was noted on any of the flakes. Most of the flakes were whole (n = 4), with the remainder consisting of lateral (n = 1) and distal (n = 1) fragments. The only evidence of thermal alteration was on a Madera chert core flake, which exhibits potlid fractures on its dorsal and ventral surfaces, indicating that it was altered—probably inadvertently—after being struck from a core.

Considering that 9 of the 10 artifacts in this assemblage came from sediment-filled irrigation channels, there is a very high probability that those specimens were transported from elsewhere and deposited at LA 146402 by stream flow. Thus, they probably had no association with the construction or use of the irrigation channels or the related field area. The single artifact recovered from field deposits is a different matter. That specimen is the quartzite strike-a-light flint, which was made on a piece of angular debris. This strike-a-light flint could have been lost or discarded by someone working in the field, and is therefore considered associated with the use of this feature.

Engine House Foundation (Structure 3, Room 9)

A single piece of unutilized and non-cortical Pedernal chert angular debris was recovered from Room 9 in Structure 3. Since this artifact was found in Stratum 2, which represents post-occupational fill, there is little likelihood that it was related to the use of the structure within which it was found.

Outhouse (Structure 5)

Two chipped stone artifacts were recovered from fill strata within Structure 5, an outhouse pit the early twentieth century, ca. 1905. An unsourced chert core was found in Stratum 106.107, sediments that were used to fill the outhouse pit after its abandonment. Thus, this artifact is unrelated to the use of this feature, and its actual source could not be determined. The second artifact was the distal end of an unutilized and noncortical Madera chert core flake. Since this specimen was recovered from Stratum 112, which consists of materials deposited when the outhouse was in use, it appears to have been purposely (or accidentally) discarded during the use-life of Structure 5. Unfortunately, since this flake did not appear to have served as a tool, its function remains unknown.

Midden (NSTR 101)

A total of 77 chipped stone artifacts were recovered from the midden (NSTR 101). Ten specimens were found in sediments that capped the actual midden deposits in this trash-filled pit (Strata 27 and 119). These materials probably either represent fill that washed into the pit following abandonment, or sediments that were used to intentionally fill the remaining pit. The presence of large amounts of native ceramics, majolica, chipped stone, and groundstone in Stratum 119 suggests that most of these materials probably derived from deposits related to the same occupation of the site that created the midden. With this in mind, artifacts from Stratum 119 are not eliminated from the midden assemblage. One artifact was found in the pre-occupational substrate (Stratum 125), and was probably moved downward from the midden deposits proper through bioturbation. Since this artifact appears to have originally been discarded in midden deposits, it will remain part of that assemblage. The 66 remaining chipped stone artifacts were found in definite midden deposits (Strata 120, 120.1, 120.2, 120.6, 126, 128), and represent materials that were discarded during the Late Spanish Colonial-period occupation of this site (Table 3.52).

This assemblage is dominated by cherts, which comprise 83.12 percent of the total (42 unsourced chert, 14 Madera chert, 5 Pedernal chert, and 1 silicified wood). The remaining artifacts are made from unsourced obsidian (n = 9, 11.69 percent), limestone (n = 3, 3.90 percent), quartzite (n = 2, 2.60 percent), and rhyolite (n = 1, 1.30 percent). Core flakes are the dominant artifact type (n = 42, 54.55 percent), followed by angular debris (n = 28, 36.36 percent), strike-a-light flints (n = 5, 6.49 percent), strike-a-light flakes (n = 1, 1.30 percent), and projectile points (n = 1, 1.30 percent). Historic dates can be assigned to the strike-a-light flints and flake, while the projectile point appears to be a prehistoric Pueblo tool that was salvaged for reuse. Other than these seven specimens, no other artifacts showed signs of use-wear. Cortex was noted on 14 artifacts, including 10 chert, 3 Madera chert, and 1 unsourced obsidian. In all cases the cortex is waterworn, showing that these materials were obtained from secondary gravel deposits.

The only modified platform was an abraded single facet platform on a silicified wood core flake. Many flakes were whole (n = 18, 40.91 percent), with the remainder consisting of proximal (n = 9, 20.46 percent), medial (n = 2, 4.55 percent), distal (n = 7, 15.91 percent), and lateral (n = 8, 18.18 percent) fragments. The only evidence of thermal alteration was luster variation on a piece of angular debris and color change on 2 core flakes.

The occurrence of chipped stone artifacts within multiple layers of midden deposits dumped into an open pit indicates that these artifacts are related to the Spanish Colonial period occupation of LA 146402. This conclusion is supported by the presence of 5 strike-a-light flints and 1 strike-a-light flake in the assemblage. These types of artifacts can only date to the historic period, because they were used against steel chispas to strike sparks in fire-making activities, and steel was not present in New Mexico before the Spanish conquest. The occurrence of a prehistoric Pueblo arrow point is not surprising, since similar prehistorically-made tools have been encountered at other Spanish sites, and appear to represent the salvaging and reuse of items from earlier sites.

Chipped Stone: Summary

Of the 90 chipped stone artifacts from LA 146402, 11 were recovered from strata deposited by post-occupational processes. Ten specimens came from sandy sediments filling abandoned lateral irrigation channels, and the last was found in sediments of unknown origin that were used to fill an outhouse pit. Since the origin of these artifacts is impossible to demonstrate, and because they were introduced into site deposits through noncultural processes or by cultural processes unrelated to the construction or use of the features in which they were found, no real meaning can be ascribed to these artifacts. The 79 remaining artifacts, including 1 from the field irrigation system, one from cultural deposits in the outhouse pit (Structure 5), and all 77 from the Spanish Colonial period midden, do appear to be related to the cultural use of the features in which they were found. The 10 specimens found in the deposits capping the Spanish Colonial midden are included because, as noted above, they either washed in from nearby related cultural deposits or were in sediments that were used to intentionally cap the trash pit that appear to have contained materials from the same occupation of the site.

LA 146402 Summary and Recommendations

Excavation at LA 146402 provides insight into the changing land use and occupation in the Barrio de Guadalupe with a time span conservatively beginning in the early- to mid-eighteenth century continuing through the post-WWII era. Refuse recovered from Spanish Colonial to Mexican-era midden deposits, (somehow left intact throughout the life of a railyard that served three train lines over a 130-year period) in concert with a series of three privies and artifacts recovered from the depot, provide a rare look at material culture south of the Santa Fe River, providing a glimpse into the local neighborhood economy and life way which evolved from an agrarian, largely barter based system focused on domestic and farming activities, to a small scale industrial port of entry.

Refuse from the midden provides some of the earliest evidence of social stratification among (presumably) Spanish surnamed groups (D. H. Snow, Chapter 7, this report) within the villa. In his comparison of imported ceramic and metal assemblages between the Baca-Garvisu house (LA 1051) north of the Santa Fe River, Trujillo House in Valencia (LA 67321), and the midden at LA 146402 Barbour points out a notable absence of Spanish Majolica at LA 146402 and a higher incidence of Indigenous Mexican ceramics. Analyses of imported ceramics along with metal artifact frequencies suggest that the households' relative wealth differed and that the assemblage at LA 146402 was likely the least prosperous of the three. Two metates recovered from similar context may support this interpretation. Analysis suggests processing of both cultigens and wild grains and implies that residents were either unable or unwilling to pay for grain processing. Archaeobotanical samples bear this out. In addition to maize and chile, wild seeds recovered from the midden included goosefoot, purslane, groundcherry, and bulrush suggesting that nearby residents engaged in both agriculture and foraging activities. Propensity to consume young goat and older cow tell the tale of domestic butchery.

Barbour also suggests possibility of cultural affiliation with mestizo or indio groups based on this assemblage. Native Ceramic analysis conducted by Wilson and compared with assemblages recovered from the Civic Center (LA 1051) indicate that the great majority of pottery recovered from the midden were produced by Northern Tewa Pueblo potters just north of Santa Fe. Significant frequencies of sand tempered gray/black utility wares provide possible evidence of pottery produced outside the Tewa basin, perhaps by Hispanic potters. Wilson also describes small frequencies of pottery produced at Zia from Zuni/Acoma and Santa Ana pueblos and notes the frequencies are within the range reported from refuse pits excavated at the Civic Center.

Very lowest strata from selected context could reflect remodeling of original structures associated with early Spanish Colonial context but confident mid-eighteenth century dates. Overlying deposits reflect a progression in time to Mexican period and later intrusive and perhaps mixed deposits.

This midden is physically proximate to deposits previously excavated by Deyloff about 200 meters to the northwest at LA 121196 in the Sanbusco Market Center parking lot. Excavation at Sanbusco exposed a deposit assigned to a pre-Revolt dates based on native ceramic analysis with a date range of about 1690–1720 (Lang, in Deyloff 1999:66). Artifacts include a chocolate cup and "other china" including Chinese porcelain and Majolica, in addition to storage, serving and mixing vessels. Cut mica suggests several windows. Curiously, deposits dating between 1720 and the late 1800s were not encountered at LA 121196 (Deyloff 1999:86).

Results of analysis suggest the existence of a wealthy household in the area. Interpretation of the two assemblages, based on both Euroamerican and Native American ceramics and Euroamerican artifact analysis, could not be more different. Discounting estimations of wealth or social status, one aspect of the two analyses that is clear is that the midden at LA 146402 contains artifact content plainly associated with mid-eighteenth century that was not exhibited at LA 121196. One interesting aspect of deposition at both sites is existence of alluvium closely associate with the midden deposits. This may provide some clue to as yet undetermined site formation processes at both sites that have affected both depositional contexts. One hypothesis is that abandoned buildings located in the area were adversely affected by flood episodes and raised or remodeled and reinhabited sometime between 1730 and 1750 or later.

Data recovery also confidently identified and documented the nature and extent of field and sangria locations within the project area previously encountered during testing. The three braided channels (sangrias that were likely fed by Acequia de los Pinos) provided undeniable evidence of irrigation and may have also bounded space, delineating field sections, if not ownership boundaries. Confident identification of a single water diversion feature may indicate a field corner and provide evidence of simple but ancient and effective technology used by farmers into the 1850s (see Barbour, above, and Chapter 2).

Pollen samples obtained from field deposits during testing yielded poor results and that, combined with lackluster results from pollen recovered from acequia context (see Hall Chapter 7 of this report) indicated that further sampling of the plowed and therefore churned field deposit was unlikely to significantly augment information gleaned from historic records (D. H. Snow, Chapter 7, this report) and archaeobotanical analysis conducted from midden context (McBride, Chapter 7, this report) which in addition to cultivars (maize, chile, lentils and wheat) indicates presence of wild plant taxa, goosefoot, purslane, groundcherry, and bulrush, potential evidence of field clearing. This range of cultivars and wild plants is typical for a New Mexico household. The household consumed its agricultural products, while acquiring wild foods as supplements or for medicinal purposes. A seed with morphological traits similar to that of Russian thistle (or tumbleweed) may provide evidence of cultivation (or at least weed clearing) as late as the 1870s.

The initiation and perpetuation of rail service to Santa Fe in 1880 represented a watershed set of events that made a significant and important contribution to broad patterns of social and economic history in the Territorial capital. A wealth of artifacts related to the late nineteenth and early twentieth century use of the railyard was also recovered from a set of perfectly preserved outhouse depressions. The three outhouses provide intriguing sequential deposits with artifacts dating to approximate eight-year intervals that track railyard use from about 1905 (Structure 5), 1910 (Structure 6), and 1921 (Structure7). Perhaps the most salient aspects of the deposits were the emphasis on industrial use complete with crow's foot wet cell battery disposal in Structure 5 and clear orientation toward presumptively male (see Barbour, above) liquor consumption (probably some of it during prohibition) weapon disposal, steam engine parts, and for the first time, motoroized vehicle maintenance. The faunal assemblage was unique and progressed from an assemblage that reflected the near absence of food item species in Structure 5 to one that reflected food consumption in Structure 7. Along with fewer industrial waste items this may reflect the area's use but also policies put in place by the AT&SF and the D&RG about industrial refuse disposal and perhaps who used the outhouses.

Data recovery work at LA 146402 exposed the well-preserved foundations of many of the AT&SF's original infrastructure buildings, providing ample information about building-construction methods, sequencing, and function (see above). It is likely that one of the first buildings constructed at LA 146402 was Structure 3, the train maintenance bay. The structure was a large industrial-scale building with a drain structure and associated cistern and may only be predated by the well and water tower foundations, which were constructed of massive blocks of sandstone (see LA 146403, discussed below).

One potential scenario based solely on the structures' archaeological manifestation could involve construction of the water tower foundation then use of spoil from the shaped water tower bases to construct both the well housing and the train-maintenance bay with the remainder used in pilasters for the depot (Structure 8a) and then perhaps in the structure (Structure 1) that was later used to house a freight scale. Buildings appear to be initially constructed to plan, with ad hoc modifications made as infrastructure aged and was repurposed as needs changed. Examples of these modifications are clearly visible in the alteration of the original passenger depot to a freight depot by using creosote-soaked planks as foundations to the pilasters—presumably to extend and strengthen the loading dock. The same techniques are seen in the water tower foundation (see LA 146403, discussed below); pipe refitting at the well (LA 146403); Structure 2 remodeling, which involved cannibalizing part of the existing sandstone foundation to enlarge the building in order to accommodate a freight scale, and track re-alignment and construction of a loading dock in the place of the former engine house. Freight scales were installed at the railyard by 1885 along the second siding, to the "right of the station" (Table 7.3). Though it is unclear if Structure 2 housed those particular scales, installation must have taken place by the early twentieth century, as is probably the case with the water crane. Both are housed in concrete boxes reinforced with rebar.

A series of ancillary features associated with large industrial architecture also attest to modifications made during the railyard's history. Railroad track alignments documented to the north and south of the engine house (Structure 3) and to the east of the original passenger depot, now ephemeral, indicate the former locations of track sections that ultimately connected the rolling stock to everything else and demonstrate modifications made to the railroad's layout over the years. Pipelines that served and connected buildings, and posthole alignments that may attest to the presence of now destroyed fence or transmission lines further bear witness to boundaries and industry. Ancillary features including a possible porch or ramp on the south side of the engine house and cistern associated with the building provide indications of day-to-day work performed in the area.

Recommendations

Excavation at LA 146402 followed the procedures outlined in the data-recovery work plan and recovered the requisite data to address relevant aspects of the project's research design (Wenker et al. 2005, Chapter 2). Because the site area was unlikely to yield additional important information beyond that already recovered, no further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction. Recommendations remain unchanged from those offered by OAS and accepted by HPD and ARC during preliminary reporting.

LA 146403

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Introduction

Excavation at LA 146403 revealed a well and the associated foundations of a windmill, as well as an adjacent water tower foundation, all of which were built in 1879–1880 by the Atchison, Topeka and Santa Fe Railway. Mechanical and hand excavation exposed the remains of the well/windmill complex revealing a subterranean, dome-shaped, masonry well vault that apparently housed the pumping apparatus. The well shaft itself was capped by a plank walkway at the level of the historical ground surface. Four square, subterranean masonry piers surrounding the well vault served to anchor the legs of the windmill frame. The subterranean foundation of the water tower was built of massive sandstone blocks (each almost 3 ft across and 1 ft thick), stacked in terraces four courses high to form an array of 16 support piers for the tower's superstructure. Evidence of repaired post supports was documented among the tower's piers, and the inlet and outlet water pipes were traced. Immediately to the west of the well and water tower foundation, mechanical scraping revealed railroad tie impressions from the 1880 trackage.

Site Location

The well and water tower at LA 146403 were the northernmost features excavated at the Railyard Park. Located immediately east of the Outside Magazine building, and south of the Sanbusco Market parking lot (Figs. 3.1a, 3.1b), the site was separated from LA 146402 by Outside Magazine. Features excavated at LA 146403 were temporally and functionally associated with the Engine House (Structure 3) and other railyard infrastructure exposed at LA 146402. Remnant trackage (Features 41, 42) to the west of the water tower (Structure 2) aligned with the still existent railroad track alignment constructed in the 1880s (see LA 153441).

Site boundaries were defined by the two structures and measured about 30 m north–south by 20 m east–west and covered about 600 sq m (Figs. 3.1b, 3.81, 3.82). Prior to this project, the site was used as a dirt-surfaced automobile parking lot.

Excavation Sequence

Overburden (Strata 1 and 2) was excavated in full-cut hand and mechanical excavation units to expose the various subsurface foundations. These upper deposits and the overlying parking lot gravel, designated ARB 1 were removed, and Structures 1 and 2 were exposed, in a series of 5 scraping units (SCU 10 to 14) located on each side of BHT 23 which was first excavated during testing. Further excavation focused on Structures 1 and 2 and extramural areas surrounding them. The historic ground surface and associated deposits within four meters of Structure 1 was designated NSTR 1. NSTR 2 was assigned to similar deposits surrounding Structure 2 and included the railroad track remnant to the east (Feature 41). Excavation sequence for specific structures and features are provided in their respective discussions. Scraping and excavation unit dimensions, locations, strata and associations are summarized in Tables 3.53 and 3.54 and mapped in Figure 3.82; BHT 23 is detailed in Table 3.55.

Because of the mixed and redeposited nature of the fill, most deposits were not systematically screened or sampled, and artifact recovery rates were relatively low (n = 303 items from the entire site). Specific screened proveniences are also discussed in the feature descriptions. Archaeological work at this site focused on feature exposure and architectural documentation in the form of plan maps, cross-section and elevation drawings, photography, and narrative descriptions.

Site Stratigraphy

Most of the sediment filling and capping the structures and the surrounding historical ground surface consisted of purposefully introduced overburden and are typical of deposits described at LA 146402. Other strata identified during the excavation are noted below in the feature or structure descriptions.

Stratum 1. Stratum 1 overburden was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving surfaces in the area and was 5 to 30 cm thick.

Stratum 2. The stratum was defined by well-sorted, pulverized coal in a fine- to medium-grained sand matrix with cinders and sparse historic refuse. The deposit was well sorted, coal inclusions were small (approximately 1 cm) and comprised 50 percent of the fill. The deposit was approximately 5 to 35 cm in thickness. Coal deposited as the result of structure remodeling and maintenance that predated Stratum 2 are discussed below with Stratum 110.

Stratum 3. Stratum 3 was the underlying sterile substrate, a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. This natural deposit's full depth was never completely exposed but was at least 1.60 m thick.

Figure 3.81. LA 146403, site overview.

Structure 1: AT&SF Windmill Foundation and Well Vault

Structure 1 at LA 146403 was the subsurface foundation remains of the AT&SF windmill and well, constructed in 1879 or 1880 (Figs. 3.81, 3.82). The windmill supplied the primary source of water for the associated water tower (Structure 2, below), located to the south. The complex consisted of a subterranean, dome-shaped, masonry well vault that apparently housed the pumping apparatus (Figs. 3.83, 3.84). The well shaft itself was capped by a plank walkway at the level of the historical ground surface. Four square, subterranean masonry piers surrounding the well vault served to anchor the legs of the windmill frame. The structure consisted of a number of elements that were assigned feature numbers and are summarized in Table 3.56. Artifacts from feature, structure, and extramural areas are listed in Table 3.57a.

Excavation Sequence

Structure 1 was initially exposed during testing in BHT 23 and was identified as Feature 38 (Wenker 2005a). During data recovery, the structure was fully exposed by the excavation of Scraping Units 10, 11, 13, 14, 20, and 26, by the full-cut excavation of the SW and SE quarters of the structure, and by the excavation in halves or full-cut of the constituent pits and other features that made up the overall structure (Fig. 3.82; Table 3.54). The uppermost portions of the structure were buried between 15 to 25 cm below the modern surface, and the foundation footing was buried to a depth of about 2.4 m.

Depositional sequence

Fill encountered during the structure definition included overburden; Strata 1 and 2, and fill; Stratum 23 and Stratum 24.

Stratum 23. Stratum 23 was a purposeful construction deposit that filled the foundation hole excavated for the well vault and windmill pilasters (Feature 22). This fill was a light brown, coarse

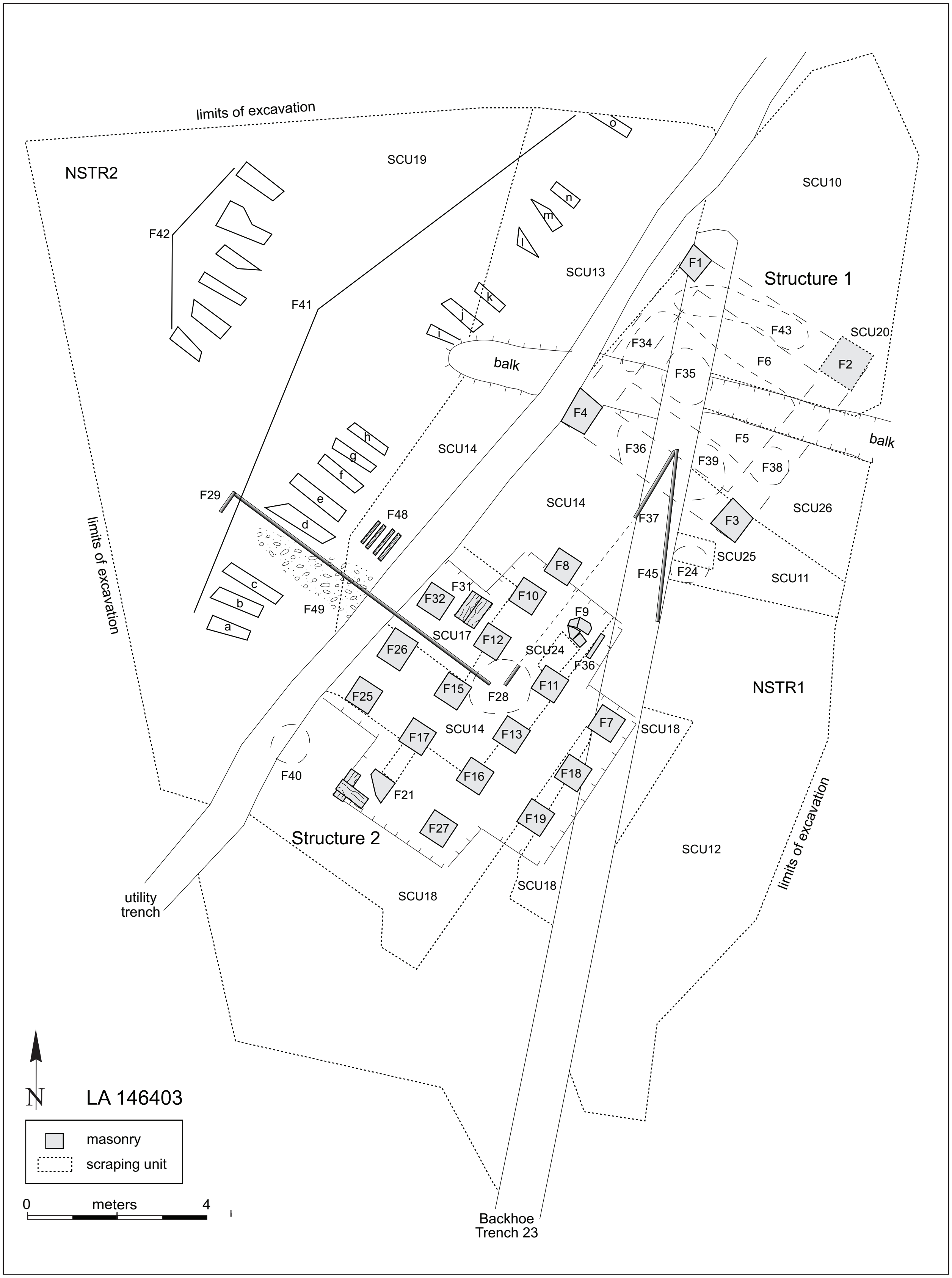

Figure 3.82. LA 146403, site map.

gravelly sand with coal lenses near the base of the deposit and was at least 2.4 m thick.

Stratum 24. Stratum 24 was an admixture of Stratum 23 and fill deposited during remodeling and maintenance. This stratum consists of a mottled brown and dark gray mix of sandy loam, cinders, ash, coal, charcoal, and gravel. The deposit, though located within the Structure 1 construction pit (Feature 22) was the result of remodeling and maintenance evidenced by a pit dug to refit metal pipes (Feature 39). This fill also appears to have been intentionally deposited after the refitting episode to cover the exposed southern face of the subterranean structure. Fill was up to 1.22 m thick.

Structure Description

The windmill and well complex was first constructed by excavating a square pit (Feature 22) into Stratum 3 into which the well shaft was dug. Once the well shaft was completed and stabilized, both the masonry well vault (Feature 6) and piers (Features 1–4) were constructed as a single, bonded unit. The pit was then filled with an admixture of sand (probably substrata from the well excavation) and Stratum 3 (designated Stratum 23), and a platform (possibly similar to Feature 5) was constructed to cover the square shaft opening (Feature 35). During construction, one, possibly two small postholes (Features 44 and 47) were incorporated into the well vault. These holes may have accommodated some equipment associated with the windmill apparatus but were subsequently covered by the wooden well platform which may have been dismantled or partially dismantled during maintenance or remodeling.

Evidence of remodeling is provided by modifications to the well vault opening (Feature 35) and four pits that surrounded the well housing. The largest was an oval pit (Feature 39) dug from the historic surface through Stratum 23 down to expose the south side of the well housing and a 5-inch metal pipe (Feature 45) that entered the side of the well vault through a hole modified for that purpose (Feature 46). The large pipe probably replaced another subterranean, two-inch diameter pipe (Feature 37) that originally ran from the well to the water tower. Rock removed as part of a modification to the top

Figure 3.83. LA 146403, Structure 1, windmill/well complex.

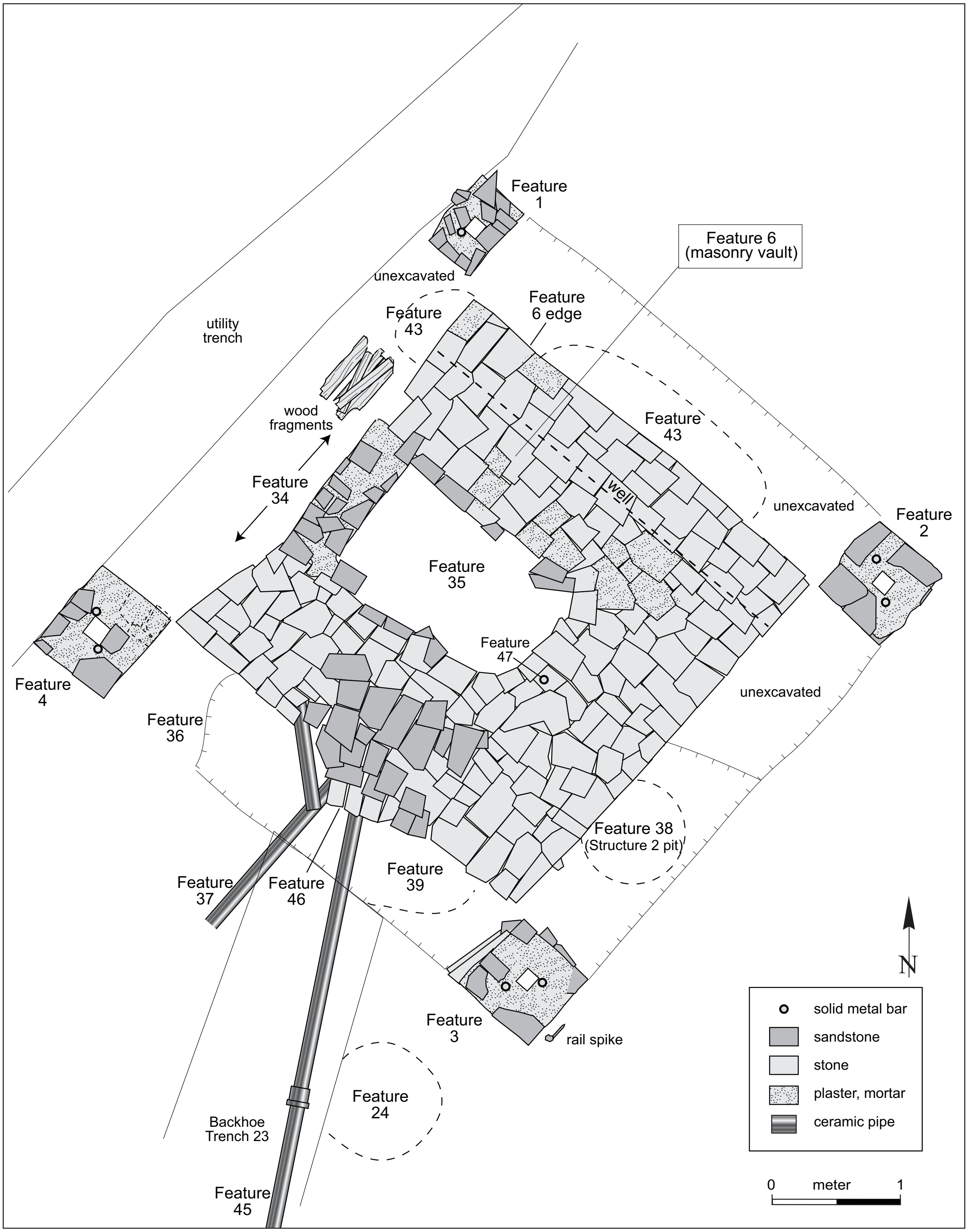

Figure 3.84. LA 146403, Structure 1, windmill/well complex.

of the well vault was then used to shore up the hole and support the pipe.

Three depressions (Features 34, 38, 43) were documented on the north, east and west sides and immediately adjacent to the well vault. Pit fill (Stratum 23 a andpulverized coal) suggests that these pits pre dated the Structure 5 platform construction.

Feature Descriptions

Structure 1 construction elements and disturbance were recorded as separate features and each element is discussed below. Feature descriptions, dimensions, age, and associated strata are summarized in Table 3.56.

Foundation Pit. Feature 22 was the initial foundation for the windmill/well complex. The large square pit had nearly vertical walls that were 4.90 m square and 2.40 m deep. The pit was dug into Stratum 3 and was originally refilled with Stratum 23. The excavation provided a subsurface cavity for the subsequent construction of the masonry well house and windmill foundation pillars, Features 1 through 4, which were constructed to fit precisely in the pit corners. Excavation was conducted in the southwest and southeast structure quadrants, and the top edge of the northern extent of the pit was exposed by hand and mechanical scraping.

Windmill Foundation. Features 1 through 4 were the windmill's subsurface masonry foundation pillars, constructed in each corner of the pit. The roughly square pillars measure about .70 m by .65 m across at the top and were about 1.4 m tall. The pillars were constructed of coursed masonry sandstone blocks set in lime-and-sand mortar. Each pillar rested on a masonry footing 2.6 m below the historic ground surface extending from the base of the corners of the central masonry well vault (Feature 6; Figs. 3.85, 3.86). These masonry footings bonded the pillars to the well vault showing that the well and foundation pillars were constructed as one unit. Two iron rods protruded from the surface of each pillar presumably for attachment of the upper wooden windmill frame. The two southern pillars were fully exposed in the southwest and southeast structure quadrants. The top and upper sides of the northwest pillar were partially exposed in BHT 23 from the testing, while the top and upper sides of the northeast pillar were exposed by hand and mechanical scraping units.

Well Vault. Feature 6 was a large, arched, subsurface masonry well housing measuring 3.45 m east–west by 3.28 m north–south and 2.38 m from the top of the arch to the foundation footing. The rectangular masonry well housing was constructed of coursed sandstone set in lime-and-sand mortar. The structure had a barrel-arched roof, also constructed of sandstone blocks (Figs. 3.85, 3.86). The outside surface of the roof was coated with a 2 to 6 cm layer of lime-and-sand mortar.

At the time of abandonment the interior of the structure was intentionally filled with the coal dust and clinkers (Stratum 2). An excavation unit within the roof opening extended to 1.2 m in depth; a 10 cm lower level of the stratum was screened. No sign of an interior floor was reached in this excavation, and no machinery was located inside the structure. Although the interior ceiling was partially exposed inside the vault, no lateral excavations were conducted inside the vault due to safety concerns from undercutting the soft feature fill. The exact function of this large subterranean well vault is somewhat problematic, but the structure may have housed the

Figure 3.85. LA 146403, Structure 1, foundation pillar and well-vault detail, east elevation.

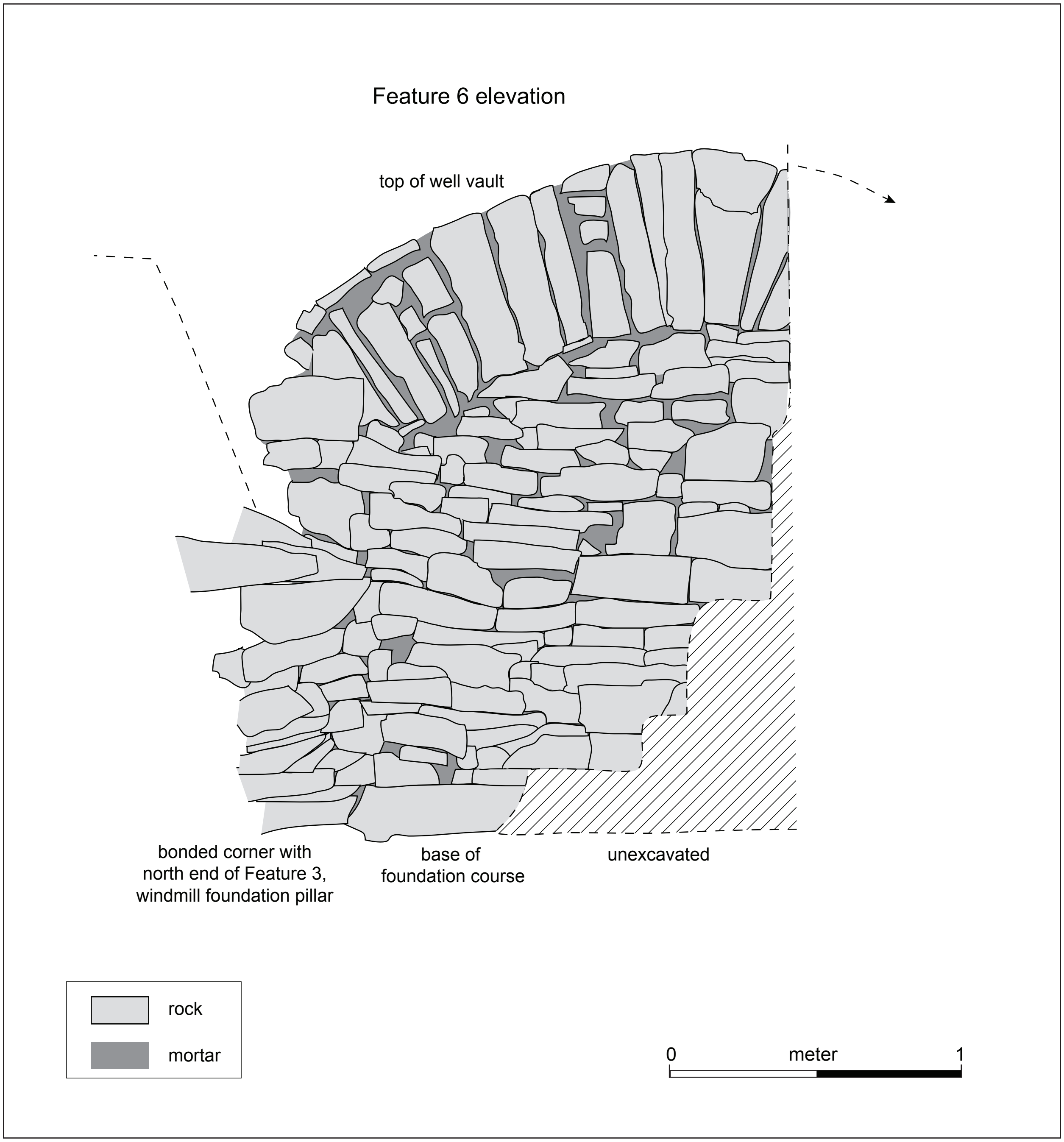

Figure 3.86. LA 146403, Feature 6, well vault, east elevation.

pumping apparatus and/or served as a secondary water cistern. Additional structural details were also assigned feature numbers and are described below.

Feature 35. Feature 35 was originally a square-shaped shaft or opening on the western edge of the roof of the masonry well vault (Feature 6), and was marked by smooth plastered faces on the northern and western edges of the original opening. The roughly 1 m square opening apparently allowed access to the interior of the chamber. At the same time water pipes serving the well vault were reconfigured, an irregular 60 cm wide modification along the eastern side of the opening was broken out, enlarging the shaft opening, apparently to allow better access to the interior of the well vault. The rocks from this modified lip were then use used to support the new pipe. A 10 cm level of Stratum 2 at the mouth of the opening was screened.

Feature 5. A walkway or platform of roughly hewn wooden planks lain at the level of the historical ground surface that capped the well shaft and vault. The rectangular platform measured 3.70 m east–west by 2.26 m north–south and the planks were each about 5 to 7 cm thick. The planks were oriented east–west and the northern and southern margins of the platform were edged by a single course of cobbles. The platform rested directly on the roof of the well vault in the center, and upon a 5 cm-thick layer of coarse sand and coal along the platform's northern and southern edges, where the vault had descended below grade. This layer of leveling fill deposit was designated Stratum 101 and the deposit was screened during the excavation. The wooden walkway was evidently constructed after the larger opening in the roof-opening shaft (Feature 35) had been broken out and expanded.

Features 44 and 47. Two small cavities or impressions on the exterior masonry/mortar roof of the well vault. They were most likely related to the removal of posts or other material associated with the upper windmill structure.

Feature 46. Feature 46 was a roughly square opening in the south wall of the well vault. The opening measured about 34 cm by 32 cm and provided access for metal water-conveyance pipes to the interior of the well vault from the south (Fig. 3.87). Two pipes leading to the water tower were fed through this modified well vault opening.

Figure 3.87. LA 146403, Structure 1, Feature 6, well vault with pipe entry, south face.

Modifications and Repairs

Feature 39. Feature 39 was a repair pit dug from the historic surface down to expose the entrance of Feature 46 along the southern edge of the well vault. The pit was apparently dug to install or repair the 5-inch metal pipe (Feature 45) entering the well vault. The pit measures an estimated 2.50 m long by 1.48 m wide and at least 1.22 m deep. The pit was filled with a fine silt mixed with coal, ash, and gravel designated Stratum 105 and all of the fill was screened.

Feature 37. Feature 37 was a 2-inch diameter steel or iron pipe passed through the Feature 46 opening into the well vault. The pipe occupied a trench leading to the center of the water tower foundation (Structure 2). The pipe apparently allowed water to be either pumped from the well up to the water tank, or it allowed water to drain from the elevated water tank back into the well vault. The pipe sloped downhill from the water tower to the well vault. This pipe had been cut; a short length of the pipe was found loose in the backdirt of Feature 39, a repair pit above the southern edge Structure 2.

Feature 45. Feature 45 was a 5-inch diameter steel or iron pipe entering through the Feature 46 opening in the well vault (Fig. 3.87). The pipe extended southwardly in a trench past the east side of the water tower for at least 9 m and then continued south to an unknown location. The pipe sloped upward to the south. This pipe was apparently a secondary addition or modification, probably installed after the Feature 37 pipe was cut. This pipe may have allowed water to either be pumped from the well to an unknown locality, or may represent the addition of an added source of water to the well vault if it served as a cistern.

Features 34, 38, and 43. These three irregular pits were situated along the east, north, and west exterior walls of the well vault, within the bounds of the larger original construction pit (Feature 22). The pits were filled with Stratum 2-like pulverized coal and were excavated into Stratum 23. Feature 34, contained remnants of what appeared to have been an earlier wooden platform covered by Stratum 23, which supported Feature 5. These remnant boards appear to have slumped into the depression suggesting that Feature 5 was at least partially reconstructed after a maintenance episode. Stratum 2–like deposits were used as pit fill during Structure 2 maintenance and may have been used as fill here as well. All three pits were excavated by hand and the fill was screened.

Structure 1: Summary

Structure 1 at LA 146403 was a windmill/well complex, which was constructed of a series of four subsurface foundation pillars for the windmill and a large masonry structure with a vaulted roof that housed the upper portion of the well. The wooden superstructure of the windmill had been dismantled in the past and nothing remained of the original above ground structure. The windmill/well was an important element of the railroad operation. The complex was the original major water source for the nearby above-ground water tower, which in turn supplied water for the steam engines and possibly other railroad operations. The subsurface vaulted structure apparently housed the pumping apparatus and/or served as a secondary water cistern. The addition of a larger 5-inch metal pipe from an unknown water source somewhere to the south suggests that there was trouble with the original well at some point resulting in a need to augment the water supply from an indeterminate water source to the south; possibly the water crane (Structure 9) replaced the old windmill apparatus. The fact that this large pipe slopes down from the south into the well vault suggests that water was entering rather than being pumped out from the well. However, this large pipe entered the well vault rather than the water tower to the south. Additional archival study failed to locate documentation that would clarify the specific function of this unique structure and its pipelines. A search for architectural analogs has also failed to clarify what is apparently an adaptation to a specific need. At final abandonment, the superstructure of the windmill was dismantled, any machinery in the subsurface well vault was apparently removed, and the well vault was intentionally filled with and buried under Stratum 2 coal dust.

Structure 2: AT&SF Water Tower Foundation

Structure 2 at LA 146403 was the subsurface foundation of the AT&SF water tower constructed in 1879 or 1880 (Figs. 3.82, 3.88, 3.89). The water tower stood about 3 m southwest of the windmill/well complex. The massive masonry foundations, constructed of a series of stone pylons, supported an above-ground wooden tower that supplied water for the steam engines on the nearby track to the west (see NSTR 2). Plumbing from the well to the north (Structure 1) provided water.

Excavation Sequence

The water tower foundation was initially exposed during testing in BHT 23. The foundation was fully exposed during data-recovery by the excavation of various sized scraping units (SCUs 14, 17, 18, 24; Fig. 3.82, Table 3.55 that exposed both the surface and selected foundation profiles. The uppermost portions of the structure, a series of capstones for 16 support peers, were buried about 20 cm below the modern surface. The base of the foundation lay at a depth of about 1.5 m below the surface. Constituent pits and other features that made up the overall structure were excavated in halves.

Depositional Sequence

Fill encountered during the structure excavation included Strata 2, 3, and 102. Stratum 2 was the black sandy loam with coal and historic refuse near the surface, Stratum 3 was the underlying sterile substrate.

<u>Stratum 102.</u> Stratum 102 was a construction deposit that consisted mainly of redeposited Stratum 3 soil with very small charcoal flecks and was used to backfill the pit into which Structure 2 pilasters were installed. Fill was 1.36 m deep surrounding and securing sandstone blocks employed to construct the Structure 2 foundation.

Water Tower Foundation

The subterranean foundation of the water tower was built of massive sandstone blocks stacked in terraces four courses high to form an array of 16 sup-

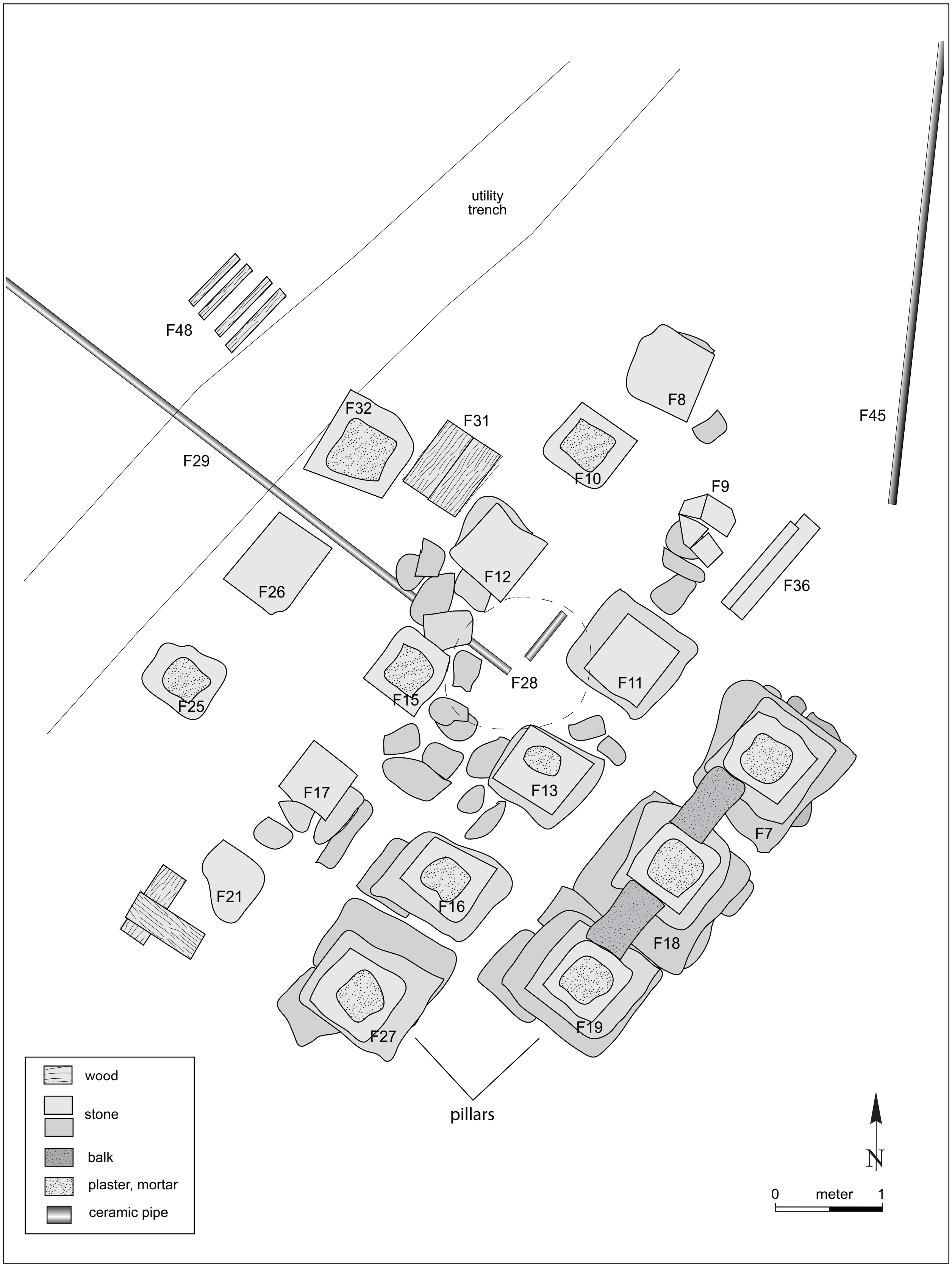

Figure 3.88. LA 146403, Structure 2, water tower.

Figure 3.89. LA 146403, Structure 2, water tower.

port piers that supported the tower's pilings (Figs. 3.88, 3.89). Although they are all constituents of one overall foundation, each of the individual capstones was assigned an individual feature number (Features 7, 10–13, 15–21, 25, 26, 32, 36). Features 32 and 36 lacked capstones and actually mark the top of the second tier of the foundation (see Table 3.55).

Initially during the foundation's construction, a cruciform-shaped pit with vertical walls was dug into the sterile substrate, Stratum 3. The large pit measured some 6.5 m (21.32 ft) across both arms and was about 1.50 m (4.92 ft) deep.

The basal footing of the foundation (seen in profile in Figs. 3.90, 3.91, 3.92) consisted of massive, irregularly shaped rectangular and possibly triangular sandstone blocks, each about 1.3 m long by 70 cm wide by 30 cm thick (9.84 x 2.29 x .98 ft). The blocks were laid to create a single massive platform that was capped by a 1/2 to 2 in base of limestone mortar. The base of this masonry foundation fit snugly (within 25 cm) against the edge of the construction pit and supported the second foundation tier.

The second foundation tier was slightly inset from the basal course, and was constructed of four parallel rows oriented northwest to southeast. Massive sandstone blocks capped the ends with smaller coursed masonry blocks filling the center of the tier. Second tier rows were from 1.2 m to 1.6 m long depending on location. Exterior rows were shortest filling the northeast and southwest tips of the cruciform pit.

The third tier was again slightly inset and was constructed of a series of single large 1.5 m by 1.5 m by 30 cm thick blocks placed at equal intervals along the bench created by the second foundation tier. Finally, the upper capstones were roughly 1 m by 1 m by 30 cm thick blocks. Sandstone cobbles were commonly set into Stratum 102 in between the capstones to serve as chinking stones. The sandstone blocks forming the massive foundation were all set in a lime-and-sand mortar.

The 16 capstones occupied terraced rows aligned northeast-to-southwest; each was separated from the others by about 1 m east–west (3.28 ft) and by about 75 cm (2.46 ft) north–south. The surfaces of many of the capstones contained 40 cm by 40 cm (1.31 ft) square mortar patches that showed the impressions of the square wooden pilings that once rested on their upper surface. Many of the large

Figure 3.90. LA 146403, Structure 2, water tower foundation construction detail.

Figure 3.91. LA 146403, Structure 2, water tower foundation detail.

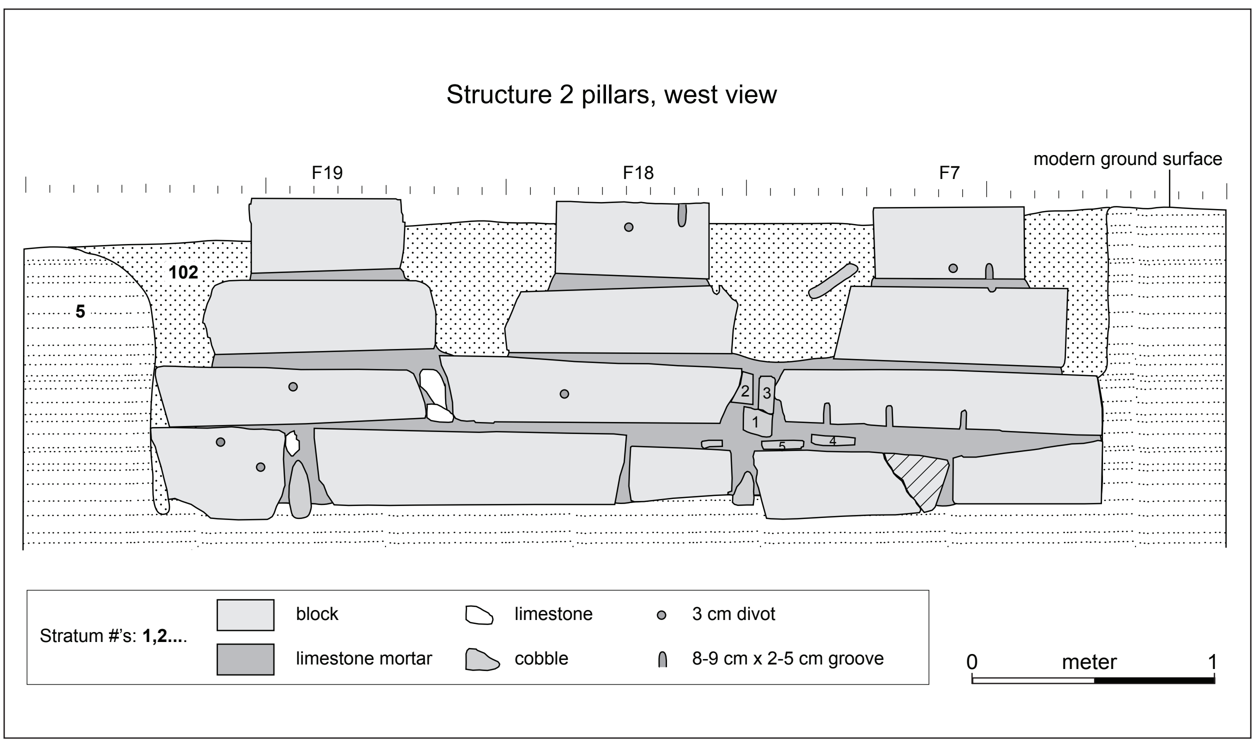

Figure 3.92. LA 146403, Structure 2, water tower profile.

blocks exhibited drill holes from the quarry, as well as pecked divots in the sides that evidently allowed the blocks to be lifted with a tong-like apparatus. Some blocks exhibited pecked or incised inscriptions. Features 11 and 20 had "XXX" inscribed on them (Figs. 3.93, 3.94); Feature 16 had an "M" scratched on a top rock (Fig. 3.95) and an "M" and a "+" or an "x " scratched on a second tier rock on a (Fig. 3.96), and Feature 17 had an incised, upside-down "A" on it.

Plumbing

The tower held water from the well to the northeast (Structure 1). The two structures were connected by a subterranean water pipe (Feature 37) that emerged at the center of the foundation (Feature 28). Feature 29 another steel pipe provided water to a southern area of the railyard, possibly the engine house. Plumbing apparatus are discussed below (see Figs. 3.97, 3.98).

Feature 28. Feature 28 was a pit situated in the center of the water tower between capstones 11, 12, 13, and 15. The oval pit measures 115 cm by about 114 cm by 61 cm deep. Sediment within the pit included Stratum 2 coal dust and a fine sand defined as Strata 103 and 104.

Stratum 103. Stratum 103 was tan poorly sorted sand. Probably a construction deposit.

Stratum 104. Stratum 104 was loose fine-grained sand with 5 percent cobbles, large coal inclusions, rotting wood, slag and nails.

Deposits from the south half of the pit were sampled and screened. The pit contained two metal pipes designated Features 29 and 37. These pipes were probably related to water input and output from the water tower.

Feature 29. Feature 29 is a 2 1/4-inch diameter steel or iron pipe exposed in the Feature 28 pit. An elbow in the pipe originally connected a vertical section of the pipe with the upper tub of the water tank. That vertical pipe was apparently removed when the upper structure of the water tank was dismantled. The subsurface horizontal pipe extended from the water tank 2.60 m to the west, under the original track alignment, where a 90-degree elbow directed the pipe southward to an unknown locality, possibly the engine house (Feature 3 at LA 146402).

Feature 37 (continuation). At its southern end, Feature 37 was a continuation of the subsurface 2-inch pipe extending from the nearby well vault. More of the pipe was exposed in the Feature 28 pit. An elbow originally connected a vertical section of the pipe with the upper tub of the water tank. That vertical pipe was removed when the upper structure of the water tank was dismantled. The pipe probably allowed water to be either pumped to the nearby water tank or to drain from the tower's tank back into the well vault. The pipe sloped downhill from the water tank to the well vault.

Maintenance

Modifications to the foundation provide evidence of tower maintenance during its use. A series of creosote soaked boards were used as replacement bases for water tower supports.

Feature 30. Feature 30 was an L-shaped brace of creosote-soaked boards set against the southwestern edge of the capstone of the Feature 21 foundation pillar (Fig. 3.99). The array of boards measures about 68 cm by 68 cm across and appeared to form a secondary modification or repair on the water

Figure 3.93. LA 146403, Structure 2, Feature 11, "XXX" inscription.

Figure 3.94. LA 146403, Structure 2, Feature 20, "XXX" inscription.

Figure 3.95. LA 146403, Structure 2, Feature 16, "M" on east face of support.

Figure 3.96. LA 146403, Structure 2, Feature 16, "M" and "+" or "x" on south face of support.

Figure 3.97. LA 146403, Structure 2, Features 29 and 37, pipes protruding from Feature 28 pit.

Figure 3.98. LA 146403, Structure 2, Feature 29.

tower. The L-shaped brace was set in a shallow pit of pulverized coal similar to Stratum 2, indicating that it was a later deposit intrusive to the original Stratum 102 construction backfill. The upper surface of the boards exhibited a circular stain, indicating that a roughly 13-inch diameter post once rested on the brace. The brace apparently served as a wooden pillar support, possibly as part of a repair to the water tower. The southwestern corner of the Feature 21 sandstone capstone was also missing, indicating that the failure of that capstone may have necessitated the installation of Feature 30 as a repair.

Features 31 and 40. Features 31 and 40 were additional installations of creosote-soaked planks. Both were arrays of planks set side by side along the western edge of Structure 2 and, apparently functioned as expedient foundations or stabilizers, possibly supporting beams as part of repairs to the water tower.

Feature 31 was an array of three planks resting on Stratum 102. Though the top plank was removed during excavation, two remained as installed. Between Features 12 and 32 a pit was excavated to the top of the third foundation tier and 25 3/4- to 26 1/4-inch long planks cut from 10 x 2-inch boards were set parallel to each other, another board (removed during excavation) was probably placed perpendicular on top. A post was presumably added and the modification was filled with Stratum 110 coal dust. Proximity to Feature 32, which was missing a capstone, may indicate a replacement or additional support installed for a rotted tower section.

Feature 40 seen in Figure 3.100 was an array of two planks occupying a pit measuring 1.03 m by 73 cm by 45 cm deep. The pit, dug into Stratum 2, was similar in construction to Feature 31 though the top board remained. The halo from a .30 m diameter post was evident on the top board, which was placed at a 45-degree angle across the bottom planks. The pit was filled with Stratum 110, defined as coal dust similar to Stratum 2.

Dismantling

Feature 8. Feature 8 was a disarticulated sandstone capstone offset about 1 m north of the water tower foundation. The block rested in and on a deposit of Stratum 2 coal dust, indicating it had been

Figure 3.99. LA 146403, Structure 2, Feature 30, wooden brace detail.

removed from its original location well after the water tower was in use or abandoned. The original location of this block was not determined. Feature 32, about 2.3 m to the southwest, was missing a capstone, as is Feature 36, about 1.5 m south. Regardless of which of these two piers the Feature 8 block originally capped, one capstone was apparently removed from the site.

Feature 9. Feature 9 consisted of two redeposited chinking stones resting on Stratum 2 about 1 m north of pier Feature 11, at the north edge of the water tower. No mortar was associated with the sandstone fragments and they rested in a Stratum 2 coal and clinker deposit. The stones may have been loose chinking stones from the tower foundation.

Structure 2: Summary

Structure 2 at LA 146403 was the massive subsurface masonry foundations of the water tower constructed of Glorieta sandstone (D. H. Snow, Chapter 7, this report), which supported a 30,000-gallon tank or approximately 249,900 lbs of water. The foundations supported 16 wooden pilings, which in turn supported an above-ground wooden water-storage tank. The water tower was an important element of the railroad operation supplying water for the steam engines and for other railroad operations. Subsurface water pipes connected the water tower to the nearby water source at the well vault and possibly carried water southwest to the engine house.

The number of tower supports (16) appears to correspond with a contemporary AT&SF water-tower design plan (Fig. 3.101). For comparison, a large tower built on the D&RG line held 50 thousand gallons of water. This tower, built to standard gauge specifications at Chama, New Mexico, has only 12 pilings. The tower was re-constructed in 1897 after fire destroyed the original built in 1881 (Fig. 3.102). The presence of 16 pilings suggests either a very large water tower although archival documents indicate a 30,000-gallon capacity. The addition of three creosote-impregnated wooden foundation supports and two cap rocks that appear to have been moved from their original location indicates modifications or repairs to the water tower over time. At final abandonment the wooden superstructure of the water tower was dismantled and the massive foundation stones were intentionally covered with the Stratum 2 coal fines, capping the site.

Figure 3.100. LA 146403, Structure 2, Feature 40, supporting planks.

NSTR 1

NSTR 1 at LA 146403 encompassed the extramural historical ground surface in the area east of the modern utility line, around the two structures. The area was exposed by the excavation of SCUs 10, 11, 12, 14, and 25. One feature was found in this area.

Feature 24. Feature 24 was a heavily oxidized surface burn originally exposed in the east profile of Backhoe Trench 23. SU 25 exposed the top of this burned surface. After excavation, the roughly circular oxidized area measured about 65 cm by 50 cm and from 1 to 5 cm thick. The burn is located on the surface of the Stratum 3. A circular hole within the oxidized surface was designated Feature 24B. This circular feature may be a posthole measuring 10 cm in diameter and 12 cm deep. The mottled oxidized sandy fill from both the posthole and the oxidized surface was screened. The function of this oxidized burn and possible pos hole is unknown. They may be related to the construction or dismantlement of the windmill complex or to a repair episode on the subsurface water pipes.

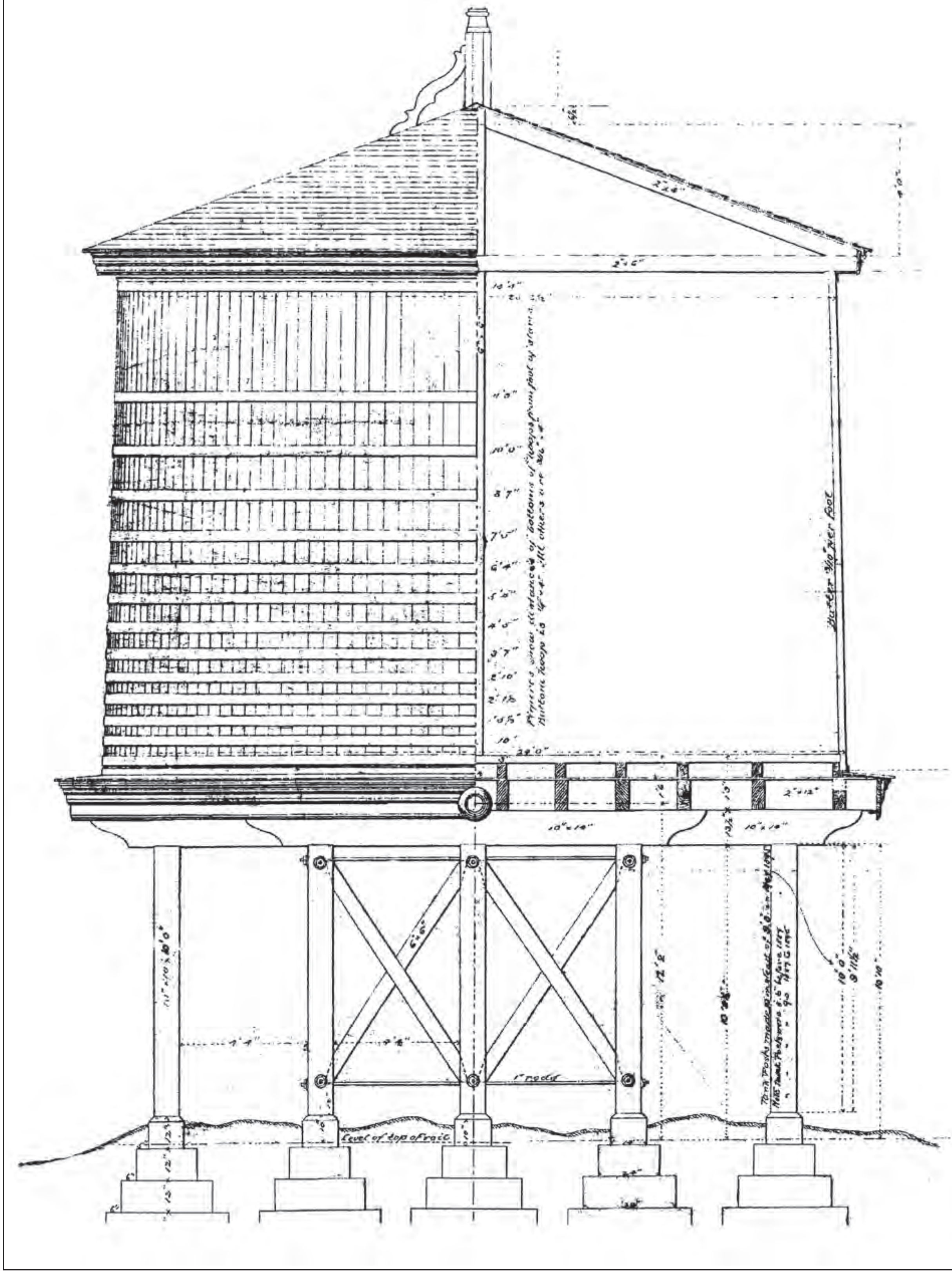

Figure 3.101. Water tank elevation from a tower built in 1880 (courtesy Russell Crump/Priest Library Kansas City, MO).

NSTR 2: Railroad Tracks

NSTR 2 at LA 146403 encompassed the area west of the modern utility line, west of the two structures. The area was exposed by the excavation of SCUs 13, 14, and 19. Four features were found in this area.

Features 41 and 42. Two sets of demolished railroad tracks were mechanically exposed west of the structures. The tracks had been removed in the past and the only remaining indications were railroad tie depressions in the top of Stratum 3 that were filled with Stratum 2 coal dust. The impressions frequently only represented parts of the railroad ties, due to uneven preservation and due to the fact that the mechanical scraping extended nearly to the base of the impressions so they could be distinguished from the surrounding Stratum 2 coal dust deposits. Feature 41 consisted of north/south trending railroad tracks located about 2.5 m west of the water tower. Fifteen tie impressions were designated Features 41A through 41O. The Feature 41 track directed steam engines to the water tower for filling. The Feature 42 tracks are located about 3 m west of the Feature 41 tracks. The tracks parallel Feature 41 and were also dismantled in the past. Six impressions were recorded and designated Features 42A through 42F. Portions of some tie impressions were excavated to obtain base level elevation data that could be compared to the elevation of the tower foundation.

Feature 48. Feature 48 was constructed of three creosote-soaked planks located west of the water tower, about 50 cm north of the Feature 49 cobble-lined trench (see below; Figure 3.103a). The easternmost plank fell within the modern utility trench and could not be fully exposed. The planks are spaced about 14 cm apart and occupy a shallow pit measuring at least 1.10 m by 72 cm by 10 cm deep. The pit was filled with Stratum 110 consisting of coal

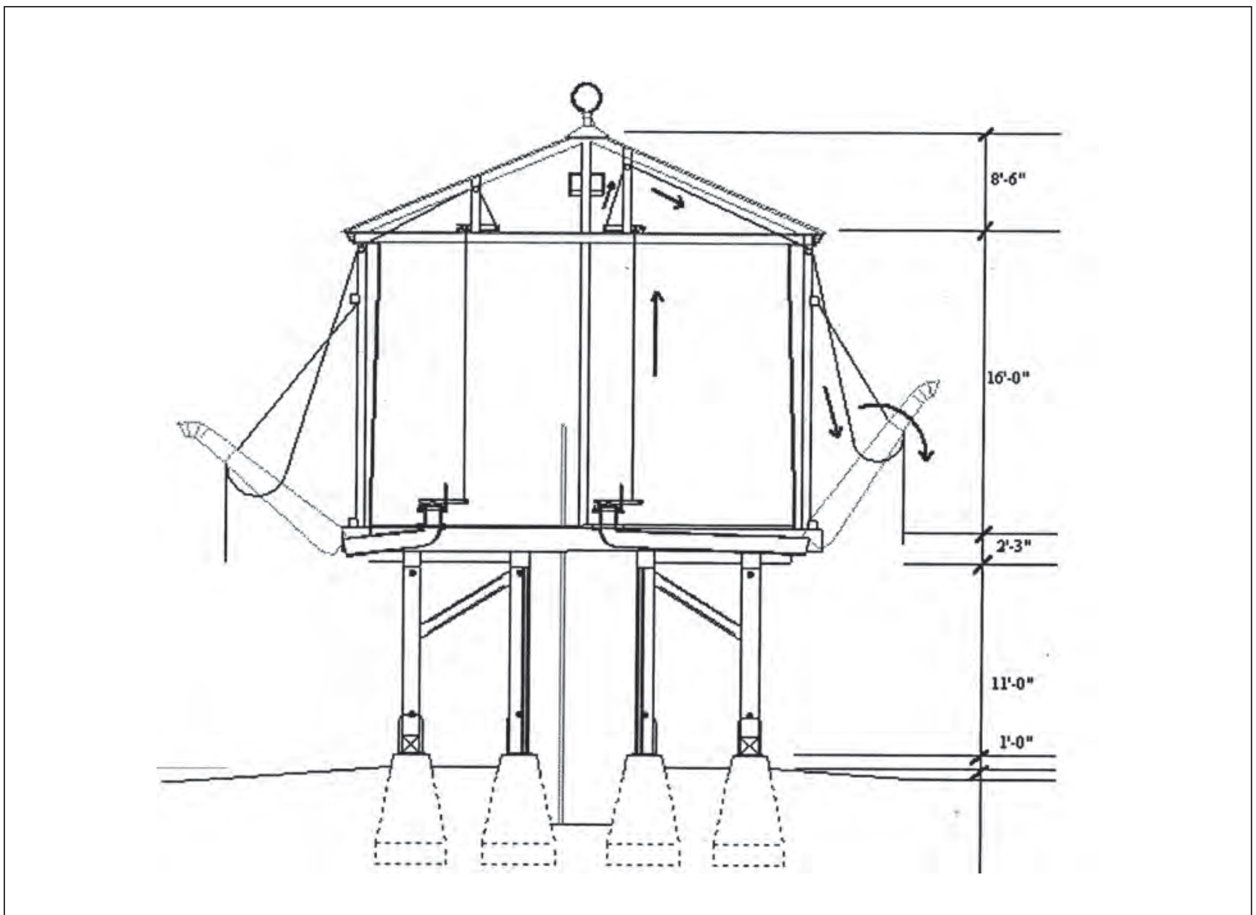

Figure 3.102. Plan view and elevation detail of 50,000 water towers at Chama, NM (courtesy Sandia Software © 2000).

and coal dust. All fill was screened. A single Powhoge Polychrome potsherd (the only Native-made sherd from the site) was recovered from the historical ground surface between the two western planks. The function of the planks and pit is unknown, but the water tower is only 1.9 m to the east, and the planks may have served as a dry walkway under the tower's spout.

Feature 49. Feature 49 was an east/west trending trench measuring an inferred 5.6 m long by 1.10 m wide and about 30 cm deep. The shallow trench had been dug into the Stratum 3 sterile substrate just west of the water tower (Fig. 3.103a) and was filled with abundant cobbles. The trench partially overlaps the underlying Feature 29 water pipe alignment, but the Feature 49 trench was slightly offset to the south. The cobble-lined trench may be a spillway or dry sump associated with use of the water tower's spout.

Euroamerican Artifacts
Matthew J. Barbour

LA 146403 represents a windmill (Structure 1) and water tower (Structure 2) associated within the Atchison, Topeka and Santa Fe Railway. A total of 243 Euroamerican artifacts were collected and analyzed from LA 146403. These materials were found both in association with the two structures and in an extramural late nineteenth or early twentieth century surface area. Table 3.57b summarizes the distribution of Euroamerican material culture by category, type, and function for the windmill (Structure 1), water tower (Structure 2) and extramural area (NSTR 2). The majority of Euroamerican artifacts collected from the site were unassignable (n = 163, 67 percent; Fig. 3.103b), specifically coal clinkers (n = 97) and scrap pieces of metal (n = 27). The coal clinkers are likely the result of fuel product consumption by the steam engines and are directly associated with the industrial use of the area by the Atchison, Topeka and Santa Fe Railway. Construction and maintenance materials (n = 69) represented 28 percent of the assemblage and appear to largely

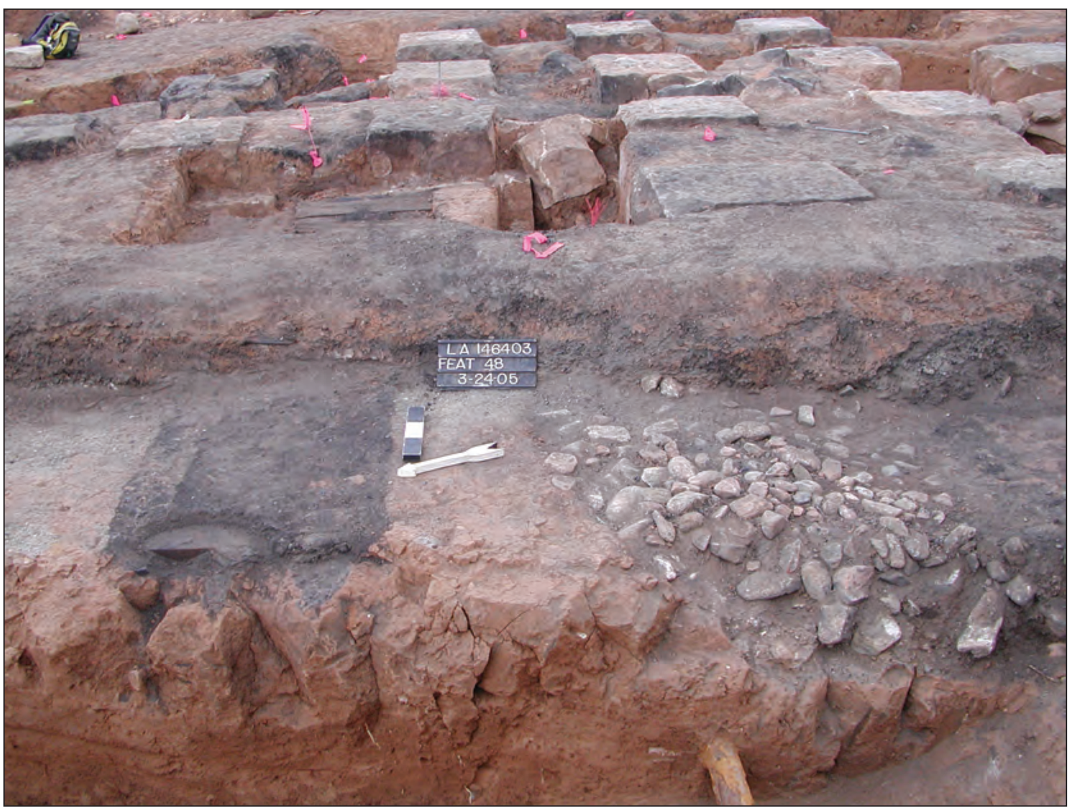

Figure 3.103a. LA 146403, Features 48 and 49, cross section.

correspond to materials associated with construction of the two structures. Based on the abundance of machine-cut square nails (n = 48) in the vicinity of Structures 1 and 2, it would appear that the wooden portions of the windmill and water tower were joined using this technology. Archival evidence provided by Scheick et al. (2003) suggests these buildings were constructed between 1879 and 1880. The use of machine-cut square nails would match well with known building practices during the mid- to late nineteenth century. The near absence of all other types of products, such as indulgences (n = 4) and domestic (n = 3) artifacts, is to be expected given the nature of the site.

LA 146403: Summary

Structures at LA 146403 provided a unique opportunity to examine late nineteenth and early twentieth-century railroad engineering design, infrastructure development, and use through architectural characteristics. The foundations to the windmill, well and water tower were capped by a mantle of protective overburden (Stratum 1, 2) that served to shield them from weathering and mechanical disturbance. The features exhibited sufficient structural integrity for construction method and function to be documented. Additionally, they provided data on remodeling and maintenance providing, along with other large infrastructure at LA 146402, evidence of the first large scale corporate investment in Territorial Santa Fe.

Research conducted by Scheick et al. (2003:56–57) indicates that a water tower and windmill were built on the east side of the main line of the AT&SF tracks between 200 and 250 ft north of the north end of the 1880 depot, with the tower located closer to the depot than the well. An 1888 AT&SF Water Service Book (Scheick et al. 2003:56–57) provides further information on water service at the Santa Fe depot ground. It states that the water was supplied from a stone well measuring 30 ft across and 30 ft deep that was located right of the main line and west of the depot. The well served a water tower that was 20 ft in diameter and had a 30,000-gallon capacity, also located right of main line and west of the depot. There was no pump house, but the windmill was an Armstrong Standard, apparently with a

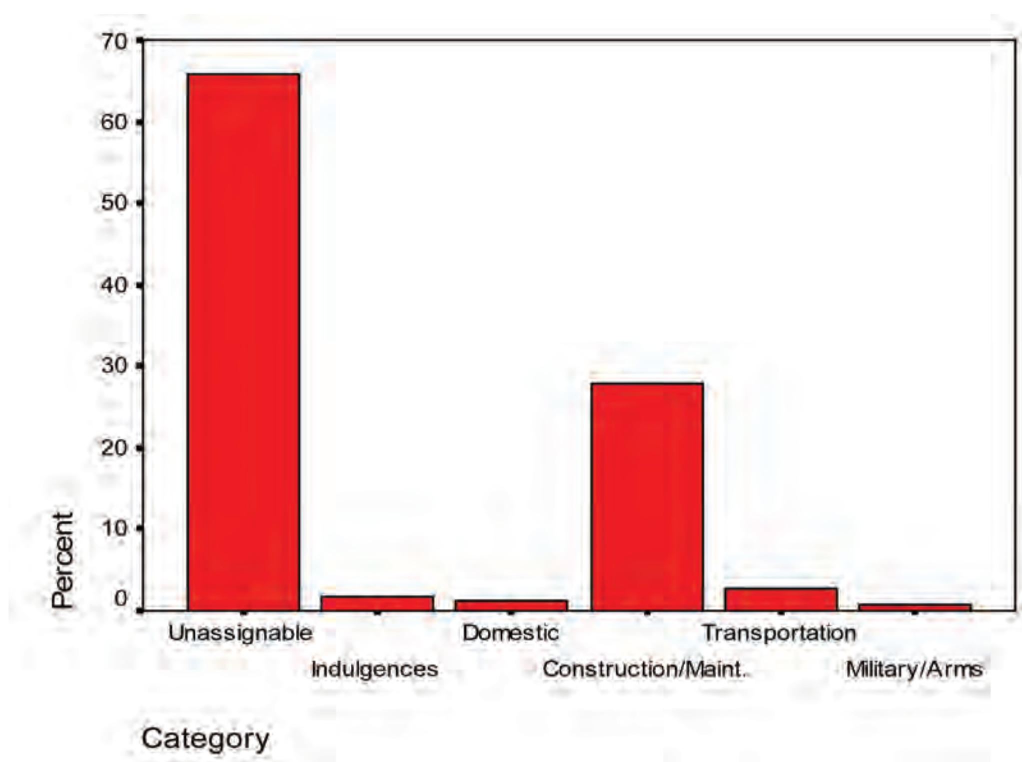

Figure 3.103b. LA 146403, relative frequencies of Euroamerican artifacts by functional category.

62-ft-high tower and a 16-ft-diameter blade wheel, also located in the same area. Four hydrants were served by this tower.

Interestingly a perusal of Sanborn Fire Insurance maps do not depict either the well or water tower in the June 1913 or any earlier maps (Fig. 3.104) although the area is one of the few parts of the railyard that have Fire Insurance map coverage. Additionally none of the station maps post-dating 1916 depict either structure suggesting that the well and water tower were not in use for long after the turn of the century.

Additional architectural details are available from Stoner's 1882 Bird's Eye View of Santa Fe map, which depicts both the water tower and the windmill (Fig. 3.105). The windmill, located just north of the tower, was mounted on a tall, pyramidal tower with an open-lattice frame. This structure occupies the location identified as Structure 1. The water tower is evident immediately south of the windmill, in the area identified as Structure 2. The structure is apparent as an above-ground cylindrical tower supported by vertical pilings. The tower is encircled by horizontal hoops, suggesting it was made of vertical staves; it has a cone-shaped roof. Additional archival investigation conducted for this report by D. H. Snow (Chapter 7) has not yielded additional information specific to the Santa Fe water tower's use history.

Excavation of the well-preserved foundations of the water tower and windmill/well complex associated with the operation of the AT&SF railroad proved successful in obtaining information on late nineteenth and twentieth-century railroad engineering design and infrastructure development and use. Specifically, the water tower was apparently a large structure supported by 16 pilings. Additional repair pillars were added over time. In addition, the windmill/well complex had a subsurface well house or cistern with an exceptionally engineered vaulted ceiling. The exact function of this large subsurface structure is unclear. The extension of a large 5-inch water pipe to the well house from an unknown water source suggests that problems may have developed with the primary water source, and the need developed to bring in additional water from another locality. Problems with the primary windmill/well water supply may have prompted the ultimate abandonment of these important railroad structures. Alternatively, the structures may have been in use until the water crane was installed in 1898; it was supplied by a city water main that had been extended into the railyard by 1894 (C. T. Snow 1991:64–65). Historic research conducted for this report by D. H. Snow failed to provide any further information as to the specific use history of the well or water tower.

LA 146403: Recommendations

The data recovery program has recovered abundant architectural data and a moderate number of artifacts from LA 146403. The site area is not likely to yield additional important information beyond that already recovered. No further archaeological investigations are recommended for the site as part of the data-recovery program. Recommendations remain unchanged from those offered by OAS and accepted by HPD and ARC during preliminary reporting.

The Santa Fe Railyard Community Corporation has incorporated some of the original 16 water tower foundation supports into the design and construction of the new railyard infrastructure and are still visible as part of the railyard landscaping.

LA 146404

Chris T. Wenker, revised by Jessica A. Badner and Matthew J. Barbour

Introduction

LA 146404 (Fig. 3.106) was a broad, thin, culturally derived sedimentary deposit associated with a single thermal feature (Feature 51). This deposit probably represented an informal, extramural use area produced during the early railroad-era ca. 1879. Three additional pits of unknown function represent later use. Feature 35 may be associated with use of the area by the AT&SF in the twentieth century. The other two, Features 36 and 50, are of modern origin.

Figure 3.104. June 1913 Sanborn Fire Insurance Map, rectified to modern aerial imagery.

Figure 3.105. Stoner's birds-eye view of Santa Fe, showing the AT&SF water tower and windmill.

Site Location

LA 146404, which was bisected east to west by a dirt road, was west of existing AT&SF railroad tracks, north of the Gross Kelly warehouse building, and south of the Tomasita's Restaurant parking lot. Site boundaries were defined by presence of Stratum 22, as visible in trench exposures (Fig. 3.106). The deposit was approximately 33 m (108 ft 3 in) long northwest–southeast and 18 m (59 ft 1 in) wide northeast–southwest covering approximately 30 sq m (323 sq ft).

Archival Research

The Gross Kelly building immediately to the south was built in 1913. Historic photographs indicate that the area north of the building, in the location of LA 146404, was used as an automobile parking lot (Scheick 2003:68–69). No other railyard activities were indicated for this space.

Excavation Sequence

In order to satisfy a 2 percent testing requirement stipulated for medium potential railyard project tracts (Scheick 2003; Wenker 2005a), three backhoe trenches (BHTs 21, 39, 44) and an XU were used to investigate LA 146404 (Fig. 3.106; Table 3.58). All three trenches revealed Stratum 22, which was associated with a burned soil lens associated with Feature 51 in BHT 39. A single one-meter-square XU (XU 19) was excavated to evaluate content and integrity of the burned area (Fig. 3.107). The other refuse pits, (Features 35, 36, 50) were exposed in BHTs 21 and 39. These features were only recorded in profile.

Site Stratigraphy

Strata 1, 2, 3, 4, and 5. Strata 1, 2, 3, 4 and 5 were typical of project stratigraphy and are described in detail in "Project Stratigraphy" chapter of this report. Strata 1 and 2 capped the site. Stratum 1 was 12 to 25 cm (5 to 10 in) thick. Stratum 2, which overlaid Stratum 22, was from 35 to 40 cm (1 ft 2 in to 1 ft 4 in)

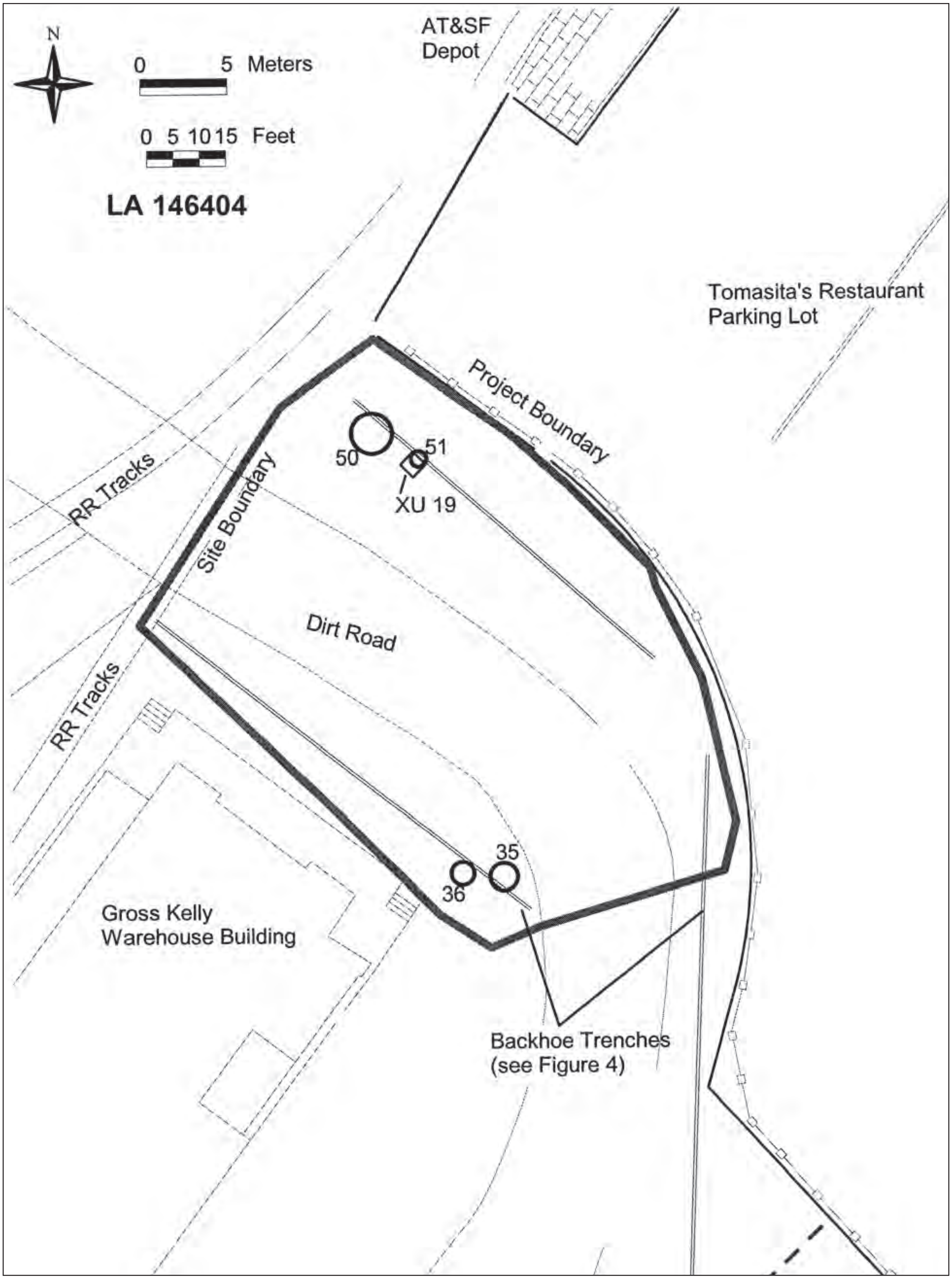

Figure 3.106. LA 146404, showing feature numbers.

thick. Stratum 3, 4, and 5 were sterile substrate. Stratum 3 was between 40 to 60 cm (1 ft 4 in to 2 ft) thick disappearing into the base of the trench. Strata 4 and 5 were beneath Stratum 3 and were sporadically exposed in the bottom 20 cm (8 in) of the trench base.

Stratum 22. Stratum 22 was deposited between Strata 2 and 3. This cultural horizon covered Feature 51. The deposit was a 5 to 40 cm (2 in to 1 ft 4 in) thick, slightly hard, brown sandy clay loam containing few, fine charcoal flecks and low frequencies of large-mammal bones. Both the upper boundary (with Stratum 2) and lower boundary (with the underlying sterile substrate Stratum 3) were smooth and distinct. Based on available trench profiles, this deposit covers an area measuring roughly 33 by 18 m (108 ft 3 in by 59 ft 1 in) roughly 50 to 75 cm (1 ft 8 in to 2 ft 6 in) below the modern surface.

Stratum 49. Stratum 49 was a 3 cm (1–2 in) thick lens of gravelly, light brown sandy loam that may represent a discrete alluvial sediment deposited on top of Stratum 22.

Feature Descriptions

Four features were identified during testing (Table 3.59). Two of these features (Feature 35 and 51) were identified in association with the AT&SF use of the area in the late nineteenth or early twentieth centuries. The remaining two features contained modern refuse and appear to have been created relatively recently. Features are described below in the inferred order of use beginning with the earliest.

Railyard Era

Feature 51. Feature 51 was a flat burned soil surface exposed in XU 19. It was 87 cm (2 ft 10 in) below the modern surface capped by Strata 22 and 49. Roughly 90 cm (3 ft) in diameter with a circular edge, the feature represented a 6 cm (2 in) thick lens of oxidized earth formed from the upper surface of Stratum 3 (Fig. 3.107).

Stratum 22 and Stratum 49 from directly above the feature were removed in one level and screened. These combined strata yielded Native American and Euroamerican ceramics, bottle glass, metal, and mammal bones (Table 3.60). Glass included three tiny brown-bottle-glass shards, one clear tumbler rim shard, and one shard of clear pressed glass.

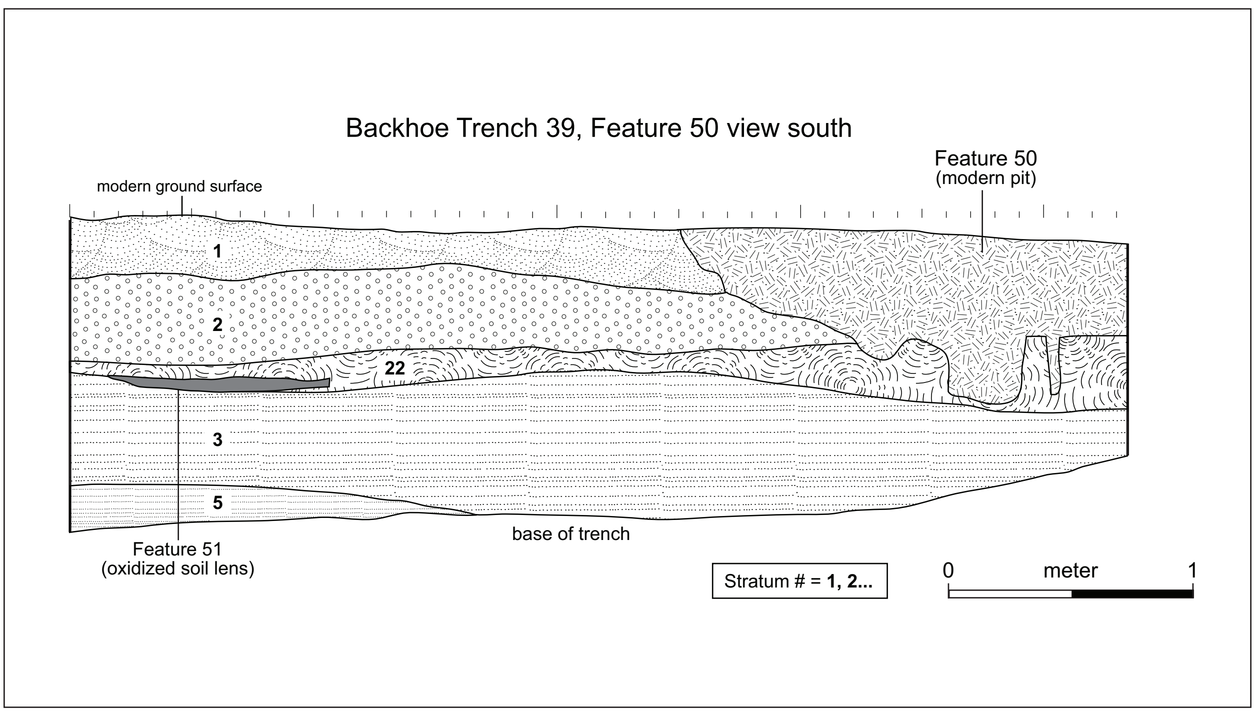

Figure 3.107. LA 146404, Feature 51 and Stratum 22 in BHT 39 and XU 19.

These glass fragments suggested hand-blow bottles and early pressed glass typical of the mid-nineteenth century. Among the metal was a center-fire shell casing (possibly a .45-70) suggesting at earliest, a post-1870 date to the deposit, while the presence of a machine-cut square nail clearly suggested that the deposit was created prior to the twentieth century.

Feature 35. A historic or modern pit, this feature probably was part of the lower portion of a bell-shaped pit, one edge of which was exposed by BHT 35. Measurements represent the portion exposed in the backhoe trench and not pit dimensions, which were not determined. The upper margin of the 40 cm (1 ft 4 in) wide feature and pit opening were not evident in the trench exposure; the feature was only evident in the lowermost 80 cm (2 ft 8 in) of the trench wall and in the trench floor. Pit fill was bounded by Stratum 5 at the base and covered by Strata 2 and 1.

Fill was reddish-brown (5 YR 4/6) sandy clay and included coal, ash, mica and cobbles. No modern trash was observed and no artifacts were recovered. Proximity to Feature 36 (see below) would suggest they are associated and of a modern age. However, the absence of modern debris is perplexing and it is possible that feature is associated with AT&SF use of the property.

Modern

Feature 36. Feature 36 was a modern trash pit. As with Feature 35, excavation nicked the side of the pit providing incomplete measurements (Table 3.59). The pit was located on the opposite side of the trench from Feature 35. Pit fill was recorded as Stratum 2. Though no modern trash was observed in the fill, stratigraphy indicates that this feature was intrusive through the modern overburden deposit of Stratum 1 and, therefore, must represent a modern backfilling event.

Feature 50. Feature 50 was a broad, comparatively shallow pit with an irregular base at least 2 m (6 ft 7 in) in length and 78 cm (2 ft 7 in) deep. The feature was filled with, and dug into, modern Stratum 1 that contained coal, cinders and small to medium 3 to 10 cm (1 to 4 in) diameter pebbles.

LA 146404: Summary

LA 146404 consists of a series of pits related to use of the area during the late nineteenth and twentieth centuries. Feature 51 appears to represent a small surface burn formed by a single hot fire. The overlying Stratum 22 deposit probably represents the slow accumulation of alluvial sediment and refuse during the early railroad period. Stratum 49 could indicate a short-lived fluvial event near the end of Stratum 22 formation or a surface associated with the Gross Kelly building 1913 parking area. Soil accretion in this area was shortly thereafter interrupted, and Stratum 22 was sealed under a thick layer of introduced twentieth century overburden (Stratum 2, and later, Stratum 1). The temporal and functional relationship between the 1913 parking lot, the deposition of Stratum 2, the development of Stratum 22/49, and the use of the burned feature is unclear.

At best, the historic sediments and features at this site represent occasional, casual, ephemeral episodes of past use when the lot was vacant or later used for parking. Archaeological testing at LA 146404, in 2004, had exhausted the information potential of these features to inform upon New Mexico's past and no further archaeological investigation was recommended (Wenker 2005a:38). ARC and HPD concurred. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 153441

Chris T. Wenker, revised by Jessica A. Badner and Matthew J. Barbour

Introduction

LA 153441 is comprised of the existing standard-gauge railroad tracks present north of Cerrillos Road (Figs. 1.1, 3.108). This site, which was not excavated was defined by the Atchison, Topeka and Santa Fe (AT&SF) railroad tracks that have been continuously maintained since 1880. The main alignment, spurs and salient features are placed in their historic context and described below.

Site Location

LA 153441 is defined as extant AT&SF railroad tracks in the Santa Fe Railyard project area (Fig. 3.108). The rest of the line that extends southward from Cerrillos Road to Lamy was not included with this site record. Within the project area the tracks span roughly 1010 m (3314 ft). A defunct and buried extension of the same alignment was recorded at LA 146403 to the north.

Archival Research

As reported by Scheick et al. (2003), grading and track construction for the AT&SF Railway's spur line between Lamy and Santa Fe started in November 1879. The tracks, and the first AT&SF train, entered Santa Fe on February 9, 1880, although the train had to back into town because the Romero Street wye, or junction, had not yet been constructed. Regular service to Santa Fe began a week later.

The course of these 1880-vintage tracks is evidently represented today by the pair of parallel tracks that cross just west of the location of the original 1880 depot (Fig. 3.108), south of the Outside Magazine building. The demolished and buried track remnants at LA 146403 probably also represent part of this original line (Fig. 3.108). The Romero Street wye and the original track alignments to the engine house, which were either maintained or realigned when the engine house was remodeled, also probably date to this late nineteenth-century phase of railyard infrastructure construction.

By 1909 the AT&SF had opened a new passenger depot northeast of the original depot (this newer depot is still in use). The track sidings that are mapped along the eastern side of the original 1880 depot lead to the west side of the later depot (Fig. 3.108). These track corridors probably date no earlier than the 1909 depot-construction period. Likewise, the tracks adjacent to the Gross Kelly warehouse (Fig. 3.108) evidently date no earlier than that building's 1913 construction date.

The AT&SF expanded its holdings in the Santa Fe Railyard when in 1926 it bought the standard-gauge trackage and all associated infrastructure of the NMC (which includes the abandoned tracks today identified at sites LA 149911, LA 149915, and, possibly, LA 146406; Fig. 3.108). The AT&SF also purchased the D&RG's interest in the Santa Fe Railyard in 1945 (which may also be represented in part by the tracks at LA 146406 and LA 149911). Much of the purchased infrastructure was eventually abandoned and demolished. However, if only for a short period in the mid-twentieth century, all of the tracks and infrastructure in Santa Fe were once a part of the AT&SF system.

Feature Description

Most of the trackage in the railyard remains in use to this day, serving the Santa Fe Southern Railway's locomotives and rolling stock. These active lines include the main track (which leads southwest out of the railyard toward Lamy) as well as a number of sidings and spurs. Some of these spurs or sidings are truncated and no longer lead to their original destinations, but they are currently used to temporarily store rolling stock. Accordingly, much of the extant railyard trackage is continuously maintained, and has been for the past thirteen decades. Old or worn out parts or components are frequently removed and replaced or upgraded as needed. It is unknown how many, if any, of the original nineteenth-century components of this structure remain.

Some of the intact sections of railroad tracks in the North Railyard are disconnected from the active lines. Most of these stranded track sections are essentially abandoned, and some sections that lay alongside existing railyard buildings have been in-

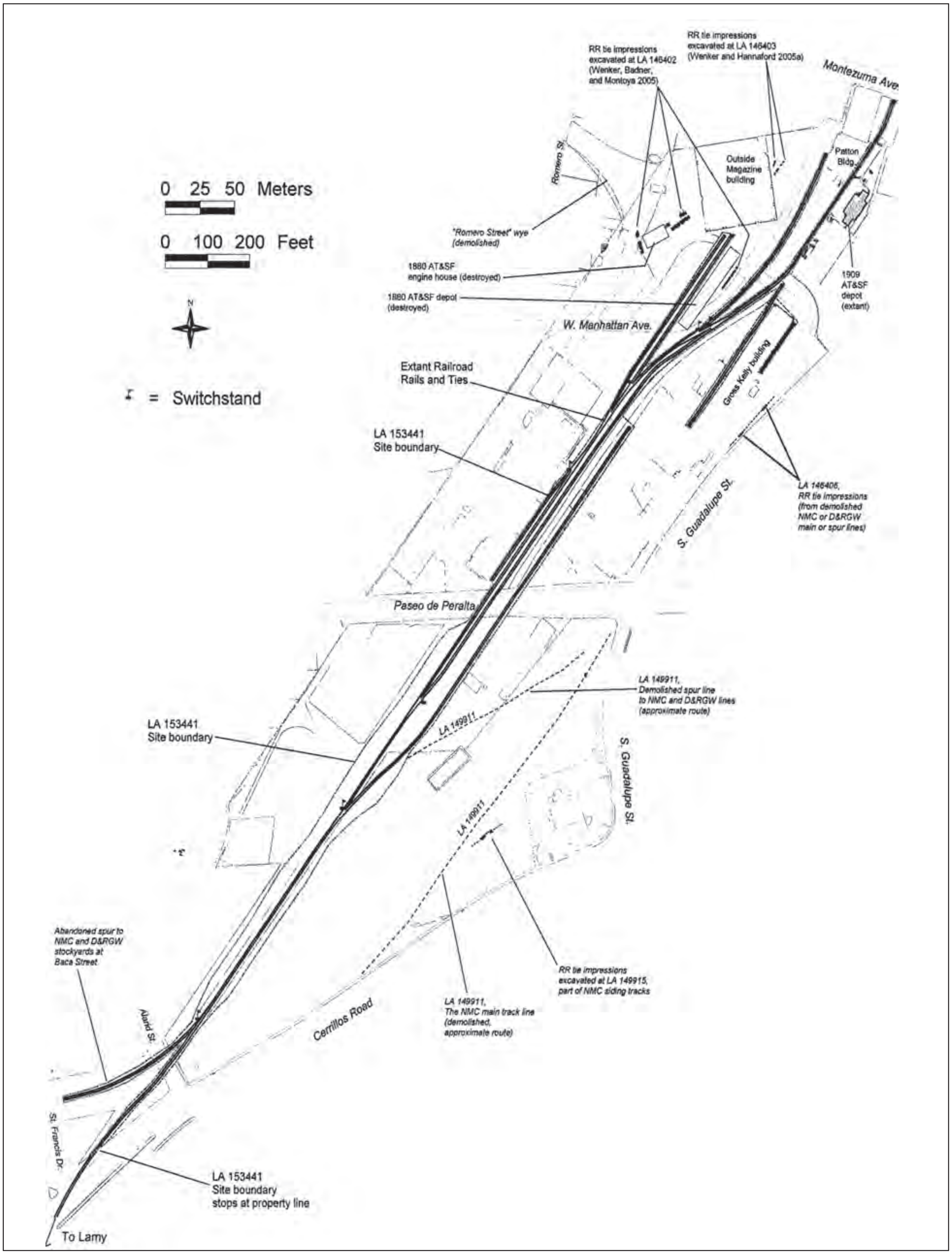

Figure 3.108. LA 153441, site map, showing the extent of the AT&SF railroad tracks in the Santa Fe Railyard project area and other nearby sites with previously recorded sections of demolished or abandoned tracks.

corporated into sidewalks or walkways by partially paving over the ties, leaving the tops of the rails visible. This treatment effectively preserves the tracks but obscures their appearance.

Tracks

Standard-gauge tracks are the most common gauge in the U.S., and are built with a rail span of 1.435 m (4 ft 8-1/2 in; Baxter 1966). The AT&SF tracks in the railyard are built with wooden cross-ties that are set in clinker or gravel ballast. The jointed rails are bolted together with joint bars, and the rails are affixed to the cross ties with spikes.

The site boundary encompasses an elevated earthen berm, atop which the tracks cross the slight drainage depression in the Railyard Park area, between Paseo de Peralta and Alarid Street (Fig. 3.108). At its widest and highest point, this berm measured roughly 22 m wide (72 ft) at the base and 4 m (13 ft) at the crest, and it stood 3 m (10 ft) high. Overall, from the southern site boundary to the northern end at Montezuma Avenue, the tracks rise 9 m (30 ft; from 6934 ft [2113.5 m] to 6964 ft [2122.5 m] above sea level), a 0.9 percent gradient.

Switches and Frogs

Switches are devices that enable trains to be guided from one line of tracks to another by moving the points (long tapered rail sections) between adjacent sets of tracks. All seven of the switches on the active lines in the railyard are operated by manual levers housed in switch stands (Figs. 3.108, 3.109). The switch stands are mounted outside the rails on long switch ties. Frogs are devices mounted at the crossing point of two rails in the absence of a switch, and this site also exhibits a multitude of fixed frogs (i.e., with immovable points) at the various track crossings (Fig. 3.109).

Related Track Alignments

Figure 3.108 indicates the location of the demolished wye that once extended northwest of the North Railyard (known informally on some of the modern construction plans as the "Romero Street wye" area). This wye, which once provided a turnaround for trains arriving or leaving the station grounds, now exists only as an abandoned dirt parking lot and alleyway. No archaeological remains of the railroad tracks were found in the wye during testing (Wenker 2005a).

During testing and data recovery excavations in the North Railyard, a variety of other partial track alignments were also identified (Fig. 3.108). None of these buried track sections contained intact rails; all had been abandoned, largely dismantled or demolished, and buried under overburden. Most consisted simply of clinker-filled sockets filling the cavities left by wooden ties (although a few contained intact cross ties). Although many or most of these buried track sections were at one time probably related to the existing tracks, they are not recorded as part of LA 153441 but remain instead associated with the sites on which they were discovered during excavation.

For example, the westernmost of the buried tracks found at LA 146402 (Fig. 3.108) apparently led toward the Romero Street wye. The central two sets of tracks at this site probably served the engine house that once occupied this area, and the eastern set of tracks at this site once ran along the eastern side of the original depot (Wenker et al. 2005). The tracks excavated to the north, at LA 146403, evidently represent an extension of the western pair of LA 153441 tracks, which may have been demolished when the Outside Magazine building was built. To the south and east, the other excavated track segments at LA 146406, LA 149911, and LA 149915 were probably related to the NMC and D&RG lines rather than the original AT&SF tracks (although the AT&SF did eventually own the entire infrastructure in the railyard, including these tracks, see below).

LA 153441: Summary

The initiation of rail service to Santa Fe in 1880 made a significant and important contribution to broad patterns of social and economic history in the Territorial capital.

Railroad tracks installed in 1880 connected the city of Santa Fe for the first time to infrastructure that, rail by rail, section by section, connected the Territorial capitol with a network of tracks that spread across the west and eventually from coast to coast. This initiation and perpetuation of rail service to Santa Fe made a significant and important contribution to broad patterns of social and economic history in the Territorial capital. Association of track and ancillary operational structures cannot be de-

Figure 3.109. View of railroad tracks (LA 153441) in the Santa Fe Railyard, facing northeast toward the Manhattan Avenue crossing. The 1909 AT&SF depot is in the background, behind the locomotives; note the manual switch stand in the left mid-ground.

nied. Although the tracks are continually maintained and upgraded, and have even occasionally been realigned, they still exhibit the structural integrity and appearance that convey their historic character and contribute to the appreciation of their historical function and role. Hence, LA 153441 was recommended as being NRHP-eligible under Criterion 'a' (Wenker 2006a:25–26).

The AT&SF railroad tracks have formed the visual and structural backbone of the railyard and have dictated all subsequent aspects of the architectural and operational environment of this industrial/commercial zone. The effects of the rails on the social structure of local land use and the area's functional layout were noted in the 2005 MOU regarding cultural resources management in the Santa Fe Railyard. That MOU states (in part) that among "the *character defining* features of the railyard are (1) its engineering features, *including trackage*, (2) the presence of an operating rail line, (3) the *visual open corridor along the main rail line*, (4) the inventory of railroad-related buildings and structures that are *linear in form*, modest in scale and constructed of simple utilitarian materials, and (5) *a southwest–northeast linear orientation that follows the rail line tracks and spurs*" (italics added). LA 153441 was also recommended as NRHP-eligible under Criterion 'd,' following this MOU guidance, because the tracks embody (actually, create) the distinctive character of the railyard. The tracks were recognized as eligible mainly for the effect that the physical presence of the linear rail corridor (including the related spurs and sidings) has had on directing the development of the neighborhood of adjacent industrial and commercial spaces, and less for the particular construction details or the length or orientation of specific track alignments in the railyard (Wenker 2006a:25–26).

ARC and HPD approved of the eligibility recommendation and no further archaeological investigations were found to be necessary. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

SYNTHESIS:
Archaeological Sites Associated with the Atchison, Topeka and Santa Fe Railway in the Santa Fe Railyard Project Area

Jessica A. Badner

Introduction

Archaeological excavation and archival research was performed on a series of five archaeological sites with Atchison, Topeka and Santa Fe Railway (AT&SF) components. Investigations provided data relevant to *Research Domain 3: Bringing Archaeology and History to Bear on the Archeological Buildings and Structures of the Santa Fe Railyard* (Wenker et al. 2005: 123–132; Chapter 1, this report). Questions within this research domain pertain to the documentation and temporal sequencing of railroad buildings and infrastructure. Construction, and decommission sequences (Research Question 7) are also discussed in the LA 146402 summary. Research Question 8 (What indicators are there of economic activity and speculation among the railyard's archaeological remains?) and Research Question 9 (What effects did the physical presence of the new depots and other railyard buildings have on the greater municipal culture and economic milieus?) are addressed in this synthesis. Railroad history is replete with mergers acquisitions and bankruptcies. For ease of discussion facilities built in 1880 by New Mexico and Southern Pacific Railway (NM&SP) will be referred to as AT&SF because the NM&SP was a subsidiary of that line and AT&SF later acquired it in 1899. The corporate history of the three main railroads serving Santa Fe is briefly summarized in Chapter 1 of this report, and a more detailed discussion is provided by D. H. Snow in Chapter 7, also in this report.

A second research domain relevant to this section is that of socioeconomic changes brought on by realignment of major trade routes. This research domain seeks to examine the process of acculturation by envisioning Spanish colonization and later American entre to the Southwest as a series of changing frontiers that shifted as transportation networks evolved. *Research Domain 2: Frontier Model for Social and Economic Acculturation: A Material Culture Study* (Wenker et al. 2005: 123–132) examines this process by quantifying the incidence of trade goods in various contemporary locales across northern New Mexico. This is done in order to make inferences about the inhabitant's relative wealth, and by association access to and acceptance of the core's dominant culture. Research Questions 4 and 5 seek to quantify the availability of manufactured goods at Spanish Colonial- to Railroad-era sites across northern New Mexico and strategies adopted to substitute them in absence of their availability. The model postulates that increasing access to trade routes grants more affordable and varied trade goods

Trade Routes

Before Mexican independence in 1821 Santa Fe was a distant outpost of the Spanish Empire. Spanish trade restrictions caused exorbitant overland import costs, which resulted in a local economy that relied heavily on barter. Though a few manufactured goods were imported from Mexico along the Camino Real, most goods were produced locally (D. H. Snow, Chapter 7, this report). The route from Mexico City was 1,500 hundred miles and was arduous enough that the city's inhabitants did not learn of independence from Spain for nearly a month (LeCompte and Sanchez: 2008).

Mexican independence marked the end of Spanish restrictions on trade and the beginning of steady commerce with the United States (LeCompte and Sanchez 2008; 57–58, 61). Manufactured goods, previously in short supply, were brought overland along the Santa Fe Trail, which stretched 775 miles from Independence, Missouri, to Santa Fe. The entire route took 70 days to Santa Fe and 38 days back. Freight charges were 32 cents a pound.

In 1822, $15,000 worth of goods was moved along the trail. In 1846 (the end of the Mexican war) "the overland trade" as reported in 1881 by the Governor, to the Secretary of the Interior was $1,752,250. By 1876 it had nearly doubled (1881 Report of the Governor of New Mexico) and was used by the Governor as justification for railway construction. Bryant reports that, on the Santa Fe Trail by 1860, 16 million pounds of goods were moved by 9,000 traders, 3,000 wagons, and 27,000 oxen (Bryant 1982:3).

In 1845 on the east coast of the United States, a reporter by the name of John Louis O'Sullivan used the phrase "manifest destiny" to express the divine right and even responsibility of the United States to expand westward across the American continent to the Pacific. It is in this climate of westward expansion, which was thought critical to national security and unity, and lucrative trade along the Santa Fe Trail that the AT&SF was first chartered in 1859 (Riskin 2005:8, C. T. Snow 2003, Berkman 1988:8). The actual survey of the proposed route through New Mexico was conducted 19 years later in the summer of 1878 by W. R. Morley, and his possibly malarial crew. The resulting battle for Raton Pass (D. H. Snow, Chapter 7, this report) is a storied subject repeated in many sources having to do with either the narrow gauge D&RG or the AT&SF railways, and with the development of New Mexico's railways (for a more through treatment of the subject, see *The History of the Atchison, Topeka and Santa Fe* by Pamela Berkman, *New Mexico's Railroads* by David F. Myrick, and *The Train Stops Here* by Marci L Riskin). The resulting victory for the control of the pass insured AT&SF's superiority in later westward expansion. By the time the AT&SF reached New Mexico trade along the Santa Fe Trail had decreased and other economic considerations were in play. These included resource availability along the proposed routes. Cheap timber, access to agricultural development along the Rio Grande valley, the Cerrillos coal fields and proximity to gold silver and copper mining (D. H. Snow, Chapter 7, this report) influenced decisions about the train's proposed route. Citing reduction of trade along the Santa Fe Trail (Bryant 1982:59–60), Morley successfully argued for a route change from the 32nd to the 35th parallel, which shifted the route north and bypassed Santa Fe.

Once over the pass, the AT&SF line expanded exponentially connecting to Albuquerque in April 1880, and Deming a year later. This connection completed the nation's second trans-continental railroad and by extension its telegraph system, which was developed simultaneously along with the track (Riskin 2005:9; Berkman 1988:19). A railroad line's configuration was based by necessity on the distance a steam locomotive could travel, and the amount of track that could be maintained in a single day. Steam engine maintenance was constant and intensive. Because a train could travel about 100 miles per day, the western railroad was divided into "division points" at regular intervals which housed stations with large repair shops, hotels, lunch rooms and amenities for both tourists and employees. The construction of a train stop, or bypass of a destination, could make or break a town. Towns that happened to be along division points were the recipients of railroad manna in the form of railroad related work and tourist traffic (Riskin 2005:19–20). But there was also a symbiosis that occurred. To be profitable, the railroad needed customers, and to have a sufficient customer base the railroads needed to populate the west. To boost revenue AT&SF hit on a series of promotions to insure ridership going as far as to recruit immigrant farmers with pamphlets published in their native languages (see Kansas Historical Archives). Mining and lumber were lucrative as was the tourist trade.

While apprising Santa Fe Railyard connections to national and international trade it is useful to keep in mind that the track, constructed section-by-section, added up to millions of dollars of infrastructure that was the railroad's primary investment (Riskin 2005:25). Santa Fe's $150,000 expenditure in bonds (D. H. Snow, Chapter 7, this report) was an investment that tied Santa Fe to a revolutionary new transportation network and national corporation subsidized by the U.S. government. This corporation spanned the coasts providing access to goods, markets and communication that had not been previously available.

Public Construction and the AT&SF in Santa Fe

Before the railroad, large-scale infrastructure in Santa Fe was built by the Spanish Crown, the Catholic Church, and the U.S. Army. Fort Marcy was constructed by the U.S. Army in 1846 to fortify the city after the United States occupied Santa Fe in the wake of the Mexican War. An irregular "star fort" the earthwork was faced with adobe and according to its builder, Lieutenant J. F. Gilmer, was "large enough to conform to the accident of the ground which forms the site" (J. F. Gilmer Nov 1, 1846, in *The Mexican Correspondence of Richard Smith Elliot,* Gardner and Simmons 1997:95). Its exterior dimensions were 300 to 400 ft (Twitchell 1923:36–38) with a relief from trench wall top of 17 ft. The adobe and timber fort, or at least its exterior, was constructed from August 23 to late September 1846 by 100 army laborers who were paid 18 cents a day after ten consecutive days of labor in addition to their regular pay rate. Twenty local masons were also hired (Twitchell 1923:35–36).

Excavation behind the Palace of the Governors indicates that buildings erected by the U.S. Army in 1868 and previous Presidio-era constructions commissioned by the Spanish Crown, were built of local materials using similar building techniques. Buildings were supported by foundations constructed of river cobble. The only cut stone in foundations can be attributed to construction and remodeling conducted by Jesse Nussbaum 50 years later (Badner n.d.).

St. Francis Cathedral construction began before the railroad was surveyed and continued for 18 years from 1869 to 1887. The building was financed in part by local charity (Horgan 1975: 360) and cost over 100 thousand dollars to build. Unlike the old *parroquia* that it eclipsed—which was built of 3-ft-thick adobe walls set on massive cobble and boulder foundations—the new Romanesque cathedral was masonry. Rock was quarried from the Arroyo Sais and from Bishop Lamy's land near what is now the Lamy railroad junction (Horgan: 1975 Ellis 1985:147). In later stages of construction it was serendipitously transported to Santa Fe by railroad. The only other completed stone building to predate it was Loretto Chapel also built by Bishop Lamy (Morand 1984:49).

Railyard infrastructure represents some of the first large-scale commercial investment in the city of Santa Fe. Unlike the Presidio-era architecture at Palace of the Governors or Fort Marcy that were built to maintain a military presence and defend frontier territory against invasion, or apostethic construction built in part by Bishop Lamy as an epistemological statement, the railroad was built to move goods and people and to make money.

The citizens of Santa Fe approved $150,000 in bonds to construct the AT&SF spur and another $100,000 to bring the narrow gage Denver and Rio Grande railroad to Santa Fe (Twitchell 1925: 398–400). The AT&SF engine house was built of milled lumber and roofed with wood shingles it cost $2,800. The first depot, constructed in 1880 was built for $2,550. Later, in 1908 the brick depot was constructed at the same time as the Lamy train station. The plans were identical, and both buildings were constructed at a cost of $10,000 (C. T. Snow 2003).

The original wooden depot constructed late in 1879 was likely a "combination depot," a three room building with a room for passengers and one for freight separated by an office for railroad employees. Though "standards" were not codified until 1895 the basic design of these early depots were built to specifications based on similar criteria dictated by function, practicality and economic necessity. Buildings were wood frame with a straight, pitched roof line and a semi hexagonal bay window (D. H. Snow, Chapter 7, this report). Heated with coal, they were designed to be solid yet easy to construct and to be both temporary and portable. Only minor changes were made to the basic design for sixty years. (Sivinsk 1979; Pounds 1984:17) The reader is directed to Santa Fe Depots, the Western Lines: A Route-by-Route and Station-by-Station Look at the Western Lines of the Atchison, Topeka, and Santa Fe Railway by Robert E. Pounds, and Traditions of Depot Building in New Mexico: Wooden Structures by Valerie Anne Sivinski, for a comparative discussion. There is no archaeological evidence that provides sufficient detail from the 1880-era depot construction to fruitfully evaluate its unlikely influence on any subsequent standards development.

Construction techniques used in train stations, were similar along the line (Sivinski 1979; Pounds 1984). It was common for the AT&SF to replace and reuse early wooden station houses with more substantial mission style architecture that was subsequently used at more important stops. It was also common for the railroad to convert the earlier structures built on a more constrained budget after the initial expenditure of laying down track and other infrastructure to freight depots (Pounds 1984, Riskin 2005). Modifications of this type were performed on the original wooden AT&SF depot. These changes emphasized and expanded its freight function.

Together, standardized wooden and more permanent mission style architecture provided a cohesive AT&SF image that was used to promote tourism. Although it provided improvements and "modern amenities" in the new permanent depot in 1909 (C. T. Snow 2003:53) the second train station equally reflected the company's corporate image and a lack of anticipated increase in passenger volume. The brick building, which is still standing, is small and not significantly larger than dimensions reported for the first wooden building. The nod given to the tourist trade through its construction was small when compared to facilities built in 1902 at the Albuquerque main-line division point. Albuquerque housed a large depot that included a train hospital, the 119-room Alvarado Hotel and an Indian Curio building, the interiors of which influenced subsequent hotel and lunchroom design throughout AT&SF's western division (Myrick 1990:34, Riskin 2005:66). Santa Fe's "permanent" depot compares with Lamy's in its scale and design. Its small size and sturdy construction corroborates records of spotty, small-scale passenger service.

> Our people have for a long time have felt that the Santa Fe railroad had very little interest in the city of Santa Fe and a great deal of unfriendly criticism has been going on here for years when we have observed the interest taken by the road in other cities where your road has no competition… when had great hopes that your road would take the lead in granting tourist rates to our city and we are unable to understand why… —(February 12, 1912; Letter from Edgar Lee Hewett to W. J. Black Passenger Traffic Manager, AT&SF, Chicago Ill. Hewett Collection Box 37, AT&SF file, History Library, Museum of New Mexico; C. T. Snow 2003:49)

The engine house excavated at Santa Fe was not one of the largest on the line. When compared to facilities at Albuquerque and Las Vegas, the shop is small and may have only been planned for emergency repairs and routine maintenance. Trains were pulled by "small tender" locomotives with likely wheel configurations of or similar to 2-6-0, 2-8-0 and 2-6-2 (the Prairie) with six to eight thousand gallon water tanks or tenders which increased in capacity to twelve thousand gallons by 1924 (Martens 2010). A 1922 photograph from the Chili Line (Dorman 2009) shows an AT&SF 4-6-0 (train No. 454) and two 2-8-2 s in the yard during the 1930's. Archaeological investigation did not provide sufficient data to evaluate the technological fitness of, or care put into maintenance and repair facilities. Considering Santa Fe's location on the line, such a comparison may not be representative of other shops.

AT&SF potentially gained access to both the engine house and the turntable originally constructed by the D&RG and New Mexico Central railways and located to the south on Guadalupe Street Station maps conflict as to the presence of the engine house in the early twentieth century. The AT&SF map from the Collection of Jo Brown drafted in 1916, but corrected to after 1937, has no engine house. A D&RG map drafted in 1919 and corrected to 1923 shows the building's outline. The AT&SF station map from the collection of Joe Brown indicates siding No. 13 (located in what is now the Railyard Park) could be used as a connection track between AT&SF sidings and those standard gauge tracks marked on the map as owned by Santa Fe Central Railroad. The turntable is marked as "Standard ga-." The Denver and Rio Grande station map indicates an AT&SF track associated with the turntable, excavated by Southwest Archaeological Service in 1999. The turntable was 70 ft in diameter and was constructed of cut stone blocks with a concrete crenulated capping apron. Artifact manufacture dates indicate abandonment occurred sometime between 1913 and 1938. Ethnographic research from informants in the neighborhood conflicted as to the exact date of abandonment but agree it was around 1929 (R. Moore 1999).

Water tower construction seems to conform to plans of others built in New Mexico. Plans of the tower at Pecos (although narrow gauge) are similar (see LA 146402, discussed above). Archival research has indicated that the water tower had a 30,000-gallon tank. This tank size would have been sufficient to fill more than two "small tender" locomotives. It may be that the 16-pilaster configuration was initially constructed because the builders could not predict the well's flow rate and engineers were hedging their bets. Perhaps the engineers originally planned to store excess water so that the water tank would have sufficient time to recharge. The number of trains that could be serviced by the well in any one day probably relied heavily on the well's flow rate and the capacity of the constructed water tank. The fact that the tank was not unusually large probably indicates that the well's flow rate was at least initially sufficient to serve anticipated traffic. As with maintenance facilities, the tank's initial capacity and eventual well reconfiguration reflect Santa Fe's spur location, the amount of traffic initially anticipated by the AT&SF, and eventual changes that were in part, the results of larger economic and technological transformations that took place in the years following the facilities initial construction.

City water installation probably had some impact, as the water tower was presumably dependent on the performance of a single well. The “water crane” or water column may have represented an increase in capacity. The water column was used in the United States by 1858 (Lester 2008:6), but it was not initially used in Santa Fe. Decision to install a water crane later may have been influenced by problems with the well, but if the crane was capable of pumping more than thirty thousand gallons of water it may have been impossible to affect this change before Santa Fe was able to deliver sufficient impounded water for its reliable use. Another consideration could have been railyard growth. By the turn of the century the area was serving three lines. Although according to the AT&SF station map, the water crane served AT&SF tracks, the line continues beneath the narrow gauge line and a potential hydrant is depicted along the narrow gauge track. Because facilities were variously shared and leased, water may have been provided for a number by using one line.

Structural remains complete with loading platforms and surrounding warehouses shown on the Santa Fe station maps appear to confirm a yard more geared towards freight management than heavy tourist traffic. Some aspects of the railyard’s daily management may best be observed with outhouse maintenance. Privy contents with assemblages indicating heavy indulgence use may substantiate this hypothesis. After 1909, although the AT&SF station was provided with “modern amenities” continued use may have been primarily by railyard employees. “Amenities” may have been reserved for “guests” or perhaps “ladies.” Evidence of remodeling undertaken at the 1880 depot (Feature 8; LA146402), the water tower (Structure 2; LA 146403) and the scales (Structures 1 and 2; LA 146402) indicate ad hoc solutions to building maintenance and modification that may reflect an ever changing industrial environment but also demonstrates more thrifty modifications undertaken to existing infrastructure. This may reveal economic stress experienced by the AT&SF from 1893–1895 when the company was placed into receivership and subsequently sold at foreclosure (Robertson 1986:89). Evidence from excavation was insufficient to provide any additional information about the size and complexity of the stockyard and its barns or stables or to estimate livestock traffic through the yards.

Though they were not the largest, or perhaps most heavily used along the line, foundations that supported the well, water tank and station house are unique to the project and were built with care and skill, indicating an initial outlay by the AT&SF appropriate to the task of providing well-built facilities on an industrial scale. These buildings differ in material and construction technique from any other archaeologically observed foundation attributed to the same time period in Santa Fe, and are a clear departure from vernacular architecture often constructed of large river cobble. Foundations are built of materials that are local to New Mexico, but not the immediate environs, using techniques not traditional to the area. Although sandstone for foundations was quarried nearby, it had only been used previously in the St. Francis Cathedral, Loretto Chapel, and the Territorial Capitol, some of the only other examples of codified large-scale construction undertaken at the time. This approach likely reflects building techniques familiar to the railroad’s designers, engineers and skilled laborers who hailed from the United States and were mostly Anglo (D. H. Snow, Chapter 7, this report).

Eastern architectural styles were first imported by the U.S. Army in 1846 (Kingsley 2004:13). Railroad construction further imported architectural styles native to the eastern United States, but more importantly provided access to materials that had been costly or difficult to obtain. Adobe structures were refit with more maintainable metal gable roofs and larger windows. Brick, which was unavailable before railroad construction became common and flat roofed adobe buildings in downtown Santa Fe were raised and replaced with brick buildings (Riskin 2005:15–16). Perhaps one of the earliest buildings influence by the presence of the railroad, if not its architectural style, was the Palace Hotel. Built in 1880 to house tourists, it was a three-story building constructed of milled lumber in Second Empire style. Another more physically immediate indication of the railroads architectural influence may be the Guadalupe Church, an adobe structure licensed in 1795 and completed by about 1807 which was then remodeled by Father de Fouri by adding a steeple, pitched roof and Gothic windows. Its second remodel undertaken in 1922 transformed the church into a California Mission style building (Sze and Spears 1988:68, Morand 1984:72); the same style as the AT&SF and Union depots a block away.

Evaluating the Frontier Model

The precise benefits derived from New Mexico's new ties to the United States are unfortunately difficult to quantify using artifacts analyzed during this project as a comparative assemblage. This is especially difficult for the targeted 1820's time period proposed by Moore's frontier model of acculturation (Wenker et al. 2005; Chapter 1, this report). Certainly midden refuse in upper deposits at LA 146402 contains vastly more manufactured goods than from earlier Spanish Colonial context. Manufactured household and building materials and a discarded hoe indicate purchasing power in a cash economy (Barbour, in LA 146402, discussed above; Moore, Chapter 7, this report). But the particulars of economic change or acculturation as indicated by access to manufactured goods in core versus periphery areas (or even within the villa) is more difficult to assess because Mexican-era context from railyard assemblages was far more limited than anticipated by test excavation and was somewhat churned with later twentieth-century deposits. Based on the results of Euroamerican ceramic analysis, associated strata were assigned to a wide date range of 1817± 85 years (Barbour, in LA 146402, discussed above), range that spans the entire time frame that the model seeks to distinguish.

Based on assemblages from sites assigned mid-seventeenth century to the mid-nineteenth century dates across northern New Mexico, Moore (Chapter 1, this report; J. Moore 2001b) demonstrates the Santa Fe Trail afforded a wider segment of New Mexico's population improved access to imported goods. This improved access can be quantified in the percentage of imports as determined by majolica, glass and metal recovered from a series of 21 Spanish occupations. Percentages of imports from these sites (Moore 2001b:186) increased from early Spanish Colonial to Santa Fe Trail eras. Imported goods recovered from small early Spanish Colonial sites made up and average of 2.9 percent of the assemblages. Late Spanish Colonial Sites were reported as 1.6 percent at small sites and an average of 10.8 from three comparatively large wealthy residences. Assemblages from Santa Fe Trail-era sites contained an average 11.4 percent imported goods. Early Railroad-era assemblages had 37.6 percent imports. These findings are subject to various sampling errors including interpretation of the sites occupation status and intensity and are used with caution. For example, standard deviation at sites reported as "comparative wealthy" late Spanish Colonial sites was 9 percent, an obvious result of small sample size, but also an indication of the assemblages' variability. Furthermore, average values were tied to a site's size and complexity, unknown factors at LA 146402. Taking these factors into account, a comparison of railyard assemblages to regional data indicates that imports from Spanish Colonial context at LA 146402 midden made up 2.3 percent of the analyzed artifact assemblage (Barbour, Chapter 7, this report). This is within the range of values reported by Moore for early and late Spanish Colonial sites. This percentage must be evaluated with the peculiarities of the data set in mind, but may be interpreted as consistent with late Spanish Colonial assemblages associated with small sites, unremarkable relative wealth and limited access to imported goods. Santa Fe Trail-era artifacts recovered from field irrigation features at LA 146402 contained 12.1 percent imports. Secondary depositional context for this assemblage is most certainly a source of error, making comparison with other reported context in northern New Mexico somewhat problematic. The percentage of imports is similar to that reported by Moore at other sites for the same period. No sites excavated at the railyard yielded significant numbers of artifacts from assemblages that could be confidently isolated as early railroad era. A later assemblage recovered from Structure 5, an outhouse with a date assigned to ca. 1905 at LA 146402 indicates almost complete reliance on imported goods.

Within any one time period, questions about manufactured and imported goods availability in both core and periphery areas posed by Research Design Question 5 were most straightforwardly addressed in the Spanish Colonial temporal component at LA 146402. A comparison of dinnerwares and associated Euroamerican artifacts recovered from LA 146402 midden, at Trujillo House in Valencia, and the Baca-Garvisu house excavated at the Santa Fe Civic center north of the river indicates potential lowest economic status at LA 146402. The comparative assemblages indicate that inhabitants of Trujillo house had better access to a wider variety and greater quantity of products than inhabitants of the Barrio de Guadalupe in Santa Fe. This result is counter-intuitive to traditional core and periphery models and the Frontier Model as developed by Moore et al. (2003) which predicts fewer imported goods and a greater reliance on local manufacture at Trujillo house than in the villa. This contradiction is potentially more illustrative of diverse economics within the villa than demonstrative of a larger macroeconomic picture. Residents of both the Baca-Garvisu house and LA 146402 had access to dinnerware from central Mexico. But the residents of LA 146402 purchased redware instead of porcelain or Majolica. As Barbour suggests, this could be both an indicator of economic status and identification with mestizo or Indio heritage. Another possibility is that, residents of Santa Fe benefitted from social networks forged in a larger population center. These relationships may have somehow mitigated import costs, allowing less affluent residents on the south side of the river to purchase a certain amount of less expensive dinnerware imported from Mexico.

Attempts to address questions about cultural and economic relationships between core and periphery posed in Research Question 4 were undertaken by evaluating the use of substitute implements or objects to replace unavailable manufactured goods at different locales. Material substitutes for metal and Euroamerican ceramics were most prominent in the analyzed artifact assemblage. Chipped stone use in Abiquiu and Talpa with dates assigned to between 1880 and 1900 is documented by Moore, providing evidence of continued use by a thrifty and relatively isolated population. Citing excavations of a Spanish homestead near Pojoaque Pueblo, Moore contends that chipped stone was used as a substitute for metal tools, and was still common in a relatively prosperous core area residence during the Spanish Colonial period and well into the American period. This mirrors continued use of substitutions in more isolated areas.

Evidence of chipped stone use in, or near larger population centers during the Mexican period and early twentieth century is more difficult to assess. The railyard assemblage is simply too small for a detailed evaluation of this question (Moore, Chapter 7, this report). But other small assemblages recovered from early twentieth century context in Albuquerque (LA 78945) and at the Capitol Parking Structure (Barbour 2012) in Santa Fe indicate that assemblage size in itself points to limited use of chipped stone as substitution for metal tools in urban post Santa Fe Trail context. Use of chipped stone can just as easily be attributed to personal preference as economic necessity.

Another measure of substitute use proposed by the research design is potential use of Spanish-made pottery. Citing Carrillo (1997) Moore postulates a premium on the value of Pueblo pottery created as a result of Santa Fe Trail commerce, effectively providing economic entre to pottery manufacture by Spanish producers (Moore, Chapter 1, this report). Wilson (Chapter 7, this report) counters this assertion by pointing out that Tewa potters and other groups adapted pottery production to supply the Spanish market and that regardless of the ethnicity of the manufacturer, pottery production during the eighteenth and nineteenth centuries reflected Hispanic settlers taste in areas colonized and controlled by Spain. D. H. Snow (Chapter 7, this report) further argues that although there may have been some isolated Hispanic pottery production, no clearly identifiable and perpetuated pottery tradition emerged from such production.

Native ceramic analysis at LA 146402 identified a small amount of sand tempered gray/black utility ware. While this pottery *could* have originated from non-Pueblo areas, there is no conclusive evidence recovered from LA 146402 to confidently indicate purchase or barter of Hispanic pottery. This is especially true for the time period after 1821, the beginning of the Santa Fe Trail period and the time period when Carrillo (1997) reports most Hispanic pottery manufacture. This makes the Santa Fe Trail's impact on the scale or relative economic importance of Hispanic or inter-ethnic pottery production difficult if not impossible to assess.

The faunal assemblage from the railyard project provided evidence of gradual transition throughout time in consumption of sheep/goat butchered at home to saw-cut steak chops. The largest jump in steak consumption is evident at the end of the Santa Fe Trail period and the beginning of the railroad era. Interestingly, through time the majority of bone recovered from acequias was sheep/goat instead of cattle.

The research design proposed validating the tenets of the *Frontier Model for Social and Economic Acculturation* with six assumptions that assemblages from the railyard were unable to address conclusively. This is because the data recovered from various assemblages was not sufficiently temporally sensitive nor, in some cases, stratigraphically segregated, to confidently make comparisons between assemblages from compressed time frames. The assumptions were:

(1) A*ccess to imported goods should be reflected in higher proportion of European to locally produced goods across time periods.* At the railyard, this is debatable. Evidence for better access to imported goods in the Villa by less wealthy populations may be indicated by redware recovered from the LA 146402 midden. However, living in the villa didn't automatically guarantee a higher standard of living. Percentage of manufactured goods recovered from eighteenth century context was slightly greater than that calculated for the assemblages of some small isolated sites in the Cochiti area, but this slight difference is hard to evaluate given the wide range of values presented for this time period in the data set reported by Moore (Moore 2001; 188–203). Assemblages assigned to later time periods have higher percentages of manufactured goods than reported at sites from other areas of northern New Mexico but as stated above, context and temporal concurrence are sources of error.

(2) *Percentages of imported goods recovered from Spanish assemblages should increase sooner in the core than in the periphery, reflecting better access to transportation sooner in the core.*

(3) *Traditionally used pottery including majolica and earthen wares should begin to decrease in assemblage percentages. By sometime in the Railroad period they should almost disappear. The process should happen earlier in the core than on the frontier.*

(4) *Ratios of pottery made by Hispanic potters should be higher on frontier sites.* Questions that required comparison of later Spanish Colonial and mixed period assemblages to determine degree of manufactured goods adoption by various populations in core and periphery areas as transportation improved were not easily answered with the available data. Assemblages recovered from acequia deposits at LA 146402 and assigned nineteenth century dates contained large quantities of Native American ceramics which made up a ratio of about 1 of every 3 artifacts recovered from alluvium. The research design anticipates a decrease in traditional wares earlier in core area assemblages. Acequia assemblages were somewhat mixed, and predominance of native ceramics can be explained by high artifact fragmentation. Additionally artifact deposits from nineteenth century within Santa Fe often contain significant percentages of native ceramics contributed by urban site formation processes. Even so, high percentages of earthenwares in later assemblages do not fit the model. Native ceramics potentially manufactured in traditionally non-Pueblo areas were not numerous and provide negative proof of use.

(5) *Meat selection and butchering technique should reflect acculturation. By the late Santa Fe Trail-era or early Railroad period, Spanish households in the core should begin displaying patterns similar to the eastern United States. Periphery areas should be slower to and may never completely adopt these changes.*

(6) *Chipped stone tools other than gun flints and strike-a-light flints should be more common in periphery areas and should be replaced sooner in the core.* Both chipped stone and faunal assemblage analysis seems to support the model. While throughout northern New Mexico there is evidence to indicate chipped stone tool use by core area populations, the railyard assemblage is too small to directly evaluate the model other than as an indicator of limited chipped stone utilization. As stated above faunal assemblages showed gradual transition of consumption from sheep/goat butchered at home to saw cut steak chops with a regional spike occurring after railroad construction. Both of these questions are fully addressed in Chapter 7 in this report, by both Starkovich (Fauna) and Moore (Chipped Stone).

The data set provided by artifact analysis makes it hard to either accept or reject the frontier model of acculturation. When compared to regional data, some aspects of Spanish Colonial acculturation within the villa have traits more similar to more rural and isolated locales than those sites located within the Villa north of the Santa Fe River. This may be a reflection of the residents' social as well as economic standing.

During the eighteenth century, Santa Fe's society, like that of Spanish colonies throughout the New World, was multicultural yet stratified, with a social system based on various degrees of "pureza de sangre españoles." Although the caste system was not enforced as strictly as in New Spain, Santa Fe's residents of mixed race were unable to hold high office and were subject to more stringent application of Spanish law, including trade restrictions (Bustamante 2008:51–55). Santa Fe's original construction was that of a walled midlevel town, which by the eighteenth century had spread out along the Santa Fe River. Therefore, it should not be a surprise that neighborhoods within the villa exhibited a degree of socioeconomic variability that was in part a result of ethnically based social stratification.

Conclusion

D. H. Snow's description (Chapter 7, this report) of the New Mexico economy during the Spanish Colonial period is one of basic production. Lack of transport was a persistent problem across the territory and as Snow points out, accepting a world system framework proposed by the research design to describe the colonies relationship with Spain is problematic because of lack of trade, lower order goods production, and isolation experienced by the colony. Snow prefers to use Eric Wolf's "kin mode of production" to describe trade and a Colonial "situation" that, in his view was more accurately described as resource extraction by a few lucky stakeholders who relied on a variety of small-scale family-level producers. This is a different situation than somewhat symbiotic trade between core and periphery described by Wallerstein (1974, 1979). Review of material culture reported by Moore (2001b) from northern New Mexico seems to support this view. Even wealthy enclaves demonstrate a reliance on local trade until the Santa Fe Trail–era when imports begin to increase on a more consistent regional level.

During the Spanish Colonial period, New Mexico was a military colony and as such paid no tax to the Crown. In the early eighteenth century the area lacked sufficient labor to extract its few exportable mineral resources or access to extensive pasture lands and failed to produce sufficient quantities of trade goods to be considered essential to Mexico's economy (D. H. Snow, Chapter 7, this report). Its continual drain on the Spanish coffers and later, the new republic of Mexico's inability to support the colony was evident in the plight of its social institutions. From 1760 to 1833, no bishop visited New Mexico leading to a curtailment of basic sacraments including baptism, conformation and marriage. By the nineteenth century, presidio guards went largely unpaid and unarmed save for locally made or antiquated weaponry (LeCompte 2008:65).

The U.S. conquest of Mexico in 1846 coupled with Santa Fe Trail trade infused the economy with much needed currency and an influx of Anglo traders and military troops. Two years after Kearney's conquest the complexion of the villa had changed. Jobs were more plentiful and Army payroll, which was paid on a predictable schedule, infused cash into the local economy. In addition to Fort Marcy construction and commerce from soldiers, the U.S. Army purchased draft animals, food for both animals and people, building supplies and local labor (Simmons 2008:91). By 1864 the weekly New Mexican commented wages paid to the U.S. Army volunteer service far exceeded former labor wages previously paid to peons raising the wages for Mexican teamsters and herders (D. H. Snow, in LaFarge 1959:22). The same article that mentions improved wages discusses spring commencement of the Santa Fe Trail trade and describes the route that LaFarge points out as a classic boostership by interests not only competing between various wagon trail routes to California but also those trying to influence routes that would be scouted by rail lines in the future, which they were well aware could make or break cities and entire territories.

> The road however, is the best natural road, of anything like similar extent upon the face of the earth. It runs until it reaches Las Vegas, coming this way, one dry vast plain (LaFarge 1959:22).

In addition to economic boostership, locally funded railroad and cathedral construction reflected a desire by Santa Fe's businessmen and community leaders to be included in a larger national dialogue which included an economic as well as cultural dynamic. Construction of the Santa Fe spur (rather than any one particular depot) demonstrates a sea change in the area's political, economic, and cultural affiliation and inclusion from a Spanish or Mexican frontier to the Union as a U.S. Territory.

Buildings and associated structures constructed by the AT&SF were products of regional change. A result of the post -Civil War socioeconomic and military campaign that defined much of the U.S. frontier so newly connected to amenities that coastal business and industry provided. Railroad buildings relied on cut stone and milled lumber, two materials that were in short supply before a saw mill was constructed just after the American invasion and Lamy's cathedral construction. Buildings that would have been difficult and expensive to build before the railroad, became relatively cheaper to construct, once track was laid (Riskin 2005:15). The AT&SF did finally build a permanent "California Mission Revival depot with red tile roof, pebble dash stucco and curvilinear parapets [and a] brick paved landing" (Colby 2004). From the perspective of depot construction along the line it was not particularly innovative and was very similar if not the same as that of the Lamy depot (Riskin 2005:82). There is no evidence that the AT&SF attempted to accommodate Santa Fe's local sensibilities in any way other than to provide that small depot in 1908, which conformed to an architectural style widely used along the line.

The eventual effect of railroad construction on the town's overall appearance was visual evidence of Spanish acculturation and the transition from Mexican frontier to U.S. Territory as major religious, military, government, and finally leading economic institutions were increasingly housed in buildings with styles influenced by cultural trappings of the United States reflecting both cultural and demographic change. Parishioners at the Guadalupe church, now remodeled in the New Gothic style, were predominantly Anglo. Land speculation surrounding the railyard subdivided larger, previously agricultural tracts forever changing the character of the neighborhood. Subdivision streets were set on a grid with names of decidedly Anglo reference, for instance President Garfield and John Hancock (Sze and Spears 1988:67). The areas west of the yards were likely impacted by coal smoke wafted by the prevailing wind potentially impacting the area's desirability as a residential area. Last, and most obviously, the archaeology of the railyard chronicles the abrupt change in the immediate area from farmland to industrial park.

4 | New Mexico Central Railway Sites

Overview

The New Mexico Central Railway was a standard gauge railroad that ran south of Santa Fe through the Estancia Basin and eventually reached El Paso by way of the El Paso and Rock Island lines (Fig. 4.1). Its primary function was to haul agricultural produce. Originally named the Santa Fe, Albuquerque, and Pacific railroad in 1900, the company was known as the Santa Fe Central (SFC) until 1908. After which time, it merged with the Albuquerque Eastern (AE) and became known as the NMC. The NMC was eventually bought up by the Atchison, Topeka and Santa Fe (AT&SF) Railway in 1926 (Pratt et al. 1988:171).

Eight archaeological sites, identified within the Santa Fe Railyard project area, were associated with the NMC railway (Figs. 1.1, 4.2). Archaeological and archival research of these sites had the potential to inform upon the operation of the NMC in Santa Fe during the early twentieth century.

Five of the eight archeological sites (LA 146406, LA 146414, LA 146415, LA 146417, and LA 149911), were tested and recommended either "not eligible" for the National Register of Historic Places (NRHP) or "eligible" with archaeological testing exhausting the potential of the site to yield further information relevant to New Mexico's past. The remaining three sites—LA 146405, LA 149913, and LA 149915—were determined "eligible." For these sites, data recovery was necessary to collect information pertaining to site creation, function and ultimate abandonment. Work at these three sites was conducted under New Mexico State Historic Preservation (HPD) and City of Santa Fe Archaeological Review Committee (ARC) approved data recovery plans (Wenker 2005c, Wenker et al. 2005).

In order to provide the reader with a coherent picture of NMC infrastructure, archaeological sites are reported here in geographic order rather than by site number. Sites are presented in a progression from the North Railyard Parcel southwest to Baca Street. This is followed by a synthetic analysis of the sites in relation to research themes and questions proposed under Research Domain 3: Bringing Archaeology and History to bear on the Archaeological Buildings and Structures of the Santa Fe Railyard of the research design (Wenker et al. 2005:123–132).

LA 146405

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Introduction

Excavations of LA 146405 (Fig. 4.3) revealed two historic refuse pits (Features 1 and 68) and a structural complex consisting of two superimposed historic buildings (Structures 1, 2). The poured-concrete foundation of a late nineteenth or early to mid-twentieth-century three-room structure (Structure 1) may represent the remains of the original (pre-1904) depot of the New Mexico Central (NMC) railway. Subsequent expansion and remodeling episodes may be associated with the Maloof family and operation of their Coors beer and liquor distributorship, known as Quality Imports, at this location, starting in the 1930s. A second subterranean structure (Structure 2) identified as a basement or cellar exhibits two halves or partitions, one with a brick-paved floor and cobble and mortar walls, and the other with an unpaved dirt floor and dirt walls. The relationship of this lower structure to the overlying

Figure 4.1. Map of the Santa Fe Central Railway, later known as the New Mexico Central Railway, before its merger with the Albuquerque Eastern Railway in 1908.

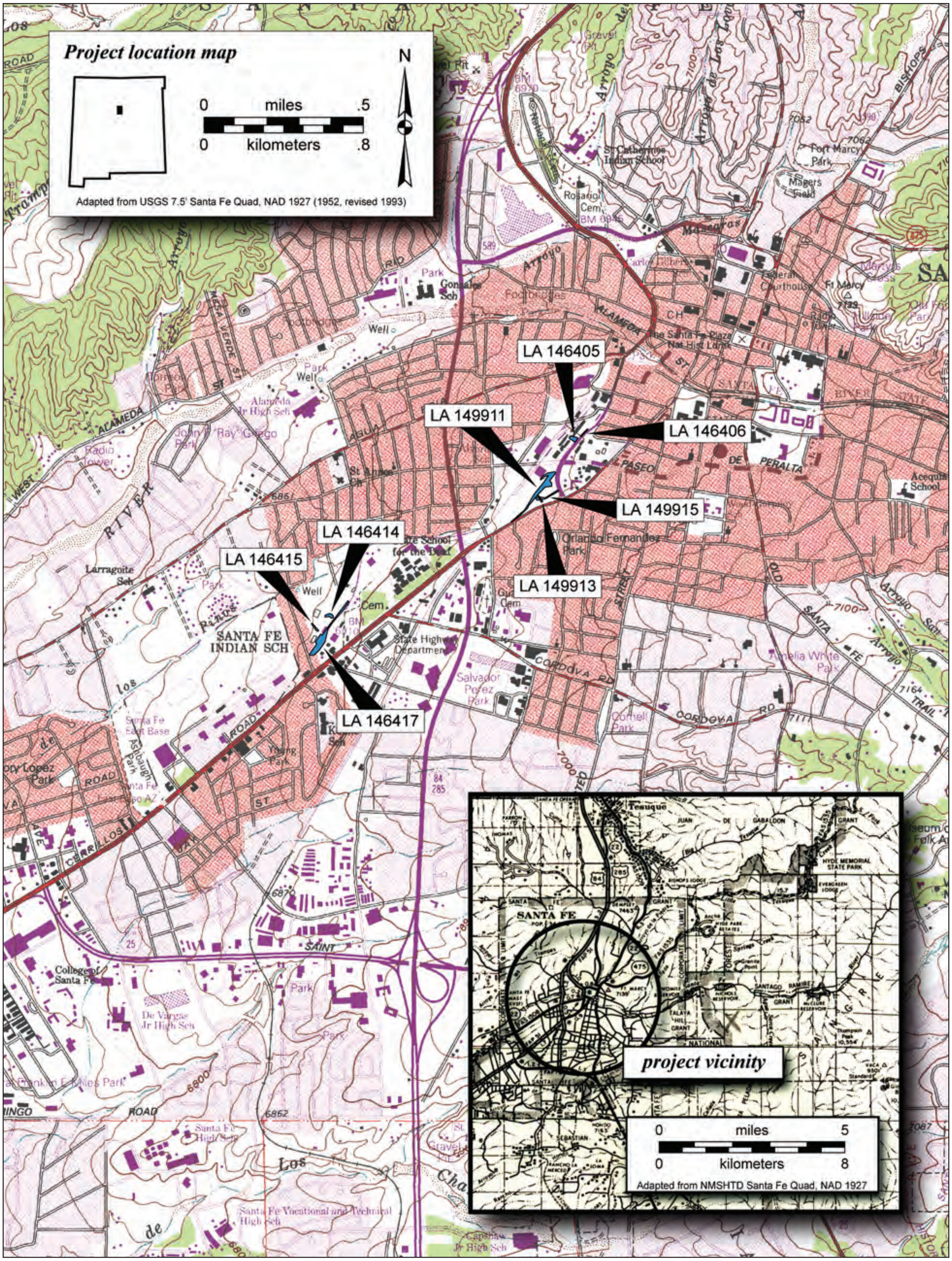


Figure 4.2. Locations of sites associated with the New Mexico Central Railway at the Santa Fe Railyard: LA 146405, LA 146406, LA 149911, LA 149913, LA 146417, LA 149915, LA 146415, LA 146414.

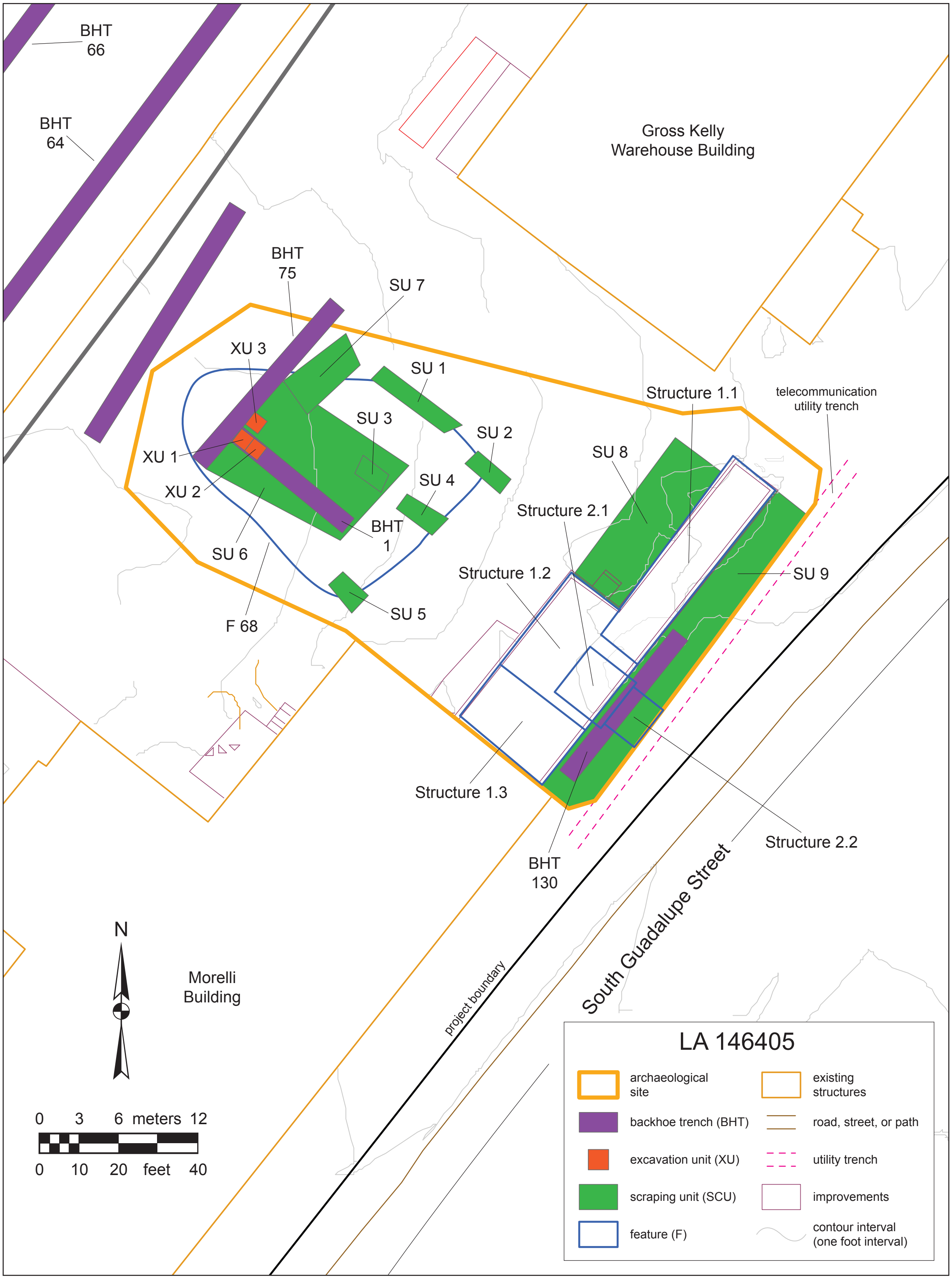


Figure 4.3. LA 146405, site map.

depot and liquor distributorship remains speculative. Based upon Euroamerican artifact analysis, it may be contemporaneous with the initial depot at the turn of the century.

Site Location

LA 146405 was located along South Guadalupe Street between the Morelli and the Gross Kelly buildings (Fig. 4.2). It measured approximately 35 m (115 ft) north–south by 20 m (66 ft) east–west and covers about 700 sq m (Fig. 4.3). Prior to this project the site was used as a dirt-surfaced automobile parking lot. The foundations of Structures 1.1 and 1.2 were visible on the modern surface. These features were in use as a landscaped flower garden prior to excavation.

Archival Research

The SFC initially built a temporary depot in the railyard, but eventually shared the Union Depot with the D&RG. Scheick (2003) notes that the 1904 Station Grounds map (Fig. 3.66, Chapter 3, this report) shows a temporary station for the SFC Railroad at the location of LA 146405. This structure was described as being approximately 175 m (575 ft) south and west of the Union Depot and west of the SFC tracks.

According to the map, the station measured 25.91 by 15.85 m (85 by 52 ft). A platform, constructed of unknown materials, surrounded the northeastern corner of the building. A map of the Joint Terminals of the D&RG and SFC railroads dated ca. 1903–1918 identifies a building in this same location as a warehouse. The north one-third of that structure is designated "perishables." If these "perishables" required refrigeration, the deeply buried brick floor exposed at this location may represent an ice-cooled cellar related to the station's freight service.

C. T. Snow (1995:17) notes that this temporary SFC depot was known as the "old freight depot" after the NMC occupied the Union Depot. C. T. Snow (1995:21, 23–24) also states that this building was used for scrap metal storage in the 1940s and was then demolished sometime between 1945 and 1960. However, aerial photographs from 1960 or 1961 (Figures 7 and 10 in C. T. Snow 1995) do in fact demonstrate that a building was occupying this space. Scheick (2003:71–72) illustrates that, in 1945 and in 1969, Quality Imports, a Coors beer-distributing company, owned by M. J. and Phillip Maloof leased a building at this location. That the original Coors beer distributor's building was located directly south of the Gross Kelly building was corroborated by Helen Maloof (personal communication to Guadalupe Martinez, December 23, 2004).

Excavation Sequence

LA 146405 was initially archaeological tested through the excavation of two backhoe trenches that cross through the present site area (Wenker 2005a:39). One backhoe scraping unit (SCU 5) and a single one-meter square excavation unit (XU 33) were also excavated at this site to evaluate the deposits, features and artifact content. These tests documented two features, Features 61 and 68. Feature 61, now identified as part of Structure 2, was a brick floor. Feature 68 was a large refuse pit. Based upon these two features, data recovery was proposed for LA 146405 because of the potential for the site to provide information relevant to *Research Domain 3: Bringing Archaeology and History to bear on the Archaeological Buildings and Structures of the Santa Fe Railyard* (Wenker et al. 2005:123–132).

Data recovery activities were conducted between February 21 and April 6, 2005. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker et al. 2005). Feature and excavation unit numbers used in this project are not always continuous from 1 to n, because in many cases the designations from the testing project (Wenker 2005a) were maintained to provide consistency in the provenience designations.

Various scraping and excavation units were used to expose and define the architectural foundations, but there were few features containing intact cultural deposits (Tables 4.1, 4.2). Generally, the upper fill of Strata 1 and 2 was excavated in full-cut hand and mechanical excavation units to expose the various surface and subsurface foundations. In most cases these upper deposits were not systematically screened or sampled because of the mixed and redeposited nature of the recent fill. Specific screened proveniences, such as the refuse pit (Feature 68) are discussed in the feature descriptions. Artifact frequencies (Table 4.3) were relatively low outside of the refuse pit (n = 1,161 items from both structures, 5,901 items from Feature 68). Most archaeological work at this site focused on feature exposure and architectural documentation in the form of plan maps, cross-section and elevation drawings, photography, and narrative descriptions.

Site Stratigraphy

At LA 146405 most of the sediment filling and capping of the structures and the surrounding historical ground surface consisted of purposefully introduced overburden. Stratum 1 was a modern deposit of dark brown silty loam with abundant inclusions of base course gravels, asphalt, modern refuse, coal, and cinders. This was probably fill brought to level the driving surfaces in the area and was 5 to 30 cm (2 in to 1 ft) thick. Stratum 2 was a black sandy loam deposit containing abundant inclusions of coal and cinders and historic refuse (glass, metal, etc.) and was approximately 5 cm (2 in) to nearly 2 m (6 ft) in thickness where it filled the cellar. These two deposits (Strata 1 and 2) were the sole strata identified in the purposefully backfilled and buried structural foundations at this site. Stratum 3, part of the underlying sterile substrate, was a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. Stratum 4, also a sterile substrate, was a soft to slightly hard, gravelly sandy silt that exhibited a weakly formed medium crumb structure. Its color ranged from light yellowish brown to very pale brown and the deposit exhibited common to many, fine to medium, distinct mottles of caliche inclusions. Stratum 5 is the basal sterile substrate and consists of a massive, hard, very to extremely gravelly, very cobbly, coarse silty sand that is light yellowish brown to brown in color. Clasts frequently exhibit caliche skins, and the overall stratum is weakly cemented with calcium carbonate. Detailed descriptions of these natural and cultural strata are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Strata exclusive to a particular feature or structure are described below.

Structure 1

LA 146405's Structure 1 consists of the structural foundations of three poured-concrete rooms (Fig. 4.3). Each room was assigned an individual structure designation. The top elevations of the foundations of the three rooms exhibit different heights. The intact portions of the northern room (Structure 1.1) rise to 70 cm (2 ft 4 in) above the surface. The top of the middle room (Structure 1.2) extends 30 cm (1 ft) above the surface, and the southernmost room (Structure 1.3) lies at ground level. The walls have footers that consist of broad concrete linear pads poured into trenches that were dug into sterile sediment or into the underlying historic backfill that in some areas extended below the bases of the footers. The walls of the three rooms were then form-poured, in sequences that left the impressions of the horizontal forms in the concrete. Bonded and abutted corners indicate that Structure 1.1 was the original building in this location. The northeastern corner of Structure 1.2 was then abutted to the southeastern outside corner of Structure 1.1. The walls of Structure 1.3 were then abutted to the south end of Structure 1.2, as well as to the northern wall of the extant Morelli Building, which rises immediately to the south of Structure 1.3, indicating that this room post-dates the construction of the Morelli Building. The rooms of Structure 1 were completely filled with post-abandonment refuse that was mechanically removed after plan and profile drawings were completed.

Structure 1.1. This room is the northernmost room and is characterized as a long narrow structure measuring about 12.5 m (40 ft) long and 3 m (10 ft) wide (Figs. 4.4, 4.5, 4.6). Based on its location and orientation in proximity to the railroad tracks that once passed just to the east, the elevated height of the foundation, and its early position in the construction sequence, this structure was originally thought to represent the foundation of the first depot of the New Mexico Central Railway (Wenker and Hannaford 2005a). However, subsequent archival research indicates that this interpretation would render the building footprint too small to approximate the size of the original depot, which was 85 by 53 ft (Scheick 2003:54). The room was mechanically excavated as a full unit, full cut to the base of the footers. The mixed deposits within the structure contained abundant construction material, possibly from the building's demolition, and nothing was located that could be associated with the depot operation.

Structure 1.2. The middle room measured about 6 m by 7 m (20 by 23 ft; Figs. 4.7, 4.8, 4.9). The western wall extended farther west than that of Struc-

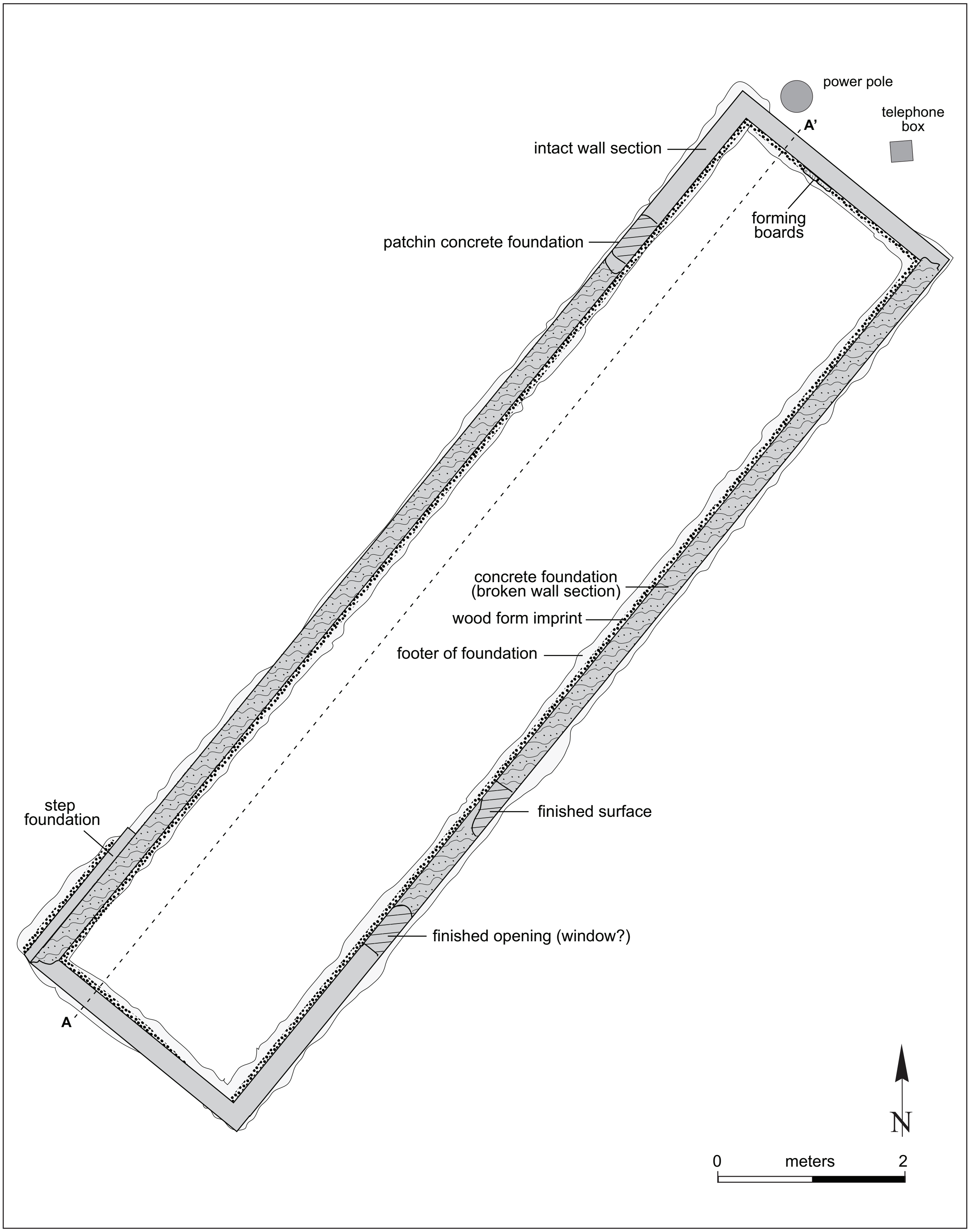


Figure 4.4. LA 146405, Structure 1.1, plan map.

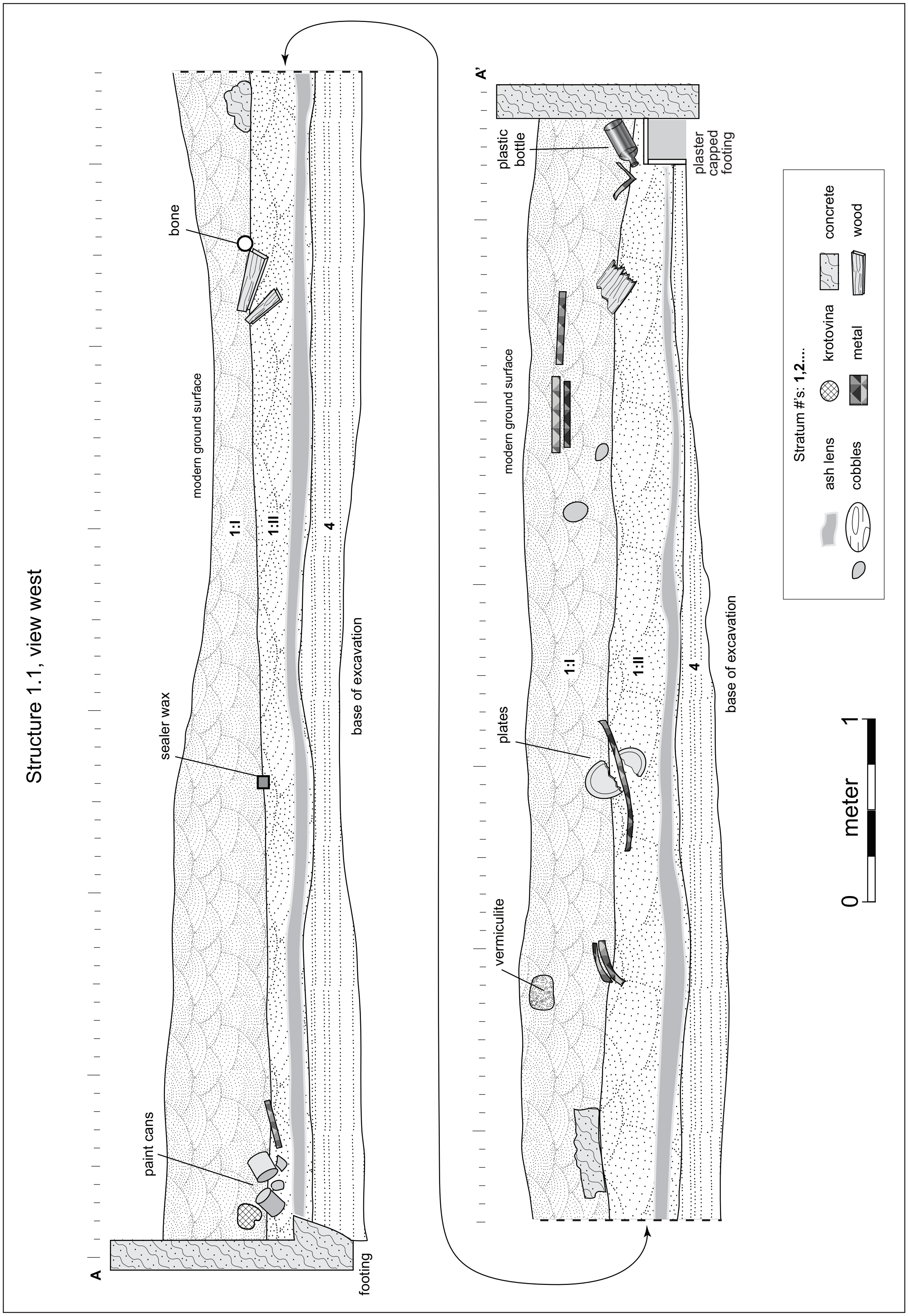


Figure 4.5. LA 146405, Structure 1.1, profile.

Figure 4.6. LA 146405, Structure 1.1, foundation, view to the north.

ture 1.1. The room was mechanically excavated as a full unit, full cut to the base of the footers. Again, deposits in the room represented post-abandonment accumulation. This structure has several 5.1 by 1.3 cm (2 in long, 0.5 in diameter) threaded bolts protruding above the concrete, spaced irregularly at 1 to 1.25 m (3 to 4 ft) intervals, probably serving as base plate anchors. The backhoe scraping unit revealed that a north–west-oriented interior wall had been added at a later date to split this room into east and west halves, but that wall had apparently been removed during the building's demolition. The partition wall was only apparent at its southern end, where a socket had been chiseled into the interior of the southern wall of Structure 1.2 and the partition wall had been poured. The northern end of the partition wall apparently abutted the southwestern corner of Structure 1.1. This room is apparently represents the first addition to their enterprise and may have been associated with the Maloof beer distributorship. It is partially positioned over Structure 2, the underlying cellar, but the cellar's walls are offset and were apparently not tied into the walls of Structure 1.2.

Structure 1.3. The southernmost room measured about 6 m by 4 m (20 by 14 ft; Figs. 4.7, 4.8, 4.10). The room shares its northern wall with Structure. 1.2, and the southern wall abuts the extant Morelli Building's foundation. East of this room were two square concrete pylons, the tops of which were mounted with metal brackets that are probably associated with this foundation. The room is also probably related to the beer distributorship operation, but its function is unknown. The room was mechanically excavated as a full unit, full cut to the base of the footers. Deposits in the room represented post-abandonment accumulation.

Structure 2

Structure 2 at LA 146405 underlies Structure 1.2 and was originally discovered during the testing phase, when a brick floor was exposed in an excavation unit at a depth of about 2 m (6 ft 6 in) below the surface (Fig. 4.3). After Structure 1 was completely documented, mechanical equipment removed that building and scraped the underlying sediment to expose the perimeter of the dirt-walled cellar in

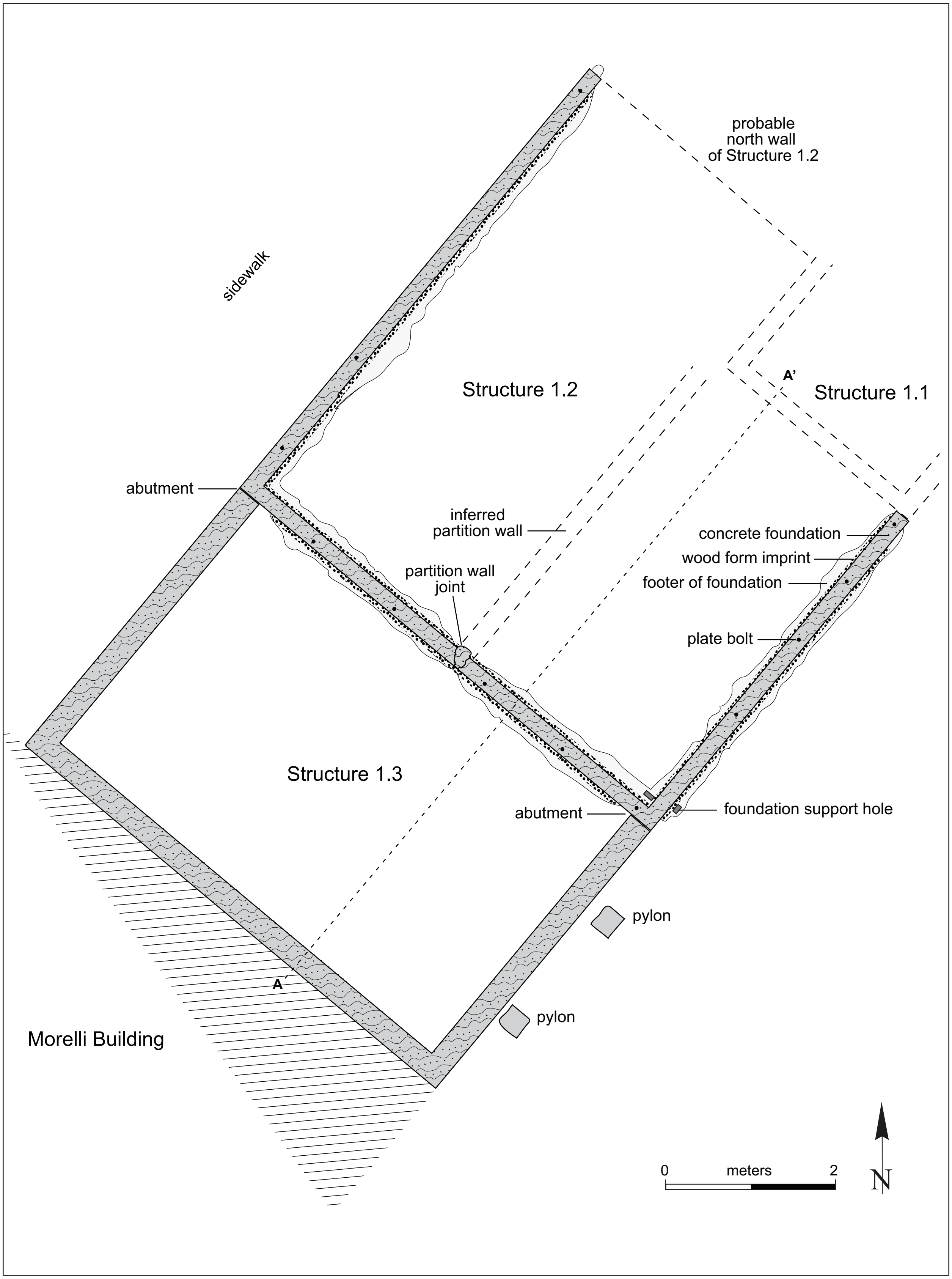


Figure 4.7. LA 146405, Structures 1.2 and 1.3, plan map.

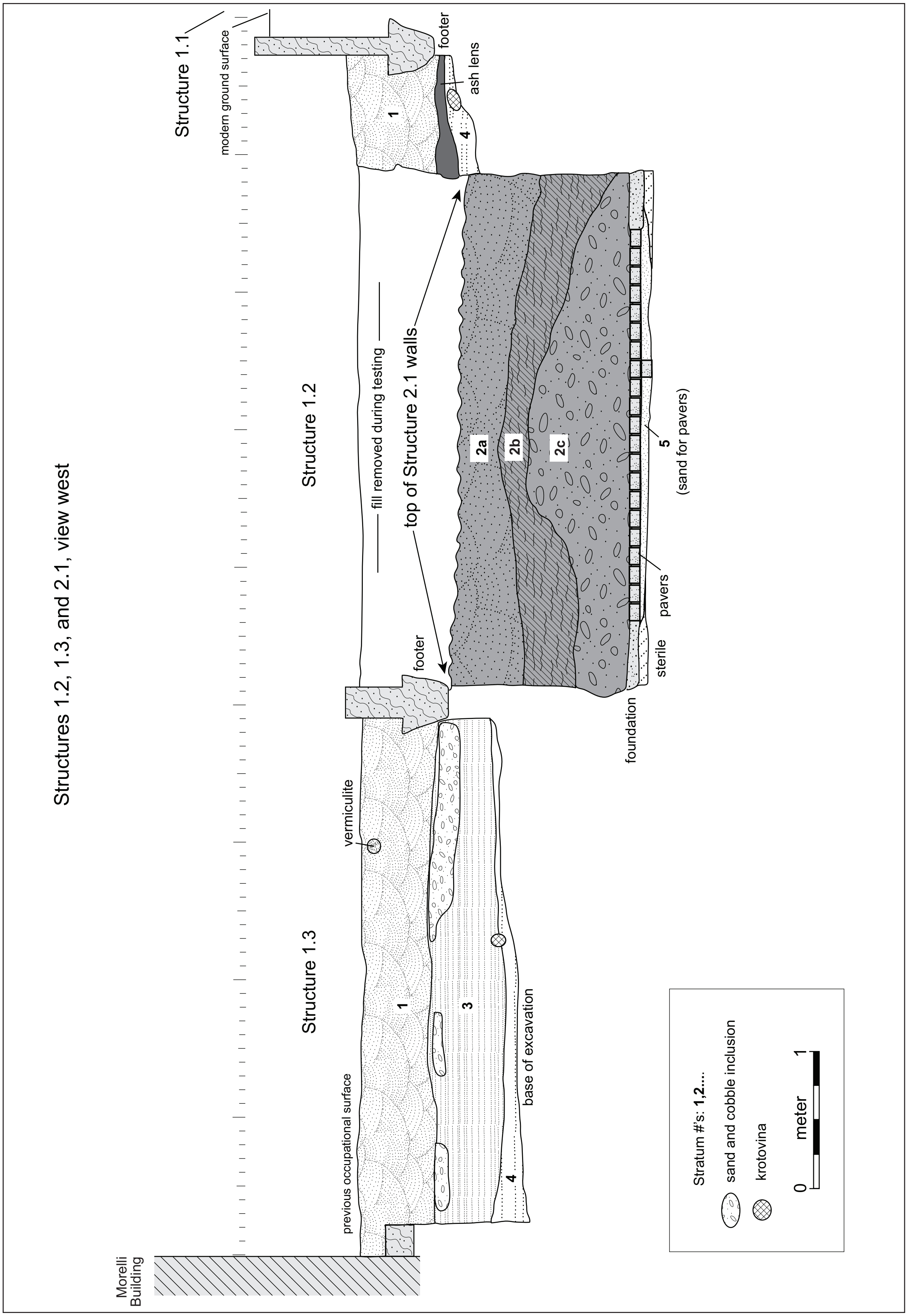


Figure 4.8. LA 146405, Structures 1.2, 1.3, and 2.1, cross sections, facing west.

Figure 4.9. LA 146405, Structure 1.2, foundation, view to the east.

Figure 4.10. LA 146405, Structure 1.3, foundation, view to the west.

plan view. The upper extent of the mixed fill within the cellar was then also mechanically excavated to a depth of about 15 cm (1 ft) above the floor. The structure was ultimately separated into two subdivisions, Structure 2.1 and Structure 2.2. Each designated portion was excavated in halves and the final 15 cm (1 ft) of floor fill was screened with 1/4-inch mesh.

Structure 2.1. The west end of the cellar was distinguished by a brick-paved floor (Figs. 4.8, 4.11, 4.12). The interior floor dimensions measure 4.5 m (15 ft) east/west by 4 m (13 ft) north/south. The brick-paved floor surface inside the room is constructed of red fire bricks (each roughly 3 1/2-inch by 8 1/4-inch across), possibly hand-made and poorly fired, placed in staggered rows in a east-to west orientation, along the long axis of the room. The bricks were set in a 2 to 3 cm (~2 in) layer of

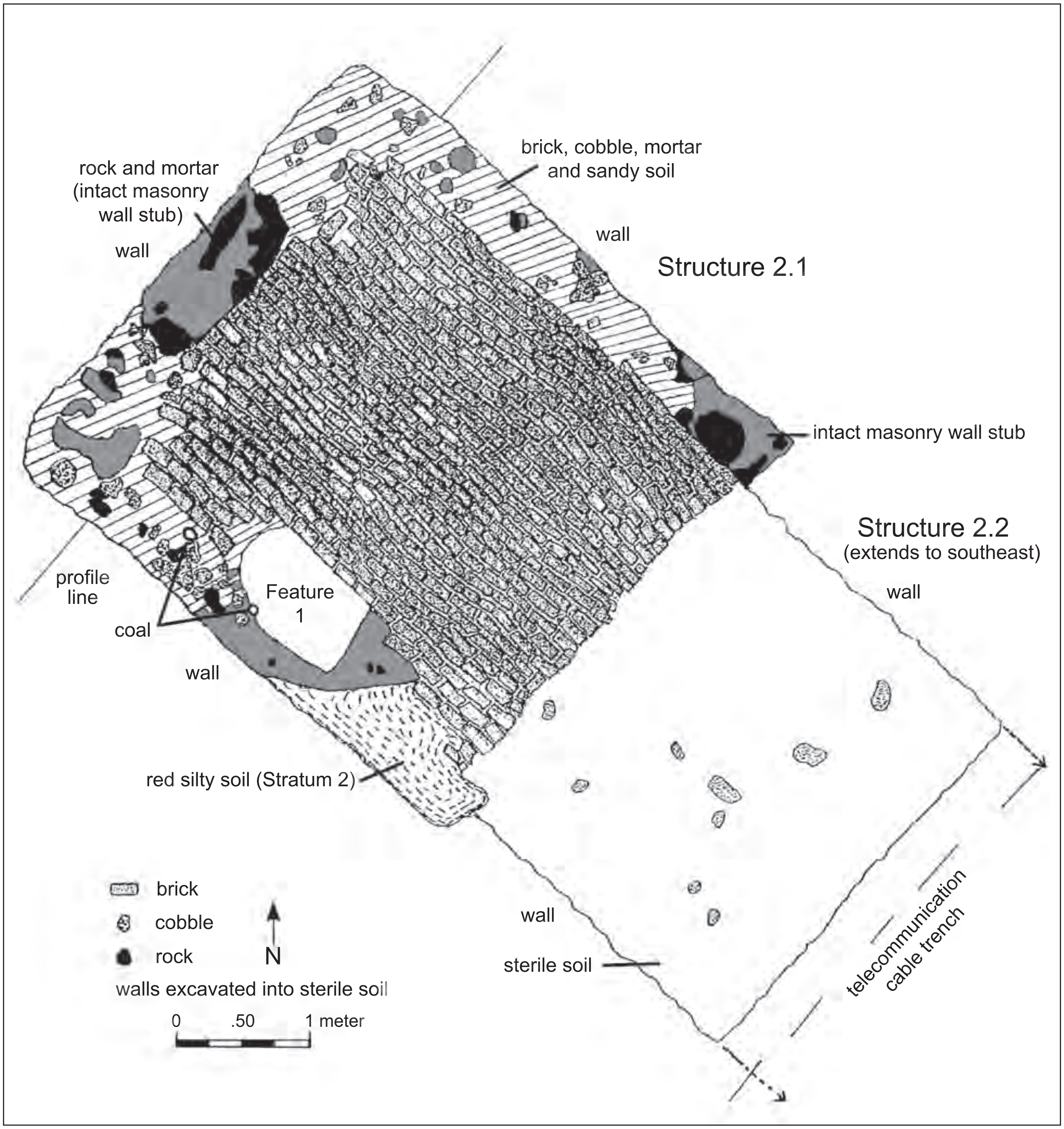


Figure 4.11. LA 146405, Structures 2.1 and 2.2, plan map.

Figure 4.12. LA 146405, Structure 2. Structure 2.1 is the brick floor; Structure 2.2 occupies the foreground.

sand and cracks between the bricks were also set with sand. The brick floor is surrounded on the north, south, and west by the stub of a crude cobble masonry foundation cemented with lime mortar. The foundation is about 50 cm (1 ft 8 in) wide, but the remaining stub does not rise much higher than the brick paving. Nothing remains of the masonry walls above the foundation, but the walls were apparently not tied into Structure 1 above. Upon excavation, only the vertical earthen walls of the cellar pit, which would have been fronted by the masonry wall, were still intact. The top of the extant earthen walls rose to 1.5 m in height, which does not provide for a full-height basement. The eastern margin of Structure 2.1 does not have a foundation stub, but is characterized by the carefully executed, uniform termination of the brick floor. The eastern end of the northern masonry wall is also marked by an abrupt termination that coincides with the edge of the brick floor. East of this wall/floor termination, the vertical earthen walls of Structure 2.2 to the east also constrict inwardly by about 40–50 cm (1 ft 4 in–1 ft 8 in) on each side and then continue to the east, further accentuating the distinction between Structure 2.1 and 2.2 as separate spaces. Whether a physical (but perishable) barrier once existed between the two spaces is unknown.

The fill above the brick floor contained abundant lime mortar and cobbles, indicating that at least part of the masonry walls had collapsed inwardly. The floor fill consisted of a sandy loam with a large amount of coal near the surface. Artifacts included ceramics, glass, fiber, peach pits, bone, and metal (Table 4.3). All of the artifacts appear to be post-abandonment debris. Of importance to dating the room's abandonment was the recovery of a whole bottle with a turned-in-mold body and an applied crown cap finish, having a probable manufacturing date of about 1882–1903 (Wenker and Hannaford 2005a:15).

Feature 1. Structure 2.1 contained a single feature along the southern wall that consists simply of a rectangular space lacking paving bricks. The feature measured 80 cm (2 ft 8 in) by 70 cm (2 ft 4 in) and an inferred 9 cm (4 in) deep. The feature had a straight-walled, flat-bottomed cross section. The feature fill was sandy loam mottled with coal, gravel, and mortar chunks. The fill was screened with 1/4-inch mesh. The function of the feature is unknown, but apparently about 30 paving bricks were either removed or were never originally placed in this area. This may have been the location of a piece of furniture or equipment that abutted the southern wall that was removed upon the cellar's abandonment.

Structure 2.2. The eastern portion of the cellar measured roughly 2.75 m (9 ft) east/west (incomplete) by 3.25 m (10 ft 8 in) north–south (Figs. 4.11, 4.12). The eastern wall was not exposed because of the presence of a modern buried telecommunication cable in that direction, as well as a sidewalk and the curb of South Guadalupe Street. The floor does not contain brick pavers, but instead is composed of the unprepared surface of the natural substrate (Stratum 5 in this area). The floor is bordered on the north and south by earthen walls carved from the natural Stratum 3, 4, and 5 substrata. The walls rose to the same height as in Structure 2.1, although the earthen walls constrict within Structure 2.2 to a width that equates with the width of the brick-paved floor in the space to the west. No cobble and mortar foundation stubs were exposed in Structure 2.2. Artifacts consisted mainly of non-diagnostic sheet metal fragments and smaller frequencies of ceramics, bone, glass, and slag (Table 4.3).

Structure 2: Summary

Structure 2 at LA 146405 consists of two adjoining spaces underlying Structure 1.2 at a depth of about 2 m (6 ft 7 in) below the surface. Structure 2.1 is characterized by a brick paved floor surrounded on three sides by a cobble and mortar foundation. Structure 2.2 lies immediately to the east, but lacks the brick paving, and the north and south walls are defined by simple walls carved from the natural substrata. Structure 2.2 extends an unknown distance to the east. Because Structure 2 extends underneath the eastern wall of Structure 1.2, it probably does not relate to the Maloof-era use of Structure 1. Instead, Structure 2 may represent a cellar (ice, root, coal?) associated with the New Mexico Central depot, which rose just to the north of the northern wall of the cellar. A whole bottle from the floor of Structure 2.1 suggests a turn-of-the-century abandonment date, and the abundance of coal also suggests a railroad-related use, but the exact nature of the cellar and its association with Structure 1 remains problematic.

NSTR Area 1

NSTR Area 1, LA 146405, included excavations in and around Feature 68, a buried refuse pit in the open parking area northwest of the structures (Fig. 4.3). Feature 68 was originally exposed in BHT 75 during the testing phase, and additional scraping and trenching in this area during data recovery failed to reveal additional features.

Feature 68. The feature consists of a large semi-circular, shallow basin-shaped historic trash midden with an inferred length of 15 m (49 ft) by 10 m (32 ft 10 in) wide and a maximum depth of 80 cm (2 ft 7 in). The feature had been dug into the sterile Stratum 3 substrate and was covered by a thick mantle of Stratum 1 parking lot cinders. The limits of the feature were defined with both mechanical scraping and trenching and hand-dug excavation units, including XUs 1–3, SCUs 1–7, and new BHT 1. The edges of the feature were marked by a horizontal differentiation between the black coal and cinder deposit capping the feature fill (which was thin and irregular about the edges) and the surrounding sterile substrate (Stratum 3 or 4) that underlay the parking lot.

Three hand-dug 1 by 1 m excavation units were dug in the deepest portion of the feature and were screened with 1/4-inch mesh (Table 4.1). The historic artifact assemblage recovered from the units consisted of 5,901 artifacts, with the overwhelming bulk of material coming out of the bottom level of the pit (Table 4.3). The majority of the artifacts consisted of scrap metal, bottles, and wood, but other material types included plastic, metal, textile, wire, railroad cinders, coal, slag, and charcoal. Artifacts were mixed in Stratum 2 characterized by dark gray loam with abundant coal and cinder. The feature functioned as a large trash pit dating from the mid-twentieth-century.

NSTR Area 2

NSTR Area 2 at LA 146405 included mechanical scraping excavations (SCUs 8, 9) around the eastern and western perimeter of Structure 1. No scraping could be conducted to the north due to modern utilities, and the Morelli Building lay to the south.

A single small refuse pit (Feature 1) was exposed in cross section in the western wall of the scraping unit west of the Structure 1.1. Several diagnostic glass artifacts were opportunistically collected, the feature was profiled, and no further work was conducted.

Euroamerican Artifacts
Matthew J. Barbour

A total of 8,533 Euroamerican artifacts were collected from LA 146405, 30 percent (n = 2,593) of which were chosen for detailed analysis. These artifacts consisted of materials within the basement (Structure 2, n = 1,310) and in a nearby extramural pit (Feature 68, n = 1,283). Table 4.4 summarizes the distribution of Euroamerican material culture by category, type and function for these two regions.

Artifacts recovered from Structure 2 fill included large quantities of construction and maintenance (n = 553, 42 percent) material presumably associated with the building's superstructure. The vast majority of these artifacts are window glass fragments (n = 543) and could indicate show or commercial business windows. Indulgence products (n = 112, 9 percent) were also relatively common. The presence of both construction and maintenance artifacts associated with the building's superstructure and indulgence products associated with alcohol consumption suggests Structure 1.2, part of the Coors distributorship was in-use and situated above the basement when Structure 2 was abandoned.

This assessment conflicts with the initial conclusions reached by Wenker and Hannaford (2005a:15). They believed the basement predates construction of the Coors distributorship by almost three decades arguing that presence of a single turn mold bottle with a crown top finish on the floor of the basement suggests abandonment sometime between 1892 and 1904. However, other materials within the fill including machine bottle glass (n = 7, 1904+, Lorrain 1968:43) and a plastic tag (n = 1) date substantially after this period. Furthermore, the turn mold bottle to which they attribute an end date of 1904 has been reported by some to have been produced into the 1910s or 1920s (Newman 1970:72). Unfortunately, no manufacture marks or brand names were identifiable on any of the Euroamerican artifacts recovered and the date of Structure 2 abandonment cannot be conclusively decided.

Feature 68 is less ambiguous. The majority of materials from the pit are unidentifiable bottle glass fragments (n = 792, 62 percent). These fragments along with artifacts from the indulgences category (n = 225, 18 percent) likely represent materials deposited from the Coors distributorship in the mid-twentieth century. Based upon the counts of bottle glass by color, it would appear likely that the majority of Coors products were bottled in a clear colored container as opposed to the aqua, green and amber colors used by their competition (Table 4.5). However, no single fragment of glass possessed an embossed Coors logo brand. Nor were any paper labels recovered. Table 4.6 lists all manufacturers identified from glass fragments within the feature. The presence of a particular Anchor Hocking manufacturer mark suggests deposition after 1946+ (J. H. Toulouse 1971:46). This would place deposition sometime in the Post-World War II era. The date can be further refined by the presence of samples from Glass Containers Inc., which went out of business in 1955 (J. H. Toulouse 1971:220-221). Hence a 1946–1955 date range can be inferred from the material culture. However, also present were materials by Olean Glass Co., which was bought by Thatcher Glass Manufacturing Co. in 1943 (J. H. Toulouse 1971:401). This date does not overlap with the production of the particular Anchor Hocking mark. It is possible that artifacts within the pit are a collection of materials from the 1930s, 1940s, and 1950s.

Fauna
Britt M. Starkovich

The faunal assemblage from LA 146405 is small, with only 55 analyzed specimens. The faunal sample comes from Structure 2.1 (n = 12), the western end of the cellar, Structure 2.2 (n = 6), the eastern end of the cellar, and NSTR 1 (n = 35), the trash deposit west of the structures. Two specimens are lacking provenience information more specific than "whole site."

Attempts were made to identify all specimens to species, but some highly fragmented pieces were only assigned to general size classes. Due to the similarity of the skeletal structure of sheep and goats and difficulty of distinguishing the two, many specimens were designated as generalized sheep/goat if a more specific identification was not possible. Though the sample size is small, there is a relatively wide range of animal species represented at the site. The majority of the remains are from domestic fauna, including cattle, sheep or goat, pig, chicken and dog. A few specimens could only be identified to the category of small ungulate, and likely represent sheep or goat. Some non-domestic fauna is present as well, including small squirrel, jackrabbit, pocket gopher and flicker. Evidence of butchering on some of the domestic fauna corresponds to cuts of meat still used today (Ashbrook 1955). There is some evidence of environmental, and animal alterations on the remains, and ample evidence of human butchering, but for the most part the sample size is too small to make any inferences.

Structure 2

Structure 2 at LA 146405 is a subterranean structure that likely represents a cellar or basement (Wenker and Hannaford 2005a). During the excavation the area was divided into structure 2.1, the western end defined by the presence of a brick floor and cobble and mortar walls, and structure 2.2, the eastern end of the cellar with compacted dirt walls and floor that was excavated directly into the substrate (Wenker and Hannaford 2005a).

The sample size for Structure 2.1 is extremely small (n = 12), but includes domestic fauna such as cattle, sheep or goat, and chicken, as well as a specimen from a flicker (Table 4.7). Most of the remains are highly fragmented (less than 10 percent complete) but two specimens were complete. Two of the specimens were altered by the environment, and three show evidence of human modification (Table 4.7). Two specimens had been butchered with a mechanical saw, often indicative of store-bought meat. They correspond to the modern rib and short rib cuts of meat (Table 4.8). In terms of cost-efficiency considering price per pound and pounds of edible meat per cut, following Lyman (1987), rib cuts are moderately cost-efficient cuts of beef, and short ribs are among the least cost-efficient cuts.

The sample size for structure 2.2 is even smaller than that from 2.1 (n = 6). It includes two cattle bones, and remains from Botta's pocket gopher, as well as an unspecified small squirrel (Table 4.7). The latter two probably are probably from intrusive animals that entered the cellar, possibly after abandonment. The specimens represent an entire range of fragmentation. One specimen exhibits environmental damage, and none of the remains show evidence of animal alteration or burning (Table 4.7). One of the cattle bones was cut through, with an ax or implement other than a saw, which may indicate home butchering. The cut corresponds to the modern round cut (Table 4.8) (Ashbrook 1955), which is a highly cost-efficient cut of meat.

The overall sample from Structure 2 is so small that no patterns are apparent. The small sample size does, however, have a fairly large range of different species, as well as a variation in fragmentation, environmental alteration and human butchery. The remains did not include teeth or long bone epiphyses, so age at death could not be estimated for any of the individuals.

NSTR 1

The majority of the LA 146405 sample came from NSTR 1 (n = 35). Domestic fauna from the midden includes cattle, sheep or goat, pig, chicken, and the partial skeleton of a small mature dog (Table 4.7). Black-tailed jackrabbit is also represented. The remains have a variable degree of fragmentation (Table 4.7), with almost 30 percent of the specimens from complete elements, but many of the complete or almost complete elements belong to the dog skeleton. There is minor evidence of environmental or animal alteration, as well as burning.

Twenty-five percent of the remains show evidence of human butchering, and six specimens are cut or sawn through at areas that correspond with modern butchery practices (Ashbrook 1955). Meat cuts include round, foreshank, rib and short rib cuts of beef, and a cut corresponding to the ham portion of a pig is present (Table 4.8). These cuts range from highly cost-efficient to among the least cost-efficient (Lyman 1987). Ages could be assigned to four specimens based on long bone fusion data (Schmidt 1972; Silver 1970; Reitz and Wing 1999). A sheep femur belonging to an individual older than 36 months was recorded. Three pig elements could be aged to older than 12 months, younger than 24 months and younger than 27 months, respectively (Table 4.9), but it cannot be ruled out that all three elements did not come from one individual between 12 and 27 months of age.

Specimens with No Provenience

Two specimens lacking provenience information beyond "whole site" were analyzed, including a fragmented piece of chicken and fragmented cattle bone (Table 4.7). Neither showed evidence environmental or animal alteration, or burning. The cattle bone, a rib sawn through by a mechanical saw possibly indicative of store butchery, corresponds to the modern short rib cut (Table 4.8), one of the least cost-efficient cuts of beef (Lyman 1987). Age could not be assigned to either of the specimens.

Conclusion

Due to the small sample size of fauna from LA 146405, comparisons between the different areas of the site are difficult. Both areas contain a relatively wide range of different species considering the small sample size, and both areas had a variable degree of fragmentation and environmental alteration. Butchering damage is apparent on about 25 percent of the remains over all, and is fairly consistent across the different areas of the site. Most of the butchered specimens belonged to cattle, and only two of them were from highly cost-efficient cuts of beef (Lyman 1987) (Table 4.8). About two thirds of the butchering corresponding to modern, wholesale cuts of meat was likely done by a mechanical saw, possibly indicative of store butchery. The other third, however, was cut through with axes or other non-saw tools, and may have been processed in-home. Though the sample size is small and much caution must be used when interpreting these data, the analyzed fauna from LA 146405 are remarkably diverse, in terms of species representation as well as human processing behaviors.

Chipped Stone
James L. Moore

Three chipped stone artifacts were recovered during data recovery at LA 146405, including a limestone core flake, and pieces of quartzite and unsourced chert angular debris. All three artifacts are whole, and the core flake has a cortical platform. Cortex was also noted on one piece of angular debris and in both cases is water worn, indicting that these materials were obtained from secondary gravel deposits. There was no evidence of use-wear on these artifacts.

The three pieces of chipped stone were recovered from post-abandonment fill that was deposited into the cellar of a building that once existed at this location. This depositional regime suggests that these artifacts might not be related to the use of this building, though of course the possibility exists that the materials used to fill the cellar when it was abandoned came from associated refuse deposits.

Summary

Data recovery efforts at LA 146405 documented the concrete foundations of a three room structure possibly associated with both the original (pre-1904) depot of the New Mexico Central Railway as well as Quality Imports, the Coors beer distributorship operated by the Maloof family starting in the 1937 (Wenker et al. 2005a:125). When the buildings were abandoned and dismantled, the open foundations were used for post-abandonment refuse dumping, so few of the recovered artifacts relate to the operation of the buildings. A large refuse pit west of the structures also contained mid-twentieth century artifacts, as did a smaller pit nearer the buildings. These materials are contemporaneous with the Maloof distributorship, but contain no recognizable Coors bottled products.

Of interest was the exposure of Structure 2 located below Structure 1.2. Structure 2 was a cellar, possibly a coal cellar (or ice cellar, or root cellar) associated with one of the upper buildings. However, Structure 2 does not seem to tie into the upper walls and the exact relationship of the overlying building remains unclear. While initial examination of the historic artifacts suggested a turn-of-the-century date for the cellar, detailed laboratory analysis of Euroamerican artifacts indicates a mix of materials that date perhaps as late as the 1910s or 1920s. This date range and presence of construction debris in cellar fill suggests that the cellar, which may have been associated with the original NMC depot, could have been abandoned by later inhabitants. If this was the site of Quality Imports, artifacts from fill suggest that some part of the original NMC building was at least partially unfit for further use and was in-filled.

The data recovery program has recovered abundant architectural data from two structures. Artifacts associated with these structures have provided baseline data regarding use and abandonment. The site area was not likely to yield additional important information beyond that already recovered. No further archaeological investigations were recommended for the site as part of the data-recovery program (Wenker and Hannaford 2005a:20). ARC and HPD concurred. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 146406

Chris T. Wenker

revised by

Jessica A. Badner and Matthew J. Barbour

Introduction

This linear site consisted of a short length of an abandoned railroad bed (excavated and recorded as Feature 104) located along the eastern margin of the North Guadalupe Parcel (Fig. 4.13). This track remnant represented part of the Santa Fe Central's standard-gauge line that was built between 1900 and 1903 (Scheick 2003:48; D. H. Snow 1995:11–12). The Santa Fe Central Railway merged with the Albuquerque Eastern Railway to form the New Mexico Central Railway in 1904, which was in turn bought by the AT&SF in 1926. A large pit (Feature 57) that cut through the railroad bed was also included in the site. However, this feature appears to date sometime after 1971.

Site Location

LA 146406 was assigned to a portion of railroad track located between the Gross Kelly Warehouse Building and South Guadalupe Street (Fig. 4.2). This exposed section of track ran almost parallel to Guadalupe Street and is projected to have crossed Manhattan Avenue to the northeast. The track alignment was roughly perpendicular to, and crossed, LA 146407, the Acequia de Analco. Figure 4.13 depicts the overlapping site locations relative to one another and Figure 4.14 illustrates their relationship in profile.

Archival Research

Historic maps indicate that the remnant alignment was probably part of the "No. 21" track (Scheick 2003:71), which passed directly east of LA 146405, the initial Santa Fe Central Depot. These tracks are visible in 1960 aerial photographs of the railyard (C. T. Snow 1995:27, 34), and are noted to have been present as late as 1971. However, construction of South Guadalupe Street had removed all remaining trackage associated with LA 146406, by 1974 (C. T. Snow 1995).

Excavation Sequence

LA 146406 was exposed in two backhoe trenches (BHTs 51, 52; Figure 4.14) excavated as part of the 2 percent sampling requirement. Features 57 and 104 profiles were exposed in trench walls and recorded without further excavation. However, during data recovery excavations of the west portion of LA 146407 and LA 146408, a section of the rail alignment (Feature 104) was exposed in plan view. Tie casts were partially excavated in XU 26 through 29 and are discussed with the Acequia de Analco, LA 146407, excavations. Remnant tie cast locations were added to the site map using a total station.

Site Stratigraphy

Strata 1, 2, 3, and 4 were typical of project wide site stratigraphy and were discussed in detail in the project stratigraphy section of this report. Backhoe trench exposures indicated that Stratum 1, which capped the site, was 30 cm (1 ft) thick. Stratum 2, beneath Stratum 1, was 14 cm (6 in) thick and filled railroad tie imprints. Stratum 3 and Stratum 4, sterile substrate below Feature 56 (which was recorded as part of LA 146407), was at least 40 cm (1 ft 4 in) thick. Site stratigraphy is illustrated in Figure 4.14.

Stratum 27**.** Stratum 27 was reddish consolidated clay associated with an underlying acequia (LA 146407). It formed the underlying substrate into which the track bed (Feature 104) was placed. The deposit was from 45 to 75 cm (1 ft 6 in to 2 ft 6 in) thick and overlays Stratum 4.

Feature Descriptions

Railyard- and modern-era features (n = 2) were encountered during testing at LA 146406. Feature 104

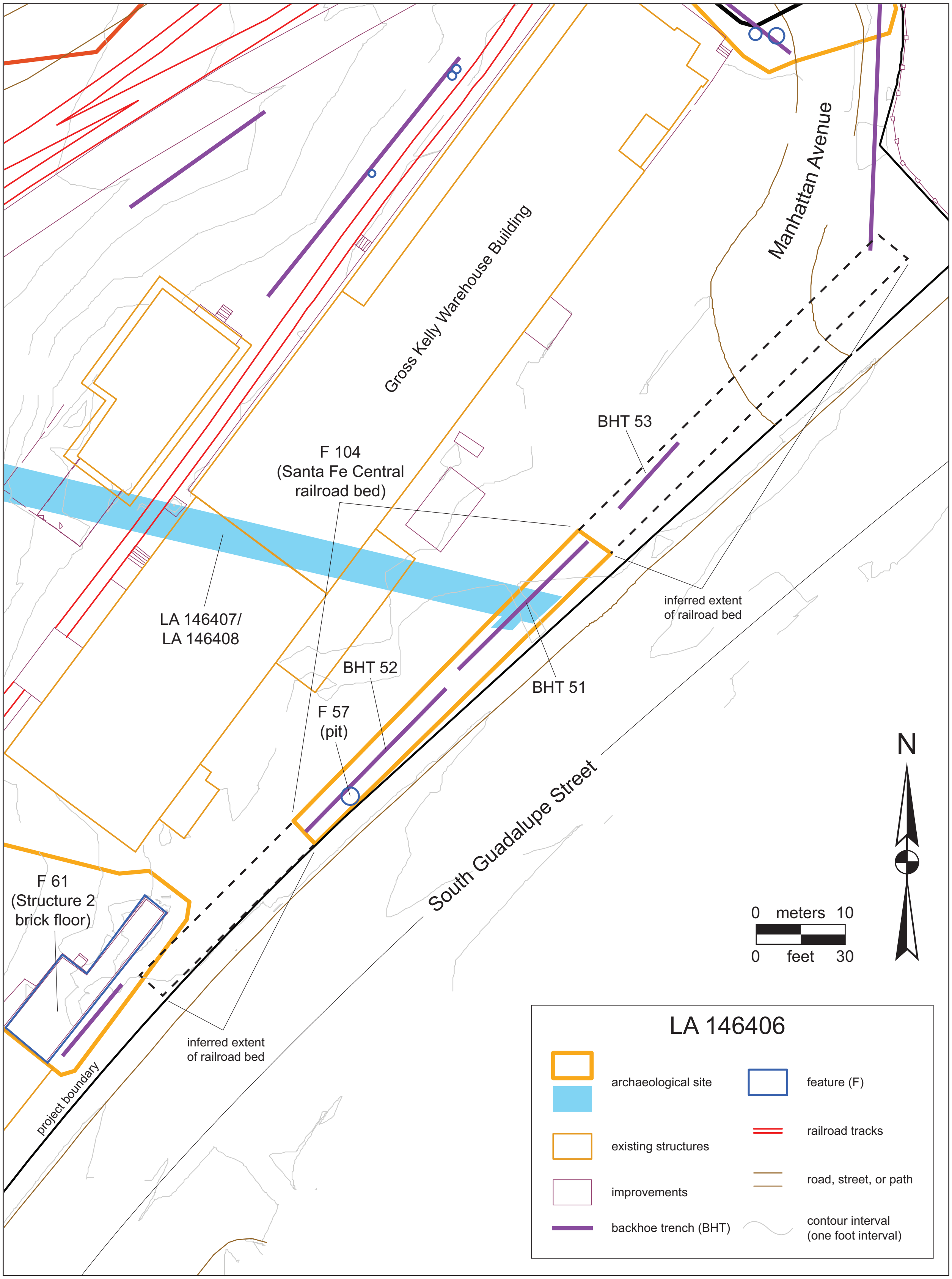


Figure 4.13. LA 146406, site map, showing feature numbers.

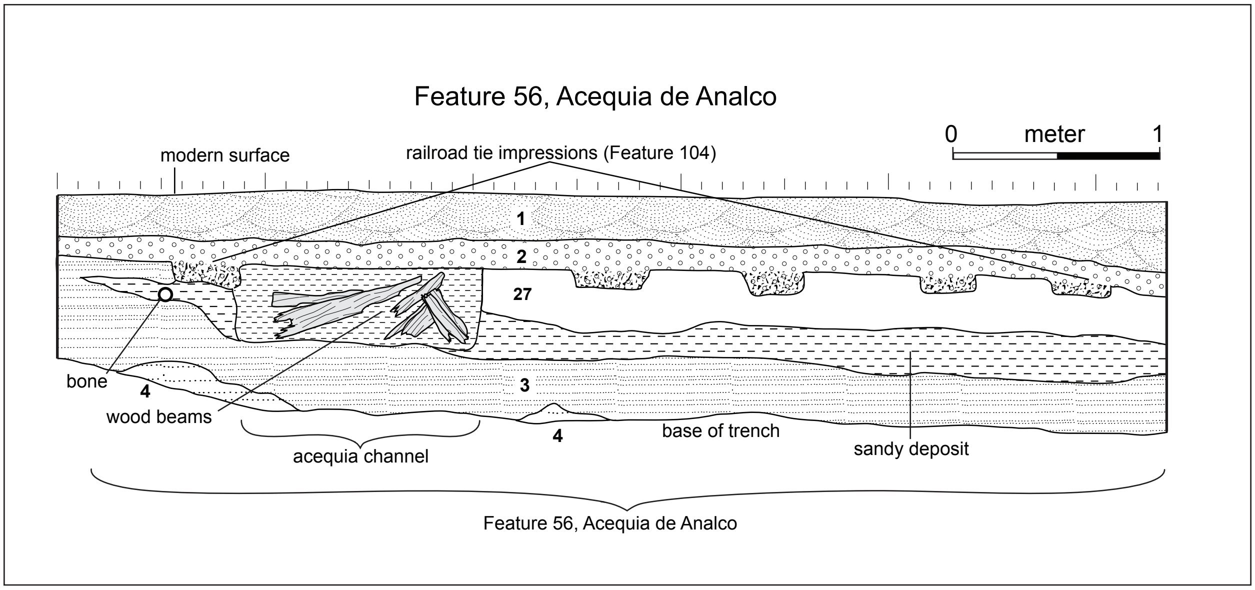


Figure 4.14. Cross-section view of Feature 56 (LA 146407), the Acequia de Analco, and part of overlying Feature 104 (LA 146406), an abandoned railroad bed, in BHT 51.

represents railroad tracks that were further exposed archaeological investigations at LA 146407, the Acequia de Analco. Feature 57, a modern pit, was also recorded.

Railyard Era

Feature 104. This 5 m (16 ft 5 in) long section of abandoned railroad trackage was represented by impressions of wooden railroad ties that were removed and the impressions filled in. The remnant track was observed in the cross sections of two northeast to southwest oriented backhoe trenches excavated along the western edge of South Guadalupe Street and again in a scraping unit (SCU 7) excavated during archaeological investigations at LA 146407.

In both trenches, a series of rectangular pit impressions, spaced at regular intervals, was visible at the lower boundary of historic overburden deposit, Stratum 2 (Figs. 4.14, 4.15). The individual pits measured between 30 to 40 cm (1 ft to 1 ft 4 in) in width and 10 to 12 cm (4 to 5 in) in thickness, and their centers were spaced at roughly 60 to 75 cm (2 ft to 2 ft 6 in) intervals.

These pits were excavated into the Stratum 27 substrate (associated with the underlying acequia, LA 146407). The scrape, which exposed the feature in plan view indicated the truncated tie impressions on both sides of BHT, would have been at least 1.6 m (5 ft 3 in) apart leading to speculation that they may represent two parallel tracks. However, this is based off pits associated with the removal of the track and not the tracks themselves. Standard gauge rails are spaced 1.42 m (4 ft 8 in) apart. Tie impressions were filled with introduced historic 9overburden (Stratum 2). No ballast or other bed-preparation deposit was evident.

This feature directly overlaid a buried acequia channel (Feature 56, LA 146407). In the location where the tracks cross the channel, the acequia was lined with a wooden culvert described as part of LA 146408, indicating that the ditch was used contemporaneously with the track alignment.

No artifacts were recovered during excavation. However, based upon the track's location, archival documents suggest that LA 146406 represent a portion of the No. 21 line first laid down by the Santa Fe Central sometime between 1900 and 1903 (Scheick 2003:48; C. T. Snow 1995:11–12).

Modern

Feature 57. This straight-sided, flat-bottomed, pit was 1.8 m (5 ft 11 in) long and 90 cm (3 ft) deep. Exposed in BHT 52, the feature was recorded in pro-

Figure 4.15. LA 146406, BHT 51, view of cross section of part of Feature 104.

file. It appears to have been intrusive through the series of railroad-tie impressions discussed above (Feature 104), and was directly overlain by modern overburden (Stratum 1). Pit fill was a dark brown sandy clay loam possibly derivative of Stratum 1, mottled with reddish loamy clay and contained cinders and coal. Artifacts included a Native American potsherd and a piece of frosted glass. Theses items suggested late nineteenth-century deposition, but because the feature intruded through the tracks, it had to post-date the railroad. Archival research indicates that the railroad track that crossed through this area was not removed until the early 1970s. Therefore, the excavation and backfilling of this pit occurred in very recent times.

Summary

Aside from confirming the presence, location, and orientation of the tracks in the railyard, this investigation yielded little additional information. The dismantled track does not contribute to the character of the railyard, and the lack of intact original trackage precludes its significance as a historical engineering feature. Once testing was completed, no further investigation of LA 146406 was recommended (Wenker 2005a:74). ARC and HPD concurred. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149911

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 149911 was a discontinuous array of features associated with and including the abandoned New Mexico Central (NMC) railroad tracks that crossed through the South Guadalupe parcel of the Railyard Park (Fig. 4.16). These features included an earthen embankment, a wooden culvert, an array of posts, and a few railroad ties. Based upon archival research, the tracks earliest installation date was likely sometime between 1900 and 1903.

Site Location

LA 149911 was assigned to remnant railroad tracks ran roughly parallel to, and 100 m (328.08 ft) to the east of the existing rail line at the Baca Street parcel (Figs. 3.108, 4.2). The alignment ran from northeast to southwest and the identified extent of the site measured roughly 311 m (1020 ft) long by 15 m (49 ft) wide (Fig. 4.16). Site boundaries intersected three acequia sites: LA 149909, an unnamed acequia; LA149912 (Arroyo de los Tenorios); and LA 120957, the Acequia Madre.

Archival Research

Archival documents dates indicate that the rail lines were probably built through the South Guadalupe Railyard Park parcel between 1900 and 1903, remaining under NMC management until 1926 (Deyloff 2004). Railroad features and components in the park that post-date that period would be associated with the AT&SF management of the line. Many of the railroad tracks that lay north of the park were apparently removed or buried in the early 1970s

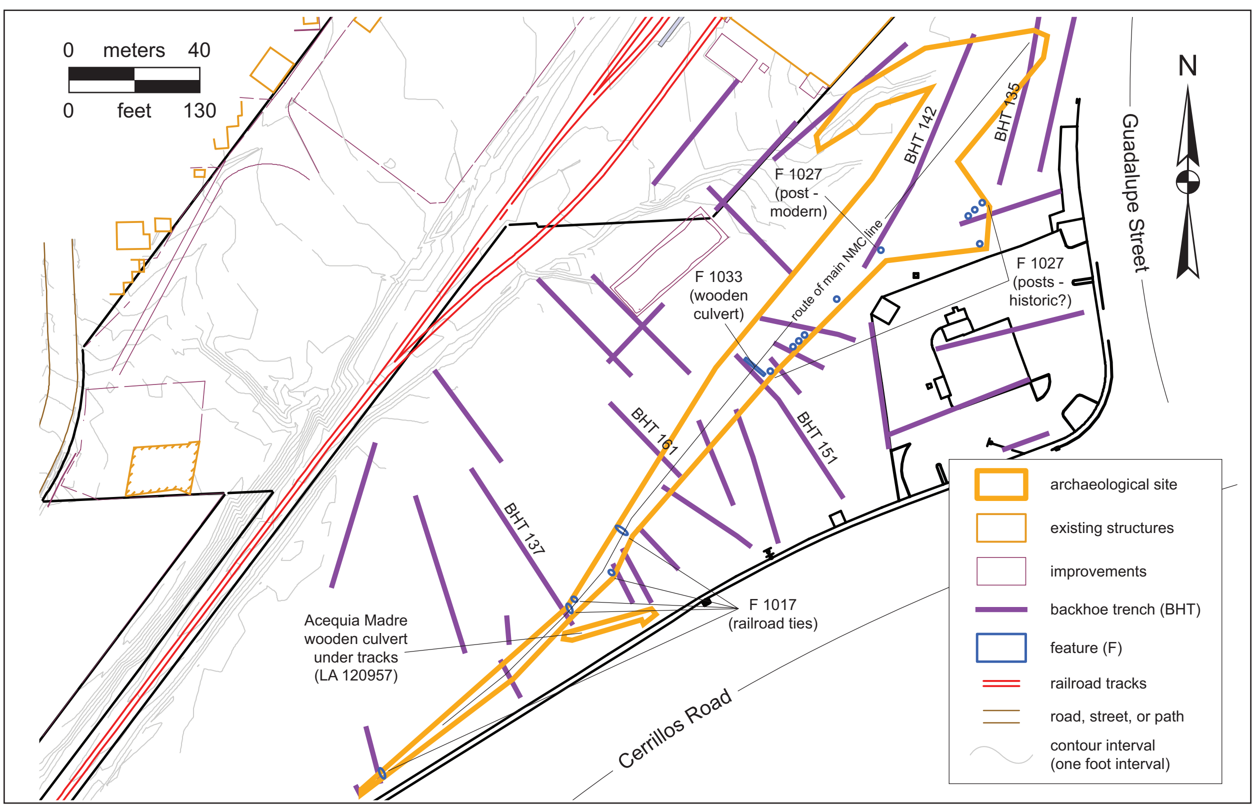


Figure 4.16. LA 149911 (NMC railroad bed), site map.

when South Guadalupe Street was built, but the date of the removal of the trackage in the park remains unclear.

Excavation Sequence

Eight backhoe trenches (BHT 134, 135, 137, 142, 148, 149, 151, 161) and one scraping unit (SCU 1000) provided subsurface exposures of the site (Fig. 4.16). Trenches were profiled and recorded according to project guidelines. SCU 1000 was excavated along BHT 135 to expose railroad ties exposed in the profile. No fill was screened. In accordance with project guidelines artifacts from redeposited or mixed contexts were not collected.

Site Stratigraphy

Features were located within Strata 1 and 2, a mixed twentieth-century overburden discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Stratum 1 was up to 40 cm thick and Stratum 2 was up to 60 cm thick. Some railroad ties were placed in Stratum 3, the natural substrate. Backhoe trenches dissecting the site exposed watercourses in their profiles below Stratum 1 and Stratum 2. These lower acequia deposits are discussed as separate sites (LA 149909, LA 149912, and LA 120957) in Chapter 2 of this report.

Feature Descriptions

This site includes a variety of wooden features and earthen escarpments that constitute the abandoned railroad track alignment of the New Mexico Central Railway (NMC; Fig. 4.16). The site includes a variety of buried features and landscape modifications, some of which (e.g., Features 1017 and 1027) include multiple, widely dispersed sub-features. These features are summarized in Table 4.10 and are discussed below.

New Mexico Central Railway Tracks

The most prominent element of this site was a long, straight track bed that marked the route of the original NMC main rail line. The corridor of this flat-surfaced earthen track bed was partly marked by a low, broad escarpment that dropped off along its northwestern side (Fig. 4.17). No ballast remained along the tracks. Trenches that intersected the railroad grade's stratigraphy indicated that in some places (such as BHTs 148, 149, and 161) between 15 and 60 cm of fill (either redeposited sterile Stratum 3, or clinker-rich Stratum 2) was used to build the track bed. In other places (such as BHT 137), intact railroad ties were observed directly upon the historic ground surface, indicating that no fill or ballast was used in the tracks' construction. An apparent hillside cut along part of the eastern edge of the corridor (Fig. 4.17, right midground) was probably formed more by a ledge of recent (1970s) overburden deposits than historical track bed construction. In the southwestern portion of the site, little evidence of the track bed was apparent on the modern surface. In two trenches at the far southwestern end (BHTs 148 and 149), railroad ties were found intact in trench walls, buried under 40 cm (16 in) of Stratum 1 overburden that appeared to have been introduced to bring the grade up to the level of modern Cerrillos Road.

A short section of a siding off of the main line was also recorded (Fig. 4.16). This segment, which juts off the northern end toward the southwest, formed part of a siding that once connected with the AT&SF line to the northwest. This segment is only apparent today as an earthen escarpment that forms part of the modern land surface. The intersection of this siding with the NMC main line formed a deep V-shaped depression that resembled a natural arroyo, but was actually a manmade topographic feature.

Feature 1002. Located at the northeastern end of the site, this feature included a set of one railroad tie and four adjacent clinker-filled tie impressions that were partially exposed in BHT 135 and SCU 1000. The exposed western ends of these ties were offset, indicating the tie ends originally alternated in length. Although the full extent could not be viewed, it appeared that these ties were part of a track switch, indicating that this was the location of the intersection where the siding to the AT&SF line met with the main NMC tracks.

Feature 1017. Feature 1017 comprised of seven intact railroad ties in the southwestern end of the site. As noted above, some were visible on the modern surface and some were buried under recent overburden in BHTs 137, 148, and 149. Figure 4.16 shows locations.

Figure 4.17. LA 149911, view to the northeast, of the abandoned New Mexico Central Railway track bed in the Santa Fe Railyard Park.

Posts and Culvert

Feature 1014. Feature 1014 consisted of a single wooden post 10 cm below the surface, exposed in the eastern wall of BHT 142 that appeared to have been installed into modern Stratum 1 overburden. This feature was modern, and is not discussed further.

Feature 1027. Feature 1027 encompassed a dispersed array of large (30 cm, 1 ft, in diameter) wooden posts embedded near the center of the site. All of the posts were sawed off at about 15 cm (6 in) above ground level. Six of the posts occupied a 30 m long (100 ft) section of the southeastern edge of the railroad bed near Feature 1033 (a wooden culvert, see below). These posts may have been related to the culvert's operation or they may have been part of a nearby commercial business' infrastructure. The remaining four posts that constituted this feature lay roughly 18 to 27 m (60 to 90 ft) southeast of the line, suggesting that they may have been related to other functions.

Feature 1033. Feature 1033, exposed in plan view in BHT 151, was a well-preserved wooden culvert that crossed beneath the railroad bed (Figs. 4.16, 4.18). The culvert measured 7.83 m (25.7 ft) in length, and 77 cm (2.5 ft) in width and height. The structure was built of creosote-impregnated 15 by 20-cm (6 by 8 in) planks, nailed together with 25 cm (10 in) machine-cut square spikes. The top of the culvert was buried under 60 cm (2 ft) of clinker-rich Stratum 2 historical overburden. The culvert crossed under the track alignment at a perpendicular angle. No acequia channels were identified that approached this culvert, and it is interpreted as a storm drain channel under the New Mexico Central Railway tracks rather than part of an acequia system (cf. the culvert at LA 146408 described by Wenker and Hannaford 2005c).

Summary

Aside from confirming the presence, location, and orientation of the tracks in the Park, the potential for the physical remains of this engineering structure to contain additional interpretively signifi-

Figure 4.18. LA 149911, view of Feature 1033, a wooden culvert crossing under the railroad tracks.

cant information was very low. After testing, this site was recommended as being "ineligible" for the NRHP and no additional work was purposed (Wenker 2005b:44). Both HPD and ARC agreed with this assessment. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149913

Chris T. Wenker
revised by Matthew J. Barbour

Introduction

LA 149913 consists of a buried water channel, designated Feature 1020 (Fig. 4.19). During the course of data recovery, this channel was found to be functionally related to the early twentieth-century NMC railroad tracks instead of Santa Fe's acequia irrigation system. In addition, the easternmost backhoe trenches (BHT 144 and 150) proved to contain alluvial deposits, but those deeply buried sand deposits are not part of the Feature 1020 channel and cannot be linked to other features or sites in the project area.

Site Location

LA 149913 is located within the Railyard Park, north of Cerrillos Road and west of Guadalupe Street (Figs. 4.2, 4.19). The known extent of the water channel (Feature 1020) at LA 149913 extends from the northern edge of the Acequia Madre (LA 120957) toward the northeast for a distance of approximately 105 m (344 ft); the channel deposits were roughly 6 to 10 m (20 to 33 ft) in width (covering an area of roughly 840 sq m [9040 sq ft]).

Prior to this project LA 149913 was covered by a dirt- and asphalt-covered automobile parking lot and an undeveloped city park, and no features or artifacts were visible on the modern surface.

Excavation Sequence

Based on archaeological testing (Wenker 2005b), LA 149913 was known to consist of a broad, deeply buried, abandoned water channel containing thick deposits of alluvial sediment. The water channel was thought to cross through the project area from east to west (e.g., from BHT 150 to BHT 154), but the western extent or orientation beyond BHT 154 could not be determined from the testing data.

Data-recovery activities at LA 149913 were conducted between February 23 and March 17, 2006.

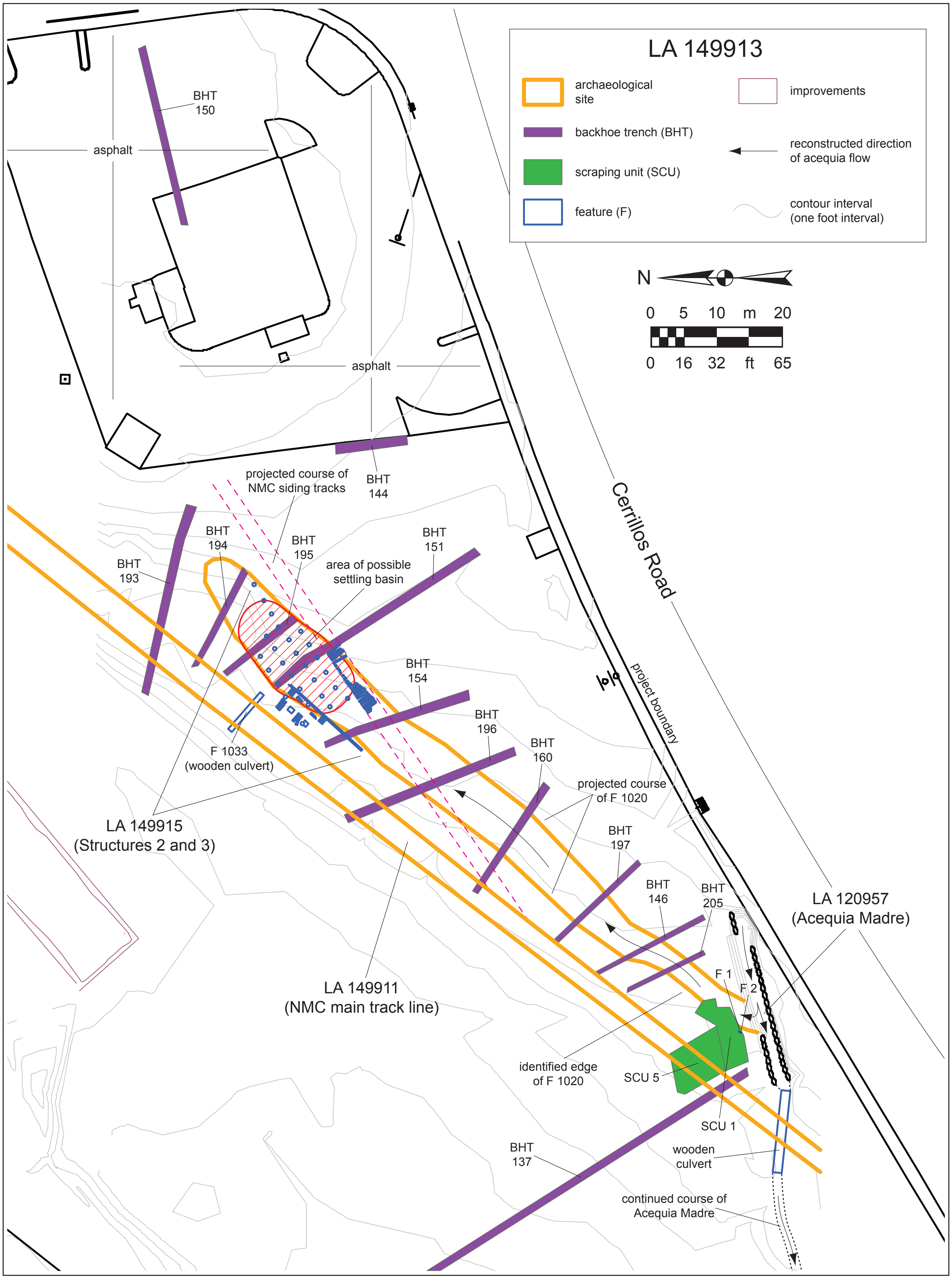


Figure 4.19. LA 149913, site map.

The goals of the data recovery phase were to determine the full horizontal and vertical extent of this water-transport channel and to collect appropriate artifactual and sedimentological data to evaluate its origin and function. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker 2005c). Feature, stratum, and excavation unit numbers used in this project are not always continuous from 1 to n, because in many cases the designations from the testing projects (Wenker 2005a, b) were maintained to provide consistency in the provenience designations.

Various backhoe trenches were used to expose and define the alignment of the water channel and expose cross sections of its deposits (Table 4.11). Six trenches from the testing phase (BHTs 144, 146, 150, 151, 154, 160) were re-excavated and in many cases expanded. Six new backhoe trenches (BHTs 193–197, 205) were excavated to better define the site. A single mechanical scraping unit dug at adjacent LA 120957 (SCU 1) also exposed part of the far western end of the Feature 1020 channel edge (Table 4.12).

As described below, much of the northeastern end of the Feature 1020 channel was deeply buried under overburden and under the remnants of two loading docks (Structures 2 and 3 at LA 149915, described later in this report). Accordingly, BHTs 151, 194, and 195 were only dug after the work on the overlying component of LA 149915 was complete and the structural elements could be removed to gain access to the underlying water channel deposits. Two of these trenches were dug with terraced walls on one side to allow deeper exposures on the remaining vertical trench wall (the southwest wall of BHT 151 and the northeast wall of BHT 194 were terraced). Along BHT 195, both sides of the trench were lowered by mechanically removing the overburden before excavating the trench through the channel sediments. These terraced areas are not depicted on Figure 4.19. No hand-dug excavation units were used at this site because it was determined that the feature was not related to the acequia irrigation, and controlled artifact recovery at the site would provide no additional data relevant to the research questions outlined by Wenker, Post, and Moore (2005). No artifacts were collected from this site during data recovery work.

On the eastern end of the site, part of BHT 144 was also re-excavated, and the western wall was terraced to allow deeper exposure and examination of the deposits. BHT 150 was also partly re-excavated; this trench was dug to 3.5 m (11.5 ft) in depth to re-expose the sand deposits, but the trench was not terraced and it was not entered for closer examination.

The site was visited by a professional geomorphologic consultant (Dr. Stephen Hall of Red Rock Geological Enterprises) during the excavation. The geomorphologist recorded field observations on channel geometry and sediment characteristics, and assisted the site archaeologists in assessing the origin and function of the water channel.

Site Stratigraphy

At LA 149913, Feature 1020 and the alluvial channel identified in BHTs 144 and 150 are excavated into Stratum 3, 4, and 5. Stratum 1 and 2 overlay the channels. These general site strata (Stratum 1, 2, 3, 4, 5) are described fully in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Fill distinct to the alluvial channels is discussed below.

Data Recovery Results

Originally, the LA 149913 testing trenches revealed a possible water channel in BHTs 144, 150, 151, and 154. At that time, all of the exposures of alluvial deposits in these trenches were assigned the same feature number (Feature 1020). The Feature 1020 designation was used during this data recovery work to denote the railroad drainage channel, as depicted in Figure 4.19.

Another exposure of the Feature 1020 water channel that was originally found during testing in BHT 146 had been assigned a separate feature number (Feature 1025) because it was originally interpreted as being part of LA 120957. During data recovery, Feature 1025 was re-evaluated and reassigned as part of the Feature 1020 channel. Two wooden posts that were newly found during data recovery were also assigned feature numbers (Features 1 and 2; Table 4.13).

The following feature descriptions generally track the trench exposures from southwest to northeast across the length of the site, following the direction of stream flow in the drain channel. Because data recovery work determined that the two eastern exposures in BHTs 144 and 150 were not related to the Feature 1020 channel, those trenches are described separately.

Feature 1020, Storm Drain Channel (including Features 1 and 2, Wooden Posts)

LA 149913's Feature 1020 proved to be a southwest-to-northeast trending water channel that followed the southeastern base of the NMC railroad track bed. The southwestern end of the channel appears to have intersected the northern bank of the Acequia Madre (LA 120957) just upstream of the wooden box culvert that crossed under the NMC railroad tracks (Fig. 4.19). The channel appears to have served to divert flood water out of the Acequia Madre and direct it to a retention pond at the northeastern end.

This drainage channel may have been necessary because the box culvert may have created a flooding hazard on the track section that crossed over the Acequia Madre. It has been reported that modern stream flow in the acequia has occasionally overwhelmed the capacity of this box culvert, causing the channel to overflow its banks. This circumstance is aggravated when trash blockages are caught in the culvert (Brian Drypolcher, Trust for Public Land; Phil Bové, Acequia Madre ditch commissioner, personal communication, 2005). If this culvert had also overflowed in historic times, the flood waters would have crossed directly over the NMC railroad tracks, potentially causing undesirable erosion on the track bed. It is also not known if the existing culvert is truly the original culvert. If a smaller capacity culvert had originally existed, for example, the flooding danger would have been increased.

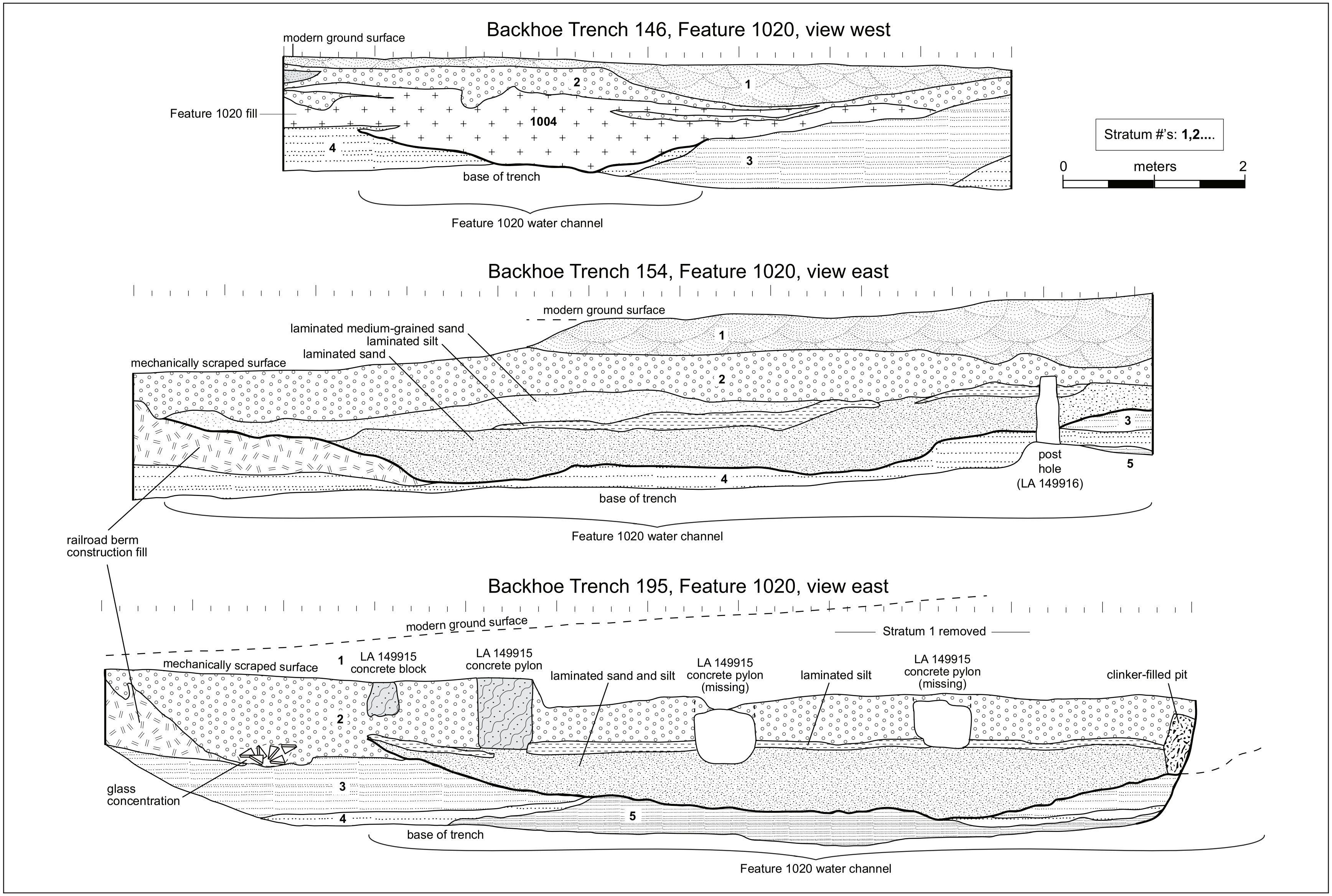
At the southwestern end of the drainage channel, the actual juncture of Feature 1020 and the acequia channel could not be exposed due to constraints on excavations within 3 m (10 ft) of the modern acequia (also LA 120957 discussion, Chapter 2). However, the projected course of the Feature 1020 channel intersects the northern bank of the modern acequia in a location where the rock retaining wall in the acequia channel bank is missing, supporting the inference that a turnout existed in that location.

In the SCU, two adjacent wooden-post stubs (Features 1 and 2) were exposed along the top of the channel's northwestern edge (Fig. 4.19). Each of these posts measured approximately 15 cm (6 in) in diameter, and they were positioned along a northeast-southwest line roughly 30 cm (1 ft) apart. The position and orientation of these posts suggest that they could have been part of a water diversion feature that reinforced the top of the Feature 1020 channel, also exposed in SCU 1, where the water was turned out of the Acequia Madre.

BHTs 205 and 146 exposed the westernmost cross sections of the full Feature 1020 channel. In the BHT 146 exposure (Fig. 4.20), the feature was apparent as a broad, shallow, basin-shaped channel dug into the sterile substrate. Typical of the overall channel, the gently sloped edges of the channel grade gradually with the surrounding historical ground surface. In this cross section, the channel measured roughly 5 m in width (16 ft) and 80 cm in depth (2.5 ft) below the associated historical ground surface. The channel contained a laminated deposit of interdigitated lenses of brown silt, fine sand, and fine sandy loam sediments (combined into Stratum 1004) with few, fine to medium coal and clinker fragments as inclusions. A thin layer of Stratum 1004 deposits also extended beyond the southern edge of the channel bank, overlying the sterile ground surface and continuing to the southern end of the trench and beyond, toward the channel of the Acequia Madre. Both the top of the channel fill and the surrounding historical ground surface were buried under an additional 40 to 60 cm (1.5 to 2 ft) of modern and historical overburden deposits (Strata 1 and 2).

Northeast of BHT 205 and 146, the Feature 1020 channel was again exposed in BHT 197, 160, and 196. In these trenches, the morphology and contents of the water channel were generally similar to that described in the BHT 146 exposure, although the channel width gradually increased as the feature continued to the northeast. This feature had not been previously revealed in BHT 160 during the testing due to the presence of concrete foundations from LA 149917, which at that time prevented deeper excavation. Because LA 149917 was determined to be a non-eligible site, the trench was dug deeper during this phase to expose the water channel beneath the foundations.

In BHT 154 (Fig. 4.21), the Feature 1020 channel had reached an overall width of roughly 8 m (26 ft), and at this point the northwestern margin of the puddled, laminated alluvial deposits (Stratum 1004) overlapped a sloped surface of railroad construction



Figures 4.20, 4.21, 4.22. LA 149913, top (Fig. 4.20): BHT 146, west wall, cross-section view of Feature 1020; middle (Fig. 4.21): BHT 154, east wall, cross-section view of Feature 1020; bottom (Fig. 4.22): BHT 195, east wall, cross-section view of Feature 1020.

fill that formed the toe of the NMC railroad track bed (similar to that described at LA 149912 earlier in this report). The southern edge of the Feature 1020 channel sloped gradually up to the south, merging nearly imperceptibly with the original historical ground surface underneath the concrete foundations of the Sinclair Oil Co. bulk station (LA 149916) farther to the south.

From the projected intersection with the acequia on the southwest, the base elevations in the center of the storm drain channel actually rose slightly (30 cm; 1 ft) as Feature 1020 proceeded northeastward toward BHT 160 (rising from 2116.36 m amsl [6943.35 ft] in the modern Acequia Madre channel, to 2116.38 m [6943.42 ft] in BHT 205, to 2116.66 m [6944.34 ft] in BHT 160). Trench 160 appears to mark a dividing point in the channel's gradient, however, because from BHT 160 to BHT 151, a substantial elevation drop (93 cm; 3 ft) marks the channel's course to the presumed center of the settling pond in BHT 151 (dropping to 2115.73 m [6941.28 ft] amsl).

The cross section in BHT 151 revealed one of the widest (11 m; 36 ft) and thickest (1.6 m; 5.25 ft) expressions of the Feature 1020 channel, and as noted above, the basal channel elevation in this trench was the lowest point measured in the entire feature. In BHT 195 and 194 to the northeast, the channel base rose slightly again (to 2116.50 m and 2116.71 m [6943.81 ft and 6944.50 ft], respectively). Figure 4.22 depicts Feature 1020 in BHT 195.

In both BHT 151 and 195, the channel lay beneath the foundation piers of loading docks or platforms from LA 149915 (described below). The bases of the concrete piers were set upon, or were embedded slightly into, the upper surface of the filled-in water channel, indicating that the basin had been abandoned and was no longer in use when the structures were built.

The channel did not continue farther northeast into BHT 193. It appears that BHT 151 crossed through or near the largest, deepest portion of the channel, which appears to have served as a retention pond. Water entering the pond would not be able to return to the Acequia Madre until the pond was filled to a depth of 0.93 m (3 ft), at which point the stream gradient divide at BHT 160 (see above) would be surpassed and water could flow back to the southwest.

The wooden culvert (Feature 1033) underneath the NMC tracks immediately to the northwest of the pond may not have been contemporary with or functionally related to the Feature 1020 retention pond, although this relationship is unclear. The culvert's spillway elevation lay at approximately 2117.00 m (6945.45 ft), and in this area the top of the NMC railroad bed lay at roughly 2117.75 m (6948 ft). Hence, the Feature 1020 retention pond would have to have been flooded to a depth of over 1.27 m (4.2 ft) before the water level reached the culvert. As noted above, some of the alluvial fill in BHT 151 extended up to 1.6 m above the base of the channel, indicating that water could have reached the level of the culvert at 1.27 m, if it existed when the pond was in use.

A flood of such magnitude would have come close to the limit of the system, however, filling nearly the entire Feature 1020 channel. At the downstream end, where the Acequia Madre crossed under the tracks, the top of the box culvert lay at approximately 2116.90 m (6945.12 ft) and the railroad track bed atop the culvert lay at about 2117.15 m (6946 ft) amsl. This elevation differential indicates that, if the culvert were blocked and water began to back up into the Feature 1020 storm drain channel, the flood water would first rise to the level of the BHT 160 gradient divide at 2116.66 m (6944 ft), spill over the crest, and drain into the retention pond at 2115.73 m. Water would have then needed to fill the entire Feature 1020 channel to the 2117 m (6945 ft) level before it was funneled through the Feature 1033 culvert and allowed to pass under the railroad tracks, without breaching the top of the tracks anywhere along the length of the berm.

Eventually, the Feature 1020 channel and retention pond was apparently abandoned and allowed to fill in with slackwater alluvium. The storm drain apparently only functioned for a relatively short time, between the time the tracks were built (ca. 1900–1903 at the earliest) and the construction of Structure 2 of LA 149915 at the latest (estimated in the 1920s). The rationale for its abandonment is not presently known. The foundations of Structures 2 and, later, Structure 3 of LA 149915 were then built atop the infilled channel deposits, and the entire surface was covered with additional historical Stratum 2 overburden. During this remodeling, the Feature 1033 culvert may have been retained, because it could have continued to serve as a drain for the area around Structures 2 and 3.

Backhoe Trenches 144 and 150

The two easternmost testing trenches at this site (Fig. 4.19) were originally thought to contain deposits related to the Feature 1020 channel. These trenches were partially re-excavated during the data recovery phase, and it was determined that the deposits in those trenches were not part of the Feature 1020 channel, nor could they be linked to other features or sites in the project area.

Trench 144. Originally this trench revealed a partial exposure of a 1 m long (3.3 ft) coarse sand deposit underneath a thick layer (1.5 m; 4.9 ft) of Strata 1 and 2 overburden. The fill of the 20 cm thick (8 in) buried sand deposit contained charcoal chunks, and it appeared to overlay the sterile Stratum 3 substrate.

Upon re-exposure of the sand during data recovery, it was found to only consist of a thin (20 cm [8 in]), flat-lying lens of sand that extended for roughly 3.5 m (11.5 ft) along the trench wall. The sand lay upon a 20 cm thick deposit of charcoal-flecked reddish-brown loam, which in turn overlay the sterile Stratum 3 substrate. No water channel was present in this trench. The sand lens in this trench appeared to represent a sheet-wash erosional deposit overlying the buried historical ground surface, and no further work was conducted.

Trench 150. Originally this trench revealed a partial exposure of a massive deposit of extremely gravelly and extremely cobbly coarse brown sand that was buried under Strata 1 and 2 overburden to a depth of 1.9 m (6.2 ft). The sand appeared to be at least 1.1 m thick (3.6 ft). The trench was located in an area of the Railyard Park that is covered by asphalt and is used by the local farmers' market. Because of these constraints, the data recovery plan (Wenker 2005c) stipulated that this trench was only to be re-excavated and examined from the modern surface, without entering the trench.

During data recovery, the trench was dug to 3.5 m in depth (11.5 ft), revealing that the sand deposit was roughly 1.5 m (5 ft) thick and extended 14.3 m (47 ft) along the trench wall (continuing an unknown distance beyond the eastern end of the trench). The sand was observed to overlay the sterile Stratum 5 substrate at the base of the trench, but the overall morphology of the sand deposit could not be determined. As noted during testing (Wenker 2005b), artifacts in the sand deposit included wood, metal, glass, and native-made and Euroamerican ceramics. No additional artifacts were collected during data recovery.

Trench 150 evidently revealed part of a deeply buried water channel containing thick alluvial deposits, but this location is clearly not part of the Feature 1020 channel. Although this exposure could also represent an alternate channel of the Arroyo de los Tenorios (LA 149912, described in Chapter 2), the projected route of that channel actually lay roughly 50 m (165 ft) north of this trench location. The BHT 150 deposit may instead be related to a different natural waterway that crossed through the southeastern portion of the project area, although its orientation and alignment cannot be determined.

Summary

The data-recovery program has revealed that Feature 1020 at LA 149913 appears to represent the course of a twentieth-century storm drain built for the NMC railroad. The excavations at this site generally followed the procedures outlined in the data-recovery work plan (Wenker 2005c), although the absence of irrigation-related features precluded the excavation of 1 x 1 m units for artifact recovery. The site, now known to be part of the industrial landscape, is part of the abandoned, poorly preserved NMC railroad track infrastructure, which includes two other non-significant sites (LA 149911 and LA 146406 [Wenker 2005a, b]), and contains little relevant data to address the project's research design (Wenker et al. 2005). The site area was not likely to yield information beyond that already described and no further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction (Wenker 2006a:29). ARC and HPD concurred. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 146417

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 146417 consists of a discontinuous set of short lengths of abandoned railroad tracks that cross through the Baca Street parcel (Fig. 4.23). Based on archival research, the tracks date between 1900 and 1904, at the earliest, and are believed associated with both the New Mexico Central (NMC) and Atchison, Topeka and Santa Fe (AT&SF) Railways. Some of the tracks still possess intact rails affixed to the ties, while in other places only the buried ties remain in place. A single earthen platform along the western edge of the site apparently represents a loading platform.

Site Location

LA 146417 was a northeast to southwest running site located approximately 80 m northwest of the Baca Street and Cerrillos Road intersection and adjacent to LA 146416 (Fig. 4.2). Site boundaries were 322 by 38 m (1056 by 125 ft) within a 12,236 sq m area (Fig. 4.23).

Archival Research

This site represents the central section of the 10-acre Baca Street freight yard used from 1903–1926 by NMC. After AT&SF bought the parcel and infrastructure in 1926, it is unclear for how long the area was used as a freight yard, and for how long the tracks were in use. Documents indicate that land-use patterns started to change in the 1930s when pipeline easements were granted. Leases of land to adjacent businesses started in 1940 (Deyloff 2004).

Excavation sequence

This site was investigated by first examining the railyard project's as-built and design blueprints for the locations of intact railroad tracks that were mapped by project-development engineers. Those mapped locations were then ground truthed. Sections of trackage that had not been mapped by the engineering company were mapped with a Nikon 350 total station and added to the design map. Shallow excavation of some of the buried ends of the ties or rails was used to confirm mapping points. No other work was conducted.

Site Stratigraphy

Site stratigraphy was typical of project strata found elsewhere within Santa Fe Railyard project area. A detailed description of these strata are provided in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature Descriptions

Track and Tie Alignments

Nine separate short lengths of trackage existed in the project area (Fig. 4.23) and are numbered sequentially north to south. Sections to the far south (section 1) to the far north (section 9) and to the northeast of the loading dock (section 5) consist solely of railroad ties imbedded in the modern ground surface. These creosote-impregnated ties generally measured 2.5 m (ca. 8 ft) in length. Most ties were heavily weathered from elements and vehicle traffic. Many were nearly completely buried under modern gravel. The remaining sections were intact. The rails still mounted to the ties were spaced at a distance of 1.42 m (4 ft 8 in), indicating that they served a standard-gauge railway.

Three overall track alignments are apparent among the exposed sections. The alignment of the northern two sets of ties appears to represent the original No. 21 line, which served as the original New Mexico Central main track and later served the AT&SF main line. This line had been removed by at least 1978 (Deyloff 2004:31). The two sets of rails at the southeastern end of the array are apparently part of the No. 28 siding. The four western rail and tie alignments and the southern set of ties represent the No. 29 siding.

The current engineering design map also indicated a length of rails in the area between the two

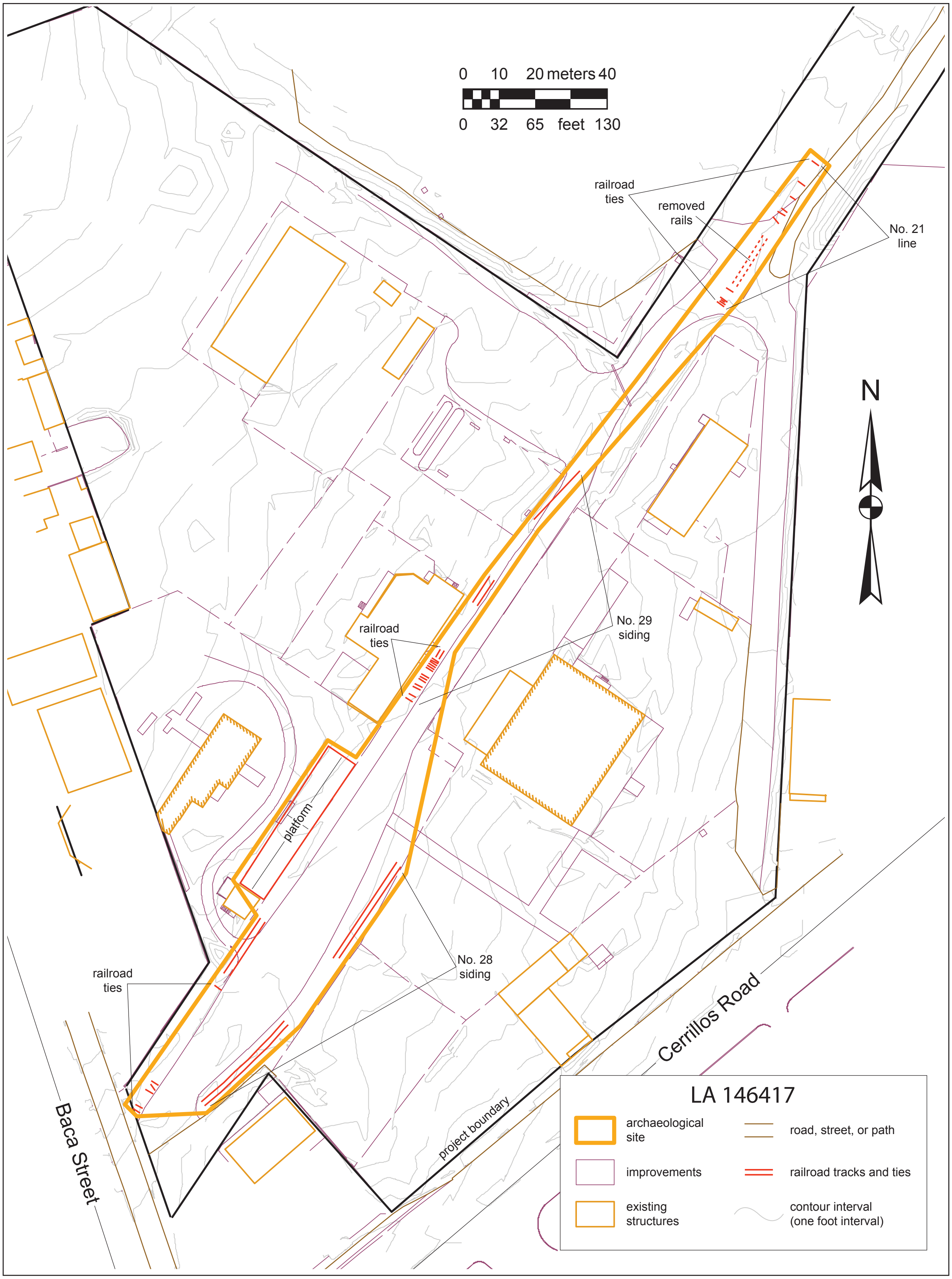


Figure 4.23. LA 146417, site map.

northern sets of remnant ties (No. 21 siding and No. 29 siding). These rails were not in place during the testing fieldwork. However, a pair of badly twisted rails was located on the modern surface several hundred ft north of this end of the site, indicating that these rails had been removed and set aside sometime in the recent few years since the design plans were created.

Loading Platform

The single loading platform was built of earth and exhibited a 5 m long (16 ft 5 in) retaining wall built of railroad ties in the center of the western edge. The remaining mound edges were covered by modern vegetation and were poorly defined because the slope graded gradually into the surrounding ground surface, but the overall mounded area measured roughly 45 m (148 ft) long by 8.5 m (28 ft) wide and was 90 cm (3 ft) in maximum height. The long axis was aligned with the No. 29 siding, which would have passed roughly 3 m (10 ft) from the eastern edge of the platform. This platform occupied the southeastern end of a historically known stockyard (recorded as site LA 146415, see above), and so may be related to that activity.

Summary

Aside from confirming the presence, location, and orientation of the tracks in the freight yard, this site contained little additional physical material that would yield information through archaeological investigation. The site may exhibit significance as a historical engineering feature, however. The railyard project MOU notes that among the "character defining features of the Railyard are…its engineering features, including trackage." This statement indicates that the tracks, as a tangible aspect of the railyard's past service, serve to define and perpetuate the current social construal of the railyard as a historical site. The significance of preserving the trackage and incorporating it into the railyard design is also explicitly addressed in the MOU as is preservation of existing tracks now in use should they be abandoned. For these reasons LA 146417 was recommend as potentially "eligible" for listing on the NRHP (Wenker 2005a:79).

However, archaeological investigation undertaken by OAS has sufficiently recorded existing trackage so that preservation efforts can be undertaken. No additional work was recommended for LA 146417 (Wenker 2005a:79), both HPD and ARC agreed with this evaluation. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149915

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 149915 consisted of three structures along with their associated intramural and extramural features (Fig. 4.24). These structures were located adjacent to abandoned New Mexico Central Railyway (NMC) tracks. Based upon archival research, Structure 1 may have initially functioned as warehouse for the New Mexico Highway Department in the 1930s. Structures 2 and 3 are superimposed on top of one another and appear to represent loading docks or platforms constructed at different times in the twentieth century.

Site Location

The site was located approximately 12 m (39 ft) on the north side of Cerrillos Road and 80 m (262 ft) west of the intersection of Guadalupe Street and Cerrillos Road (Fig. 4.2). The site was approximately 46 m (151 ft) east of LA 120957 (the Acequia Madre), 23 m (75 ft) southwest of LA 149912 (the Arroyo los Tenorios) and was bisected by LA 149913 (a twentieth-century water diversion feature). The entire site measures about 20 m (66 ft) northeast–southwest by 40 m (121 ft) northwest–southeast and covers about 800 sq m (2,624 sq ft, Fig. 4.24). Prior to this project the site was part of an unimproved city park, and the features were not visible from the surface.

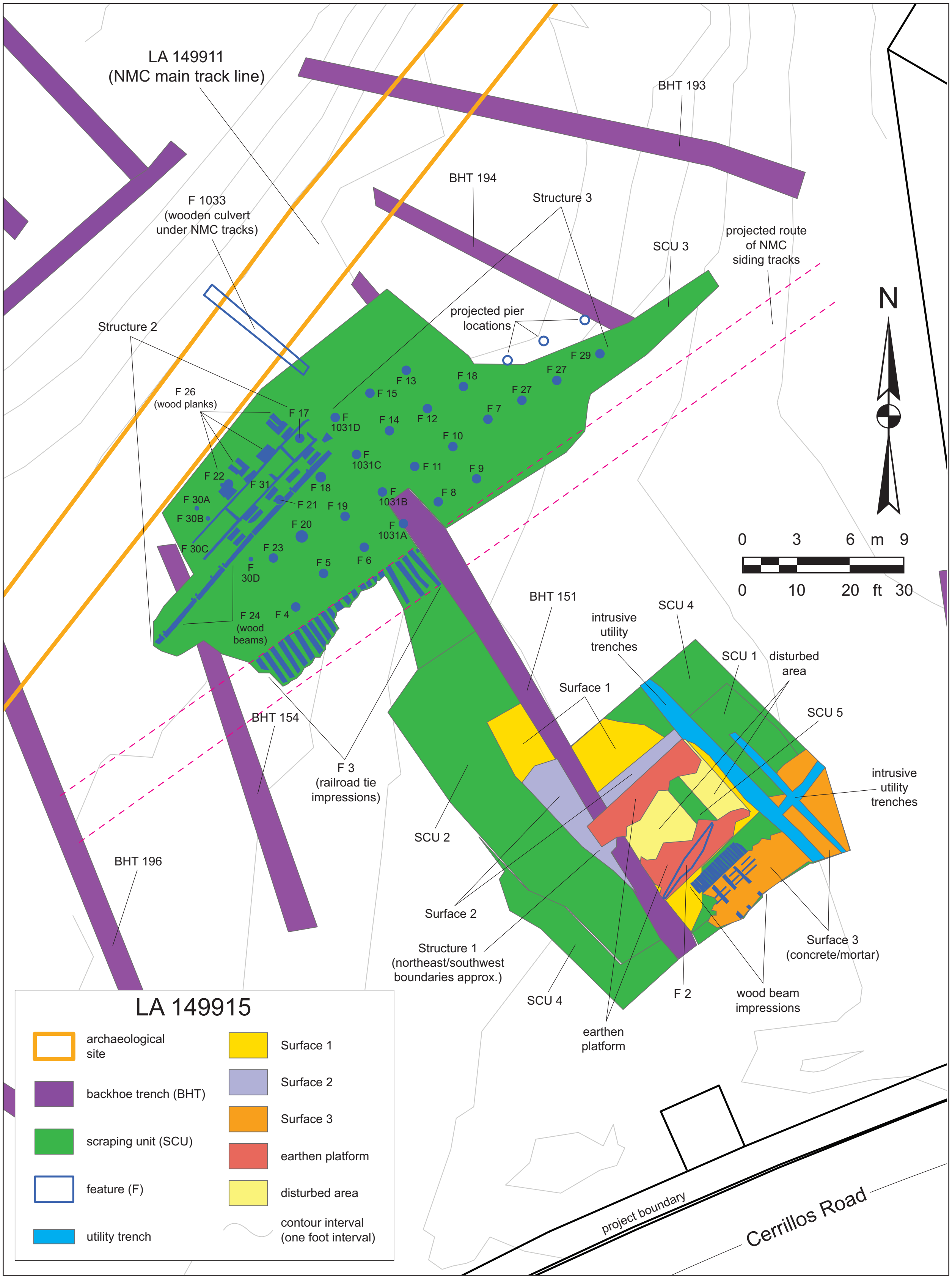


Figure 4.24. LA 149915, site map.

Excavation Sequence

Test excavations at LA 149915 (Wenker 2005b) revealed an assortment of architectural elements that were thought to represent one or more buildings or structures. Three features were identified in a single backhoe trench (BHT 151, Fig. 4.24), including an apparent adobe pad or platform, an extramural occupation surface, and an array of concrete support piers.

Data-recovery activities were conducted between January 23 and February 28, 2006. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker 2005c). Feature, stratum, and excavation unit numbers used in this project are not always continuous from 1 to n, because in many cases the designations from the testing projects (Wenker 2005a,b) were maintained to provide consistency in the provenience designations.

Most archaeological work at this site focused on feature exposure by mechanical and full-cut hand excavation, and architectural documentation in the form of plan maps, cross-section and elevation drawings, photography, and narrative descriptions. No contexts containing intact primary artifact-rich deposits were encountered. Generally, the overburden fill of Strata 1 and 2 was excavated in full-cut mechanical excavation units to expose the various subsurface foundations. These upper deposits were not systematically screened or sampled because of the mixed and redeposited nature of the fill. A total of 2,191 artifacts were opportunistically collected from the scraping units (Tables 4.14, 4.15).

During data recovery, various excavation units were used to expose and define the structural features and extramural surfaces (Fig. 4.24). Three structures, three extramural surfaces, and 34 intramural and extramural features (Table 4.16) were identified at this site. Structure 1 consisted of a rectangular pad/platform of adobe or earth, the exact function of which is unclear. The three extramural surfaces were associated with this structure. Structure 2 included an array of wooden beams and planks that appeared to support a loading dock or platform along the main line of the NMC railroad tracks (LA 149911). Structure 3, which superimposed part of Structure 2, consisted of an array of concrete-filled steel drums that also appeared to support a loading dock or platform. Structure 3 was aligned with a siding track (Feature 3) off of the main NMC tracks. As noted earlier (see the LA 149913 description, above), a wooden culvert under the NMC tracks (Feature 1033) also lies adjacent to this site, but it is not known if the culvert was operational when the structures at this site were in use.

Site Stratigraphy

LA 149915 was typically represented by Stratum 1 and Stratum 2, which were possibly deposited to level this area. Both strata were initially located in BHT 151 during testing and were dominant throughout the project area (Fig. 4.24). In BHT 151, Stratum 1 had a range in depth from 20 cm to 1 m (8 in to 3 ft). It consisted of a slightly hard, silty, sandy loam with inclusions of a few cobbles, charcoal, metal, glass and construction debris (brick, concrete, nails and milled lumber). Stratum 2 had a range in depth from 6 cm to 50 cm (2 in to 20 in) and consisted of railroad cinders or "clinkers" and was occasionally mixed with cobbles. Stratum 3 was also intermittently encountered below Stratum 2 and represented a non-cultural deposit. Stratum 3, which was also dominant throughout the project area, consisted of a sterile, semi-consolidated fine-grained silty, sandy loam. These strata are discussed in detail in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Structure 1: Highway Department Warehouse

Introduction

Structure 1 at LA 149915 consisted of a rectangular pad/platform of adobe or earth, the exact function of which is unclear (Fig. 4.24, 4.25). The overall structure remnant was relatively poorly preserved. A broad, irregular section through the central long axis of the feature had been destroyed during some past historical trenching or excavation, plus an intrusive elongated pit or trench (Feature 2) cut into the upper surface along the southern edge of the structure. A recent or modern utility trench passed directly along the northeastern margin, and BHT 151 had substantially removed much of the southwestern end of the pad/platform.

Figure 4.25. LA 149915, view of Structure 1, facing southwest.

Excavation Sequence

Structure 1 was initially located in BHT 151 during the testing phase. It was identified as a cobble and adobe foundation/platform and was designated as Feature 1030. During this data recovery phase BHT 151 was re-excavated to relocate the identified features. Structure 1 was further exposed in scraping units (SCU) 1 and 5. SCU 1 was mechanically excavated while SCU 5 was a 1-m-wide, hand-dug trench through Structure 1's construction fill. The exterior of this pad/platform and the surrounding historical ground surfaces were exposed by SCU 2 and 4. Once it was initially exposed in the SCU, shovel and trowel excavations further exposed the extent of the remnant structure outline.

Strata description

Structure 1 was capped with Stratum 1 overburden that was deposited to possibly level the area. It had a maximum depth of 1.06 m and most of it was removed mechanically to expose the structure.

Description

This structural foundation (Figs. 4.24, 4.25) was built of a thick (30 cm; 1 ft) mass of adobe-like brown clay loam containing common inclusions of river-worn stones and cobbles, bricks, and artifacts. This earthen construction deposit formed a rectangular, flat-lying earthen pad or platform measuring 7.7 by 6.2 m (25.2 by 20.3 ft) across.

The northwestern and southeastern edges of this pad were framed with upright wooden boards and strips of corrugated sheet metal. These framing members resembled forms into which the earthen structural fill had been packed or poured. The northeastern and southwestern margins of the feature were disturbed and the construction details could not be discerned. The earthen pad had been built on top of a previously existing extramural occupation surface (Surface 1, discussed below), and the top of the structure was elevated roughly 30 cm (1 ft) above the surrounding extramural areas. The upper surface of the earthen pad was relatively flat and level, but no structural subfeatures were located on or in the structure.

Intramural features

Feature 1. Feature 1 abutted the southeastern side of Structure 1 and consisted of a poorly preserved, flat-lying wooden platform (Fig. 4.24). This feature was built of two long boards aligned with the edge of the structure, with planks set across the boards to form a possible boardwalk or loading dock. The edge of this rectangular platform extended 1 m (3.3 ft) from the structure margin, and the remaining planks measured 4.4 m (14.4 ft) long, although its original length was not preserved. The platform had been crushed under the weight of Stratums 1 and 2, which capped the feature. The remnants of the feature measured 5 cm (2 in) in thickness and the upper boards lay roughly 8 cm (3 in) below the top of the Structure 1 earthen pad.

Feature 2. Feature 2 consisted of a shallow, basin-shaped, linear channel that was located along the east side of Structure 1 (Fig. 4.24). It measured 5 m (16 ft 5 in) in length by 45 cm (18 in) in width, was 8 cm (3 in) deep and filled with stratum 2. The edge of the feature was composed of fine compacted clay, while the base was a sandy clay with gravels. It is unclear if this feature was constructed intentionally for possible water diversion or if it occurred naturally during the post-abandonment of the structure.

Associated surfaces

Surface 1. Surface 1 was the extramural surface originally defined during the testing phase north of Structure 1 (called at that time Feature 1035; Fig. 4.26) and was present above Structure 1, Feature 1 and Surface 3 (see below). The surface consisted of a 3–5 cm (1–2 in) thick band of hard, dark gray loam containing common fine to medium inclusions of coal and clinker. Stratigraphically, this surface was overlain by the construction deposits of Structure 1 (and its related features) or by historical overburden deposits (Stratum 2) in areas outside the structure. As revealed in SCU 5 and BHT 151, Structure 1 was built directly upon this surface. SCU 5 also revealed that, under Structure 1, Surface 1 was covered with abundant artifacts (including large pieces of metal and wood), suggesting that the structure was deliberately built upon an artifact-laden surface.

Surface 1 overlay a 15 to 25 cm thick (6 to 10

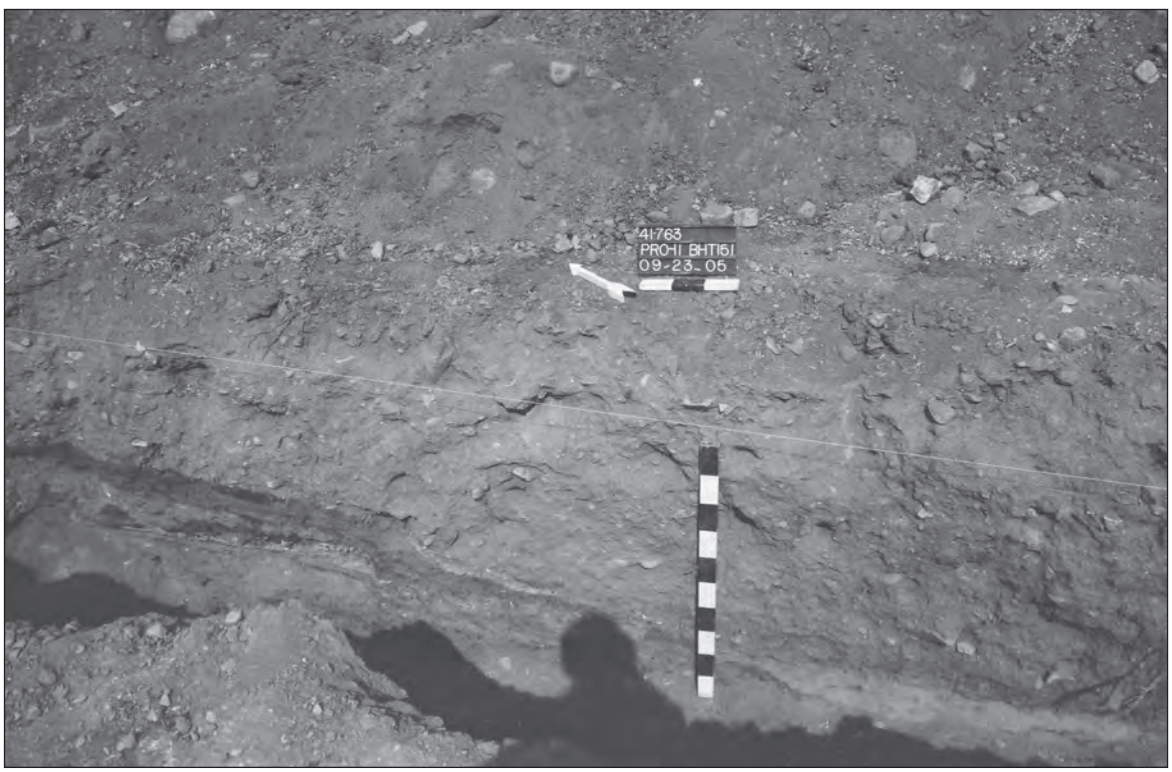


Figure 4.26. LA 149915, BHT 151, Feature 1035. The bottom of the scale rod rests upon the packed earthen surface of Feature 1035. Stratum 2 deposits extend above the floor to the dark horizontal band, as well as below the floor, into the shadowed area at lower left.

in thick) historical Stratum 2 deposit of soft, dark gray loam containing abundant, medium and large coal and clinker inclusions (exceeding 50 percent of the volume of the deposit). The hard packed surface may have been deliberately deposited over this clinker-rich fill to stabilize the soft underlying sediment.

This surface could be tracked on all sides of the structure. On the northeast side, the surface was disturbed by utility trenches and did not extend more than 30 cm (1 ft) beyond the structure edge. On the southeast side, a corner of the surface was exposed southwest of Feature 1, although Surface 1 appears to have extended under Feature 1 and Surface 3 an undetermined distance. Along the southwestern edge of Structure 1, Surface 1 (as well as the underlying Surface 2) was observed to exhibit a fairly clear, straight edge that roughly paralleled the edge of the structure. Surface 1 extended for roughly 8 m (26 ft) to the northwest of the structure, although the boundary became less evident in areas away from the structure. Overall, the area covered by Surface 1 is relatively irregular, and the origin and function of this hard-packed surface remains unclear.

Surface 2. A second extramural surface below Surface 1 was observed in some areas.

This lowest surface (Surface 2) underlay the 15–25 cm (6–10 in) thick clinker-rich deposit under Surface 1. Surface 2 consisted of a 3 cm (1.5 in.) thick lens of pale brown clay that overlay the sterile Stratum 3 substrate. The sediment constituting Surface 2 also contained few, medium lenses of sand; few, fine charcoal and coal fragments; as well as a few historical artifacts. Limited exposures of this surface prohibited the full definition of its extent, but this lower surface is known to exist along the northwestern side of Structure 1 as well as to the southwest and west. As with Surface 1, this lower surface is of unclear origin and function, although both surfaces shared a similar southwestern edge.

Surface 3. Feature 1 was built on top of a broad, relatively flat, artificial, extramural surface (Surface 3). This 5–10 cm (2–4 in) thick surface, built of an expanse of poured mortar or soft cement or concrete, extended at least 4 m (13 ft) southeast and east of Structure 1. Surface 3 was positioned above the level of Surface 1, and hence represented the latest extramural surface that was associated with Structure 1.

Southeast of Feature 1, the top of Surface 3 exhibited a discontinuous pattern of linear impressions from beams or other structural elements that had once been pressed into the top of the mortar. These impressions generally matched the existing width of Feature 1, and may indicate that the boardwalk or platform may have extended even farther to the southeast.

Structure 2

Introduction

Two superimposed loading dock or platform foundations lie at the northern end of LA 149915, one mainly built of wood and one consisting of concrete piers (Figs. 4.24, 4.27). Structure 2, the wooden structure, represents what is thought to be the earlier of the two. This structure was exposed in SCU 3, and had not been previously identified during the testing phase.

Excavation sequence

Structure 2 was not located during the testing phase and therefore was not anticipated during the data recovery phase. It was exposed in SCU 3 during the investigations for Structure 3. Once it was initially exposed in SCU 3, shovel and trowel excavations further exposed the extent of the structure.

Strata description

Structure 2 (LA 149915) was capped with Stratums 1 and 2, which were deposited to possibly level the area. They had a maximum depth of 1.64 m (5 ft 5 in) and most of it was removed mechanically to expose the area.

Description

Structure 2 consisted of a discontinuous assortment of flat-lying beams and planks (Figs. 4.24, 4.27) set upon, or slightly embedded in, the buried historical ground surface along the southeastern edge of the NMC railroad track bed (LA 149911). The structure consisted of a central wooden frame (Feature 31) surrounded by an assortment of flat-lying planks (combined together as Feature 26), as well as several posts (Feature 30A–D) and an alignment of flat-lying wooden beams (Feature 24). The overall exposed extent of Structure 2 measured 4 by 14.8 m (13 by 48 ft 6 in) across.

Figure 4.27. LA 149915, view of Structures 2 and 3, facing northeast.

Intramural features

Feature 24. A long assortment of flat-lying beams (Feature 24) marked the southeastern edge of Structure 2 (Fig. 4.24). This feature was made of at least seven creosote-impregnated round beams that were approximately 30 cm (1 ft) in diameter and 1.6 to 3.3 m (5 ft 3 in to 10 ft 10 in) long. These beams were laid end-to-end to form a row at least 14.8 m (48 ft 6 in) in length. Small wooden posts or pegs had been installed at varying locations along both sides of the beams, apparently to provide lateral stability for the structure. Although the feature was not fully exposed at its southwestern end, it is known that these beams did not extend as far as BHT 196, 8.7 m (28 ft 7 in) farther to the southwest.

Feature 26. The northwestern and southeastern sides of Feature 31 were flanked by a group of flat-lying creosote-impregnated wooden planks (combined together as Feature 26; Fig. 4.24). These planks all varied in their dimensions, but were generally either 32 by 18 cm or 32 by 10 cm (12.5 by 7 in or 12.5 by 4 in) in cross section and ranged between 0.8 to 1.1 m (32 to 42 in) long. Along the southeastern edge, six groupings of planks were spaced along the outside of Feature 31 at intervals of roughly 1.5 m (5 ft). Four complementary groupings of planks lined the northwestern side of Feature 31, and other plank arrays may have once existed. Each grouping of planks was built of one to five individual planks. These evenly spaced plank groupings may have supported vertical posts or pilings, although no other evidence of such structural elements was observed.

Feature 30. Four small wooden posts, each approximately 18 cm (7 in) in diameter occupied the southwestern end of Structure 2 (Fig. 4.24). Three of these posts (Features 30A, B, and D) formed a northwest-southeast alignment. Feature 30C was located along the southwestern end of Feature 31, and may have been related to the central wooden frame (Feature 31).

Feature 31. The wooden elements constituting Feature 31, the central wooden frame, were poorly preserved and in many cases were indicated simply by the impressions left in the substrate (Fig. 4.24). Measurements of many portions of the frame are therefore estimated. Overall, this feature measured 9.7 m long and 1.3 m across (32 by 4 ft). This feature was built of two main parallel boards, roughly 6 by

18 cm (2.5 by 7 in) in cross section and spaced about 1 m (3.3 ft) apart, oriented along a northeast-southwest axis. Small wooden posts or pegs had been installed at varying locations along both sides of these parallel boards, again to provide lateral stability for the structure. Cross-ties of smaller boards, roughly 4 by 12 cm (1.5 by 5 in) in cross section and spanned the space between the long parallel boards at intervals of roughly 1.5 m (58 in).

Overall, Structure 2 was aligned parallel with the orientation of the main NMC railroad track line to the north. The northwestern edge of this structure lay roughly 1.5 m (5 ft) from the presumed edge of the tracks. This orientation differs from that of Structure 3, which was aligned with the edge of the NMC siding tracks to the south.

Structure 3

Introduction

Structure 3 at LA 149915 consisted of an array of concrete piers (Figs. 4.24, 4.27) that were set upon or dug into the buried historical ground surface south of the NMC railroad tracks. The structure consisted of 27 individual piers that were assigned feature numbers (Table 4.16). The overall area covered by the structure measured 22.6 by 8 m (74 by 26 ft).

Excavation sequence

Structure 3 was initially located during testing in BHT 151, where four piers were located and designated as Feature 1031. During this data recovery phase BHT 151 was re-excavated to relocate the identified features. SCU 3 along with shovel and trowel excavations were excavated to further expose the structure.

Strata descriptions

Strata 1 and 2 capped Structure 3 and were more than likely deposited to level the area. Stratum 1 had a maximum depth of 70 cm (2 ft 4 in) and Stratum 2 had a maximum depth of 44 cm (1 ft 5 in). Both strata were removed mechanically to expose the area.

Description

The piers were arranged in rows that were oriented northeast–southwest, parallel with the railroad siding tracks (Feature 3) that were exposed immediately to the south (Figs. 4.24, 4.27). The drums were relatively evenly spaced at approximately 2.5 m (8 ft) intervals across the structure. Two gaps in the western corner of the array (east and south of Feature 22) may indicate that historical disturbances removed the piers, or piers may not have occupied these spaces.

Aside from those two gaps, the western end of the structure appears to have been broader than the eastern end. The western end was six rows wide (as measured along the siding tracks) and four rows deep (i.e., away from the tracks). At this end of the structure, the piers approached to within 1.3 m (4 ft) of the edge of the siding tracks. At the eastern end of Structure 3, the pier array narrowed to only two rows wide (although the second row east of Feature 16 was not fully exposed), and the distance from the piers to the tracks increased to about 4 m (13 ft).

The northwestern corner of Structure 3 substantially overlaps the eastern half of Structure 2, with three concrete piers occupying the Structure 2 footprint. Further, during the original construction of two of the concrete piers (Features 21 and 22), the underlying wooden elements of Structure 2 had to be cut out or dug away to allow the concrete piers to be installed in the correct position. This relationship between these architectural elements clearly demonstrates the sequential construction of the two structures and indicates a later date for Structure 3. The type of structure that was built atop these concrete piers is not yet known, nor is its actual construction date.

Intramural features

Features 4–23 and 27–29. Each pier was made of a 55-gallon drum filled with concrete. The average length of the drums was between 55 to 60 cm (1 ft 10 in to 2 ft) and the average width was between 53 to 59 cm (1 ft 8 in to 2 ft). Some of the drums were full height (75 cm [2 ft 6 in]), while most of them had been cut in half (40 cm [1 ft 4 in]) before being used as piers. Regardless of the height of the drum, the tops of all of the piers were relatively level across the entire structure. A threaded 2 cm (3/4 in) diameter bolt protruded from the top of each pier, indicating that the piers were once capped by a superstructure.

Extramural features

Feature 3 (NMC Railroad Track Bed). Feature 3 represented an abandoned railroad track bed that crossed southwest–northeast through the site, along the southern edge of Structure 3 (Fig. 4.24). These tracks are part of a siding that originally extended several hundred feet along the south side of the main NMC tracks. At LA 149915, these tracks were partially exposed during the excavation of SCU 3, which uncovered only an 11.4 m (37 ft) long section that contained the impressions of 23 individual railroad ties. The wooden ties were no longer present, but the resulting sockets were filled with clinker- and coal-rich deposits of historical Stratum 2 overburden.

Most of the ties were only partially uncovered, but the four full-length impressions that were exposed each measured about 2.4 m long (7 ft 11 in), suggesting that these tracks were built with standard 8 ft long ties. These siding tracks are depicted on the 1930 Sanborn map (Fig. 4.28), but their original construction date remains unclear (sometime post ca. 1900–1903).

Archival Research

The 1930 Sanborn map depicts a long, narrow, rectangular building, oriented roughly north-northwest by south-southeast, directly over the location of Structure 1 (Fig. 4.28) at LA 149915. That building is marked as one of the "New Mexico State or District Highway Ware Houses." The same building is also depicted on the 1948 Sanborn map.

Larger building footprints are depicted in this same location on pre-1951 and 1960 aerial photographs, which may indicate that the ca. 1930 warehouse was remodeled or replaced by a larger structure. The exact street address for this lot is not known (it lies between 722 and 740 Cerrillos Road), but the 1960 city directory (Hudspeth 1960) indicates that Breese Industries, Inc., a gas light manufacturer, operated out of 732 Cerrillos Road, which could be the building evident on the aerial photographs. The date of that building's demolition remains unknown.

Based on preliminary artifact and field data, the excavations at Structure 1 and the nearby extramural surfaces did not provide much evidence of the 1950s–60s vintage buildings that once stood in this area. If Structure 1 and the "extramural" surfaces were truly related to the earlier highway department warehouse, their range of possible functions may be narrowed down. It may prove to have been the case that these so-called "extramural surfaces" were part of an interior dirt-surfaced work area or storage/parking space inside the warehouse. The archival data that are presently available do not assist in this respect.

The 1930 and 1948 Sanborn maps do not depict the specific area of Structures 2 and 3. However, a large structure is depicted at this location on pre-1951 and 1960 aerial photographs (Fig. 4.28). This structure appears to be oriented with the siding tracks, however, not with the main NMC line to the north, suggesting that the structure in those images represents Structure 3 rather than Structure 2. Structure 2, was built along the main tracks, therefore appears to have been utilized between ca. 1900–1903 and sometime prior to 1951. By 1951, Structure 3 had been built at this location.

Euroamerican Artifacts
Matthew J. Barbour

A total of 2,178 Euroamerican artifacts were collected and analyzed from LA 149915. As depicted in Table 4.17, artifacts were distributed across two structures (Structures 1, 2), an extramural activity area (NSTR 1) and from a general collection of materials across the entire site.

Historical records suggest both structures were constructed at the turn of the twentieth century (ca. 1900). Euroamerican artifacts (n = 1,057) from Structure 1 represented a mixture of products manufactured during the Spanish Colonial, American Territorial, and New Mexico Statehood Periods. For example, an undecorated Majolica soup plate fragment (ca. 1600–1850, Deagan 1987), Wisconsin Glass Co. beer bottle base (1882–1886, Toulouse 1971) and a Hiram Walker and Sons whiskey bottle with a plastic screw-on cap (ca. 1924–2009) were found in the same spatial context and at the same elevation. The business card, while undecipherable, is likely even more recent. Given the diverse variety of temporal periods represented within the fill it is clear that many of the materials excavated in association with Structure 1 are deposits brought in from elsewhere after the demolition of the structure. As a result the Euroamerican artifacts analyzed cannot inform upon use of the structure.

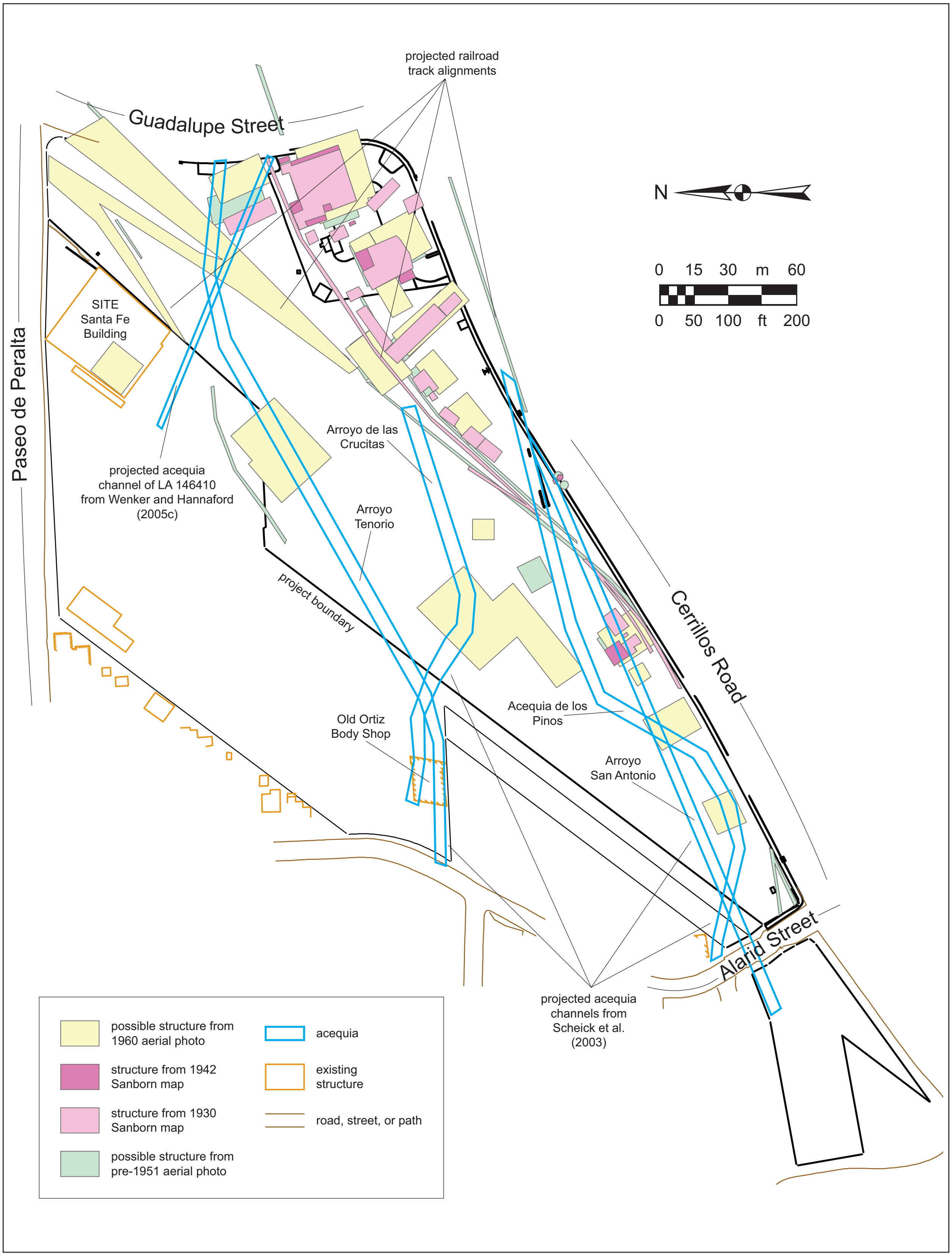


Figure 4.28. Map of the Railyard Park showing an overlay of projected locations of historical buildings and structures derived from composites of Sanborn Fire Insurance maps and aerial imagery.

Materials from Structure 2 are less mixed. However, Euroamerican materials from the structure appear to date largely to the mid to late twentieth century. Plastic artifacts represent a significant portion of the assemblage (n = 15, ~8 percent) and objects such as plastic spoons were not commonly manufactured until the 1970s. Interestingly, domestic items (n = 41, 21 percent) represent substantial portion of the assemblage and would suggest a possible residential household or commercial service business (such as a diner or hotel). The latter would seem most likely. Of the 39 dishware fragments, 24 are vitreous or semi-vitreous white-bodied earthenware vessel fragments with molded motifs or are undecorated suggesting institutional use as opposed to the more personalized heavily decorated wares purchased by individual households. While the AT&SF did offer food service within its diner cars, the plates do not mach patterns, such as the Mimbreño Pattern, utilized by the company.

Neither a commercial establishment nor residential household was ever documented at LA 149915. Furthermore, archival evidence suggests that the building was used as a loading dock between ca. 1900 and 1951. A headlight for the train and two iron railway spikes were recovered from the building and are indicative of this function, but it is possible that the majority of materials found in association with Structure 2 post-date this period. There is no reason to believe these materials are associated with in situ discard from the surrounding area.

Adding to the already perplexing assemblage, NSTR 1 (Extramural Surface 1), thought to be an extramural area, has the highest frequencies of construction and maintenance (n = 209, 60 percent) objects relative to the total number of artifacts collected and analyzed. Stated simply, artifacts from NSTR 1 look more like portions of a collapsed structure than artifacts recovered from Structures 1 and 2. It seems likely that materials collected from NSTR 1 are associated with the demolition of these two buildings and/or Structure 3 from which no Euroamerican artifacts were collected. It is also possible that the area identified as being extramural was actually encapsulated by one of the buildings. The majority of construction and maintenance materials were wire-drawn nails (n = 115) typically used in building practices in twentieth century. These materials fit well with archival resources that place construction of the buildings at LA 149915 in the early twentieth century.

Artifacts collected from the whole site represent a grab sample of materials and could not be used to infer upon use of the site or upon the inhabitants of the surrounding area. These materials included a plastic Society of Mary devotional medal (1931+), wine bottle fragments and a part of a bicycle.

Fauna Analysis
Britt M. Starkovich

The faunal sample from LA 149915 is small, with only 284 analyzed specimens. The sample comes from three different features: an adobe foundation and two superimposed support structures, as well as an extramural occupation surface. A portion of the sample (n = 56) is from unknown provenience simply labeled as "whole site."

The assemblage is mostly composed of domestic species, though a few non-domesticates were also recorded, including prairie dog, coyote, pigeon or dove, whistling swan, mallard, and fish (Table 4.18). Due to difficulties in distinguishing small fragments of sheep and goat, such fragments were assigned to a generalized "sheep/goat" category. About 17 percent of the remains could only be identified to general ungulate size classes, though "small ungulate" and "large ungulate" likely represent sheep/goat and cattle, respectively. Cattle dominates the identifiable component of the assemblage, followed by sheep/goat, though cat, pig, turkey and chicken are also present (Table 4.18). Fragmentation rates are relatively low compared to other Santa Fe Railyard sites, with 60 percent of the assemblage less than 10 percent complete. Environmental damage, animal alterations, and burning are fairly uncommon (Table 4.18). Evidence of human butchery is extremely common; over 40 percent of the remains are butchered. Butchery patterns correspond to cuts of meat still used today (Ashbrook 1955). Comparisons between the areas are not possible because Structure 1 makes up the majority of the sample.

Structural Units

Structure 1. Structure 1 is a thick foundation made of adobe that contains the bulk of the faunal sample (n = 190). A range of domesticates are represented, including house cat, cattle, sheep/goat, pig, turkey and chicken, as well as wild species such as prairie dog, coyote, mallard, pigeon or dove, and fish (Table 4.18). Large ungulate or cattle composes most of the assemblage, followed by small ungulate or sheep/goat. The remains are not as fragmented as might be expected, with 64 percent less than 10 percent complete. Five percent exhibit exfoliation that often results from being exposed to the elements. Animal alterations and burning are fairly infrequent, but the remains are heavily butchered, and the majority of the damage is from sawing or steak cuts (Table 4.18).

Structures 2 and 3. Structure 2 at LA 149915 is a group of wooden planks and beams that may have supported a loading dock or platform. It is partially superimposed by Structure 3, a set of concrete-filled steel drums that likely served a similar function as Structure 2. The faunal sample comes from the area of superimposition of the two structures. The sample is extremely small (n = 19) and is composed entirely of sheep/goat and cattle (Table 4.18). There is a high rate of fragmentation, but environmental and animal processes are relatively uncommon. Over 60 percent of the specimens have human butchery damage, but none of them are burned.

Extramural Surface 1. The Extramural Surface 1 is associated with Structure 1, and has a very small faunal sample (n = 19). Though it is small, it contains a range of different species, including small ungulate or sheep/goat, large ungulate or cattle, pigeon or dove, and chicken (Table 4.18). The remains are highly fragmented, though only one specimen has evidence of environmental damage. No animal alteration is apparent. None of the bones are burned, but 37 percent have evidence of human butchery.

Unspecified Provenience. Fifty-six specimens were collected from an area outside of the structures and extramural surface. They represent a range of domestic birds and mammals, as well as a non-domesticate: whistling swan (Table 4.18). Most of the remains are large ungulate or cattle followed by small ungulate or sheep/goat. The specimens are highly fragmented, though there is no animal alteration and only one bone has environmental damage. Half of the specimens have butchery damage, and none are burned.

Species Utilization

Understanding human taphonomic processes, such as butchery patterns and prey selection, is an integral part of interpreting a faunal assemblage. The selection of a specific animal for consumption is important, and can be understood by looking at the age profiles of animals at a site. Though the overall sample is quite small, the butchered remains, by comparison, make up a large portion of the greater assemblage of LA 149915. Because it is an historic site, a body part profile analysis is not necessarily the most useful approach for understanding species utilization. By historic times, meat was purchased as specific cuts, evidenced by smooth, uniform saw marks made by professional butchers. Because this was the typical method of meat acquisition, body part profiles that examine specific elements are not as useful as those that focus on historic meat cuts.

Historic meat cuts aid in understanding the economic situations of people that deposited the remains; in theory, wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. Schulz and Gust (1983) present a ranking system for meat cuts based on the relative prices of beef in Sacramento, California at the turn of the nineteenth century. This ranking system has been widely applied to later historical faunal data sets in the western United States. Based on this system, the majority of the beef cuts from LA 149915 were moderately priced (n = 27), followed by the most expensive (n = 24) and cheapest cuts (n = 21). From this construction it appears that meat cuts of different costs were fairly evenly represented at the site. Lyman (1987) argues that such price rankings may not accurately reflect the economic standing of the people responsible for depositing the remains. Rather, cost-efficiency based on the price per pound and pounds of edible meat for each beef cut is a more logical model to use when interpreting historic meat consumption patterns. Meat rankings of the portions of beef from LA 149915 based on Lyman's (1987) system are presented in Table 4.19. In terms of cost-efficiency, the vast majority of the cuts of beef found at LA 149915 are moderately cost-efficient (n = 39), followed by highly cost-efficient (n = 19) and the least cost-efficient cuts of meat (n = 14). From these data, it seems that the people depositing the faunal refuse were toward the middle of the economic scale, though it is unlikely that the remains were discarded by a specific family or group of people.

The age of animals at a site are indicative of what kinds of meat were eaten: for example, if lamb or mutton was preferred, or if veal was eaten instead of older cattle. Ani mal age at death can be determined by the fusion of long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1970; Reitz and Wing 1999). Summarized age data for LA 149915 are presented in Table 4.20.

Based on bone fusion data, Structure 1 contains at least two cattle, one under the age of ten months and one over 42 months. The younger animal was probably consumed as veal, and the older animal was either at the upper limits of being used for milking or breeding, or was a draft animal. Structure 1 also contains at least two sheep/goats. One, younger than 24 months, was consumed as a lamb or slightly older. The other was older than three years, which is the upper limit of an animal raised for food. A pig younger than 42 months was also found. It may have been slaughtered as a young animal in the prime age for consumption. Two cattle, one younger than 10 months and one older than 12 months, were present in the overlap area of Structures 2 and 3. The younger animal was likely eaten as veal, and all that can be said about the older animal is that it was slaughtered when it was beyond the age of veal. A sheep/goat older than 18 months was also found in this area, which is older than an animal consumed as a lamb. At least one cattle younger than 48 months and a sheep/goat older than 18 months were found in the Extramural Surface 1. The cattle was slaughtered at an age when it was prime for eating, or was used for milk and breeding. The sheep/goat was old enough at the time of death that it was not consumed as lamb. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The fauna from LA 149915 is fairly typical of a Santa Fe Railyard site, though the sample is too small to make any broad inferences. Cattle or large ungulate dominate the assemblage, followed by sheep/goat or small ungulate. Though the sample is small there is a fairly broad range of species represented, though many of the wild fauna were probably introduced to the site by non-human forces. Most of the ungulates were slaughtered at the prime age for consumption, though a few older animals may have been present as well. Moderately cost-efficient cuts of beef are by far the most common in the sample, which indicates that the people depositing the remains were toward the middle of the economic scale. Caution must be taken in this interpretation, however, because the site was an industrial complex and likely had a range of people using it.

Native Ceramics
C. Dean Wilson

The majority (98.1%) of the 53 sherds from LA 149915 represent historic period types (Table 4.21). Prehistoric sherds are represented by Plain Gray Body sherds (1.9%). Historic period types include Tewa Polychrome Painted Undifferentiated Two Slips (1.9%), Black-on -cream Undifferentiated (9.4%), Powhoge Polychrome (3.8%), Historic White Cream Slipped Unpainted (1.9%), Red-on-tan Unpainted (1.9%), Tesuque Polychrome (11.3%), Cochiti Polychrome (7.5%), Tewa Buff Undifferentiated (1.9%), Tewa Polished Gray (1.9%), Tewa Polished Black (18.9%), Highly Micaceous Paste (5.7%), Smudged Interior Mica Slipped Exterior (3.8%), Tewa Polished Red (20.8%), Plain Micaceous Tan (5.7%), and Acoma Zuni Red Slip Unpainted (1.9%). The combinations of types noted for this assemblage including the presence of Cochiti Polychrome and Tesuque Polychrome indicate this assemblage dates to the late Territorial Period. None of the sherds were modified by water transport. Vessels include jars, bowls, soup plates and cloud blower pipes (Table 4.22).

Chipped Stone
James L. Moore

The distal end of a Madera chert core flake was recovered from LA 149915's Structure 1, an earthen foundation dating to perhaps the early 1900s. The position of this artifact within a foundation that also contained numerous historic artifacts as well as a few prehistoric sherds suggests that the adobe from which the foundation was made was obtained from nearby Territorial period trash deposits, which substantially predated the period of construction for this architectural feature. Thus, the Madera chert flake does not appear to be related to the construction or use of this feature.

Summary

The data-recovery program at LA 149915 has revealed that Structure 1 consisted of a relatively unremarkable earthen structure foundation that had been substantially disturbed. The few construction details that were observed do not provide much additional information about this structure's function or age. Archival research indicates the building served as a warehouse for the New Mexico Highway Department. Structures 2 and 3 were also identified. These superimposed structural foundations both appeared to represent loading docks or platforms situated along the NMC railroad tracks.

Artifacts recovered from the structures contain a wide-array of items many of which are likely not associated with use of the site by the NMC. These artifacts include majolica from the Spanish Colonial period and plastic spoons from the 1970s or 1980s. NSTR 1, or Extramural Surface 1, has the highest frequencies of construction and maintenance (n = 209, 60 percent) objects relative to the total number of artifacts collected and analyzed. These materials consist primarily of wire-drawn nails and presumably associated with demolition of the structures sometime in the twentieth century.

Excavations at this site followed the procedures outlined in the data-recovery work plan (Wenker 2005c) and recovered the requisite data to address relevant aspects of the research design (Wenker et al. 2005). No further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction (Wenker 2006b:35). ARC and HPD concurred. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 146415

Chris T. Wenker, revised by Jessica A. Badner and Matthew J. Barbour

Introduction

LA 146415 was a small historical site that consisted of an array of four buried fence posts and postholes (Fig. 4.29). These four fence posts were identified as two features (Features 76 and 88). Based on archival research, these features were interpreted to represent the structural remains of a railroad-related stockyard.

Site Location

Located along the western edge of the Baca Street area, this site was approximately 35 m (115 ft) west of abandoned railroad tracks assigned LA 146417, and 50 m (164 ft) east of Alarid Street (Figs. 4.2, 6.18). This linear site was 56 m (184 ft) northwest to southeast by 9 m (30 ft) wide (Fig. 4.29).

Archival Research

Deyloff (2004:15, 19) reports that stockyards are plotted in this portion of the Baca Street parcel on a 1918 ledger book from the New Mexico Central Railway. As illustrated by Deyloff (2004:19) the stockyard covered a rectangular area measuring roughly 140 by 280 ft, extending northwestwardly from the northwestern edge of the railroad right-of-way, with the short side of the rectangle fronting the rails. No further information is available.

Excavation Sequence

This site was investigated by the excavation of two backhoe trenches, BHTs 97 and 107 (Fig. 4.30; Table 4.23). Trenches exposed a total of 152.7 linear meters (501 linear ft) of soil profile and were recorded according to project guidelines. No test pits or scraping units were excavated.

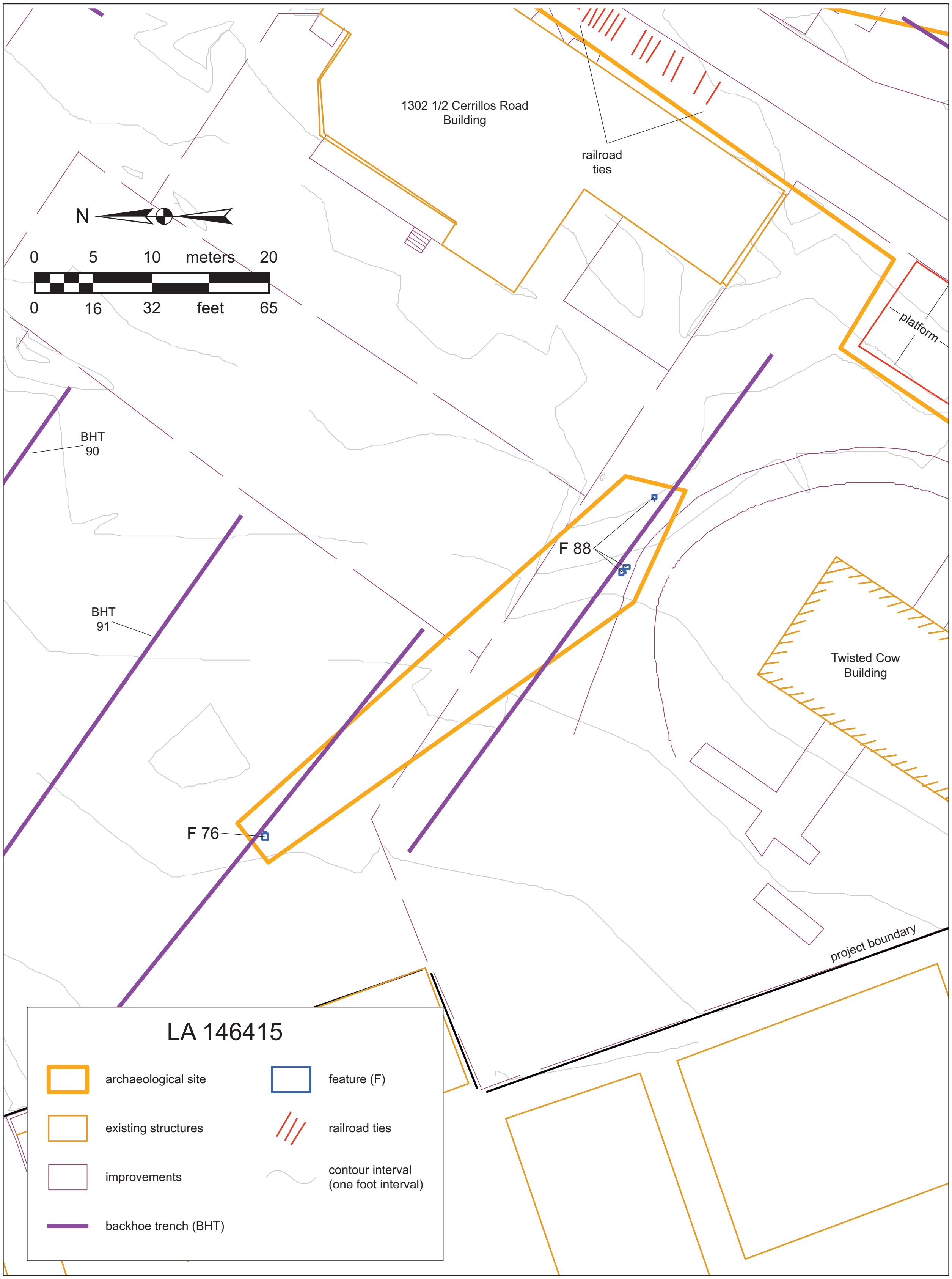


Figure 4.29. LA 146415, showing BHTs 92 and 107 and Features 76 and 88.

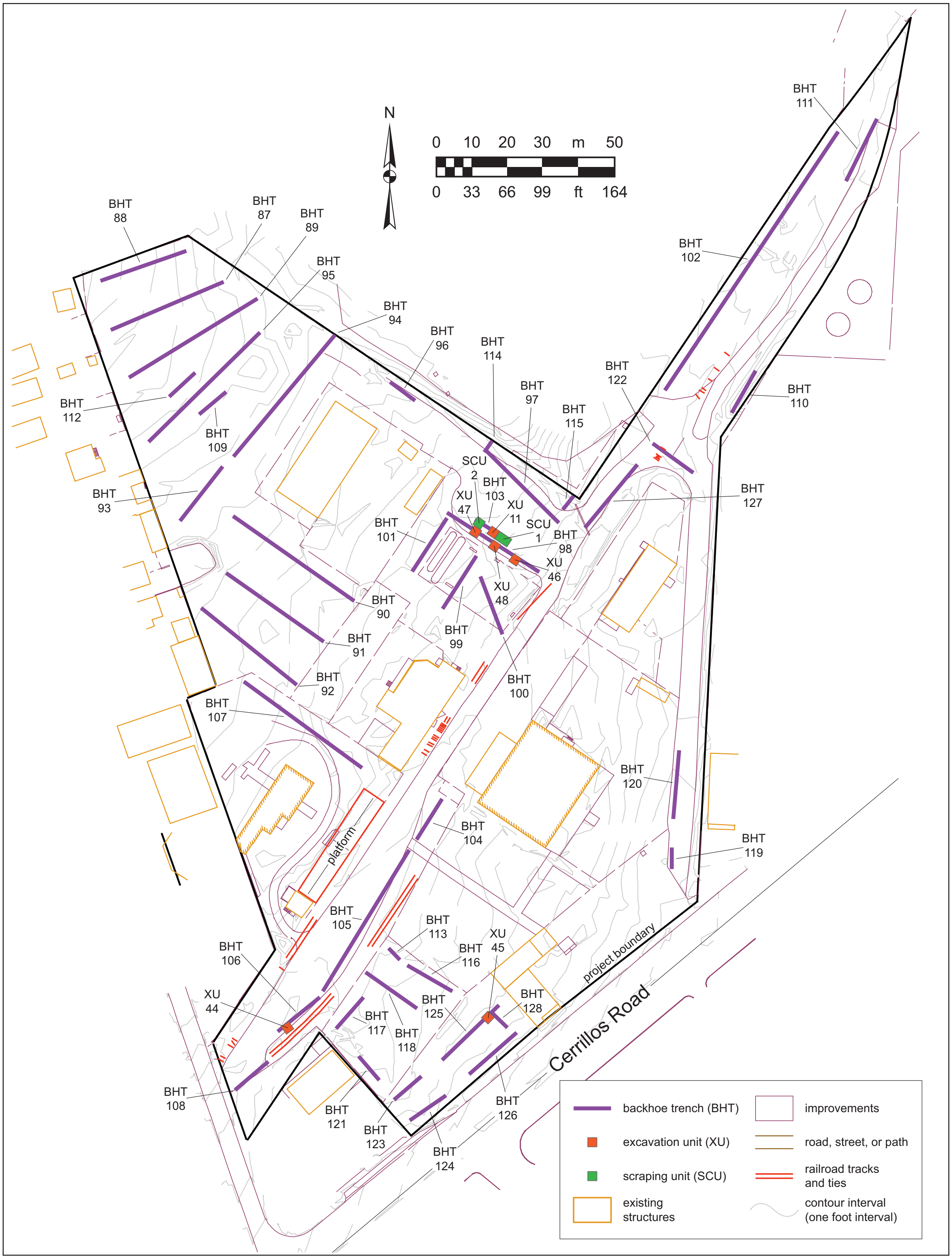


Figure 4.30. Backhoe trenches (BHT) excavated in the Baca Street area during the testing phase of the Santa Fe Railyard project.

Site Stratigraphy

Strata 1, 2, and 3 were typical of those reported throughout the project area. These strata are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Trench exposures indicate that Stratum 1 was from 5–20 cm (2–8 in) thick. Stratum 2, redeposited fill, was discontinuous and approximately 25 cm thick. Underlying natural strata were Stratum 3 and 4. Stratum 3 ranged in depth from 0.25 to 1 m (10 in to 3 ft 3 in) below the current ground surface. Stratum 4 was at least 60 cm (2 ft) thick and disappeared into the trench base.

Feature Descriptions

Railyard-era features were limited to a series of four postholes postulated to belong to a fence that enclosed a stockyard recorded in 1918 and are summarized in Table 4.24. As exposed overall, the Feature 76 and 88 posts encompassed a northwest-southeast axis measuring 45 m (147.6 ft) in length. As posts were only revealed in backhoe trench exposures, this measurement only roughly approximates the stockyard dimensions and boundaries.

Feature 76. A single post fragment in a posthole (Feature 76) was recorded in BHT 92 at the northwestern end of this site. That feature consisted of a 25 cm wide (10 in) posthole that was dug at least 55 cm (1 ft 10 in) in depth through sterile substrate Stratum 3. The top of the posthole was capped by 20 cm (8 in) of modern Stratum 1 overburden. In the trench exposure, a 20 cm thick (8 in) layer of historic overburden Stratum 2 originated roughly 25 cm (10 in) northwest of the edge of this post and continued 19.5 m (8 in) to the northwest, but the association of that deposit with the posthole is unknown.

Feature 88. Feature 88 was a cluster of three fenceposts or postholes, designated as Features 88A to 88C, exposed in BHT 107 at the southeastern end of this site. These postholes ranged from 22 to 30 cm (8 to 12 in) in width and were from 37 to 68 cm (1 ft 3 in to 2 ft 4 in) deep, excavated through sterile substrate, Stratum 3. The tops of the postholes were capped by modern Stratum 1 overburden. Two of the posts were located 75 cm (2 ft) apart, and the overall feature cluster encompassed a 7.5 m long (24.6 ft) length of the trench.

Summary

LA 146415 consisted of an array of four buried fence posts and postholes. Inferring that the posthole features are part of a stockyard corral made of wooden fenceposts seems the most parsimonious interpretation of these archaeological features. No extant posts or other landscape features related to the stockyard were visible on the modern surface, and the overall configuration of the complex remains unknown. A possible earthen loading platform along the railroad tracks southeast of this site (part of LA 146417, discussed above) could be functionally related, but this is unsubstantiated by current archival documentation.

Abundant modern overburden has obscured the actual extent of the historic stockyard, and the fence posts are poorly preserved. The layout of the overall stockyard is not clear from the available data. Beyond confirming that a stockyard once occupied the area in and around LA 146415, the potential for the physical archaeological remains of this site to contain additional interpretively significant information is very low. This site was recommended as being "ineligible" for the NRHP (Wenker 2005a:78). HPD and ARC concurred with this evaluation. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 146414

Chris T. Wenker, revised by Jessica A. Badner and Matthew J. Barbour

Introduction

LA 146414 (Fig. 4.31) was a historical site that included a single charcoal-filled thermal feature (Feature 77), and an array of sandy sedimentary deposits that may represent shallow, amorphous water channels or basins. A single clearly defined water channel was also exposed in two trenches.

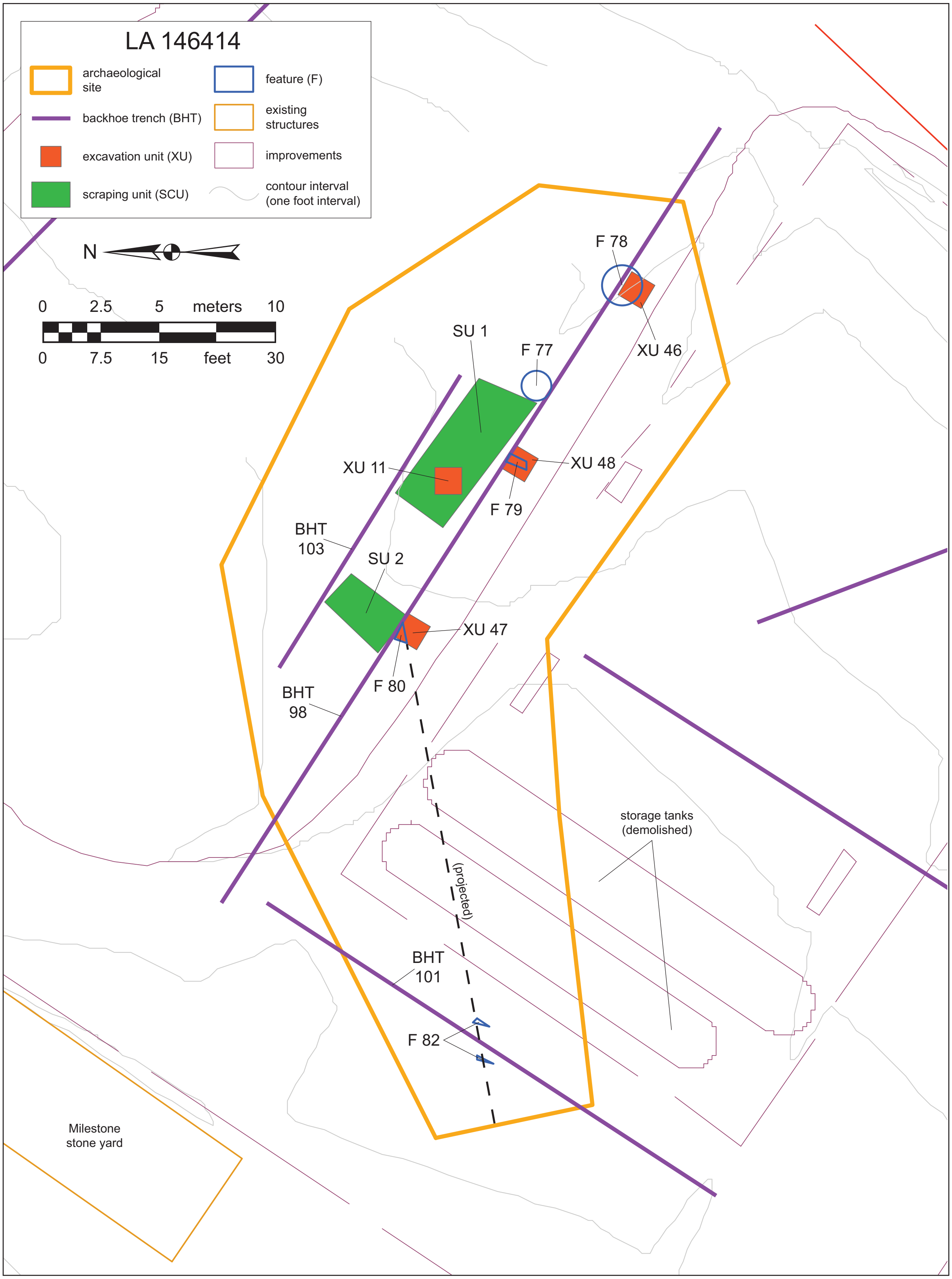


Figure 4.31. LA 146414, site map.

Artifacts recovered during test excavations suggest a twentieth-century period of use, during the railroad era.

Site Location

LA 146414 was located approximately 150 m (492 ft) northwest of Cerrillos Road, northeast of Baca Street, and just southeast of the Milestone Stone yard (Fig. 4.2). It covers 672 sq m of area and measured 40 m (131 ft) east–west by 16 m (52 ft) north–west (Fig. 4.31). Topographically and geomorphically, this site appears to occupy a pedestaled remnant of the historic ground surface and related topsoil (Stratum 44). The area occupied by the site forms a low, northwest-trending ridge, flanked on the north and south by slightly depressed areas (Fig. 4.31).

Archival Research

Deyloff (2004) notes that archival documents indicate that this area of the Baca Street parcel was used as agricultural fields until about 1900, but little evidence of this type of use is evident among the site's features or deposits. This may be explained by extensive mechanical alteration to surfaces adjacent to the site area. Ephemeral evidence of fields could have been removed by mechanical scraping and subsequent back fill. Evidence of water channels and pools may imply agricultural use.

Excavation Sequence

Three backhoe trenches (BHTs 98, 101, 103; Fig. 4.31; Table 4.25) were employed to investigate this site. Two backhoe scraping units (SCUs 1 and 2, Table 4.26) and four one-meter-square XUs (XUs 11, 46–48, Table 4.27) were dug to evaluate the deposits, artifact content, and condition of the water channels (Fig. 4.31). The site contained five features (Table 4.28), four of which are possible water channels or basins.

Site Stratigraphy

Strata 1 and 3. Strata 1 and 3 were typical of stratigraphy throughout the project area and are summarized in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Trench exposures indicate that Stratum 1 was from 30 to 50 cm (1 ft to 1 ft 8 in) thick and that Stratum 3 was directly below Stratum 1, which continued to the trench base, forming a deposit at least 1 m (3 ft 4 in) deep. Stratum 2 was not encountered.

Stratum 44. Stratum 44 was a 15 cm (6 in) thick deposit of yellowish-brown silty loam with few fine charcoal flecks and variegated fine sand lenses throughout. This stratum was present in Feature 77 and the backhoe trench north of the Feature 77 location (BHT 103). It also formed part of the fill in the other sandy channels or basin features in BHT 98 (see below). The deposit was beneath Stratum 1, approximately 12 cm (5 in) below the surface.

Stratum 42. Stratum 2 was a 20 cm (8 in) thick deposit of brown, hard, friable sandy loam in BHT 101. Located beneath Stratum 1, this deposit lacked cultural inclusions and may have been a derivative of Stratum 3 beneath. Feature 82, an alluvial deposit was encased in this deposit.

Feature Descriptions

Five features were identified in profile. They represent a thermal pit (Feature 77), two swales (Features 78, 79), and two water channels (Features 80, 82). All reflect use during the early to mid-twentieth century.

Thermal Pit

Feature 77. The upper margin of this small, basin-shaped pit (61 cm [2 ft] wide by 32 cm [1 ft] deep) lay at the base of a thick deposit (40 cm [1 ft 4 in]) of modern Stratum 1 overburden in BHT 98 (Fig. 4.32). The pit had been excavated into the underlying sterile substrate (Stratum 3) as well as part of culturally deposited sediment (Stratum 44) that extended from the western edge of the pit. The fill in Feature 77 consisted of carbon stained, very dark grayish-brown silty clay with common, fine charcoal flecks. The margin of the pit was not hardened or reddened. No artifacts were observed in the pit; its function and origin remain undetermined.

Water Channels/Basins

Features 78 and 79. Features 78 and 79 were swales into which water had settled. In cross section by BHT 98, Features 78 and 79 appeared as broad, thin, poorly defined basin-shaped depressions in the top margin of the sterile substrate (Stratum 3).

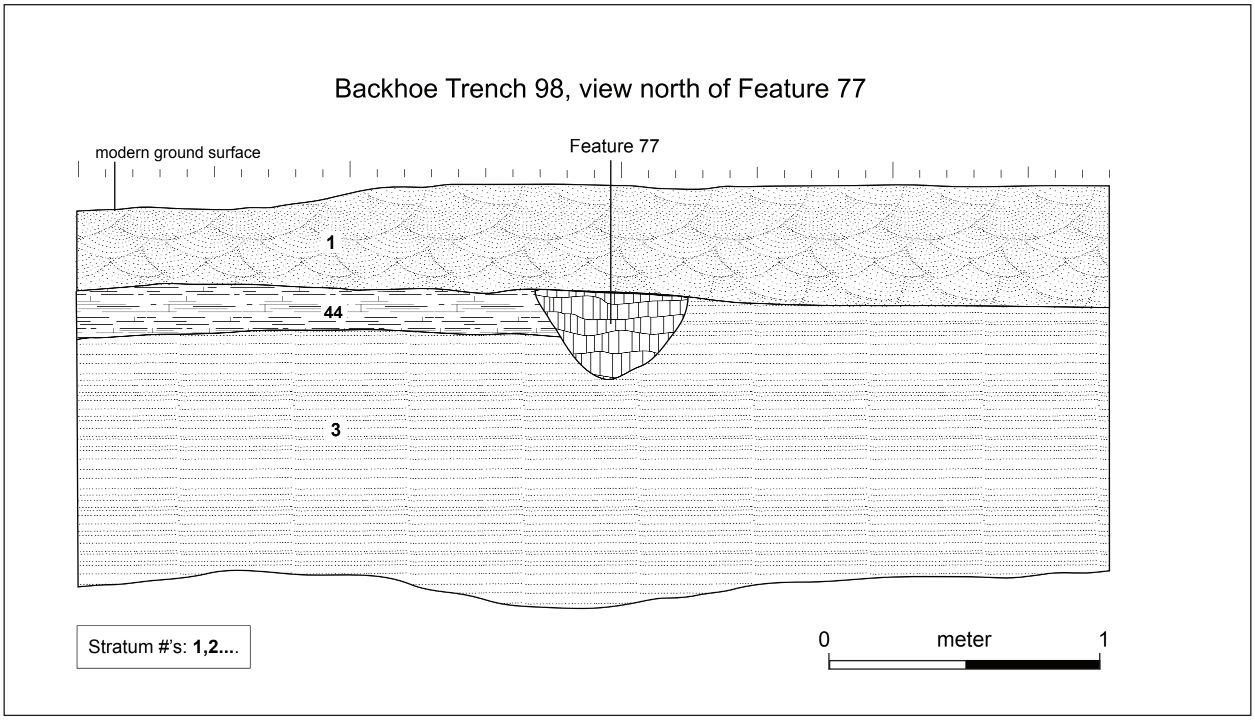


Figure 4.32. LA 146414, BHT 98, Feature 77, cross section.

Feature 78 was 2.25 m (7 ft 4 in) wide in profile and 25 cm (10 in) deep. Feature 79 was 84 cm (2 ft 10 in) wide and only 12 cm (5 in) deep. Both were capped by a 30 to 60 cm (1 to 2 ft) thick mantle of modern Stratum 1 overburden. Each feature was filled with laminated lenses of Stratum 44 and with yellowish-brown fine silty sand, with abrupt upper and lower boundaries but only gradual horizontal boundaries.

Less than 5 m (16 ft) to the north, the cross section of BHT 103 revealed a broad expanse of Stratum 44 (described above) with no discrete sandy feature deposits as noted in BHT 98. To define feature extents, a backhoe scraping unit (SCU 1) was used to expose the top of this deposit between BHTs 98 and 103. The SU revealed that the cultural deposit was discontinuous and thin (5–10 cm [2–4 in] thick). Several mid-twentieth century metal and bottle glass shards were opportunistically collected from the SU (Table 4.29). An XU (XU 11) was excavated in the base of the SU, but that unit only encountered sterile substrate Stratum 3.

Each sandy feature in the south face of BHT 98 was then further examined by the excavation of an XU. XU 46 was placed over Feature 78 and XU 48 was placed over Feature 79. Both XU confirmed the shallow depth of the feature fill and the amorphous nature of the horizontal extent of the sandy fill. The XU excavations revealed that these features consisted of thin lenses of alluvially deposited sand in shallow basins on the top surface of Stratum 3. No discrete channels were evident. The fill in both features contained metal and bottle glass indicative of a mid-twentieth century period of deposition (Table 4.29).

Features 80 and 82. Features 80 and 82 probably represent exposures of a single linear, sand-filled water channel oriented along a northeast-to-southwest axis. A discrete basin-shaped depression was xposed on the north end of BHT 98, west of Features 79 and 80. It appeared to be relatively narrow (60 cm [2 ft]). The feature was excavated 15 cm (6 in) into the top of the sterile substrate (Stratum 3) and capped by a 30 cm (1 ft) thick mantle of modern Stratum 1 overburden. Fill consisted of laminated lenses of fine and coarse yellowish-brown silty sand. An XU along the south edge of BHT 98 (XU 47) only intersected part of the eastern margin of the feature fill, but no certain indication of a channel or continuous-edged feature was observed. Several artifacts were present in the Stratum 44 overlying the channel but no artifacts were recovered from the level within the sandy feature fill (Table 4.29). A backhoe scraping unit (SCU 2) was dug over the projected northern extent of this feature, north of BHT 98. The SU was unable to locate the feature; only Stratum 3 was encountered.

The exposure of Feature 82 in BHT 101 to the west revealed a 75 cm (2 ft 6 in) wide, shallow (6 cm [2 in]) pocket of laminated lenses of fine and coarse yellowish-brown silty sand embedded within an expanse of Stratum 44 (described above). From the orientation of the exposures of this lens in the walls of BHT 101, Feature 82 was projected to intersect with the Feature 80 exposure in BHT 98, leading to the interpretation of these features as a linear water channel. The orientation of this water-bearing channel closely follows the natural topographic slope of the modern ground surface. Given the absence of cultural material in the channel fill, this feature appears to represent a small natural arroyo that was in-filled. The association of this single small postulated channel to a similar feature (Feature 90) at LA 146413 to the west-northwest is unknown.

Summary

The modern surface of the ridged area occupied by LA 146414 lies roughly 30 cm (1 ft) higher than the dirt parking lot immediately to the north and the dirt lot to the south. The modern surfaces of the adjacent lots have been extensively graded and scraped. These actions presumably limited the extent of deposits associated with LA 146414. This is further supported by the fact that backhoe trenches in those areas failed to locate any deposits similar to the Stratum 44 deposit. Stratum 44 is interpreted as historic topsoil sediment similar to Stratum 42 in LA 146413 to the west-northwest. The features in this stratum appear to represent natural water channels or puddled basins where cultural material accumulated incidentally during the early or middle twentieth century. The single remaining thermal feature indicates that this site contained, at best, evidence of an ephemerally used, extramural activity or use area of unknown function.

Little or no evidence of the agricultural fields noted by Deyloff (2004) was evident among the site's features or deposits. The recovered artifacts suggest a twentieth-century period of use, during the railroad era. At best, the features at this site represent occasional, casual, ephemeral episodes of past use within the vacant lot during the twentieth century. The site exhibited little interpretive potential and was recommended as being "ineligible" for the NRHP (Wenker 2005a:78). ARC and HPD concurred. No further archaeological investigations were conducted and recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

SYNTHESIS: Archaeological Sites Associated with the New Mexico Central Railway in the Santa Fe Railyard Project Area

Matthew J. Barbour

Eight archaeological sites investigated within the Santa Fe Railyard project area could be tied to the New Mexico Central (NMC) Railway. Archaeological excavation and archival research performed for these sites is specifically relevant to *Research Domain 3: Bringing Archaeology and History to bear on the Archaeological Buildings and Structures of the Santa Fe Railyard* (Wenker et al. 2005:123–132). Questions within this research domain included: What was the overall configuration of the original depot? Are use-related artifacts present? When was the building demolished? Do structural remains substantiate or dispute the historical record? What economic and social factors influenced the design of the NMC facilities?

This chapter examines the eight sites in relation to themes discussed in the research design by first presenting a brief overview of the history of the NMC and its role within New Mexico commerce. This is followed by a discussion of the NMC as represented by the archaeology of the Santa Fe Railyard project. Archaeological data is used to confirm or refute existing archival depictions of the design and organization of NMC holdings in the project area and then supplement this information with data regarding specific building construction sequences, manufacturing techniques, materials used, and abandonment processes. Lastly, the legacy of the NMC is compared with the much larger Atchison, Topeka and Santa Fe (AT&SF) Railway.

New Mexico Central Railway

In the early twentieth century, pinto beans were the fifth most important crop, from the standpoint of acreage, in the state of New Mexico (Culbert 1941:50). It was estimated that roughly 154,000 acres of land were dedicated to pinto bean production. Nearly 78 percent or 120,000 acres of this land were in or near the Estancia Basin.

With stops in Moriarty, McIntosh, Estancia, Willard, and Torrance, the NMC was pivotal to the movement of the pinto bean across the state (Turquoise Trail Preservation Trust 2011; Fig. 4.1). While the NMC had other functions, such as the transporting of coal or the utilization of the railway for passenger service, these roles were secondary to the hauling of agricultural produce (D. H. Snow, Chapter 7, this report). Known affectionately to the locals as the "Bean Line," the NMC provided farmers in the Estancia Basin large markets, such as Santa Fe and El Paso, in which to sell their pinto beans (Culbert 1941). Through the 1900s, 1910s, and 1920s, the success of all agricultural endeavors in the region were tied to the NMC Railway which saw fit to establish its headquarters in the Torrance County seat of Estancia, New Mexico.

The NMC was originally incorporated as the Santa Fe, Albuquerque, and Pacific railroad in December of 1900 (Pratt et al. 1988:171). It was later named the Santa Fe Central (SFC) Railway the following year. In 1908, the SFC merged with the Albuquerque Eastern (AE) Railway, to form the NMC Railway, after a failed attempt by the AE to run tracks west of Moriarty through Tijeras Canyon to Albuquerque (Pratt et al. 1988:171). Figure 4.1 illustrates the locations of both the SFC and AE Railways just prior to the 1908 merger.

The NMC was a standard gauge railroad that ran south of Santa Fe through Moriarty and on to Torrance eventually reaching El Paso by way of the El Paso and Rock Island (EP&RI) Line. In many ways, the "Bean Line" was the sister line to the Denver and Rio Grande Railroad (D&RG) Company, or "Chili Line," which was contemporaneous with the NMC and ran a narrow gauge rail from Santa Fe north into the coal fields of southern Colorado (Glover 1997). Between the two lines, agricultural produce could be transported efficiently from central and northern New Mexico to markets as far away as southern Colorado and west Texas.

After the 1908 merger, a branch of the NMC was started from Moriarty to reach the mines in the Hagan valley through Frost (Fig. 4.1). The money ran out just north of the Bernalillo County line after crossing the future, New Mexico Highway 14 (Turquoise Trail Preservation Trust 2011). Financial difficulties continued to constrain further development of the line in the 1910s and early 1920s (Pratt et al. 1988:171). The NMC operated until 1926 when the AT&SF bought the line and all associated infrastructure.

The New Mexico Central Railway in Santa Fe and the Archaeology of the Santa Fe Railyard

Santa Fe represented the northernmost stop along the NMC. Archival Research (Scheick 2003, Deyloff 2004) suggests NMC holdings within the city included a depot (Structures 1 and 2 at LA 146405), loading dock (Structure 2 at LA 149915), stockyard (LA 146415 and LA 146417), and of course the tracks necessary to facilitate locomotion (LA 146406, LA 146417, and LA 149911). These landscape features were identified and documented during archaeological investigations within the Santa Fe Railyard project area. In addition, two other archaeological sites (LA 146414, LA 149913) were associated with the NMC Railway, but their features were not discussed in any historical records.

Beyond locating NMC infrastructure and confirming archival records, research conducted by the OAS included structure and artifact analyses resulting in information pertaining to site use and abandonment. These findings are summarized below.

Initial NMC/SFC Depot, Structures 1 and 2 at LA 146405

D. H. Snow (Chapter 7, this report) suggests that the initial NMC/SFC Depot in Santa Fe was built by early August of 1903. The 1904 Station Grounds map shows this depot for the SFC Railroad at or near the location of LA 146405 (Scheick 2003:54–55). The depot was utilized for less than a year, after which time the NMC/SFC shared a depot with D&RG (located off site) until its demise in 1926. A map of the Joint Terminals of the D&RG and SFC railroads dated sometime between 1904 and 1918 identifies the building at LA 146405 as being utilized as a warehouse with the north one-third of the structure being designated "perishables." This suggests that after the depot moved elsewhere, the building was used primarily for storage.

Based upon archaeological excavation, foundations of the depot (Structure 1) at LA 146405 were 30 cm (1 ft) wide and constructed of poured concrete without the use of rebar for reinforcement. Each room abutted the next, with Structure 1.1 having been constructed first, then Structure 1.2, and lastly Structure 1.3. These building practices were used in vernacular architecture throughout Santa Fe in the early twentieth century, including contemporaneous residential buildings in the Santa Fe Capitol Complex Historic Neighborhood (Barbour 2011). However, they depart substantially from the building efforts of the AT&SF, constructed a generation earlier, which saw fit to import quarried sandstone and build on a scale similar to industrial landscapes in the eastern United States.

While it has been suggested that Structure 1.2 and Structure 1.3 post-date use of Structure 1.1 as the depot (see LA 146405), dimensions of Structure 1.1 are only 12.5 m (41 ft) long and 3 m (10 ft) wide (Figs. 4.3, 4.4). This room alone is not large enough to match the building depicted on the 1904 Station Grounds map, which measures 85 by 52 ft (Scheick 2003:54). Only if the three rooms are combined does structure even approach the dimensions necessary to resemble the building depicted on the 1904 map (20 by 7 m [66 by 23 ft]).

This suggests that Structures 1.1, 1.2, and 1.3 were built in rapid succession between 1903 and 1904 and that their combined blueprint is what is depicted. Three-room "combinations" depots were after all the norm amongst railways at the turn of the century with separate rooms for freight, passengers and baggage, and railway agents (Wenker et al. 2005:131). However, it is unclear if the NMC adhered to this building practice. If so, the rapid accretional growth of the structure provides some archaeological evidence of the financial shortfalls or speculative nature of the NMC. Instead of planning and constructing a structure suitable for its needs, the original depot appears to have been built sporadically with rooms added as funds were made available or as necessary to facilitate operation in Santa Fe.

Ultimate use of the structure by the NMC as a warehouse can also be seen in the archaeological record. As discussed above, a later map of the railyard, published sometime between 1904 and 1918, depicts the north one-third of the structure as housing "perishables." Coincidentally, the northern subterranean portion of the structure at LA 146405, designated Structure 2.1, had a brick floor that could be used as a root cellar for storing organic produce. Euroamerican analysis of artifacts found in the fill just above the brick floor also dated to the early twentieth century.

Whereas the cellar appears to have been abandoned either prior to or at the time the NMC was bought by the AT&SF, use of the ground floor rooms (Structures 1.1, 1.2, and 1.3) appears to have continued as part of Quality Imports, the Maloof Family's Coors beer and liquor distributorship, in the 1930s and 1940s.This later use of the building by Quality Imports and its links with Coors beer demonstrates Santa Fe's connections with ever larger regional and nation-wide commercial networks. Furthermore, the success of such a business illustrates the continuing integration of immigrant families, such as the Lebanese Maloofs, into the existing societal hierarchy.

NMC Loading Dock, Structure 2 at LA 149915

LA 149915 appears to have represented a warehouse associated with the New Mexico Department of Transportation (Structure 1) and two superimposed loading docks (Structures 2, 3). The earlier of the two loading docks (Structure 2) was oriented along the main tracks of the NMC Railway (Fig. 4.24). Its appearance on the 1930 Sanborn Fire Insurance Map suggests it was built sometime in the 1920s, possibly by the NMC before it was bought by the AT&SF. The remaining structures (Structures 1, 3) date to the mid-twentieth century and are not associated with the NMC.

The NMC loading dock consisted of a central wooden frame (Feature 31) surrounded by an assortment of evenly spaced flat-lying creosote planks (combined together as Feature 26), as well as several posts (Feature 30A-D) and an alignment of flat-lying wooden beams (Feature 24). The evenly spaced plank groupings (Feature 26) may have functioned as joists or supported vertical posts. Each grouping of planks was built of one to five individual planks.

These planks all varied in their dimensions, but were generally either 32 by 18 cm or 32 by 10 cm (12.5 by 7 in or 12.5 by 4 in) in cross section and ranged between 0.8 to 1.1 m (32 to 42 in) in length.

The lack of standardization in the number and distribution of planks used to support each vertical post is substantial and suggests at best, making use of the materials at hand, but may indicate no planning and/or poor execution. The overall exposed extent of Structure 2 suggested a rectangular structure measuring at least 14.8 m by 4 m (48 ft 6 in by 13 ft) across (Fig. 4.29). This matches well with the size and shape of the structure as depicted on the 1930 map, roughly 60 ft by 20 ft (18.28 m by 6.1 m).

While a train headlight and two iron railway spikes were recovered from the structure, plastic artifacts represented a significant portion of the Euroamerican assemblage (n = 15, ~8 percent,). Objects such as plastic spoons were not mass-produced until the 1970s and there is no reason to believe these materials are associated with use of the structure or its demolition. However, materials found in the surrounding area (NSTR 1) consisted primarily of wire-drawn nails possible used in manufacture of the loading dock's superstructure. The use of wire-drawn nails is consistent with twentieth century building practices.

NMC Stockyard, LA 146415 and LA 146417

As illustrated in the New Mexico Central Railway Ledger Book (1918:13), the NMC stockyard covered a rectangular area measuring roughly 140 ft (42.67 m) northeast–southwest by 280 ft (85.34 m) northwest-southeast. This area roughly matches the location of LA 146415 and LA 146417. However, archaeological evidence of the stockyard was limited to four postholes (LA 146415, Fig. 4.29) and a rectilinear mound of packed earth running parallel to the No. 29 siding (LA 146417, Fig. 4.23).

The mound at LA 146417 appears to represent a loading platform and was located within what was presumed to be the southeast third of the stockyard. It measured roughly 45 m (148 ft) long by 8.5 m (28 ft) wide and was 90 cm (3 ft) in maximum height. In addition to the packed earth construction, the feature exhibited a 5-m-long (16 ft 5 in) retaining wall built of railroad ties in the center of the western edge. It is unclear if this 5 m long retaining wall represents a single location where the wall was necessary or if it is a remnant of a much larger wall that surrounded the platform on all sides.

Each of the postholes at LA 146415 measures between 20 and 30 cm (8 and 12 in) in diameter. When viewed collectively, the four postholes create a linear arrangement along the northeast wall of the stockyard and suggest the stockyard corral was constructed, at least in part, of wooden fence posts.

In sum, archaeological documentation of these two sites confirmed the layout of the stockyard as illustrated in the 1918 ledger and provided substantial information regarding the construction of the stockyard corral and loading platform. However, no artifacts were collected from either site and it is unclear if this stockyard continued to be used after the NMC was bought up by the AT&SF in 1926.

NMC Tracks, LA 146406, LA 146417, and LA 149911

LA 146406, LA 146417, and LA 149911 (Figs. 4.13, 4.23, 4.16) represent standard gauge track alignments first laid down by workers under the NMC Railway. However, as with any railroad track, frequent maintenance was required. This maintenance would have continued after the AT&SF purchased the holdings of the NMC. Hence, very few, if any, of the landscape features associated with these two sites represent the original materials used by the NMC Railway.

Based upon archival research (Deyloff 2004), tracks at the three archaeological sites appear to represent portions of the No. 21 line (LA 146406, LA 146417, LA 149911), which served as the original NMC main track, and the No. 28 and No. 29 sidings (LA 146417). The creosote-impregnated ties generally measured 2.5 m (ca. 8 ft) in length and in those instances where rails were still mounted to the ties, these rails were spaced at a distance of 1.42 m (4 ft 8 in). These dimensions are typical of standard-gauge railway construction throughout the United States and there is no evidence that NMC line was constructed differently from railways elsewhere.

However, a culvert (LA 149911, Feature 1027) was identified and investigated in conjunction with part of the No. 21 line. This culvert allowed the tracks to cross a discontinuous ephemeral stream or arroyo and was built of creosote-impregnated 15 by 20 cm (6 by 8 in) planks, nailed together with 25 cm (10 in) machine-cut square spikes. By the turn of the twentieth century, machine-cut square spikes represented an antiquated technology. Ever increasingly, these materials were being phased out as wire-drawn nails and spikes were adopted as the construction norm and produced in greater and greater frequencies. The use of these materials when constructing the culvert ca. 1903 could indicate surplus materials or could conversely, indicate that the culvert was built of a salvaged boxed-frame wooden flume used commonly in nineteenth and twentieth century northern New Mexico irrigation (Ackerly 1996:134). Both interpretations would likely represent a cost-saving measure by the NMC.

Beyond confirming the distribution and layout of railway lines associated with the NMC within the Santa Fe Railyard project area, archaeological investigations at LA 146417 and LA 149911 demonstrated that practices used in constructing the standard gauge line were similar to those used throughout the country. However, regular maintenance of the actual railway line throughout the mid-twentieth century by the AT&SF may have erased any differences, shortcuts, or cost-saving measures undertaken by the NMC. One exception is the investigation of the culvert at LA 149911, which suggests materials used to build the feature were out of date when the feature was constructed or set in place.

Water Diversion Features Associated with the NMC, LA 146414 and LA 149913

Archival documents (Scheick 2003) indicate that the area of the NMC holdings in Santa Fe was used as agricultural fields until the turn of the twentieth century. These fields included numerous agricultural features, including irrigation ditches, or acequias, that trapped and dispersed flood water across the landscape. As the NMC Railway began to utilize the land for industrial purposes, it must have been required that the water associated with these earlier agricultural features be redirected so as not to undermine or destroy the newly created NMC infrastructure.

Two archaeological sites were documented in association with these water redirection activities. LA 149913 included a large alluvial channel (Feature 1020, Fig. 4.19) meant to divert floodwater out of the Acequia Madre and direct it to a retention pond at the northeastern end of the feature. In this instance, the drainage channel may have been necessary to supplement a nearby box culvert and prevent waters, in times of flooding, from rising above the culvert and crossing directly over the NMC railroad tracks.

The vacant lot at LA 146414 (Fig. 4.31) may have served a similar purpose with the natural arroyo and shallow basins forming catchments for storm run-off and flooding episodes. These features were not purposefully engineered per-se, but leaving the lot vacant may have been a conscious effort on the part of the NMC to delineate a location away from their railroad track and structures where water was allowed to sit and evaporate after a powerful storm or flood. At the very least, the NMC understood that the area was prone to a marsh-like environment and chose not to build there.

Examining the Legacy of the New Mexico Central Railway in Relation to the Atchinson, Topeka and Santa Fe Railway

Features associated with both the NMC and AT&SF Railways were encountered within the Santa Fe Railyard project. On a general level, the two railways shared a lot in common. Both railways were standard gauge railroads. Both owned a depot, storage facilities and track. Both operated in Santa Fe during the early twentieth century. However, these railways represent very different businesses.

The NMC was a local or, at best, regional enterprise funded and owned by New Mexico businessmen. Revenue was largely derived from shipping agricultural products, particularly pinto beans, across southern Colorado, New Mexico, and west Texas. Budget shortfalls were common. These shortfalls constrained the construction of additional lines, limiting the number of markets accessible to the railway.

To the NMC, Santa Fe was a large and important market for goods originating in the Estancia Basin and, through the NMC Railway's agreement with the D&RG, it also served as a gateway to markets north. Facilities constructed within Santa Fe largely followed the local vernacular construction techniques using concrete without rebar reinforcement and with additional rooms built-on as necessary or as funds became available. Several of the features, such as the culvert at LA 149911, appear to have used out-of-date materials, possibly as a cost-cutting measure.

Conversely, the AT&SF was a national enterprise funded by businessmen throughout the country. The AT&SF shipped everything, but was supported in large part by manufacturing industries in the Midwest, particularly in Chicago and St. Louis, which saw the west as a growing market for their factory produced items. Funds were not an issue. Expansion throughout the west was both rapid and thorough.

Santa Fe was not an important market to the AT&SF. It did not boast sizeable population when compared with Los Angeles, San Francisco, Sacramento, Denver, and Salt Lake City. In designing the New Mexico portion of the AT&SF mainline, engineers saw fit to bypass Santa Fe altogether choosing instead to create a spur to Santa Fe at Lamy Junction only after local businessmen raised funds to pay for the project. Ultimately, Santa Fe represented the last stop on a line of secondary importance.

However, in building the AT&SF rail yard in Santa Fe, the railway had the means to acquire and transport manufacturing materials produced throughout the country. Instead of constructing their buildings with the materials at hand, the AT&SF chose to import quarried sandstone. It chose to employ standard construction hardware, instead of using outdated materials like the NMC. It built on a scale necessary to meet its needs. While this may not have been on the size of the railyard in Chicago, AT&SF infrastructure in Santa Fe was much more grandiose than the ephemeral undertakings of the NMC. Within the archaeological record, structures associated with the AT&SF were almost always larger, built of more robust materials, and built on a scale much larger than their competitors.

Following trends toward an ever-increasing nationalized business structure, the financial power of the AT&SF eventually caused the struggling NMC to collapse completely in the 1920s. The AT&SF assumed ownership of the NMC line and all associated infrastructure. NMC functions were consolidated with the AT&SF which survives today as part of the Burlington, Northern and Santa Fe (BN&SF).

Conclusion

The NMC was founded as the Santa Fe, Albuquerque, and Pacific Railroad in 1900 and was in operation until 1926. During this 26-year period, it was a speculative venture developed by New Mexico entrepreneurs. Success of the railway was tied to agriculture in the Estancia Basin and to markets in Santa Fe and El Paso. Financial difficulties brought on by poor decisions and a lack of capital investment, ultimately led to its demise. The NMC rail and structures were subsequently bought up by the AT&SF.

Investigations within the Santa Fe Railyard project area unearthed eight archaeological sites associated with NMC Railway. These sites included portions of the initial depot, loading dock, stockyard, and rail. In addition, two of the sites identified appear to function primarily as a means to deal with flooding and/or water diversion within NMC Railway grounds.

Archival documentation regarding the layout of the NMC holdings and size of the individual structures matched the archaeological data remarkably well allowing archaeological features to be linked with specific NMC infrastructure. Archaeology was also able to inform upon building materials and techniques used in the construction of the NMC buildings and structures. With the exception of the railroad tracks, very little of the building practices documented during archaeological investigations was standardized. In many instances the NMC appears to have employed cost-saving measures to complete the work, or to have built incrementally as funds were made available. These apparent cost saving measures attest to the overall speculative nature of the enterprise.

While there is a natural tendency to want to compare the NMC with the AT&SF, these railroad systems represent very different business ventures. The NMC operated on a local or regional level hauling agricultural produce whereas the AT&SF was tied into national commerce and eastern industry. Differences in capital investment eventually led to the collapse of the first and the continued expansion of the latter.

5 | Neighborhood Refuse Sites

Overview

Two archaeological sites (LA 146412 and LA 146413), located within the Santa Fe Railyard project area, were found to be associated with residential trash disposal into vacant lots in the early to mid-twentieth century (Fig. 5.1). These sites offered an opportunity to examine waste disposal practices and consumption and discard patterns of Santa Fe residents living in or near the Railroad District Historic Neighborhood in the 1930s, 1940s, and 1950s.

Analysis methods used in these evaluations included mean bottle-glass dating, the construction and application of mean ceramic price-index values, and the economic scaling of commercially butchered fauna. Results suggest a working or middle class wage earning population, largely dependent on store-bought products, living in a recently established residential neighborhood. The waste disposal practices and consumption and discard patterns of these consumers were similar to those found elsewhere within the city. While purchasing nationally advertised products, local consumers also possessed items distinctive to Santa Fe and the American Southwest.

LA 146412 and LA 146413 were excavated according to the data recovery plan (Wenker et al. 2005). The sites are discussed in order of LA number. This is followed by a synthetic analysis of the two sites in relation to archival information pertaining to waste disposal practices in Santa Fe during the twentieth century and to archaeological findings associated with contemporaneous sites excavated in the downtown area.

LA 146412

Chris T. Wenker
revised by Matthew J. Barbour

Introduction

LA 146412 is a historical site that includes a cluster of five residential refuse-disposal pits (Features 66, 67, 71, 72, 73) and a single sand-filled water channel (Feature 105, Fig. 5.2). Data recovery was performed on Features 66 and 72. Artifacts from excavated contexts suggest deposition during the early to mid-twentieth century. However, some late Colonial- or early Territorial-period indigenous ceramics and chipped stone debitage was also encountered.

Site Location

LA 146412 is located within the North Railyard development parcel (Fig. 2.35). The entire site measures about 75 m northeast/southwest by 49 m northwest/southeast and covers about 2,432 sq m of area (Fig. 5.2). Prior to the project, the site was a dirt parking lot and the features were not visible from the surface.

Excavation Sequence

During archaeological testing, six backhoe trenches crossed through the present site area (Fig. 5.2). This resulted in the documentation of five refuse pits (Features 66, 67, 71, 72, 73) and a sand-filled water channel (Feature 105). A single one-meter-square XU (XU 40) was dug to evaluate the deposits, artifact content, and condition of the water channel. This alluvial feature along with two of the refuse pits (Features 66, 67) appeared to contain artifacts dating to the late twentieth century.

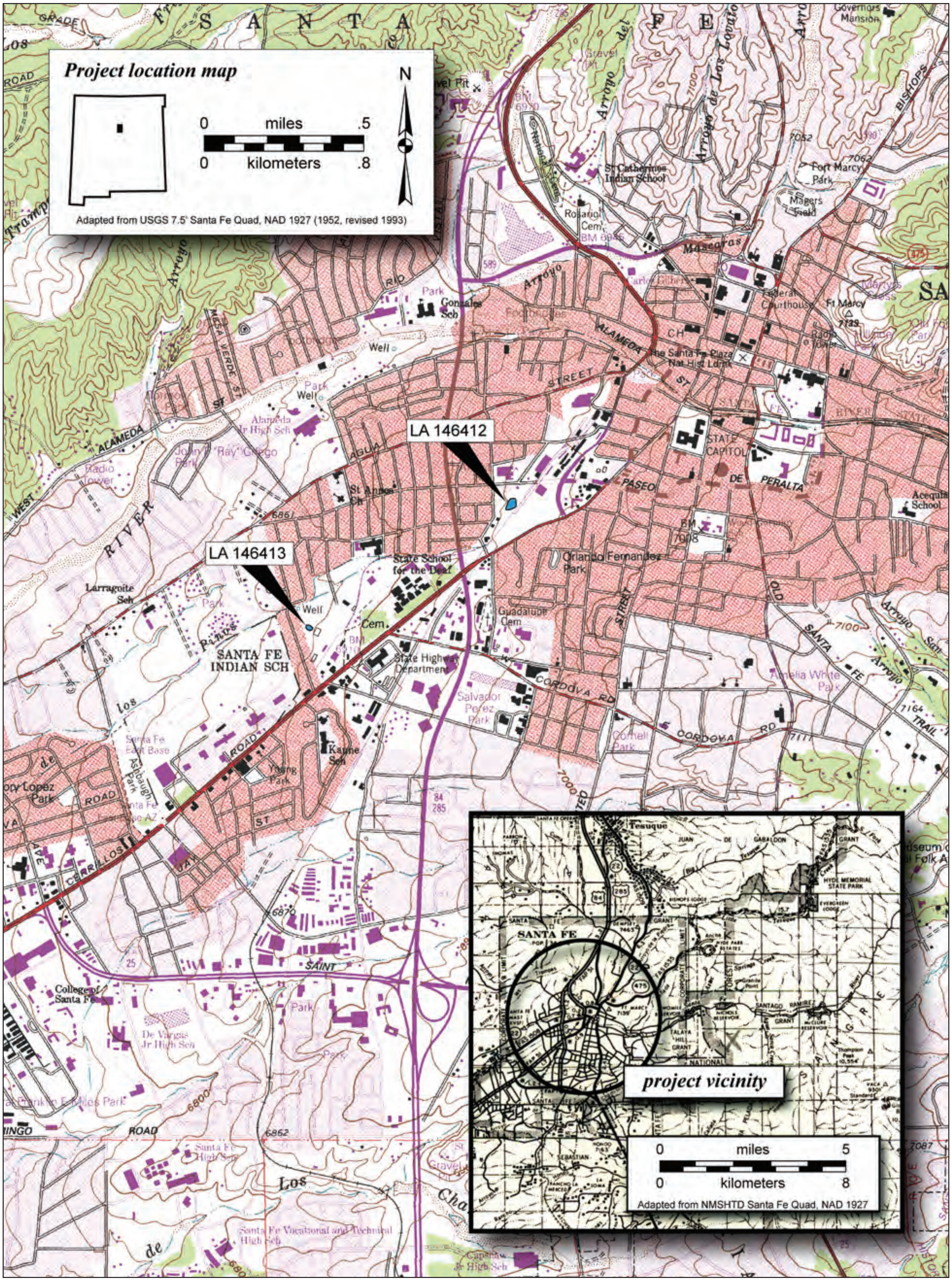


Figure 5.1. Location of neighborhood refuse sites.

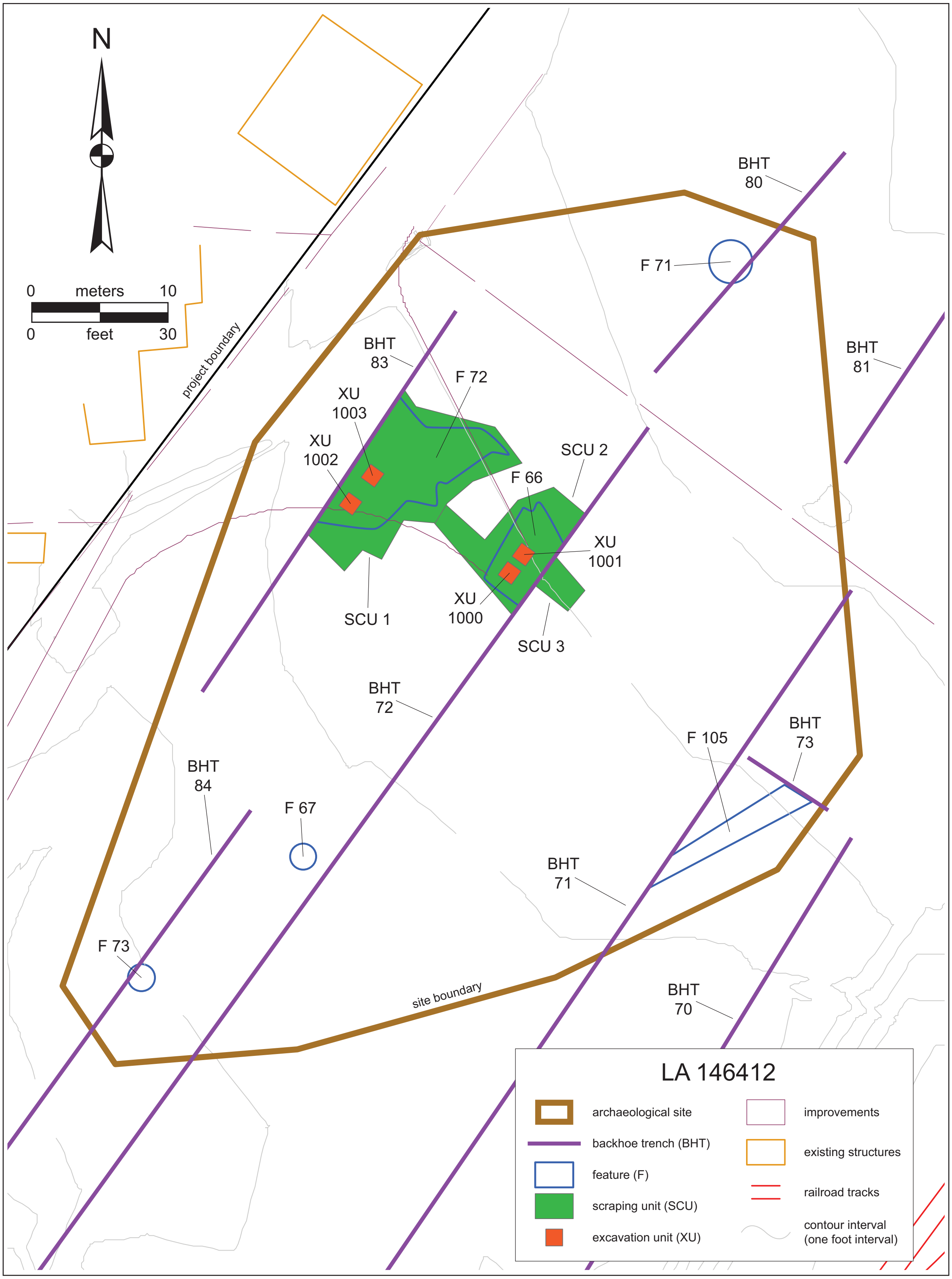


Figure 5.2. LA 146412, site map.

Feature 73 was mostly removed in the backhoe trench that exposed it; little of this feature remains for further investigation. Features 66 and 72 exhibited abundant material in the trench cross sections, and given their large sizes, these features had the potential to yield additional data relevant to twentieth century residential consumption discard patterns. These refuse-disposal pits were subsequently subjected to data recovery.

Data-recovery activities were conducted between January 13 and 23, 2006. Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker, Post, and Moore 2005). Feature and excavation unit numbers used at this site are not continuous from 1 to n because the designations from the testing project (Wenker 2005a, b) were maintained to provide consistency in the provenience designations.

The features were investigated by first re-exposing the cross-sections in BHTs 72 and 83 from the testing phase. Each feature was sampled by the excavation of two hand-dug 1 by 1 m excavation units (XUs 1000–1003) positioned over the deepest portion of each feature as exposed by the trenches (Fig. 5.2). Modern overburden was discarded to reveal the top of the feature fill, and all hand-excavated feature fill was then screened through 1/4-inch mesh. The feature limits were horizontally defined with mechanically excavated SCUs 1 through 3 (Fig. 5.3; Table 5.1). Diagnostic items were opportunistically collected as the scraping units were excavated. The edges of the features were marked by a horizontal differentiation between the stained feature fill and the surrounding Stratum 3 sterile substrate. No mechanical scraping was conducted northwest of BHT 83 due to the presence of a sewer line and an actively used dirt driveway.

Site Stratigraphy

Three sediment layers were identified in the site area outside the features (Figs. 5.4, 5.5). Stratum 1 was a thin (10 cm thick) mantle of modern overburden. Stratum 3 is the underlying sterile substratum consisting of a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. Stratum 5, which formed the basal substrate, consisted of a massive, hard, very

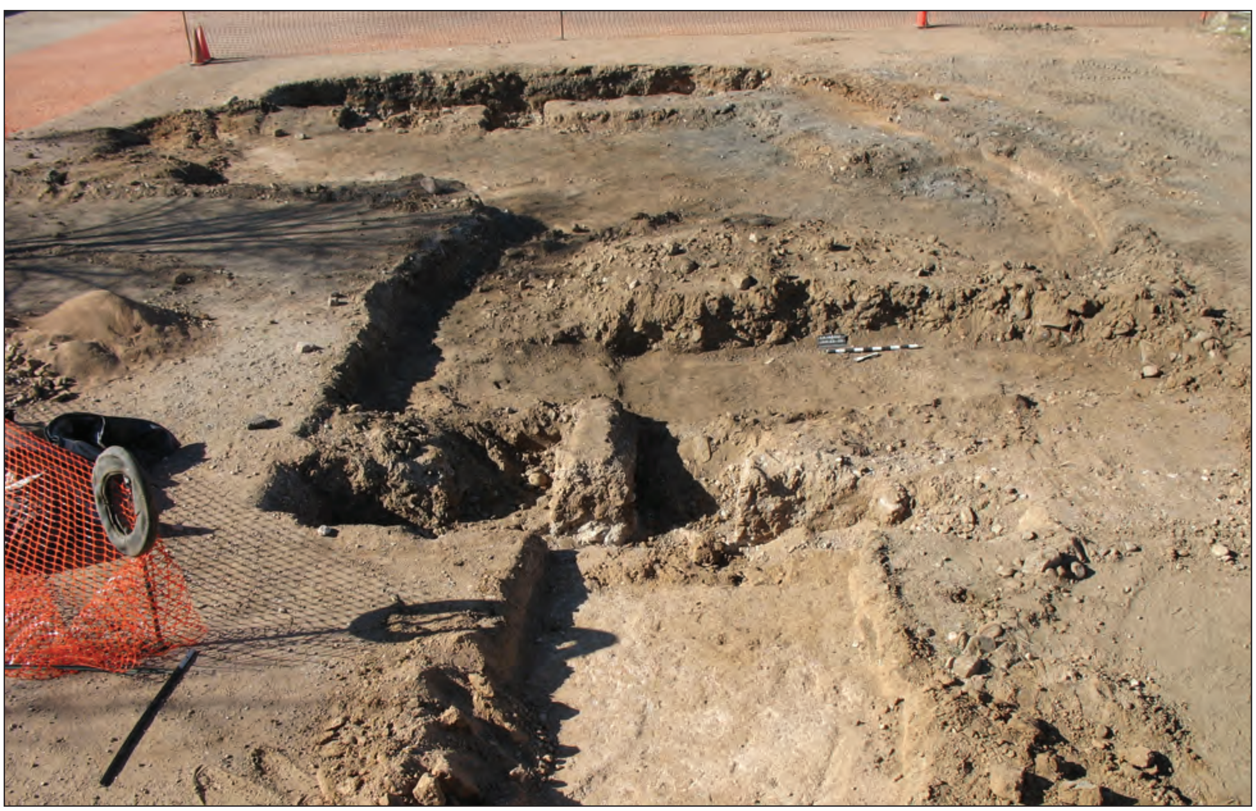
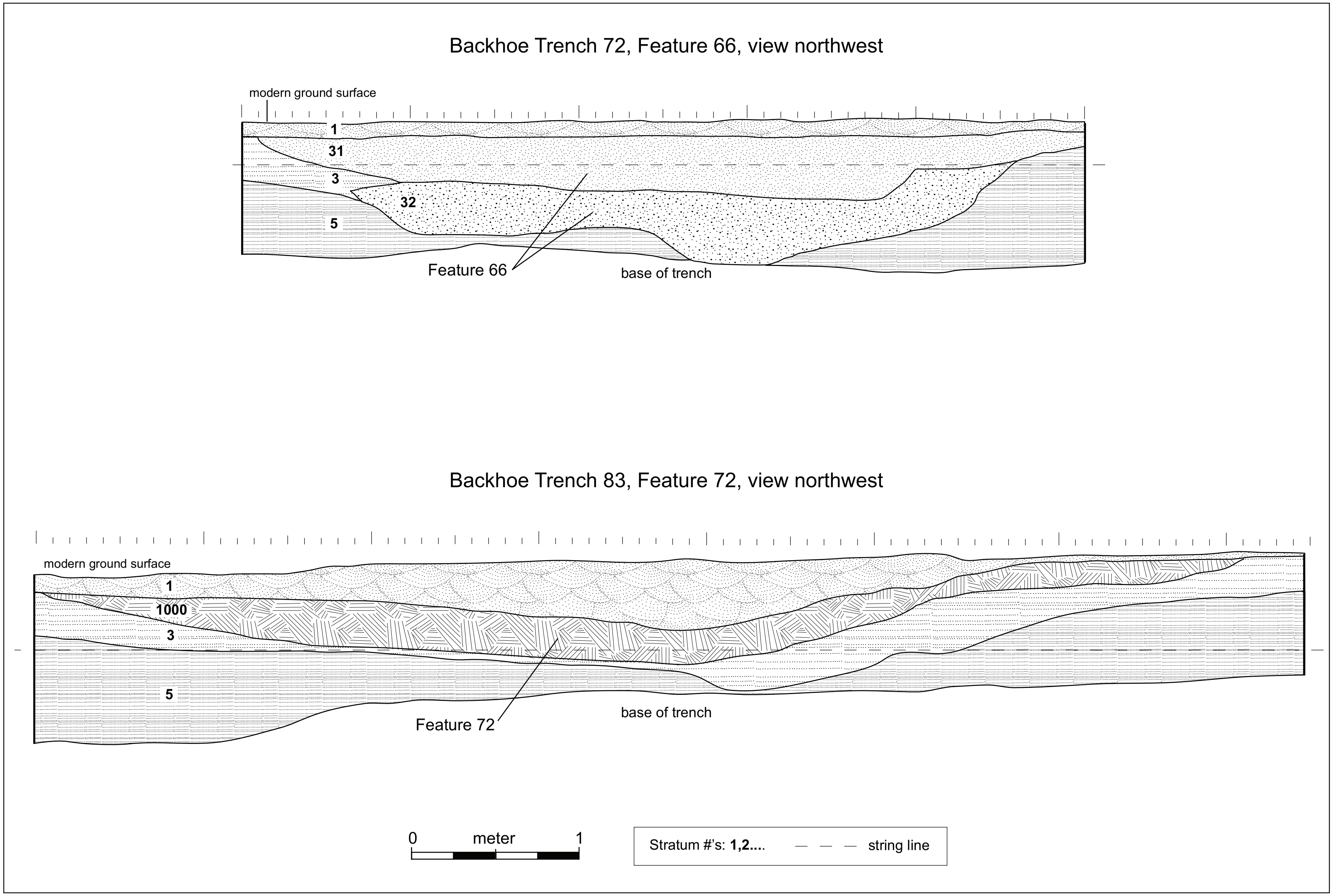


Figure 5.3. LA 146412, overview of excavations, view to the northwest.



Figures 5.4, 5.5. LA 146412, top (Fig. 5.4): BHT 72, northwest wall, cross-section view of Feature 66; bottom (Fig. 5.5): BHT 83, northwest wall, cross-section view of Feature 72.

to extremely gravelly, very cobbly, coarse silty sand that was light yellowish-brown to brown in color. Detailed descriptions of these natural and cultural strata are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Strata within the features are described below.

Features

A total of six features were encountered at LA 146412 (Table 5.2). These included five refuse pits and one sand-filled channel. Two of the refuse pits were intensively investigated during data recovery. The remaining features were exposed during archaeological testing, but not revisited (Wenker 2005a). All six features are discussed below.

Feature 66. Feature 66 is a large refuse pit originally found in BHT 72 during the testing phase (Figs. 5.2, 5.3). Data recovery began by removing the fill from the backhoe trench and exposing the feature cross-section (Fig. 5.4). The horizontal limits of the feature were defined by SCUs 2 and 3, mechanically scraped units covering some 9 by 12 m (30 by 39 ft). This large, shallow pit measured 7 m (23 ft) northeast–southwest by 5.5 m (18 ft) northwest–southeast (roughly 23 sq m [250 sq ft]) and was about 80 cm (2.6 ft) thick. The feature was irregular in plan with a broad, basin-shaped profile. The feature was covered by a relatively thin post-abandonment deposit of Stratum 1 (ca. 10 to 30 cm [4 to 12 in] thick) with an irregular lower boundary, and the upper extent of the feature fill may have been impacted by modern activities. The edges of the feature were rather diffuse and irregular, but the gravelly feature fill generally contrasted against the surrounding sterile Stratum 3 substrate.

Two 1 by 1 m excavation units (XUs 1000, 1001) were hand dug in the feature and screened with 1/4-inch mesh. The units, dug in 10 cm thick levels, segregated an upper deposit of light brown coarse gravelly sand (Stratum 31, extending to roughly 40 cm [16 in] in thickness) from an underlying deposit of dark yellowish-brown, coarse sandy loam (Stratum 32, about 40 cm [16 in] in maximum thickness). No clear differences in artifact content or deposition origin were evident between these two deposits.

The historic artifact assemblage recovered from the feature consisted of 3,748 artifacts (Table 5.3). The majority of the artifacts consisted of scrap metal, bottle glass, and faunal bone, but other material types included Euroamerican ceramics and various construction materials (including wood, bricks, and plaster). The feature functioned as a refuse pit (originally, probably just a convenient natural depression) containing both domestic and construction related materials dating sometime after 1946 (see Euroamerican artifact analysis below).

Feature 67. Feature 67 is a refuse pit originally found in BHT 72 during the testing phase (Fig. 5.2). It measured 1.72 m (6 ft) in length and 24 cm (9 in) in depth. Fill was a gray ashy silty loam with silty sand inclusions. This refuse pit contained recent artifact classes and was stratigraphically positioned in the uppermost deposit of modern overburden (Stratum 1). No excavation of the feature was undertaken.

Feature 71. Feature 71 is a refuse pit originally found in BHT 80 during the testing phase (Fig. 5.2). It measured 3.12 m (10 ft) in length and 42 cm (17 in) in depth. Fill was a grayish-brown silty loam with small and medium cobble inclusions. This refuse pit contained recent artifact classes and was stratigraphically positioned in the uppermost deposit of modern overburden (Stratum 1). No excavation of the feature was undertaken.

Feature 72. Feature 72, located northwest of Feature 66, was a similarly large, diffuse refuse pit that was originally recorded in BHT 83 during the testing phase (Fig. 5.2, 5.3). During data recovery, the horizontal limits of the feature were defined by SCU 1, a mechanically scraped unit covering a 10 by 15 m (33 by 50 ft) area. As noted above, no mechanical scraping was conducted northwest of BHT 83 due to the presence of a sewer line and an actively used dirt driveway, so the overall feature dimensions were not identified; it is estimated that about one-half of the feature was exposed in SCU 1. The large pit measured at least 11 m (36 ft) northeast–southwest by 8.5 m (28 ft) northwest–southeast (covering about 51 sq m [550 sq ft]) and was roughly 30 cm (1 ft) thick. The pit had a broad, shallow basin profile, but the upper extent and margin of the feature were diffuse and irregular in plan. The feature was covered by a relatively substantial post-abandonment deposit of Stratum 1 overburden (ca. 40 cm [16 in] thick), and the upper extent of the feature fill may have been impacted by modern activities (Fig. 5.5).

Two 1 by 1 m XUs (1002 and 1003) were hand-dug in 10 cm thick levels in the deepest part of the pit and screened with 1/4-inch mesh. XU 1002 contained a deposit of dark grayish-brown, fine silty sand (Stratum 1000) that was 19 cm (8 in) thick. XU 1003, however, contained an upper, 10 cm thick (4 in) layer of Stratum 1000 over an underlying deposit of brown silty sand (Stratum 1001) that was 16 cm (6 in) in thickness. No clear differences in artifact content or deposition origin were evident between these two deposits.

The historic artifact assemblage recovered from the feature included 2,141 artifacts (Table 5.3). The majority of the artifacts consisted of metal, bottle glass, and faunal bone, but other artifacts types included Euroamerican ceramics, native ceramics, lithic artifacts, rubber/plastic, and macrobotanical remains. An additional 82 items were recovered from SCU 1 over the feature. The feature functioned as a refuse pit (like nearby Feature 66, this area was originally probably just a convenient natural depression). Feature 72 contained mainly domestic materials dating to the 1950s.

Feature 73. Feature 73 was found in BHT 84 during archaeological testing and consisted of broad basin-shaped pit measuring 1.8 m (6 ft) in length and 25 cm (10 in) in depth (Fig. 5.2). The feature was dug into the sterile underlying substrate (Strata 3 and 5 in this area of the railyard) and buried under a mantle of modern introduced fill (Stratum 1). Feature fill was a brown sandy loam with small gravel inclusions. Artifacts included a 1933 automobile license plate and a Neolite rubber shoe sole, patented in 1953. These artifacts possibly suggest deposition during the 1930s, 1940s, and 1950s. Feature 73 was mostly removed in the backhoe trench that exposed it; no subsequent data recovery was performed.

Feature 105. Feature 105, a sand-filled shallow water channel investigated during archaeological testing, was observed in two backhoe trench cross sections (BHT 71 and 73) located roughly 12 m (39 ft) apart (Fig. 5.2). Suspected of being a possible acequia lateral, such as those recorded at LA 146402, a single one-meter-square XU (XU 40) was dug through the channel's fill to evaluate its contents and nature. After the Stratum 1 overburden was removed, the XU was dug in 10 cm thick levels and all fill was screened through 1/4-inch-mesh.

Backhoe trench 71 intersected the channel at a fairly oblique angle, but BHT 73 probably crossed it perpendicularly. In that trench exposure the channel was roughly 2.23 m (7 ft) wide, 15 cm (6 in) deep, and it was buried under approximately 25 cm (10 in) of modern Stratum 1 overburden. The gravelly and cobbly sand filling the channel in XU 40 also contained brown, green, and clear bottle glass, wire, sheet metal, bone fragments, charcoal, and plastic fragments (which were not collected). The feature was determined to be modern based on the presence of the plastic items.

Euroamerican Artifacts
Matthew J. Barbour

A total of 4,470 Euroamerican artifacts were collected at LA 146412 of which 4,016 (90 percent) were subjected to intensive analysis. The features are similar in Euroamerican artifact composition. Table 5.4 summarizes the distribution of Euroamerican material culture by category, type and function for each feature by stratum.

The 2,686 Euroamerican artifacts collected from Feature 66 consisted primarily of unidentifiable bottle glass (n = 282) and can fragments (n = 972). Artifacts within the unassignable category (n = 1,677) account for 62 percent of the total assemblage. Many of these objects likely represent products such as soda and beer bottles and vegetable and fruit cans. As a result, the indulgences (n = 225, 8 percent) and food (n = 127, 5 percent) categories are underrepresented. While construction and maintenance artifact counts appear relatively high (n = 556, 21 percent), Rathje and Murphy (2001:104) state that twentieth century municipal or domestic waste produced by nuclear families was comprised of roughly 20 percent construction debris. Overall the patterns witnessed in Feature 66 would fit well with a domestic refuse pit. Artifacts within this particular domestic refuse pit likely represent discarded products associated with the adjacent neighborhood.

Bottle-glass manufacture marks (Table 5.5) provide for a mean bottle glass date of 1944 (std. deviation 16 years). However, one manufacturer's mark, Anchor Hocking was not produced until 1946 (J. H. Toulouse 1971:46) and would seem to suggest deposition at the beginning of the post-WWII era. Interestingly, there are substantial quantities of machine-cut square nails (n = 23) identified in Feature 66 for an assemblage dating this late into the twentieth century. While machine-cut square nails are still used today in some specialized masonry construction, these items were largely replaced by cheaper wire-drawn nails for most construction tasks in the 1890s. By the 1940s, these materials are roughly 50 years out of date and could indicate the disposal of nineteenth-century building elements within the pit or their use in twentieth-century masonry work. These possible nineteenth-century materials are found in both Stratum 31 and 32. There are no differences in the types or dates of the material culture found in each of the two strata suggesting infilling occurred rapidly.

Unfortunately, while Euroamerican ceramic sherds were found in the assemblage, no mean ceramic value indices have been developed for 1940s dishware, making economic scaling all but impossible. Even if indices were created there are no comparable assemblages collected outside of the Santa Fe Railyard project by which to evaluate the results.

Feature 72 is nearly identical to Feature 66. A total of 1,330 Euroamerican artifacts were analyzed. These included substantial unidentifiable bottle glass (n = 164) and can fragments (n = 303). As with Feature 66, these objects likely represent food (n = 11, 1 percent) and indulgence (n = 58, 4 percent)—products that are underrepresented in the assemblage as a whole. While there are high quantities of construction and maintenance artifacts (n = 193, 15 percent), these materials are within the range of what is expected within twentieth-century domestic refuse. Bottle glass manufacture marks (Table 5.5) suggest a mean bottle glass date of 1955 (std. deviation 18 years). This date overlaps with the date provided for Feature 66 and it is possible that both pits are contemporaneous or that Feature 72 was filled shortly after Feature 66. Like Feature 66, this infilling appears to have been rapid and there are no differences in the Euroamerican artifacts encountered in Stratum 1000 and 1001. Lastly, no economic scaling could be accomplished due to the lack of pre-generated indices and comparable mid-twentieth century ceramic assemblages for the downtown Santa Fe area.

Fauna

Britt M. Starkovich

The faunal sample from LA 146412 is small, with 483 analyzed specimens. The assemblage is fairly diverse and though it is mostly composed of domestic fauna, including cattle, sheep/goat, pig, turkey and chicken, it also contains a few wild species such as catfish and mallard (Table 5.6). Distinguishing small fragments of sheep from goat is often difficult, so unspecified pieces were assigned to a generalized "sheep/goat" category. About 15 percent of the remains could only be identified to different ungulate size classes, though it is likely that "small ungulate" and "large ungulate" represent sheep/goat and cattle, respectively. On a whole, the assemblage is highly fragmented, with 82 percent of the remains less than 10 percent complete, though about 12 percent of the remains are greater than 50 percent complete, which is higher than might be expected (Table 5.6). This can likely be explained by the large number of chicken bone that tended to be less fragmented than larger mammal bone. Environmental damage is apparent on less than 7 percent of the specimens, and animal alteration is uncommon (Table 5.6). None of the specimens are burned, but about 27 percent have human butchery damage (Table 5.6). This high incidence of butchery is not surprising as the site is composed of domestic refuse pits. The butchery patterns correspond to cuts of meat still used today (Ashbrook 1955). Though the sample size is small, some basic observations are possible.

Feature Assemblages

The bulk of the faunal material is from Feature 66 (n = 446). Two stratigraphic levels were defined (Strata 31 and 32), but the former only contains eight bones, so comparisons between the two levels are unwarranted. The only point to be made about Stratum 31 is that seven of the bones are from turkey, and the eighth is from a medium bird. Feature 66 contains both domestic and wild fauna, including an abundance of bird and a small amount of fish (Table 5.6). The remains are highly fragmented, with 73 percent less than 10 percent complete, though about 10 percent are more than 75 percent complete. Less than 3 percent of the specimens have environmental damage, suggesting that the remains were either protected, or buried shortly after they were deposited. The assemblage has minimal animal alteration and no burning, though about 27 percent have evidence of human butchering (Table 5.6).

The sample from Feature 72 is small (n = 37), so only very basic observations are included here. All of the remains are from small and large ungulates, or sheep/goat and cattle (Table 5.6). Over 60 percent of the specimens are less than 10 percent complete, though 24 percent are more than 75 percent complete. This is likely a result of the small sample size. Over half of the remains from this feature show signs of environmental damage, either exfoliation or root etching (Table 5.6), which probably cannot be attributed to the small sample. There is no evidence of animal damage or burning, and about 27 percent of the specimens have evidence of human butchery damage (Table 5.6).

Area Comparisons

Because the sample from Feature 72 is so small, broad comparisons between the two features are not possible. At a very basic level, Feature 66 is composed of a wider variety of species, which is to be expected. Feature 72 is exclusively small ungulate or sheep/goat and large ungulate or cattle, and while these species are important in Feature 66, chicken also makes up over a third of the assemblage (Table 5.6). Small ungulate or sheep/goat outnumbers cattle in Feature 66. In terms of fragmentation, Feature 72 seems to contain more whole or almost whole pieces, but as mentioned above, sample size might be an issue.

Taphonomic damage is fairly similar between the two features, with the exception of the higher frequency of environmental damage on the specimens from Feature 72. Butchery evidence is similar between the two features, with the majority of the damage from bones sawn or cut through, as well as steak cuts (Table 5.6). The uniformity of most of the saw marks indicate that they were probably done by a professional butcher.

Species Utilization

Understanding human taphonomic processes, such as butchery patterns and prey selection, are necessary when interpreting a faunal assemblage. Additionally, the selection of specific animals for consumption is important, and can be understood by looking at the age profiles of animals at a site. Since LA 146412 is an historic site, body part profile analyses in the classic sense are not necessarily the most useful ways in which to understand species utilization.

In historic times, specific cuts of meat were purchased from professional butchers, and can be observed archaeologically by smooth, uniform saw marks. Thus, body part profiles that examine specific elements are not as useful as those that focus on historic meat cuts.

Historic cuts of meat aid in understanding the economic situations of people that deposited the remains; theoretically, wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. The trash middens at LA 146412 are an ideal situation for examining domestic refuse in order to evaluate the economic standing of the people utilizing the middens.

A ranking system for meat cuts based on the relative prices of beef in Sacramento, California, at the turn of the nineteenth century is presented by Schulz and Gust (1983). This ranking has been widely applied to other historic faunal data sets in the western United States. Following this system, the majority of the meat cuts from Feature 66 were expensive (n = 22), followed by moderately priced (n = 14) and finally cheap cuts of beef (n = 5). The two cuts from Feature 72 were both expensive. Little can be said in terms of comparing Features 66 and 72, but from this construction it seems that expensive cuts of beef were favored by the people utilizing the trash middens at LA 146412. Lyman (1987) argues, however, that simple price rankings may not accurately reflect the economic standing of the people depositing the refuse. Rather, cost-efficiency based on price per pound and pounds of edible meat for each cut is likely a more logical model to use when interpreting historic consumption patterns. Most of the beef cuts from Feature 66 were from the moderately cost-efficient cuts of meat (n = 16) and highly cost-efficient cuts (n = 15), followed by the least cost-efficient cuts (n = 10) (Table 5.7). One cut from Feature 72 is moderately cost-efficient and the other is one of the least cost-efficient cuts of beef. The representation of beef cuts at LA 146412 is fairly even in terms of cost-efficiency, so perhaps the people utilizing the trash middens were toward the middle of the economic scale. Another option is that the midden was used by several families of varying economic standings. It is difficult to say which of the scenarios is more likely without knowing how many families used the refuse pit.

The ages of animals at an historic site are indicative of what kinds of meat were eaten: for example, if veal was eaten instead of older cattle, or if lamb was preferred over mutton. Animal age at death can be determined by tooth eruption and wear, and by the fusion of long bone ends, which fuse at a known predictable rate (Hillson 2005; Schmidt 1972; Silver 1970; Reitz and Wing 1999). Age data for LA 146412 is summarized in Table 5.8.

Based on bone fusion data, Feature 66 contains at least two cattle, one younger than 10 months, and one older than 42 months. The younger animal was probably consumed as veal, and the older animal was beyond the prime age for eating, so it was likely culled as an individual beyond the useful age of drafting. At least one sheep/goat older than 42 months is present in Feature 66. This is older than an animal typically raised for meat, so it may have been culled after being used for wool. Remains of a pig younger than 12 months was found, which is in the range of prime eating for pigs. Feature 72 contains at least one cattle, younger than 10 months, which was likely consumed as veal. At least two sheep/goats are present in Feature 72, an animal younger than 10 months and an animal older than 36 months. The younger animal was probably consumed as lamb. The older animal was probably primarily used for wool because it is beyond the upper range of sheep/goats typically raised for meat. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The faunal remains from the two trash middens at LA 146412 are typical of such deposits in terms of species representation, taphonomy, and the high frequency of butchery. The only notable observation is that they seem to contain a high proportion of bird bones, the majority of which are chicken. Sheep/goat is the most common species, followed by chicken and then cattle. About half of the animals were butchered at the prime age of consumption, while the other half was older than would be expected for animals raised for meat. Most of the butchering was likely done by a professional, though there are also cuts that could easily be attributed to home butchery. There is a fairly even representation of cuts of beef in terms of their cost-efficiency, with slightly more highly and moderately cost-efficient cuts. Because of the relative diversity of species, animal ages and cuts of meat, it is difficult to ascertain the economic situation of the people who utilized LA 146412 without knowing if there were multiple families using the middens.

Native Ceramics
C. Dean Wilson

The great majority (91.3%) of the 31 native sherds from LA 146412 were assigned to types known to have been produced during the historic period (Table 5.9). Prehistoric types were limited to Plain Gray Body (8.7%). Historic types identified include Black-on cream Undifferentiated (6.5%), Historic White Cream Slipped Unpainted (6.5%), Tewa Buff Undifferentiated (8.7%), Tewa Polished Gray (30.4%) Tewa Polished Black (13%), Highly Micaceous Paste (6.5%), Smudged Interior Mica Slipped Exterior (4.3%), Tewa Polished Red (6.5%), Polished Interior with Mica Slip (6.5%), and Tewa Unpolished Buff (2.2%). These ceramic types also indicate sherds mainly derived from Late Colonial or Territorial period deposits. None of these sherds have been modified through water transport suggesting their presence is not a result of secondary alluvial transport. Vessels include jars and bowls (Table 5.10).

Chipped Stone
James L. Moore

Three chipped stone artifacts were recovered from Stratum 1000 in Feature 72, a trash pit, and included two pieces of chert angular debris and one chert core flake. None of these specimens exhibited evidence of use-wear, and none were thermally altered. The chert core flake was complete, and its platform was unmodified. It is unknown as to how these artifacts came to reside in Feature 72. There may have been some mixing of the twentieth century refuse with Spanish Colonial or prehistoric deposits.

Archival Research

The refuse pits included abundant culinary refuse, such as mammal bones and soda bottle fragments. These are strong indicators of a domestic origin for the deposits. This portion of the railyard is not reported to have been commercially developed (Scheick 2003). However, the surrounding area, west of the railyard, reportedly witnessed a dramatic period of residential growth during the 1930s (Sze and Spears 1988:42). The proximity of this site to the back yards of the residential neighborhood to the west may suggest that one or several of those homes, which were evidently occupied during the mid-twentieth century, produced and deposited the fill in these features.

Summary

Initial archaeological testing at LA 146412 identified five refuse pits and a sand-filled channel. Data recovery efforts documented the size of two refuse pits and sampled their artifact content. The pits contained both domestic and construction refuse dating from the 1940s to 1950s. The refuse probably originated from the nearby residential neighborhood to the west, which contains homes dating from this time period. Several additional pits documented during the test-excavation program are more recent, but they do document the continued pattern of dumping refuse in this vacant lot.

The majority of artifacts from Features 66 and 72 suggest deposition during the early to mid-twentieth century. However, some late Colonial- or early Territorial-period indigenous ceramics and chipped stone debitage was also encountered. Euroamerican artifacts, such as soda and beer bottles and vegetable and fruit cans, were typical of those encountered within domestic refuse deposits throughout the city of Santa Fe. Interestingly, sheep/goat was the predominant form of fauna encountered suggesting perhaps that mutton was still preferred to beef. Unfortunately because of the diversity of fauna species, animal ages and cuts of meat, the economic status of the refuse pit's users could not be established.

The excavations at this site followed the procedures outlined in the data-recovery work plan and recovered the requisite data to address relevant aspects of the project's research design (Wenker, Post, and Moore 2005). No further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction (Wenker 2006a:16). Both HPD and ARC agreed and no further archaeological investigations were conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 146413

Charles A. Hannaford and Chris T. Wenker, revised by Jessica A. Badner and Matthew J. Barbour

Introduction

Archaeological examination of LA 146413 (Fig. 5.6) revealed four refuse pits (Features 1, 2, 91, 92). Two of the refuse pits dated to the mid-twentieth-century (1930–1950s) and contained abundant domestic refuse (Features 91, 92). The other, more recent pits (Features 1, 2), held discarded construction material that could have been of residential or commercial origin. The proximity of this site to the back yards of a well established neighborhood to the west may suggest that one or several of these residential units produced and deposited the fill in these features.

Site Location

LA 146413 was located along the far northwest boundary of the Baca Street railyard parcel and was adjacent to the back lot property boundary of homes that line Baca Street approximately 175 m south of Potencia Street (Figs. 2.76, 5.1). The site measured about 30 m east–west by 20 m north–south and covered about 600 sq m (Fig. 5.6). Prior to the project, the site was a vacant lot and the features were not visible from the surface.

Excavation Sequence

During initial archaeological testing in 2005, four backhoe trenches (BHTs 89, 95, 109, 112) exposed a pair of residential refuse-disposal pits (Features 91, 92) that appeared to date to the mid-twentieth century (Fig. 5.6; Table 5.11). Features 91 and 92 exhibited abundant material in the trench cross sections, and given their large sizes, these features exhibited good potential to yield additional data relevant to their late-historic period of use. Specifically, types, abundance, and diversity of culinary and other domestic refuse provided an opportunity to understand some of Santa Fe urban life ways in

Figure 5.6. LA 146413, site map.

mid-twentieth century. As a result, LA 146413 was targeted for systematic hand excavation.

Data-recovery activities were later conducted between March 21 and April 5, 2005. The features were investigated by first re-exposing the cross-sections in BHTs 109 and 112 from the testing phase. The feature limits were then horizontally defined with mechanically excavated scraping units (Table 5.12). Diagnostic items were opportunistically collected as the scraping units were excavated. The edges of the features were marked by a horizontal differentiation between the stained feature fill and the surrounding Stratum 3 sterile substrate. Each feature was sampled by the excavation of two hand-dug 1 by 1 m excavation units (Table 5.13) positioned in the deepest portion of the feature, as exposed by the trenches. All hand-excavated feature fill was screened through 1/4-inch mesh. A more thorough discussion of excavation, mapping, and recording procedures are presented in the "Field Excavation Methods and Procedures" section of Chapter 1 in this report.

Two additional pits with recent redeposited construction debris were newly discovered and documented, but were not excavated (Fig. 5.6).

Site Stratigraphy

Four sediment layers were identified in the LA 146413 area outside the features. Stratum 1 was a thin (10-cm thick) mantle of modern overburden. Stratum 3 was the underlying sterile substratum consisting of a massive, very hard deposit of reddish-brown clay loam with few faint mottles of caliche inclusions. Stratum 4 was also a sterile substrate consisting of soft to slightly hard, gravelly sandy silt with a weakly formed medium crumb structure. Detailed of Strata 1 through 3 are provided in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Stratum 42, encountered only during testing was a Baca Street-area topsoil deposit of brown silty loam containing few, fine charcoal flecks and few artifact inclusions of varying age (including, in different trenches, a lithic flake and a modern rifle cartridge, indicating an admixture of material of wide date ranges). A thin (10-cm-thick) mantle of modern Stratum 1 overburden commonly overlay the Stratum 42 deposit in this area, sealing the old topsoil under a layer of gravel mixed with modern refuse.

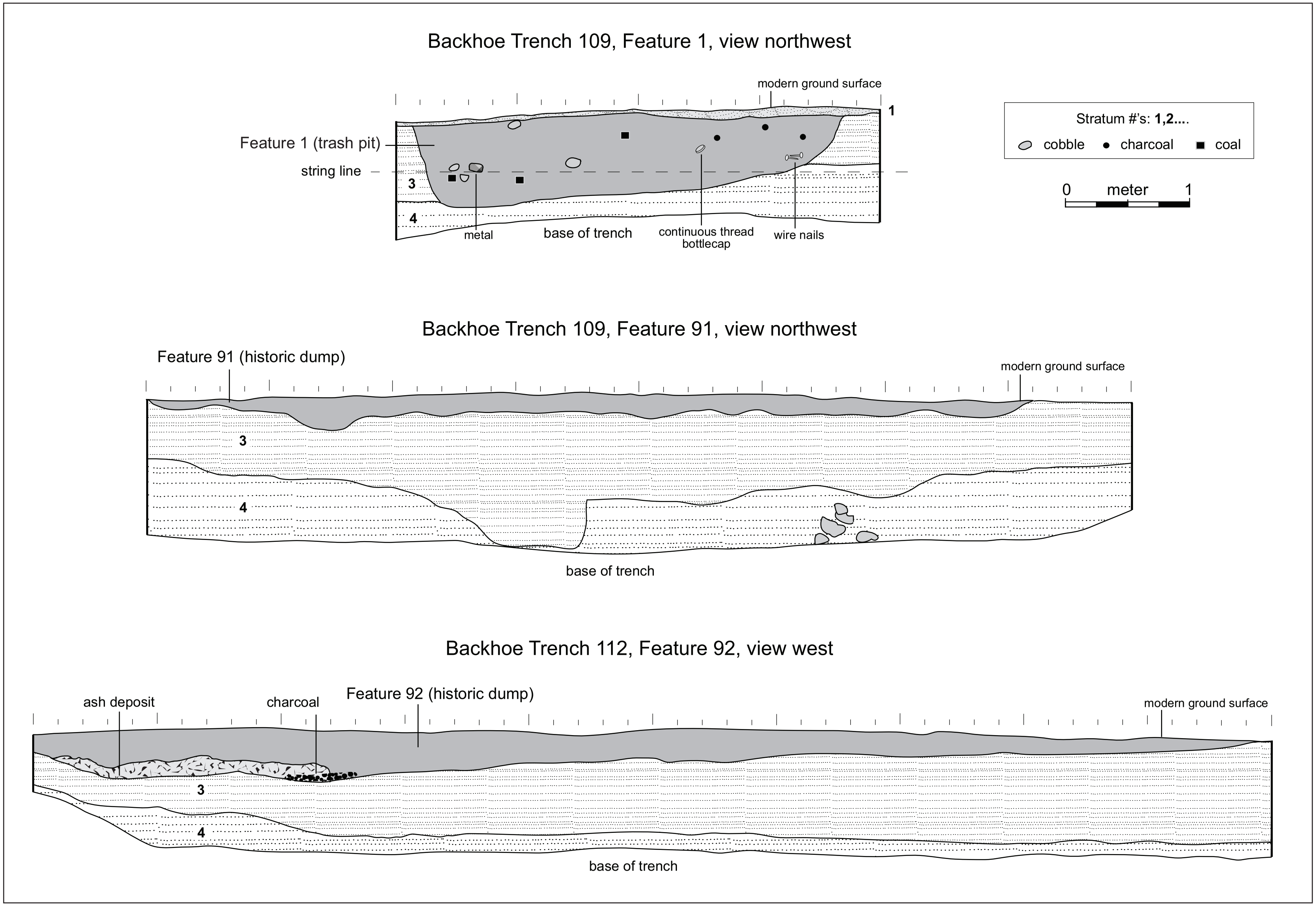
Features

The four pit features (Features 1, 2, 91, 92) excavated at LA 146413 provide evidence of domestic and construction refuse generated by neighborhood homes and by nearby remodeling and construction from the 1930s on (Table 5.14). Though these features do not provide evidence of railyard use they do provide evidence of contemporary and later residential and commercial activities. These features are discussed below in numeric order.

Feature 1. Feature 1, newly identified during the data-recovery excavation, was located just north of the large Feature 91 refuse pit (Fig. 5.6). The cross-section of Feature 1 was delineated by the northward extension of Backhoe Trench 109 and the plan view was partially exposed by Scraping Unit 1. The feature consists of an oval, flat-bottomed pit with steeply sloping sides, measuring 6 m north–south by at least 4 m east–west and with a depth of 74 cm (Fig. 5.7). Feature fill was a deposit of dark brown sandy clay with abundant mottled inclusions of brown clay. Artifact content in the cross section was sparse, consisting of several wire nails, a piece of indeterminate metal and a crown bottle cap, along with a few chunks of coal and charcoal flecks. This was not a domestic refuse pit like Feature 91 to the south, but was most likely a relatively recent pit containing construction material in the backfill. The pit was not further excavated because it did not exhibit potential to address relevant research questions.

Feature 2. Feature 2, also newly identified during the data-recovery excavation, was located in the northwest corner of the site in the vicinity of the Feature 92 refuse pit (Fig. 5.6). The feature was discovered in Scraping Unit 2 during the mechanical removal of the topsoil to delineate the perimeter of Feature 92. Feature 2 was a small pit measuring 2 m by 1.1 m across. The fill was a coarse sand deposit containing common construction materials consisting mainly of mortar and bricks. No glass or metal was observed in the plan view exposure. This feature was not a domestic refuse pit like Feature 92 to the south. Feature 2 appears to represent a relatively recent single dumping episode of building materials from a construction site in the immediate area. The pit was not further excavated because it did not exhibit potential to address relevant research questions.

Feature 91. Feature 91 was a large refuse pit



Figures 5.7, 5.8, and 5.9. LA 146413, top (Fig. 5.7): Feature 1, profile; middle (Fig. 5.8): Feature 91, profile; bottom (Fig. 5.9): Feature 92, profile.

originally found in Backhoe Trench 95 during the testing phase (Fig. 5.6). Investigations began by removing the fill from the backhoe trench and exposing the feature cross-section. The horizontal limits of the feature were defined by SCU 1, a mechanically scraped unit covering some 13 by 13 m. The large, shallow pit measured 5.20 m north/south by 4.40 m east–west (roughly 19 sq m) and was 16 cm thick. Two hand-dug excavation units (XUs 1, 3) were used to sample the deepest area of the deposit on either side of BHT 109. The feature was roughly oval in shape with a broad, shallow basin-shaped profile (Fig. 5.8). The pit was not covered by any substantial post-abandonment deposit aside from a thin sheet of modern organic topsoil, hence the upper extent of the fill may have been impacted by modern activities. Feature fill was dark brown silty clay with occasional gravel and coal inclusions. The edges of the feature were rather diffuse and irregular, but the darker feature fill generally contrasted against the surrounding sterile Stratum 3 substrate.

The historic artifact assemblage recovered from the feature consisted of 802 artifacts (Table 5.15). The majority of the artifacts were of scrap metal, bottle glass, and faunal bone, but other material types included wooden planks, nails, rubber or plastic, Euroamerican ceramics, window glass, a 1936 New Mexico automobile license plate, and various construction materials (including brick, mortar, and tar paper).

The feature functioned as a refuse pit (originally, probably just a convenient natural depression) containing both domestic and construction related materials dating from the 1930s, 1940s, or 1950s. The refuse may have originated from the nearby neighborhood to the west, which contains homes that were occupied by or after the 1930s.

Feature 92. Feature 92, located west of Feature 91, was a similarly large, diffuse refuse pit that was originally recorded in Backhoe Trench 112 during testing (Fig. 5.6). The horizontal limits of the feature were defined by SCU 2, a mechanically scraped unit covering a 20 by 22 m area. The large pit measures 13.10 m north/south by 10.70 m east/west (covering about 78 sq m) and was 39 cm thick. Two adjacent 1 by 1-m excavation units (XUs 2 and 4) were hand dug in the deepest part of the pit and screened with 1/4-inch mesh. The pit has a broad, shallow basin profile (Fig. 5.9), but the upper extent and margin of the deposit were diffuse and irregular in plan. The feature was not covered by any substantial post-abandonment deposit aside from a thin sheet of modern organic topsoil, hence the upper extent of the feature fill may have been impacted by modern activities. Fill was very dark brown sandy mottled with small reddish-brown clay inclusions. The lower 20 cm of fill had good integrity and the feature's base was clearly defined.

The bulk of the artifacts recovered from the site came from Feature 92. The historic artifact assemblage recovered from the feature included 3,035 artifacts (Table 5.15). The majority of the artifacts consisted of metal, bottle glass, and faunal bone, but other artifacts types included Euroamerican ceramics, rubber, plastic, wire, peach pits, egg shell, New Mexico automobile license plates with 1926 and 1944 dates, and construction material (including cobbles, mortar, and bricks). A 1935 New Mexico Bureau of Revenue tax token was also recovered from this feature. Artifacts were mixed in a dark brown silty clay with coal and charcoal. The feature functioned as a refuse pit. Like nearby Feature 91, this area was originally probably just a convenient natural depression. Feature 92 contained both domestic and construction-related materials dating from the 1930s to the 1950s. The refuse may have originated from the nearby neighborhood to the west, which contains homes that were occupied by or after the 1930s.

Euroamerican Artifacts
Matthew J. Barbour

A total of 3,417 Euroamerican artifacts were collected and analyzed from LA 146413. The majority were recovered from Features 91 and 92, large-scale refuse pits located within the site boundaries. The 3,417 Euroamerican artifacts represent a 100 percent sample of the materials recovered from LA 146413 with the exception of three license plates documented in the field and collected, but not found for intensive artifact analysis. Table 5.16 summarizes Euroamerican material culture by category, type and function and by surface or feature collection unit. All artifacts were collected within or on top of the upper site stratum, designated Stratum 2.

Surface artifacts (n = 19) were dispersed in trace amounts across the site. The majority of these artifacts represented either food (n = 6) or indulgence (n = 6) products and none of the materials encountered were diagnostic to a specific decade. However, all bottle glass was machine manufactured indicating disposal in the twentieth century. These artifacts could represent discard associated the adjacent neighborhood and/or by transient populations (i.e., the homeless). One of the artifacts represented a button, badge or token depicting a donkey and is likely associated with participation in the Democratic Party. However, artifacts are too few in number to discern any other specific behaviors about the consumers.

A total of 957 Euroamerican artifacts were collected and analyzed from Feature 91. These materials consisted primarily of unassignable artifacts (n = 657, 69 percent) such as unidentifiable bottle glass shards (n = 58) and can fragments (n = 337). The vast majority of these unassignable Euroamerican artifacts are likely food (n = 11, 1 percent) and indulgence (n = 37, 4 percent) products which are under represented within the assemblage. This would suggest that materials within Feature 91 are associated with residential consumption and discard. Given the close proximity of a twentieth century neighborhood to the east, it is believed that materials found in Feature 91 are related to these inhabitants. However, the exact household unit or units that discarded the materials cannot be identified.

Using dates assigned by Julian Toulouse (1971), Table 5.17 summarizes the glass manufacturers identified from artifacts recovered in Feature 91. All manufacture marks identified are still produced today and can only be used to suggest that the deposit dates after 1929. However, a 1936 automobile license plate was also identified in the field. This artifact could indicate consumption and discard during the Depression or World War II eras (ca. 1929–1945). While this date is tentative at best, the absence of plastic products is a strong indicator that the materials date prior to 1950.

If the assemblage dates to the Depression Era (1929–1941), dishware products have a mean ceramic value of 1.43 (std. deviation 0.57) based on Susan Henry's (1987) price indices developed from 1922 Montgomery Ward and Company and the 1927 Sears, Roebuck and Company catalogues. However because most of the pottery sherds were unidentifiable fragments, it was not possible to use the minimum number of recognizable vessels. Instead, fragments were used to generalize the mean ceramic value and unidentifiable fragments were treated as bowls for calculating their open stock prices. This makes the value developed a less reliable indicator of economic status. However, the 1.43 value would suggest residents of the adjacent neighborhood were economically depressed relative to consumers in the northern portions of the Santa Fe Railyard District and in the Capitol Complex Historic District (Barbour in production), where artifact assemblages consistently yielded mean ceramic index values over 1.60.

Euroamerican artifacts (n = 2,441) collected and analyzed from Feature 92 are somewhat more diverse in function than those found in Feature 91 (Fig. 5.10; Table 5.16). While the majority of artifacts were assigned to the unassignable category (n = 1,799, 74 percent), economy/production (n = 2, <1 percent) and transportation (n = 2, <1 percent) related artifacts, not found in Feature 91, were also encountered. The fish hooks (n = 2) within the economy/production category are likely associated with household consumption. However, the steam pressure gauge (n = 1) identified under the transportation category is almost assuredly associated with commercial industry. The presence of this artifact could suggest that Feature 92 is not simply household debris, but rather a palimpsest of materials associated with residential and industrial consumption and discard.

Based on identifiable bottle glass manufacture marks (Table 5.17), Feature 92 has a mean bottle glass date of 1957 (std. deviation 15 years). However, Feature 92 lacks many of the plastic materials commonly found in mid- to late-twentieth century contexts. In addition, two New Mexico license plates with 1926 and 1944 dates and a 1935 New Mexico School Tax token were identified. It is possible that like Feature 91, Feature 92 dates to the Depression or World War II periods (ca. 1929–1945). If so, the mean ceramic value—derived using fragment counts instead of minimum number of vessels—of 1.22 (std. deviation 0.47) for dishware recovered from Feature 92, would also suggest people within the neighborhood were of low economic standing relative to consumers further north.

No stratigraphic breaks could be identified within either Feature 91 or Feature 92. Nor are materials dating earlier found at the base of the feature relative to more recently manufactured artifacts. It would seem likely that materials from both of these contexts represent tertiary deposits in which the

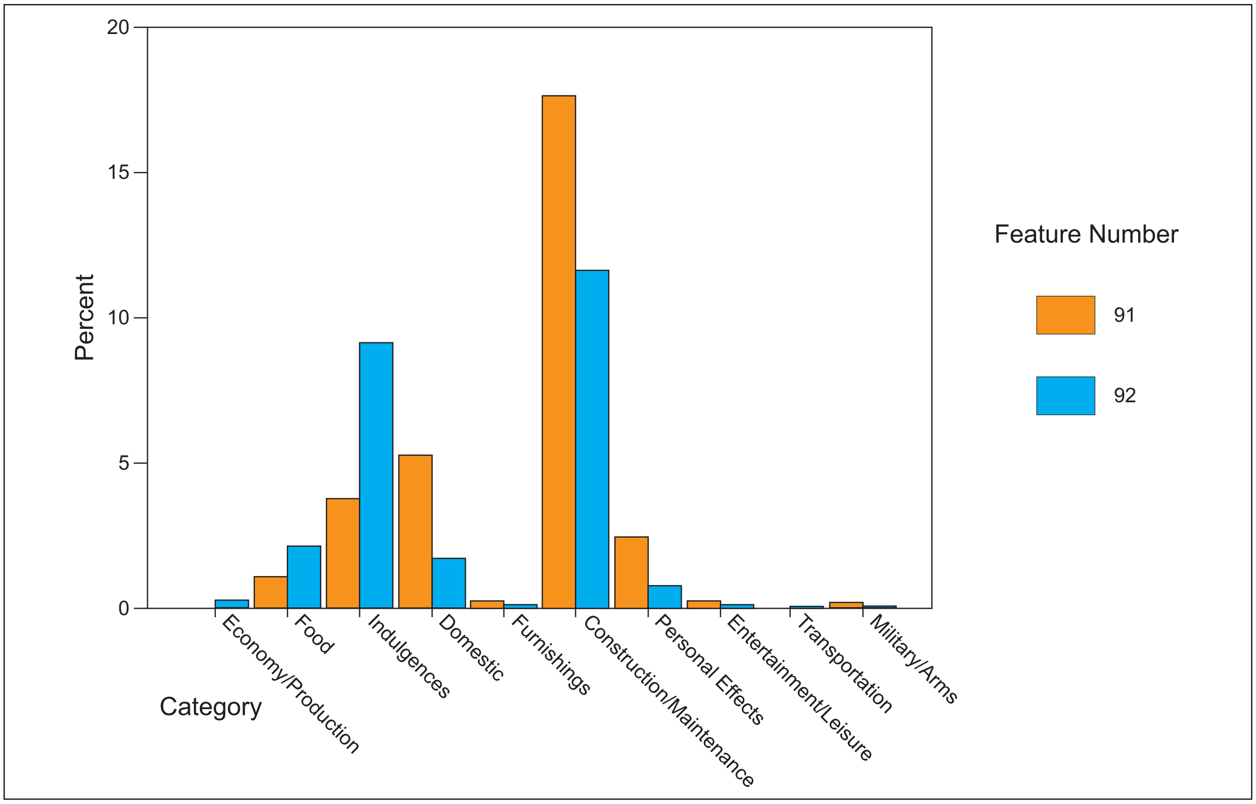


Figure 5.10. LA 146413, relative frequencies of Euroamerican artifacts by category for each feature.

materials have been moved from their primary (i.e., the house or business) and secondary (i.e., the refuse pit/dump location) discard locations.

Fauna
Britt M. Starkovich

The faunal sample from LA 146413 is fairly small, with 573 analyzed specimens. The majority of the faunal sample is from the features, though a small number of specimens (n = 6) come from an unspecified provenience outside of the middens. No stratigraphic distinctions were made for the deposits.

The assemblage is composed exclusively of domestic fauna, including dog, house cat, cattle, sheep/goat, pig, turkey, and chicken (Table 5.18). Due to difficulties in distinguishing small fragments of sheep from goat, unspecified pieces were assigned to a generalized category of "sheep/goat." Over 40 percent of the remains could only be identified to different classes of ungulate, though it is likely that the "small ungulate" and "large ungulate" categories represent sheep/goat and cattle, respectively. On a whole, the assemblage is highly fragmented, with 82 percent of the remains less than 10 percent complete. Environmental damage is apparent on 13 percent of the specimens, and animal alteration is uncommon (Table 5.18). The remains are fairly extensively burned and heavily butchered, with over 20 percent of the specimens exhibiting some degree of burning, and almost 40 percent with evidence of human butchering (Table 5.18). This is not particularly surprising as the site represents domestic trash deposits, it is expected that the remains would be heavily butchered. Butchery patterns correspond to cuts of meat still used today (Ashbrook 1955). The sample size is small, but some basic observations are still possible.

Feature 91. Feature 91 contains the smaller faunal sample of the two middens (n = 108). It is composed entirely of domesticated ungulates and birds (Table 5.18). The remains are highly fragmented, with 75 percent less than 10 percent complete, though 10 percent are more than 75 percent complete. Only 13 percent of the specimens have environmental damage; 5 percent are sun bleached; and 8 percent are exfoliated. Both of these categories of damage likely resulted from prolonged exposure to the elements. The low frequency of damage indicates that the remains were buried quickly after they were discarded, perhaps covered by more trash. There is a very minimal amount of animal alteration or burning, though 30 percent of the specimens show signs of human butchering (Table 5.18).

Feature 92. The bulk of the sample from LA 146413 comes from Feature 92 (n = 459). It is composed entirely of domestic animals, including dog, house cat, cattle, sheep/goat, pig, turkey, and chicken (Table 5.18). Over 80 percent of the remains are less than 10 percent complete. About 13 percent of the remains have environmental damage, mostly exfoliation and root damage. Animal damage, such as knowing, is uncommon, though human taphonomic processes are very common. Almost 30 percent of the remains are burned, and 40 percent are butchered (Table 5.18).

Unspecified Provenience

Six cattle specimens come from an unspecified area outside of the trash middens. They are variable in terms of completeness and environmental alteration (Table 5.18). There are no signs of animal alteration or burning, but five of the bones were butchered (Table 5.18). Little can be said about the sample due to its small size and lack of provenience information.

Area Comparisons

Features 91 and 92 contain large enough samples to warrant comparisons. The few specimens without provenience information are excluded from this discussion. Overall the two features are remarkably similar. The faunal samples from both areas are dominated by large ungulate and cattle, which makes up about 50 percent of both of the assemblages, followed by small ungulate and sheep/goat, which is more heavily represented in Feature 92. Feature 91 has a higher proportion of chicken (Table 5.18). Animals that presumably represent pets, cats and dogs, are present in Feature 92 but not 91, though they are a very negligible part of the assemblage. It is likely that the lack of these species from Feature 91 is a product of the smaller sample size for the midden. The remains from Feature 92 are more fragmented than those from Feature 91, though not considerably (Table 5.18).

The amount of damage from animals or the environment is similar for the two features. Human taphonomic factors, however, are very different between the middens. Almost thirty percent of the specimens from Feature 92 are burned, as compared to two percent for Feature 91. A possible explanation for this difference is that debris from fireplace cleanings was dumped into Feature 92. Also, the sample from Feature 92 has more evidence of butchering damage, 40 percent as compared to 30 percent for Feature 91. The majority of the butchered remains were sawn through or are steak cuts, and the uniformity of the saw marks indicate that they were probably done by a professional butcher. Despite the differences in butchery evidence from the two features, it is clear that they were both areas in which food remains were disposed.

Species Utilization

Understanding human taphonomic processes, such as butchery patterns and prey selection, are informative when interpreting a faunal assemblage. The selection of specific animals for consumption is also important, which can be understood by looking at the age profiles of the animals at a site. LA 146413 is an historic site, so a body part profile analysis in the classic sense is not necessarily the most useful approach for understanding species utilization. In historic times, meat was purchased as specific cuts, evidenced by smooth, uniform saw marks made by professional butchers. Because meat was acquired in this way, body part profiles that examine specific elements are not as useful as those that focus on historic meat cuts.

Historic cuts of meat aid in understanding the economic situations of people that deposited remains; the idea is that wealthier people can afford more expensive, desirable cuts of meat, while poorer people tend to purchase cheaper cuts. Trash middens, such as those at LA 146413 are an ideal situation for examining domestic refuse. The few cuts that came from the area outside of the refuse pits are not included in this analysis.

Schulz and Gust (1983) present a ranking system for meat cuts based on the relative prices of beef in Sacramento, California at the turn of the nineteenth century. This ranking system has been widely applied to other historical faunal data sets in the western United States. Following this system, the majority of the meat cuts from Feature 91 were expensive (n = 8), followed by moderately priced (n

= 2) and cheap cuts of meat (n = 1). Likewise, in Feature 92, most of the meat cuts were expensive (n = 44), again followed by moderately priced (n = 16) and cheap cuts of meat (n = 4). The sample from Feature 92 is large, and is similar in composition to that from Feature 91, and in this construction it appears that expensive cuts were favored by the people utilizing the middens at LA 146413. However, Lyman (1987) argues that simple price rankings may not accurately reflect the economic standing of the people depositing the remains. Rather, cost-efficiency based on the price per pound and pounds of edible meat for each beef cut is likely a more logical model to use when interpreting historic meat consumption patterns. In terms of cost-efficiency, most of the beef cuts from Feature 91 were from moderately cost-efficient cuts of beef (n = 9), followed by highly (n = 1) and the least cost-efficient cuts (n = 1) (Table 5.19). The pattern is similar in Feature 92, with most of the cuts moderately cost-efficient (n = 36), followed by the least cost-efficient (n = 17) and highly cost-efficient cuts of beef (n = 11). What is interesting about the cuts from the two middens is that they follow the same general pattern, in that moderately cost-efficient cuts are by far the most common, and the highly cost-efficient and least cost-efficient cuts are about equal, yet Feature 91 has a much higher proportion of moderately cost-efficient cuts than Feature 92. This may be the product of a larger sample size, and overall the two features are remarkably similar in this sense. From these data, it seems that the people utilizing the trash deposits at LA 146413 were toward the middle of the economic scale.

The ages of animals at an historic site are indicative of what kinds of meat were eaten: for example, if lamb or mutton was preferred, or if veal was eaten instead of older cattle culled after they were no longer useful for milking or breeding. Animal age at death can be determined by the fusion of the long bone ends, which fuse at a known, predictable rate, and by tooth eruption and wear, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). Summarized age data for LA 146413 are presented in Table 5.20.

Based on bone fusion data, Feature 91 contains at least two cattle, one under the age of 18 months and one over 84 months. The younger animal may have been consumed as veal, or when it was the prime age for breeding and milking. The older animal likely represents an individual culled as an adult beyond the useful age of drafting. At least two cattle are present in Feature 92, like those in Feature 91 one is younger than 18 months the other is older than 84 months. It is unclear if the two features were used contemporaneously and if the same two animals are represented in both features. The remains of at least one sheep/goat are present in Feature 92, indicative of an animal older than six months and younger than 16 months. If the remains belong to the same individual, they represent a lamb or very young adult. Feature 92 also contains at least one pig, younger than 12 months, which is at the upper limits of the prime age for slaughter. Age ranges used to define animals raised for meat and animals at the prime age for consumption follow Ashbrook (1955).

Conclusions

The faunal remains from the two trash middens at LA 146410 are typical of such deposits in terms of species representation, taphonomy, and the high frequency of butchery. Cattle is the most common species, followed by sheep/goat. Most of the animals were butchered at the prime age of consumption, and most of the butchering was likely done by professionals. Moderately cost-efficient cuts of beef are by far the most common cuts in the assemblage, which indicates that the people responsible for the deposits were toward the middle of the economic scale, though other cuts were also utilized.

Archival Research

Before the 1880s the railyard's Baca Street parcel was agricultural land, granted to owners by the Spanish Crown in the 1740s. The current site (LA 146413) area was not reported to have been commercially developed (Deyloff 2004), although local residents state that the area was once part of a lumber yard. The proximity of this site to the backyards of houses lining Baca Street in a well established neighborhood suggest that one or several of those homes, which were probably occupied by or after the 1930s (Deyloff 2004), produced and deposited the fill in these features.

Summary

Data recovery efforts at LA 146413 documented the size of four refuse pits, two of which were sampled. These two pits contained both domestic and construction refuse likely deposited by residents of the nearby neighborhood during the twentieth century. The more recent pits documented during excavation attest to the continued pattern of dumping refuse despite the advent of city-provided trash collection services in the 1970s. Excavation provided no direct evidence of earlier land use, although the site area was likely used for agricultural purposes before 1901.

Sampling recovered abundant cultural debris from the site, all late historic urban refuse. Based upon Euroamerican analysis, the individual feature assemblages represent a palimpsest of 1930s, 1940s, and 1950s materials. Mean ceramic index values generated from dinnerware recovered from these features suggest a population substantially poorer than those living to the north and east in the Capitol Complex Historic Neighborhood (LA 158037). However, moderately cost-efficient cuts of beef are by far the most common cuts in the fauna assemblage suggesting occupants may have been middle class. Cattle were the most common fauna identified with most having been commercially butchered. This commercial butchering combined with the abundant Euroamerican can and bottled items suggests a wage-earning population largely dependent on store-bought products.

The recovered sample was sufficient to characterize the consumption and discard patterns of the local residents. The site area was not likely to yield additional important information beyond that already recovered. No further archaeological investigations were recommended by OAS (Wenker and Hannaford 2005a:7). HPD and ARC concurred with this determination and no additional archaeological investigations were conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

SYNTHESIS: Neighborhood Refuse Sites in the Santa Fe Railyard Project Area

Matthew J. Barbour

Waste disposal is a major concern for inhabitants of urban and suburban landscapes. Improper discard patterns can promote vermin infestations, the spread of infectious disease, environmental degradation, and other equally serious consequences. Examination of waste disposal practices and consumption and discard patterns in Santa Fe during the twentieth century through the documentation of LA 146412 and LA 146413 addresses questions proposed in the data recovery plan concerning Santa Fe's role within the larger world economy and the socioeconomic status of its residents (Wenker et al. 2005). This section discusses the findings of these investigations.

Waste Disposal Practices

During the Spanish Colonial period, the acceptable procedure for human waste disposal in the province of New Mexico involved its placement in fields, irrigation ditches, and streets. Once tossed, scavengers in the form of dogs, pigs, and chickens consumed much of it aided by the strong sun and wind which quickly dried up any remaining filth (Simmons 2001:90). The practice had been ongoing since prehistoric times and continued in many rural areas until the mid-twentieth century.

Santa Fe, as the largest and most urban environment within the territory, was the first to try to curtail these activities. Ordinances were initially established by the city's legal advisor Don Antonio Barriero as a result of the Mexican government's fear of a cholera epidemic spreading from merchants traveling down along the Santa Fe Trail in 1833. These ordinances included the draining of stagnant pools, the cleaning of the streets and prohibition against throwing trash, human waste, and dead animals into irrigation ditches and streams (C. M. Wilson 1982:20, Simmons 2001:92–95).

Unfortunately, these measures were not enforced and the Anglo-American administration that arrived in 1846 did little to change the situation.

As with many other customs, such as architectural style of buildings and cuisine, the majority of the newly arrived Anglo-American population simply adapted to the traditions in place and disposed of waste in any convenient location.

This situation began to change in 1870 when a County Probate Judge issued police regulations to enforce the 1833 Mexican Government ordinances. Then in 1879, those ordinances were modified and reissued by the County Commission further reinforcing the stance taken nearly 50 years earlier (Wilson 1982:57). The new ordinances, like those that came before, called for the draining of stagnant pools, the cleaning of the streets and prohibition against throwing trash, human waste, and dead animals into irrigation ditches and streams.

As exemplified by the archaeology of LA 146412 and LA 146413, disposal in vacant lots was still local practice. Features from these two sites yielded refuse from the 1930s on up into the twenty-first century. However, the majority of features investigated dated to the mid-twentieth century (ca. 1930–1950). At both sites, natural low-lying areas or depressions were chosen as waste receptacles. In most instances, the size and depth of these natural depressions were augmented by hand-excavation to create an amorphous pit. Pits at LA 146412 and LA 146413 averaged roughly seven meters in diameter and extending half a meter below the surrounding ground surface. Into these waste receptacles were tossed a variety of items including commercially butchered bone, soda and beer bottles, metal hardware, and Euroamerican dinnerware.

While construction debris was present, Rathje's examination of Tuscon area landfills in the 1970s found twentieth century municipal or domestic waste produced by nuclear families was comprised of roughly 20 percent construction debris, 15 percent glass, 20 percent metal, 10 percent plastic, 30 percent organic, and 5 percent other (Rathje and Murphy 2001:104). Using this definition, the refuse pits sampled from both LA 146412 and LA 146413 would appear to contain domestic waste. However, small amounts of industrial debris, such as the steam pressure gauge found in Feature 92 of LA 146413, were also present in some instances.

Based on archival evidence, it seems likely that the inhabitants of the surrounding residences consumed and discarded the items found therein. This practice has been documented throughout the "the city different" at numerous contemporaneous archaeological sites dating to the early to mid-twentieth century, such as LA 156207 (Santa Fe Judicial Complex, Lakatos 2011) and LA 158037 (Capitol Parking Structure, Barbour 2011). For many, it is hard to believe that municipal trash collection service in Santa Fe did not begin until the early 1970s (C. T. Snow, personal communication November 23, 2010). Disposal into pit features, such as Feature 91 at LA 146413, provided a clear alternative to hauling or paying to have hauled their domestic refuse to a landfill for many residents. While this alternative may not reflect current health or environmental standards, it provides a window into the household consumption patterns of Santa Fe residents during the last century.

Consumption and Discard Patterns

It is unclear exactly which or how many households contributed to the domestic refuse at each site. Unlike LA 158037, residential property boundaries cannot be used to ascertain a chain of ownership and specifically identify who deposited the debris (Barbour 2011:80–81). Conversely, strong indicators of multiple households are absent. At documented privies and refuse pits at LA 156207, the presence of numerous dinnerware and cutlery sets were used to argue that both Features 1 and 2 contained materials discarded by multiple residents of the Quintana Apartment Complex and patrons of the Maternal Health Center (Lakatos 2011:258–265). Most of the dinnerware found at LA 146412 and LA 146413 is undecorated making it difficult to identify different sets. Artifact assemblages could represent a single household or multiple households using undecorated wares.

Commercially butchered cuts of meat and abundant Euroamerican canned and bottled items suggest a wage earning population largely dependent on store-bought products. Brand and manufacturer names, such as Kerr and Coca Cola (Tables 5.5, 5.17), are instantly recognizable and indicate participation within the larger national economy. However, locally produced items and home butchered products are still present in reduced quantities.

Perhaps the best example of this is the occurrence of sheep or goat bone cut with an axe or cleaver (see Tables 5.6, 5.18). These artifacts indicate an animal, or a portion of an animal, that was later divided into cookable or consumable portions by someone who did not have access to a bone saw (i.e., outside of a processing plant, butcher's shop or grocery store). In contexts such as LA 146412 Feature 66, non-professionally butchered sheep or goat could point towards a family raising an animal in their backyard or purchasing it directly from a farmer. In these instances, readily available implements, such as an axe or cleaver, would have been used to butcher the animal.

Native American ceramics were also encountered. While the majority of these materials are not associated with the twentieth-century domestic refuse, Tesuque Polychrome is roughly contemporaneous with Euroamerican objects recovered from the pits (ca. 1870s to 1950s, B. Toulouse 1977). Jar fragments (n = 5) of this sherd type were found at LA 146412 and presumably represent at least one decorative piece. Such an item suggests that while these Santa Fe residents are participating within the national economy, regional traditions or preferences, at least aesthetically, are still visible.

An examination of functional Euroamerican dinnerware suggests the people contributing domestic refuse to the features at LA 146413 were relatively poor when compared to contemporaneous domestic refuse dinnerware assemblages in the Capitol Complex Historic Neighborhood (Barbour 2011). However, the types of Euroamerican products and the relative frequencies of these items consumed and discarded by both populations are remarkably comparable. Similarly, the economic scaling of commercially processed beef cuts suggests a moderate income or middle-class lifestyle with the proportions of chuck, round, fore shank, rib, etc., being analogous to those found elsewhere in twentieth-century Santa Fe (Craw 2011; Starkovich 2011). Assemblages encountered at both LA 146412 and LA 146413 would appear to be at least somewhat characteristic of the population as a whole. Perhaps, differences in dinnerware assemblages simply reflect a population that, while middle class, possesses less inherited wealth.

Certainly, there is a limit to the information that can be obtained through the analysis of artifacts from four features excavated at LA 146412 and LA 146413. Sample size is somewhat limited and may be too small to examine nuances between the residences discarding into these domestic refuse pits relative to households in the Capitol Complex Historic Neighborhood. Like the Capitol Complex Historic Neighborhood, residential development around LA 146412 and LA 146413 does not have its roots in a pre-statehood barrio. In these instances, city expansion during the late nineteenth and twentieth centuries represents the transition of formerly outlying areas south of Santa Fe River from agricultural land to an urban landscape. This is a consequence of population growth, cheap land, and the increase in economic opportunity, particularly around the Santa Fe Railyard and New Mexico state government buildings. The movement of Santa Fe's residential population out of city core during the this time period is a familiar theme of city expansion felt elsewhere in modern America and represents the initial development towards 1950s suburbia.

Summary

Examining artifacts from these archaeological sites suggest a wage earning population largely dependent on store-bought products. However, it is unclear exactly how many households contributed to the refuse pits. Brand and manufacturer names illustrate participation within the greater national economy. Economic scaling of Euroamerican dinnerware points towards inhabitants of the area being relatively poor when compared with residents of other parts of Santa Fe, although the proportions of different commercially butchered cuts of beef are indicative of a middle-income purchasing power.

While regulations dealing with proper waste disposal were enacted in Santa Fe during the early nineteenth century, discard behaviors were slow to change. Into the twentieth century, vacant fields were still utilized as an alternative to hauling domestic and industrial refuse to a landfill. Features at LA 146412 and LA 146413 were filled primarily with domestic items dating to the mid-twentieth century. Much, if not all of the waste, is believed associated with nearby residential structures.

Archaeological investigations into mid-twentieth century contexts are just beginning. Documentation of features and analysis of artifacts at LA 146412 and LA 146413 were effective to characterize waste disposal practices and consumption and discard patterns of residents living in and around the Santa Fe Railyard project area during the mid-twentieth century. The results of this study can be used to provide baseline data for future comparative studies in and around the Santa Fe area.

6 | Twentieth-Century Industrial Sites

Overview

Matthew J. Barbour

Ten archaeological sites identified within the Santa Fe Railyard project area were associated with early to mid-twentieth century industrial activities not directly tied to the AT&SF or NMC railways (Figs. 1.1, 4.30, 6.1, 6.3, 6.18). Archaeological and archival research of these sites had the potential to inform upon some of Santa Fe's freight-dependent commercial businesses in service during the early twentieth century and how these commercial industries operated within the current project area.

However, nine of the sites were tested and recommended either "not eligible" for the National Register of Historic Places (NRHP) or "eligible" with archaeological testing exhausting the potential of the site to yield further information relevant to New Mexico's past. The remaining site, LA 146411, was determined "eligible" with data recovery efforts being necessary to collect information pertaining to site creation, function and ultimate abandonment. Work at this site was conducted under a New Mexico State Historic Preservation (HPD) and City of Santa Fe Archaeological Review Committee (ARC) approved data recovery plan (Wenker et al. 2005).

In order to provide the reader with a coherent picture of the railyard's modern infrastructure, archaeological sites are reported here in geographic order rather than by site number. This is followed by a synthetic analysis of the sites in relation to research themes and questions proposed under *Research Domain 3: Bringing Archaeology and History to bear on the Archaeological Buildings and Structures of the Santa Fe Railyard of the Research Design* (Chapter 1, this report; Wenker et al. 2005:123–132).

LA 146409

Chris T. Wenker
revised by Jessica A. Badner

Introduction

LA 146409 (Figs. 6.1, 6.4) is a large historic site that includes the demolished, and broadly distributed remains of the Wholesale Building Supply warehouse complex as well as a small, earlier, structural complex along the tracks at the southwestern end of the site. This earlier complex may represent an AT&SF-related loading dock or freight scale. In addition, a cluster of thermal features that predated the warehouse and loading dock was also encountered along the railroad track to the west.

Site Location

LA 146409 was a 177 x 37 m (581 by 121 ft) tract east of the existing railroad tracks. Located between the Morelli and Old Sears buildings on South Guadalupe and Santa Fe Clay and Museo Cultural, west of the railroad tracks, the site was bounded to the south by Paseo de Peralta (see Figs. 6.1, 6.4).

Archival Research

The Wholesale Building Supply Complex Area

Three buildings constituting the Wholesale Building Supply facility were demolished by the SFRCC in the autumn of 2004 as part of the approved master railyard development plan (City of Santa Fe 2002). These three buildings resembled warehouses with cinder-block walls or wood-framed walls clad with corrugated sheet metal.

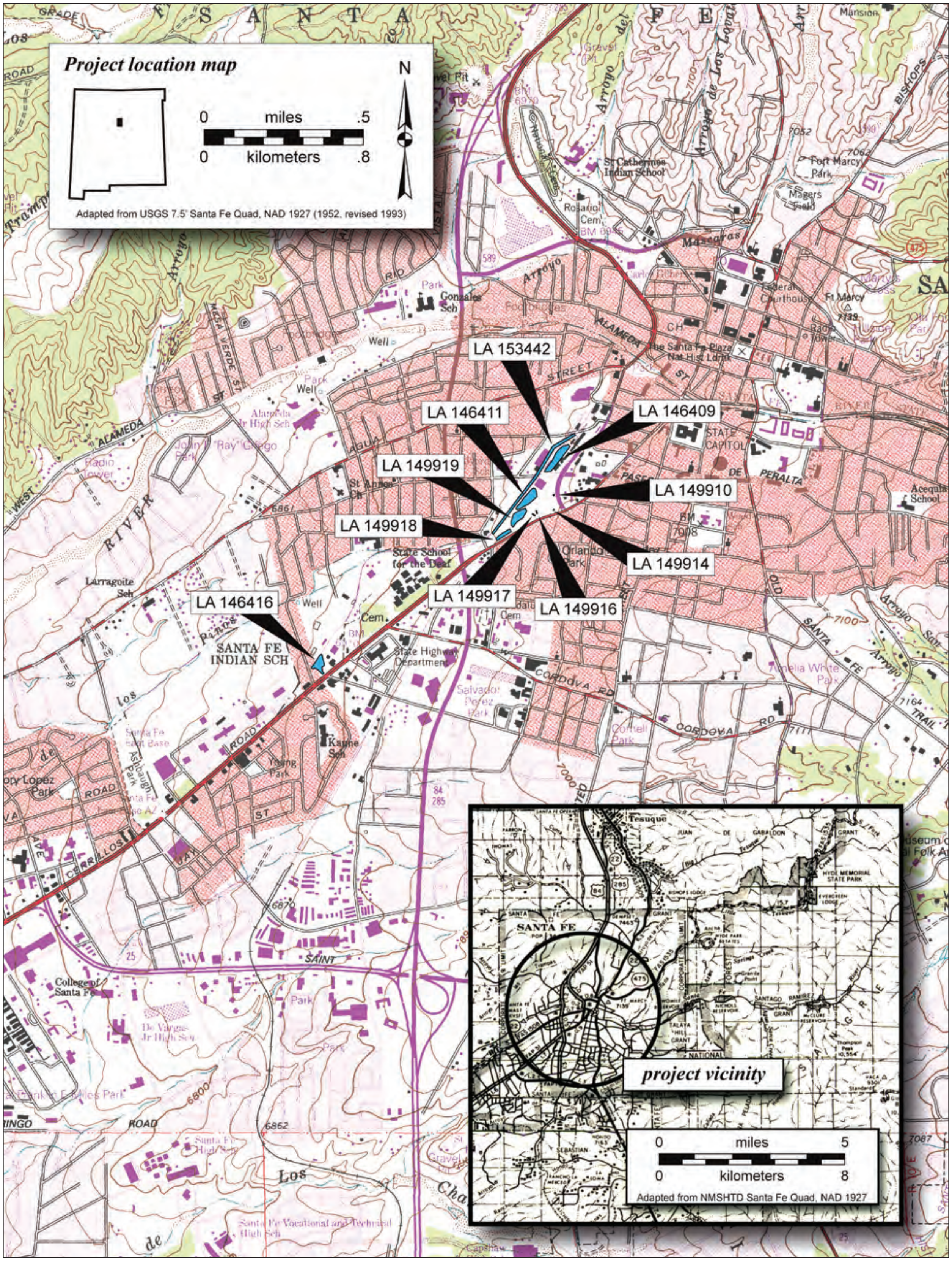


Figure 6.1. Locations of twentieth-century industrial sites at the Santa Fe Railyard: LA 146409, LA 146411, LA 149910, LA 149914, LA 149916, LA 149917, LA 149919, LA 149918, LA 153442, and LA 146416.

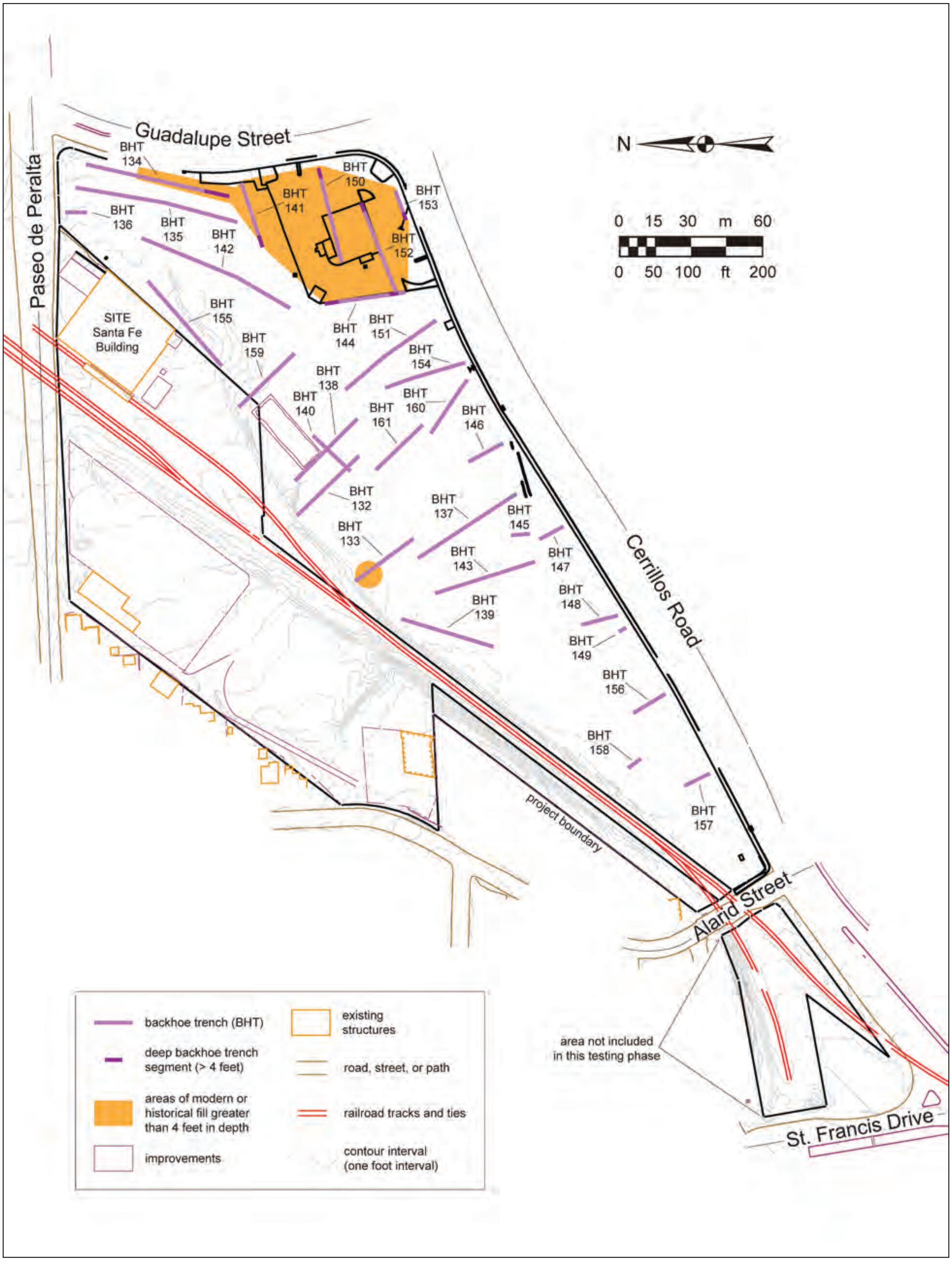


Figure 6.3. South Railyard Backhoe Trenches (BHT), Scraping Units (SCU), and Excavation Units (XU) excavated in the South Guadalupe area of the Santa Fe Railyard project.

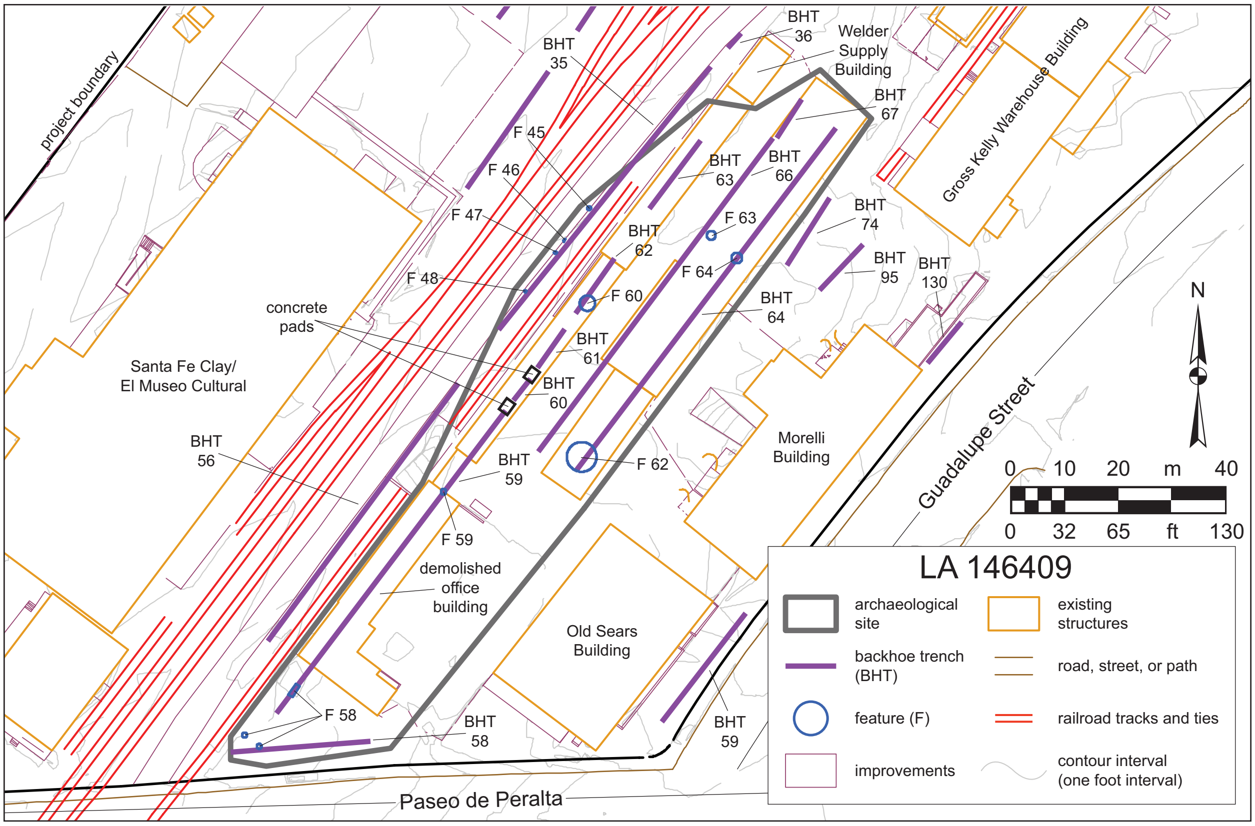


Figure 6.4. LA 146409, site map, showing feature numbers.

Scheick (2003:70–73) notes that the original buildings on this lot predate 1945, but the buildings remained in commercial use into the twenty-first century. The first lease of the area was made by AT&SF to C. L Bowlds Packing Co. in 1929, perhaps located in the Welders Supply building just south of the site area (Fig. 6.4; see also Scheick 2003, Figure 4.17). By 1940, the U.S. War Department was using the now demolished warehouses to the north across from Las Vegas Wholesale Liquor Co., now the Morelli Building (Scheick 2003:69–73). With the exception of the Welders Supply building, an adobe structure at the northern end of the warehouse complex the extant buildings were evaluated in 1997 as non-contributing historic buildings (City of Santa Fe 2002). The Welders Supply building remains in use.

Loading Dock or Freight Scales

The area near the junction of Paseo de Peralta and the modern railroad track alignment is identified by Scheick (2003:51, 59–60) as the location of the AT&SF scales, although Scheick (2003:59–60) proposes that the scales were destroyed by the construction of present-day Paseo de Peralta immediately to the south. No direct evidence of such a facility was observed during archaeological testing (Wenker 2005a).

Excavation Sequence

Archaeological testing proceeded at LA 146409 after the Wholesale Building Supply structures were demolished. Backhoe trenching revealed a number of concrete pads and pits related to the buildings. Soil east of the office building at the southwestern end of the complex was contaminated and precluded any archaeological work as stipulated, in the project MOU.

This site was investigated by the excavation of 10 northeast–southwest-oriented backhoe trenches (BHTs 35, 58–64, 66–67) that paralleled the existing railroad tracks. Trenches exposed a total of 379 linear meters of soil profiles. Trench numbers and dimensions are listed in Table 6.1; Figures 3.3 and 6.4 show locations.

Based upon these backhoe trenches, the site contained 10 identified features including four thermal features, two utility trenches, foundations to a loading platform and one pit of indeterminate use (Feature numbers and summary descriptions are presented in Table 6.2). Three one-meter-square excavation units (XUs 13, 14, 16; Fig. 3.4) were also excavated at this site to evaluate the deposits, artifact content, and condition of two of the apparent thermal features (Features 46, 48).

Site Stratigraphy

All of the backhoe trench walls at this site exhibited an upper churned layer of modern and historic overburden (Stratum 1) approximately 0.50 cm (1 ft 8 in) thick resulting from the mechanical disturbance created by building demolition. Backhoe Trench 64, in particular, which ran under the length of the eastern warehouse, exhibited an array of pits or stratigraphic irregularities, filled with modern Stratum 1 that may represent demolition disturbances or features within part of the original warehouse floor. Stratum 2 was .05m (2 in) thick or not identified, except in Feature 59, exposed in BHT 58 and BHT 59. Stratum 3, sterile substrate was 0.25 to 0.50 m thick (10 in to 1 ft 8 in) under which Stratum 5 was encountered. All strata were typical of those described for the project area. For more detailed descriptions of these site strata please, see the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature Descriptions

Features indicated railyard era, historic, and pre-World War II use. Railyard-era use was represented by the remains of a loading dock and its associated pilings, Feature 58. Additionally, four thermal features (Features 45–48) of indeterminate historic periods were investigated near the track alignment. Pre-World War II use was represented by remains of the Wholesale Building Supply complex (Features 59, 60, 62, 64).

Railyard Era

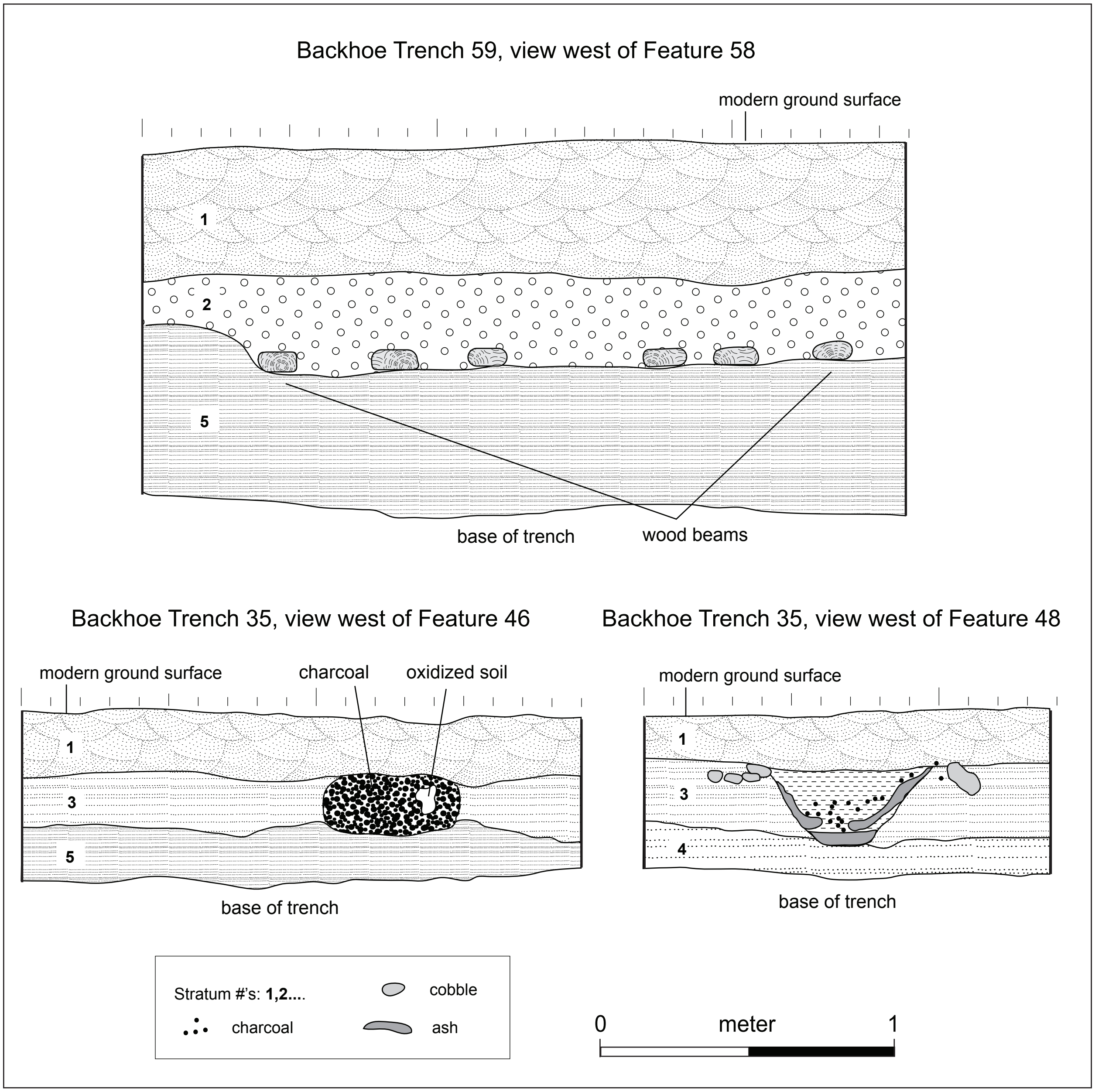
Feature 58. Feature 58 may have been the remains of a loading dock. Located to the south of the Wholesale Building Supply complex, this structural complex was found at the juncture of Paseo de Peralta and the railroad tracks. Buried elements of Feature 58 were exposed in two backhoe trenches (BHT 58 and 59). An additional element consisting of concrete pilasters was observed on the modern surface indicating that the structure was probably at least 12 m (39 ft 4 in) long.

In BHT 59, the feature was visible in both trench walls at a depth of 70 to 80 cm (2 ft 4 in to 2 ft 8 in) below the ground surface (Fig. 6.5). The feature elements in this trench consisted of six flat-lying wooden beams or railroad ties, each measuring 18 cm (7 in) wide by 8 cm (3 in) high in cross section. The centers of the beams were spaced from 25 to 35 cm (10 in to 1 ft 2 in) apart and the overall array measured 2.34 m (7 ft 8 in) in length. The north–west trench appears to have intersected the beams on a perpendicular axis. The beams lay upon sterile Stratum 3 substrate and were buried under a 0.50 cm (1 ft 8 in) thick mantle of historic Stratum 2 overburden (as well as modern Stratum 1).

These beams form a discrete cluster; no additional ties or beams were present to the north or south in this same backhoe trench. Given their proximity to the railroad tracks, these beams may have been supports for a loading dock or a related structure. Prior to the demolition of the Wholesale Building Supply facility, a wood-and-earth loading dock measuring approximately 1 m (3 ft 4 in) high, 6 m (19 ft 8 in) wide, and 5 m (16 ft 5 in) long once occupied the space directly above these buried beams. These beams may represent an earlier version of this ramp's foundation.

Pilings. Two additional components of this structural complex were identified 12 m (39 ft 4 in) to the southwest. These elements consisted of poured-concrete pilings, the tops of which were level with the modern surface or were slightly buried. These columnar pilings measured roughly 46 cm (1 ft 6 in) across. One piling exposed in BHT 58 extended at least 1.2 m (4 ft) below the ground surface. Both pilings exhibited steel bolts in the top. The pilings were 3.7 m (12 ft 2 in) apart and were aligned along a northwest-southeast axis, perpendicular to the orientation of the railroad tracks that cross three meters to the northwest.

No direct evidence of freight scales was recovered during testing. However, similar infrastructure associated with scales was exposed in full excavation at LA 146402 (see Structures 1 and 2). Based on this evidence, a freight scale may be inferred to have been located nearby, but was removed during con-



Figures 6.5, 6.6, 6.9. LA 146409, top (Fig. 6.5): BHT 59, Feature 58, cross section; middle (Fig. 6.6): Feature 47, cross section; bottom (Fig. 6.9): BHT 35, Feature 48, cross-section.

struction of Paseo de Peralta as previously proposed by Scheick (2003:51, 59–60).

Historic Thermal Features

A series of four apparent thermal pits (Features 45-48) was exposed in the west wall of BHT 35, along the western site boundary (Fig. 6.4). These features were positioned along the western side of the existing railroad track, well north of the Feature 58 complex and west of the Wholesale Building Supply complex. A modern dirt road passed along the western side of this feature array, and the railroad tracks crossed roughly 3.75 m (12 ft 4 in) to the east. The features were distributed across a 21 m (69 ft)-long expanse of the trench wall.

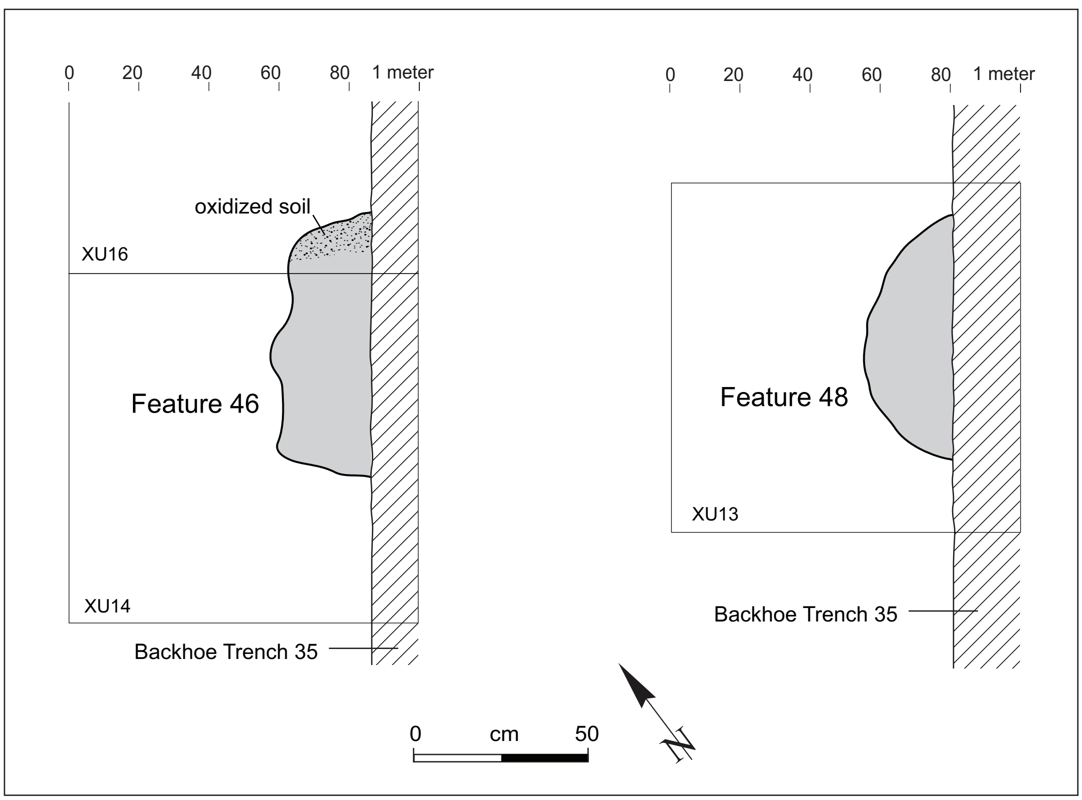
These features (summarized in Table 6.2) were apparent in cross-section as basin-shaped or flat-bottomed pits measuring between 32 and 75 cm (1 ft 1 in and 2 ft 6 in) in width and 24 to 30 cm (10 in to

1 ft) in thickness (Fig. 6.6). All originated at the top of sterile Stratum 3 and were dug into or through that sterile substrate layer. All were also capped by roughly 20 cm (8 in) of modern overburden consisting of Stratum 1. Each of the features contained moderate to abundant charcoal chunks in their fill. The southern three pits (Features 46, 47, and 48) also displayed reddened, hardened soil along the pit margins, indicating their use as hearths or fire pits.

Three hand-dug XUs (XUs 13, 14, 16) were used to expose the tops of two of these pits (Features 46 and 48, which are summarized below) to determine their morphology (Figs. 6.7, 6.8). The XUs removed only the overburden from above the pits. Fill within the features was not excavated during this process. Beyond their identification as historic-age features, the function and external association of the features in this array remains undetermined.

Feature 46. Feature 46 (Fig. 6.6) proved to be a square-cornered thermal pit with relatively straight, oxidized walls (Fig. 6.4). It was 70 cm (2 ft 4 in) long and at least 30 cm (1 ft) wide (the width was partly removed by the trench). The top of the pit was exposed in XU 14 and XU 16, which exposed the aperture in Stratum 3. Overburden, though removed in a 10–12 cm (4–5 in) thick block by hand was not screened. Feature fill was 90 percent charcoal mottled with black sandy loam, and oxidized soil.

Feature 48. Feature 48 was a circular thermal pit (Fig. 6.4). Although the majority of the feature had been removed by the trench, the remnant portion indicated that the pit measured approximately 70 cm (2 ft 4 in) in diameter and was 0.24 m (10 in) deep. Twenty centimeters of Stratum 1 overburden was excavated in XU 13 to expose the top of the pit evident in Stratum 3. Three layers of feature fill were evident (Fig. 6.9). The base layer was a mixture of ash, small pieces of charcoal and 20 percent gravel. Gravelly loam with charcoal flecks contained two sloping charcoal lenses containing large chunks (10–15 cm; 4–6 in) chunks of charcoal. A single brown bottle glass shard indicated a historic age.



Figures 6.7, 6.8. LA 146409, top (Fig. 6.7): XUs 14 and 16, Feature 46, plan view; bottom (Fig. 6.8): XU 13, Feature 48 plan view.

Pre-WWII

The Wholesale Building Supply Complex (including Features 59, 60, 62, 63, and 64) was represented by a series of five modern pits and two concrete pads located beneath demolished warehouses across form the Morelli Building, southwest of the Welder's Supply. These features were identified in BHTs 59, 62, 64, and 66 (Fig. 6.4). Feature dimensions and fill are summarized in Table 6.2.

Features 63 and 64. Features 63 and 64, located under the eastern warehouse, were exposed in adjacent trenches. These two fairly large pits measuring in width from 1.13 and 2.40 m, did not appear disturbed by the recent demolition. However, the fill in each pit consisted of redeposited backdirt. Both pits are best interpreted as a large utility trench that may have once contained a sewer line, although no utility lines were observed in place. The line may have been abandoned and removed while the warehouse was still in use.

Feature 62. Feature 62, located under the southern end of the eastern warehouse, consisted of a large, deep refuse-disposal pit that contained abundant structural detritus as well as domestic refuse. Measuring 4.90 m (16 ft 1 in) in length and 1.09 m (3 ft 7 in) deep, it was covered by a 0.30 m (1 ft) mantle of Stratum 1. Wood, bricks, linoleum tile, nails, and window glass were common in the fill, and temporally diagnostic items were collected (Table 6.3). The numerous fragments of machine-manufactured bottles indicated a post-1904 date at the earliest, and the bulk of the material suggested that the pit was filled in during the 1940s or later. Based on the quantity of construction debris, this pit may derive from the demolition of an earlier structure.

Features 59 and 60. Features 59 and 60 were two modern pits of unknown function along the western margin of the original warehouse complex. Feature 59 measured 1.26 m (4 ft 2 in) in length and 1 m (3 ft 3 in) in depth. Feature 60 measured 4 m (13 ft 1 in) in length and 1.09 m (3 ft 7 in) in depth.

Concrete pads. The western row of backhoe trenches (between BHTs 59, 60, and 61) also revealed two large poured-concrete pads that are probably from the wood-frame warehouse buildings. During the demolition, numerous additional concrete pilings, pads, and foundations were dismantled and removed from the site, so the full extent of foundation pads remains unknown. However, these pads measured roughly 3 m (9 ft 10 in) long and 2 m (6 ft 7 in) wide and were spaced 4 m (13 ft 1 in) apart.

Summary

The remains of the Wholesale Building Supply facility, which was not considered a significant historic building, are present as a broadly distributed expanse of disturbed modern and historic refuse punctuated by scattered features or structural remnants of unclear temporal or functional association to the overall complex.

The complex is in poor condition. Although a few concrete slabs are still intact, no definite building foundation is present. The mechanized demolition of the buildings and infrastructure has substantially compromised the site integrity. The original construction date for the buildings (ca. pre-1945) barely places this complex in the realm of consideration as a historical cultural resource (as defined by the NRHP 50-year-old criterion), and its continued use into the modern era probably further compromised any historical deposits or features. Beyond confirming the archival documentation of a warehouse operation in this area, the potential for the physical archaeological remains of this structural complex to contain additional interpretively significant information was very low.

The thermal features of indeterminate age most likely represent expedient hearths or campfires, although their close spatial association with the railroad tracks is puzzling. Given the dearth of associated temporally or functionally diagnostic artifacts, these features contain limited potential to contain additional archaeologically relevant data.

The small structural complex at the southern end of the site marks the location of a railroad activity area, but the actual function, age, and contemporaneity of the remains are unknown. The features appear to represent expediently constructed and easily abandoned components of the railroad infrastructure. The physical remains of these features exhibit no interpretive potential that would warrant additional archaeological investigation.

As a result, no additional work was recommended for LA 146409 (Wenker 2005a:50). ARC and HPD concurred.

LA 146411

Chris T. Wenker,
revised by Matthew J. Barbour

Introduction

LA 146411 consists of one structure and seven features (Fig. 6.10). Archival records and construction elements suggest these features represent two distinct structural complexes associated with the AT&SF station grounds. However, the modern overburden that capped these architectural elements was presumably associated with demolition or post-demolition activities in the late twentieth century.

Site Location

LA 146411 is located west of Guadalupe Street between Paseo de Peralta and Cerrillos Road (Figs. 2.35, 6.10). The site area overlaps parts of both the Railyard Park and the North Railyard development parcels. Prior to the project the site was covered by a dirt automobile parking lot and an informal city park; only Structure 1 and Feature 69 were visible on the modern surface. Based on the distribution of surficial and buried architectural and structural features, the site measures 130 by 35 m (426 by 115 ft) across and covers roughly 4,050 sq m area.

Excavation Sequence

During the testing project (Wenker 2005a; 2005b), six backhoe trenches were excavated through the site and two 1-by-1-m excavation units (XUs) were used to test the depth and content of Structure 1 (Fig. 6.10). XU 39, in the northern end, revealed a shallowly buried deposit of sterile Stratum 3 about 35 cm below the modern surface, while XU 41 in

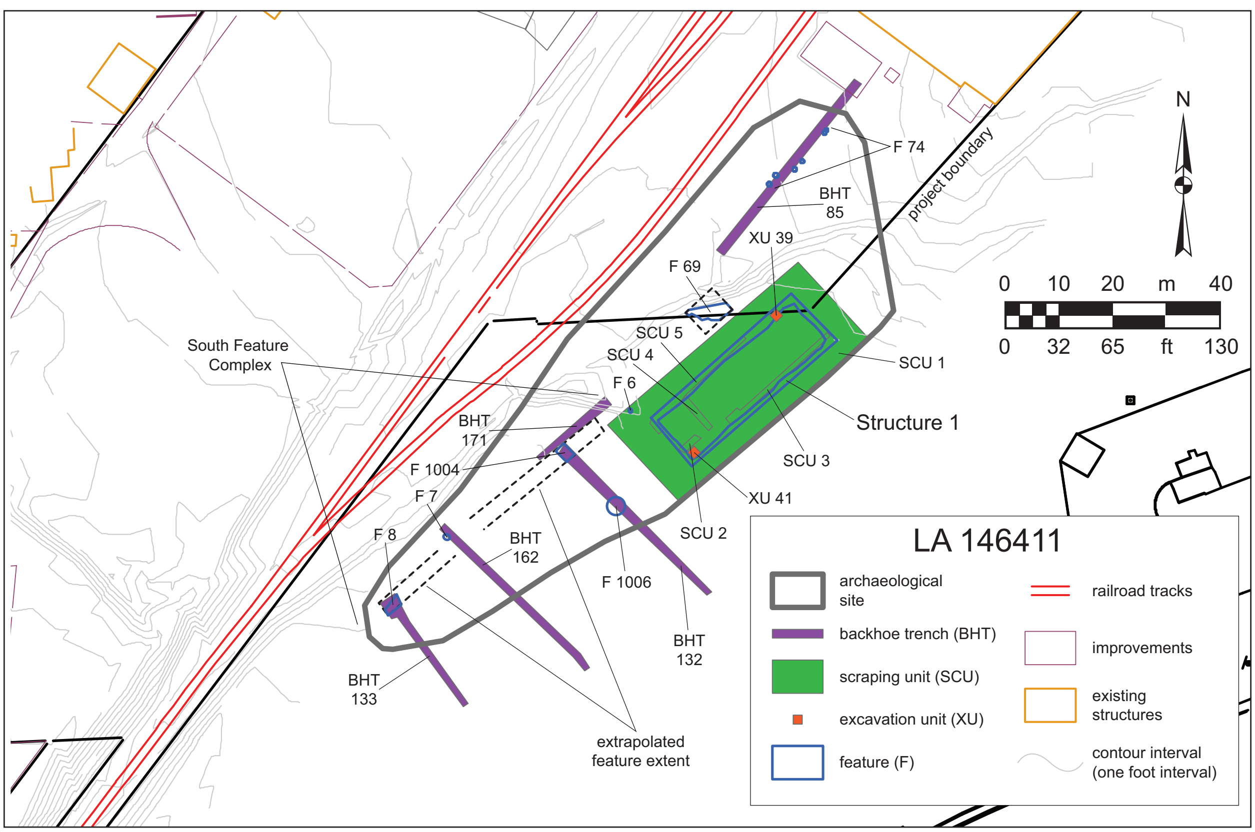


Figure 6.10. LA 146411, site map.

the southeastern corner revealed a poured-concrete floor at 1.24 m below the modern surface.

Data-recovery excavations targeted this deeply buried floor area to examine the nature and extent of this unexpected architectural characteristic of Structure 1 (Wenker 2006a). Excavation, mapping, and recording procedures followed those detailed in the data-recovery work plan (Wenker, Post, and Moore 2005). Feature, stratum, and excavation unit numbers used in this project are not always continuous from 1 to n, because in many cases the designations from the testing projects (Wenker 2005a, b) were maintained to provide consistency in the provenience designations.

During data recovery, various excavation units were used to expose and define the architectural foundation of Structure 1 (Fig. 6.10). The interior of the large room of Structure 1.01 was partially exposed by backhoe scraping units (SCUs) 2 through 5. The exterior of the building and the surrounding historical ground surface were exposed by SCU 1. The interior of the small, subterranean room or cell in the building was completely excavated by mechanical means in a single, full-cut, whole-feature excavation unit. Several new or expanded data-recovery backhoe trenches (BHTs 133 and 162, dug during investigations in LA 149912) revealed Features 7 and 8, which were attributed to LA 146411. BHT 132 (containing Feature 1004) was also reopened during this work, and BHT 171 further exposed Feature 1004, but BHT 85 at the northern end of the site was not re-excavated.

Most archaeological work at this site focused on features exposed by mechanical excavation, and architectural documentation in the form of plan maps, cross-section and elevation drawings, photography, and narrative descriptions. No contexts containing intact primary artifactual deposits were encountered. Generally, the upper fill of Strata 1 and 2 was excavated in full-cut mechanical excavation units to expose the various subsurface foundations. These upper deposits were not systematically screened or sampled because of the mixed and redeposited nature of the fill, and no artifacts were recovered.

Site Stratigraphy

Site stratigraphy was consistent with that recorded throughout the project area. The modern overburden that filled and capped the architectural elements was presumably associated with demolition and post demolition activities. Detailed descriptions of natural and cultural strata are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Features

One structure and seven features were identified at LA 146411 (Fig. 6.10; Table 6.4). Archival records and construction elements suggest these features represent two distinct structural complexes. Structure 1 & Associated Features (Features 6 and 69) represent a mid-twentieth century building configuration of unknown function and the Southern Feature Complex, which includes Features 7, 8, 74, and 1004, is slightly earlier and may be associated with "Santa Fe Trans. Co. Gas Tanks & Drive" (see archival research section following feature descriptions). These two structural complexes are discussed below.

Feature 1006 was not identified with either complex. This basin-shaped pit, 1.4 m (4.6 ft) in width and 1.1 m (3.6 ft) in thickness, originates from the modern ground surface and contains mixed deposits with material including metal, wood, glass, and plastic. These fill inclusions indicate a modern origin for the feature and it was not considered further.

Structure 1 and Associated Features

Structure 1

Structure 1 is a poured-concrete building foundation consisting of two main intramural room spaces, identified as Structures (or Rooms) 1.01 and 1.02 (Figs. 6.11, 6.12). Overall, the building's perimeter walls (marking Room 1.01) measured 37.25 by 12.4 m (122 by 41 ft) across, and were roughly 20 cm (8 in) in width. The concrete footers of the building were poured into shallow trenches, extending no more than 47 cm (1.5 ft) below the modern surface. The exteriors of the perimeter footers were poured into shallow forms, creating a straight-edged exterior of the wall, but the interior edges of the perimeter walls were all marked by jagged, broken edges of a 13 cm (5 in) thick concrete sheet that may have been an interior poured-concrete floor that was integral with the wall footers. This floor was still intact southeast and southwest of Room 1.02 (Fig. 6.11), but the center of Room 1.01 lacked a concrete floor.

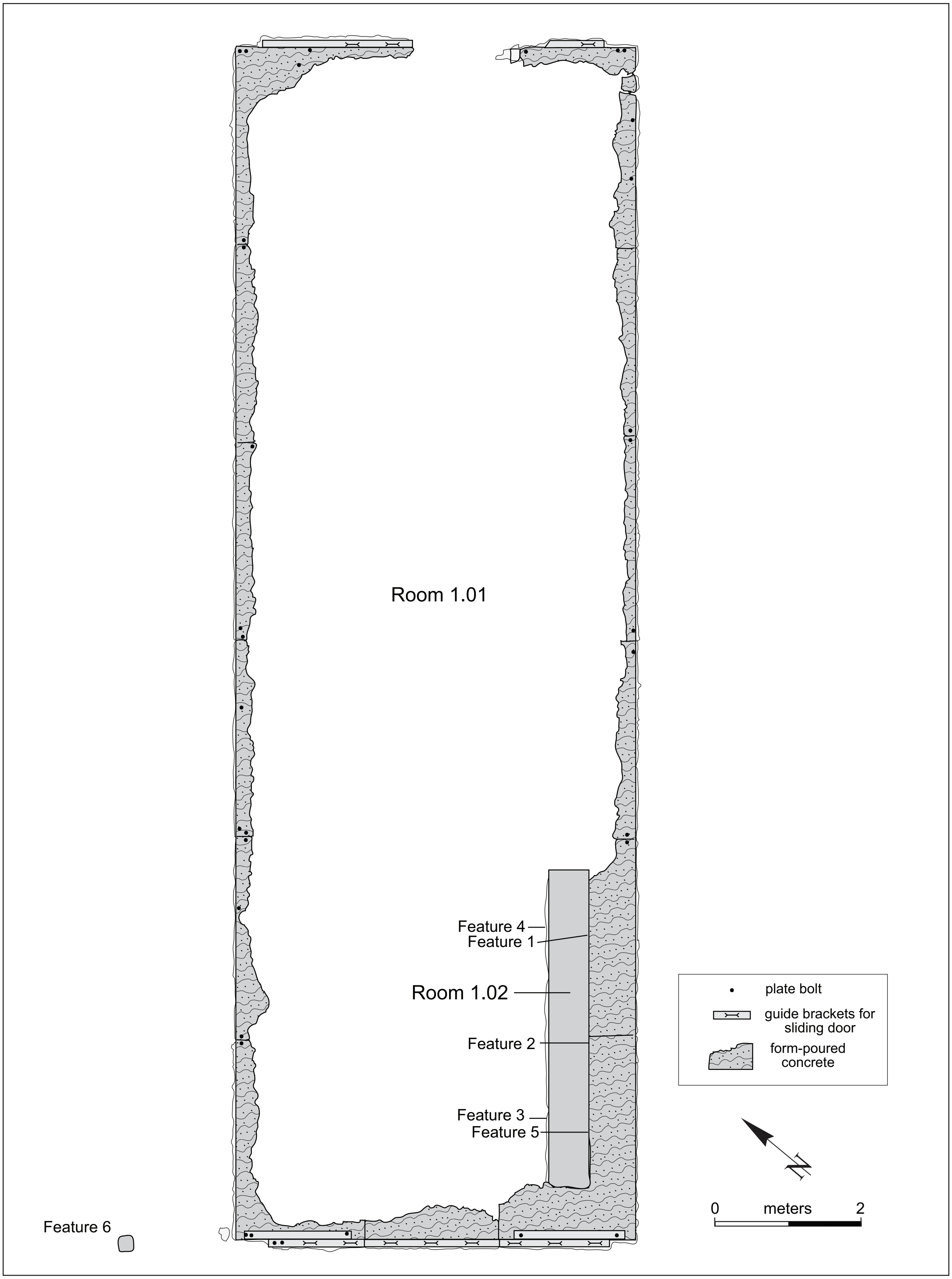


Figure 6.11. LA 146411, Structure 1, plan view.

Figure 6.12. LA 146411, overview of Structure 1, view to the south.

It cannot be presently determined if the entire building had a concrete floor or if only a strip around the edges was paved. Two series of steel brackets, evenly spaced along the exterior lips of the northeastern and southwestern exterior walls, in conjunction with a low step in the concrete of those walls, suggest that those ends of the building once contained large sliding doors, perhaps large enough to allow vehicles to enter the structure. Various other plate bolts along the perimeter walls indicate the affixation points for the long-demolished superstructure. Other pipes and rods protruded from the foundation at various points. The interior of Structure 1.01 contained a thin (less than 47 cm thick [1.5 ft]) veneer of reddish-brown loam with modern artifacts (Stratum 1) overlying a sterile Stratum 3 surface.

The subterranean room space identified as Room 1.02 contains the deep concrete floor discovered in testing XU 41. This portion of the building proved to represent a long, narrow, sub-grade, concrete-lined room of unclear function (Figs. 6.11, 6.13). This room measured 1.1 by 9.55 m (3.6 by 31.3 ft) across, and the floor lay 1.35 m (4.4 ft) below the top level of the adjacent concrete floor surface. The upper lip of the room's edge lay about 1.2 m (4 ft) from the edges of the building walls to the southeast and southwest. The concrete walls and floor of the subterranean space had been poured in-place into a straight-sided pit that was dug into sterile Stratum 5 deposits. The floor of the room showed no appreciable slope in either axis. The walls exhibited seams from the concrete forms, indicating that the forms were made of wooden planks roughly 30 cm (1 ft)

Figure 6.13. LA 146411, overview of Room 1.02, view to the north.

high. The northwestern wall measured only about 20 cm (8 in) in thickness.

Both the northwestern and southeastern walls of Room 1.02 exhibited evenly spaced rectangular sockets (Features 1 through 5) about 45 cm (1.5 ft) below the level of the upper lip of the walls. A sixth socket that probably once occupied the center of the northwestern wall had been destroyed by post-abandonment disturbances. Although most were damaged and incomplete, it appears that each of these sockets measured 80 cm (2.6 ft) in length and 20 cm (0.6 ft) in height, and extended completely through the concrete wall to reveal the soil behind. The sockets were spaced about 2.75 to 3.25 m (9 to 11 ft) apart along the wall, and appeared to represent complementary pairs between the northwestern and southeastern walls. The functions of these features remain unclear; these sockets may have supported beams that spanned the short axis of the room, but no evidence of such structural elements was observed.

Room 1.02 was filled with two main modern refuse-bearing deposits, which were originally noted in XU 41 (Wenker 2005a). The uppermost 65 cm consisted of brown sandy loam with inclusions of bottle glass, plastic, asphalt, concrete, and aluminum. Below that, the Stratum 1 changed in appearance to a light brown silty loam and the modern artifact inclusions changed to primarily construction-related refuse (painted concrete, tar, roofing paper, masonry nails, and cinder blocks). The lower portion of this cell appears to have been filled during or soon after the demolition of the building, while the upper portion may represent refuse from domestic or residential origins. No additional artifacts were collected from the deposits in or around Structure 1.

Feature 6. Feature 6 was identified in SCU 1 around Structure 1 (Fig. 6.11). Feature 6 consisted of a small poured concrete pier, measuring 40 by 45 cm (1.3 by 1.5 ft) across and 14 cm (.5 ft) high. A section of steel rebar protruded from the top of the pier, indicating a post or other structural element had been affixed to the top of this feature.

Feature 69. Feature 69 is visible at the present ground surface and consisted of a rectangular slab of form-poured concrete. The concrete that constitutes this pad contains a different type of aggregate than the concrete in the foundation of Structure 1, and the floated finish also differs, indicating that they are two separate construction episodes. The long axis of the pad parallels that of the Structure 1, however, suggesting that the pad is functionally related; it is probably a later addition to the complex.

Southern Feature Complex

Feature 7. This concrete feature was discovered in the sidewall of the northwestern end of BHT 162 during an exploratory excavation to track the overburden depth above the historical ground surface along the edge of the railroad tracks (Figs. 6.10, 6.14). Feature 7 consisted of a poured-concrete pier, measuring 60 cm (2 ft) in width; the full top or plan view was not exposed, but the pier appeared to be square or rectangular. The pier measured over 2.3 m (7.5 ft) in overall height (additionally, the top of the pier was buried 70 cm below the modern surface), although the trench was not able to expose the base of the pier. The pier was buried in a thick deposit of Stratum 1 and 2 overburden; sterile substrate was not encountered in the trench base. This portion of the railyard, near the 1880 AT&SF railroad tracks, appears to have been historically excavated below grade, and then refilled by numerous episodes of infilling to the present ground level, burying this and its related track-side

Figure 6.14. LA 146411, overview of Feature 7 in BHT 162, view to the south.

features. The top of this pier appeared to have been broken off, and no plate bolts or other affixation points were present. Feature 7 lay approximately midway between Features 8 and 1004.

Feature 8. This large poured-concrete slab appears to represent a mirror-image of the Feature 1004 slab to the north (see below). Feature 8 was not fully exposed, only the intact southeastern edge of the slab and a 2-by-3-m area of its upper face were uncovered in the northwestern end of an extension of BHT 133 (Fig. 6.10). This slab measured 14 cm (5.5 in) thick and was at least 2 m (6.5 ft) wide and 3 m (10 ft) long. The entire slab had been built at an angle, sloping downward toward the northeast (toward Feature 7). In the exposed portion, the slope measured roughly 22 percent (22 cm rise per 1 m run). Feature 7 was buried under roughly 1.7 m of strong brown silty loam with sparse artifacts and coal inclusions (probably representing Stratum 2 overburden).

Feature 74. Feature 74 represents a cluster of six fenceposts or postholes, designated as Features 74A to 74F (Fig. 6.10). The posts were located on the broad flat-topped terrace northwest of Structure 1 and measured between 25 and 30 cm in diameter. Archival documentation (Scheick 2003:59, 80) indicates that this area was occupied by the AT&SF stockyards. The most parsimonious interpretation of the terrace and fencepost array is that this complex represents a purposefully leveled corral, chute, or enclosure that was fenced with wooden fence posts, although the size or orientation of the fenced area is unknown.

Feature 1004. This large poured-concrete slab appears to represent a mirror-image of the Feature 8 slab to the south (Figs. 6.10, 6.15). Feature 1004 measured fully 3 m (10 ft) in width, and was 10 cm (4 in) in thickness. The northern end of the slab was found in BHT 171, but the southern end was not located. Minimally, this slab measured 9.5 m (31 ft) in length along its northeast-southwest axis. Like Feature 8, Feature 1004 also sloped downward, in this case to the southwest (again, toward Feature 7), at an approximately 11 percent grade. This slab was buried by Stratum 1 deposits (mainly strong brown loam) that ranged between 0.5 and 1.6 m in thickness.

Figure 6.15. LA 146411, overview of Feature 1004 in BHTs 132 and 171, view to the east.

Archival Research

Scheick et al. (2003:59, 80) noted that the AT&SF's stockyard, located in the southeastern one-third of the North Railyard property, occupied part of the LA 146411 area. No features have been confidently identified, with the possible exception of Feature 74, that matches the reported dimensions of the historical stockyard. However, a 1927 map of the AT&SF station grounds (not illustrated by Scheick et al. [2003]) from the collection of Joe Brown (a former AT&SF freight manager at the Santa Fe station), does indicate the "Santa Fe Trans. Co. Gas Tanks & Drive" in or around the area of the Southern Feature Complex. This enterprise consisted of a 10 ft wide "Paved Drive," which was 57.15 m (187.5 ft) long and oriented northeast–southwest, that passed along the southeastern side of a set of tanks, which measured 10 by 2.2 m (33 by 7.2 ft). The tanks were connected to the nearby railroad tracks by a dashed line on the map, presumably indicating a pipeline of some sort.

The steeply sloped concrete slabs (Features 8 and 1004) constituting the driveway indicate that this structural complex was a partially subterranean installation, although no indication to that effect is listed on the 1927 map. This sub-grade construction method may have been designed to allow the tanks to be gravity-fed from railroad cars on the tracks, and also allow the tanks to use gravity to fill vehicles parked on the driveway below.

The same 1927 map also illustrates that a railroad siding continued to the northeast, near the northern end of the driveway, crossing through the area now occupied by Structure 1. This relationship strongly indicates that this gas tank/driveway complex (as well as the siding) had been abandoned and demolished before the construction of Structure 1 commenced.

Some additional information about Structure 1 and the site as a whole, gleaned from aerial photographs that were examined during the Railyard Park testing phase, can be added to this discussion (see the Archival Research section in Wenker [2005b]). Neither the 1930 or 1948 Sanborn maps illustrate the portion of the project area containing LA 146411, but a small-scale, relatively fuzzy aerial photograph, dated 1936, does not depict any obvious structures in this location. Another undated aerial photograph (pre-dating 1951) does, however, depict a large gable-roofed building precisely in the location of Structure 1. Lastly, a 1960 aerial photograph indicates that Structure 1 had been remodeled and expanded northwestwardly, nearly doubling the roofed area of the structure. The remains of this building addition are not readily apparent in the field; the expansion may have only added on an open, roofed area that did not posses a foundation. Features 6 or 69 may be part of this expansion. These observations help clarify the construction period of Structure 1, but do not assist in determining the building's function.

Summary

LA 146411 consists of one structure and seven features. Archival records and construction elements suggest these features represent two distinct structural complexes. Modern overburden that filled and capped the architectural elements was presumably associated with demolition and post demolition activities. As a result most archaeological work at this site focused on feature exposure by mechanical excavation, and architectural documentation in the form of plan maps, cross-section and elevation drawings, photography, and narrative descriptions.

Structure 1 consisted of a poured-concrete foundation, with a largely demolished concrete interior floor. A long, narrow, sub-grade room, work space, or storage area that was walled and floored with concrete occupied one corner of the building, although the function of this subterranean room is unclear. The subterranean room's location in the corner of the building (less than 4 ft away from the exterior building walls) argues against (but does not preclude) its use as a grease pit or repair bay for mechanics to work on vehicles. The pre-1951 photograph suggests this structure was built during the late 1940s or early 1950s.

Additional extramural features, designated the Southern Feature Complex, appear to represent an earlier, separate structural complex related to a commercial enterprise that received fuel shipments from the nearby AT&SF line. This portion of the railyard, near the 1880 AT&SF railroad tracks, appears to have been historically excavated below grade, and then refilled by numerous episodes of infilling to the present ground surface, burying this and its related track-side features. Based upon a 1927 map of the AT&SF station grounds, this complex was in use during the 1920s and was apparently demolished prior to the 1936 aerial photograph.

Testing and subsequent data recovery exhausted the potential for LA 146411 to address relevant aspects of the project's research design (Wenker et al. 2005). No further impact-mitigation archaeological fieldwork was recommended for this site prior to the start of, or during, construction (Wenker 2006a:13). Both HPD and ARC agreed and no further archaeological investigations were conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149910

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 149910 was a deeply buried poured-concrete building foundation (Figs. 6.16, 6.17). It may have been constructed shortly before January 1930 and is labeled on the Sanborn Fire Insurance map "WAGONS." No intact cultural deposits could be associated with the foundation. The modern overburden that surrounded and capped the foundation is believed to be building demolition and post-demolition activities occurring at LA 149910 during the mid- to late-twentieth century.

Site location

LA 149910 was located 30.48 m (100 ft) east of Guadalupe Street half-way between its intersection with Cerrillos Road and Paseo de Peralta along the eastern edge of the Railyard Park parcel (Figs. 6.16, 6.18). The site was east of LA 149912 and approximately 45.72 m (150 ft) north of 149913. Its known extent measures roughly 6 m (20 ft) across.

Archival Research

Archival research for LA 149910 focused on documenting twentieth-century buildings within site boundaries. The 1930 Sanborn map depicts a long, narrow, rectangular building, oriented roughly north-northwest by south-southeast. The building is simply labeled "WAGONS," but no street address was provided for this location. While its location is approximately 10.68 m (35 ft) to the west of LA 149910, the vagaries of overlaying historical maps on modern maps may account for some spatial errors (compare Figs. 4.28 and 6.18).

A possible structure in this location is visible on the 1936 aerial photograph, but interestingly, no structure is illustrated in this location on the 1948 Sanborn map. The pre-1951 aerial photograph again indicates a long, rectangular structure (oriented roughly north-northwest by south-southeast) in a location that is positioned closer to LA 149910, although the structure appears much wider than the foundations assigned to Feature 1012 (below). The 1960 aerial photograph also depicts a similarly large structure in this location, although it appears to be located slightly east of the pre-1951 structure (but still overlapping with Feature 1012).

Excavation Sequence

A single backhoe trench (BHT 141) was excavated along the eastern edge of the park parcel (Fig. 6.16). Feature recording at LA 149910 was consistent with project recording guidelines discussed in the "Field Excavation Methods and Procedures" section in Chapter 1 of this report.

Site Stratigraphy

Overall, the deposits exposed by BHT 141 were notable for the thickness of the Stratum 1 overburden, which extended to more than 1.2 m (4 ft) in depth across the entire length of the trench. Stratum 1 had several variants, including a massive upper churned gravelly deposit (containing construction debris, plastic, etc.) over a thin (15 cm thick, 6 in) basal deposit of hard, fine alluvially deposited sand (also containing plastic inclusions). However, all variations are believed to be associated with building demolition and post-demolition activities occurring at LA 149910 during the mid- to late twentieth century. A deep trench window excavated at the

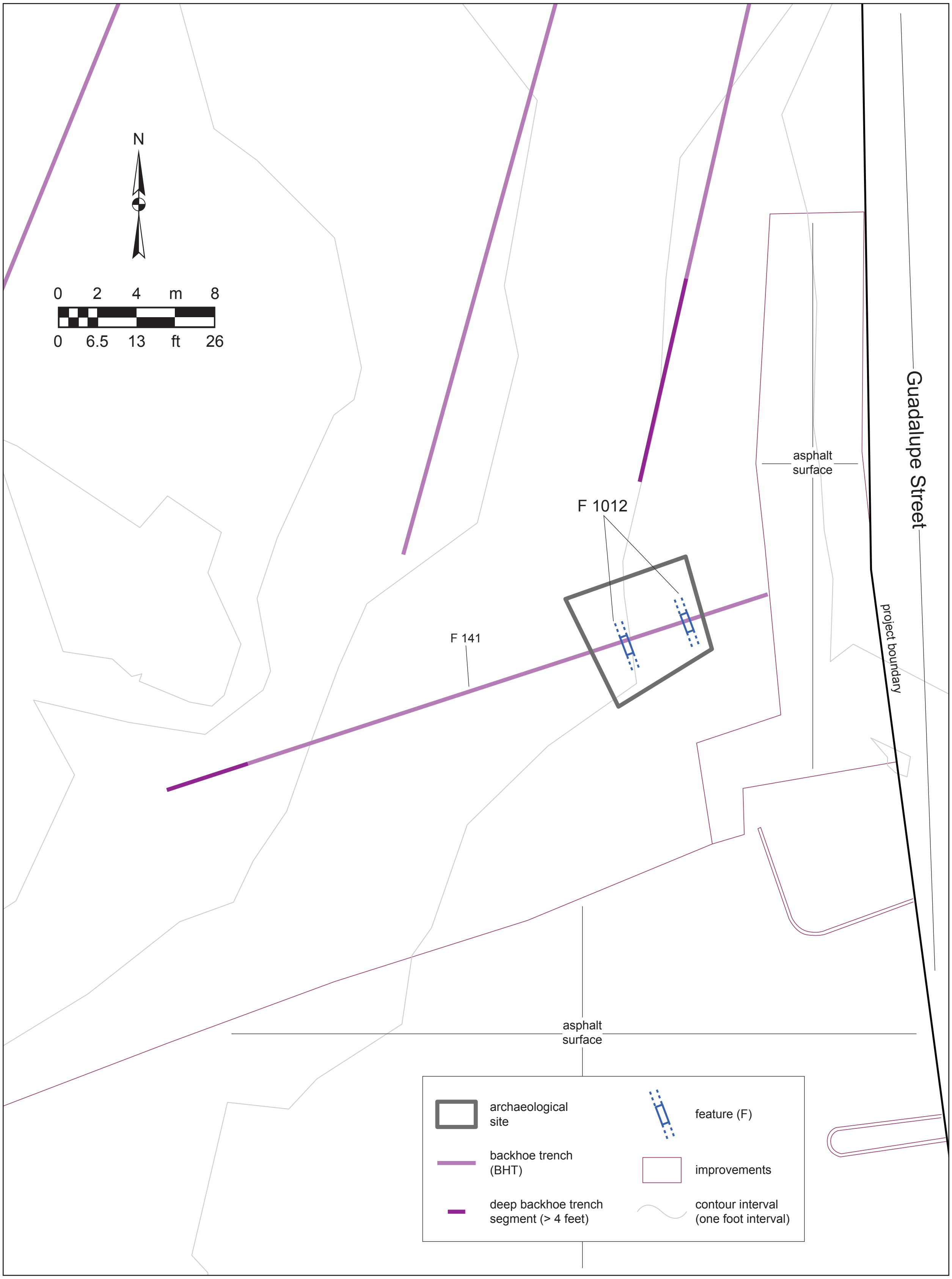


Figure 6.16. LA 149910, site map.

Figure 6.17. LA 149910, BHT 141, Feature 1012, concrete building foundations.

western end of the trench (Fig. 6.16) revealed that the Stratum 1 extended to 1.33 m (4.4 ft) below the modern parking lot surface. Below that, Stratum 2, extended to 1.63 m (5.3 ft) below the surface, at which point an intact, 90 cm (3 ft) thick deposit of sterile Stratum 3 was observed overlying intact Stratum 5. Detailed descriptions of these strata are provided in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature Descriptions

Feature 1012. Two form-poured concrete foundation alignments were exposed in the trench base (Fig. 6.17), apparently representing the western and eastern footers for the walls of a building. These walls extended out of the trench an unknown distance to the north and south. The interior faces of the footer walls were spaced 3 m (10 ft) apart and each wall measured 30 cm (1 ft) in width. Although about 5–10 cm of the tops of the footers was exposed during excavation, the ultimate height and depth of the foundations remains undetermined. The tops of the walls were buried under modern Stratum 1 overburden to a depth of 1.2 m (4 ft). The interior and exterior of Feature 1012 was further filled and covered with Stratum 1 and the depth of any intact or associated historical deposits within or adjacent to the feature could not be determined in the present trench excavation.

The thickness and overall depth of the combined modern and historical overburden deposits in this trench prevented the full exposure of Feature 1012, but it appears likely that the building foundations are associated with a historical ground surface associated with Stratum 2 deposits underlying the modern overburden.

Summary

Archival evidence suggests that poured-concrete foundations found at LA 144910 represent a building constructed not long before 1930. This qualifies the site as historic for NRHP consideration. However, no intact cultural deposits associated with the building were encountered. Beyond confirming the archival documentation of a structure in this

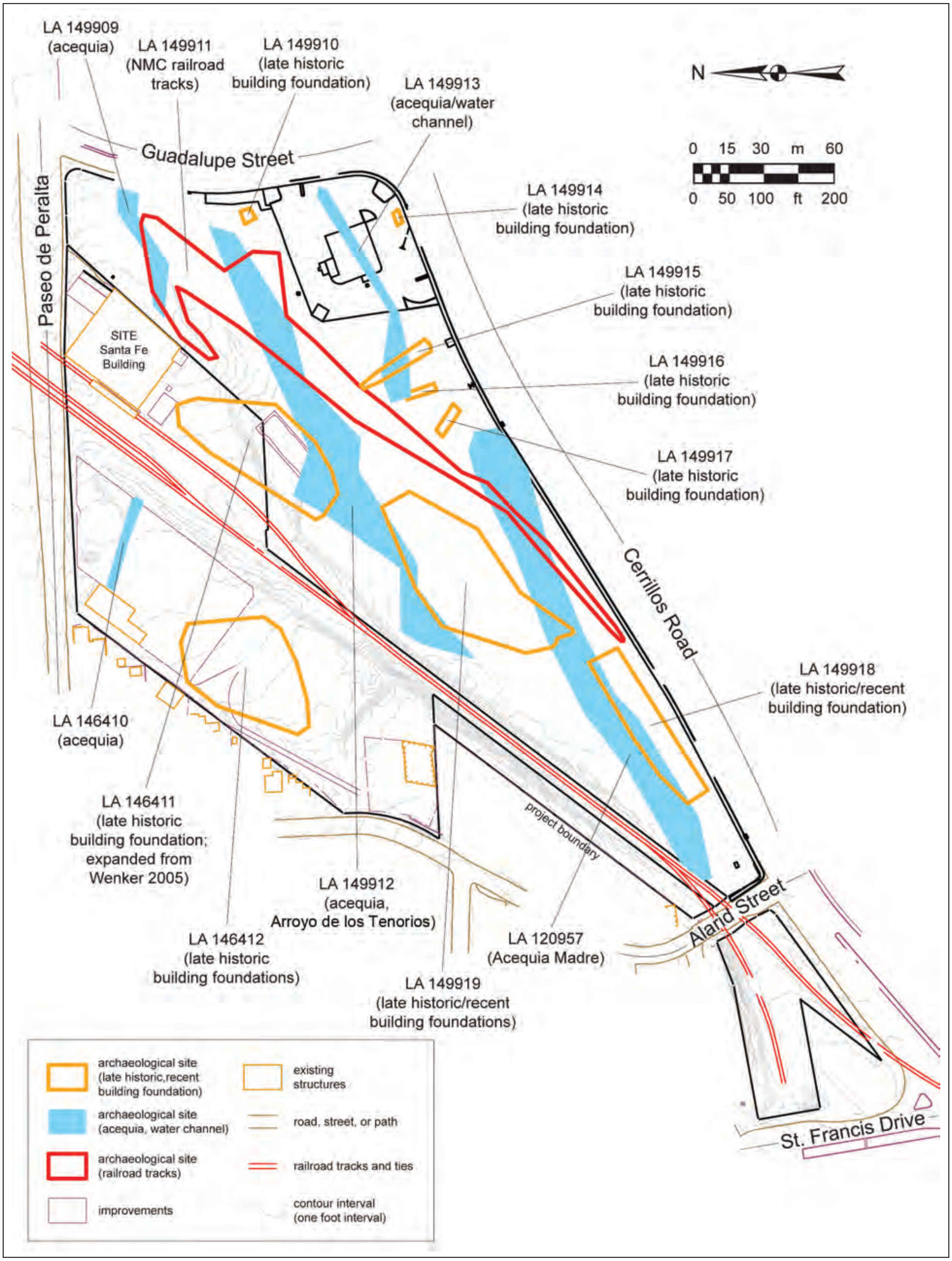


Figure 6.18. Map of the South Guadalupe Railyard Park area showing locations of identified archaeological sites and acequias.

area, the potential for the physical remains of this building to contain additional interpretively significant information is very low. This site was recommended was being "ineligible" for the NRHP (Wenker 2005b:43). HPD and ARC concurred with this recommendation and no further archaeological investigation was conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149914

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 149914 is small historic site was composed of the buried remnants of a poured-concrete building foundation and a second rock wall of modern origin (Figs. 6.19, 6.20, 6.21). No intact deposits were associated with the historical foundation. The modern overburden that filled and capped the foundation appears to be related to demolition or post-demolition activities. However, the foundation may be related to the Santa Fe Creamery and Ice Company, which was built sometime before January 1930.

Site Location

LA 149914 was located in the southeastern corner of the Railyard Park parcel (Figs. 6.18, 6.19) at the northwest corner of Cerrillos Road and Guadalupe Street. The southern site boundary was less than 6 m (20 ft) from the sidewalk. The known extent of the site measures roughly 3 by 7 m (10 by 23 ft) across.

Archival Research

On the January 1930 Sanborn map, a long, narrow, rectangular building, oriented roughly north–northwest by south–southeast, is depicted in a location approximately 6 m (20 ft) to the north of LA 149914 although the vagaries of overlaying historical maps on modern maps may account for some spatial errors (Fig. 4.28). The building is simply labeled "VEND." and is located on the same lot as the Santa Fe Creamery and Ice Company (722 Cerrillos Road), which may indicate that it was a retail outlet for the creamery. A second, square building is also illustrated on the January 1930 Sanborn map, roughly 3 m (10 ft) to the west of the site. This building, which occupies the lot to the west of the creamery, is labeled as a "State Engineer Dept. W. Ho." (warehouse). Possible structures are also visible in this location on the 1936 aerial photograph, but interestingly, no structures are illustrated in this location on the August 1948 Sanborn map, or on any subsequent aerial photographs. Given the apparent north-northwest by south-southeast orientation of Feature 1036, it seems most likely that this foundation represents the possible vendor building related to the creamery.

Excavation Sequence

At LA 149914, deeply buried building foundation (Feature 1036) and a modern rock wall (Feature 1037) were exposed in a single 15 m (50 ft) long backhoe trench (BHT 153). Stratigraphy and archaeological deposits were recorded in profile (Fig. 6.20). In accordance with project guidelines, trench fill was not screened and no artifacts were collected. Project excavation guidelines are discussed in the "Field Excavation Methods and Procedures" section in Chapter 1 of this report

Site Stratigraphy

A 60 to 80 cm (2 to 2.5 ft) thick mantle of Stratum 1 was separated from an underlying 50 to 60 cm (1.8 to 2 ft) layer of Stratum 2 by a thin layer of asphalt (< 5 cm thick). These strata surrounded both Features 1036 and 1037 and are associated with mid- to late twentieth-century demolition and post-demolition activities (Fig. 6.20). Detailed stratum descriptions of overburden are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Underlying these deposits was Stratum 1003, believed to be buried historic topsoil. This stratum is discussed below with Feature 1036.

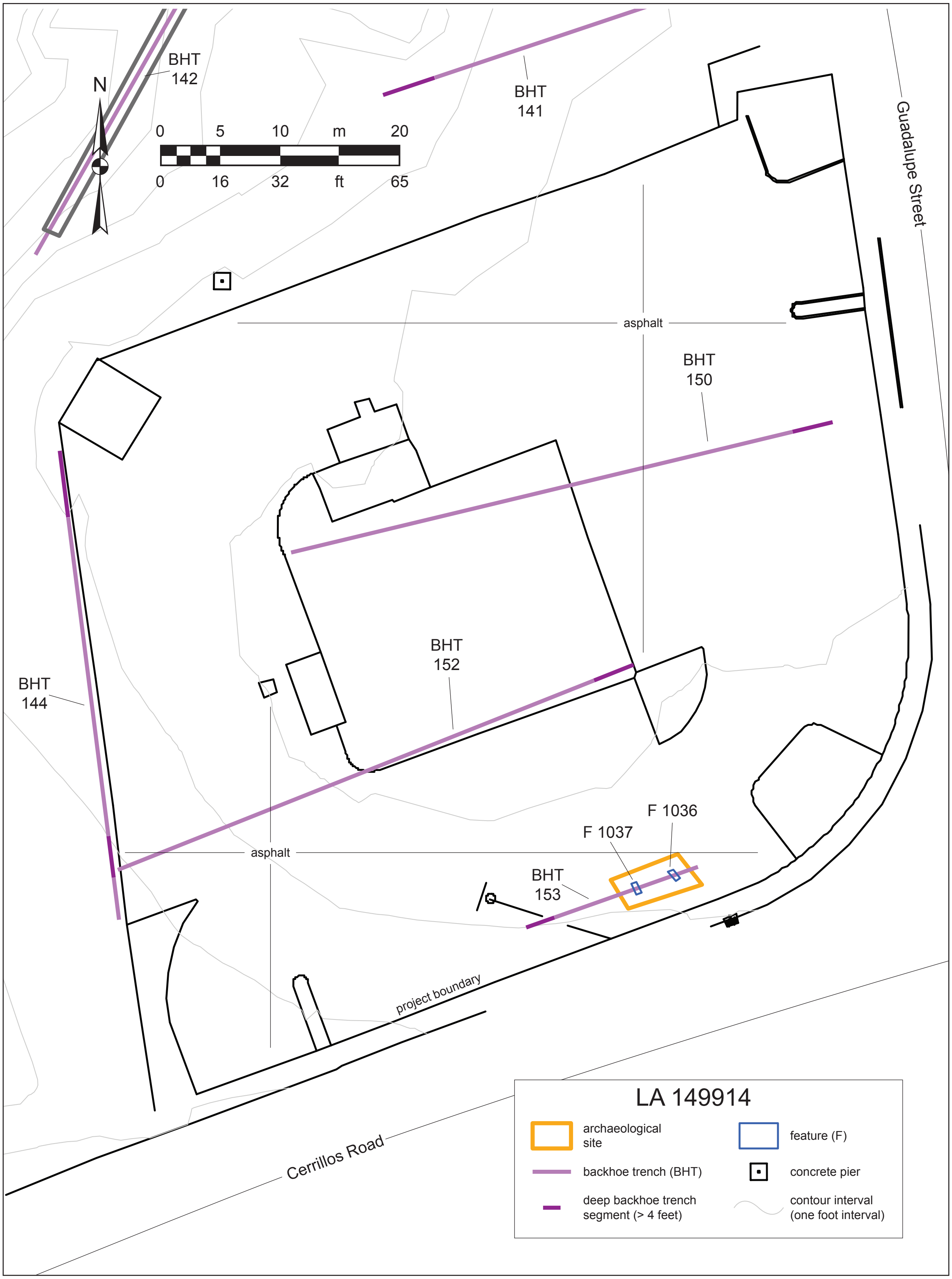


Figure 6.19. LA 149914, site map.

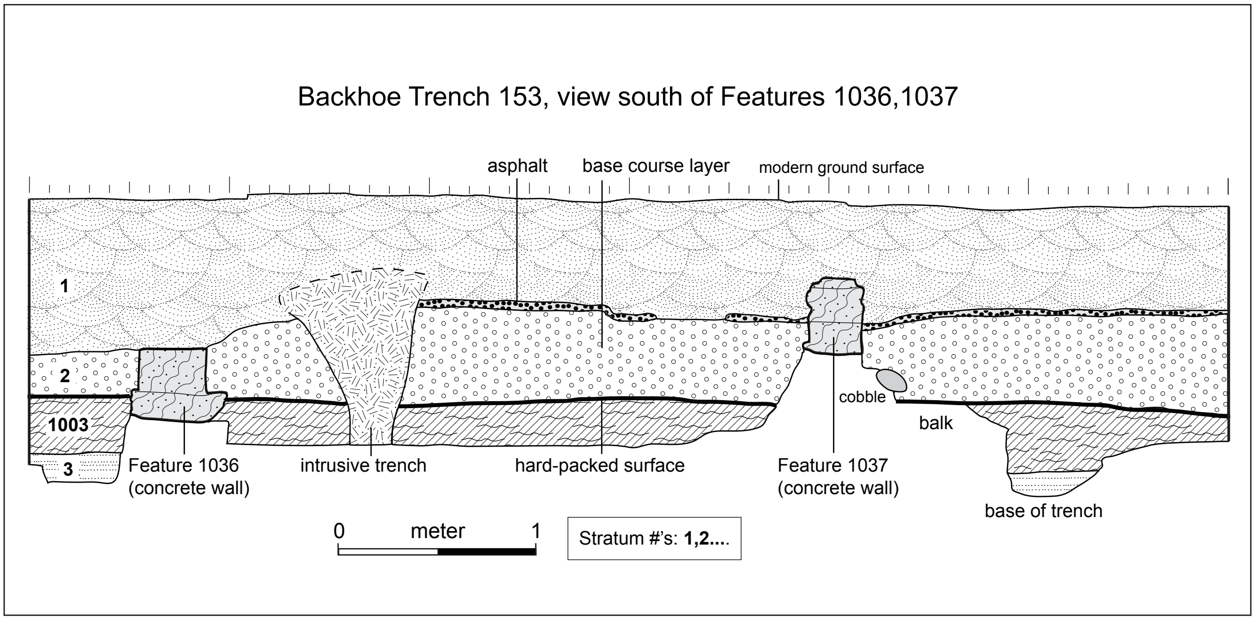


Figure 6.20. LA 149914, BHT 153, Features 1036 and 1037.

Figure 6.21. LA 149914, BHT 153, Feature 1037 (center) and Feature 1036 (upper left).

Feature Descriptions

Two buried walls were encountered during testing (Figs. 6.19, 6.21) of LA 149914. Both were relatively modern, consisting of a concrete foundation and a cobble wall installed in recently deposited Stratum 2. Both are discussed below.

Feature 1036. Feature 1036 was a single foundation wall that extended to the north-northwest and south-southeast, beyond the edges of the backhoe trench. The top and sides were fully exposed in the base of the trench (Figs. 6.20, 6.21). This form-poured concrete feature, presumably the footer for the wall of a building, exhibited a floated top and sides. The square top measured 30 cm (1 ft) in width and rose 20 cm (8 in) above a concrete lip that marked the level of a slightly wider footer trench (roughly 50 cm [1.6 ft] wide and 15 cm [6 in] deep), into which the base of the foundation was poured. The footer trench had been excavated into the top of an underlying deposit of Stratum 1003, a brown clay loam that may represent a possible buried historical topsoil deposit. It was capped by a 20 cm (8 in) thick deposit of Stratum 2 historical overburden, which also mostly buried the foundation, all of which was then covered by 70 cm of modern Stratum 1 material. On both sides of the foundation wall, the contact between Stratum 1003 and the overlying Stratum 2 was marked a by a 2 to 5 cm (1 to 2 in) thick deposit of hard, dark gray laminated silt, which also matched the level of the concrete lip of the footer. This thin sediment lens may represent a remnant of the historic ground or occupation surface associated with Feature 1036. No plate bolts or other fixtures were present in the foundation. It is unknown if this wall is the eastern or western wall of the building.

Feature 1037. Feature 1037 was also a wall, 33 cm (13 in) in width and 39 cm (15 in) high, made of small river-worn cobbles mortared with cement (Fig. 6.21). This feature had also been built in a footer trench, but the trench originated at the top of Stratum 2, and the wall was itself buried by Stratum 1 (Fig. 6.20). This stratigraphic and construction sequence indicates that Feature 1037 is modern, perhaps part of a landscaping or parking feature. This feature is not considered further.

Summary

LA 149914's Feature 1037 likely dates to the mid- to late twentieth century and is of little or no archaeological value. Feature 1038 can be associated with the Santa Fe Creamery and Ice Company established at 722 Cerrillos Road prior to January 1930 and does constitute a historical cultural resource, as defined by the NRHP. However, beyond confirming the archival documentation of a structure in this area, the potential for the physical remains of this site to contain additional interpretively significant information is very low. This site was recommended as being "ineligible" for the NRHP (Wenker 2005b:45). ARC and HPD concurred with this assessment and no further archaeological investigation was conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149916

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

Based upon archival research, LA 149916 was presumably related to the Sinclair Bulk Oil Station, the later R. P. McKnight Distributor Station, or both. The site consisted of the buried remnants of a poured-concrete building foundation and a set of concrete foundation piers (Figs. 6.22, 6.23, 6.24). City of Santa Fe Sanborn Fire Insurance Maps indicate that the Sinclair Station was in operation by 1930. The modern overburden that capped the architectural elements was presumably associated with demolition or post-demolition activities.

Site Location

Located approximately 55 meters southwest of the Cerrillos Road and Guadalupe Street intersection,

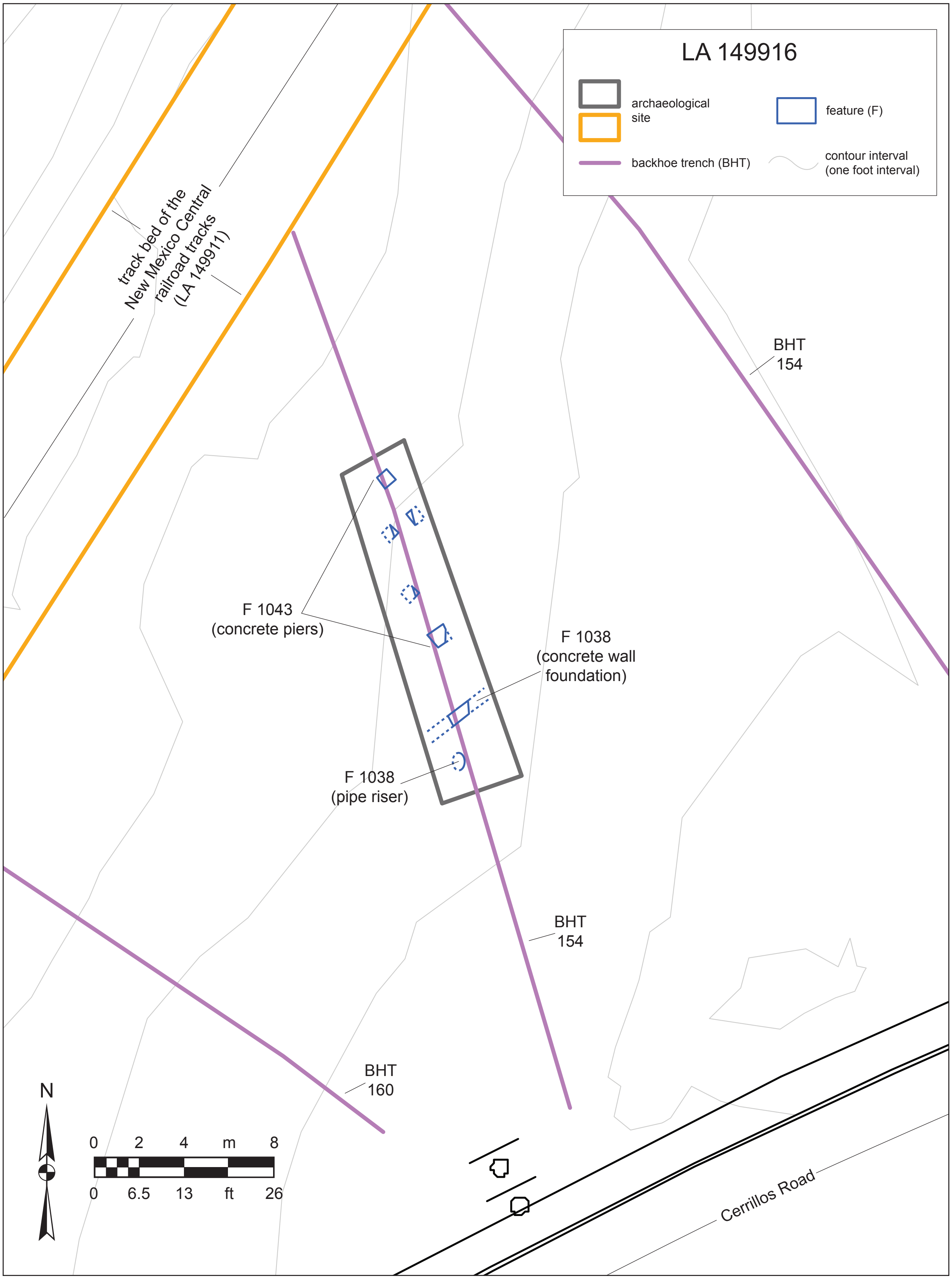


Figure 6.22. LA 149916, site map.

Figure 6.23. LA 149916, Feature 1038, from the south. A concrete pipe riser lies in the left foreground; a concrete wall foundation crosses through the center; concrete piers extend down the trench.

Figure 6.24. LA 149916, Feature 1038, from the north. The array of concrete piers occupies the foreground and the concrete wall foundation is visible in the background.

LA 149916 was located southeast of LA 149911 and was along the southeastern edge of the Park parcel within the 736 or 740 Cerrillos Road city lots (Figs. 6.18, 6.22). Site boundaries were roughly 4 by 16 m (13 by 52 ft) across.

Archival Research

Both the 1930 and 1948 Sanborn maps depict the "Sinclair Oil Co. Bulk Stat'n" (bulk station) at 740 Cerrillos Road (Fig. 4.28). One of the buildings on this lot, an "Oil Ho. (house)," overlaps the northern end of LA 149916 site. The pre-1951 aerial photograph indicates a slightly enlarged structure at this location, and by the 1960 aerial photograph, the structure has expanded to overlap most of the features identified at this site. In the 1960 city directory (Hudspeth 1960), no business is listed at 740 Cerrillos Road. However, an R. P. McKnight Distributor Station, the source of Gulf Oil Products, was listed on the adjacent 736 Cerrillos Road lot. This may be the building depicted on the 1960 aerial photograph. The date of this building's demolition remains unknown.

Excavation Sequence

LA 149916 comprised a cluster of architectural elements that appears to represent one or two adjacent structures, one of which may have been a building (Fig. 6.22). The various features were identified with a single number (Feature 1038), and the site was exposed in a single backhoe trench (BHT 154). Several artifacts collected from BHT 154's backdirt may be related to this site (Table 6.5), or to the underlying alluvial channel, designated LA 149913, just to the north in the same trench (Fig. 4.19). Complete building dimensions were not exposed. BHT 151, approximately 14 m to the northeast did not expose any architectural elements.

Site Stratigraphy

Concrete foundations were covered by Stratum 1, a mixed twentieth-century fill presumably associated with demolition and post-demolition activities. Stratum 1003, a possible buried historical topsoil deposit, was also found in association with Feature 1038. It is described below in the Feature 1038 discussion. Strata are described in the general "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature 1038

Feature 1038 at LA 149916 was a series of foundations, concrete piers, and ceramic pipe that formed the same structural complex (Figs. 6.23, 6.24). The building was manufactured using modern construction techniques, and uniform feature dimensions are reported as a group below. As previously mentioned, the foundation remnant may have been associated with either the Sinclair Bulk Oil or the R. P. McKnight Distributor Station.

Foundation

The southern end of the structural array was marked by a foundation wall that crossed east–west across the trench (Figs. 6.23, 6.24). The wall consisted of a concrete footer, which was made up of a 60 cm (2 ft) wide by 50 cm (1.6 ft) high form-poured wall overlying a 1.05 m (3.4 ft) wide, 10 cm (4 in) thick basal concrete apron that appears to have been poured into the bottom of a shallowly excavated footer trench. A single course of cement-mortared cinder blocks was bonded to the top of the concrete footer. Based on mortar adhesions, additional courses of blocks were evidently once affixed to the top of this wall remnant. The footer trench for this wall had been dug about 10 cm into the top of a Stratum 1003 deposit (a charcoal-flecked brown clay loam, 30–40 cm thick in this area, underlain by Stratum 3). The shallow footer trench and the sides of the concrete footer were then encased in historical Stratum 2 material, and modern Stratum 1 capped the course of cinder blocks. No complementary wall was located to the north or south in this trench.

Plumbing

One meter (3.3 ft) south of the footer wall, at the level of the base of the wall, a concrete mass was observed around a clay sewer pipe riser, which may represent a sewer clean-out pipe related to the structure. The presence of this plumbing outlet south of the wall strongly indicates that this area represents the exterior of the wall.

Concrete piers

From a point starting 2.9 m (9.5 ft) north of the concrete wall, a series of five poured concrete piers occupied the trench. Only the southern and northernmost piers were substantially exposed in the trench itself, the three middle piers were only partially exposed in the trench walls. The piers, spaced roughly 2.3 m (7.5 ft) apart along the trench axis, spanned an overall north–west distance of 8.2 m (27 ft), but the full east–west extent of the array of piers remains unknown. The bed of the NMC railroad tracks crosses roughly 10 m (33 ft) to the northwest of the northernmost pier. The exposed portions of the piers indicate that each consisted of a 60 cm (2 ft) square, 10 cm (4 in) thick concrete footer that was poured into a shallow footer pit excavated into the Stratum 1003 substrate. Each pier then had a 30 cm square, form-poured (possibly pre-cast) concrete pillar attached to the top. The pillar on the southernmost pier measured at least 35 cm (1.1 ft) in height, but its top was fractured and the actual height could not be determined. The pillars on the other piers were either missing or were not exposed in the trench.

Construction Sequence

The tops of both the footers and the sides and tops of the pillars were encased in Stratum 1 modern fill, indicating that these piers were exposed during their use and were only buried under fill after their abandonment sometime in the modern period. The spacing and orientation of the exposed piers suggests that at least two, and possibly three, rows of piers were oriented along north-northwest by south-southeast axes, but the ultimate configuration of this array remains undetermined and the type of structure that it supported is unknown. The relationship of the piers to the footer wall is also unclear; if the piers were located in an intramural space (as suggested by the sewer clean-out, above), then the northern wall of the building was either not located, it was destroyed, or the building did not have an enclosed northern side.

Summary

The structural elements at LA 149916 may have been fabricated prior to 1930 and could have been associated with the Sinclair Bulk Oil Station, the later R. P. McKnight Distributor Station, or both. However, the previous documentation of this comparatively recent structure lead OAS to conclude that beyond confirming the archival documentation of a structure in this area, the potential for the physical remains of this site to contain additional interpretively significant information was very low. This site was recommended as being “ineligible” for the NRHP (Wenker 2005b:45). Both HPD and ARC agreed with this determination and no further archaeological investigations were conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149917

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 149917 was a small historical site that included the buried remnants of a poured-concrete building foundation and a set of concrete foundation pads (Figs. 6.26, 6.27, 6.28, 6.29). No apparent intact deposits were associated with these historical structure foundations and modern overburden that filled and capped these structural elements substantially compromised the site integrity. Based upon archival maps, the foundation was likely related to either the Sinclair Oil Bulk Station at 740 Cerrillos Road or L. E. Meyer Contractor Co., a plumbing company located at 750 Cerrillos Road.

Site Location

Located along the northeast margin of the Baca Street parcel, LA 149917 was approximately 10 m northwest of Cerrillos Road and was located south of LA149916 (Fig. 6.18). The bed of the NMC railroad tracks crossed roughly 8 m (26 ft) from the northwestern most (nearest) structural element. The known extent of the site measured roughly 5 by 15 m (16 by 49 ft) is size (Fig. 6.26).

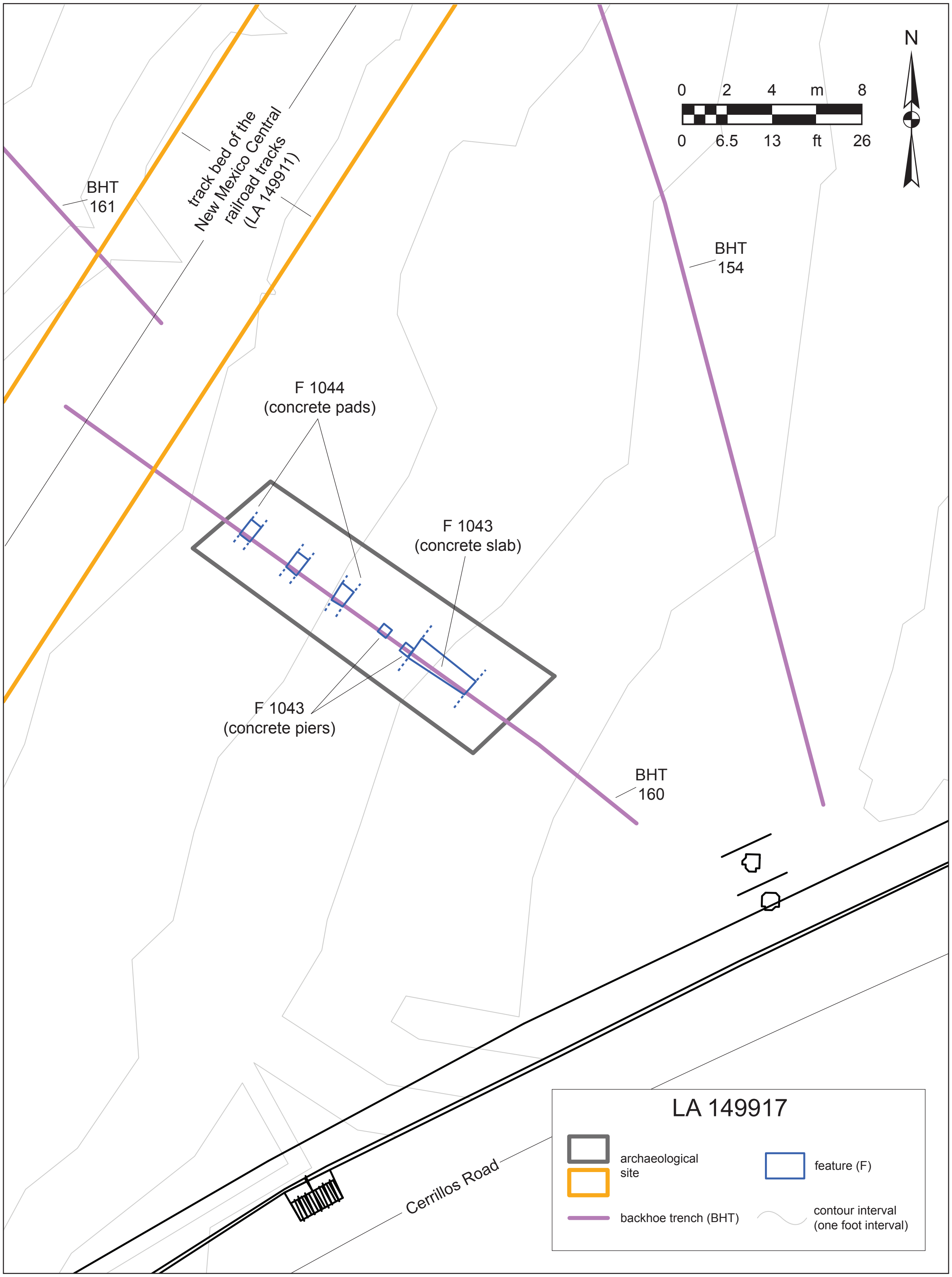


Figure 6.26. LA 149917, site map.

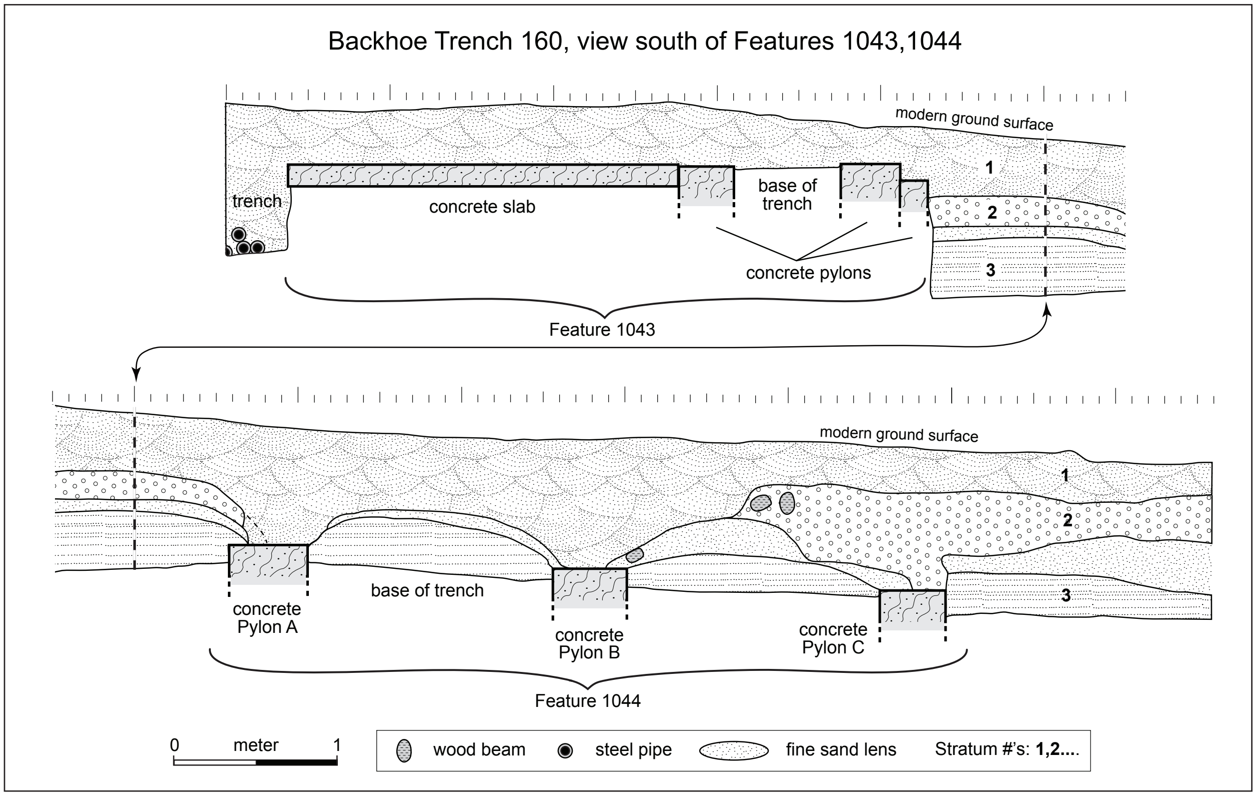


Figure 6.27. LA 149917, BHT 160, Features 1043 and 1044.

Figure 6.28. LA 149917, BHT 160, Feature 1043. Note two square piers to the upper right of the large concrete slab in the center.

Figure 6.29. LA 149917, BHT 160, Feature 1044.

Archival Research

Both the January 1930 and August 1948 Sanborn maps depict the "Sinclair Oil Co. Bulk Stat'n" (bulk station) at 740 Cerrillos Road. The oil station included a set of "Steel Tks. on Conc. Piers, Total Capcy 45,000 Gals." The location of these tanks, in the northwestern corner of the property, overlaps with the northern end of LA 149917 in the area of Feature 1044 (Fig. 4.28). Later, the pre-1951 aerial photograph indicates that a new, much larger building had been erected over the earlier steel tanks. By the 1960, aerial photography shows this structure has expanded to encompass all of LA 149917. The street address of this larger, post-1951 building is not known (but must lie between 740 and 760 Cerrillos Road). In the 1960 city directory (Hudspeth 1960), the L. E. Meyer Contractor Co. (a plumbing contractor) operated at 750 Cerrillos Road. This may represent the building on the aerial photographs. The date of this building's demolition remains unknown.

Excavation Sequence

Two separate features at LA 149917, one of which may have been a building, were identified in a single backhoe trench (BHT 160) along the southeastern edge of the Park parcel (Figs. 6.18, 6.26). The foundations were exposed and recorded in accordance with project guidelines discussed in the "Field Excavation Methods and Procedures" section in Chapter 1 of this report. Fill from redeposited contexts was not screened and artifacts were not collected.

Site Stratigraphy

Site stratigraphy at LA 149917 was consistent with that recorded throughout the project area. Concrete foundations were installed into Stratum 2 fill and covered by a 40 cm thick of Stratum 1, modern overburden (Fig. 6.27). The modern overburden (Stratum 1) that filled and capped the foundations was presumably associated with demolition and post demolition activities. Detailed descriptions of natural and cultural strata are discussed in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature Descriptions

LA 149917 consisted of a cluster of architectural elements that appeared to represent one or two adjacent structures, one of which may have been a building (Fig. 6.26). The southern end of the structural array was marked by a large, flat-lying poured-concrete slab with two associated concrete piers (all assigned to Feature 1043; Figures 6.27, 6.28). Three concrete pads assigned to Feature 1044 were located north of Feature 1043, adjacent and in an alignment perpendicular to the railroad tracks.

Feature 1043. The 10 cm (4 in) thick slab, which measured 3 m (10 ft) long in the northwest-to-southeast-oriented trench, extended beyond the edges of the trench an unknown distance to the northeast and southwest. This slab had been constructed atop a 35 cm (1.1 ft) thick layer of historical Stratum 2 overburden deposits, and it was buried under 40 cm of modern Stratum 1 material.

One square, poured-concrete pier was abutted to the northwestern margin of the slab, and a second similar pier lay 80 cm (2.6 ft) to the northwest. Each of these piers measured 45 cm (1.5 ft) square and was at least 13 cm (5 in) high. The tops of the piers were flush with the level of the pad to the south, and each exhibited a short bar of angle iron protruding from the top. The trench exposure also revealed that the northwestern edge of the northern pier possessed a 10 cm (4 in) thick basal concrete apron that extended horizontally an additional 22 cm, indicating that these piers had probably been poured, in-place, into large, shallow footer pits. The large, smooth-surfaced pad may have served as an interior floor surface, indicating that this part of the feature may represent a building location. The piers are spatially related to this possible building pad, but their function remains undetermined.

Feature 1044. From a point starting about 2 m (6.6 ft) northwest of the northern pier, a series of three poured concrete pads (identified together as Feature 1044) occupied the trench (Fig. 6.29). These pads measured about 60 cm (2 ft) across and 37 cm in thickness, and were spaced roughly 1.9 m (6.2 ft) apart along the trench axis, spanning an overall northwest-southeast distance of 5.5 m (18 ft). The full southwest-northeast dimensions of the pads remain unknown because they extended beyond the edges of the trench walls. As illustrated in Figure 6.27, the pads were installed (probably poured) into pits excavated into sterile Stratum 3 substrate, and their upper surfaces dropped consistently in elevation from the southeast to the northwest. The top of the northwestern pad lay roughly 33 cm (13 in) lower than that of the southeastern pad, and the top of the southeastern pad lay about 85 cm (2.8 ft) below the level of the Feature 1043 slab and piers farther to the southeast. The bed of the NMC railroad tracks crossed roughly 8 m (26 ft) to the northwest of the northwestern pad, and both the Feature 1043 and 1044 structural elements are aligned with the old railroad tracks (Fig. 6.26).

Summary

The ultimate configuration of the Feature 1044 pads at LA 149917 remains undetermined, and the type of structure that they supported is unknown. The temporal and functional relationship of the Feature 1044 pads to the slab and piers of Feature 1043 is also unclear. Archival evidence suggests the earliest construction at 740 Cerrillos Road began not long before ca. 1930, placing this site in the realm of consideration as a historical cultural resource (as defined by the NRHP 50-year-old criterion). However, some if not all features documented through archaeological testing may not exceed the ARC 75-year threshold. Beyond confirming the archival documentation of a structure in this area, the potential for the physical remains of this site to contain additional interpretively significant information is very low. This site was recommended as being "ineligible" for the NRHP (Wenker 2005b:46). Both HPD and ARC concurred with this evaluation. No further archaeological investigations of the site was conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149919

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

This historical site included two poured-concrete structural foundations, a poured-concrete slab, a set of concrete foundation piers, a cinder-block wall segment, an isolated concrete pier, and three nondescript pits (Fig. 6.30, 6.31, 6.32). No apparent intact cultural deposits were associated with these foundations and the modern overburden that filled and caped the foundations substantially compromised the site integrity. The postulated earliest construction date for these features is sometime after August 1948.

Site Location

LA 149919 was located in the southeast section of the Baca Street Railyard parcel (Fig. 6.18). The site was flanked to the north by the Arroyo de los Tenorios (LA 149912) and to the south by the Acequia Madre (LA 120957). Site boundaries measured about 42 by 110 m (138 by 361 ft) across, oriented to the northwest along its longest dimension.

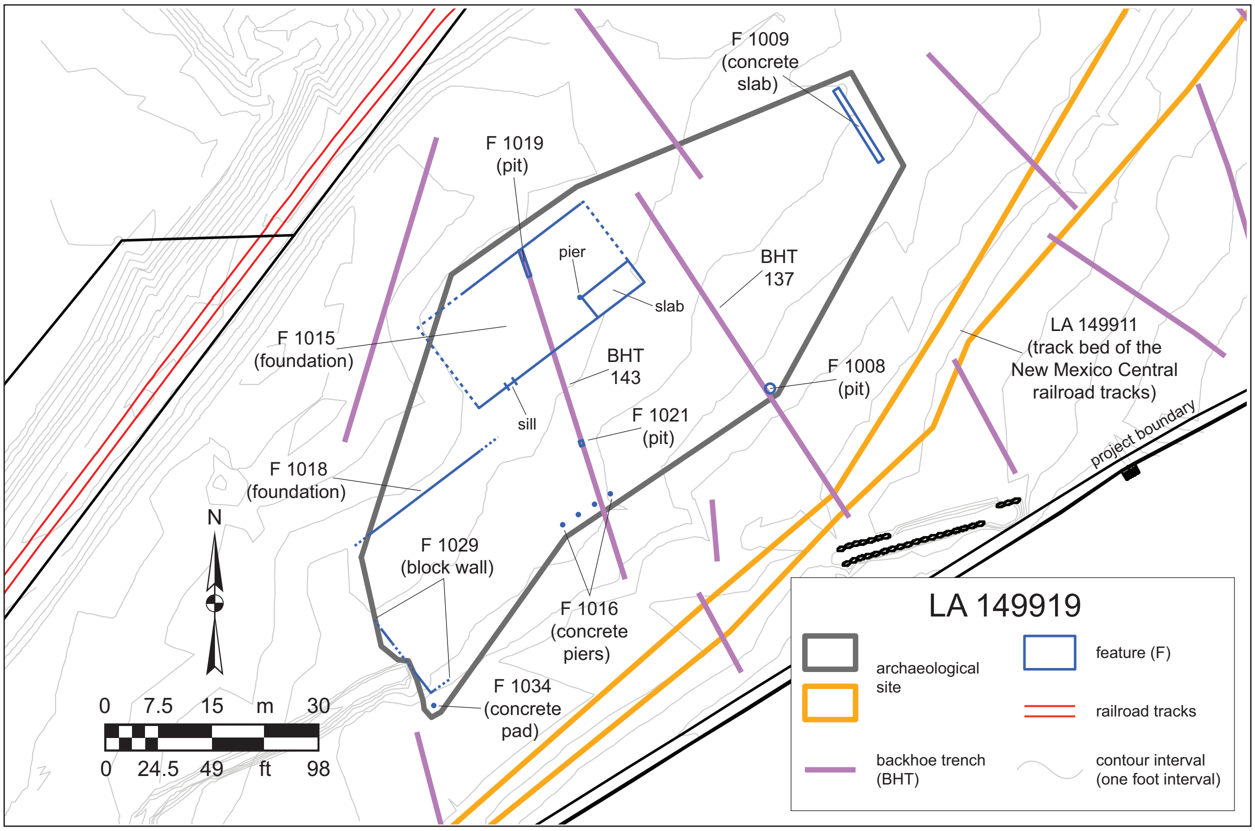


Figure 6.30. LA 149919, site map.

Figure 6.31. LA 149919, Feature 1015, view of the concrete slab in the southeastern corner.

Figure 6.32. LA 149919, Feature 1029 (cinder-block wall) and Feature 1034 (concrete pad, in foreground). An outlet culvert of the Acequia Madre lies in the upper left.

Archival Research

The 1936 aerial photograph does not clearly indicate any structures in or near LA 149919 and no historic buildings or structures are depicted at the site location on any of the Sanborn Fire Insurance maps including the August 1948 revision to the 1930 Santa Fe map. It is not until the pre-1951 photograph that a possible structure overlapping the area of Feature 1016 is visible (Fig. 4.28). The 1960 photograph shows a massive structural complex, possibly consisting of two adjacent buildings or roofed areas. These areas overlap with Features 1015 and 1018, and may abut the Feature 1029 alignment (Fig. 6.30). The functions of these relatively recent structures or buildings remain unknown. However, it appears that construction of the complex did not begin until the late 1940s or early 1950s followed by major development sometime after 1951.

Excavation Sequence

All architectural features were visible on the modern surface and were mapped and recorded according to project guidelines (Fig. 6.30). Pits were located during the excavation of two backhoe trenches (BHTs 137, 143). Pits were recorded in profile but no artifacts were recovered.

Site Sratigraphy

Three strata (Stratum 1, 4, and 5) were documented at LA 149919. These strata were consistent with stratigraphy recorded throughout the project area and are summarized in the Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Stratum 1, modern overburden, was approximately 20 cm thick. Stratum 4, sterile substrate, was located directly beneath Stratum 1 and was at least 1.2 m thick disappearing into the trench base. A 20 cm thick lens of Stratum 5 was also observed in BHT 143.

Feature Descriptions

An array of architectural features was made of concrete and of cinderblock. Features are summarized below in Table 6.6. Features included two building foundations, two wall alignments, and a series of concrete slabs and piers, as well as three pits (Fig. 6.30).

Architectural Features

Feature 1009. Feature 1009 consisted of an elongated, rectangular, poured-concrete slab that measured about 0.82 by 12.2 m (2.7 by 40 ft) across. This slab was not clearly associated with any other structural remains, and its function remains unclear.

Feature 1015. Feature 1015 represents the largest, most intact structural feature at this site. This poured-concrete foundation was of the remnant of the northern, southern, and eastern walls of a long rectangular building that measured 30.7 m northeast/southwest by 15.5 m (101 by 51 ft) across. The wall measured about 15 cm (6 in) in width. Although the fractured top of parts of the wall extended up to 10 cm (4 in) above the ground surface in places, the original wall height remains undetermined. The western end of the southern wall was fractured and slightly displaced, but the corner marking the intersection of the southern and western walls was still present, indicating that the full dimensions of the building are accurately recorded even though the western wall was destroyed. A 1.25 m wide (49 in) opening for a door sill was incorporated into the southern wall about 6 m (20 ft) from the western end. The southeastern corner of the building was occupied by a poured concrete slab measuring about 4 by 8.7 m (13.1 by 28.5 ft) across (Fig. 6.31). A 35 cm square (14 in) concrete pier abutted the northwestern corner of this slab. The slab may mark the location of an office or other internal partition of the building. No other interior floor or occupation surface was observed in BHT 143, indicating that the rest of the building possessed an earthen floor.

Feature 1016. Feature 1016 was a row of four small, poured-concrete piers. Each pier measured about 37 cm (15 in) square and 20 cm (8 in) in overall thickness. The piers had been poured into shallow footer pits excavated into the underlying sterile Stratum 4 substrate, and the tops were flush with the surrounding ground surface. Each pier exhibited a bar of 1.2 cm (1/2 in) rebar protruding from the top, and concrete adhesions on one pier indicated that concrete pillars may once have occupied the tops of the piers. The four piers were spaced about 2.7 m (8.9 ft) apart, spanning a total length of about 8.4 m (28 ft). The piers alone do not provide conclusive evidence as to their use, but dimensions and construction method suggest a large sign.

Feature 1018. Feature 1018 was a single poured-concrete wall foundation measuring 18.5 m (61 ft) in length. The wall measured about 20 cm (8 in) in width. Sections of the wall rose up to 15 cm (6 in) above the ground surface in places, but the original wall height remains unknown. The wall was discontinuous along its length due to post demolition damage, and both ends were fractured and missing, so the full eastern and western extent of the feature remains undetermined. Further, no other parallel or cross walls were observed anywhere around the extant wall.

Feature 1029. Feature 1029 was a cinder-block wall located directly above a culvert outlet of the Acequia Madre (Fig. 6.32). This discontinuous wall measured 11.5 m (38 ft) long and it consisted of a single course of cinder blocks mortared with cement, measuring 30 cm (1 ft) in width. The northern end of the wall was fractured and buried, and its full extent could not be determined. The southern end of the wall was marked by an intact corner with a remnant of the southern wall, which once extended to the east, but the full extent of the feature remains unknown. The wall crossed the Acequia Madre culvert opening, indicating that it post-dated the culvert installation and was probably of modern construction.

Feature 1034. Feature 1034 consisted of a single poured-concrete pad located just south of Feature 1029 (Fig. 6.32). This pad measured about 42 by 50 cm (1.4 by 1.6 ft) across, and rose 12 cm (5 in) above grade. A short length of 6 cm (2 3/8 in) in diameter steel pipe protruded from the top of the pad. This feature probably once served as a post or pole support, possibly for a fence.

Pit Features

Feature 1008. Feature 1008 was a relatively large, deep, straight-sided pit in BHT 137. It measured at least 1.3 m wide and 1.4 m deep. Part of the wall of the pit was lined with plywood, indicating a modern age for the pit, and it is not discussed further.

Feature 1019. Feature 1019 was a relatively large basin-shaped pit measuring at least 1.35 m in diameter and 0.48 m deep. Located in BHT 143, the feature underlay the northern wall of Feature 1015, a building foundation. The northern end of the Feature 1019 pit was not fully exposed, but the dearth of artifacts and the pit's location suggest that it may represent an over-excavated footer trench for the construction of Feature 1015's concrete walls.

Feature 1021. Feature 1021 was a small (0.76 m wide and 0.28 m deep), nondescript, basin-shaped pit of unknown age or function in BHT 143.

Summary

LA 149919 consisted of concrete foundations and well stubs remaining from buildings associated with commercial use of the property beginning in the late 1940s or early 1950s. This is considered a historical cultural resource, as defined by the NRHP, but does not appear to exceed the ARC 75-year threshold. Beyond confirming archival documentation that indicates structures were built in this area sometime after August 1948, the potential for the physical remains of these structures to contain additional interpretively significant information is exhausted. This site was recommended as "ineligible" for the NRHP (Wenker 2005b:46). ARC and HPD concurred with this assessment and no further archaeological investigation was conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 149918

Chris T. Wenker
revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

This historical site includes two poured concrete structural slabs and the buried remnants of a poured-concrete building foundation associated with a set of concrete foundation pads (Figs. 6.33, 6.34, 6.35). Based upon site location, it appears likely that these cultural features are related to the "Phillips Petroleum Co. Bulk Stat'n." at 784 Cerrillos Road. City of Santa Fe Sanborn Fire Insurance Maps indicate that the Phillips Station was in operation by 1930. However, no intact cultural deposits were found with these early twentieth-century historic structural elements. The modern overburden that filled and capped them reflects demolition and post-demolition activities.

Site Location

LA 149918 was located in the southeast corner of the Baca Street parcel (Fig. 6.18). The site measures roughly 18 by 82 m (59 ft NW/SE by 269 ft NE/SW) across. Its southeastern boundary is adjacent to Cerrillos Road. Archival maps suggest that most if not all of the site was once located within the 784 Cerrillos Road city lot.

Archival Research

Both the January 1930 and the August 1948 revision to the Sanborn 1930 City of Santa Fe Sanborn Fire Insurance map depict the "Phillips Petroleum Co. Bulk Stat'n." at 784 Cerrillos Road. The initial 1930s map depicts an "Oil Ho." (oil house) building, a pumping station, and three steel tanks for oil storage. By August of 1948, the complex had expanded to include a second oil house abutting the original "Oil Ho." building.

The pre-1951 and 1960 aerial photographs of the area (Fig. 4.28) indicate a sizeable structure in that

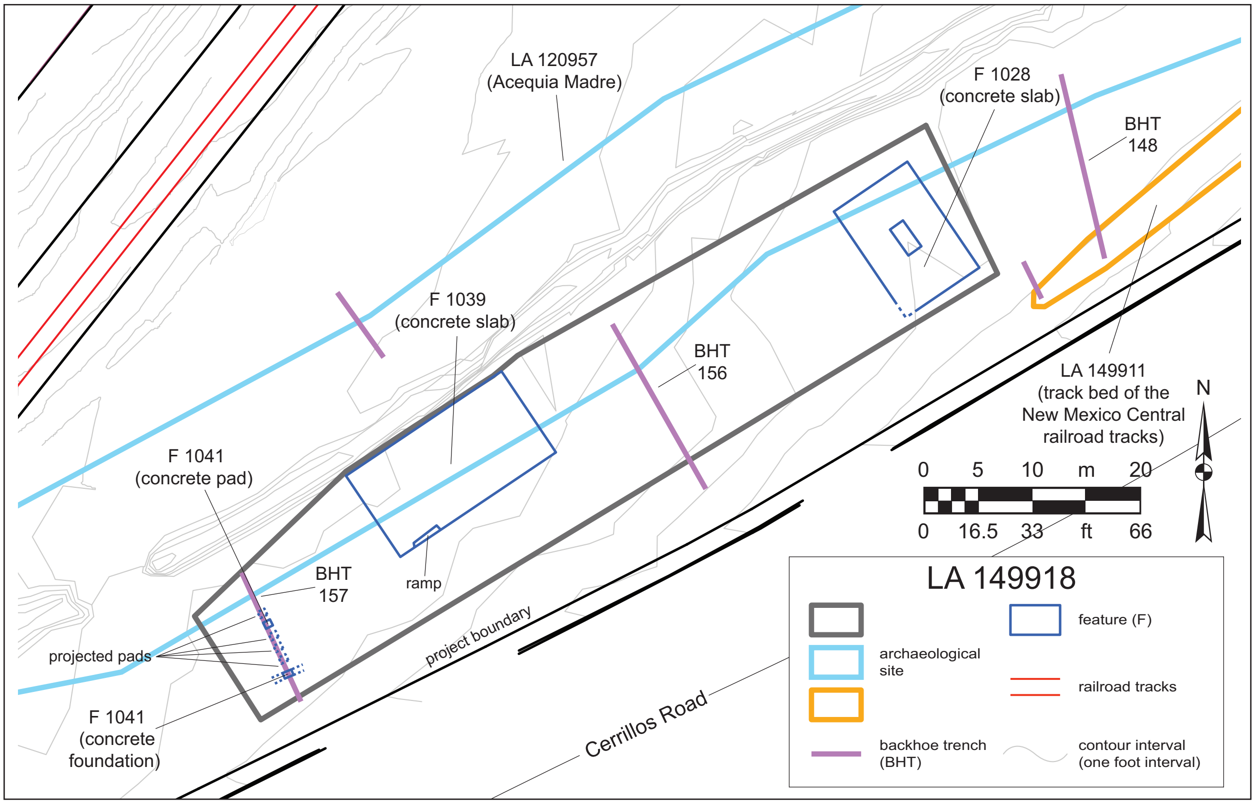


Figure 6.33. LA 149918, site map.

Figure 6.34. LA 149918, Feature 1028.

Figure 6.35. LA 149918, BHT 157, Feature 1041.

location depicting probable roof outlines in the areas of BHTs 156 and 157 (Fig. 6.33); Feature 1041 in BHT 157 probably represents one of these relatively recent structures. Nothing is apparent in either of the photographs in the Feature 1039 area.

The pre-1951 aerial photograph also indicates a structure in the area of Feature 1028, but no structure is obvious in the 1960 photograph (Fig. 4.28). Feature 1028 has been the subject of intensive soil contamination analysis in recent years. During the Dames & Moore (1995) soil-analysis fieldwork, six long, deep backhoe trenches were dug in and around the vicinity of Feature 1028 because it was suspected of having served as the pump island pad or platform overlying one of the three steel oil tanks. Several two-ft-square concrete footings were reported east of the pad at that time (although none were present during the current work), and a subterranean magnetic anomaly east of the pad was suggestive of an underground tank, but no other structural remains were reported. Six borings for the installation of monitoring wells have also been conducted around the site area. The site is still being monitored for water quality in the underlying aquifer.

Excavation Sequence

Feature 1041 was exposed in BHT 157 (Fig. 6.35). The other two features were visible on the modern surface. A second trench within the site boundary (BHT 156) did not contain material associated with this site.

Site Stratigraphy

No in situ cultural deposits were encountered in association with the documented features. Fill around the features consisted of a mix of late twentieth century materials and presumably represent deposits generated during the demolition of the structures or post-demolition processes. Natural site stratigraphy was typical of that reported in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures).

Feature Descriptions

This site includes three architectural features: two large poured-concrete slabs (Features 1028 and 1039) and a concrete foundation associated with a set of small concrete pads (Feature 1041; Fig. 6.33; Table 6.7).

Feature 1028. Feature 1028 occupied the northeastern end of the site (Fig. 6.34). This 8.5 by 12.2 m (27.8 by 40 ft) poured concrete slab exhibited a central, unpaved, rectangular hole measuring about 1.5 by 3 m across (4.9 by 10 ft). The southern corner of the slab was fractured and missing, revealing a lattice of 1.2 cm (1/2 in) rebar embedded in the concrete. A modern monitoring well occupied the central unpaved hole, but the original function of the feature remained unclear. The central hole suggested that the slab was not the floor of a building; this feature may have been an extramural space such as a fueling station or a platform for one of the steel storage tanks.

Feature 1039. Feature 1039, also a large poured-concrete slab, backed directly against the southern bank of the channel of the Acequia Madre (Fig. 6.33). The slab had been poured in forms, in two stages, to create a feature measuring 9.1 by 17.7 m (29.9 by 58 ft) across. A low, slightly raised ramp, sloping downward to the north, marked a 3 m (10 ft) long section of the southern wall. Wooden base plates were still affixed to part of the northwestern corner, indicating that this feature probably supported an enclosed building. The ramp indicates that the building probably allowed for vehicle access at the western end. A sheet of modern asphalt abutted and partially overlapped most of the southern edge of the structure, obscuring some portions of the foundation slab. Based upon its location, this slab is believed to represent the "Oil Ho." building depicted on the 1930 Sanborn Fire Insurance Map.

Feature 1041. Exposed in BHT 157, Feature 1041 was a near surface concrete foundation covered by 2 to 5 cm (1 to 2 in) of Stratum 1 overburden and duff. The southern end of this feature was marked by an east–west oriented, poured-concrete foundation wall (Fig. 6.35) that was 50 cm (1.6 ft) wide and only 6 cm (2.4 in) thick. This wall had been poured into a shallow footer trench that was excavated into the underlying sterile Stratum 3 substrate. No complementary wall was located to the north or south in this trench. From a point roughly 1 m (3.3 ft) north of the footer wall, at the level of the top of the wall, a series of five small poured-concrete pads was exposed in the trench, spaced at roughly 1 m intervals. Although most were accidentally removed during excavation, one of the pads remained in place (Fig. 6.35). Each of these flat-topped pads measured roughly 64 by 67 cm (25 by 26 in) across and were 20 cm (8 in) thick. The bottoms of the pads were irregular and the edges were lipped, indicating that the pads had been poured in place, into pits dug in the top of the Stratum 3 substrate immediately below the modern surface. The ultimate number and configuration of the pads in this area remains undetermined, and the type of structure that they supported is unknown. The temporal and functional relationship of the pads to the relatively insubstantial foundation wall to the south is also unclear, although the location, depth, and characteristics of the concrete suggest that they were all built and used concurrently. It is unclear as to which building, on the Sanborn Fire Insurance Maps, this feature represents. It is possible that these structural elements were added to the property after August of 1948.

Summary

LA 149918 contained the remnants of two poured concrete structural slabs and the buried remnants of a poured-concrete building foundation associated with a set of concrete foundation pads. These structural remnants were constructed using modern construction techniques and no intact historic deposits were encountered. Based upon archival research, features are associated with the "Phillips Petroleum Co. Bulk Stat'n." at 784 Cerrillos Road. Beyond confirming the archival documentation of a structure in this area, there is no potential for the physical remains of this site to contain any additionally interpretive information. This site was recommended as being "ineligible" for the NRHP (Wenker 2005b:46). Both HPD and ARC agreed with this determination and no further investigation was conducted. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

LA 153442

CHRIS T. WENKER
REVISED BY
JESSICA A. BADNER AND MATTHEW J. BARBOUR

INTRODUCTION

LA 153442 was a power-distribution line or telecommunications line that crossed through the central and northern end of the North Railyard (Fig. 6.36, 6.37). This site included the locations of 16 small transmission towers made of wooden poles (seven of which have been cut down and destroyed), which also each included wooden cross beams, a variety of glass, ceramic, and plastic threaded-pin-type insulators, as well as wire strung between some of the poles.

SITE LOCATION

The transmission line was roughly parallel to South Guadalupe Street and ran northward from approximately 100 m north of Cerrillos Road, across Paseo de Peralta and West Manhattan Avenue to the historical Patton Building south of Montezuma Avenue (Fig. 6.36). The line paralleled the west side of LA 153442, the AT&SF railroad tracks.

ARCHIVAL RESEARCH

Scheick et al. (2003) provide no maps or descriptions that illustrate the development of the railyard's power and telecommunications infrastructure. Regardless, both the original 1880 AT&SF depot and the second 1909 depot were certainly provided with telegraph lines. (Santa Fe's Fort Marcy had received telegraph connectivity with Denver by 1864 [Harrison and Ivey 1993]). A 1913 photograph of the 1909 depot (Scheick et al. 2003:Figure 4.3) clearly shows elevated transmission lines west of the depot, in the area of the northern end of this site, but it cannot be determined if these represent the same line as that recorded as LA 153442.

A 1927 map of the AT&SF station grounds (not illustrated by Scheick et al. [2003]) from the collection of Joe Brown (a former AT&SF freight manager at the Santa Fe station), does indicate a "5-wire" transmission line in the area west of the 1909 depot. That line extended northward to Montezuma Avenue and beyond, passing through the area occupied by the Patton Building, which is not depicted and apparently had not yet been built. The plotted locations of these 1927 poles do not match those recorded at LA 153442. Further, no line is depicted farther south along the west side of the tracks. These observations suggest that the transmission line recorded as LA 153442 was built after the 1927 map was drafted. This postulated construction date is not contradicted by the styles of insulators observed along the line.

EXCAVATION SEQUENCE

Because transmission lines were indicated by wooden utility poles, many of which were still intact, no excavation was conducted at LA 153442. Instead, power poles were given number designations and recorded and photographed. Figure 6.36 provides pole designations and locations.

SITE STRATIGRAPHY

No excavation was conducted at LA 153442, and no subsurface deposits were exposed.

FEATURE DESCRIPTIONS

The transmission line extends a distance of 685 m (2250 ft) through the project area, but the original extent of the line remains unknown. The poles ranged in height from roughly 5 to 8 m (16 to 26 ft). This line generally parallels the northwestern edge of the railroad tracks (Figs. 6.36, 6.37), but the line obliquely crosses toward the eastern side of the tracks near the Manhattan Avenue intersection. At its northern end, the line most recently served the historical Patton Building, which itself was recently demolished. It cannot be determined if this northern point was the original end of the line. The southern end of the line ends abruptly in an open lot alongside the tracks, and it cannot be determined if the line originally ended, continued, or turned its direction.

Most of the northern end of LA 153442 has been demolished during railyard construction in the last year. Of the 10 original poles that once stood north

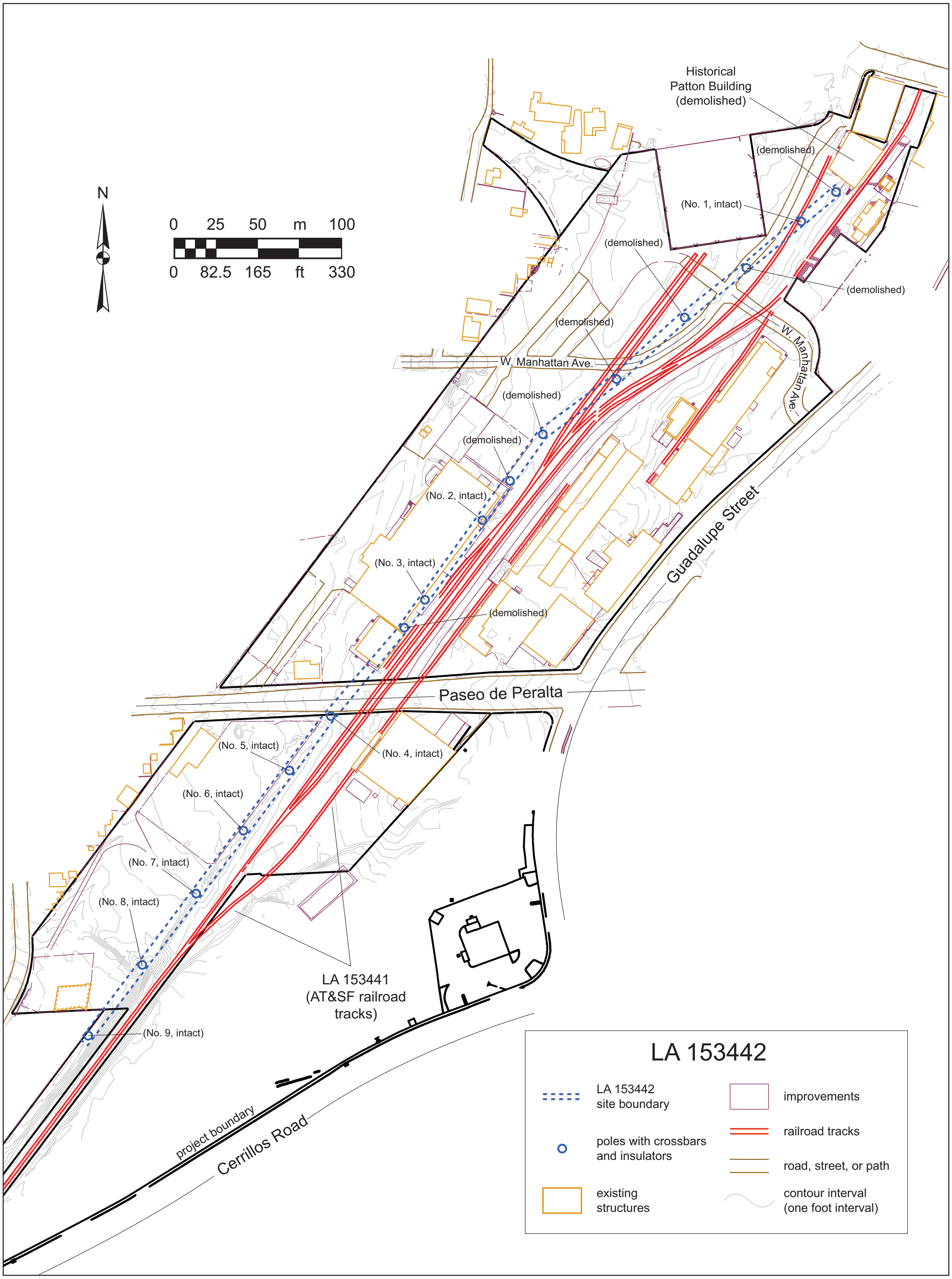


Figure 6.36. LA 153442, site map, showing locations of intact and demolished poles along the transmission line.

Figure 6.37. LA 153442, view of intact poles with insulators along the railroad tracks, facing northeast toward the Paseo de Peralta crossing.

of Paseo de Peralta, only three remain (Fig. 6.36). The sawed-off butts of the remaining poles were located and mapped, but no other information was available. No intact wire was strung between these northern poles when the site was recorded.

To facilitate the feature discussion detailed descriptions of individual poles are presented in two segments. The northern line (Pole #'s 1-3), located north of Paseo de Peralta, no longer supported a working infrastructure. The segment south of Paseo de Peralta (Pole #'s 4-9) supported an intact transmission line.

Northern Poles

The northernmost intact pole (labeled #1 on Figure 6.36) at LA 153442 rises west of the AT&SF depot, between the railroad tracks, and is currently in use as a yard-light pole (the power for which is provided from another nearby, modern power line). Two crossbars, supporting 18 clear- and aqua-glass insulators, are attached to the top of the pole.

The two other poles in the northern extent of the site also each supported two cross beams. The southern pole (#3) retained eight clear glass insulators on the top beam and two ceramic insulators on the bottom beam, as well as a threaded wooden pin (lacking an insulator) mounted directly to the pole under the lower beam. The northern of these two poles (#2) exhibited five clear glass insulators atop the upper cross beam as well as two clear glass insulators on metal brackets affixed to the bottom of the same upper beam. The lower beam possessed two ceramic insulators, and another clear glass insulator was mounted on a wooden pin affixed directly to the wooden pole below the lower cross beam.

Southern Poles

The southernmost six extant poles (#s 4–9, south of Paseo de Peralta) presently support an electrical power supply line that feeds two small transformer boxes mounted along the railroad tracks. The source of this power is a modern service line that runs along Paseo de Peralta, and the live power lines on this site are presumably part of the Santa Fe Southern

Railway's activation system for the road-crossing signal at Paseo de Peralta. The northern two poles (closest to the south side of Paseo de Peralta) each possessed two cross beams, but the southern four poles only exhibited one cross beam. The northernmost pole in this set (#4) exhibited three aqua glass, two ceramic, and four black plastic insulators atop the upper beam, and one plastic insulator mounted on a metal bracket affixed to the bottom of the same beam. The lower beam contained two ceramic spool-shaped insulators. An in-use power line descended eastward from this pole to a small transformer box mounted on a pole adjacent to the railroad tracks (this modern line was not identified as part of the historical site). Four intact wires were also strung from pole #4 to the southern end of the line at pole #9.

The second pole south of Paseo de Peralta (# 5) exhibited six plastic insulators on the top beam and two clear glass, one aqua glass, and two ceramic insulators on the bottom beam. The next three poles to the south (#s 6–8) each exhibited only two clear glass and two ceramic insulators. The southernmost pole (#9) exhibited four ceramic spool insulators, which marked the southern end of the four-wire power line that spanned this set of poles. Another small lateral power line then transferred the power eastward to a transformer box mounted on a concrete pad adjacent to the railroad tracks (which also was not identified as part of this historical site).

Because only four insulators on each of the southern six poles (#s 4–9) supported an active line, the rest of the glass, ceramic, and plastic insulators along this section were unused. This indicates that the previous, original lines (whatever their function) were abandoned (and the wires removed). Evidently, the current power line is a late (probably modern) addition to the site that may have reused some of the existing insulators.

The insulators could not be studied in detail from the ground, so the maker's marks and styles could not be determined, but most appeared to resemble typical CD 154 or 155 style insulators. The term "CD" stands for Consolidated Design, which denotes an identified "type" of glass insulator based on its profile and attachment method. This classification terminology is widely used by collectors (see Insulators.com 2011 and National Insulator Association 2011). The CD 154 and 155 insulator types were widely used through the mid-twentieth century for telephone or telegraph lines, but could also have served on low-voltage power lines.

No downed insulators were observed along the site. The other artifacts scattered along this site represent incidental scattered refuse (historic and modern) that is related to the railroad tracks and the railyard, not specifically to this line. With the available information from the site, it cannot be presently determined if this line was built to serve as a power line or a telecommunications line, or both.

Summary

Given the diversity of insulator styles on the poles across LA 153442, and the wide range in the number of insulators on each pole, this transmission line's function, extent, origin, and destination have probably changed numerous times throughout its use life. It appears that the overall line may not have even been built all at one time. In fact, even when recorded in 2006, the northern and southern halves of the site exhibited different characteristics and functions.

The line was apparently built after 1927, placing this structure in the realm of consideration as a historical cultural resource, as defined by the NRHP 50-year-old criterion. It also exceeds the ARC 75-year threshold. However, the line exhibits extensively compromised structural integrity and it fails to convey its historic character or function. Beyond providing documentation of a component of the railyard's infrastructure in this area, the potential for the physical remains of this line to contain additional interpretively significant information is very low. As a result, this site was recommended as being "ineligible" for the NRHP (Wenker 2006a:24). HPD and ARC concurred with this recommendation. No further archaeological investigations were conducted.

LA 146416

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revised by
Jessica A. Badner and Matthew J. Barbour

Introduction

LA 146416 was a historical site that included the structural remnants of a mid-twentieth century wholesale oil distributor station as well as a variety of coal/cinder pits along a short stretch of railroad tracks (Fig. 6.38). These cinder pits are believed to be associated with use of the area by the AT&SF in the late nineteenth or early twentieth century. Several sand-filled water channels, some with fill containing cultural material, also crossed the site area.

Site Location

LA 146416 was located at the northeast corner of Cerrillos Road and Baca Street on the east side of the railroad tracks and to the northeast of the Amigo Mart gas station (Figs. 4.30, 6.1). Site boundaries were irregular, maximum dimensions were 322 m (1056 ft) northeast to southwest and 38 m (125 ft) northwest to southeast (Fig. 6.38).

Archival Research

LA 146416 is located within city lot 1225 Cerrillos Road. The structural foundation exposed by archaeological testing is believed to be the Texaco, Inc. wholesale oil distributor station. The structure dated from approximately WWII to the modern era. In 1956, The Texas Company (later Texaco, Inc.) arranged to lease the lot from the AT&SF for the purposes of "the handling and storing of bulk petroleum products," although the lease records in an archival review (Duke Engineering & Services 2000: Appendix C) indicate that the 1956 lease preempted an earlier lease between the parties that dated to 1951. The 1956 lease is accompanied by a map (see Figure 30 in Deyloff [2004]), and it is apparent that a garage and an office/storage building, as well as an associated dock, tanks, and a pump, were in existence by 1956. However, Deyloff (2004:27) is incorrect in stating that the AT&SF Contract No. 107744 with The Texas Company is outside the present Baca Street parcel; it is in fact the 1225 Cerrillos Road property. The structures illustrated on the 1956 may have been built under the original 1951 lease, or even earlier.

Duke Engineering & Services (2000:iv) states that two bulk fuel distributors operated on the Baca Street parcel between 1928 and 1994, one of which (the Berridge Distributors) "operated for the entire 67 years." Conversely, current records indicate that the Berridge Distributing Company subleased the Texaco property from only 1978 to at least 1992 (Deyloff 2004:27; see also Duke Engineering & Services [2000: Appendix C]). The veracity of the 1928 date ascribed to Berridge's presence in the parcel cannot be evaluated with the present archival documentation.

Regardless, the 1960 Santa Fe city directory indicates that the 1225 Cerrillos Road address was indeed occupied by a Texaco Inc. wholesale oil distributor (Hudspeth 1960). This lot was leased by Berridge until at least 1992. The underground storage tanks were removed from the site in 1994 (Duke Engineering & Services 2000:26).

Excavation Sequence

This site was investigated by the excavation of eight backhoe trenches (BHTs 105, 106, 113, 116–118, 124; summarized in Fig. 6.38 and Table 6.8). A single one-meter-square XU 44 was also excavated at this site to evaluate the deposits and artifact content of one of the water channels (Fig. 6.38).

Site Stratigraphy

Most deposits were typical of project stratigraphy summarized in the "Project Stratigraphy" section of this report (Chapter 1, in Field Excavation Methods and Procedures). Stratum 1 was from 10 to 75 cm (4 in to 2 ft 6 in) thick throughout the site. In BHT 105 and 106, it covered a discontinuous, thin (ca.10 cm [4 in]) layer of Stratum 2. Stratum 3 and 4 were sterile substrate. Stratum 3 was at least 50 cm (1 ft 8 in) thick, and where Stratum 4 was not exposed beneath it, it was at least 1 m (3 ft 4 in) thick. Stratum 4 was most commonly associated with Feature 95, where higher natural strata had been churned. It was at least 50 cm (1 ft 8 in) thick and trenching did not fully expose the deposit.

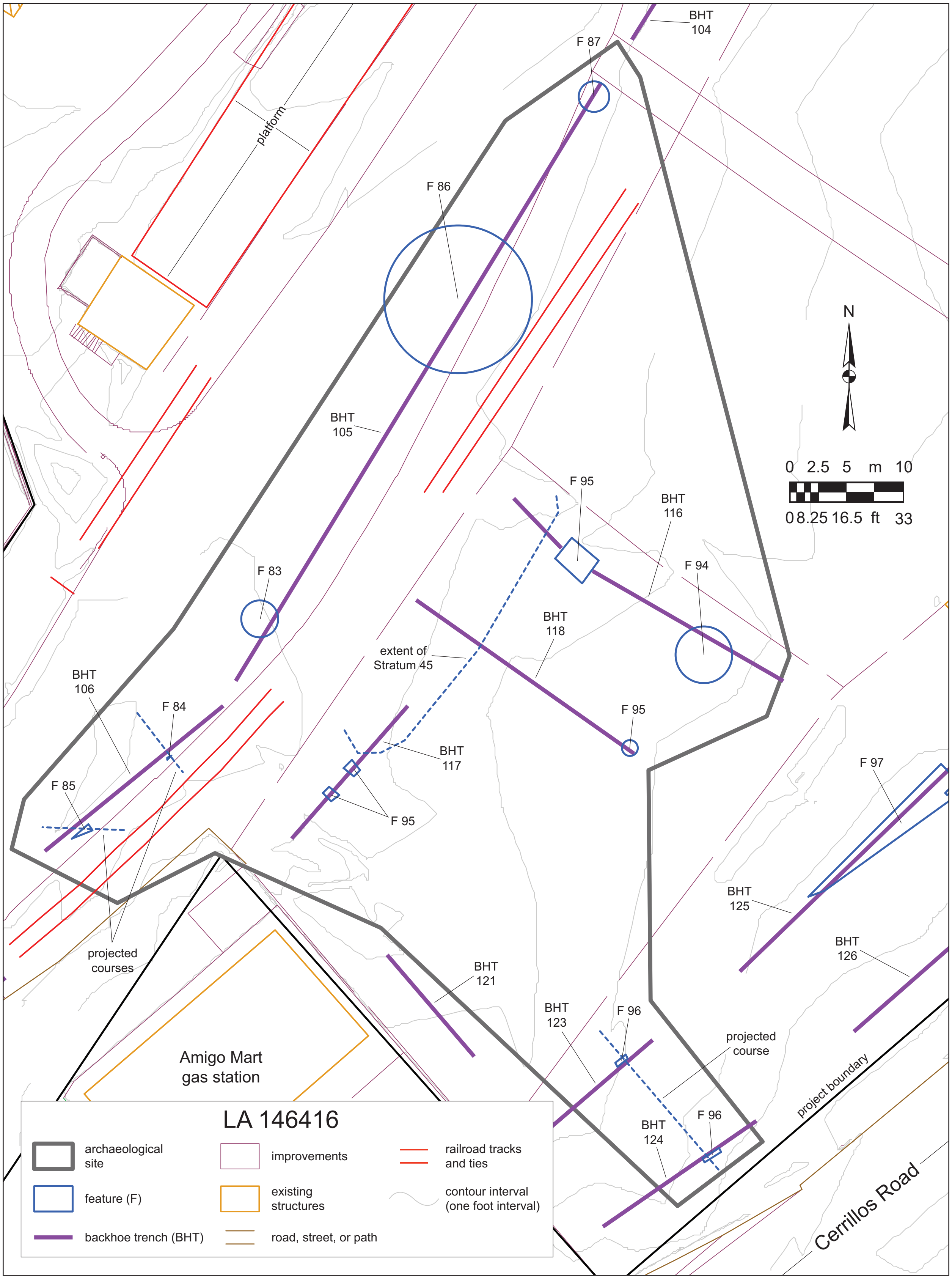


Figure 6.38. LA 146416, site map, showing feature numbers.

Stratum 41 and Stratum 42 were buried topsoils associated with the water channels, but not directly inside the feature. Both strata are associated with Baca Street area stratigraphy and were commonly found beneath a 10 to 20 cm (4 to 8 in) thick layer of Stratum 1 and 2 which sealed the old topsoil under a layer of gravel mixed with modern refuse. Stratum 41 was a 5 to 10 cm (2 to 4 in) thick deposit of reddish-brown clay with common caliche inclusions variably deposited above and below Stratum 42. Stratum 42 was a 27 cm (11 in) deep layer of brown silty loam containing few, fine charcoal flecks and few artifact inclusions of varying age indicating an admixture of material of wide date ranges. Strata exclusive to specific feature are discussed below with the context in which they appear.

Feature Descriptions

Eight features were identified including remnants of the Texaco oil distributor's structural foundation (Feature 95), a pit of indeterminate use (Feature 94), four water channels (Features 84, 85, 86, 96), and two coal and cinder pits located along the railroad tracks (Features 83, 87). Table 6.9 provides a summary of feature dimensions and a description of fill. Figure 6.38 depicts their locations.

Texaco, Inc., wholesale oil distributor, station

Feature 95. Feature 95 was the structural foundation to the Texaco, Inc., wholesale oil distributor station (Fig. 6.38). The buildings were probably constructed just after WWII. The building complex consisted of a series of concrete slabs set into Stratum 4 and a large pit, or series of pits to the northwest that may have housed underground storage tanks and a length of vertically positioned concrete pipe. This structural complex was exposed in four exploratory backhoe trenches (BHTs 113, 116, 117, 118) and was 34 by 20 m (111 ft 6 in by 65 ft 8 in).

There were three main depositional strata fill associated with Feature 95. The uppermost layer of fill consisted of Stratum 1 a modern dark brown silty loam approximately 35 to 75 cm (1 ft 4 in to 2 ft 6 in) thick with abundant inclusions of base course gravels, asphalt, modern refuse (glass, metal, plastic, etc.), coal, and cinders. This deposit directly overlaid the exposed concrete slabs. The slabs were constructed in pits that had been dug into the underlying sterile substrate (Stratum 4 in this area). Finally, the large excavated area marking the location of the underground storage pits was filled with Stratum 45, a soft pink granular gravelly sand that was probably purposefully introduced clean backfill imported from elsewhere to fill in the remediation pits.

The concrete slabs were poured in forms and may have served as pump platforms or structural supports (Fig. 6.39). The slabs ranged in width from 3.2 m (10 ft 6 in) between BHT 113 and 116 to 80 and 95 cm (2 ft 8 in and 3 ft 4 in) in BHT 117. The average depth of the top of the exposed concrete was 75 cm (2 ft 6 in) below the ground surface. The bases of these slabs approached 1.05 m (3 ft 6 in) below the ground surface. The full extent or configuration of the slabs was not exposed, but they encompass a northeast-southwest axis measuring 32 m (105 ft) long. A vertical concrete pipe at the eastern end of BHT 118 may have been a collar or sleeve around an oil-delivery pipe. The area north and west of the slabs in BHTs 113 and 117 and in the western end of BHT 118 was marked by a wide, deeply excavated pit or pits filled with Stratum 45 fill (Fig. 6.39, also see below). This large pit or series of pits was excavated into the modern ground surface and extended below 1.2 m (4 ft) in depth. This broad excavated and backfilled area is interpreted as the past location of the underground oil or fuel-storage tanks that were removed in 1994 (Duke Engineering & Services 2000:26).

A small steel sign (12 in wide by 18 in high), painted with the Texaco "Fire Chief" emblem, was recovered from BHT 117 in the Feature 95 area. The lower right corner of this sign is marked "3-4-55," which may indicate a 1955 production date. This date matches well with the archival documentation for this site. Table 6.10 summarizes the artifact classes and counts from all excavated proveniences at LA 146416.

The overall condition of the structural complex was poor. The concrete slabs are still intact but no building foundation is present. The underground tanks and other station infrastructure have been removed, causing substantial disturbance to the buried portions of the site.

Unknown pit

Feature 94. Feature 94 was a nearby pit feature of unknown function (Fig. 6.38). Its proximity to the eastern end of the oil distributor complex suggests that it was related to that use of the site. This broad, shallow basin-shaped pit was 5.06 m (16 ft 7 in) long and 30 cm (1 ft) deep. It was excavated into the sterile underlying substrate (Stratum 3) and was filled with a laminated, gravelly yellowish-brown sandy loam that appeared to have accumulated through alluvial infilling, suggesting that the feature was an open depression that filled naturally. No artifacts were observed. The pit was capped by 5 to 15 cm (2 to 6 in) of Stratum 42 (described above), a topsoil deposit.

Coal/cinder pits

Features 83 and 87. Two relatively small, deep, basin-shaped pits, probably cinder disposal pits, contained abundant inclusions of gravel-sized coal chunks and cinders (Fig. 6.38). Feature 83 was 3.35 m (11 ft) long and 60 cm (2 ft) deep beneath 10 cm (4 in) of fill. Feature 85 was 2 m (6 ft 7 in) long and 30 cm (1 ft) deep. It was located at the modern ground surface.

Feature 87 contained fragments of ferrous wire, but no temporally diagnostic material was present in either feature. Both coal/cinder pits lay between 3 and 6 m (10 and 20 ft) west of the standard-gauge railroad track that crosses through this area (see LA 146417, below). As at LA 146402, the creation of these relatively small, low-volume cinder-disposal pits was probably through incidental clean-out of the steam engines.

Water channels

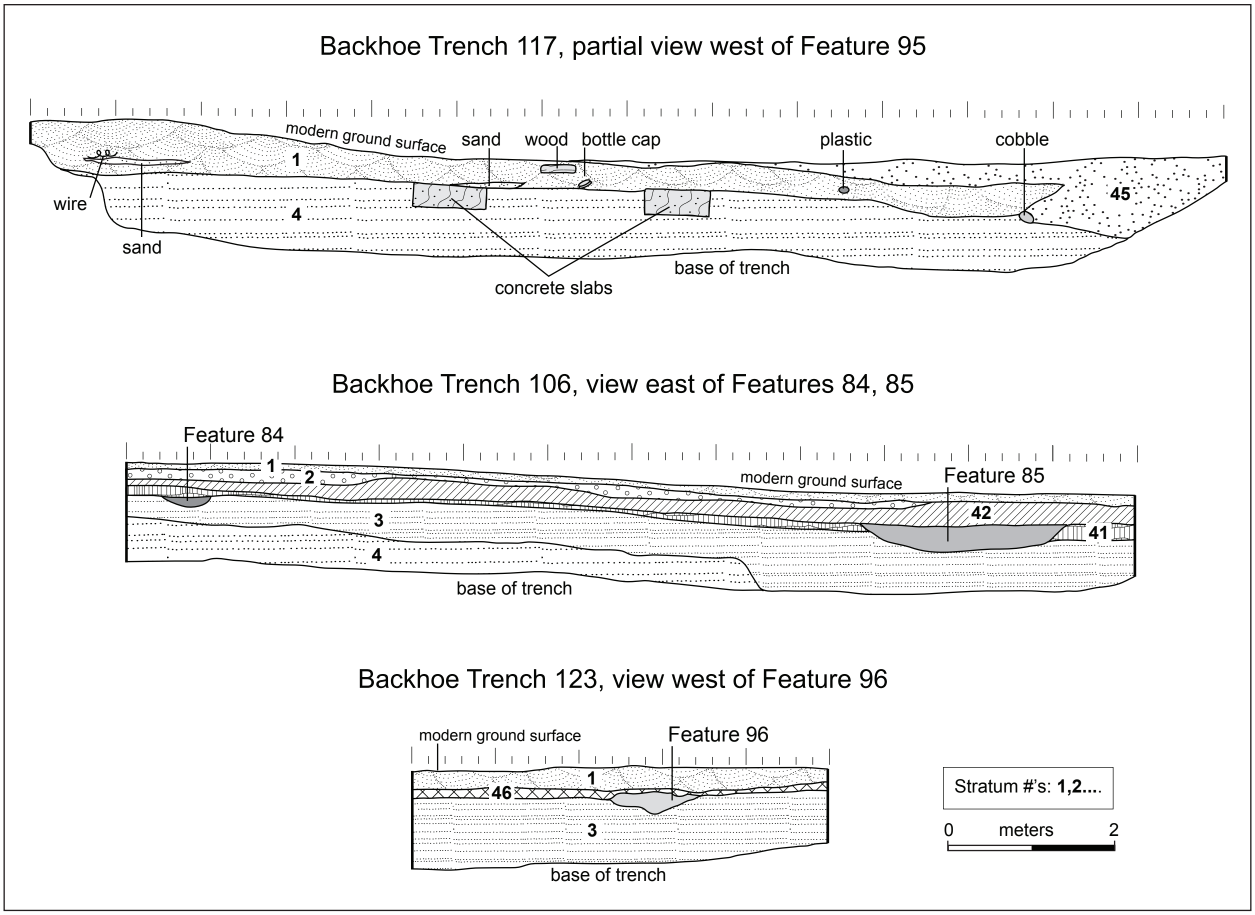
Three apparent water channels were located in the southern end of the site. Backhoe trench 106 revealed two of these features (Features 84 and 85) in cross section (Fig. 6.40), and a hand-dug excavation unit (XU 44) was used to further investigate Feature 85. Two backhoe trenches at the southeastern end of the site (BHT 123 and 124) revealed two exposures of another channel (Feature 96). Feature 86 was a modern water control feature.

Feature 84. Feature 84 (Fig. 6.40) was apparent in BHT 106 as a 50 cm (1 ft 8 in) wide, 10 cm (4 in) thick, basin-shaped lens of gravelly yellowish-brown coarse sand dug into underlying sterile substrate (Stratum 3). The top of the feature lay at or immediately underneath a 5 cm (2 in) thick deposit of reddish-brown clay with common caliche inclusions (Stratum 41), which was in turn buried under 15 cm (6 in) of Stratum 42 (see above). Strata 41 and 42 together probably represent the old topsoil layers that were buried under a 20 cm (8 in) thick mantle of historic and recent overburden (Strata 1 and 2).

Feature 85. In BHT 106, Feature 85 (Fig. 6.40) was a larger basin-shaped depression, 2 m (6 ft 7 in) in width and 30 cm (1 ft) in thickness, which occupied a similar stratigraphic and elevational position as Feature 84. Both of these features cross sections in the trench indicated a general southeast-to-northwest orientation, along the slope of the modern ground surface. The excavation unit (XU 44) in Feature 85 intersected the eastern margin of a straight-walled, steep-sided pit that extended 40 cm (1 ft 4 in) into the northern one-third of the base of the XU. The orientation of the pit edge suggests either that Feature 85 is not a channel but is a circumscribed pit feature, or, more likely, that the orientation of the channel may approach an east-to-west direction. No artifacts were recovered from Strata 41 or 42 in XU 44, but the fill of the excavated portion of this feature contained coal and charcoal flecks as well as sherds of Native American pottery (Table 6.10). This mix of cultural inclusions suggests that they washed in from elsewhere.

Feature 86. This broad shallow pit was filled with laminated sand and clay and exhibited a PVC pipe in one edge. This modern feature was built to control the local drainage in the driving lane, and is not considered further.

Feature 96. Feature 96 was exposed in two adjacent trenches (BHTs 123, 124; Fig. 6.41). The feature was apparent as a 1 m (3 ft 4 in) wide, 25 cm (10 in) thick lens of yellowish-brown coarse sand dug into underlying sterile substrate (Stratum 3). The top of the feature lay immediately underneath a 5 to 10 cm (2 to 4 in) thick deposit of reddish-brown fine sandy loam with few, fine charcoal inclusions (Stratum 46). Stratum 46 exhibited moderate lenses of alluvially deposited fine sand throughout, suggesting that it was subject to periodic flooding and ponding. No artifacts were present in either the channel or the stratum. A 20 cm (8 in) thick mantle of historic and recent overburden (Strata 1 and 2) covered the feature and associated stratum. The exposures of this feature indicate that the channel is oriented along a southeast-to-northwest axis. This buried channel parallels a shallow modern drainage



Figures 6.39, 6.40, 6.41. LA 146416, top (Fig. 6.39): BHT 117, Feature 95, cross-section view; middle (Fig. 6.40): BHT 106, Features 84 and 85, cross-section views; bottom (Fig. 6.41): BHT 123, Feature 96, cross-section view.

located roughly 5 m (16 ft 4 in) to the southwest. Although the modern ground surface in this area is highly disturbed, the similarity in location and direction between the modern swale and the buried channel suggest that this feature is a natural drainage feature.

Summary

LA 146416's Feature 95, the Texaco Inc. wholesale oil distributor station, is in poor condition. Although a few concrete slabs are still intact, no definite building foundation is present. The removal of the underground tanks and dismantling of the rest of the station infrastructure has substantially compromised the site integrity. The original construction date for the station (ca. 1951, but definitely prior to 1956) barely places this complex in the realm of consideration as a historical cultural resource (as defined by the NRHP 50-year-old criterion), and its continued use into the modern era probably further compromised any historical deposits or features. Beyond confirming the archival documentation of an oil wholesaler in this area, the potential for the physical archaeological remains of this structural complex to contain additional interpretively significant information was very low.

The coal/cinder pits at this site probably represent expedient disposal of material from the steam engines that once served this area. Given the dearth of associated temporally or functionally diagnostic artifacts, these features contain limited potential to contain additional archaeologically relevant data. However, the pits are presumed associated with AT&SF operations in the late nineteenth or early twentieth century.

Some of the water channels at this site contain cultural material in the sandy alluvial fill, but the mix of material strongly indicates that the artifacts are introduced from elsewhere by water transport and saltation in the channel. The orientation of the features down the natural slope of the land also supports an interpretation of their origin as natural landscape drainage or erosion features. The area occupied by Features 84 and 85 at the southwestern end of the site is separated from the Feature 96 alignment on the southeast by a broad acequia (LA 146418, see below), crossing northeast-to-southwest, that presumably intersects the Feature 96 channel. Hence the relationship, association, or connection of Features 84 and 85 with Feature 96 remains unknown.

It was recommended that documentation of these features had largely exhausted the potential for LA 146416 to yield information important to the prehistory of history of the area (Wenker 2005a). ARC and HPD approved and no further archaeological investigations were undertaken. Recommendations remain unchanged from those offered and accepted by HPD and ARC during preliminary reporting.

SYNTHESIS: Twentieth-Century Industrial Sites in the Santa Fe Railyard Project Area

Matthew J. Barbour

A total of ten archaeological sites were associated with early to mid-twentieth century industrial activities not directly tied to the AT&SF or NMC railways. Half of these sites (LA 146411, LA 149916, LA 149917, LA 149918, and LA 146416) were linked to bulk oil stations. The remainder included a creamery (LA 149914), a transmission line (LA 153442), and three sites (LA 146409, LA 149910, and LA 149919) presumably tied to the transportation and/or freight storage.

This section examines these sites in relation to themes discussed in the research design (Wenker et al. 2005). While nine of the ten sites were not intensively excavated, archaeological and archival evidence can provide some insight into *Research Domain 3: Bringing Archaeology and History to bear on the Archaeological Buildings and Structures of the Santa Fe Railyard*. This domain focuses, to some extent, on the freight-dependant commercial businesses that were attracted to the railyard area and how these commercial industries operated in early twentieth century Santa Fe (Wenker et al. 2005:123–132).

Bulk Oil Stations

A bulk oil station is a facility used primarily for the storage and/or marketing of petroleum products, which has a total bulk storage capacity of less than 50,000 barrels and receives its petroleum products by tank car or truck (McCracken 2011). The presence of the Phillips Petroleum Co. Bulk Station (LA 149918), the Santa Fe Trans. Co. Gas Tanks and Drive (LA 146411), the Sinclair Bulk Oil Station (LA 149916 and LA 149917, later R. P. McKnight Distributor Station), and a Texaco, Inc., facility (LA 146416) within the Santa Fe Railyard project area speaks to the role of the Santa Fe Railyard to the city and surrounding areas. Based upon Sanborn maps and other forms of archival evidence, the development of these bulk oil stations occurred primarily in the 1920s. Some of the fuel from these enterprises was likely consumed by the diesel locomotives entering and leaving the Santa Fe Station. However the 1920s development dates for these bulk stations coincides with nation-wide trends towards greater and greater reliance on the automobile (Kyvig 2004). Between 1921 and 1925 alone, the number of motor vehicle registrations nation-wide rose roughly 2.37 million annually (Pratt et al. 1988:253) reflecting a greater economic boom likely felt in the Santa Fe area.

Given that there are three of these bulk stations within a single city block, it seems plausible that these initial operations were somewhat speculative. The location of these stations nestled next to the rail also suggests that these emerging enterprises utilized the existing railyard infrastructure. Each bulk station would have presumably received their oil by tank car along the AT&SF or NMC rail line. From there, the oil could be hauled to smaller fueling stations throughout the city and the surrounding areas. Utilization of the existing railyard infrastructure would have decreased both initial startup costs and long term operating costs of a bulk oil station. However, the close proximity of the stations to one another would have enhanced competition ultimately leading to either consolidation or elimination of all but the most successful operations.

This can be corroborated to some extent with the archival evidence. By 1960, only one bulk oil station remained in the North Railyard project area, the other surviving bulk station was located further to the south on the Baca Street parcel. In the North Railyard, the R. P. McKnight Distributor Station, which may have emerged from the initial Sinclair Bulk Oil Station, was still located adjacent to the railway. Like its predecessors, it presumably still capitalized on the railyard infrastructure as a cost effective means for moving its products into the city. Placement of the Texas Oil Co. (later Texaco Inc.) at the Baca Street parcel, adjacent to Cerrillos Road, in 1956 may reflect this transition from dominance of rail freight to greater reliance on the nations emerging and more diverse delivery systems. Other bulk stations, if present within the Santa Fe area, had presumably moved to pipeline-fed operations elsewhere in town. Or perhaps more likely, increasing numbers of small-scale fueling stations in Santa Fe were, by the 1960s, being fed by truck-delivered oil stored in bulk stations located in and around the railyard in Albuquerque. Either of these scenarios would fit with the overall decline of the Santa Fe Railyard as a freight depot in the 1940s and 1950s and reflect nationwide post-war shipping trends towards highway transportation (D. H. Snow, Chapter 7, this report).

While these enterprises were short-lived, the archaeological remains of these structures are quite substantial. The foundations and pilasters that supported all of these operations were built of concrete and were often over one ft thick. Certainly, these materials and measurements are strong indicators of the large-scale industrial endeavor of storing and distributing petroleum products to a city or region. However, the arrangement of these architectural features across the individual bulk stations did not follow a regular pattern. It suggests no "best practices" had been developed for the layout of a bulk station or for building the individual structures necessary for the operation to be a success. This lack of foresight only re-emphasizes the potentially speculative nature of these early twentieth century enterprises.

Other Modern Industrial Sites

The remaining five sites (LA 146409, LA149910, LA 149914, LA 149919, LA 153442) had a variety of site-specific functions. However, all appear to have been tied into the existing Santa Fe Railyard infrastructure in some way.

Buildings at LA 146409 are a clear example of a warehouse complex that grew out of necessity to store freight along the AT&SF line. Rental of one of the warehouses by the U.S. War Department is presumably associated with clandestine shipments of materials and supplies needed at Los Alamos during the Manhattan Project era.

Like the bulk stations, the Santa Fe Creamery and Ice Company (LA 149914) appears to have been built at 722 Cerrillos Road to capitalize on the railroad as a means of transportation. Raw dairy or semi-processed dairy materials could be shipped to the facility by rail. There these items could be refined into consumer products. Then either sold at the facility, shipped throughout the city for retail, or packed back onto the rail for distribution on a larger more regional scale.

While the exact name of the business at LA 149910 is unknown, the "WAGONS" label for the building depicted on the Sanborn Maps suggests site function was associated with the distribution of products transported into the city via rail. This may also be true of LA 149919, built in the later 1940s or early 1950s. This structure(s) may have served as a storage facility for loading and off-loading products onto the rail.

Archaeological evidence at all four sites was limited to minor architectural elements that offered no direct evidence of site function. However, decline of both the creamery and these potential storage/distribution centers appears to have been tied to the overall life cycle of the Santa Fe Railyard. As truck shipping industries expanded depot functions at the Santa Fe Railyard faltered. By the late twentieth century, the buildings, these sites represented, had been demolished and their businesses failed or moved off site.

Lastly, LA 153442 represents the adaptive reuse of the existing transmission lines. Archival records suggest these lines were initially used for a telegraph in the nineteenth century. However, a visit to the site, in archaeological documentation in 2006, suggests that a portion of the line was still in use.

Insulator types present on the poles may be used to support a low-wattage power line or telephone.

Summary

Archival research suggests that many of the modern industrial archaeological sites investigated were associated with bulk oil stations. The remaining four include a creamery, two sites presumably associated with the storage and distribution of railway freight and a transmission line. These operations were presumably built in the railyard project area to capitalize on the existing rail infrastructure. In most instances, the rail offered a means to move materials cheaply into the city for processing and distribution.

Many of these early capitalist ventures appear to have been somewhat speculative. In the case of the bulk oil stations, operation layout did follow a regular pattern or at set of "best practices," but rather appeared to represent more ad hoc development. The success and failures of these operations can be played out within the archival documents. By 1960, only the R. P. McKnight Distributor Station remained, as did Texaco, Inc. Other bulk stations, if present, had moved away from the railyard and transitioned to acquiring their oil from trucks or pipeline.

Ultimately, these other modes of transportation undermined the need for the Santa Fe Railyard as a freight depot. This in turn led to an economic decline in and around the railyard with many of the freight related business leaving the area and structures left vacant. Some of this abandoned infrastructure was reused, such as the transmission lines at LA 153442, but most was demolished during the last decades of the twentieth century. This created the largely empty industrial core that is currently under redevelopment.

7 | Analyses

Archival Research: Santa Fe Railyard Historical Report

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Introduction

This historical research was guided by two primary "domains" of interest stemming from the Office of Archaeological Studies' (OAS) field excavations at 16 locations within the Santa Fe Railyard Historic District. Briefly re-stated, those "research domains" are concerned with traditional irrigation agriculture from Colonial times to the early twentieth century; frontier acculturation with the focus on general economic and technological trends, in the context of transportation systems; and the accumulation and identification of the details of the railyard facilities, and changes in the infrastructure over time. How those three factors related to and impacted one another from ca. AD 1700 to 1950, guides the presentation of the data in this report.

Specifically, the historian was asked to view the traditional acequia systems as "long-term technological and economic adaptations" from a "world-systems" theoretical perspective. The second objective of the overall research was to focus on the means and efficiency of transportation systems to Santa Fe, and their roles in acculturation, as inferred from archaeological materials recovered. Artifacts and features reflect both technological and economic adaptations, and also can be viewed through the lens of Immanuel Wallerstein's (1976) economic theory; however, I opt instead to review some aspects of New Mexico's (and, therefore, Santa Fe's) earlier economic history. The railyard facilities, of course, reflect a different level of technological and economic adaptation. The arrival of rails to Santa Fe, more so, perhaps, than traditional acequia irrigation, and the accumulation of artifacts moving to and from over the Santa Fe and Chihuahua trails, linked New Mexico to the rapidly expanding world-system "core" entity that was the United States. As a result, my second goal as historian was to contribute to the history of the railyard and its infrastructure.

Excavations by the OAS resulted in the definition of 16 features in the yards that revealed multiple remains of both the acequia systems and the railyard's infrastructure features. This report is divided into four sections: (1) the acequias and field systems; (2) New Mexico's economic trajectories; (3) the systems of transportation of goods to and from Santa Fe, and their economic impacts; (4) development of the railyard and its facilities. Review of these factors, as Santa Fe progressed from Colonial to Territorial and, finally, to Statehood status, in many ways, reflects the economic history of New Mexico.

This research has benefited from conversations with Mr. Phil Bové, *mayordomo* of the Acequia Madre Ditch Association, Mr. Edward ("Gonzo") Gonzales, New Mexico Engineer's Office (retired), Mr. David Barsanti, City of Santa Fe, GIS coordinator, Cordelia T. Snow, and Vernon Glover. In particular, Vern Glover has kindly shared with me the fruits of his own research and documents pertaining to New Mexico's railroad history. Finally, Jessica Badner, Project Director with the Museum of New Mexico's OAS, has provide much assistance (and, with good grace, patience), in assisting me with the research and assembly of the report.

Efforts to obtain information from former businesses in the railyard have been, for the most part, futile. Representatives of the Maloof family and the former Hutchison Fruit Co., for example, state that documents pertaining to their history, buildings, and operations in the yards, have long since been discarded or lost. Similarly, I have been unable to locate any Gross Kelly business documents. Efforts to identify additional materials in the archives of the Temple [Texas] Railroad and Heritage Museum, have proven fruitless (Craig Ordner, Archivist, personal communication 1/19/10). Similarly, the Russell Lee Crump Memorial Library in Topeka, Kansas, advises that documents pertaining to Santa Fe may not be reproduced, and are not available online. Also, the National Archives has not responded to my inquiries. However, several important documents in miscellaneous railroad files at the New Mexico State Records Center and Archives were consulted and are included here.

Land Use and the Acequia Systems in the Railyard District

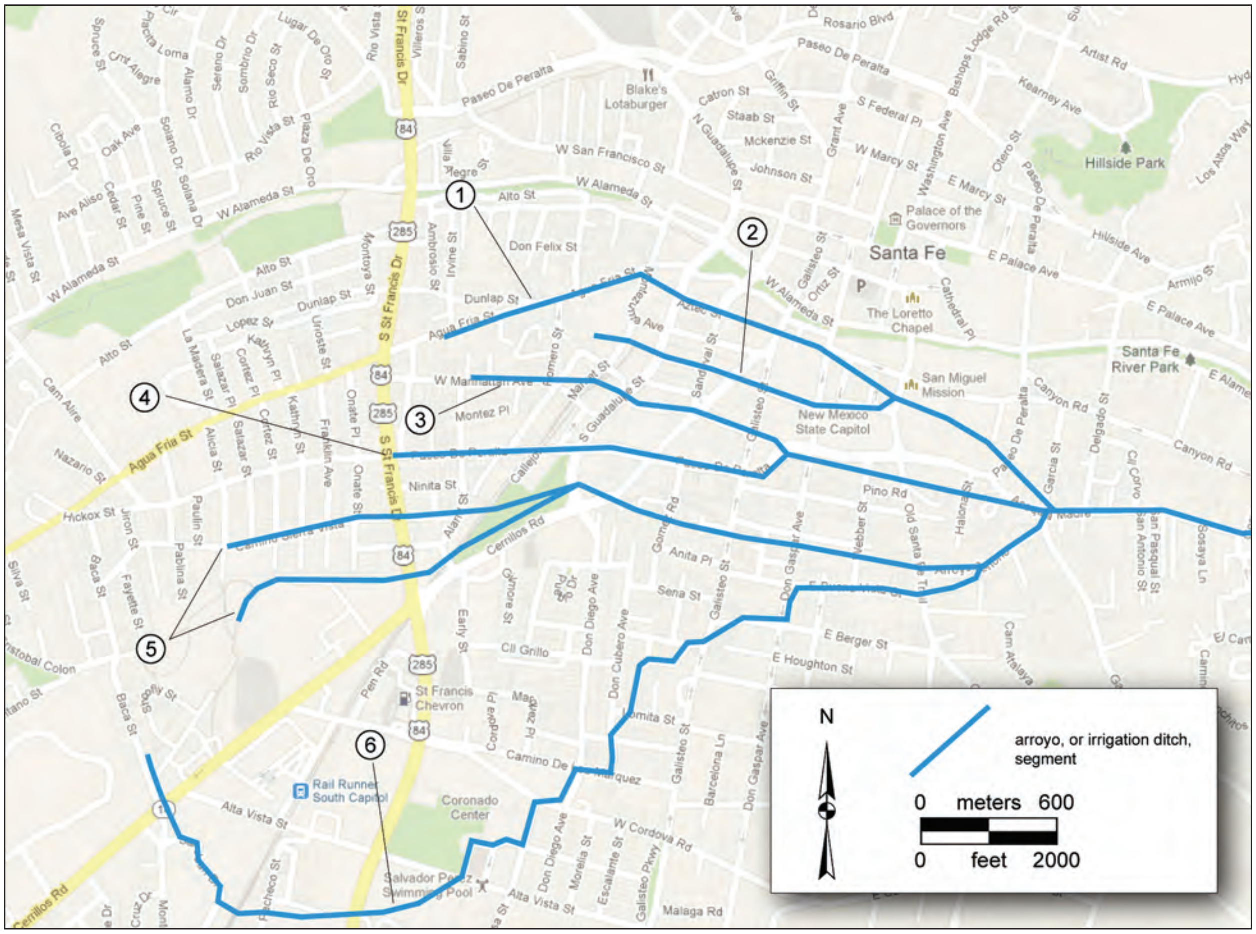
Introduction

The expansion of the city's "metropolitan" district south of the river was the result of the eminent arrival of rail service and the subsequent establishment nearby of the State Capitol complex in 1884–1885. Both factors signaled the ultimate demise of a centuries-old agricultural way of life for most of the residents in the western portions of the barrio of San Miguel and in adjacent portions of the barrio of Guadalupe on the west. Long-ditch irrigation, as practiced from Colonial times to the present, is a system of considerable antiquity brought to the New World from the Iberian Peninsula (Butzer et al. 1985), and to New Mexico no earlier than 1598. Long-ditch irrigation systems and the field systems they supported were technological and economic necessities in areas of the New World with inadequate rainfall, especially New Mexico. That the ditches served not only irrigation, but as the power to operate grist mills and to provide domestic water, were critical to local subsistence requirements, and description of such systems does little to illuminate or to provide support for Wallersteinian "world-systems" constructs. One might as well argue that the Spanish Colonial use of adobe bricks for residential and other construction purposes also constituted "technological and economic adaptations" in New Mexico.

The acquisition of properties for the anticipated railyard facilities, and the creation of the adjacent Valuable Building Lots (C. T. Snow 1995) eliminated substantial subsistence agricultural lands and residential properties. Those generally small agricultural and residential tracts, since the eighteenth century (at least), had been served by the Acequia Madre and its system of laterals that provided irrigation and domestic water for both of the south-side barrios. Aligned enfilade north to south from the river to the crest of land along present-day Coronado Road (Fig. 7.1), as described below, the complex system of irrigation ditches (Table 7.1) was an arterial pattern upon which an agricultural livelihood was entirely dependent. The author's earlier acequia survey (Fig. 7.1; D. H. Snow 1988) of extant and abandoned ditches south of the Santa Fe River was a hasty overview, limited by time and funding. Subsequent investigations have provided additional data on the south-side irrigation systems, some of which are discussed in more detail in this section of the report. A major shortcoming of the earlier survey, for example, was failure to attempt to identify the course of the Acequia de Analco lateral westerly beyond the grounds of the former Christian Brother's St. Michael's School.

Investigations for the present project have discovered that two former ditches south of the river bore the name "*de Analco*," reflected by a contra-acequia at the location of the former Delgado house opposite St. Michael's High School. Over the years following the 1988 survey, additional segments of the south-side Acequia Madre system have been revealed both from survey and from documentary sources; and several of those are pertinent to the discussion of railyard history and the ditches that passed through it. There remains, nevertheless, some confusion, perhaps, in identifying the precise course of some of those laterals from the main Acequia Madre. The full extent of the former system, as a result, must await systematic research in the property records in the Santa Fe County Deed Books.

Dry farming in northern New Mexico is at considerable risk given the unpredictability of precipitation as well as variability in the length of the growing season mostly above about 6000 feet (1524 m) above sea level (D. H. Snow 1991). In order to offset the former, the Spanish introduced a system



DITCH KEY

1. "Analco Ditch," identified as such in 1866 as extending as far west as 803 Agua Fria Street (SFCD Bk H:454, Bk F-1:598).

2. Analco "contra-acequia" ditch, diverted to the former Delgado House (now the Rio Chama restaurant (McIntosh and D. H. Snow 2006), and identified in 1890 as the "old acequia [of] Diego Gonzales" (Fig. 7.6; William White, surveyor).

3. Ditch of Juan Diego Romero, or the Manhattan Street Ditch (McIntosh and D. H. Snow 2006; D. H. Snow 2005:30, 43).

4. Acequia Madre Ditch, frequently referred to interchangeably with the "ditch" or "acequia del [de los] Pino [Pinos]," and the "main ditch" (SFCD Bk P04:451). I am unclear concerning where the two westerly segments of this major lateral diverged—one branch continuing west along what is today Hickox Street, the other flowing southwesterly along the north side of the New Mexico School for the Deaf.

5. Tenorio Ditch, or "acequia de las crucitas" (SFCD Bk G-1:268), also frequently referred to as the "Acequia Madre." A lateral diverted on the west side of Garcia Street. Its westerly course appears to have been along what is today Sierra Vista Street.

6. Unnamed ditch segment along Baca Street, possibly a lateral from the Buena Vista segment of the lateral frequently called "Acequia Madre," diverted from Arroyo Tenorio to present Buena Vista Street (D. H. Snow 1988).

Figure 7.1. D. H. Snow's proposed courses of former laterals from the Acequia Madre through the Santa Fe Railyard.

of "long-ditch" irrigation to insure adequate water for multiple users dependent on subsistence crops of maize and wheat (both spring and winter wheat require irrigation in New Mexico). Josiah Gregg (1954:107), in Santa Fe during the early 1830s, recognized the significance of irrigation: "The necessity of irrigation has confined, and no doubt will continue to confine agriculture principally to the valleys of the constant-flowing streams." His description of the irrigating process (Gregg 1954:108) describes quite accurately that which served Santa Fe's south side for centuries.

Although water wells are occasionally mentioned in Colonial documents (Lambert 1985), most domestic water was obtained from the Santa Fe River via the acequia systems. Interestingly, located south of the river, lands at "*Buena Vista*" belonging to Juan Tomas Lovato in 1750, had for their western boundary "a well which they have begun to dig in the arroyo" (Spanish Archives of New Mexico [SANM] I:959). Just which arroyo, and where in Buena Vista, I am not able to determine. One or more wells are also known to have existed within the administrative compound of the Palace of Governors (Lambert 1985), one of which apparently was dug in the 1860s. Of considerable importance also, acequias provided—in season—a suitable habitat, not only for riparian growth (shade trees, and a variety of pot-herbs), but for trout utilized by the villa's inhabitants for food. The course of the ditch frequently served as a footpath to fields, many of which were converted to the city's streets in the nineteenth and twentieth centuries. Not only did the acequias serve fields planted in subsistence crops, but provided water for gardens and fruit trees adjacent to residences constructed along their courses. A south-side acequia mentioned in a 1738 sale of land, for example, "led" to the house of a neighbor (SANM I:757). Today's Acequia Madre Street, paralleling that ditch from the take-out on the river to Garcia Street, is a reminder of that former practice, as is, I believe, the course of today's De Vargas Street (formerly called Analco Street, later, Agua Fria Street).

The presence of multiple east–west trending laterals south of the river throughout much of the city's history, must certainly reflect its gradual population growth to the south from ca. 1700, if not earlier, to the late nineteenth century—growth that continues unabated today. For much of the earlier period, most of Santa Fe's citizens were subsistence farmers and, as the need for crop lands grew with the population, so too did the irrigation systems extend further south and west.

Dating irrigation ditches is problematical, at best, although terminal dates might be more easily determined (for example, D. H. Snow 1988 and Bergeret al. 2008). Annual cleaning of the accumulation of silt and trash and other maintenance and repair activities (widening, for example, or deepening a ditch), repair of banks damaged by livestock (Simmons 1968) and muskrats, ditch-side run-off from nearby residences (and their trash disposal placement) will certainly mix and/or obliterate any discrete depositional strata from which dateable materials might be obtained. Re-channeling laterals as a result of flooding or because of other factors, also might confuse efforts to date segments of laterals. Where a channel has been excavated through a former residential complex whose occupation is known, however, might provide an approximate initial date for the ditch.

Colonial Ditch System and Land Use

West of today's Old Santa Fe Trail, and south of Agua Fria Street, all irrigation waters were supplied via a single "mother ditch," or acequia madre, today's Acequia Madre (also Acequia del Pino, or "de los Pinos"). There seems good reason to believe this "mother ditch" is that depicted on the map of the villa executed by Joseph de Urrutia, ca. 1767 (Figs. 7.2a, 7.2b), that he designated *"acequia para regadío."* East of the railyards, a series of laterals were taken to serve an expanding agricultural base during the eighteenth and, likely, into the nineteenth centuries. Some, perhaps all, might have been designated originally by an individual's name—as, for much of the nineteenth century, the "acequia de los Pinos" implies. Nevertheless, many of the ditches mentioned in the eighteenth century documents simply lack a formal name. Ditches (laterals, for the most part) appear frequently to have served as property boundaries, especially in eighteenth-century documents. The "mother ditch," today's Acequia Madre, was designated Number 11 by the New Mexico State Engineer hydrographic surveys of 1914, and all laterals then in use also were designated as Ditch 11, regardless of any common name applied by their users. Those common, earlier, names for laterals were not utilized by the State Engineer.

Figure 7.2a. Overlay of Urrutia's 1767 map with "Santa Fe Acequia Arterials, 17th–19th Centuries" in black, and "Proposed Courses of Former Laterals from the Acequia Madre Through the Santa Fe Railyards" (in orange) (D. H. Snow 1988).

Figure 7.2b. Approximation of the course of the "acequia para regadío," as mapped by Urrutia in 1767 and overlaid with City of Santa Fe streets and "Santa Fe Acequia Arterials, 17th–19th Centuries" (D. H. Snow 1988). Rectification of the Urrutia map was performed by Tara Plewa (Plewa 2009:186) and nudged east by OAS using the former location of La Castrense as a guide (Badner n.d.).

The Urrutia map of the villa in 1767 does not depict the complexity of the system of lateral ditches presumably in use at the time; but it is reasonable to assume that some of them had been constructed prior to the 1680 Pueblo Revolt, for example, Berger et al. 2008). Governor Otermín, for example, observed the Pueblo rebels, August 14, 1680, in the "*milpas de San Miguel*," the fields that supplied the Mexican Indian inhabitants of the *barrio de analco* (Hackett and Shelby 1942:98). Unfortunately, just how far south of the river those *milpas* extended is not known, but clearly they were irrigated by acequia waters.

As there is no indication of cultivated fields south of the river at the time, Vargas returned in 1692 and 1693, it is likely that any pre-Revolt ditches in the *barrio de Analco* (later designated, *de San Miguel*) were not in operation during the Revolt. With the influx of new colonists to the villa, in addition to returning former residents, documents from the early eighteenth century onward indicate the presence of considerably greater numbers of persons utilizing lands south of river for crops as well as for residential purposes. Several property transfers during the early decades of the eighteenth century refer to "ancient" and "old" ditches that might be suggestive of a more complex system of laterals than we might imagine. Neither their approximate locations nor dates of their inception, however, have been satisfactorily determined. It is likely that Santa Fe's gradual population growth during the eighteenth century required increasing amounts of land for cultivation and domestic purposes and, consequently, the addition of new acequias and laterals, or extension of formerly existing ditches (D. H. Snow 1988). Nevertheless, there are few references to construction of new ditches in surviving Colonial and later documents.

In the absence of specific reference points in documentary records, several factors preclude detailed examination of pre-railyard uses of the project area: (1) readily identifiable features, such as property boundaries, on the pre-Territorial period landscape; (2) the inability to identify many former land-owners, their properties, their heirs or ancestors; (3) failure of many former deeds to have been recorded; and (4) imprecise or multiple definitions of land and crop measurements cited in documents; and, (5) failure of most land transfers to provide either dimensions or the estimate of amount of seed (fanega, almudes, etc.) the lot might hold. That said, it is clear that lands south of the Santa Fe River were utilized by the villa's citizens for subsistence crops prior to the 1680 Pueblo Revolt, and there can be little doubt that those crops were irrigated via acequias taken from the river (Bergeret al. 2008).

Lot Sizes

Consideration of the size and locations of irrigated fields abandoned for use by the railroad facilities depends on dating the use-periods of identified ditches from documents or other means, and determining Colonial and later lot sizes from boundary descriptions, or agrarian and linear measurements utilized in northern New Mexico. For the more recent past, the distances between documented ditches crossing the railyards might provide an estimate of the width, at least, of irrigated acreage at the time of sale to the railroad companies. Whether such estimates bear any relation to earlier irrigated croplands, perhaps, is debatable. What is clear from surviving earlier maps, however, is the apparent failure of many of the cultivated lots in the vicinity to conform to the traditional "long-lot" pattern extending perpendicularly to the river and ditches. That seeming characteristic of the smaller river valleys north of Santa Fe is likely a function of the narrow land base of such smaller watercourses. With respect to the issue of lot configuration, an important question is the degree to which the cultivated lots depicted by Urrutia (or Gilmer, for example), reflect the actual, or merely "representational" configurations of cultivated fields south of the river (Fig. 7.2a).

The effort to determine Colonial lot sizes from documents is confounded, seemingly, by a variety of different translations from Spanish for both land and dry measure capacities (D. H. Snow 1990). I have, nevertheless, found what appears to be a useful approximation from the memoirs of Mrs. Russell in the 1870s in New Mexico. As a trader's wife in Tecolote, she remarked that a "*fanega*" was, by measurement, "about two and one-half [American] bushels" (Russell 1954:118). Assuming this was a standard measure in New Mexico, I turn to Fray Atanasio Dominguez's figures, in 1776 (Adams and Chavez 1954:30–31), in which he described the acreage upon which the *parroquia* at Santa Fe was dependent for its sustenance. He notes that the "garden" measured 274 by 172 *varas*, figures that yield a number of 8.18 acres (a *vara* equaled roughly 33 inches). The returns, he said, from one and one-half fanegas of wheat seed might yield 15 fanegas harvested; if in corn seed, in the amount of three *almures* (one almud equals one-half an American bushel, according to Cobos [1983]), the return amounted to some 12 fanegas of corn (I assume, shelled, the same as seed). How accurately, or not, these figures might reflect dry-quart plantings and returns in earlier documents is simply not known.

A sample of lot measurements from Colonial and Territorial period deeds to properties south of the river indicate a variety of configurations and sizes that scarcely resemble the more or less neatly squared lots depicted by Urrutia and Gilmer. Fourteen lots for planting grants in Series I of the Spanish Archives, an average of roughly five acres/lots is indicated. For example: a 1755 parcel measured 140 varas from north to south and 104 varas in width (ca. 0.9 ac). It was bounded by two arroyos and an "*acequia madre que vaxa de la sierra*," [a mother ditch that comes down from the mountain], and another acequia (SANM I:408). A 1774 lot measured 171 and three-quarters varas north to south, and 56 varas, roughly 1.66 ac (SANM I:119). A lot measured in 1866 was 90 by 23 varas (ca. 0.47 ac; SFCD Bk H:434); the New Mexican vara, nearly equivalent to the English yard and feet, was 84 cm long, or 33.4 inches (Boyd 1954:46). The same dimensions were expressed in 1876 in feet, using three feet to the vara. Fourteen parcels of planting lands adjacent to and west of the railyard and Cerrillos Road, between the New Mexico School for the Deaf and Agua Fria Street, in 1914, averaged only about three acres.

The lots described above were longer north-to-south than wide. Assuming that the ditches that crossed the railyards were constructed in the eighteenth century, the distance between them today (from north to south) is roughly 500 feet (ca. 150 m, or roughly 150 vara). At present, confined by Cerrillos Road to the east and by the railyards, there is no way to estimate the length of the original lots.

Unfortunately, the 1914 Hydrographic Survey maps of fields irrigated from the south-side ditches do not include properties within the limits of the city's league square grant, that is, within the railyards. Beyond, west of the railyards, however, the lots reflect a crazy-quilt pattern of shapes and sizes that belie the traditionally perceived New Mexican long-lot pattern. Efforts to trace backward in time the formation of lots depicted on Hartmann's 1882 map is not feasible for this report, certainly a time-consuming task. Many of them, by that time, for example, reflect reduction in size through inheritance, and other factors, and it is highly likely that many of the 1882 lot configurations no longer reflect earlier shapes or sizes. Comparison of the various later maps, especially further west down river in Cieneguitas and Agua Fria Village, nevertheless, do indicate patches of long-lot holdings, most frequently extending back (south) from the river itself.

Acequias

The Acequia Madre, the same ditch identified as the "*acequia para regadío*" depicted in 1767, is today diverted from the Santa Fe River at a point a short distance easterly of East Alameda Street near its intersection with Lower Canyon Road. The take-out consists of a concrete channel and an iron gate, with a wheel to raise and lower the gate, apparently installed, in the 1980s. Similar facilities are present at diversion points (*contra-acequias*) for the Acequia de la Loma and the Ranchitos ditches (D. H. Snow 1988), but laterals taken from the Acequia Madre further west must have depended on less substantial structures, for no evidence exists today for such diversion features on the Acequia de Analco or the "Manhattan Street Ditch" (the former Juan Diego Romero ditch). Mr. Phil Bové informs us that the metal gates and turn-wheels on several of the laterals from the Acequia Madre were installed under his supervision, as Majordomo, ca. 1984. Previously, he said, the diversions were simply of branches and stone arranged to divert water into the laterals when needed.

Because these ditch names are given in documents dating after the annexation of New Mexico by the United States, and because ditches and laterals were seldom (if ever) provided with names in the Colonial documents, there is no way to correlate the "modern" names with active ditches during the Colonial (or later Mexican) period. References in eighteenth-century documents to a "deep ditch," to an "ancient ditch," or to those that formed property boundaries, do not appear to have been named by the colonists (except for those found in D. H. Snow [1988]). Not until the Territorial period did ditches and laterals appear to have acquired the names by which they are known today.

A major lateral, today referred to as Arroyo [de los] Tenorio[s] ("*de las cruces*," or "*crucitas*"), today is diverted by a metal culvert beneath the intersection of Garcia and Acequia Madre streets (D. H. Snow 1988). As the Tenorio ditch no longer carries water, the culvert directs water into the ditch once called "*del Pino*," or "*de los Pinos*" ("los Pinos") running along today's Pino Street, before crossing Old Santa Fe Trail immediately behind (south of) Kaune's Grocery Store near Paseo de Peralta. It is this latter ditch that carries the name "Acequia Madre."

The former take-out for the Acequia de Analco, still visible as a break in the Acequia Madre immediately east of Garcia Street, must formerly have had a wooden "gate" (for example, Ackerly et al. n.d.). Similarly, the same arrangement must once have existed at the take-out point for the Juan Diego Romero ditch from the "los Pinos" ditch, a short distance west of Don Diego Street (McIntosh and D. H. Snow 2005a, Plate 5). The contra-acequia that formerly divided the Analco ditch at the former Delgado home, also is no longer visible, except perhaps as a cement walkway on the south side of the present restaurant.

An Alcalde's bando of 1813 (although proclaimed in the Jemez district) describes a situation that might once have been present within or adjacent to the southern end of the railyard:

> Those who must irrigate by bringing water from up above another ditch, should construct a flume (canoa) wherever the waters cross, so that owners of the other ditches will not be harmed and to avoid theft of waters which might otherwise be made under the pretext of emptying water from one irrigation ditch to another. (Simmons 1968:8).

There is no visible or documentary evidence, that Arroyo Tenorio continued west down what is today Sierra Vista Street (D. H. Snow 1988). Its waters possibly were diverted to form an ice pond at the eastern head of Sierra Vista where an ice-house is depicted (Fig. 7.3). As a result, the Tenorio ditch must have crossed over (or under) a major lateral from the "los Pinos" ditch running southwesterly along the edge of the earlier alignment of Cerrillos Road (D. H. Snow 198, Fig. 4) as far as the New Mexico School for the Deaf, adjacent to the present Lamy branch tracks. That branch of the "los Pinos" ditch, apparently, emptied its waters into the San Antonio ditch near the intersection of present St. Francis Drive and Cerrillos Road (D. H. Snow 1996). This ditch may reflect the former course of the Acequia de Analco, which continued down today's Aztec Street (formerly an alley) and aligned with the Romero Street wye (Scheick et al. 1991, end map) and with the northern property boundary of J. Hesch.

The mean width of 23 existing ditch segments surveyed by the author in 1988 was 2.8 feet (0.85 m), the greatest width in one case was slightly greater than six feet (1.8 m). Depth could not be reliably estimated since most of the no-longer active ditches have been filled in or modified beyond their original configurations. Stream-flow volume of the Santa Fe River, calculated by Tara Plewa (reflecting monthly averages; personal communication, October 29, 2009) decreased from some 10,000 acre-feet between 1600–1745, to about 8,500 acre-feet from 1750 to 1970. These figures are significant for estimating acequia discharge—the greater the number of ditches, the lower (in theory) the discharge in a given ditch—depending on how many were in use at one time, and the amount of cubic feet per second (cfs) in the river. The mean for those ditches was 4.278 cfs and ranged from an estimated 17 cfs (Ditch # 31, west of Agua Fria Street) to 0.7 cfs (upper East Alameda Street). Unfortunately, the 1914 hydrographic survey did not measure cfs for the Acequia Madre (Ditch 11) or its various laterals that crossed the railyard.

Physical characteristics of the acequia segments encountered and recorded during railyard excavations, at least in terms of their width, are well within the range of the mean (and one standard deviation) of those measured in 1988. While none of the measurements of ditch remains encountered during OAS excavations is excessive with respect to those measured in 1988, I note that the north-side Jones Ditch measured slightly in excess of 6 feet in width, carrying sufficient water for the landowner's large orchards. The Arroyo San Antonio, after being joined by a southwesterly lateral from the Acequia Madre/los Pinos ditch, along the northern edge of the New Mexico School for the Deaf (D. H. Snow 1996), was a minimum of 6 feet in width for much of its observed course, and also watered extensive orchards.

Figure 7.3. William White survey map (D. H. Snow 1988, Figure 36; NMSRCA) of Santa Fe property and landowners, ca. 1898. Note the "Ice Co. Grant pond" and "Ice House" at the head of today's Camino Sierra Vista Street.

Territorial and Statehood: Irrigation and Land Use

Each of the laterals mentioned—as well, of course, as the Acequia Madre/los Pinos ditch—once coursed through the railyard. Today, only the Acequia Madre remains an active ditch, but no longer carries its meager water through Santa Fe's railyards. From north to south across the railyard at least six laterals from the acequia madre, as well as that "mother ditch," coursed westerly through the railyards to serve cultivated fields. From north to south, these are identified by the following names: Acequia de Analco, an unnamed arroyo or ditch along Montezuma Street, "acequia de Diego Gonzales," "acequia de Juan Diego Romero" (Manhattan Street Ditch), Acequia de los Pinos (also known as Acequia Madre), Acequia Tenorio (aka, "*de las Crucitas*"), and Baca Street lateral. Although an arroyo is referred to in an 1846 deed along what is today Montezuma Street (D. H. Snow 1995), I have been unable to determine when it last carried irrigation waters (projected replacement of underground facilities down Montezuma Street might be able to identify this feature (Lakatos, personal communication 12/2009). These are further identified and described below:

Acequia de Analco: At the terminus of the AT&SF wye at Romero Street, a lateral is shown on a map of the "Santa Fe Operation Records" (Crump Collection; C. T. Snow 1991:69, and end map of Operations). This was the Acequia de Analco lateral from the Acequia Madre, in use in the nineteenth century (Santa Fe County Deed Books, hereafter abbreviated, SFCD Bk H:454, 1866, Bk F-1:598, 1897; and Cordova 1981:58, the Larragoite House at 803 Agua Fria). Originating at Garcia and Acequia Madre Streets, it coursed through Christian Brothers (St. Michael's) property to a point in front of today's Rio Chama Restaurant (formerly, the Delgado home; McIntosh and Snow 2006), where a contra-acequia was diverted from it. The Analco ditch apparently then coursed somewhat northwesterly and ran parallel to the south side of De Vargas Street (although this is an assumption that was not field checked in the 1988 survey).

The course of the Analco ditch east of the railyard most likely is indicated in a 1930 plat prepared by surveyor Walter Turley (Fig. 7.4) on which is noted the "ruins of irrigation ditch (acequia)" directly aligned and west of Manderfield Street. Manderfield Street was constructed ca. 1900, following an eight-year delay because of (unidentified) land acquisition issues, possibly relating to water rights from the Analco ditch. Originally designated North Capitol Street, the name was changed to Manderfield in 1912 (Sze and Spears 1988:75–76). From Manderfield Street, the ditch obviously crossed Galisteo Street and might have coursed along what is now either Aztec Street or today's Montezuma Avenue (C. T. Snow 1995), along which formerly ran an acequia as late as 1881 (a likely a lateral from the Analco ditch (D. H. Snow, in preparation). Crossing the northerly portion of the railyards, I believe it is that ditch identified as the "Romero Street wye" (C. T. Snow 1991:69), and its approximate course beyond that feature is likely depicted as the north property line (in part) of land belonging to J. Hesch in 1912 (Fig. 7.5; not indicated on Fig. 7.1). It was still referred to in 1929 as the Analco ditch (SFCD Bk V-ms:228) as far west as the present intersection of Irvine and Agua Fria streets (803 Agua Fria).

The contra-acequia Analco: a lateral from the Analco ditch. Although no longer visible at the take-out in front of the former Delgado house, its course might be reflected today by a narrow walkway between the State Capitol grounds and the Guadalupe Café (off Old Santa Fe Trail, north of Paseo de Peralta). Its westerly course is documented as having run along today's South Capitol Street (D. H. Snow 2009a,b), a course that aligns well with the 1892 William White property survey sketch that depicts a "small old acequia of Diego Gonzales" (C. T. Snow 1995; Fig. 7.6). The apparent distance from the ditch to the northeast corner of "Penitentiary Road" (today's Cerrillos Road), at Montezuma Street, is indicated as 265 feet. Although the configuration of that corner has been considerably altered in subsequent years, the distance is approximately the same as that of today's Garfield Street; and I suspect the acequia of Diego Gonzales, as White labeled it, was a continuation of the Analco contra-acequia, no longer in use. Diego Gonzales and his wife and children are identified in the 1880 U.S. census, and his neighbors include John Allen (and wife Eleuteria Gallegos), and Jose Rafael Baca. Unfortunately, the census does not include street names, but the proximity to Allen and Baca, shown as contiguous land-owners on the 1880

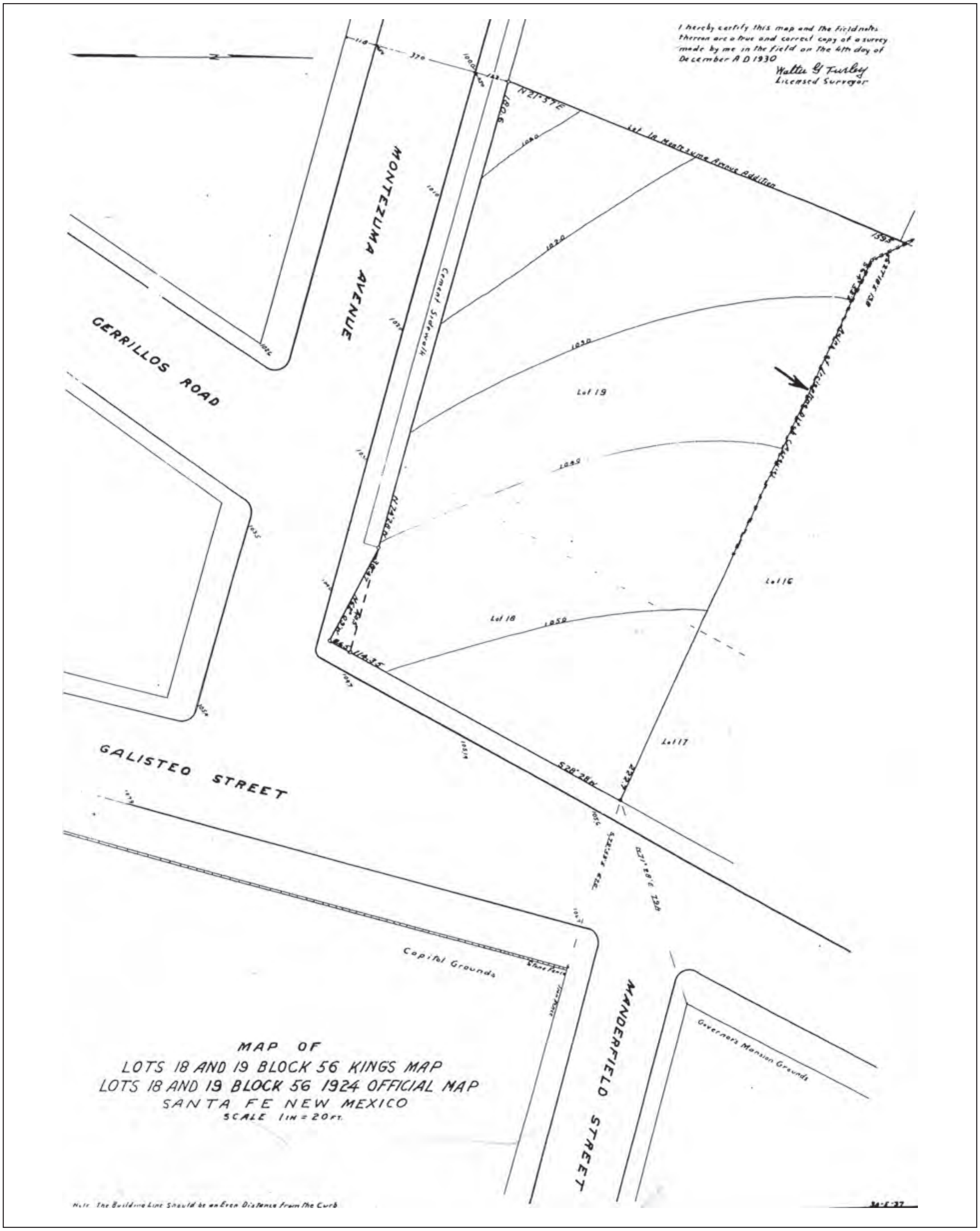


Figure 7.4. Walter G. Turley survey map of property west of Manderfield Street (North Capitol) and Galisteo Street, 1930. Note "ruins of irrigation ditch (acequia)." The author believes this site reflects the former course of the Acequia de Analco which course continued down today's Aztec Street (formerly an "alley"), and aligns with the "Romero Street wye" (Scheick et al., end map), and with the northern property boundary of J. Hesch (see Figure 7.5) (D. H. Snow 1988, Figure 32; CPWD).

plat map of the New Mexico and Southern Pacific Railroad; Fig. 7.7) suggests the vicinity of today's Garfield Street. That it is identified in 1891 as an "old" acequia suggests that it no longer was operative at the time surveyor White mapped it.

Juan Diego Romero ditch: South of the Analco contra-acequia, or Diego Gonzales ditch, along Manhattan Street (possibly, "camino de los arces," either Manhattan or Hancock Street?), was a lateral once referred to as the "Juan Diego Romero ditch." It was diverted from the acequia madre/de los Pinos a short distance west of Don Gaspar Street (McIntosh and D. H. Snow 2005a:30, 43). Insofar as I have been able to determine, this lateral continued west along Manhattan Street at least as far as present St. Francis Drive. A 1900 sale of property from Canuto Alarid to his son Ricardo—for whom Alarid Street is named (Canuto's wife was Guadalupe Britton de

Figure 7.5. Portion of King's 1912 Official Map of Santa Fe. Note the north property line of "J. Hesch" that begins at the northeast corner of the "Romero Street wye." The author believes this line reflects the former course of the Acequia de Analco.

Alarid, an error for Brito; see below) was bounded north by the acequia and Manhattan Street, suggesting the active use of the ditch at the time (SFCD Bk F-1:513). Juan Diego Romero is identified as a resident in the general neighborhood in the 1850 U.S. census, and might well be the man for whom the ditch took its name, perhaps the grandfather of the Jose Feliz Romero who sold adjacent property to the AT&SF Railroad (see below).

The Acequia Madre: Presumably the same as Urrutia's 1767 *"acequia para regadío,"* it no longer carries water through the railyards along Hickox Street. The path along this ditch became known as Hickox Street (for the Hickox Addition) as far as its junction with Agua Fria Street, where it is assumed it returned some of its waters to the Agua Fria Street ditch (D. H. Snow 1988). Prior to the more recent application of the name, Hickox Street, its course was

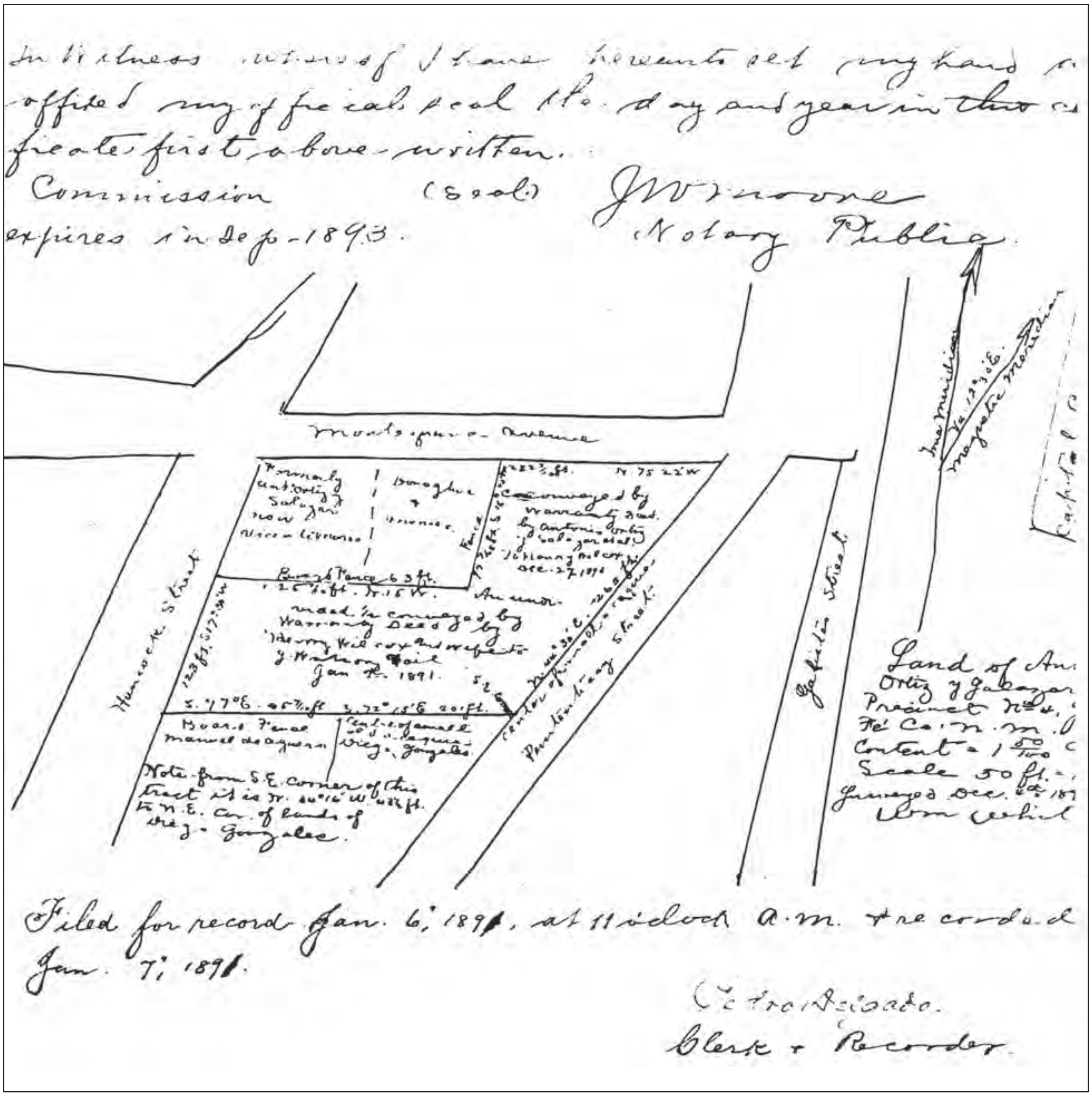


Figure 7.6. 1892 survey map by William White of property at the southwest corner of "Penitentiary Street" (today's Cerrillos Road) and Montezuma Avenue. Note "centre of small old acequia [of] Diego Gonzales" between Penitentiary and Hancock streets.

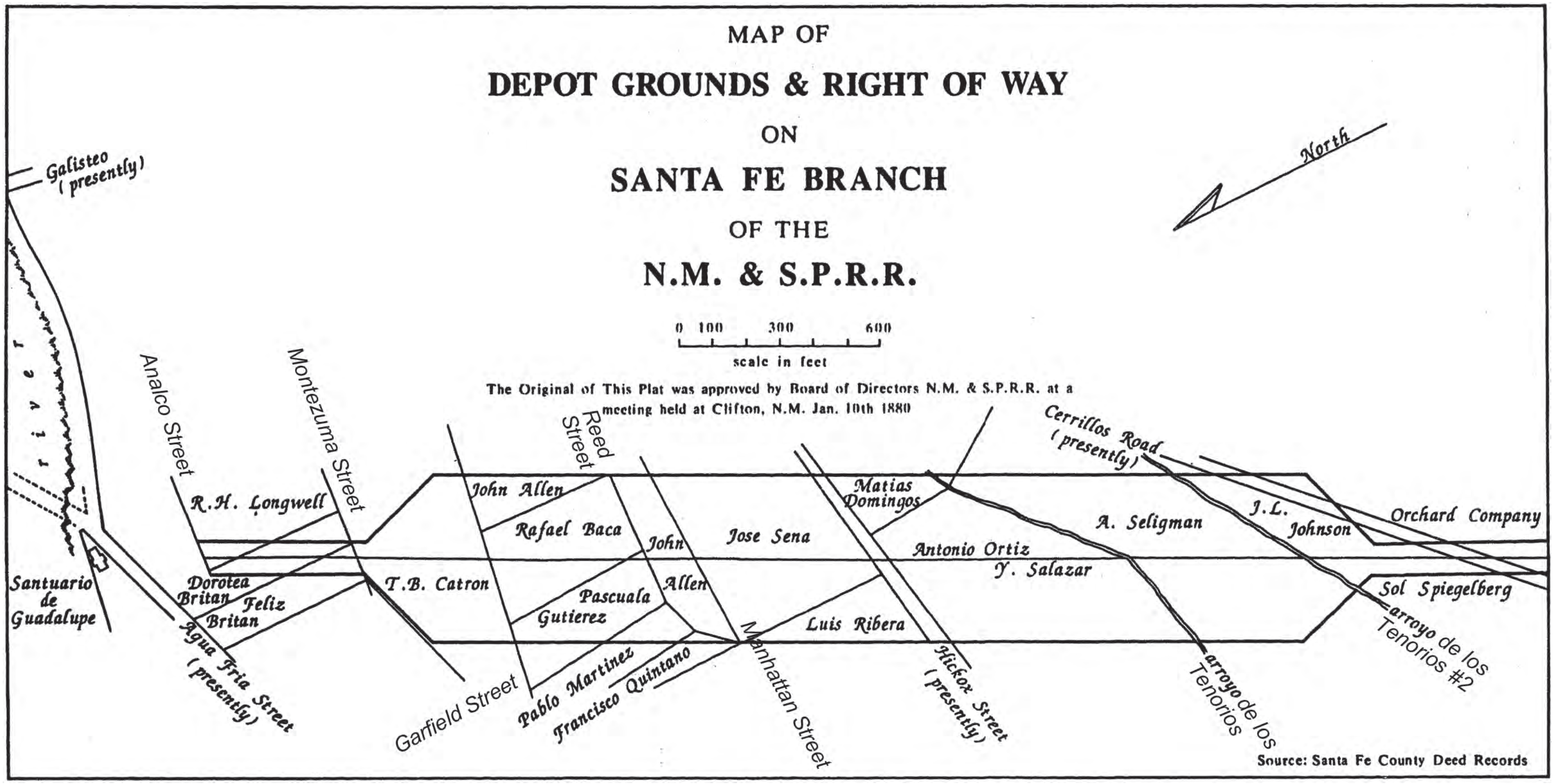


Figure 7.7. 1880 plat of railyard property purchases by the New Mexico and Southern Pacific Railroad. Each of four oblique lines shown crossing the railyards from approximately east to west, and north of the double line indicated as Hickox Street delimit individual properties purchased by the NM&SP RR in 1880. Note the two "arroyos" crossing the area. To the south is the Acequia de los Pinos (Acequia Madre) paralleling Cerrillos Road (far right). To the north is, apparently, Arroyo Tenorio ("las crucitas"). I believe each reflects a former ditch and can be identified as (from south to north) Manhattan Street and the Juan Diego Romero ditch; Garfield Street and the "contra-analco acequia;" Montezuma Street and an unnamed ditch; and the Analco ditch, perhaps alongside Analco (de Vargas) Street (D. H. Snow 1988, Figure 17; City of Santa Fe Planning Department).

known as the "los Pinos" ditch, and the "path" referred to as the "road to Pinos ranch."

"Romero Street wye ditch": The identity of this ditch (C. T. Snow 1991) is unclear; but both the Analco and "contra-analco" ditches are likely candidates. What apparently was another lateral from the Acequia Madre paralleled the Santa Fe Central Railroad along the north side of the New Mexico School for the Deaf and Fairview Cemetery (Hydrographic Survey Map, Ditch No. 11; Fig. 7.8). Some distance to the north, along what is certainly Hickox Street, the same sheet also depicts Irrigation No. 11. A short distance north of the latter is shown Agua Fria Street with its own ditch (No. 17). Clearly, then, a major lateral from the "acequia madre" diverged at some point—I assume, at the intersection of today's Cerrillos Road at Paseo de Peralta—paralleling the former and the railroad tracks before veering westward and then southwesterly behind the Indian School (Fig. 7.9). That both "arms" of the Acequia Madre were called, contemporaneously, "de los Pinos" and "del Pino" likely is cause for confusion to the reader. Both D. H. Snow (1988) and Maxwell (1988) contain discussions of this same issue).

Acequia los Cruces ("las crucitas"): South of the Hickox Street segment of the "del Pino," or Acequia Madre, was yet another lateral from the "main ditch" (SFCD Bk P-4:451) in 1930, that is today's Arroyo Tenorio (Fig. 7.2a). Its westward course across today's Guadalupe Street lay a short distance north of the intersection with Cerrillos Road at the southern end of the railyards. Taken out at the western edge of Garcia Street, at the head of today's Arroyo Tenorio Street, it was referred to as the "Tenorio acequia" in a 1901 deed (SFCD Bk G-1:268). It is elsewhere suggested (D. H. Snow 1988) that this major lateral eventually ran west down what today is Sierra Vista Street (Fig. 7.9), and might well have provided water for a former pond and ice-house adjacent to the railyards (Fig. 7.3). Its course west of Cerrillos Road is no longer visible (Maxwell 1988).

"Baca Street" ditch: I am unclear about the "origin" of the "Baca Street" ditch, but I suspect that it was a continuation of the former lateral from the Acequia Madre that was taken out at the west edge of Garcia Street, at the head of today's Arroyo Tenorio (D. H. Snow 1988). Also consistently referred to in documents during the nineteenth century as the "*acequia madre*," this former lateral coursed west along Buena Vista Street, crossing Galisteo Road before at least one additional lateral was taken from it that ultimately ran down Columbia Street, across Pacheco Street and, perhaps across Cerrillos Road to Baca Street. From there, apparently, its waters were emptied back into the "main" ditch ("*del Pino*" lateral) near the intersection of Baca and Potencia Streets (D. H. Snow 1988; Maxwell 1988).

Arroyo San Antonio ditch: Running along the southernmost edge of the railyard, crossing today's St. Francis Drive (and two sets of former rail tracks) slightly southwesterly of the intersection with Cerrillos Road, was the "arroyo San Antonio" (D. H. Snow 1988, 1996). The 1988 acequia survey (D. H. Snow 1988:19) was not able to satisfactorily determine the head of this long ditch. That it remained operative well into the twentieth century (post-1943), presumably after receiving additional waters from the "del Pino" lateral (or perhaps, arroyo las cruces?), is evident from the fact that it contained occasional trout that furnished food for students at the New Mexico School for the Deaf (Mrs. Marian Meyer, personal communication, in D. H. Snow 1988).

Unidentified Cerrillos Road ditch: Possibly contributing irrigation waters to the Acequia Madre laterals just described, was an unnamed ditch along the west side of "Penitentiary Road" (Cerrillos Road today) indicated on a survey map (Fig. 7.6), between Montezuma and Garfield Streets. Identified simply as a "small old acequia" by the surveyor, it clearly ran perpendicularly across the Diego Gonzales acequia down what is now Garfield Street; and its waters either were carried by a flume (canoa) or bridge across the former; alternatively, the Gonzales ditch no longer was active by 1890. Possibly this unidentified ditch was a small lateral from the main Analco ditch below West De Vargas Street.

Tentative concordance of these ditches with field observations reported in the various railyard archeological investigations (Wenker and Hannaford 2005b; Wenker et al. 2005) follow:

LA 146407. Formerly identified as a segment of the former Acequia de Analco, in the North Guadalupe portion of the yards by the archaeologists, this likely is a segment of the Manhattan Street Ditch ("Juan Diego Romero" ditch).

LA 146408. Identified as a "*sangria*" (perhaps, also, "*veta*," vein) taken from the larger ditch represented

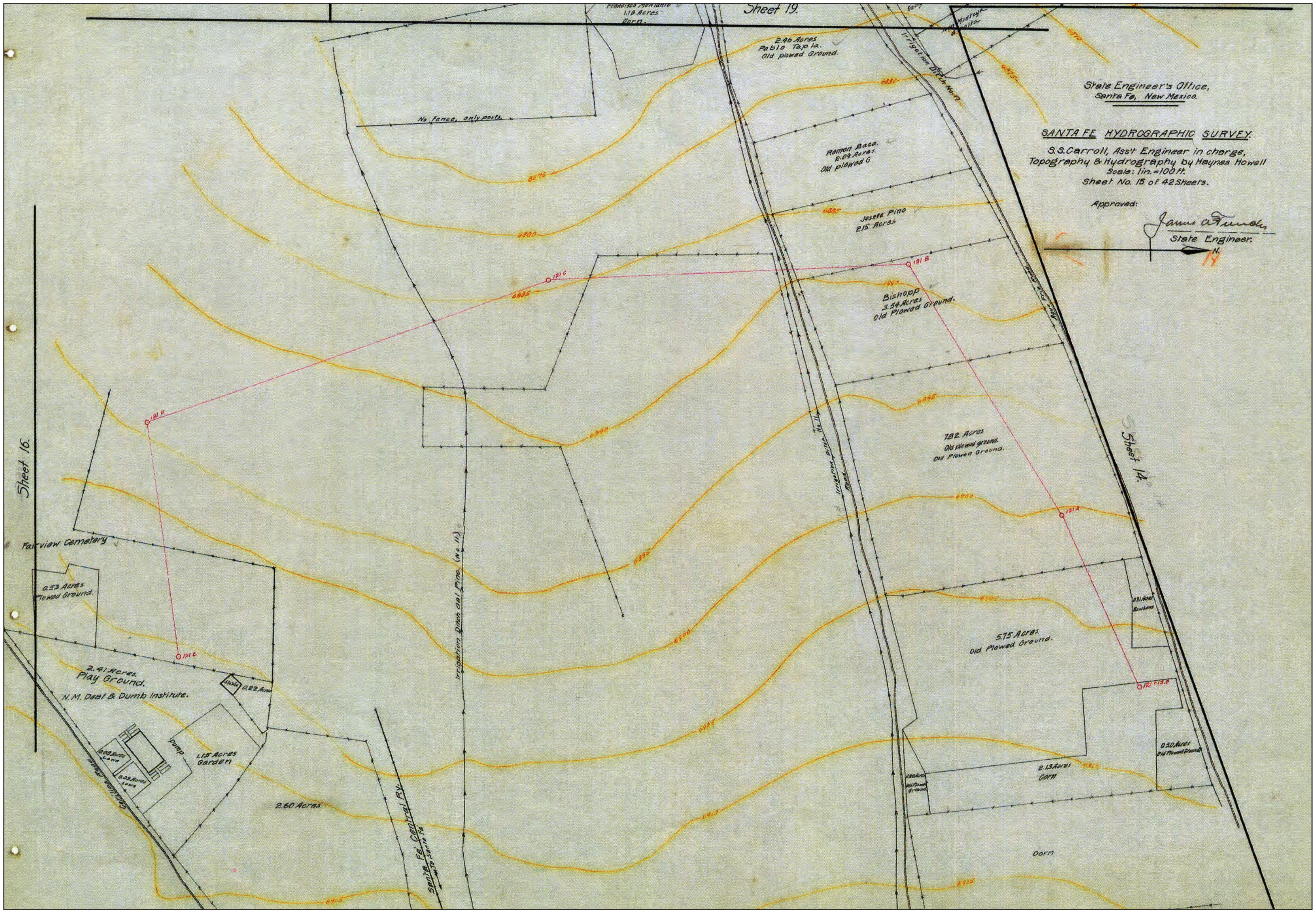


Figure 7.8. Portion of Sheet No. 15, New Mexico State Engineer's Office 1914 Hydrographic Survey. Two branches of the "Acequia Madre" are labeled "de los Pinos." The northernmost of the two most likely was that formerly paralleling Hickox Street.

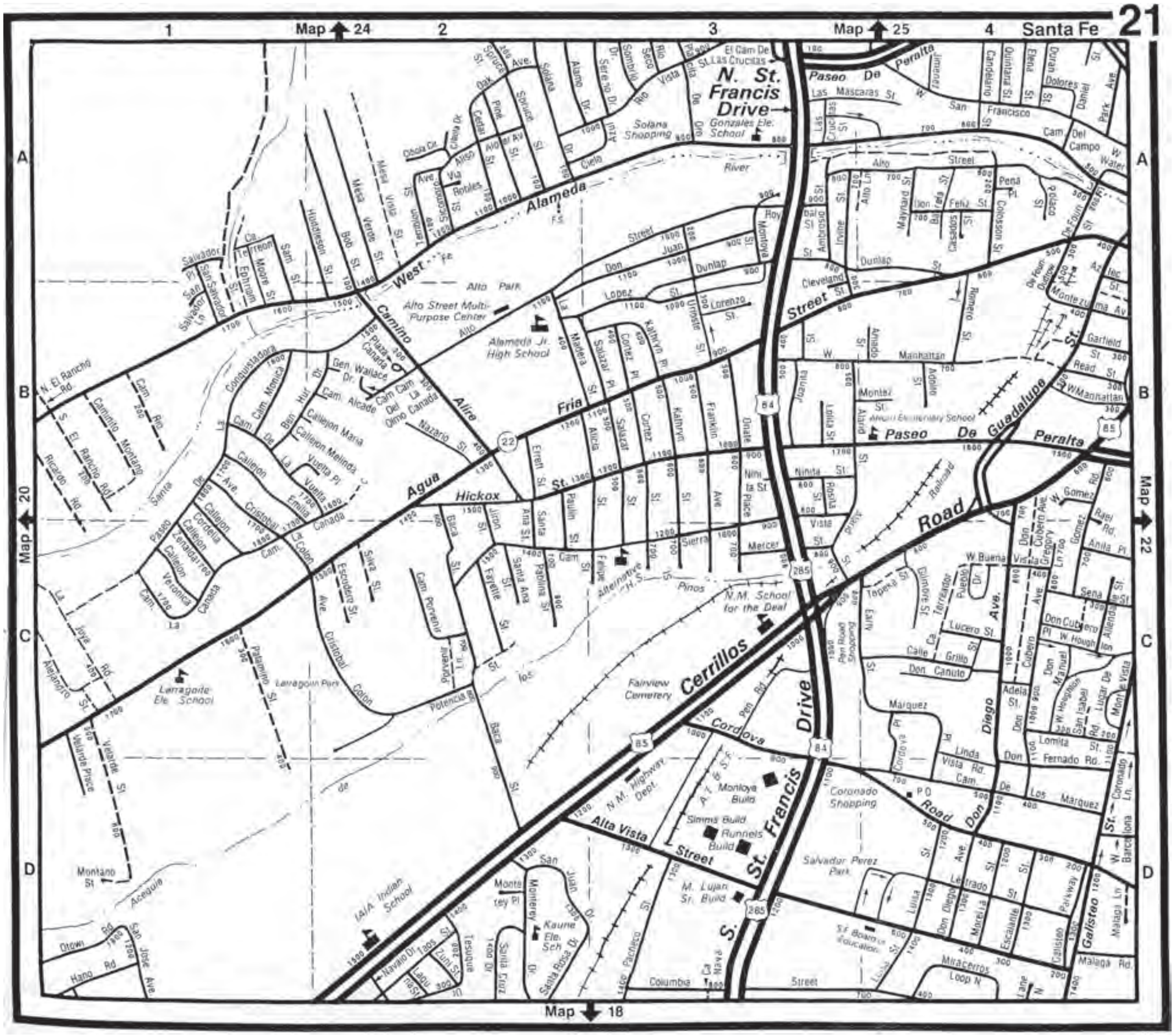


Figure 7.9. Copy of the Horton Family Maps (1988), Map No. 21, showing the southwesterly course of the "Acequia de los Pinos" after its intersection with Arroyo San Antonio ditch (see Figures 7.1 and 7.8).

by LA 146407 to provide water to an individual plot of cultivated ground west of the railyard; but is superimposed on the Manhattan Street segment (LA 146407) along Guadalupe Street. The alignment would fit the function of a small feeder channel, but I have been unable to identify the specific property in question.

LA 149409. The "los Pinos" ditch, today's Acequia Madre, a lateral which formerly flowed due west down what is today Hickox Street as far as Agua Fria Street.

LA 146410. Identified as a segment of the "los Pinos" ditch, presumably a continuation of LA 146909.

LA 149912. Acequia Tenorio, or "las Cruces" (or "crucitas"), which flows west a short distance north of the intersection of Guadalupe Street and Cerrillos Road; possibly what now is Sierra Vista Street, formerly called "arroyo de en medio." It appears from the White map, ca. 1898 (Fig. 7.3), that an "ice-house" might have been associated with this ditch, water having been diverted, perhaps, to a pond and, thence re-diverted to the arroyo de en medio (Camino Sierra Vista; Maxwell 1988).

LA 120957. This is most likely the lateral from the Acequia Madre that eventually ran behind the New Mexico School for the Deaf, initially paralleling Cerrillos Road to St. Francis Drive along the railroad tracks; designated by the Hydrographic Survey as the “los Pinos” ditch (No. 11).

LA 146418. Unnamed ditch segment aligned east–west through the Baca Street parcel, aligns approximately with Alta Vista Street; possibly a lateral from the Luisa Street segment of the Acequia Madre (D. H. Snow 1988:Sheet 21), prior to crossing Pacheco Street (C. T. Snow field survey, personal communication 2/2009). It appears that water from this ditch eventually emptied into the “los Pinos” lateral from the Acequia Madre west of the Indian School (Fig. 7.9).

In the preface of the 1919 Santa Fe River Hydrographic Survey report is included a petition from three hundred and six owners of lands irrigated from the river, who requested of the State Engineer, in 1914, that:

> he cause to be made a Hydrographic Survey in order to fix and determine the extent, character and proportionate part to each in the legal right to said Waters (petition addressed to Honorable James A. French, New Mexico State Engineer Office. (1919).

Of the 32 irrigation ditches extant in 1914, only 23 were operable. They provided water to some 1,267 acres of land under cultivation. The 1919 hydrographic report, based on actual field measurements, categorized those various plots of irrigated land as lying under alfalfa, beans, corn/wheat, and lawn. Table 7.1 summarizes the number of acres irrigated by ditches based on Kings’ 1912 block numbers, which were assigned on both sides of the railyard. It is important to note that the majority of the cultivated acreage calculated by the Hydrographic Survey lay west of the railyards, thus sub-totals per block do not add up to totals for each category of crop.

In 1914, the commissioners for Ditch 11, the “Acequia Madre,” were Canuto Alarid, Candelario Romero, and Hilario Apodaca. Canuto’s property was west of the railyard between the Manhattan and Hickox ditches; I cannot identify Romero and Apodaca. (Additional information on the Alarid family is provided in D. H. Snow 2009a,b.) The overall length of the ditch (presumably, not counting laterals) was 7.6 miles; the “area of average section” was 4.4 square feet; the slope was 0.009, and its capacity was 17.7 cfs. The gross duty of water (calculated from March 24 to October 31) was 3.7 acre-feet per acre. The greatest discharge month was May (501.92 second-feet); the least, October (31.55 second-feet cfs). The total number of acres irrigated from Ditch 11 was given as 464.5 acres, 122.7 of them within the city’s grant boundaries.

Of 70 parciantes on Ditch 11 in 1914, only five east of the railyards were Hispanic. Irrigated lands immediately west of the railyard were owned by Ricardo Alarid, T. C. Bacon, Apolonio and Panfilo Martinez, Josefa Pino, and Canuto Alarid], for whom Alarid Street is named (Alarid 1997; D. H. Snow 2009a). The father of Ricardo owned property adjacent to the west side of the railyards, abutted on the south by West Manhattan Street in the nineteenth century, but it is unclear which acequia(s) the Alarids might have utilized—Manhattan Street Ditch or Hickox Street Ditch—or perhaps the Analco Ditch.

T. C. Bacon’s property lay between today’s Sierra Vista Street and the railway right-of-way along the northwesterly side of the School for the Deaf (Fig. 7.8). His property was not cultivated at the time (as it was, by then, part of the Hickox Addition), but formerly should have been irrigated from the Tenorio ditch. The Martinez family properties lay below the Analco ditch running westerly along the south side of Agua Fria Street; while Josefa Pino’s property lay further west.

Unfortunately, the 1914 survey did not distinguish among the various laterals from the Acequia Madre, referring to all simply as “Ditch 11” on the field sheets. Thus, even though it is clear that areas immediately west of the railyards were still under ditch irrigation in 1914–1919, it is not possible to identify precisely just which of those laterals irrigated the blocks indicated in Table 7.1. The grounds of the School for the Deaf, Fairview Cemetery, and the Indian School were clearly watered from both the Acequia Pino lateral, and the Arroyo San Antonio acequia (D. H. Snow 1988; 1996). Lands between Hickox and Manhattan Streets were irrigated from the Acequia Madre/los Pinos ditch within the memory of former residents (D. H. Snow 1988:15), most likely from the Hickox Street segment (rather than from the Juan Diego Romero lateral down Manhattan Street).

As late as 1946, Manhattan, Read, Aztec, and Garfield Streets were still unpaved (Sze and Spears 1988:68), but the city’s water main had been extended, by 1926, along Manhattan west of the railyard. By 1912, South Capitol Street had been laid out (Sze and Spears 1988:76), but whether the "Diego Gonzales" ditch from South Capitol Street was obliterated as a result, I have not determined. Both would have crossed the railyards in the nineteenth century. C. T. Snow (1991:64–65, 68) indicates that the city's water main extended into the east side of the railyard by 1894, and by 1898 supplied the water crane in the yard.

The original diversion structures for these ditches, except for the Juan Diego Romero lateral, are no longer visible. Prior to the familiar iron gates (see photos in D. H. Snow 1988; Ackerly et al. n.d.), diversion features consisted of rock and/or timber and brush "dams" that turned river waters into the head of the ditch; and similar features can be assumed for laterals off the acequia madre. With the advent of lumber mills in northern New Mexico, many head-gates were constructed of milled boards (Ackerly et al. n.d.:233–234), few of which remain anywhere and, likely, did not have a long "shelf-life" unless treated with creosote.

Pre-Railyard Land Ownership

There is no documentary evidence that lands immediately west of the future railyards prior to ca. 1879 served any purpose but pasture, cultivation, and residence. It is clear that those lands were served by active ditches as late as the 1914 hydrographic survey and, in most cases, for some years after that date. Several tracts identified under irrigation in 1914 are shown on Sheet 12 of that survey (see below). Whether any of the tracts identified were cultivated under a tenant-owner agreement is moot in the absence of records to that effect (SFCD books do not record such transactions). While it is possible that some of the acreage identified under ditches were treated with modern equipment, such as tractors or other farm machinery, the majority simply were too small to warrant the expense of purchasing such equipment, particularly for the many small lots indicated on contemporary maps. Traditional practice—using horse/mule- (or oxen) pulled "hand-plows" with subsequent maintenance of the fields by family members—was probably not replaced by expensive machinery; and I can locate no documentary or oral evidence to the contrary.

The following tracts west of the yards are identified by the hydrographic survey (Sheet 12) in 1914:

Panfilo Martinez, 1.05 acres under corn
Unidentified owner, 3.46 acres of plowed land
[?] Alarid, wheat [no acreage provided; probably Ricardo Alarid, whose land spanned the city limits adjacent to the railyard]
Unidentified owner, 1.91 acres in wheat
Unidentified owner, 13.3 acres of plowed land
Apolonio Martinez, 2.24 acres under corn
Unidentified owner, 5.36 acres under corn

Additional landowners irrigating from Ditch 11 were identified west of the railyard between Manhattan and Hickox Streets by the 1978 hydrographic survey team, as follows:

King's 1912 Block 124/Lot 1: Antonio Alarid (brother of Ricardo), 2.48 irrigated acres
King's 1912 Block 67/?, [?] Hesch: 0.74 irrigated acres (possibly W. Hesch?)
King's 1912 Block 124/2, 3: Nicolasa Gutierrez, 2.33 irrigated acres
King's 1912 Block 124/6, 7: Isaac Harrison, 2.15 irrigated acres
King's 1912 Block 124/5: Ricardo Alarid, 1.86 irrigated acres
King's 1912 Block 123/1: Chas J. Bacon, 10.82 irrigated acres (possibly from the "los Pinos" ditch)

There is no evidence in any repository for the existence of ditch association records kept by ditch *parciantes* or *mayordomos* (the exception being recent records in possession of Phil Bové that provide no information on pre-1950 ditch data). If such documents exist, they remain in family hands and have not come to light. Hordes and Payne (1991:42–47) have provided a brief review of land ownership prior to the railyard purchases by the AT&SF Railroad Co. between 1879 and 1885 (Scheick et al. 1991, end map). Eight, possibly nine of those named on the map were traditional subsistence farmers, each of them native New Mexican Hispanics. Luis Rivera, a non-native, born in "Mexico" (Texas, while still claimed by Mexico), and Ortiz y Salazar (and, perhaps, Matias Dominguez, a blacksmith), like the Anglos identified, had purchased their properties for speculative purposes, as none of them were farmers. Using the 1880 base map, Hordes and

Payne attempted to trace the ownership history of 16 individual railyard tracts (Scheick et al. 2003, Fig. 2.55). Some of their interpretations require correction, as several of Hordes and Payne's errors have been repeated. Moreover, the amount of land purchased for the railyards is nowhere provided in the earlier report edited by Scheick (1989). The New Mexico State Records Center and Archives collections contain an undated field survey map of 22.1 acres in the railyard, but neither abutting owners nor reference to prior ownership is noted; the only notation to existing features is an "adobe wall" at its north edge. The map is in extremely poor condition and cannot be duplicated, and might not reflect the entire railyard properties.

Tract 1 (Hordes and Payne 1991:142–143): Deed records indicate ownership succession from R. H. Longwell, in 1884, to the railroad property he had purchased from Cesaria Tapia, who in turn, bought it in 1869, from Andrés Tapia, presumably her brother. Figure 7.7 shows the location of Longwell's property in 1880, from which it is possible to further identify the acequias referred to in the various transactions cited in Hordes and Payne. The 1880 map depicts four oblique, roughly east-to-west lines that appear to identify successive (south) boundary lines of the properties north of Hickox Street (which is depicted as a double line). As a strong possibility, each of those four lines may represent, from left to right on the map, the Analco ditch, next a possibly unnamed lateral from Manderfield Street (or a separate and as yet unidentified ditch/lateral), the Garfield Street, or Diego Gonzales ditch, and the Manhattan, or Juan Diego Romero ditch. Longwell's purchase from Cesaria Tapia amounted to 2.8 acres that likely extended eastward to encompass lands that were immediately incorporated into the "valuable building lots" (Sze and Spears 1988:65), including what later is designated as Hancock Street, the west boundary of land owned in 1878 by Cesaria (SFCD Bk y:416) that was bounded on the south by an acequia along Montezuma Street and most likely continued west where it is identified as the "Romero Street wye ditch" (C. T. Snow 1991, end map).

Tract 2 (Hordes and Payne 1991:43): Juan Diego Romero is said to have received from his father-in-law, Phelipe Tafoya, a narrow strip of farmland measuring some 173 varas (ca. 518 feet) east to west that was situated between the camino de los carros (Cerrillos Road) and an old acequia on the north. This cannot describe the situation of Tract 2 shown on the map prepared by Hordes and Payne, since Cerrillos Road lies too far east of the property in question. The description provided in the document cited (SANM I:995), likely pertains to land south of Hickox (the "old acequia") and Cerrillos Road, two parcels of which were sold by Bruno Romero to Canuto Alarid in 1882 (SFCD Bk L: 373, 383). The first property was bounded on the south by the Arroyo San Antonio (called the "main ditch") and [Solomon] Spiegelberg; the second was bounded on the north by the acequia Pino ("Acequia del Pino" as mapped in Map of the Station Grounds (C. T. Snow 1991, in Scheick 2003, Fig. 4.2) and shown in this report in Figure 7.5 as the Tenorio ditch (see "Land Use and the Acequia Systems in the Railyard District," earlier in this section) crossing the southerly portion of the railyard. If Hordes and Payne have the correct Romero lineage, then it would appear that the original 1742 grant to Tafoya lay primarily southwesterly of the railyard.

The property shown as Tract 2 was sold to Feliz Britan [sic] in 1868 by Juana Trinidad Torres, widow of Jose Leon Montoya in the 1841 census (Vegil 1983:45), living with Jose Dominguez in 1850 (Windham 1976:120). Juana's father, Cristobal, was a son of Maria Francisca Pacheco, daughter of the 1742 grantee, Felipe Pacheco. Ricardo Alarid married the widow, Guadalupe Brittan [sic], mother of Dorotea and Feliz (Hordes and Payne 1991:43). The 1841 census of Santa Fe lists, in the barrio of Guadalupe, Tomas Brito, his wife Gualupe [sic] Esquibel, and their two children, Dorotella [sic] and Jose Felis, ages 10 and 5, respectively (Vegil 1963:48). Clearly, at some point, perhaps by the 1850 Anglo-American census-taker, "Brito" became "Britan ~ Brittan." As a result of these relationships, then, Tract 2 might originally have been included in the 1742 Pacheco grant lands. Sold in 1869 by Romero and Gonzales to John Allen, this piece was bordered on the south by an acequia—most likely the one I have identified along Montezuma Street, the "Romero Street wye ditch"—and east by other lands of Allen. Allen, and his wife Eleuteria (not "Utemia," as rendered by Hordes and Payne), subsequently sold to the AT&SF.

Tract 4 (Hordes and Payne 1991:43): The tract sold by Felix [de Balois] Romero to John Allen was bordered on the south, according to Hordes and Payne, by "an acequia madre (Acequia de Analco)."

This is incorrect, as that acequia was a lateral (to be sure, from the acequia madre), but the ditch in question is clearly that of Juan Diego Romero, running down Manhattan Street (Fig. 7.1). Hordes and Payne identify Felix as the son of Juan Diego born in 1834; however, Felix was a son of Juan Felipe and Juan Maria Gallegos, and grandson of one of at least two men named Juan Diego Romero, in this case, the husband of Maria Gertrudis de la Luz Padilla (AASF, Reel 16, frame 1067). Felix de Balois, apparently, is confused with Jose Feliz Romero, born 1838, son of Juan Diego and Refugio Martin, and grandson of Diego Antonio Romero and Maria Josefa Roybal. It is likely, as a result, that the Juan Diego Romero ditch along Manhattan was named for the grandfather of Jose Feliz Romero.

Tracts 7, 8, 9 (Hordes and Payne 1991:45): the ditch identified in each instance was that called Juan Diego Romero, as is evident by the course of Manhattan Street separating Tracts 7 and 8 from 9. Unfortunately, Hordes and Payne did not identify deeds by which the Romero Street wye, which crosses these tracts, was transferred to AT&SF ownership.

Tract 12 (Hordes and Payne 1991:46): No documents are cited for transfer of Tract 12 by Hordes and Payne; nor do I find Guadalupe and Matias (his son) occupying contiguous properties in the 1870 or 1880 federal censuses. In the former, Matias and family (family number 132) occupied dwelling number 137. Hordes and Payne have transposed the 1880 census dwelling and family numbers for Matias's family and dwelling, but I am unable to identify the owners of the tract.

Decline of Santa Fe's Irrigation Systems

By about 1947–1948, only a single ditch, the Arroyo San Antonio, carried water to the western portions of the city, its waters derived from a diverted "los Pinos" ditch—the Acequia Madre—beneath Cerrillos Road, where it joined the Arroyo San Antonio on the grounds of the New Mexico School for the Deaf.

Several segments of the ditch channels encountered crossing the railyard are believed, during earlier excavations, to have been "truncated" by flood episodes (for example, LA 146407 and LA 146408), as suggested by study of the contents and extent of overburden and sediment fill. Severe flash-flooding of the Santa Fe River has a tendency to destroy "head-gates" constructed of rock, brush, and timber, characteristically used prior to the availability of concrete and iron gates. As a result, floodwaters would have been siphoned off into the *acequia madres* and ultimately into their laterals. Without systematic scrutiny of the local newspapers since their inception during the Territorial period, we have no way of knowing how frequent or how disastrous such floods might have been for the ditches.

The earliest recorded such flood, to my knowledge, was that of October 16–17, 1767, only several weeks after the departure from the villa of engineer Joseph de Urrutia:

> Whereas it is fitting and necessary to remedy quickly and opportunely the…threat the river of this Villa is to the churches, Royal Houses and others in the center of this Villa, by its unusual crest the 16th and 17th of this past October, filling its ancient bed with stones and sand, for which reason its current took it into that which is called Rio Chiquito [Water Street], causing considerable damage to the houses and farm lands" (Manuscript, Pinart Coll., Bancroft Library # 940, Nov. 7, 1767; translation by the author).

In an undated document (but from internal evidence, probably 1848), 35 of Santa Fe's citizens were called to the Palace of Governors to discuss "*el aumento de la agua del rio de esta Ciudad*" [the increase of the river's water], likely referring to a flood (Donanciano Vijil Papers, NM State Records Center and Archives). On September 1, 1866, the *Santa Fe New Mexican*'s editorial applauded Don Antonio Ortiz y Salazar, "our worthy Prefect," for credit in having the river re-bridged following a "torrent." LaFarge (1959:38–39), following this entry, noted that:

> Ninety-one years later, in the summer of 1957, as work was going forward to replace the then successor to the bridge described above with one competent to handle heavy automobile traffic, the Santa Fe River again rose up and wiped out the construction, partially cutting the town in half. The new bridge was completed almost on time however, and will probably not be obsolete for several years.

According to Bandelier, April and September of 1886 saw heavy flooding of the river that swept away several bridges (Lange et al. 1975:144, 172). On October 1, 1901, the Santa Fe New Mexican reported, "DESTRUCTION IN WAKE OF POWERFUL FLOOD," noting that the waters rushed down the canyon at "an estimated velocity of twenty miles an hour." It is ironic, perhaps, that the front page of that edition, under the heading above, is so badly water-stained that much of the text is illegible! Nevertheless, what can be deciphered from the story is the severe destruction of properties along the riverbanks below Two Mile Dam, which structure is said to have prevented total disaster throughout much of the city. Bridges as far west as Guadalupe Street were obliterated, and alfalfa crops and orchards below the dam were swept away. The AT&SF, according to an official, estimated that it might be several weeks before service to Santa Fe would be resumed, presumably because tracks were under water (see also, Lt. Bourke's comments, 1881, for bridges of the AT&SF, and D&RG washed out from flooding; in Bloom 1937:77). The Estancia Basin, said the news account, was a vast "lake." Not mentioned, but surely obliterated also, were the diversion structures for acequias at least as far west as the College Street crossing; but there seems to be no mention of damage to the acequias themselves.

I find no mention of any effects of such floods on the irrigation systems, but note here only that if severe flood episodes were responsible for "truncating" the ditches designated LA 146407 and 146408, it is curious that the culverts constructed for purposes of running railroad tracks across them appear to have remained unscathed. The request, in 1914, by owners of ditch rights for adjudication of those rights suggests that whatever flood damage might have occurred from time to time before then had been repaired and the ditches were still in operation. Presumably, culverts also were provided beneath the tracks over the "los Pinos" ditch (Hickox Street) and over Arroyos San Antonio and Tenorio, and it would be useful for interpreting the effects of floods to know if those culverts remained intact as well. Moreover, it is apparent that those culverts either were repaired (as were the tracks above them) or were unaffected by flooding.

In 1896, residents of Agua Fria petitioned the Territorial Governor to have their water rights from the river restored following curtailment of irrigation waters by the Compania de Agua de Santa Fe (precursor, apparently, to the Santa Fe Water and Light Co.; Miller 1981). To what extent ditches above Agua Fria Street were also denied access is not stated. This resulted from the county commissioners having granted a water system franchise, in 1881, to a St. Louis capitalist and engineer, J. P. Kennedy. The grant was illegal, as the county had no authority to override ditch associations or water rights to individual properties, including operators of grist mills. Not content to surrender their rights of water control to a private company, armed farmers confronted pipe-layers at Two Mile Dam, pipes were broken, and one superintendent was fired upon (Wilson 1997:66–67).

Informants repeat the received wisdom that the irrigation systems were abandoned as a result of three primary factors: the siphoning off of young men for military service during World War II, the migration of their families to centers of higher wage earnings in California and Texas, and, thus, the decline in subsistence agriculture and garden crops. As a result of this and the subsequent failure to utilize ditch waters, so this reasoning goes, water rights were lost. The construction, in 1926, of McClure Dam and Reservoir, it also is claimed, depleted the availability of irrigation waters; and the subsequent construction of Nichols Reservoir above, combined with the drought years of the 1950s, further curtailed the availability of water for ditch irrigation (Edward Gonzales, New Mexico State Engineer's Office, retired; personal communication, October 14, 2009; Phil Bové, personal communication, November 30, 2009; S. Miller 1981; and David Barsanti, City of Santa Fe, personal communication, January 8, 2010). Earlier still, construction of Stonewall Dam by 1881 resulted in concerns over the appropriation of ditch waters (D. H. Snow 1988:14).

Extension of water mains on Manhattan Street in 1926 likely rendered obsolete the former Juan Diego Romero ditch (Manhattan Street Ditch); although a GIS map of the drain system (Fig. 7.12) indicates a storm/sewer drain beginning very near the former take-out of that ditch as well, possibly following the course of the former Analco ditch along West De Vargas Street. Dredging the river for gravels, beginning also in the 1950s, as well as increased depletion of groundwater supplies by a burgeoning population, left take-outs high and dry (Tony Baca, personal communication, cited in D. H. Snow 1988).

Figure 7.12. GIS map of Santa Fe's sewer systems, ca. 1990 (courtesy David Barsanti, Santa Fe, GIS Specialist, City of Santa Fe). Note that, although there are currently disjuncts across the railyards, several sewer lines appear to occupy former ditch laterals.

By 1912, it was assumed that lands immediately west of the railyards were "least apt to become a residence section" of the city, and it was expected that the area should be "designated as a factory district in order to protect the rest of the City from smoke and other nuisances" (Sze and Spears 1988:41). As the city's infrastructure—paved streets, and the underground pipes supplying hydrants–expanded west beyond the grant boundary and the railyards, it can be assumed that ditch use declined apace. That is, ditches were no longer needed for domestic purposes with the advent of city water, and even gardens and orchards were most often served from city hydrants. With the further impounding of water in Nichols Reservoir and subsequent drought years, most of Santa Fe's acequia systems dried up for good, except for the Acequia Madre, which continued to serve the School for the Deaf property well into the twentieth century. The major laterals taken from it, described above, seem to have ceased being used by or during the 1930s (Fig. 7.13). I imagine that, unless the channels of the defunct ditches remained open, subject to being silting in and flushed out over the years, the result might well be the appearance of having been flooded.

It is doubtful that Santa Fe's agricultural capacity, dependent on irrigation from the river, provided much of a surplus for export at any time during the Colonial and subsequent periods of her history. As a result, it is difficult to visualize the irrigation systems of acequias as having formed a significant contribution to New Mexico's tenuous economic links to New Spain, to the Republic of Mexico, to the United States, or to Wallersteinian constructs of world-systems. Santa Fe's agricultural endeavors were for the subsistence of families, and while some surplus undoubtedly supplied merchants with marketable commodities, the bulk almost certainly was for local transactions. The difficulties of transporting such commodities southward (or elsewhere) precluded long-distance movement of the principal crops of wheat and maize.

Figure 7.13. Ca. 1930s aerial view of Santa Fe's railyards and neighboring districts. No ditches are apparent, but note the apparently fallow fields west of the yards (lower left).

"Poor New Mexico": Santa Fe in World-Systems Economic Perspective

Would it not be better to abandon a country which hardly seems fit for the inhabitations of civilized man by remunerating them for their property in money or in lands situated in more favorable regions? – Colonel E. V. Sumner, 1852

Introduction

Because Santa Fe's acequia systems were to be considered as technological and economic "adaptations" from a world-systems perspective, I review some of the economic conditions and technological adaptations in New Mexico as those reflect changing times and impulses from Spain, Mexico, and later, as a result of encroaching Manifest Destiny and the achievement of statehood. I suggest that New Mexico and Santa Fe's economic and technological "histories," certainly until annexation by the United States, are inappropriately viewed through a world-systems lens. Much of Wallersteinian theory (Wallerstein 1976, 1980) derives from a concern with world "market economy," those "mechanisms of production and exchange linked to rural activities, to small shops and workshops, to banks, exchanges, fairs and (of course) to markets" (Braudel 1979:23).

As Braudel reminds us, however, there is another, "shadowy zone, often hard to see for lack of adequate historical documents, lying underneath the market economy," an "infra-economy, the informal other half of economic activity, the world of self-sufficiency and barter of goods and services within a very small radius" (Braudel 1979:23–24). Wallerstein's conceptualization of "world economics," focused as it is on the "other" half of Braudel's viewpoint, scarcely comes to grips with Colonial and post-Colonial New Mexico. Wolf's "modes of production," especially those that address the "state" and "kin" modes, fail to capture the unique situation here; for the kin mode was intended to characterize "native" societies and cultures, and New Mexico's ineffectual bureaucracy for much of her history precludes the characteristics of his "state" mode of production. New Mexico's "everyman"—her Hispanic citizens—for the most part, like the Pueblos under New Spain's rule, were structured, nevertheless, in their everyday lives by Wolf's kin mode of production.

Unfortunately, the eighteenth century in New Mexico remains a virtual blank in the writing of most of her historians (Frank [1992] has a differing opinion). In spite of Frank's 1992 review of Governor Chacon's report, reflecting the Bourbon reforms, and their apparent impacts on New Mexican economies, neither the apparatus of the "state" and its activities, nor the overall well-being of her citizens saw significant improvements, as Fray Morfí's roughly contemporary "disorders" reveal. I refer to this account of "disorders" to support, to some degree, the argument that neither Wallerstein's (1976, 1980) "semi-periphery" nor his "periphery" usefully, or adequately, characterize the unique interplay between this geographically distinct and distant, economically backward frontier with an emergent world capitalist system—a system in which Spain's "New Spain" (Mexico) was semi-peripheral to Europe's emerging world empire. A somewhat more "rosy" exposition of condition in the first half of the nineteenth century is contained in Pino's *Exposición,* and the subsequent updated *Ojeada* of Barreiro (1832), and the additions by Escudero in 1849 (Carroll and Haggard 1942).

Richard White (1991:234–244) has identified three interrelated components necessary for the economic development of the western United States: (1) sufficient labor and capital to exploit existing resources; (2) a market for the commodities derived therefrom; and (3) a transportation system to move them to market. Each of these comprise the infrastructure of any "semi-periphery," and Colonial New Mexico's failure to become a significant factor in the vagaries of New Spain's economic ups and downs is a telling argument against assigning her economic history to any of Wallerstein's interrelated concepts. As late as the 1850s, Elder and Weber (1996:xxxiii) noted that New Mexico remained in an "anomalous position" with respect to these basic requirements for economic growth. I will briefly review these three components from the perspective of the Colonial, Mexican Republic, and U.S. Territorial eras, and the post-statehood period of Santa Fe's history.

Until the arrival of rail services to New Mexico, her population was geographically and economically distant from, and unable to contribute significantly to, the economies either of Viceregal Mexico or of the subsequent Mexican Republic. Not until the republic's recognition of the economic importance of the burgeoning Santa Fe Trail trade from Missouri did Santa Fe—and to a lesser extent, "greater" New Mexico—emerge significantly from the economic doldrums that characterized much of her existence for some 200 years. First, however, here are some comments regarding Wallerstein's definitions and characterization of "peripheries" and "semi-peripheries."

Peripheral New Mexico: the Colonial Period to 1821

> Wallerstein defined the "*periphery*" to his emergent capitalist entitiescal sector… wherein production is primarily of lower-ranking goods (that is, goods whose labor is less well rewarded) but which is an *integral part of the overall system of the division of labor because the commodities involved are essential for daily use* (1976:199–200; my emphasis).

New Mexico's limited Colonial exports to New Spain and, later, to the Republic of Mexico consisted, to be sure, of low-ranked products—the labor for which was "less well rewarded"—but, for the most part, their "essentiality" (beyond slaves for the mining frontier) can be questioned. Geographical distance from "core" and "semi-peripheral" centers does not characterize Wallerstein's "peripheries," but its definition is purely an economic one, I argue, that does not characterize resource-poor Colonial or Republican New Mexico.

A "*semi-periphery*" according to Wallerstein, was simply a "former core area" moving in the direction of "peripheral structures" occupied by a "strong indigenous *bourgeoisie*." Wallerstein characterized Spain's sixteenth-century economy as part of the developing European capitalist "core" until its retreat into seventeenth-century "semi-peripheral" status (Wallerstein 1976:74–77). Borah (1951) argues that Spain's decline as a participant in the emerging European "core" economic system, was precipitated by the severe demographic decline in her New World indigenous labor base (see also MacLachlan and Rodriguez 1980). New Spain's "century of depression," Borah suggested it stemmed from the growth of Mexico's debt peonage system dependent on "free" indigenous labor sources, a system that, because of Franciscan control over New Mexico's indigenous populations and their lands, meant that the Colonial population was unable to implement or to control either indigenous labor or sufficient productive lands in the Rio Grande. Thus, I argue, Colonial New Mexico is not a good fit for Wallerstein's "semi-periphery" construct.

Moreover, New Mexico's pre-European-contact indigenous Native Americans did not constitute a "former core area," in Wallerstein's perspective, but was comprised of a wide variety of hierarchically structured, autonomous, and independent "theocratic" pueblos whose intra- and inter-regional economies did not constitute a unified "state" on the order of those encountered by the Spaniards in Central Mexico. Nor, in the European sense of the word, can they be thought of as constituting a bourgeoisie class.

Geographically isolated from the interior of Mexico, "*la tierra afuera,*" as it was called by Colonial New Mexicans (the land "outside"—in spite of efforts to popularize the "*camino real*" as leading to "*la tierra adentro*," "the interior"), the Spanish Colonial settlement of the Upper Rio Grande Valley in 1598, until its temporary abandonment in 1680, was justified and maintained for the express purpose of harvesting Christian souls among the indigenous Pueblo and Apachean peoples (Hammond and Rey 1953:895–896). Neither economic nor political reasons existed for the maintenance of this isolated, tenuous, and resource-poor possession on the outermost edge of Spain's New World hegemony. It required the audacity of rebellious Pueblo Indians in 1680, the subsequent return of Spanish control of their lands, and, significantly (and ultimately), the threat of French incursions into Spanish territories before political concerns justified military considerations as the rationale for maintaining this isolated northern frontier (Thomas 1935). Inclusion of New Mexico (and Santa Fe, with its presidial troops) into the quasi-political military administration of the *Provincias Internas*, in the late eighteenth century, simply underscores its vulnerability from the perspective of the semi-periphery of vice-regal Mexico.

That the New Mexican colony was perceived, both by the Crown and the Viceroy, as a purely military venture, was underscored by the latter's efforts to collect from Governor Codallos y Rabal, in 1746, the royal *media anata* (a special tax or tribute collected from persons occupying official positions, such as titled individuals or guild officials). The governor refused, arguing that persons occupying military positions were exempt. All of New Mexico's governors were military appointments, he pointed out, and he solicited testimony to the effect that no previous governor had ever paid such a tax for that reason. Witnesses testified, moreover, that:

> the poverty of the province was such that none of the inhabitants paid any fees or tribute, and the seven alcaldes mayores received no pay and very little fees (Twitchell 1912:217; and LeCompte 1985:17 for the same argument against taxing her citizens ("because of military service performed").

Thus, not required to pay taxes to the state's apparatus, New Mexico's ties to the Crown were further weakened. As a result, in lieu of skimming taxes from her citizens, and whether by chicanery, outright theft, or through the use of "political" power, New Mexico's officials accumulated their gains without the need to share them with the "state." As Wallerstein (1976:15) points out, the strength of empire is that it "guaranteed economic flows from the periphery to the center by force," that is, through tribute and taxation. The obvious weakness of such a system, he continued, was its bureaucracy, which absorbed "too much profit" from the peripheries and semi-peripheries. This, in turn, increased military expenditures in efforts to "control" peripheral populations.

As early as 1707, Lt. Governor Paez Hurtado referred to the "special characteristics that military service in New Mexico entailed," and he suggested that soldiers should be paid their annual salary in advance in a lump sum, instead of by "thirds," as was the custom in the interior (Flagler 1990:471). He points out that New Mexico was the "most removed" of all of New Spain's frontiers, and "lacked human and material resources available in other areas." In other parts of New Spain, he notes:

> there were civilians who contributed to the defense with horses, clothing and food, while in New Mexico the soldiers had to cover all their own needs. He also indicated that frequently the men had to sell their horses in order to clothe themselves because the annual salary of 450 pesos was insufficient to cover the expense of purchasing their own munition and supporting their families at the same time."

Flagler notes also that, until 1703, the Crown supplied both munitions and "a special ration of meat," the cessation of which "produced a negative effect on the average soldier's economy" (Flagler 1990:471).

Lacking the mass-labor resources of Mexico's indigenous populations, lacking critical, or even desirable and necessary exportable resources, such as abundant minerals and the labor to extract those the colonists identified (McIntosh and D. H. Snow 2005b:38–45, 104–112), and in the absence of extensive and available agricultural and pasture lands, or a layer of wealthy "capitalist" land-owners, New Mexico—Santa Fe—was simply a weak "colonial situation" in Wallerstein's terms (1976:231). New Mexico, throughout the seventeenth and eighteenth centuries, was a military necessity only; neither periphery nor semi-periphery. In particular, from the outset, because the land-base for agriculture and graze for cattle was limited to the immediate valley of the Rio Grande, and in the absence of a "free" indigenous labor force, New Mexico was unable to develop a latifundio system that characterized Mexico until recent times (for example, Harris 1975).

An expanding "world-system," Wallerstein points out (1976:31–34), required the accumulation of vast amounts of food, building materials (wood, iron, etc.), textiles and clothing, as well as capital—basic ingredients needed for the sustenance and growth of a "core" system. Those ingredients were supplied by its semi-peripheries and peripheries. Seventeenth-century New Mexico's contributions to Mexico and, thus, to Spain, were limited to hides, cheap woven materials, salt, piñon nuts, cattle (but primarily sheep), and Native American slaves for the mining communities of northern Mexico, none of which were present in sufficient quantities to be considered essential to Mexico's economic growth. Grains (wheat, maize) are nowhere documented as among her Colonial exports because, as Frank (1992:176) noted, transport of those bulky items "cost too much to make their sale in Chihuahua [or places further into the interior of Mexico] economically viable."

Such "lower-ranking goods," for the most part, are those produced under what Wolf (1982) refers to as a "kin mode of production;" and, like Wallerstein's periphery, characterize those indigenous peoples whose roles in the expansion of semi-peripheries and tributary states were necessary to the existence of capitalist core entities. The profits from such goods as New Mexico was able to export accrued principally to the succession of avaricious governors and their henchmen who passed through the villa with surprising rapidity between 1598 and 1680, extracting personal wealth, and providing little to augment Spain's capitalist economy.

Wallerstein (1976:234–235), referring to the "capitalist farmers" of Europe's Hapsburg "empire" peripheries, provides a fair portrait of New Mexico's Colonial and later *ricos*:

> They willingly sacrificed local cultural roots for participation in "world" cultures. But to constitute an international class, they needed the cooperation of the capitalist strata of the core-states, and this was not to be forthcoming. So, increasingly, these peripheral capitalist farmers became the antiquated and snobbish Spanish-American *hacenderos* [sic]…of later centuries, retreating from potential international class-consciousness into local status solidarities—which served well the interests of Western European bourgeoisies.

Substitute U.S. mercantile houses for his Western European bourgeoisies, and the description easily fits Republican New Mexico and much of New Mexico's Territorial period. In spite of the efforts by Colonial governors (both prior to and following the "Re-conquest") to advance their status through economic gains during their tenure in New Mexico, most faded into complete economic obscurity as a result of New Mexico's poverty (*sic transit gloria mundi*!).

That New Mexico under Spain and the Republic of Mexico was peripheral geographically as well as economically from the apparatus of those state-constituted, capitalist entities, begs the question of just how to characterize her economic histories. Wolf's (1982:75–100) "tributary mode of production," the means by which Spain (and her viceregal agents in the New World, including New Mexico's pre-Territorial governors) derived "income" (that is, those necessities itemized by Wallerstein above), was dependent upon a class of surplus producers. The tributary mode was constituted by the:

> domination that extract tribute from the producers by ["political processes"]. Politics in a tributary state may affect the concentration and distribution of tribute among contending categories of surplus takers, but it remains anchored in the direct extractive relationships, no matter what the organizational form of the state" (Wolf 1982:99–100).

Labor and Capital

The majority of New Mexico's non-indigenous inhabitants, until well into the period of Statehood, were subsistence farmers and ranchers, inhibited by a limited land base for either pursuit. Constant encroachment by Spanish citizens on Pueblo lands underscores this fact. With few exceptions, such encroachment was by individual families rather than by political maneuvering on the part of the state (governors as agents of the Viceroy) or by lower-level administrative entities and communities However, Hall [1984], presents a case for Pecos Pueblo lands). Following suppression of Native American hostilities, the later nineteenth-century encroachment, with few exceptions, was fueled by an expanding Hispanic population on a limited land base in need of additional crop and/or grazing land, or control of water sources, by individuals and groups of individuals and their families. For it was the family (and its *agregados*—relatives, servants, and hangers-on), both immediate and extended, that constituted the only labor force.

If New Mexico's Colonial and post-Colonial producers failed to contribute significant amounts of surplus to the state apparatus of viceregal and Republican Mexico, it was to a large extent because most of their products were the result of the "kin mode of production." Although Wolf intended this "mode" to characterize indigenous societies encountered by expanding "core" entities (1982:88–100), the peculiar circumstances of mission control over New Mexico's Pueblo peoples, together with a gradually expanding Hispanic population, left her Colonial "*fulano de tal*" ("everyman") as the principal surplus producers under the state's apparatus. The economic dimension of the deployment of social labor under the kin mode, rather than the political dimension:

> [i]nhibits the institutionalization of political power, resting essentially upon the management of consensus among clusters of participants. Moreover, the ties of kinship set limits to the amount of social labor that can be mobilized for collective purposes. Social labor can be aggregated through the temporary convergence of many separate ties, but it is dispersed again when changing conditions require a rearrangement of commitments. At the same time, the extension and retraction of kin ties create open and shifting boundaries of such societies." (Wolf 1982:99).

While it is the case that the tributary and capitalist modes, according to Wolf, require mechanisms of domination over the class of surplus producers, the primary focus of New Mexico's non-indigenous population was production for subsistence—not for surplus upon demand by the state. The earliest (and only) reference to the storage of "surplus" grains in New Mexico, for example, is the 1836 mention of the *"granero de la tropa,"* a building located where now is the Catron Building at the corner of Shelby and East Palace Avenue (SANM I:1314). What grain was stored is not known (some 97,000 fanegas of corn from the countryside were deposited in Mexico City's *alhóndigas* as surplus for redistribution in 1709 (Gibson 1964:329). The average lot sizes for crops indicated earlier, although a small sample, do not suggest production for surplus beyond the needs of the immediate family; perhaps comparable to those calculated for annual maize requirements by the author (D. H. Snow 1983).

The growth of New Mexico's sheep-industry during the latter decades of the eighteenth century might appear to contradict the plight of "everyman," until one realizes that sheep-export was in the hands of a thin strata of New Mexican ricos who controlled much of the province's wealth, including the collection of tithes for the church (Baxter 1987: 50–54). To the extent that a system of debt-peonage existed, it too was controlled by those same ricos, the majority of whom were allied with—as kin or agregados—with the large Ortiz clan.

The economic development of eighteenth-century New Mexico has been ably reviewed by Frank (1992) who characterizes the latter decades of that century as one of relative prosperity following the cessation of Comanche hostilities under the actions and policies of Governor Anza (Thomas 1932), and the Bourbon reforms. With relative peace, interrupted by the Navajo "wars" of the nineteenth century, available land for both sheep and agricultural potential expanded significantly. According to Frank, increasing prosperity of the province resulted from increases in tithes collected by church authorities in Durango, capital that amounted to ten percent of the annual increase of all agricultural products and livestock, but which benefited only a small coterie of individuals.

For collection of the tithes, the Bishop of Durango auctioned off to merchants and New Mexican officials, generally her governors (especially during the seventeenth century), the right to collect them for a flat annual fee. For the year 1778, Fray Morfí calculated the amount of tithes produced in New Mexico at 11,285 pesos (Simmons 1977:22–23), a not inconsiderable amount that he notes was collected only "haphazardly by the individual lessee." Morfí continues by noting that, "it is public knowledge that the current collector of tithes makes huge profits and engages in scandalous conduct." The scandal involved subterfuge in efforts by two wealthy New Mexican merchants and the Alcalde Mayor of Santa Fe—a member of the wealthy Ortiz family of merchants—to obtain the lease to collect tithes for the following year. As a consequence, Fray Morfí summarized his perception of the plight of New Mexico's "everyman" under the tithing system:

> Debts are incurred even before the seeds are planted and there are those who have sold their crops as much as six years in advance. Nothing is put aside, and a farmer who today eagerly takes up a hundred bushels of corn or wheat from the threshing floor, tomorrow must buy whatever else he needs to eat at four times the price of his [goods] sold. Since he has no money and no additional harvest to pay for this purchase, he must mortgage his future in order to live. And if he has a family, however large, he must either see it suffer or commit the products of his labor many years in advance. He sells at one rate and buys at another five times higher, and the disparity causes

his debts to grow indefinitely (Simmons 1977:15–16).

Thus, were the surplus takers and surplus makers that made up New Mexico's kin mode embedded within the larger state apparatus; but this system of "debt-peonage," clearly, was not the same as the system created under the great *latifundio* operations of eighteenth- and nineteenth-century Mexico (Harris 1975).

Frank's (1992) analysis underscores the fact that, in the long run, profits from the tithes collected were garnered by those who could afford to pay—the highest bidder. The governors and merchants were those who had money and, therefore, were able to profit from the tithes collected, and the system continued until secularization of the mission system in New Mexico under the Republic. As West (1949:84) notes for the northern mining districts in the seventeenth and eighteenth centuries, merchants were the bankers of the communities since they were virtually the only ones with cash and they constituted a class of minor capitalists. To what extent this was also the case in Santa Fe during the eighteenth century is unclear, as little hard money circulated in the province since no formal market place existed, with the exception of the annual Taos trade-fairs in which Southern Plains Indian hides and captives were exchanged for guns, horses, and trinkets.

Like the avaricious governors of the seventeenth century, the eighteenth- and nineteenth-century sheep *patrones* (the majority of whom made up the upper-classes of Santa Fe and Albuquerque) contributed little to the economic well-being of the bulk of the population. With the opening of the Santa Fe Trail trade and its extension to the interior of northern Mexico, many of those same ricos reaped the bulk of the profits from trade both with the United States and with the Republic of Mexico (Baxter 1987; Boyle 1994). Less fortunate citizens on the northern frontier of New Mexico—the bulk of the population, laboring under the local system of debt-peonage to sheep patrones—benefited little in either situation and continued to gain their livelihood through acquired necessary household craft skills (weaving, tailoring, smithing, shoe-making, and so on) to supplement subsistence agriculture and small-scale ranching. The Rio Abajo, rather than Santa Fe, however, was the center of textile production of wool, with the bulk of the products—carding, spinning, and weaving—produced by the household (Olmsted 1979:73–97). The majority of the products from these craft-skills and labor were locally produced and, for the most part, consumed at the household and extended kin levels.

"They all want to be merchants."

The mission supply service to New Mexico, funded by Spain's treasury during the seventeenth century (Scholes 1930), was continued after the return of Spanish control, but ultimately was replaced in the mid-eighteenth century by merchant caravans leaving Chihuahua for New Mexico. Privately owned and funded caravans, often at the expense of New Mexico's seventeenth-century governors, also plied the Camino Real between Santa Fe and the interior, but the amount of such traffic cannot be determined in the absence of documents. However, Bloom (1937) has another opinion. Prior to the 1680 Revolt, the mission supply service was to make the 18-month trip from Mexico and back every three years; but in actuality, the trip was undertaken as infrequently as every six or seven years. The return trip, of course, carried local products to the interior. After about 1700, friars, rather than the crown, leased wagons from merchants, purchased the necessary supplies from mission coffers, and were partially responsible for the safety of the cargoes and the freighters.

New Mexico's principal eighteenth- and nineteenth-century market centers were at Chihuahua and Parral, supplying mining concerns with woven goods, hides, and slaves; the latter were frequently bartered from Southern Plainsmen at the annual Taos fair into the first decades of the nineteenth century. Nevertheless, from an economic standpoint, Santa Fe was an important destination for products from the interior. Some idea of the range of imported materials from interior markets is suggested by the request for payment by Santa Fe's presidial troops in 1715 (Ahlborn 1983). Of 81 categories of items listed, 49 consisted of clothing, cloth, and sewing materials; 13 were military items, including weapons and horse gear; but only 10 were foodstuffs, primarily luxuries such as cinnamon and other spices, but including one "head of cattle" (at 10 pesos), and one fanega each of unground wheat and corn (at 4 and 3 pesos respectively), possibly for seed (the purpose of one "head of cattle" is enigmatic). Imported cloth and items of clothing dominate the inventories of estates of individuals throughout the eighteenth- and nineteenth-century documents that survive.

Research by Brading (1985:283) provides background information on fifty newly created titles of Mexican "nobility" in the eighteenth century, the sole criterion for which was personal wealth. Twenty percent were identified as *comerciantes*, recalling one viceroy's observation that everyone in New Spain wanted to be rich, "and in order for it to be, they all wanted to be merchants" (Brading 1983:135). According to West's (1949) study of Parral's mining district, 37 merchants' shops existed as early as 1639, serving the roughly 800 *vecinos* of the district. New Mexico's own Governor Rosas, in mid-seventeenth century was accused of selling chocolate out of the *casas reales,* most likely not as profitable as the Apache captives he peddled at Parral (for further reading, see D. H. Snow 1993a).

An "extremely perilous trip."

Perilous or not, by the mid-eighteenth century the caravans were an annual affair, requiring some 40 days to Chihuahua and longer to San Bartolomé, Parral, Durango, the annual trade fair at San Juan de los Lagos, and points south. Don Pedro Pino's *Exposición*, written in 1812 (Carroll and Haggard 1942:106), explained the manner in which the traders and merchants of New Mexico carried on commerce outside the province. The wagons formed up at La Joya de Sevilleta (present day San Acacia)—as was tradition as early as 1626. The c*onductas* formed up at the pueblo of Alamillo, a short distance north of San Acacia (Scholes 1930:199), by the latter part of November, might consist of more than 600 persons (drivers, drovers, and guards). Prodigious amounts of supplies were required, and Pino listed 600 fanegas of wheat flour for bread, ground beef from more than 100 beef-cattle, 150 fanegas of corn, and corresponding amounts of beans, chick-peas, mutton, and a large number of barrels of water. These were supplies in support of the personnel of the conducta only.

The colonial wagon, with iron-rimmed wheels, carried some 4,000 pounds of merchandise and supplies, much of them replacement and tools for repairs to the wagons:

> 16 spare axles, 150 extra spokes, 24 reserve iron tires (each weighing 17 pounds), 500 pounds of tallow for lubrication, 24 pounds of cord for repairing the wagon hood and cargo coverings, an assortment of nails, bolts, washers, harping pins, cleats, linchpins, and ribs, and—among other tools—hammers, saws, adzes, crowbars, and a twenty-seven pound sledge [and] an extra team of eight mules, and as replacements for the caravan at large, an extra drove of thirty-two" (Moorhead 1958:33).

These were pulled by eight-mule teams, similar to the Conestoga-type wagons of westward U.S. expansion, which required some 40 yards of coarse woolen cloth for covers. The 1627 conducta consisted of 32 wagons, 16 of them new, fitted out with 16 mules, and took a year and a half going, unloading, packing with New Mexico products—mostly salt—before returning to Mexico City (Scholes 1930).

Pedro Pino's *Exposición* of 1812 observed that:

> the annual importation into the province of products for its consumption amounts to 112,000 pesos, and that its annual income is only 60,000 pesos. Therefore, there is an annual deficit of 52,000 pesos. The salaries paid by the treasury to the governor of the province, to his assistants, and to the 121 soldiers may be said to be the only income that keeps money in circulation. This income is so small…that until recently the majority of its inhabitants had never seen money (Carroll and Haggard 1942:36).

The Santa Fe Trail, 1821–1880: Labor, Capital, and the Markets

In spite of Mexico's declaration of independence from Spain in 1821, for the following 25 years, New Mexico remained little more than a "neo-Colonial" appendage to the newly created Republic. In 1824, New Mexico was appended, briefly, to Chihuahua and Durango to form the Internal State of the North; but she reverted to a territory (until 1837) shortly after a new Republic constitution was approved the same year. Both military and political administration remained under Spain, but the most far-reaching development was abandonment of Spanish policy that excluded foreign traders.

The first small load of goods from Missouri reached Santa Fe, in fact, the same year as Independence was achieved in 1821. By 1825, increased traffic to Santa Fe from Missouri had broken the monopoly of the Chihuahua merchants, since U.S. goods were not only cheaper but of higher quality, and Yankee entrepreneurs and mercantile houses waxed wealthy from the influx of Mexican gold and silver converted to cash. With increasing regularity, New Mexican merchants, primarily from Santa Fe, purchased such U.S. goods in excess of local demand, in order to sell at premium costs in Mexico (Moorhead 1958, 1990).

Virtually neglected by the newly created Mexican Republic, New Mexico's inhabitants and its military-political authorities maintained a degree of autonomy from the Republic (characteristic of her neo-Colonial status, in Wallerstein's terms), and her fortunes quickly became tied to U.S. Manifest Destiny via the Santa Fe Trail. As a result, Santa Fe's citizens experienced a brief period of real growth as hard currency, cheap material goods, and Yankee entrepreneurs flowed westward over the Santa Fe Trail. Santa Fe became an important *entrepôt* for the transport of such goods to the Mexican interior (Moorhead 1958, 1990; Gardner 1993). However, many local and U.S. merchants began, by the 1830s, to bypass Santa Fe completely, traveling directly to the interior of Mexico. Santa Fe's economy, as a result, began a downward spiral, although some New Mexican merchants carried Mexican and local products to Missouri.

Moorhead (1958:188) notes that what likely was the most vital influence of this trade "was the stabilizing effect" of Mexican silver on the monetary systems of the United States. "By the close of 1824," he notes:

> the Mexican peso had reached Missouri in such numbers and was circulating so freely that it was accepted by the federal land office in Franklin [Missouri] at par weight with the American dollar; by 1828 it was more common in the western counties of Missouri than the dollar itself; and by 1831 it constituted the principal circulating medium for the entire state.

New Mexican merchants exported U.S. goods to Mexico, and Mexican silver to the United States; what silver failed to reach Missouri, remained in their hands. To what extent this additional cash in the hands of local merchants was to the economic benefit of New Mexico's "everyman" is unknown.

Table 7.2 provides a rough approximation of Santa Fe's "labor" force, both skilled and not. Farmers (and farm laborers), not surprisingly, made up the bulk of the occupations of heads of households between 1750 and 1841. An incomplete 1790 census for Santa Fe counted only a single merchant. Three were identified in the 1823 census; and nine were counted in an incomplete 1841 census (Vigil 1963), clearly under-counting the number of persons engaged in transporting and trading goods. Boyle's (1994) data clearly contradict the latter census counts for merchants and arrieros ("mule-skinners"), possibly because many of those identified by Boyle did not consider such work as more than temporary occupations. The numbers of skilled, or other "specialized" occupations in Santa Fe also increased between 1790 and 1841, from 65 (1790), to 99 (1823), to 122 in 1841. These included muleteers, shoemakers, tailors, carpenters, masons, blacksmiths, lumber men, and so on; but farmers and laborers (both "day" and "farm") were combined.

The 1841 (incomplete) Santa Fe census also provides information on womens' occupations, as follow: *cocineras* (cooks, 6), *costureras* ("dressmakers," 4 identified, "most women"), *hilanderas* (spinners, 14), *lavanderas* (washer-women, 3), *mercerianeras* (notions peddlers, 11), *panadera* (baker, 1), *partera* (midwife, 1), and *planchadera* (ironing woman, 1). "Making pottery" is not identified in this census.

The number of merchants (286) sending goods to Mexico and the number of muleteers/wagon drivers (74) are indicated by the *guías* (commercial passports issued to merchants by the Mexican authorities) issued between 1826–1845 (Boyle 1996). Such guías were not required under Spain and were a means of collecting taxes on the goods passing between New Mexico and the Mexican interior. According to these incomplete guía accounts, the recorded value of exports of *productos de la tierra* (that is, local products), was 64,677 *pesos*, 2 *reales*. Sheep driven south, however, were valued at some 140,715 pesos. U.S. goods carried from Santa Fe to Mexico, on the other hand, amounted to some 172,800 pesos. In return, New Mexico's imports from Mexico, consisting of "foreign" goods (that is, from Europe, mostly cloth and clothing), and iron and steel, were valued at only 30,420 pesos. By 1860, Santa Fe native

New Mexican merchants numbered 18, and in 1870, 22; while there were 32 Anglo merchants in Santa Fe in 1860 and only 21 in 1870.

The peak years of New Mexico's sheep (wool) industry, 1821–1846 (Baxter 1987), saw a small number of people who monopolized their export to Mexico:

> so it must not be considered as beneficial [to the general population] as that carried on in hides, coarse woolen goods, etc. which is well distributed among all classes in New Mexico, especially the lowest and middle (Licenciado Antonio Barreiro, 1832, in Baxter 1987:89).

As Boyle (1994) has documented, the export-import merchandise, including sheep, was controlled by a handful of New Mexican merchant family dynasties, especially the Armijos of Albuquerque (Baxter 1987; Simmons' 1977 translation of Fray Juan Agustin de Morfí's account of "Disorders in New Mexico, 1778").

The incomplete itemized import-export records, or guías, for the years 1831 to 1845 (Boyle 1994) recorded the value of the goods leaving for the interior, from Santa Fe to Chihuahua. Exclusive of sheep, the assigned value of all itemized locally produced exports to Mexico for that period, amounted to 64,677 pesos. At the legal rate of 5 percent (Moorhead 1958:186, Note 3), this incomplete figure converts to somewhat more than a million and a quarter dollars. In contrast, for that same period, the value of foreign—that is, United States—goods exported through Santa Fe to Chihuahua, amounted to nearly 173,000 pesos, or just under three and one-half million dollars. Sheep and miscellaneous goods (such as piñon) exported during that same period were valued at just over a million and one-half dollars.

New Mexico's imports from Mexico, according to surviving *guías* (Boyle 1994), were small, consisting almost exclusively of iron (most likely in bar form; West 1949:82), steel, and both domestic (Mexican) and foreign (European) goods in the amount of only 27,332 pesos, 6 reales (roughly, half a million dollars). The number of surviving import guías, however, represents fewer than one percent of the extant export passports, and the small values assigned imported iron (100 kgs @ 84 pesos) and steel, for example, suggests it consisted primarily of military hardware (swords for example) and iron for horse shoes, nails, wagon-wheel rims, and farm implements. U.S. mercantile houses and their agents brought to New Mexico a wide variety of yard goods, clothing, notions, ironstone and porcelain dinnerwares, and small tools, primarily for domestic, or household consumption (see, for example, the manifests of goods in Boyd [1974:313–326] and Elder and Weber [1996]). How much of this merchandise, in turn, was transported to Mexico remains to be studied in detail (but see, Gardner 1993).

Some idea of the variety of goods that reached New Mexico across the Santa FeTrail is furnished by the inventory purchased in 1854 at St. Louis by Mariano Yrisarri of Los Ranchos de Albuquerque, and in the lists of imported goods in Boyd (1974), and the inventories of estates listed by Ahlborn (1983). By 1864, following the "reduction of the Mescalero Apaches," and establishment of the "colony" of Navajos at Fort Sumner, the *Weekly New Mexican* reported that the merchants and freighters "have started or are preparing soon to start to the States to prosecute their business" (LaFarge 1959:21). Crossing the Plains two to four times a year, "the Laboring Mexicans generally, like to go [on] trips as teamsters and in other service," but the editors reported difficulty in procuring sufficient men for the wagon trains.

> This is much owing to so many peons and laborers, having entered the volunteer service. The United States soldier's pay much exceeds the former prices for Mexican labor in New Mexico. A large number of peons have extricated themselves from their thraldomas as servants, by going into the United States volunteer regiments. Owners and masters of freight trains, now have to pay a fair price, to obtain Mexican teamsters and herders" (LaFarge 1959:22).

In 1880, the U.S. federal census (Bancroft 1889:789) noted that roughly 13 percent of Santa Fe's population of 2,315 (presumably, heads of household), worked 313 farms averaging some 42 acres each. By 1850–1851, intensification of U.S. military occupation of New Mexico—a near fruitless effort to protect its citizens against hostile Native American raiding—lead to a change in local land-use patterns. An increasing amount of agricultural land traditionally used for basic subsistence crops was augmented by various ranch stock (both large and small, particularly, swine) for military procurement (Miller 1989; D. H. Snow n.d.). With the advance of the railhead west into Colorado in 1878, however, military subsistence supplies from farther away soon became cheaper and more plentiful. Transported goods began to exceed the production and purchase of local grains and other food-stuffs from New Mexico's far-flung posts, shortening haul-roads, and reducing labor requirements for commercial wagon trains and their companies. Military officers were among the most enthusiastic supporters of the advancing trans-continental railroad systems (Miller 1989:320).

Transport

"Poor New Mexico, so far from heaven…;" and, Governor Armijo might as well have added, from Mexico City or Missouri. Nevertheless, with the opening of the Santa Fe Trail trade, New Mexico's fortunes began to change as wagon and mule traffic between Missouri and Chihuahua increased substantially. The roads in New Mexico, Pedro Pino wrote in 1812 (Carroll and Haggard 1942:31–32):

> are generally adequate since most of them run along river banks and through settlements…they are all wide enough for oxcarts, except the one to Taos along the canyon route. All the roads are safe, and the traveler need have no fear that highwaymen may rob him of his possessions or take his life. The road to the United States on the Missouri route is markedly beautiful.

Among the economic problems, he continued in another section, were the "great dangers from wild Indians along the roads," citing this as the principal reason that the export of agricultural products was "impossible" (Carroll and Haggard 1942:35).

Gregg (Moorhead 1990:15–16) notes that 1824 was the first year in which wagons were employed on the Santa Fe Trail, but he was in error by two years. This 1824 expedition consisted of pack-mules, 25 "wheeled vehicles, of which one or two were stout road-wagons, two were carts, and the rest Dearborn carriages. By the time his *Commerce of the Prairies* was in print, the wagons were almost exclusively of the Conestoga type, manufactured in Pittsburgh. These, like the earlier Camino Real traffic, were drawn by eight-mule teams or more, up to 12. The wagons carried a cargo of up to 5,000 pounds and, thus, were larger than their Mexican predecessors. By the end of the decade it was found that oxen out-performed mules.

The number of wagons arriving at Santa Fe between 1821 and ca. 1878 probably is unknown, and the number of merchants' wagons leaving Santa Fe for Chihuahua and points south will never be known. The cargo weights referred to above, however, indicate that the wagon traffic was not only an efficient means of transport, it was the only feasible means of supplying the needs of an expanding New Mexican population, a population that increased substantially with the arrival of rail service in 1879.

"Santa Fe's Triumph:" The Railroad's Impact

The End of the Trail

Planned extension of the rails into New Mexico by the AT&SF Railroad Co. were in place prior to 1873 as a result of negotiations between the company and Dutch associates for construction of the line from near its terminus, at Granada, Colorado, to Cimarron, New Mexico. Those unidentified "Dutch associates," according to Twitchell (1912:483, note 393) were "interested" in the Maxwell land grant, adjacent to Cimarron. "The panic of 1873," wrote Twitchell, and the failure of J[ay] Cooke and Company, "and other disasters" of the period halted plans to make Cimarron "the center of industrial development which afterward came to Pueblo and Trinidad." Not until 1879 did the New Mexico and Southern Pacific, a subsidiary of the AT&SF Railway chartered in 1878, reach Lamy, its surveyors having urged the company to bypass Santa Fe, noting that the trade to Santa Fe "was no longer significant" (Bryant 1974). Instead, a bond issue was voted by the county in the amount of $150,000 in October of 1879 (Twitchell 1912:486).

In a letter of April 17, 1875, to Vice President William B. Strong from Chief Engineer, A. A. Robinson, of the AT&SF Railroad Co. at Pueblo, Colorado, Robinson enumerated nine reasons for selecting the Glorieta route from Las Vegas to the Rio Grande, as opposed to the Abo [Pass] line (copy courtesy of Vernon Glover). First, wrote Robinson, was the proximity to suitable cheap timber in the Pecos River canyon; and, second, he estimated, as a result, that acquisition of cross-ties, bridge timbers, and telegraph poles would save an estimated 15 percent to 20 percent of the cost of the Abo route.

Subsequent arguments for the Glorieta line identified additional potential economic benefits that might accrue: it would pass through the Galisteo Coal field (a drawback, Strong noted, was the difficulty of arranging title or royalties, as virtually all the field was under Spanish land grants); the line would follow the fertile Rio Grande Valley where the potential for agricultural development and passenger service were far greater; and the route would be in close proximity to the "noted gold placer mines and a rich mineral-bearing section producing gold, silver and copper." Finally, "this route will pass within 15 or 20 miles of Santa Fe so that a branch road could be built there if desired for a moderate outlay."

It was so desired. As a result, the New Mexico and Southern Pacific Railroad Co. was incorporated on February 6, 1878, for purposes of rail traffic to Santa Fe. Grading for the 18.1-mile line from Lamy to Santa Fe began in November of 1879 by McCardy & Harmon, T. Cox and "several others" contracted for the work. Tracks reached Santa Fe on February 9, 1880, and Governor Lew Wallace drove the last spike for the Santa Fe spur, which was memorialized by the donation of a silver spike, from Solomon Spitz, well-known jeweler of Santa Fe.

The February 14, 1880, *Weekly New Mexican*, under the banner head above ("Santa Fe's Triumph"), went on to proclaim: "And the Old Santa Fe Trail Passes into Oblivion" (C. T. Snow 1991) as did, very nearly, Santa Fe itself, in spite of the best wishes of the Territorial legislature:

> Resolved, that the legislature of New Mexico observes with pleasure and satisfaction the completion of a line of railroad to the City of Santa Fe,..and the rapid extension of the same southward through the great valley of the Rio Grande. That this even may well be regarded as the most important in the history of the Territory, as the beginning of a new era, in which, through the development of its resources and the improvements which are certain to follow the establishment of means of rapid communication with other parts of the country, New Mexico may be expected soon to take her position in the American Union to which she is by nature justly entitled.

The reporter continues, saying:

> That in the celebration of the advent of the road to the capital, which took place on the 9th day of February, 1880, participated in by the representatives not only of the city of Santa Fe but of the Territory, this assembly recognizes as evidence of the good will and progressive tendency of the whole people with regard to the important improvements and changes which are now at hand." (Twitchell 1912:482–483).

As a once-prominent place along the path of Manifest Destiny, Santa Fe's predicted "triumph," nevertheless, was premature at best; and other voices were not so sanguine. C. M. Wilson (1997:65) cites a "less-often-heard voice" (presumably, from the newspaper) to the effect:

> That Santa Fe can never amount to anything more than what it is; that it has already reached its greatest importance as a town; that its location and mountainous approaches are virtually a bar to the approach of railroads. The old Dons will neither improve their property or sell to others on terms that will admit of their improving; that there are no mines or extended agricultural resources or sufficient other natural advantages to build up a town; in short, that a town never should have been located here…there shall never be anything above the present adobe piles." (Lehman 1975)

In spite of the author's pessimism, perhaps, three major railroad systems (or their subsidiaries) converged at Santa Fe: the Atchison, Topeka and Santa Fe, the New Mexico Central, and the Denver and Rio Grande Railroad—the latter ultimately becoming the Denver and Rio Grande Western (D&RG). The existing New Mexico Southern, purchased from the Santa Fe Railway in 1992, is beyond the scope of this report.

By December, parcels of land for a depot and railyard were being purchased. In less than two months, on February 14, 1880, the *Weekly New Mexican* proclaimed that "The Last Link is Forged in the Iron Chain which Binds the Ancient City to United States" (C. T. Snow 1991:56; most of the information pertaining to the New Mexico Central and its predecessors is taken from Glover 1997).

The original incorporation of the companies controlled by the AT&SF, according to Twitchell (1912:483), was formed by Miguel A. Otero [II], Henry L. Waldo, William Breeden, Edward Hatch, Jose Placido Romero, Henry M. Atkinson, J. L. Johnson, Frederick W. Pitkin, Henry C. Nutt, Albert A. Robinson, Jefferson Raynolds, and William Griffin (Twitchell 1912:483); conspicuously absent from this list is Thomas B. Catron. Of these, I am unable to identify Jose Placido Romero in either the 1870 or 1880 Federal Census returns, and suspect Twitchell was in error, or Romero was not a Santa Fean. Johnson, formerly a freighter, was married locally to Jesusita Montoya; between them they owned considerable Santa Fe properties (McIntosh and D. H. Snow 2005c:19–20). Otero was appointed Governor of the Territory in 1896 by William McKinley and formed a powerful Republican-party political machine. Henry Waldo, the son of a Santa Fe Trail merchant and freighter, was a prominent judge and chief justice of the Supreme Court of New Mexico. Following his tenure on the Supreme Court, Waldo formed a partnership in law practice with William Breeden, member of the bar in Santa Fe. Waldo was appointed solicitor, in 1883, for the Santa Fe Railroad Co., and dissolved his private practice with Breeden. William Breeden came to New Mexico after the Civil War and held a position with the government revenue service. By 1869, he was a clerk of the Supreme Court and of the first judicial district. He held the office of attorney general in 1872. Colonel Breeden, deemed by many to have been the "shrewdest politician and most capable lawyer of his time," was chairman of the Republican Party in New Mexico. Failing health by 1883 resulted in his leaving the state for Boston.

William Griffin, a civil engineer and government surveyor, came to New Mexico in 1860, where he served as a clerk in the office of the U.S. quartermaster at Santa Fe as well as deputy collector of internal revenue. A Mason, and chair of the Republican party, he was one of the organizers of the Montezuma lodge, No. 1, and became the first Grand Master of the Grand Lodge of the territory. Two of his children served in Roosevelt's regiment of Rough Riders.

Concerning General Edward Hatch, Twitchell notes only that he took command of the military forces in New Mexico in 1879 and was responsible for driving the Apaches under Victorio into Mexico. Albert Alonzo Robinson, in 1878, was then Chief Engineer for the AT&SF Railroad, but I am unable to locate additional information about him beyond the fact that, along with surveyor W. R. Morley, they were responsible for efforts to gain the edge for the AT&SF line over Raton Pass (C. T. Snow 1991:55). In the meantime, William B. Strong, vice-president and general manager of the AT&SF, had procured the lease of the D&RG lines and purchase of its stock. Protracted litigation ensued…

> as well as actual physical contest of great vigor in which considerable bloodshed and destruction of property took place—the Denver and Rio Grande Company using physical force in its efforts to recover the property it had leased to the Santa Fe Company. After the Santa Fe had won all of its fights, both in the field and in the courts, an offer to refund to the Santa Fe all the cash it had expended in the purchase and the contest proved tempting to the board of directors in Boston and a settlement was made on that basis" (Twitchell 1912:483).

As a result, Mr. Strong pushed the line to Santa Fe by 1880. By December of 1880, the Texas, Santa Fe and Northern Railroad Co. was incorporated, eventually extending its line from Española to Santa Fe (C. T. Snow 1991:56–57). Again, the corporation was formed of local Santa Fe businessmen, several of whom had already purchased lots in the Valuable Building Lots addition adjacent to the proposed depot grounds and railyards. Together with Charles Irvin, Chief Engineer for the TSF&N Railroad Co., these included Lehman Spiegelberg, Zadoc Staab, Romulo Martinez, Antonio Ortiz y Salazar, Bernard Seligman, and Charles Gildersleeve (see D. H. Snow 2009a for Ortiz). Charles Gildersleeve was a well-known Santa Fe attorney active in the Santa Fe Ring politics (Ittelsen and Tigges 1983:21–22). Not completed until 1887, the tracks from Santa Fe to Española were sold to the D&RG in 1895.

Spiegelberg, one of six brothers, was prominent in Santa Fe mercantile business and, eventually, banking (Jaehn and Chavez 2003). He was also among the purchasers of a lot in the Valuable Building Lots addition. Zadoc and Abraham Staab were brothers. Abraham was one of the Santa Fe spur's initial promoters and financers, so much so that he paid expenses to the 1881 Territorial legislators who traveled to Denver to persuade the D&RG directors to build to Santa Fe. Abraham provided each of the legislators a top hat and a gold-headed cane for the trip (Jaen and Chavez 2003:11). Seligman, like the Spiegelbergs and Staabs, was a prominent Jewish mercantile leader in the community and a member of the Territorial House in 1880. Later he was appointed to the Office of Territorial Treasurer (Jaen and Chavez 2003:62). Additional information on Spiegelberg, Staab, and Seligman may be found in Tobias (1990).

The Labor Force

Employment by the railroads introduced a labor structure to which a majority of New Mexicans were unaccustomed: a twelve-hour a day, six days a week schedule that insured not only timely completion of tracks and facilities, but the timely operation and maintenance of those facilities. The initial train reached Santa Fe on February 16, 1880. The much-vaunted spur from Lamy did attract and stimulate the capital and labor necessary for the improvement of daily life of Santa Fe's citizens; it is clear that Santa Fe began to go about the business of transforming itself from a "Colonial" outpost into a semblance of a community worthy of its status as capitol of a new U.S. Territory. As increasing numbers of easterners migrated to the city, and purchased properties for new businesses—in particular, on the plaza, now given over almost entirely to a commercial center whereas formerly it was the residential center under traditional Spanish town organization. Imported goods and the cash with which to purchase them were available to a growing number of the citizens. That such improvements owed much to the arrival of the railroad cannot be doubted (Pratt and D. H. Snow 1988:397).

For example, Lamy's new cathedral in Santa Fe required large quantities of cut stone, and in 1883, the newspaper reported 100 [rail] cars of stone brought for the purpose (cited in Ellis 1985:32) The "skilled" stone cutters were employed at Lamy but where they resided is not known. By April 5 the same year it was reported that the contractors for the construction had employed a half-dozen workmen for cutting the stones, and the firm was receiving stone at the rate of two car loads a day from Lamy. Later that month the paper continued, noting that:

> Messrs. Monier and Co. have twenty-five men engaged on the new cathedral. A number of talented artisans have arrived from France and gone to work chiseling the fine stone into shape. Fifty car loads of stone are on the ground (Ellis 1985:33).

Gradual replacement of adobe structures, particularly around the plaza and nearby streets, required not only skilled brick-masons, but factories and labor to produce the bricks (Ellis 1985; Pratt and D. H. Snow 1988). The necessary labor, for the most part, must have been furnished by the city's labor forces.

Although local labor surely was employed for all phases of the necessary work, minimum wages paid must also have been of economic benefit to the company. Wages paid, for example, to unskilled laborers employed by the D&RG, although considered "unbelievably high wages" in the latter decades of the nineteenth century, were $1.00 for a 12-hour day (Weigle 1975:35). Few references in the available literature discuss the labor or the laborers involved in constructing the Lamy spur to Santa Fe, but the *New Mexican*'s observation concerning the use of local labor (cited above) probably applies also to the work forces for the railroads.

Labor was needed to fell, trim, and transport ties, telephone and telegraph poles, signposts, and for acquiring and hauling sand and gravel for the track beds. At the assumed rate of one dollar a day (cited as the amount during the Depression for the Española Basin; Weigle 1975), this undoubtedly was sufficient incentive for acquiring local laborers. Skilled labor for the operation of the railroad and its facilities in the yards, however, seems to have been "imported" for the most part until the first decades of the twentieth century, as indicated in the Crump Collection Ledger Books (Museum of New Mexico (MNM), Fray Angélico Chávez History Library). By 1910, with New Mexico's population at approximately 11,000, Luckingham (1982) notes that some 5.5 percent were employed by the railroads, the majority in Albuquerque in related industries (foundry, wool-scouring mill, and lumber companies that treated ties and poles).

Of 60 households I selected from the 1920 U.S. census of families in neighborhoods in the immediate vicinity of the railyards, seven individuals, including a single Santa Fe Hispanic (Tom P. Delgado), were employed by the railroad companies. All but Delgado, who identified himself as "railroad engineer," were from out of state and did not own land or homes in Santa Fe, but were boarders and renters of quarters. Delgado occupied a home on Montezuma Street according to the 1920 census (and see C. T. Snow 1991:69). Neither wages nor financial worth are noted in that census. In the same neighborhoods, I did not identify (from a much larger sample of households in the 1880 U.S. census) any resident railroad employees, although many identified simply as "laborer" might well have been so employed as conditions and work were available. Wages on the Santa Fe railway, at least during the 1870s—and likely for some thereafter—amounted to some $60.00 a month for conductors, and as much as $3.25/day for engineers (Riskin 2005:21).

Transportation

Railroads are about transportation and movement, and one major result of the burgeoning system of track in New Mexico was the roughly tripling of her population between 1880 and 1920. In the earliest years, freight cars were all wood with iron hardware and fittings. They measured some 34 to 36 feet in length with a capacity of about 40,000 pounds, but the capacity grew gradually until about 1905, steel under-frame cars were used. Obviously heavier, they were also longer (40 feet), with a typical capacity of 40 tons. One effect of their increasing use was the need for larger and more powerful locomotives as well as track, engine house, and other infrastructure upgrades. By the 1940s freight capacity reached as much as 50 to 70 tons.

Narrow-gauge cars generally were small and of wood with a capacity of from 20,000 to 30,000 and more pounds. The ca. 1920s steam locomotives (at Chama, for example) might be capable of hauling up to 70 freight cars. Steel car frames were occasionally used for pipe hauling during the first half of the twentieth century. Flatbed cars were utilized for hauling timber for ties and telegraph poles, as well as track segments and, perhaps, other bulky materials not suited to enclosed cars; "gondola" cars carried gravels and similar material necessary for the rail bed. The primary purpose of the Lamy spur to Santa Fe, however, was for carrying passengers to the capitol city. As freight-haulage rapidly turned to the nation's highways before and during World War II, Santa Fe's rail-freight service declined equally rapidly, and the commercial facilities leased therein, for the most part, were no longer in business during the decade of the 1950s.

In the remainder of the report I provide what little documentation I have been able to assemble for the three major railroad companies that created Santa Fe's railyards. It is, perhaps, not surprising that New Mexico's railroad buffs have devoted considerable research into the local "Chili Line" history, and little information is available for the major lines. A single publication details the early years and subsequent decline of the importance of the New Mexico Central Railroad (Glover 1997), but references to Santa Fe in the voluminous literature on the AT&SF are scarce and singularly uninformative.

Railyard Facilities

> *Railroads are about transportation and movement, but they depend on numerous structures that go nowhere. As time and the train rush by, the depots, the coal tipples, the turntables, and water towers stay still, a testament to our past.*
> —Riskin (2005:3).

But, *mutatus mutandis*, change is inevitable, and the necessary changes have all but obliterated those once prominent features of Santa Fe's earlier railyards; and, to a large extent, even the memory of their appearance and location is scarcely bolstered by surviving documents. C. T. Snow's (1991, and end map of yards) overview of the history of the three lines that ultimately comprised the infrastructure of the city's railyard provides considerable detail concerning the various features and need not be repeated here. Additional information has been difficult to come by, and efforts to obtain documents relating to the commercial structures and properties leased by the various railroad companies have not been successful.

The history of America's railroads is one of constant upgrading and improvements of lines, rolling stock, freight and passenger facilities, and yards (Lamar 1998; Riskin 2005), but there is seemingly little record of such improvement details for the Santa Fe Railyard facilities through time. Depots (Figs. 7.14, 7.15) were single-sided, with arrivals and departures on one side of the tracks and platform

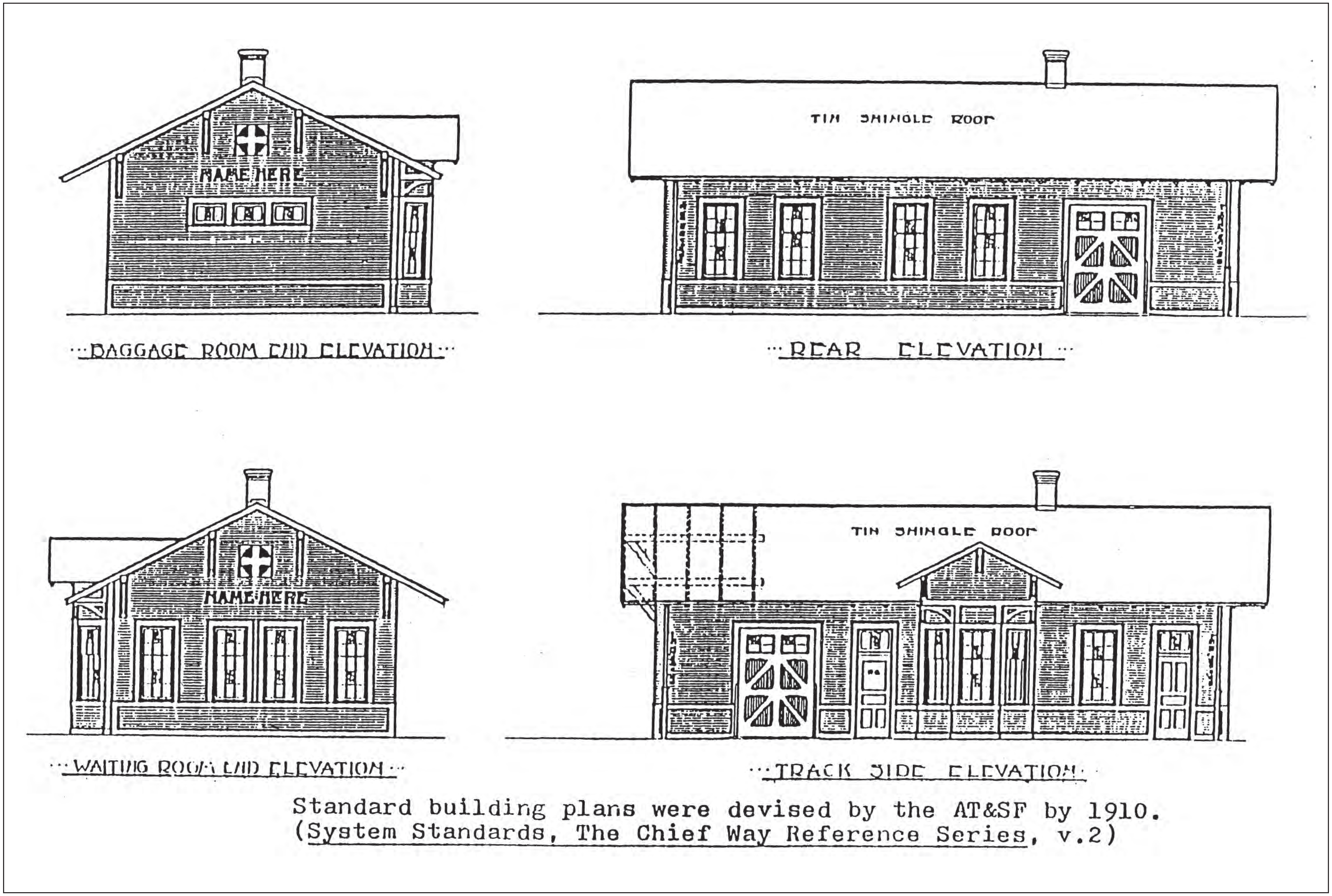
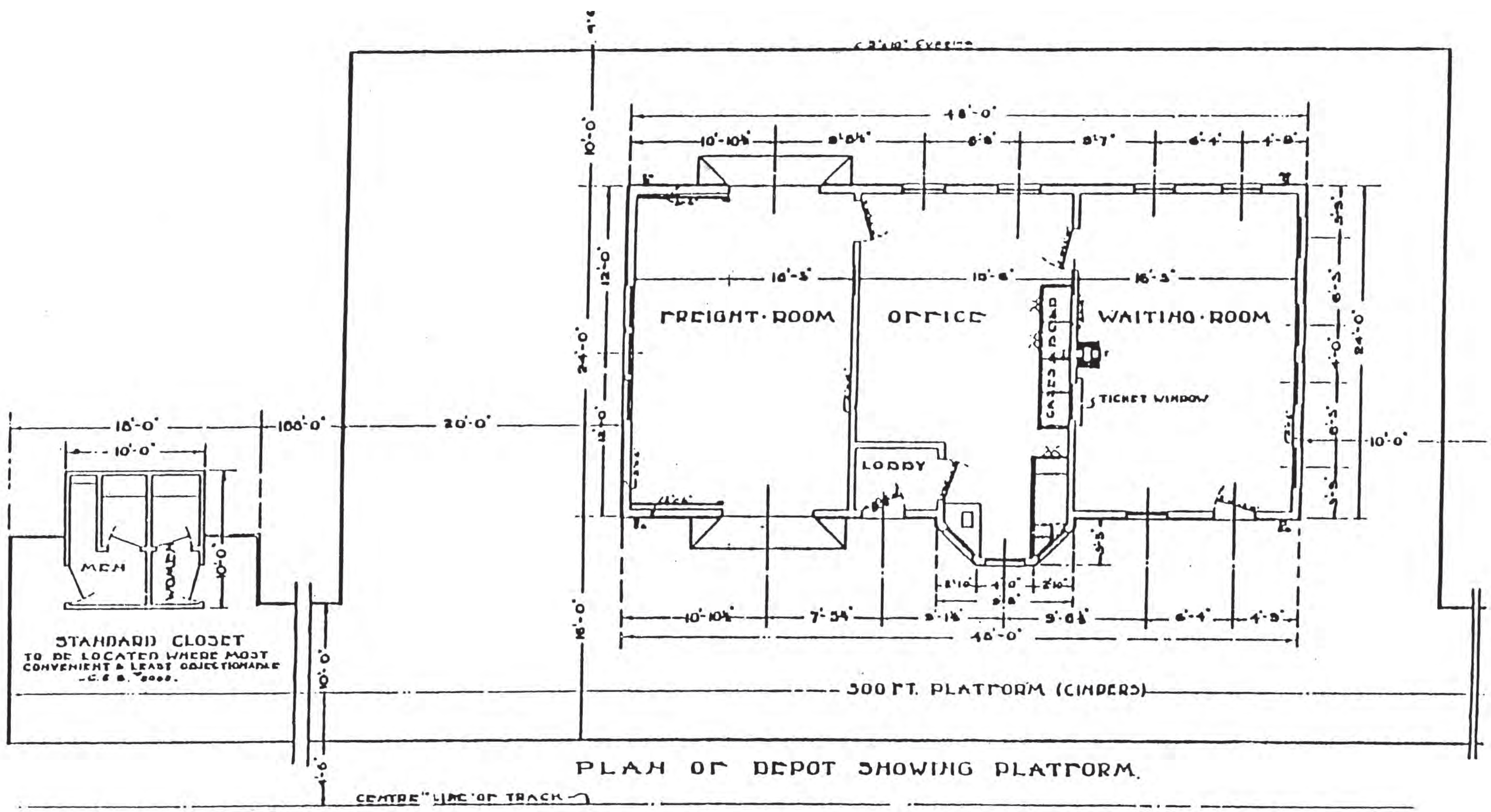


Figure 7.14. Elevation drawing of a standard AT&SF station, track side (Sivinski 1979, Figure 93; from Systems Standards, The Chief Way Reference Series, v. 2).



The typical depot contained three spaces: the freight room, an office for the agent, and a waiting room for passengers. (Systems Standards, The Chief Way Reference Series, v. 2.)

Figure 7.15. Floor plan of a standard AT&SF station, showing the platform (Sivinski 1979, Figure 93; from Systems Standards, The Chief Way Reference Series, v. 2).

length specified at 300 feet. This was the only design used in New Mexico; and generally included freight platforms as well, although this was not the case at Santa Fe where a separate freight facility was situated. Depots were placed on wooden piles pre-1900, later on concrete and concrete-block footings, and the platforms were faced with Coffeyville [Kansas] brick. Additional bricks for the Santa Fe depot (and the Castañeda Hotel in Las Vegas) were furnished by the H & B Company (H. Brown and Mr. Hill, unidentified; Pratt and D. H. Snow 1988:421) of Las Vegas. The primary track was to be visible from the depot's bay window, with sidings at the rear, often on the street side. Restrooms were located outside (before water was available), "where most convenient and least objectionable" (Riskin 2005).

The depot (Fig. 7.15) was envisioned as the "gateway" to the community, and was felt to represent not just the railroad company, but the town itself. This was particularly the case when the AT&SF began converting its depots to the California Mission Style of architecture, reflecting its role and contributions to the western part of the country—a style inappropriate to Santa Fe's Pueblo-revival style (C. M. Wilson 1997). The AT&SF maintained a separate freight depot at Santa Fe, but many were converted passenger depots. The AT&SF freight depot was replaced in 1909 to compete with Santa Fe Central's new depot; the year before, the company's depot was converted to a freight station. The Union Station depot was built by the Santa Fe Central in 1903; it was shared jointly with D&RG after 1906. As a result, the D&RG converted its two-story frame depot (constructed by the TSF&N) to an ice-house. That structure, since demolished, was built in 1887. It was located beyond the current project areas on the other side of the Santa Fe River, south of Catron Street and east of the D&RG's wye. A wye arrangement of tracks and switches allowed engines to execute a three-point turn and face in the opposite direction; the Santa Fe yards contained only one such wye that I can determine (see end map in Scheick 1992).

For track ballast, crushed rock or slag were best, but cinders (volcanic or by-products of coal-burning), oyster shells, and coarse sand were used if more desirable materials were not locally available. Santa Fe's yards almost certainly utilized crushed rock, as is suggested by payments for loads from Santa Fe to San Marcial and Rincon by the AT&SF subsidiary company (Rio Grande, Mexico & Pacific RR papers in the Crump Collection, Fray Angélico Chávez History Library files). Materials available do not provide references to the track ballast utilized for the Santa Fe yards. It is certainly possible, however, that either limestone or sandstone "chips" from quarries on Gonzales Road (limestone) or near Lamy (sandstone) were available from construction projects, such as the new Cathedral, and other projects requiring stone building blocks in the city. Although a crushing machine had been imported to the city from Denver in 1879 (Ellis 1985:4), it is likely that the railroad company utilized their own equipment to produce the necessary track ballast from local materials.

A wye arrangement of tracks and switches allowed engines to execute a 3-point turn and face in the opposite direction, and the Santa Fe yards contained only one such wye that I can determine (see end map in Scheick et al. 1991). The TSF&N, later the D&RG two-story frame depot south of Catron Street lay east of the D&RG wye (in the vicinity of former Star Lumber Company, opposite Carlos Gilbert Elementary School) beyond the current project areas.

A list of typical railyard facilities is provided by Berg (1904) and included: dwellings, sleeping quarters, reading rooms, and club-houses for employees; car sheds and car-cleaning yards; ash-pits, ice-houses, sand-houses, oil-storage, and mixing houses; water stations, cooling stations for locomotives, engine houses, freight houses, platforms, and platform sheds; and combination depots, flag depots, and passenger depots. At Santa Fe, in addition, were stockyards, although no description beyond measurements can be located. The stockyard was 42 by 48 feet, constructed of wood and valued at $20.

Engine houses, water towers, and coal towers were rapidly replaced by the use of diesel engines in 1935, in part, because of the constant difficulty of obtaining sufficient water and coal across the western United States. Water tanks were constructed of wood with a shingled roof; and Santa Fe's railyard water tank was constructed on footings of sandstone, most likely Glorieta Sandstone from quarries near Lamy, New Mexico. Although sandstone is readily available a short distance north of Santa Fe, the Tesuque Formation sandstone is poorly cemented. Glorieta Sandstone is a finer-grained and well-cemented rock that was used for Archbishop Lamy's new cathedral, as well as for other buildings in the city (New Mexico State Bureau of Mines and Mineral Resources, Bulletin 87, 1965:364–365; Pratt and D. H. Snow 1988:422). An ice-house was usually located near railyards as refrigeration was frequently required for various freight products. An ice-house and pond were formerly located at the (east end) head of Sierra Vista Street, just west of today's Site Santa Fe museum facility, and, therefore, adjacent to the railyard. Although that feature is not identified on the accompanying valuation map of 1919 (updated to 1923) , it is indicated on a ca. 1898 map of property owners prepared by surveyor William White (Fig. 7.3), but ownership has not been determined.

Cinder pits were a feature of most yards, as was the case at Santa Fe (Scheick et al. 1991, end map) at the base of the Romero Street wye. Others must surely have existed, but their former locations are no longer evident or known, and have been removed or covered. Perhaps the ca. 1.5 m of cinders upon which the former Firestone Building, on the northwest corner of West Alameda and Guadalupe Street, intentionally placed to build-up the grade, came from the railyard (D. H. Snow 1993b).

Atchison, Topeka and Santa Fe Railroad Company (AT&SF)

The New Mexico and Southern Pacific Railroad Co. sold its charter back to the AT&SF on February 15, 1899. A second subsidiary, the Rio Grande, Mexico, and Pacific Railroad Co., incorporated June 19, 1880, then undertook the task of extending the line from Lamy to San Marcial and Rincon utilizing, to some extent, the Santa Fe spur for moving supplies (including food-stuffs for officials and workmen, ties, mules and horses, and grade materials, such as sand, gravel, etc.). I have been unable to identify the total amount of land for the yards ultimately owned by the AT&SF Co. In addition to the lot history provided by Hordes and Payne, I note a 1909 sale of "lots 118–119," by Aniceto Abeyta (SFCD Bk L-1:549, to the AT&SF, in 1909, but not the "valuable building lots" (Sze and Spears 1988:65).

Construction of the 18.1 miles of spur from Lamy to Santa Fe, under Robinson, B. F. Randall, Locating Engineer, E. W. Lee, Engineer in Charge of Bridges, and B. S. Crocker, Resident Engineer in Charge of Construction was funded with a county bond issue in the amount of $150,000 at the urging of local Santa Fe businessmen (Twitchell 1912:486). Grading began in November 1879, under McCardy & Harmon. Upon completion of the tracks on February 9, 1880, they were "turned over to the Operating Department" on the 16th, on which date "the first regular train was run" (Meade 1919:123). A few days earlier, the telegraph line was completed to Santa Fe. Between 1880 and 1883, the AT&SF had completed the necessary infrastructure for the Santa Fe Station and yards. Table 7.3 (from the Charles Goebel Collection, #176, Kansas State Historical Society, 1992 microfilm) identifies the structures, their dimension, building material, and location. The company constructed its brick depot in 1908–1909, located a block nearer town than the old one, which was maintained for freight in its original location. A wye existed in front of the new depot. Valuation schedules for the AT&SF facilities and equipment for the years 1881, 1900, 1901, 1902, and 1905 are contained in the New Mexico State Records Center and Archives, and contain an inventory of Santa Fe's railyard facilities (Tables 7.4, 7.5). Not until October of 1923 do I find additional information on the AT&SF Santa Fe yards, when a revised Engineer Valuation report was submitted to the Bureau of Valuation, Interstate Commerce Commission (Table 7.6).

Telegraph and telephone lines were jointly owned (50 percent each) by the Western Union Telegraph and Telephone Co. and the AT&SF Railroad Co. The telegraph equipment included "complete" office apparatus, with interior wiring and "associated items in two offices." Also under this account were "Eastern Cedar Class C poles" at 20 and 25 feet, and "others" not identified, numbering 546 poles total (no valuation for these is provided).

The AT&SF Railroad Co. ceased operations to Santa Fe in 1926, and passengers to the city were driven to and from Lamy by the Fred Harvey Co. Cars stationed at La Fonda Hotel (C. M. Wilson 1988). The subsequent history of properties leased by the AT&SF to private companies, which actually began as early as 1897, is obscured by a number of factors reviewed by C. T. Snow (1991:72 and following). The greatest difficulty is the absence of records of leases or, where those are available, lack of adequate documentation or adequate details. The reader is referred her report for the available information.

New Mexico Central Railroad Company (NMC)

Sensing a need for commercial development of the nearly empty territory lying between the Rio Grande and Pecos River, a proposal for creation of a railroad across the region anticipated profit from the road itself, as well as from dependent businesses and adjacent properties. As a result, with capital amounting to two and a quarter-million dollars, the Santa Fe Albuquerque & Pacific Railroad was incorporated on December 7, 1900, by a group of New Mexican businessmen. One of them, Charles W. Dudrow of Santa Fe owned and operated a lumber company, and gave his name to Dudrow Street, south of Agua Fria Street, which gave access to his lumberyard. Later blocked off, it became merely an extension of Montezuma Street (Sze and Spears 1988:40–41).

Dudrow, from Maryland, was twice elected Sheriff of Santa Fe County (although he declined both times), and served two terms as County Commissioner, and was a member of the City Council. Dudrow's home was at 518 Agua Fria Street (Cordova 1981:64–65). Dudrow is said to have arrived in Santa Fe on the first passenger train to the city in 1880, and proceeded to open a freight transfer business. The New Mexico warehouse, now incorporated into the Sanbusco complex, was situated on Dudrow's ca. five acres of land that ultimately included his lumberyard and builder's supply firm (Cordova 1981:61).

The other incorporators included Willard Hopewell of Hillsboro, J. T. McGlaughlin of the San Pedro mining district, Joseph Saint of Albuquerque, and William H. Andrews of Pittsburgh, Pennsylvania. Andrews, president of the company, also was in charge of finance, and apparently was instrumental in securing the initial funds from Pittsburgh businessmen (Glover 1997:64).

The company did not attract sufficient monies to begin construction and, by 1901 had been re-named the Santa Fe Central Railway. On the same date, the company organized the Albuquerque Eastern Railway. Colonel W. S. Hopewell held the title of vice-president and general manager of the Santa Fe Central, with offices in the Catron Block. Hopewell superintended the preliminary construction work, and plans were to connect with the narrow-gauge D&RG at Santa Fe, thence south toward Galisteo, curving ultimately southeast to connect with the El Paso & Rock Island near Corona. Not until 1902 did construction in earnest begin with grading at Santa Fe. By June of 1903, track crews were at Santa Fe working on the yards, interchange tracks, and locomotive service facilities. The main line of the Santa Fe Central south of Kennedy was not complete until mid-July. James Spivey of Santa Fe was hired to paint each of the 115 mileposts along the route, as well as signs for each of the station buildings.

By early August of 1903, temporary station buildings were opened at Santa Fe, and sidings and small buildings were completed—presumably at Santa Fe as well. Regular service began August 30, 1903, with trains daily in each direction between Santa Fe and Kennedy. Further development, however, ceased abruptly for lack of operating cash to finish the line, and by January, 1904, stations had been closed and locomotives sold off, and the company was limited to the role of an agricultural carrier across a region marginal for farming.

The Santa Fe Central yards and station were located between Guadalupe Street and the AT&SF yards at the western edge of the city, and its tracks were merged into the south end of the D&RG with the addition of a third rail. As a possible competitor to the AT&SF, the latter company offered to purchase the Santa Fe Central, but the cash offer was rejected. In 1908, the Santa Fe Central and Albuquerque Eastern were merged into a single entity bearing the name, New Mexico Central Railroad (NMC). Capitalization in the amount of five million dollars was anticipated, and new officers, including Charles Easley of Santa Fe, were installed. Nevertheless, revenue and cashflow problems dogged the new company, and the company was placed in receivership in January, 1910. Although the company continued to run trains between Santa Fe and Estancia until 1918, it remained in receivership and was unable to generate sufficient funds to offset claims against it for accidents and other expenses. Finally, in January of 1918, the U.S. Railroad Administration (USRA) took over direct control of all railroads in the country, and the New Mexico Central Railway was again re-organized under purchase agreement with the USRA, in the amount of $300,000. During the remainder of the year efforts were made to rehabilitate tracks, bridges, and station facilities.

According to the ICC (Interstate Commerce Commission) valuation, the company owned a No. 2-J Fairbanks-Morse "motor car" and a No. 5 Rock-ford "motor car"; 3 locomotives; and an 8-wheel "Tenier" with wood under-frame with a 10-ton coal capacity, and a 4000-gallon water capacity. Also listed are a No. 700 stock car with a capacity of 400,000 lbs, purchased second-hand in 1903, with a wood body and under-frame; 20 box cars also of 400,000-pound capacity, with wooden body and under-frame, purchased in 1903, second-hand; 13 gondola cars with the same capacity and construction, also purchased second-hand in 1903; 15 tank cars of the same construction of 60,000 pound capacity, including 6300 gallons; and 27 "flats" with a capacity of 40,000 pounds of similar construction and, like the others, purchased second-hand in 1903. Wooden bunk cars, listed separately from the freight cars and locomotives, numbered 20, and were also purchased used in 1903. A single passenger car, with wood body and under-frame, a wood truck with six 33-inch cast iron wheels, as well as a mail and separate baggage car, are identified as the same construction and wheels as the passenger car. Roadway tools and work equipment, as well as poles and lines, wire, and telegraph equipment also are itemized, and the total value of the company was placed at $18,609, depreciated to $7,328, as everything was second-hand.

In addition to short-hauls of freight, primarily coal and agricultural products, passenger service on the New Mexico Central was desultory at best, with very few passengers arriving at Santa Fe on the two cars devoted to that service. Glover (1997:88) notes that "baseball excursions to Santa Fe (and to Albuquerque's State Fair) required the loan of additional carriages. Efforts to gain permission for extensions of the line into northern New Mexico were repeatedly denied by the ICC, and the company was forced for monetary reasons, to sell lock, stock, and barrel, to the AT&SF. On June 23, 1926, the ICC approved the transfer of the New Mexico Central Railroad to the AT&SF, and the company ceased to exist—the same year in which the latter company ceased passenger operation on the Santa Fe spur from Lamy.

In spite of this historical overview, there is little information on the New Mexico Central's (or its predecessors') railyard facilities (but see C. T. Snow 1991). In March of 1909, however, the D&RG engine house at Santa Fe burned to the ground, damaging a locomotive and destroying a carload of coal and nearby shed. As a result, the New Mexico Central's "primitive facilities" were temporarily utilized by the D&RG (Glover 1997:79). Just what those facilities might have consisted of I am unable to identify; but the timetable for trains between Santa Fe and Torrance, includes trains that left from the "stock yards."

Denver and Rio Grande Railroad Company (D&RG)

Construction for the D&RG Railroad Co. was initiated in 1871 and, by 1878 the company had begun a new line from Colorado's El Moro coal mines to Raton Pass, at which point, competition with the AT&SF for access to New Mexico's coal, timber, and ore resources was won by the latter. During the "battle for Raton Pass" General William Jackson Palmer, president and promoter for the D&RG continued construction westward, reaching Alamosa in July of 1878. From there, crews pushed a branch line southward from Antonito, Colorado, into New Mexico along the valley of the Rio Grande as far as a terminus at Española. Rail was predominately iron of 30 lbs/yard weight, but a few miles of steel rail were utilized on steeper slopes. Ties were of untreated local pine obtained, for the most part, west of Tres Piedras. The need for access to Santa Fe during the 1880s was met by local investors and businessmen, resulting in formation of an independent line of the Texas, Santa Fe & Northern Railroad in 1887. Reorganized because of inadequate revenues, it became the Santa Fe Southern Railway, but by 1895 had come into the D&RG system as the Rio Grande & Santa Fe Railroad Co. (Glover, personal communication, 2009–2010).

The TSF&N, in 1880, had as board of directors several prominent Santa Fe residents, such as Bernard Seligman and Zadoc Staab, but money was difficult to come by and, in 1882, the county again voted a bond issue to help build the final leg to Santa Fe. Not until 1886, however, was a syndicate found that was interested in financing the necessary construction. Luther Meily, an Ohioan, headed the syndicate and became president of the TSF&N Railway Co. The last link was built northward from Santa Fe, rather than the reverse from Española, and on November 6, 1886, the first locomotive ran on a short segment of track from the depot to the Arroyo de las Mascaras; but not until January 8, 1887, was the last spike driven in Española, and the connection of the TSF&N with the D&RG was complete.

The next morning the first passenger train left Santa Fe (Riskin 2005:118).

Business increased substantially for the D&RG with the opening of the Santa Fe Central Railway in August of 1903, and shipments of rail for the SFC overloaded the D&RG narrow gauge line for some weeks. Sidings were full of carloads of rail and an additional locomotive was assigned to assist deliveries. Although the D&RG carried both timber and agricultural products (the latter from the Española Valley), it was noted by pleasure-seekers for its scenic views through Colorado and northern New Mexico (Ingersoll 1885:92–115). The Pullman fare from Denver to Española in 1881 was $32.50, and sleeping cars suggested the romance of travel to exotic places: Aztec, La Señorita, San Ildefonso, and Tierra Amarilla (Riskin 2005:117).

Known as the "Chili Line," the earliest apparent use of that name dates from 1914. As freight traffic gradually moved from railroads to highways, the D&RG revenues began to decline by the 1930s (Kelley 1972), and permission to withdraw many of its spurs were granted during the Depression years. Permission to abandon the main line from Antonito to Santa Fe was granted by the ICC effective September 1, 1941, and the last northbound train from Santa Fe ran that day. Shortly thereafter, crews began removing rails and ties at the rate of a mile and a half a day, stockpiling the materials at Antonito, Colorado.

This link between Santa Fe and the mining communities of Colorado's San Juan Mountains, moved car-lots of groceries, such as canned milk and dried fruit, in addition to mail (for a short time, because of favorable rates at Santa Fe compared to Denver [Kelley 1972:134]). A "peddler-car" service initiated in the mid-1920s by the New Mexico Central, in conjunction with the AT&SF, provided shipments of fresh meat and fruits and other perishable freight which reached Santa Fe over the latter's line. These might then be shipped south until the cars were emptied along the line. By the 1930s, the Bond Sheep Co. of Española shipped wool via the D&RG to Santa Fe for shipment (by the AT&SF) to scouring factories at Las Vegas and Albuquerque.

At the Santa Fe yards, the ICC's Bureau of Valuation of 1917 (Tables 7.7, 7.8) provided the following list of structures and facilities for the D&RG: two section laborers houses ("improved box car bodies"); miscellaneous building improvements ($130, with depreciation, $115); frame tool house with a wood roof (12 x 17 x 9 ft, valued at $35); engine pits, wooden (29.5 ft long); water supply (no additional information); equipment (no information); frame and house with corrugated galvanized iron roof (12.5 x 34 x 11.5 feet); and frame oil house with wooden roof and porch (6 x 8.5 x 7 feet). The telegraph and telephone line office contained complete apparatus, including interior wiring and associated items, but are unidentified. In addition, there were valued "type A" telephone booths—but whether one or more were associated with the Santa Fe yard is not indicated.

A second valuation, also undated, but possibly ca. 1940 (Table 7.8), is appended to a brief history of the D&RG's Santa Fe yards, and provides information on the tracks in addition to structures, and should be compared with the 1919–1923 Station Map (Fig. 3.67). Tracks listed in the 1940 valuation included:

Track # 5, 330 feet, Lumber Co. spur
Track # 6, 542 feet, north wye legislature
Track # 7, 502 feet, Depot bypass
Track # 8, 756 feet, south wye leg and engine pit
Track # 9, 230 feet, storage
Track # 10, 180 feet, engine pit

The two-story depot measured 20 x 60 feet. Also listed are a car and tool house, bunkhouse (carbody), shop building and sand house (12.6 x 34 feet), oil house (8 x 32 feet), and tool house (6 x 8 feet 6 inches).

The same list provides a separate itemization for the D&RG Union Depot, including tracks as follows:

Track 1, 965′, 3-rail
Track 2, 883′, 2-rail
Track 3, 717′, 2-rail
Track 4, 511′, 3-rail
Track 5, 218′
Track 11, 1421′
Track 11A, 165′
Track 11B, 735′, 3rd rail owned by D&RGW, other by AT&SF
Track 12, 511′
Track 13, 1035′, 3rd rail owned by D&RGW

Track 14, 5691′, 3rd rail owned by D&RGW, other by New Mexico Central
Track 15, 354′, 3rd rail owned by D&RGW
Track 16, 843′, 3rd rail owned by D&RGW

The Union Depot, at 24 x 108 feet, was jointly owned with the New Mexico Central Railroad Co. A water column is given as 6"—possibly a typo. The AT&SF transfer platform also is listed, followed by Track 14, 16, the stockyards with 16 pens, and measuring 142 x 520 feet. Some of those features can be seen in Fig. 7.13.

At two locations on the D&RG and AT&SF 1923 valuation map of the railyards "planking" is indicated (Fig. 7.5). The northernmost of these lies between the beginning of the third rail of the New Mexico Central line and the beginning of the "joint yard," presumably between the D&RG and the AT&SF. Its location at the east side of the D&RG track appears to be approximately on line with Aztec Street (not identified on the plan). The second "planking" site is placed in the middle of Montezuma Street as it crosses the railyard. No other locations are so identified, and I can only guess at the purpose of the "planking." Both are in the approximate locations of former (or then still extant?) acequia courses; or, in the case of the Montezuma Street location, perhaps a formerly active arroyo), and might simply have been "cross-walks" over the tracks. Similar wood planking served as the pedestrian walkway across the D&RG bridge over the river (D. H. Snow 1993b).

The Chili Line suffered from decline in revenues in the 1930s and, ultimately, went bankrupt, receiving permission to abandon the line in 1941. The last train to Santa Fe arrived August 30, 1941. Rail scrapping began a week later. The depot, formerly shared with the New Mexico Central, is now a popular restaurant.

Santa Fe Railyard Miscellany

The 1880–1881 ledger book included in the Fray Angélico Chávez History Library (Crump Coll., Ledger, Box 306) contains few references to any benefits to the city or its inhabitants as a result of the recent arrival of rail service. The book itemizes expenditures incurred as a result of the extension of the AT&SF lines south through the Rio Grande Valley from San Marcial by a subsidiary corporation operating as the Rio Grande, Mexico and Pacific Railroad Co. The Sisters of St. Vincent's Hospital frequently treated railroad injuries, for which they were compensated by the rail company. Francisca Hinojos (whose former home bears an Old Santa Fe Association plaque on East Palace Avenue) received $40 for renting rooms and providing fuel for company personnel.

The New Mexican Printing and Publication Co. was paid $125 for publishing railroad laws and an index for the compilation. Costs for shipping cross ties (@$428 for 56 #70 ties), gravel, crushed rock, mules (1 car of mules @ 20,000 pounds) and horses, and other supplies for line construction shipped from Santa Fe to San Marcial are included, as are passenger fares from Kansas City to Santa Fe ($49.25), and Santa Fe to San Marcial ($18.80), and to Rincon ($23.17). Pay for train guards was $40 per month. Where such materials and draft animals were obtained is not identified, but they were evidently shipped by rail from Santa Fe.

C. T. Snow (1991:71) identified leases from the railroad to circus companies for performances on railroad lands in Santa Fe as early as 1909. Unfortunately, the leases do not identify the location of the properties (C. T. Snow, personal communication 2/2/10). I have not been able to identify just how early such circus acts came to the city, but circuses were moved by rail virtually nationwide as early as 1872 (Parkinson and Fox 1978). For the most part, performances were scheduled for towns on the major lines, only occasionally booking acts on spur lines such as Santa Fe. By 1881, circus wagons and railroad cars were being manufactured "for each other," and up to 83, and as many as 100 circus cars, were being moved for the Barnum Brothers and Bailey by 1923. Spur lines to cities like Santa Fe required side tracking, and roadbed quality, train speed, crop conditions, strikes, and local economic conditions often prevented the circus from booking off the main lines.

C. T. Snow (1991) notes that portions of Santa Fe's railyards were occasionally leased to circus companies, and suggests that such leases were let in the southern parts of the rail company's yards, but I have found no information as to where in the railroad properties such events took place. During the 1920s, through the 1940s, circuses set up camps on private property where Alvord Elementary School now is, immediately west of the more southerly portions of the yards (DeWalt 2009:32–35). Assuming that earlier performing circus companies set up in the same general area, the presence of active irrigation ditches—"Acequia Madre" (Hickox Street branch), and possibly the Juan Diego Romero ("Manhattan Street") ditches—would have provided the necessary water for any animals with the various troupes prior to extension of city water mains. What might have been the last such performance was the Standard Circus Corporation's arrival in July of 1947. Nevertheless, the Depression had severe impacts on the circus route, for only two shows nationwide were left in operation in 1939 (Parkinson and Fox 1978).

Conclusions

In the preceding pages I have presented, perhaps, a rather pessimistic (if cynical) review of New Mexico's later Colonial period and subsequent periods of her economic growth, much of which is reflected in Santa Fe's own economic struggles for some 300 years. I have focused on those travails as a counterpoint to characterizing New Mexico's condition in terms of the generalized and over-arching theoretical constructs of Wallerstein and, to some extent, of Eric Wolf. My bias clearly is not without contrary opinions, but I believe that Santa Fe's economic development since the beginning of the eighteenth century has been of very limited benefit to the systems with which it was politically (and minimally) entangled. Similarly, the majority of its citizens, whose lifestyles and land uses remained essentially unchanged until the early years of statehood, were only minimally affected by the emerging politico-economic entities of New Spain and the Mexican Republic, and only marginally affected initially by the industrial engine of U.S. Manifest Destiny. Although trade with them brought improvements to some New Mexicans, the basic division between "haves" and "didn't-haves" remained significant.

The continued dependence by large segments of Santa Fe's population, until the early decades of the twentieth century, upon irrigated crop lands both for subsistence and limited cash crop-production underscores the importance of the 300-plus year acequia system south of the river. That the railroad infrastructure accommodated some of the major laterals from the Acequia Madre as late as 1914 indicates the critical nature of their continued operation. Although I have been unable to document the actual dates for the demise of each of those laterals, extension of water mains up to and eventually through the railyard to serve properties to the west, apparently went hand-in-hand with the development of "additions"—the Hickox Addition, for example—carved out of formerly irrigated farm lands. It would be interesting to determine whether purchase of such lands for housing development was a factor in the abandonment of all but the Acequia Madre—or if such developments followed their disuse because of other factors.

Manifest Destiny passed quickly by New Mexico, leaving the young United States confronted with maintaining a land and people far removed from the large and complex "world-economic" systems of the nineteenth century. Santa Fe's status as a trade *entrepôt* declined rapidly when the last wagons made their way back to the trading houses of eastern Kansas and Missouri, leaving Santa Fe little more than an economic backwater in the headlong rush of Manifest Destiny to California's goldfields and coastal harbors. Still, the presence and influence of Yankee entrepreneurship and the attendant economic activities connected with Santa Fe Trail trade appear to have provided a modicum of stimulus for alternative means of livelihood.

New Mexico's isolation, geographically, economically, and politically, were major factors in suppressing its growth much beyond frontier status until well into the twentieth century. Although linked more or less tenuously to Spain's new world hegemony until Mexico's independence in 1821, neither the subsequent Santa Fe Trail trade nor the ultimate arrival of a railroad spur to Santa Fe were sufficient to propel the local economy into national, or even geopolitical, consciousness. Both avenues to Santa Fe brought improvements to many individuals (some of whom became locally prominent) and, to some extent, altered the lifestyles of a relatively small number of its native citizens. New Mexico's limited resources, however, mined principally by outsiders for eastern U.S. interests and profit, allowed for limited investment and subsequent economic growth. The result, in the long run, was that it became a mecca for health- and curiosity-seekers, land speculators, artists, anthropologists, and, finally, tourists.

The Santa Fe Trail trade, the implementation of a substantial U.S. military presence and, eventually, rail service to Santa Fe over the course of the nineteenth century, brought substantial numbers of newcomers eager to participate in the exploitation of New Mexico's insubstantial resources. Those newcomers brought with them values frequently at odds with traditional New Mexican Hispanic dependence on the land and its resources. While Yankee (and foreign-born) entrepreneurs brought frontier New Mexicans into a cash-economy, wealth flowed (again), like water, upwards into the hands of a few, leaving the majority of the population, predominately Hispanic and Native American, with little to show for New Mexico's ties to the larger "core" that was the expanding United States. With considerable anticipation, Santa Fe, as Bancroft notes (1896:788), "bases its faith in future greatness on its position as a railroad centre…," a greatness subverted, nevertheless, by her distance from marketable resources critical to an expanding industrial empire.

As late as Bancroft's 1889 history of New Mexico, he could observe that:

> New Mexico can hardly be said to have as yet any manufacturing industry; that is, the only establishments of this kind in existence, as shown in statistics of the census in 1870–80, are the few and ordinary ones that naturally spring up in any community to supply in part local needs and furnish a livelihood to those engaged" (1889:770).

From the 1880 census of New Mexico, he prepared the following table which I have modified by eliminating his figures for "Material" and "Product" (Table 7.9).

As for the impact of the railroad's arrival in the state, Bancroft (1896:771) remarks that he found "nothing in the distribution of goods from railroad centers or the operations of the ordinary mercantile establishments of the different settlements that calls for remark." He notes furthermore that the state's bureau of immigration, under the direction of Prince and Ritch, in 1889, estimated that "nearly 20,000 immigrants have been drawn to the territory since 1880" (1896:774), eight years after rail service was established. Where those immigrants might have settled is an interesting proposition since federal census figures for Santa Fe provided by C. M. Wilson (1997:330) indicate a 39 percent population increase from 1870 to 1880; but a 7 percent decrease from 1880 to 1890, and a further decrease of 9 percent in the following decade.

Wallerstein's economic model of the development of world capitalism from the sixteenth through the eighteenth centuries (Wolf 1982), underscores the "anomalous" situation of much of New Mexico's economic history (as Elder and Weber [1996] have characterized it). Geographically and economically isolated from the semi-periphery of Spain's New World hegemony, it was a minor player on the edge of New Spain and Mexico. Initially merely a mission field, New Mexico was maintained throughout the following nearly 200 years as a military, defensive bulwark on the frontiers of the three "semi-peripheries. Neither a "periphery" in Wallerstein's model, nor a perfect fit with Wolf's "kin mode or tribute mode of production," New Mexico's primary economic ties were weakly linked with Colonial Mexico's northern mining frontier until trade with the United States was inaugurated in the early decades of the nineteenth century.

Wallersteinian world-systems theory, in short, is a construct that suffers from evidentiary bias, a tendency toward mechanistically reductionist and structurally overdetermined functionalist explanation. It suffers from an emphasis on the core's determination of processes in the periphery, and does not accommodate culture or local agency because of an over-reliance on textual data that privileges "core agency" (Stein 2005). It is, after all, the core that writes the histories, not the peripheries, not the colonies such as New Mexico. Few Colonial-era New Mexicans (or post-Colonial New Mexicans, for that matter) contributed to the written history of her formative and "post-formative" periods (Twitchell 1912).

Irrigation agriculture continued to sustain most of the city's native Hispanic population until the early years of the twentieth century on lands of their ancestors, working with labor resources of the household and extended family and neighbors. New Mexico's traditional economic endeavors, and her relationships with the larger systems in which she was only a tenuous participant until Statehood, are unique aspects that set them apart from larger theoretical constructs.

The decision to isolate Santa Fe from the main route of the transcontinental railroad forced the city's movers and shakers to seek alternative strategies for her economic survival and improvement, in spite of its status as capital of the Territory. Failure of the railroad's arrival to spur the anticipated economic growth south of the river resulted, nevertheless, in attracting new business to the district, as the spur served as a distribution point for products arriving by freight cars. Charles Dudrow's decision to locate his lumber yard and builders' supply business ("Sanbusco"), perhaps, was the earliest such enterprise attracted to the rail-head.

The commercial growth of the district simply failed to materialize, and the "New Town" never developed, in part because, as the *Daily New Mexican* (March 25, 1881) reported, "owners of lots near the depot are holding them at almost unreasonable [sic] high prices." Situated in a region with few resources immediately available for exploitation (minerals, coal, timber, cattle, and agriculturally limited), Santa Fe had little to offer the transcontinental railway systems that passed her by the wayside. As a freight depot, the railyard attracted branch offices (C. T. Snow 1991) whose impact on the local economy was limited.

Such enterprises, however, were overshadowed by the growth of Santa Fe's downtown merchants, state government, and, ultimately, by a tourist economy, as artists, health-seekers, ethnographers, and tourists, sought out unique experiences in the Southwest. The railyard's function as a freight entrepôt was all but eliminated with the development of a subsequent transportation system—the improvement of highways and increased motor vehicle transport of products to the city during the 1940s and after World War II. By 1954, Gross Kelly Co. had relinquished its lands and structures, leaving the Maloof Co., distributors of alcoholic beverages, as the major business in the yards—a dubious economic boon to the city's citizens.

Ceramic Report (LA 146402)

C. Dean Wilson

This chapter discusses the results of analysis of the 5,041 sherds recovered during the excavation of LA 146402, a small farmstead occupied during the Spanish Colonial period. The LA 146402 assemblage is by far the largest recovered during the Santa Fe Railyard project. The documentation of characteristics and trends noted for pottery recovered from LA 146402 provided information relating to the dating of this site as well as ethnic affiliation, production technology, area of origin, and use of ceramic vessels.

Northern Rio Grande Ceramics: The Big Picture

Distributions of various attributes noted for native pottery from LA 146402 may provide clues concerning the nature of production and decoration of pottery vessels by native potters (mostly represented by Northern Tewa Pueblos residing in the Tewa Basin) and the distribution to and use of these vessels by Hispanic settlers in the Santa Fe area. Distributions of native pottery along with other aspects of material culture appear to be very similar at both Hispanic and Pueblo sites in Colonial northern New Mexico. Until the coming of the railroads in the late nineteenth century, artifact assemblages from almost all sites in northern New Mexico are dominated by native ceramic types, and are associated with much lower frequencies of European, American, and Mexican ceramics.

Similarities in material culture at sites associated with various ethnic groups appear to reflect the nature of dynamics between different groups during the Spanish Colonial, Mexican, and early part of the American Territorial period. While it is sometimes assumed that sharp boundaries and distinctions existed between different ethnic groups residing in Colonial northern New Mexico, such characterization may often imply a level of cultural difference and isolation that appears to have seldom been appropriate for this period (D. H. Snow 1992).

Examinations of native pottery dominated assemblages in residential sites occupied in the Santa Fe area provide an opportunity to examine patterns of interaction that tied diverse groups together in the Spanish borderlands of the New Mexico province.

The conquest and occupation of the Pueblo world by the Spanish during the early seventeenth century appears to have had limited immediate impact on the production and decoration of Pueblo pottery produced in northern New Mexico. This was partly because of a long history of pottery production across the Pueblo provinces that resulted in the production of diverse forms of well-made, durable, and visually appealing utilitarian and decorated service ware vessels that were well suited for a wide range of activities and uses. During the Classic period, spanning from about AD 1350 to 1600, potters in various Pueblo provinces began to produce distinct and specialized forms. Forms produced in some localities or villages were distributed over a wide area of the Northern Rio Grande region (Habicht-Mauche 1993; Powell 2002; Vint 1999). By the time of the establishment of the provincial capital of Santa Fe, a number of distinct and specialized forms had long been produced in the surrounding Pueblo provinces, and included the production of a range of glaze ware forms over a wide area to the south (Franklin 1997; Morales 1997; Shepard 1942, 1965; Warren 1969), and Biscuit Ware and then Sankawi Black-on-cream (Vint 1990) in areas to the north including the Tewa Basin. Pottery recovered from settlements in the Santa Fe area dating to the early spans of the Colonial period are represented by a combination of glaze wares from a variety of localities, with Sankawi Black-on-cream, and utility wares indicative of production in a number of different Pueblos (Seifert 1979; Wiseman 1988, 1992).

The isolation of the New Mexico province from other areas of the Spanish empire due to distance and hostilities from surrounding nomadic Indians was also a factor in Spanish dependence on Pueblo pottery. As a result, the economy of the New Mexico province was largely based on a barter system. The maintenance of the New Mexico colony was underwritten by the Spanish crown (Simmons 1979), in which the secular population received very little support. The caravan system that supplied this area was notoriously inefficient, and Majolica produced in Europe and Mexico was considered a luxury during the entire Colonial period (C. T. Snow 1993).

Major shifts in the technology, decoration, and distribution of pottery vessels occurred during the second half of the eighteenth century and continued into the first half of the nineteenth century. This period is defined by changes in the relationship between Hispanic settlers and Pueblo potters that appear to have influenced major changes in the design, shape, and production techniques in pottery produced by different Pueblo groups (Frank 1991). Frank (1991, 2000) notes that a combination of historic events may have led to a distinct system ultimately created and oriented around culturally innovative and dominating Hispanic settlers in northern New Mexico, whom he refers to as *Vecinos*.

Historic events that may have spurred the increasing influence of this group include the end of hostilities with many of the surrounding nomadic Indian groups and population reduction resulting from a smallpox epidemic in the 1770s. These events changed the population balance between Pueblo Indians and Hispanic settlers, resulting in Hispanic settlers' emergence as the largest group in the New Mexico province. The Hispanic population permanently surpassed that of the Pueblos by 1780, due to a faster population rebound from the epidemic and intermarriage between Indians and Hispanic settlers. Demographic changes also served to concentrate ownership of land, livestock, and materials of production to the Vecinos. Decreasing hostilities with nomadic Indians also freed up new lands for settlement and allowed increased commerce with Mexico, creating an economic boom between 1785 and 1810. In the mid-1780s, the provincial economy began a period of expansion fueled by booming export to southern markets. The lifting of trade regulations as part of fiscal reforms heightened commercial activities and investment throughout the northern provinces of New Spain. As local populations grew, regional markets had to draw supplies from more distant sources. By 1780, New Mexican products, including wool, textiles, and pottery, became better integrated into the larger economy. As their populations grew, Vecinos began to take choice lands away from Pueblo communal ownership, as Pueblos received decreasing favor in the provincial legal system. This expansion of Hispanic populations along with their usurpation of the Chihuahua trade after 1785 and the replacement of Pueblo woven goods with those produced by the Vecinos all contributed to the emergence of their increasing control of a new commercial order that emerged in the New Mexico provinces (Frank 2000).

Frank (1991, 2000) postulates that the expanded trade in Pueblo Indian pottery to Hispanic settlers influenced the production, decoration, and quality of Pueblo pottery produced in Rio Grande Pueblo provinces during the end of the eighteenth and first half of the nineteenth century (Frank 1991). A comparison of Powhoge Polychrome vessels with types assumed to be earlier was interpreted as indicating the replacements of cloud feathers and other formalized designs with less formally organized decorative spaces and new active stylized shapes. In addition, the appearance of Powhoge Polychrome is interpreted as reflecting a marked degradation in production quality. Comparisons of vessels assigned to different types also seem to indicate changes in pottery shape were taking place at this same time. These involved the rounding of the low bulge common on earlier types. Based on characteristics noted on these jars Frank (1991, 2000) also proposes that the sloppy execution of pottery decoration and imperfect shaping and firing of vessels could also signify a compromise in tradition quality to meet the demands of the market (Frank 1991). He notes that such considerations could have resulted in changes in shapes, decorations, and manipulation characteristic of contemporary Mexican or Spanish pottery forms. Vessels belonging to types produced by Pueblo groups during the end of the eighteenth century seem to reflect similar alterations in form, design, and technique (Frank 1991). These include a shift toward heavier walls, simpler shapes, and a slip of poorer quality. Thus, parallel changes in ceramic production took place in each of the pueblos, between 1780 and 1820 (Frank 1991).

The changes in pottery shape, design elements, and production techniques that took place from about 1780 to 1820 are among the most visible manifestations of changes brought about by economic growth. The nature of the changes in the Pueblo ceramic tradition, influenced by Hispanic taste, attests to the growing dominance of Vecino society in late Colonial New Mexico. Changes in decorations that distinguish transitional Pueblo pottery may also reflect influences from religious items that New Mexico Vecino artisans begin producing around AD 1790 (Frank 1991). These include forms decorated in floral, roundel, and medallion designs, and the combinations of red and cream slips to produce specific decorated forms and unpainted polished red and black vessels characteristic of various traditions long produced in Mexico and traded over wide areas of Colonial Spain (Fox and Ulrich 2008; Warren 1979). The appearance and increase in various styles and forms in Pueblo pottery appears to have resulted from significant economic developments based on long distance trade resulting from a reorientation of social relations between Hispanic settlers and Indians (Frank 1991). Pueblo designs involved the transformation of non-Indian designs into new modes of representation, and some of the pottery shows a striking similarity to the elaborate decorations found in locally crafted religious objects by Hispanic artists in northern New Mexico.

Darling and Eiselt (2005) also emphasize the importance of the emergence of Hispanic villagers during the late eighteenth and early nineteenth centuries relating to trends associated with the inter-ethnic production and distribution of micaceous pottery. Data resulting from stylistic and chemical characteristics of micaceous pottery in the Lower Chama Valley indicated a combination of pottery produced locally and obtained from nearby Tewa Pueblo and Jicarilla Pueblo groups. Ceramic data from these studies indicate that trade and interaction with Indian neighbors was strongest at more remote ranchos than at the larger Hispanic villages. These inter-ethnic production and exchange networks are largely attributed in these studies to the role of female Hispanic consumers and to their ties with female Indian producers (Darling and Eiselt 2005). Decisions made by Hispanic women, for example, are influential in obtaining and consuming pottery over wide areas of the New Mexico province (Darling and Eiselt 2005).

Another important issue concerning pottery production in northern New Mexico is the existence and importance of pottery produced locally by "Hispanic" occupants of villages during the eighteenth and nineteenth centuries. While the great majority of ceramics at most Hispanic villages were produced locally by Pueblo potters (particularly those located close to Pueblo villages), there is a considerable range in opinion whether non-Indian potters produced significant amounts of pottery in some villages in northern New Mexico during the eighteenth and nineteenth centuries (Carrillo 1997; Dick 1968; Ferg 1984; Franklin 1997; Hurt and Dick 1939; Levine 1990; D. H. Snow 1984; Warren 1979A).

Pottery postulated to have been produced by "Hispanic" individuals residing in these villages includes unpolished utility ware, red-on-tan-brown, polished smudged, and micaceous forms (Carrillo 1997; Dick 1968; Levine 1990). Much of the disagreements concerning the clarification of certain pottery as Spanish or Hispanic in origin hinges on the definition of these terms. For example, while acknowledging evidence for the production of pottery at some Hispanic villages, D. H. Snow (1984) notes that the low status of pottery production associated with class distinctions prevented most Hispanics from pottery manufacture. He feels that pottery made at such villages in Colonial New Mexico was almost always made by Indians that may have resided at Hispanic villages or by poor Hispanic women who were temporarily supplementing their income. D. H. Snow (1984) feels that documented cases of pottery-making by Hispanic potters probably represents isolated incidences involving the adoption of Pueblo technologies to supplement incomes, and he does not believe such incidences can be described in terms of a valid ceramic tradition that was passed from one generation of potters to the next. The majority of pottery produced at villages considered Spanish or Hispanic is assumed to have been produced by either Indian servants, by Hispanized Indians (*"genizaros"*) that were forced to settle villages along the southern and northern flanks of the Colonial New Mexico frontier, or by *"mestizo"* women (native women married to Spanish men). Regardless of the ethnic identity of these potters, it is likely that significanct amounts of pottery were produced in non-Indian villages located in some areas of Spanish Colonial New Mexico, particularly in areas that were no longer located close to Pueblo villages after the Pueblo Revolt and Reconquest periods.

It is also clear that regardless of the ethnicity of individuals producing these vessels, the pottery produced at locations throughout northern New Mexico during the late Colonial period was made to fulfill needs of large numbers of Hispanic or Spanish settlers. As previously indicated aspects of pottery produced during the eighteenth and nineteenth century reflect widespread tastes of Hispanic and Spanish settlers in areas colonized and controlled by Spain. An example of pottery representing a widely traded tradition displaying such characteristics is represented by pottery forms long produced in the Mexican state of Jalisco that has been assigned to various types, including Aztec IV, Guadalajara Polychrome, and Tonala Burnished (Deagan 1987; Fox and Ulrich 2008). While this pottery encompasses a sequence, which includes forms produced during the prehistoric period to those made today, the Colonial version of this ware dates from about AD 1650 to 1810. This ware includes forms displaying combinations of black decorations and red slip over a cream surface as well as decorated surfaces that are red slipped or smudged black. This ware, along with similar ware produced in other production centers has been found at Colonial sites throughout the southwestern United States, and may have been preferred by Hispanic settlers. Thus, it is not surprising Pueblo potters producing pottery for Hispanic settlers would have adopted styles and techniques that are characteristic of these pottery traditions.

Another source of locally produced pottery available to settlers in northern New Mexico that emerged during the late Colonial period is the micaceous pottery produced by potters belonging to the Ollero Band of the Jicarilla Apache. Sometime during the late 1700s, Jicarilla Apaches began to occupy the mountains above Abiquiu where they mixed with Utes and genizaros (Darling and Eiselt 2005). By the nineteenth century, Jicarilla potters were a major producer of the micaceous ceramics found in Hispanic households in some of the northernmost villages in the New Mexico province. Much of the pottery attributed to Jicarilla potters has been assigned to Ocate Micaceous, and is characterized as thin and unpolished with abundant mica temper.

Methodology

In order to examine these issues, a variety of attribute classes and ceramic type categories were recorded.

Ceramic Types and Attributes

Temper

Temper categories were identified by examining freshly broken sherd surfaces through a binocular microscope. Temper categories reflect distinctive combinations of color, shape, size, fracture, and sheen of observed particles.

Granite with abundant mica reflects the use of combinations of local alluvial clays and crushed igneous river cobbles that were abundant in northern areas drained by the Rio Grande. Even without microscopic examination, this temper is easily recognized by the presence of numerous mica fragments visible through the vessel surfaces. Crushed rock fragments are relatively large and sub-angular to sub-rounded. These particles are usually white, but occasionally are clear, light gray, or pink. Rock fragments may contain mica fragments or black inclusions. These fragments may be a crushed granite that came from either the Sangre de Cristo Mountains or local stream deposits weathered from Sangre de Cristo granites. It is also possible that some temper assigned to this category was derived from metamorphic rocks, displaying similar combinations of minerals, such as schist.

Similar temper to granite without mica was differentiated based on the absence or dominance of mica fragments. Sherds with similar granitic temper without mica were assigned to a *Granite without mica* category. Sometimes it was difficult to distinguish slightly rounded versions of this temper from sand resulting in overlap between these categories that may reflect naturally weathered granite inclusions within the clay.

Another category is differentiated by the occurrence of high frequencies of mica that occurs in residual clays. Sherds displaying this combination of temper are classified as *Highly micaceous residual paste.* This category consists of clay weathered from highly micaceous rock that occurs in the mountains to the north near Taos, New Mexico.

Fine tuff or ash refers to the presence of fine volcanic fragments presumably derived from pumice, ash, or tuff deposits long-used by potters in the Northern Rio Grande region. This category consists of small, clear to light, or dark vitreous, angular to rod-shaped particles with light colored dull pumice particles. The presence of tuff or ash particles may reflect either the use of self-tempered ash derived clays or the intentional addition of crushed or weathered tuff to the clay. Attempts were made to divide tuff into a series of categories that might represent potential production areas. Category assignments were based on variation in the amount of mica and sand inclusions, mica by itself, and the size and appearance of tuff fragments. Placement of sherds into these finer sorting categories was difficult and sometimes inconsistent, although general patterns observed across these categories may be important. Examples of temper categories defined based on slight differences in size or mixtures of inclusions included *Fine tuff and sand*, *Mica and tuff*, and *Mica, tuff and sand*. Another possible variation of this temper was recorded as *Large tuff fragments* which consisted of large poorly ground tuff fragments appearing as clusters of puffy white fragments. Another variation of tuff commonly occurs is gray ware types recovered from sites on the Pajarito Plateau; it is referred to here as *anthill sand*. Anthill sand grains are often quartz phenocrysts with smaller tuff particles that have a transparent or crystalline structure within a non-micaceous paste. Sources noted for this material include anthills and sorted stream-bed sands on the Pajarito Plateau (Vint 1999).

Sand refers to rounded or sub-rounded, well-sorted sand grains. These grains are translucent, or white to gray in color and may be frosted. This category is distinguished from sandstone temper by the presence of large even sized quartz grains, and the absence of a matrix. The differentiation of sand from weathered granite proved to be a difficult distinction to consistently make particularly for polished micaceous utility ware types. This temper appears to reflect the use of local sand weathered from granite.

Sandstone temper exhibits similar grains along with angular matrix fragments. Grains derived from sandstone are often smaller than those found in sand temper resulting in the recognition of a *Fine sandstone* category. Another variation of this temper was recorded as *Mica quartz and sandstone*.

Basalt refers to the presence of homogenous greenish, gray, or black colored angular rock fragments representing the use of crushed basalt in glaze ware vessels. *Gray crystalline basalt* refers to the presence of homogenous gray, or black colored angular rock fragments representing the use of crushed basalt. Examples of similar material with numerous rounded quartz grain were recorded as *Basalt and sand. Scoria* refers to basalt with red or orange colored particles. Another crushed rock temper common in glaze ware pottery is *Latite*. This temper is characterized by dull buff, light gray, to dark colored dull tuff particles and shiny black and white quartz particles. Similar temper with sand fragments was assigned to *Latite and sand*.

Sherd refers to the use of crushed potsherds as temper, and is usually white, buff, gray, or orange in color. These fragments are often distinguished from crushed rock by their dull nonreflective appearance. However fragments of tuff may be similar in appearance. Small reflective rock particles may be included inside or outside the sherd fragments. In some cases, the presence of fairly large particles along with crushed sherd may indicate the addition of both crushed rock and sherd. In cases where both sherd and distinctive rock fragments occur together, the combination of the two materials was noted such as for *Sherd and sand*.

Temper consisting of similar sand along with rounded white to dull gray fragments, assumed to represent natural inclusions in the clay with sand, was classified as *Oblate shale and sand*. Paste with shale fragments without other lithic fragments was assigned to a *Shale* category.

Pigment Type

Pigment categories refer to the presence, surface characteristics, and color of painted surface decorations. In unpainted sherds, this category was simply recorded as *None*, and indistinct pigments were recorded and *Indeterminate*.

Organic pigment refers to designs applied with vegetal material only. Organic paint is absorbed into the vessel surface. Streaks and polish are often visible through the paint, and painted surfaces are often lustrous depending on the amount of surface polishing. Decorations in organic pigment may be gray, black, bluish, and occasionally orange. The edges of the painted designs range from sharp to fuzzy, depending on paint density. A few sherds exhibiting organic paint and red pigment were classified and *Organic black polychrome*.

Mineral pigments are made from finely ground minerals, usually iron oxides that are applied as powdered compounds, and are often applied with an organic binder. The pigment appears as a physical layer, and exhibits surface relief. Mineral pigments obscure surface polish and irregularities. Firing atmosphere affects the color of iron-based mineral pigments. A neutral or reduction atmosphere produces black pigments, while an oxidizing atmosphere results in reddish pigments. Mineral pigment categories identified during the present study include *Mineral black* and *Mineral black and red.*

Glaze pigments result from the use of a fluxing agent, such as lead, that produces a vitrified or glassy appearance. Glaze pigments are often very thick and runny. Glaze pigments fire to black, green, brown or yellow colors.

Surface Manipulation

Surface manipulation refers to the application of polished, slipped, and textured treatments to interior and exterior surfaces. Slip refers to the intentional application of a distinctive clay, mineral, or organic layer over a vessel surface. Such applications were used to achieve black, white, or red surface colors, usually not obtained with local paste clays and commonly employed firing methods. Categories utilized during the present study also denote the presence of surface polishing. Polishing is achieved through the continual rubbing of a surface with a very smooth stone to produce a compact and lustrous surface. Textured treatments are formed by the retention of coils on the vessel surface creating banded or corrugated appearances or by pressing of an object into a wet surface to creating incised decorations. Sherd surfaces may display combinations of these treatments. Categories recorded during the analysis of sherds recovered from sites excavated during the railyard project include *Plain unpolished*, *Plain polished*, *Polished white slip*, *Polished red slip*, *Polished smudged*, *Micaceous slip*, *Surface missing*, *Smeared Indented Corrugated, Polished cream and red slip*, *Polished cream slip*, *Polished thin cream slip, Unpolished cream slip, Smudged with micaceous slip*, *Fugitive red*, *Red or white micaceous slip, Smeared plain with micaceous slip, Incised punctuated with mica slip, Polished gray with mica slip,* and *Red slip splatter.*

Vessel Form

Shape and surface attributes of sherds provide clues to the form and function of vessels from which they are derived. Vessel form classification is usually dependent on sherd size, surface manipulation, and the portion of the vessel that is represented. The consistent placement of sherds into form categories provides for basic functional comparisons within and across assemblages. It is usually possible to assign rim sherds to more specific categories than body sherds. *Indeterminate* refers to cases where vessel form is unknown.

Very little relationship exists between surface manipulations and vessel form in historic types. For example, both jars and bowls may be polished on either side. This often makes the assignment of body sherds from historic pottery types to vessel form categories very difficult. Thus, the majority of body sherds were assigned to a series of categories based on the location of polished and unpolished surfaces and include *Body sherd polished both sides*, *Body sherd unpolished both sides, and Body sherd unpolished interior polished exterior.*

Sherds thought to have derived from jars were assigned to several broadly defined categories. *Jar rim* refers to rim sherds derived from jars with relatively wide orifice diameters. Such rims are often associated with vessels used for cooking or storage. This form is distinguished from other jar rim forms by wide orifice relative to vessel size proportion. Jar neck includes non-rim jar sherds with curvature indicating they were derived from necked jars. Some of the sherds assigned to this category also may have been derived from dough bowls with flared rims. *Jar body* refers to body sherds thought to have been derived from jars but may include some sherds with characteristics identical to sherds with unpolished interiors assigned to more general categories. Other categories defined for jar forms include *Miniature jar*, *Jar body with lug handle*, and *Jar bottom*.

Bowl rim refers to sherds exhibiting inward curvature from the rim indicative of bowl shapes. *Bowl body* refers to body sherds with interior polishing or painted decoration indicating they came from bowls. *Soup plates* represent a European-derived form consisting of flat tray like area closest to the rim with flaring creating a bowl near the center. Some forms assigned to this category more closely resemble bowls with a narrow out-flaring rim, while other are more plate-like, exhibiting a wide rim and low curve in the bowl area.

Another form, which is often difficult to distinguish from rim sherds, is *dough bowls*. Dough bowls refer here to a large deep bowl form commonly produced during the Late Colonial and Early Territorial period. Like jars, dough bowls commonly flare outward near the rim. Another similarity to decorated jars is that the slip and painted decorations are usually limited to exterior surfaces. The distinguishing characteristic of rim sherds derived from dough bowls is a very wide rim diameter relative to vessel size. It is sometimes possible to identify larger sherds as dough bowls because of a wider or squat profile as compared to jars. Dough bowls may represent a form that is transitional between historic Pueblo bowls and jars. Categories recognized for sherds derived from this form include *Dough bowl rim* and *Dough bowl body*.

Tewa bowls have characteristics intermediate between shallow bowls and dough bowls. This form was introduced during the early AD 1600s, and was quite common during the early 1700s, and is rarer from contexts dating after the late AD 1700s or early 1800s. These vessels are deeper than shallow bowls but shallower than dough bowls, and are characterized by a sharp angle or keel in the middle of the vessel. For decorated forms, paint and slip tend to be limited to the exteriors of vessels.

Other forms sometimes associated with historic contexts were characterized as *Indeterminate steep bowl jar rim*. Another bowl form recognized was characterized as *Bowl rim with indeterminate handle*. Other vessel forms recorded during this analysis include *Cloud blower*, *Indeterminate coil strap handle*, *Square corner, Ring base,* and *Footed vessel.*

Modification

Modification refers to evidence of post-firing alternations resulting from the use, repair, and shaping of sherds and vessels. Modification categories combine information about the shape and associated wear patterns of a sherd. Modifications categories identified during the present study include *None*, *Drill hole complete*, *Beveled edge*, *Firing spall*, *Interior spall erosion, Abraded surface exterior*, *Drill hole incomplete*, *Interior surface partially worn, Abraded surface interior, Rim wear, Interior exterior erosion, Sooted interior exterior, Sooted interior, Exterior partially exfoliated erosion, Sooted exterior, Shaped all sides, Spindle whorl, Intentional chipping, Unknown residue, Rounded from water transport,* and *Single groove incised.*

Rim Measurements

Larger rim sherds were measured. Rim radius refers to the projected radius of a particular sherd determined through a circular diagram showing curvature of various radius sizes. This category conveys additional information concerning vessel function. Rim Arc refers to the total amount of curvature of the sherd, and may ultimately provide information concerning relative number of vessels represented. Arc is measuring using the same diagram used to determine rim radius.

Typological Classification

Ceramic types refer to categories identified based on combinations of paste and surface characteristics with known temporal, spatial, and functional significance. For LA 146402 and the other railyard assemblages, ceramic items were initially assigned to specific traditions based on probable region of origin as indicated by paste and temper characteristics. They were then placed into a ware group on the basis of general surface manipulation and form. Finally they were assigned to temporally distinctive types within the various tradition and ware groups.

Most of the pottery examined during the present study represents historic types, which exhibited a wide range of characteristics. The large number of types identified can make comparisons of distributions very cumbersome. Therefore, types were also combined into more general groupings that allow for an easier comparison of ceramic distributions based on very basic temporal (prehistoric versus historic) period or distinct combinations of manipulations indicative of basic technology.

Prehistoric Types

Pottery exhibiting characteristics of types known to have been produced in the Northern Rio Grande region prior to the Spanish Colonial period were represented by extremely low frequencies (five sherds) of gray wares and may reflect small amounts of material redeposited from nearby prehistoric sites. Prehistoric types recovered from LA 146402 include *Plain Gray Body*, *Smeared Plain Corrugated*, and *Smeared Indented Corrugated.*

Historic Types

As previously noted, the great majority of the native pottery from LA 146402 represents historic types, most typical of assemblages from the late part of the Colonial period. Historic pottery types were subsumed under several groupings based on paste, polish, slip, and painted decorations. Groups noted for Pueblo utility ware types include *Historic micaceous polished, Historic buff utility, Historic red utility,* and *Historic polished gray/black utility.* Historic decorated types were assigned to three basic groupings including *Historic Tewa polychrome, Historic intrusive matte polychrome,* and *Historic or Indeterminate glaze ware*. The other historic category is represented by a single sherd assumed to have been produced by historic Navajo potters.

Background

Most prehistoric and historic Pueblo types produced in the Northern Rio Grande region were first named and described by H. P. Mera or A. V. Kidder (Kidder and Shepard 1936; Mera 1932, 1933, 1939). Historic pottery types described from various archaeological sites have also been described or illustrated by more recent scholars (Carrillo 1997; Dick 1968; Eiselt 2005; Hawley 1936; McKenna and Miles 1990; D. H. Snow 1982). Descriptions and discussions of historic Pueblo types currently used are largely based on descriptions of whole pots from collections that lack contextual information (Batkin 1987; Frank and Harlow 1990; Harlow 1970; 1973; Mera 1939). These usually consist of fairly detailed descriptions of painted forms produced from the early historic to modern period, and often differentiate types based on minor differences in overall decoration and vessel shape. This strategy employed historic vessel collections amassed by museums and collectors mainly during the late nineteenth and early twentieth century. A weakness of this approach is that the whole vessels lack spatial and temporal information and the descriptions cannot be consistently applied to sherds, which make up the bulk of ceramic assemblages recovered from archaeological sites in the Northern Rio Grande region.

Archaeological investigations of Spanish villages and households (Brody and Colbert 1966; Darling and Eiselt 2005; Ferg 1984; Franklin 1997; Hurt 1939; Hurt and Dick 1946; Lang 1997; Levine 2001; 2004; Marshall and Walt 1984; Marshall 1992; Mensell, J. Gaunt, and J. Moore 2003; Rudecoff and Carillo 1987; Seifert 1979; Warren 1979a; C. D. Wilson 2001; Wiseman 1988, 1992) and historically occupied Pueblos (Adler and Dick 1999; Ellis and Brody 1964; Lambert 1954) have yielded descriptions and illustrations of native pottery based on sherds recovered from historic sites in northern New Mexico. These investigations have resulted in the definition of a number of similar pottery types thought to exhibit regional variability in paste, manipulations, and surface treatments. This variability is inferred to relate to an area and group responsible for the production of a particular vessel form.

The great majority of the native pottery analyzed from LA 146402 exhibits characteristics indicative of types known to have been produced by Northern Tewa Pueblos during the late part of the Colonial and early part of the Territorial periods (Batkin 1987; Frank and Harlow 1990; Harlow 1973; McKenna and Miles 1990; Mera 1939; D. H. Snow 1982). In order to document the range of variability represented, historic pottery forms examined during the present study were assigned to a combination of formal and descriptive type categories. Formal types were mainly assigned to decorated pottery exhibiting a distinct range of styles and forms attributed to a particular area and temporal span. These pottery types are named for the place of their assumed production followed by a descriptor that reflects a surface treatment or a combination of treatments. These types have long been used to differentiate distinct forms associated with specific manufacture areas and time spans. Examples of formal types identified in this study include Powhoge Polychrome and Kotyiti Glaze Polychrome. Informal types that lack diagnostic traits are given a descriptive name based on a combination of characteristics used to separate it from other types. Examples of informal types used during the present study include Tewa Polished Black and Smudged Interior Mica Slip Exterior. Informal categories used in this study document the range of characteristics noted in native pottery types common on sites in northern New Mexico while avoiding conjectures about the specific group responsible for the production of that vessel

Micaceous Utility Wares

Historic micaceous pottery types reflect distinct manufacturing technologies and resources used in the production of utility ware vessels (Eiselt 2005; Habicht-Mauche 1993). Micaceous pottery is distinguished from other pottery groups by the presence of a visible layer of fine mica on at least one surface. This effect was usually achieved through the application of powdered mica as a slip, but was sometimes the result of the use of highly micaceous clays.

Micaceous utility wares produced during the historic period can be traced to gray ware technologies long utilized by Pueblo potters in the Northern Rio Grande region (Warren 1979b). The earliest utility ware pottery produced in the Northern Rio Grande derived from long practiced gray ware traditions of the Colorado Plateau to the west. In the Northern Rio Grande, utility ware pottery from sites dating as early as the tenth century AD display numerous mica flecks visible on both surfaces. This mica was not intentionally added, but instead reflects the use of granite and clay pastes with a relatively high mica content (Warren 1979b). Pottery manufactured from similar clays that continued to be used into the Late Classic period. True micaceous pottery first appeared during the Classic period and is distinguished from earlier types by the application of micaceous slips to the surface or the use of residual pastes with high mica content (Anderson 1999; Warren 1979b). The earliest micaceous type exhibiting these residual pastes is Sapawe Micaceous, which is common at villages occupied during the Late Classic period.

Micaceous pottery from historic contexts has often been assigned to different pottery types based on the location of recovery and assumptions regarding the identity of the potters assumed to have been responsible for its production (Adler and Dick 1999; Eiselt 2005; Warren 1979b). To avoid confusion resulting from these assumptions, all micaceous types were assigned to descriptive types based on combinations of paste characteristics and surface manipulations. Despite the use of a neutral terminology, evidence of the area of production and ethnicity of the potters responsible for the production of a particular ceramic form is an important issue addressed by this study.

Historic Micaceous Unpolished Plain

Historic micaceous utility ware pottery was assigned to types belonging to two basic groups distinguished by the presence of polish on at least one surface. Pottery with a micaceous paste or slip, but without polished or smudged surfaces, was assigned to the historic unpolished micaceous group. The majority of sherds assigned to types within this group are derived from unpolished jars. Unpolished micaceous pottery produced during the historic period essentially represents a continuation of the basic utilitarian technologies that began with prehistoric gray ware forms when the great majority of pottery assigned to unpainted utilitarian types made throughout northern New Mexico were polished.

One of the most distinct forms of unpolished micaceous pottery is represented by pottery exhibiting self-tempered residual clays classified here as

Highly Micaceous Paste Utility. Pottery assigned to this type appears to be very similar to that described from sites in the Taos area thought to have been produced by Northern Tewa Pueblo and Apache potters This type subsumes pottery that may have been previously classified as Peñasco micaceous, Ocate Micaceous, and Petaca Micaceous (Adler and Dick 1999; Brugge 1983; Dick 1968; Eiselt 2005; Lang 1997; Woosley and Olinger 1990).

Surfaces are usually unpolished and are not slipped. While surfaces are sometimes quite smoothed, they are not polished. Higher concentrations of mica on some surfaces may indicate the occasional application of a mica slip similar to that in the paste. Mica flecks tend to be smaller and more even in size than those noted in other micaceous types. Exterior surfaces may exhibit small regular striations. Color ranges from dark gray and gray to red. Cores tend to be dark gray with occasional reddish streaks. Pastes fire to dark red colors in oxidizing atmospheres. This reflects the use of similar clays that were fired in variable atmospheres, including both examples that have been oxidized and reduced. Pastes are often vitrified and exhibit platy texture. Inclusions within the paste include a dark biotite mica and sub-angular crystalline fragments and occasional large sand grains (Lang 1997). It is doubtful that most of the pottery assigned to this type could have been made using clays occurring in the Tewa Basin. The most likely source for this pottery are settlements near the mica rich deposits found near Taos and Picuris Pueblo (Adler and Dick 1999; Eiselt 2005; Woosley and Olinger 1990). A typical characteristic of this type is that sherds almost always break with a very rough and irregular fracture distinct from other historic types. Forms are usually represented by jars often displaying fairly narrow rim diameters although bowls have been identified. Rims are often rounded.

Sherds exhibiting plain unpolished surfaces were assigned to an *Unpolished Mica Slip* category. Flecks of granite are often large and distinct. This pottery exhibits a distinct slipped surface and pastes and tempers are similar to those noted on polished micaceous types, as well as some prehistoric types. Pastes are gray to dark gray, although some examples are reddish. Temper usually consists of fairly large sand grains or granite fragments. Vessels tend to be thin. Forms are usually represented by jars.

The occurrence of pottery displaying distinct and well-oxidized surfaces with similar pastes resulted in the assignment of pottery to a *Plain Tan Mica* and *Plain Tan Mica Polished category*. Pottery assigned to this type is distinguished by a tan to brown to salmon-pink colored surface. Exterior surfaces are covered with large but sparse mica flakes that are usually gold but are sometimes silver. The overall effect is fairly distinct to that noted for other unpolished or micaceous types, but similar to Tewa Buff Ware types. Pastes tend to be hard and dense. Paste cross section is either reddish-yellow or reddish-brown, and may exhibit a gray core or streak. Temper of most pottery assigned to this group often consists of fine tuff along with smaller amounts of rounded sand grains. All sherds identified for this group derived from jars. A final type identified for this group was classified as *Micaceous Utility Undifferentiated*. This type was used when diagnostic characteristics were absent from sherds.

Historic Micaceous Polished

An important class of utility wares found at many Colonial period sites in northern New Mexico consists of vessels with plain exterior surfaces containing thin layers of mica slip and interior surfaces that are polished and sometimes smudged. This pottery appears to have developed out of late forms of Sapawe Micaceous produced during the early Spanish Colonial period (D. H. Snow 1982).

Pottery exhibiting similar characteristics was assigned to one of two distinct types based on the presence of sooted or smudged interiors and include Smudged Interior Mica Slip Exterior and Polished Interior Mica Slip Exterior (Fig. 7.17). Except for evidence of interior sooting, pottery assigned to these categories appears to exhibit similar characteristics, and all characteristics except interior treatments are described jointly for these types.

The pottery assigned to these categories appears to be very similar to forms previously described as Vadito Micaceous. This type is described as a culinary ware made from a non-micaceous clay and that has a distinct mica slip over a plain rough surface (Dick 1968; Levine 2001). Pottery exhibiting such characteristics appears to have been produced at various Northern Tewa Pueblos from AD 1600 to the early twentieth century. Pottery assigned to this group is also similar to El Rito Micaceous described from the El Rito-Abiquiu area and Picuris-Taos area at contexts dating to the nineteenth century (Dick

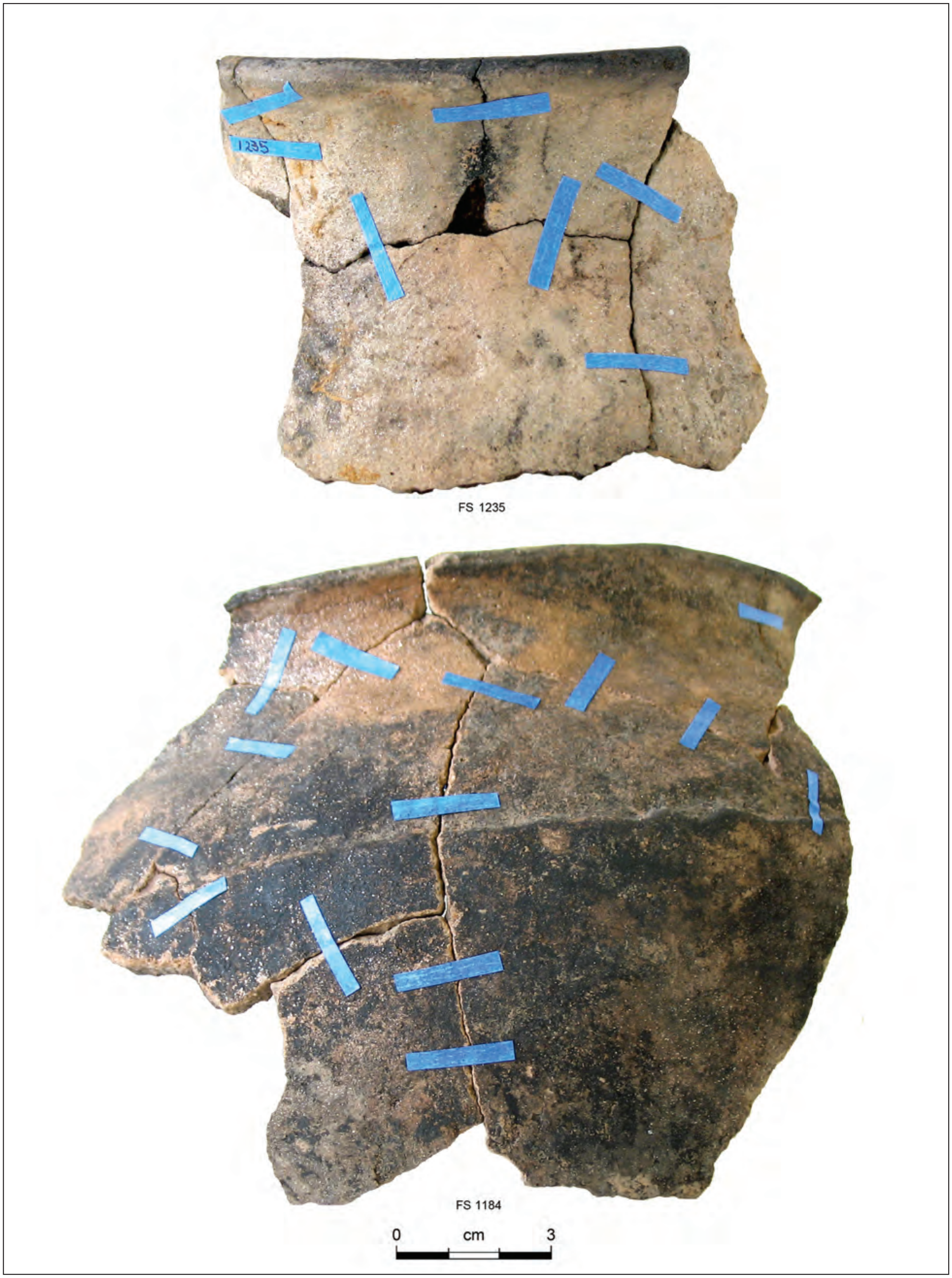


Figure 7.17. Smeared indented mica-slipped pottery.

1968), as well as forms from other areas postulated to have been produced by Hispanic potters (Carrillo 1997).

Pastes almost always fire to a similar yellow-red color when exposed to an oxidizing atmosphere. Pastes are usually dark throughout, and cores tend to be red. When present, cores consist of red-brown to red streaks. Most vessels appear to have been fired in reduction atmospheres with occasional exposures to oxidizing atmosphere during the final stages of firing. Vessels seem to have been fairly well fired as hardness and friability is comparable to that noted in earlier prehistoric gray ware pottery. Examples for which temper was examined included variations of granite and sand, or combinations of the two. A single sherd with basalt temper was assigned to a Middle Rio Grande variety of this type.

Exterior surfaces are plain and unpolished and are usually covered with a distinct mica slip with large visible flecks. Many of the surfaces erode easily, often obscuring evidence of a mica slip. These surfaces are very rough and unpolished, and completely smoothed. Small pitted marks resulting from the intrusion of temper into the surface and very small striations are often present. Unslipped surfaces are usually dark gray, but occasionally gray brown, or yellow red. Mica ranged from a gold to silver color. Some exteriors were covered with large distinct mica flecks, while mica particles are sparse and hardly visible in other examples. Interior surfaces were slightly to moderately polished. Micaceous flecks may show through polished interiors, but appear to represent inclusions present in paste rather than an added slip. Surfaces that were not sooted were usually brown, but sometimes gray. Sooted interior surfaces were usually dark gray to black, and usually more polished than surfaces that are not smudged. There appears to be very little relationship between interior and exterior surface color and treatment.

Rim forms are dominated by jars although everted bowls are relatively common. Jars exhibit a slight flare near the rim, and tend to be short. Jars size is variable. Rims are usually rounded, but are sometimes tapered. Bowls are often flared near the rim and essentially represent a shorter version of jars.

Sapawe Micaceous Late Variety refers to a late form of Sapawe Micaceous Utility. While earlier versions of Sapawe Utility were produced during the Classic period (Wendorf 1953), by the beginning of the seventeenth century Tewa potters manufactured a distinct form, with exteriors slipped with mica over partially obliterated surfaces with smeared corrugations (D. H. Snow 1982). Exterior surfaces range from tan, brown, to red. Interior surfaces are polished and smudged. Forms usually consist of large wide mouth jars that tend to be everted near the rim. Walls are usually quite thick. This type appears to have developed into later slipped micaceous forms and is extremely rare at contexts dating after the late seventeenth century. Another category noted was *Polished with Highly Micaceous Paste*.

Tewa Plain Ware Types

Tewa plain ware refers to the other major historic utility ware group represented at Spanish Colonial period sites in northern New Mexico. Most Tewa plain ware types are polished, and textured treatments are almost always absent. Characteristics of Tewa Plain Ware types reflect the combinations of traits of earlier utility, decorated, and glaze wares produced in the Northern Rio Grande region as well as influences from "Old World" ceramic technologies long-practiced in much of Europe and Asia. During the historic period, these old world technologies were transplanted to areas that became Mexico and the United States. During the later Colonial period this pottery influenced on Native potters while occurring as ceramic containers transported to Santa Fe by caravan.

The shapes, surface treatments, types of slips, and pastes employed in types belonging to Tewa Plain and Tewa Polychrome wares overlap; and developments in these different ware groups appear to have influenced each other (Harlow 1973; Mera 1932). These similarities may sometimes make it difficult to distinguished unpainted sherds from portions of Tewa decorated vessels not exhibiting a white- or cream-colored slip. Thus, it can be assumed that certain amount of the polished buff and slipped red sherds assigned to Tewa Plain ware types actually originated from painted polychrome vessels.

Tewa Plain Wares were divided into basic ware groups based on the presence or type of slipped surface, and variation noted within these groups was used to define descriptive types used here. The different groups defined for Tewa Plain Wares represented related innovations in the decoration of red and smudged utility ware forms (Harlow 1973). Vessels belonging to both of these groups were manufactured using similar techniques. Those assigned to red ware and gray/black ware types differ only by techniques used in final steps of firing. Oxidizing atmosphere was used for red wares while a high reduction atmosphere resulted in dark sooted smudging of polished gray and black ware forms (Harlow 1973).

Types within a Historic Buff Utility ware group refer to sherds not exhibiting clear evidence of painted decoration or distinct clay, smudged, or micaceous slip application. This category is represented by sherds with buff, tan, and brown surfaces. Surfaces are almost always smoothed, and they are often polished. The use of this category often proved to be problematic. In the analysis this type may have been used as a catchall category to classify sherds without evidence of a distinct slip applications or other decorations. Sherds placed in this category may also include micaceous sherds where the slip was missing or not visible, sherds with slips that could not be readily identified, slightly oxidized polished gray polished forms, and sherds derived from portions of polychrome, glaze ware and red-on-tan vessels that were not slipped or painted.

Sherds within this group were assigned to types based on polish, and in rare cases by variation in surface texture. *Tewa Buff Undifferentiated* refers to smoothed buff wares with at least one polished surface. Tewa Unpolished Buff refers to similar pottery without polished surfaces. In many cases, the absence of a slip and polish appears to have resulted from obliteration caused by weathering, and sherds assigned to this group are probably derived from vessels belonging to a wide range of types and ware groups. Thus, many of the sherds assigned to this ware group could actually have originated from several different basic ware groups. This type may also occasionally reflect a very small subset of utility ware forms that exhibit neither a micaceous slip nor a polished or slipped surface.

Pottery was assigned to types of the Historic Red Utility group based on the presence of a visible and distinct polished red slip. Sherds assigned to the red ware group were derived from a number of distinct classes of vessels. These include examples where at least one surface is entirely covered with a red slip, the upper slipped portions of red-on-tan forms, oxidized areas of black wares, and red-slipped unpainted portions of polychrome vessels. Sherds with at least one surface that exhibited a red polished slip without evidence of other decoration were classified as Tewa Polished Red (Fig. 7.18). While a few bowl sherds from LA 146402 seem to reflect the presence of red slip over the entire vessel surface, evidence of surfaces that were completely slipped appeared to be very rare. Red wares produced prior the middle of the eighteenth century are commonly slipped over the entire surface. After this time the application of red slip is often limited to the upper portion of the vessel. Similar slipped red vessels appear to have been produced from the early part of the seventeenth century to the early twentieth century. Generally for this type, the slip is bright red to maroon and tends to be fairly well polished. Slip colors and polish appear very similar to that noted in red-slipped areas of polychrome vessels. Both surfaces are commonly slipped and polished. Unslipped surfaces are usually tan to buff in color. Temper usually consists of a fine tuff similar to that noted in other plain ware and polychrome types. Forms are represented by bowls and jars. Small mica flecks are sometimes visible on surfaces.

San Juan Red-on-tan or Red-on-tan Unpainted refers to forms exhibiting a red-slipped band over an unpolished surface (Fig. 7.19). The color of this slip often is similar to that described for other slipped red-ware types. The first few centimeters of the upper vessel interior or exterior of this type is often covering only 10 mm or less and seldom more than 30mm on the interior and exteriors of bowls and jar exteriors may range from bright red, dark red, to purple. This limited use of red slip is similar to that noted on late eighteenth and nineteenth century Tewa Polychrome forms including decorated and plain wares. Decorated areas are often broader on the exteriors of jars, where the slip may cover the entire neck. Temper is a fine tuff similar to other plain wares. Forms are similar to Powhoge Polychrome and are mainly represented by wide mouth jars and deep and shallow bowls. This type was assigned only to examples exhibiting the distinct red-on-tan effect. Thus, it is likely many sherds classified as Tewa Polished Red are derived from San Juan Red-on-tan vessels. This is indicated by an unusually high frequency of types with red slips derived from rims as compared to other ware groups.

Pottery exhibiting gray or black polished surfaces were assigned to types placed into the Historic polished gray/black group. In most cases, sherds were assigned to various types in this group based on the darkness and thickness of slip, which reflect differences in the degree of smudging and application of sooting over slipped red surfaces.

Tewa Polished Gray refers to sherds with gray- to dark gray-sooted deposits. This type in part, may reflect pottery associated with either an earlier plain ware technology where polished vessels were reduced during the later stages in firing or sherds derived from unslipped portions of black ware. Pottery assigned to *Tewa Polished Black* exhibits thick black deposits applied over slipped red surfaces. The very high iron content of the red slip allows for an extremely polished surface characteristic of Tewa Black. Sherds from similar vessels, in which surfaces have not been sooted, would be classified as Tewa Red. The sooted deposit may occur over the entire surface on bowls, and the entire exterior surface for jars, and both forms may also be sooted on both surfaces. Almost all examples identified during the present study are highly polished with a lustrous surface. Highly polished pottery may have been preferred by Spanish and Hispanic settlers accustomed to hard and impervious serving vessels of European, American, or Mexican manufacture. Pueblo potters slightly modified their technology to produce a similar effect, through the use of a highly polished red slip exposed to a highly reducing atmosphere during the final stages of the firing of vessels.

Examination of overall color patterns of large sherds indicate that sherds assigned to Polished Gray and Polished Black commonly originated from the same vessel. Examinations of large rim and neck sherds indicate an upper black band and a lower gray band on some vessels, mimicking San Juan Red-on-tan vessels. Similar slipping and sooting conventions have been noted in whole vessels described as "San Juan burnished black ware" dating to the late nineteenth century (B. Toulouse 1977). These vessels are described as having been polished, but not to the degree as noted for the later black wares. The red slip was applied to the upper part of the vessel. This produced an effect similar to San Juan Red-on-tan, where the upper part of the vessel exhibited a dense black color and the lower part was dark gray to gray brown (B. Toulouse 1977).

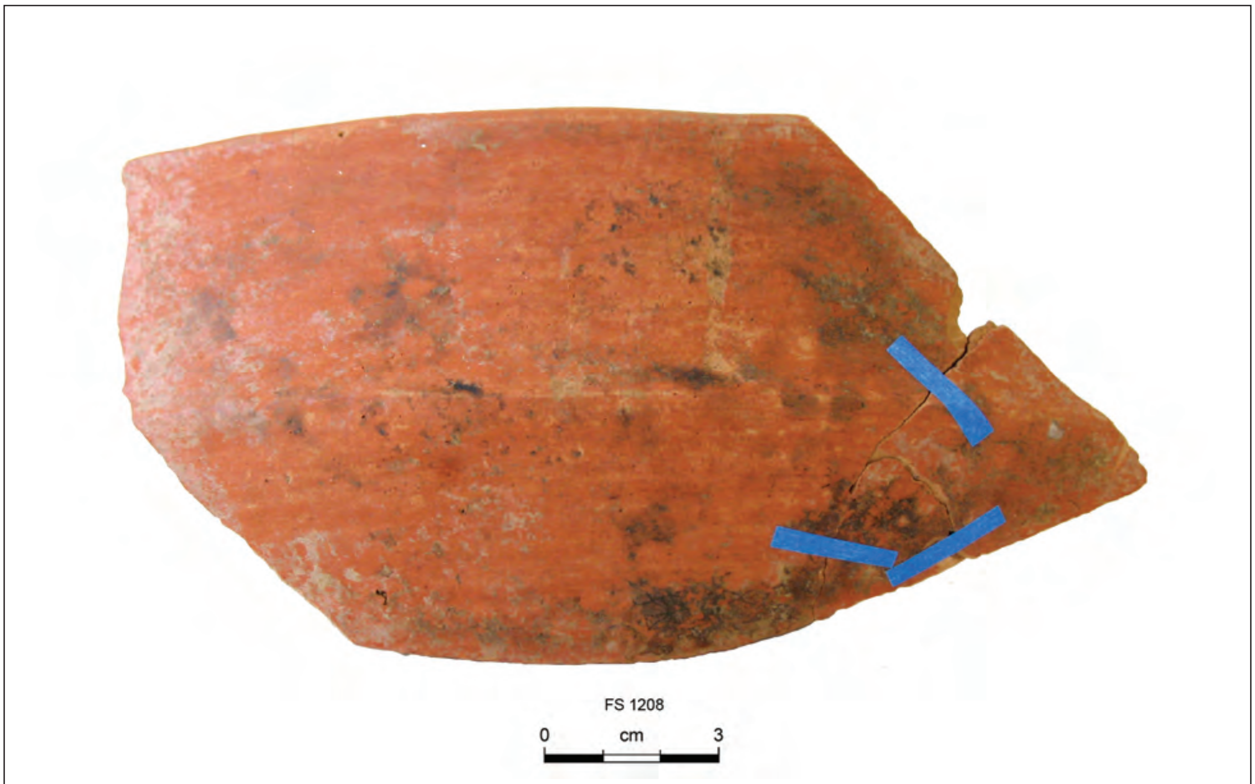


Figure 7.18. Tewa Red pottery.

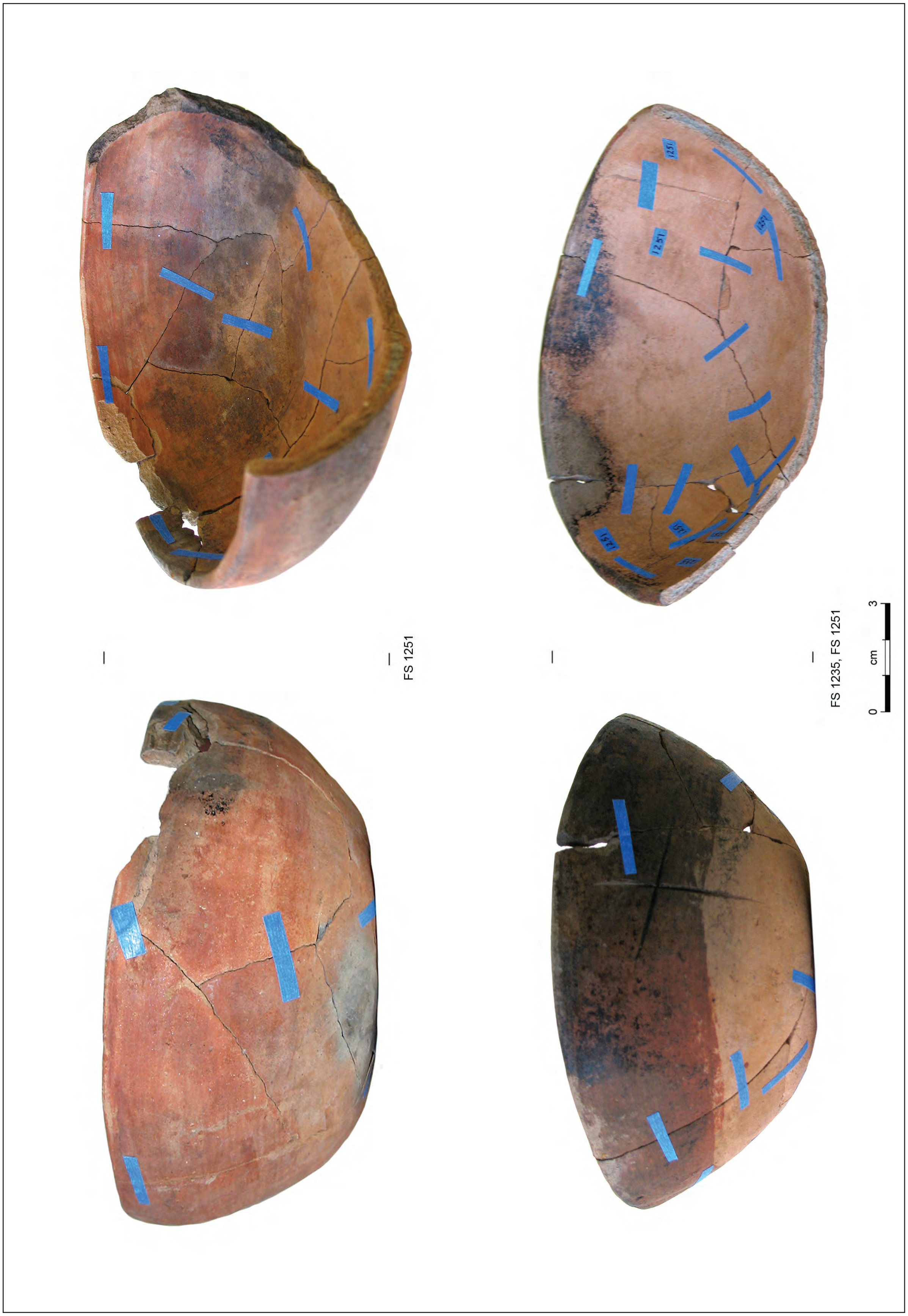


Figure 7.19. San Juan Red-on-tan pottery.

It is likely that these vessels reflect styles and conventions that were commonly employed by potters at most northern Tewa pueblos during the late eighteenth century and the first half of the nineteenth century. This may represent a technology with a fairly short duration, as black wares produced earlier (before 1780) and later (after 1880) appear to have been largely slipped over the entire surfaces. Other black ware bowls and jars were slipped over the entire surface and appear to be highly polished.

Paste profiles tend to be light gray, gray, or brown, and cores are usually absent. Sherds tend to break along a very even plain. Vessel surfaces lacking thick, sooted deposits are light gray to gray. Pastes fire to yellow-red to red colors, and the slips fire to a deep dark red in an oxidizing atmosphere. Temper consists of a very fine vitric tuff or pumice. Vessels are represented by a wide range of forms including bowls, dough bowls, soup plates, and jars.

Other polished sherds with gray or black surfaces were assigned to a Smudged Micaceous, *Smudged Interior Buff Exterior*, *Tewa Unpolished Black*, *Smudged Interior Unpolished Exterior, Smudged Interior Corrugated Exterior, Tewa Polished Gray with Mica Slip,* and *Historic Polished* Black Middle Rio Grande area.

Tewa Polychrome Types

The production of painted polychrome forms by Northern Tewa Pueblo potters during the historic period represent a series of technological and stylistic developments in decorated pottery produced in the Tewa Basin and surrounding areas. The Tewa decorated tradition began with the production of mineral-painted white ware types such as Kwahe'e Black-on-white during the Late Developmental period. The production of Santa Fe Black-on-white reflects a shift toward the use of organic paint on decorated pottery by AD 1200. This type later developed into the Biscuit ware types produced in the northern most areas after the middle fourteenth century (Mera 1939). Further technological changes represented by Sankawi Black-on-cream appear during the late Classic period, and continue into the Spanish Colonial period. By the seventeenth century, Tewa vessels with cream slips exhibited large red-slipped areas. This innovation is reflected in the earliest Tewa polychrome types of Sakona Polychrome and Tewa Polychrome. Polychromes continued to evolve with changes in the application of slip, forms, and painted styles resulting in a wide range of historic Tewa polychrome types (Frank and Harlow 1990).

With the exception of a single sherd assigned to Sakona Polychrome, the earliest historic polychrome type identified at LA 146402 is Tewa Polychrome (Fig. 7.20). This type is characterized by broad areas covered with red slips without painted decorations, with narrow bands covered with white, tan, or cream slip and painted decorations. These bands usually occur in the upper exterior portions of bowls, the mid to lower portions of jars, and flat edges of the outer interior of soup plates. In contrast to later polychrome types, the white or cream-colored slips are applied over the red-slipped areas. The design field of these decorated areas appears in narrow panels of cream-slipped areas, and tends to be quite simple and standardized. Designs are executed in organic paint with styles similar to those noted in earlier Sankawi Black-on-cream and Sakona Polychrome vessels. Common motifs are narrow or zigzag lines that are thin and widely spaced. Lines are often decorated with pendant dots, solid triangles, and hatchured areas. Forms include shouldered bowls, ollas, and soup plates.

Ogapoge Polychrome was quite rare at LA 146402. Ogapoge is distinguished from other Tewa polychrome types by the addition of red paint to distinctive design elements (Batkin 1987; Harlow 1973; Mera 1939). The field of design is much wider than earlier forms and is commonly represented by solid designs covering much of the upper areas of the jar exterior. Designs are often less organized than in earlier polychrome types. Designs commonly consist of stylized feather motifs where the tips are often filled with red. Such designs appeared to be closely related to western Keres and Zuni matte-painted polychrome types (D. H. Snow 1982). The extent of red slip is more restricted than earlier forms assigned to Tewa Polychrome.

Powhoge Polychrome

The majority of decorated sherds assigned to specific types from LA 146402 were classified as Powhoge Polychrome, a type named and defined by Harlow (1973). Decorations on Powhoge Polychrome are usually executed with organic paint applied over broad areas slipped with a low-iron light-colored slip clay (Fig. 7.21). This slip is usually cream-colored and covers almost the entire interior surfaces of shallow bowls and the upper three-quarters of the exterior of jars and deep bowls. This slip is usually fairly thick, well polished, and may exhibit a crackled surface. Most of the exterior surfaces of shallow bowls and soup plates and the interior surfaces of jars and deep bowls are unslipped, but commonly polished. Unslipped portions of these vessels are usually tan to brown in color. The polychrome effect is produced through the application of red slip on limited areas of the vessel. This slip is dark red to maroon in color. The effect created on these surfaces is similar that described for San Juan Red-on-tan, although the red band tends to be more narrow. For shallow bowls, the red slip is usually limited to a single band along the rim that extends below both the interior and exterior surfaces. A similar line is on the rim and between the cream-slipped upper and unslipped lower portions of the exteriors of jars and deep bowls.

The low-iron slip to which decorations are applied is usually a cream color, but may range from an off-white to light gray, light tan to buff color. The slight variation of color appears to reflect variation in firing atmosphere, as slipped portions consistently fire to a similar cream color when exposed to an oxidizing atmosphere. These surfaces are moderately to well polished and sometimes exhibit faint crackling and streaking. Application of this slip tends to be fairly thick and even.

Painted decorations were applied over the cream slip in a black organic pigment. Paint is well polished into the surface. The consistent darkness and well-defined edges of this paint is fairly remarkable, given its exposure to an oxidizing at-

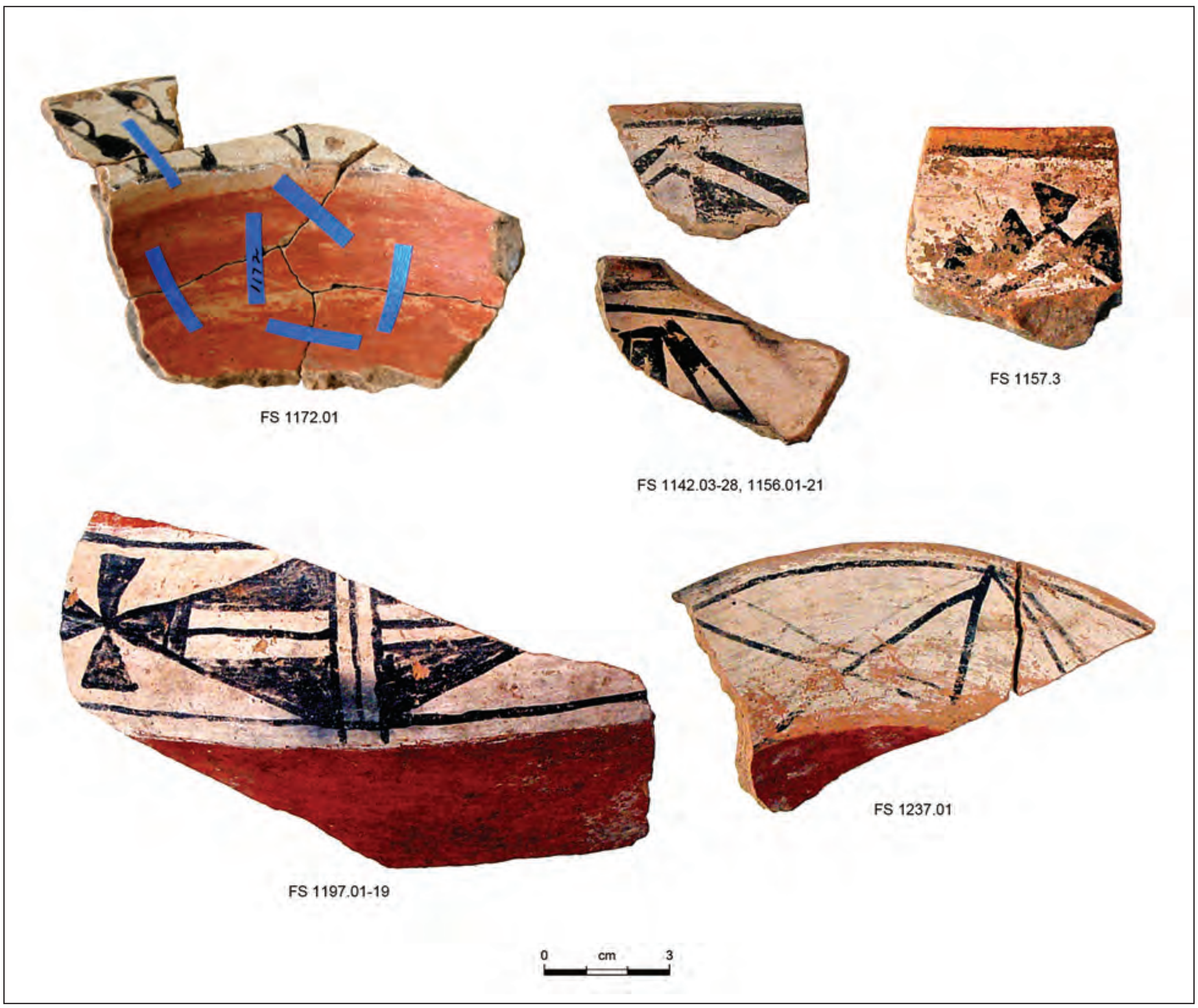


Figure 7.20. Tewa Polychrome pottery.

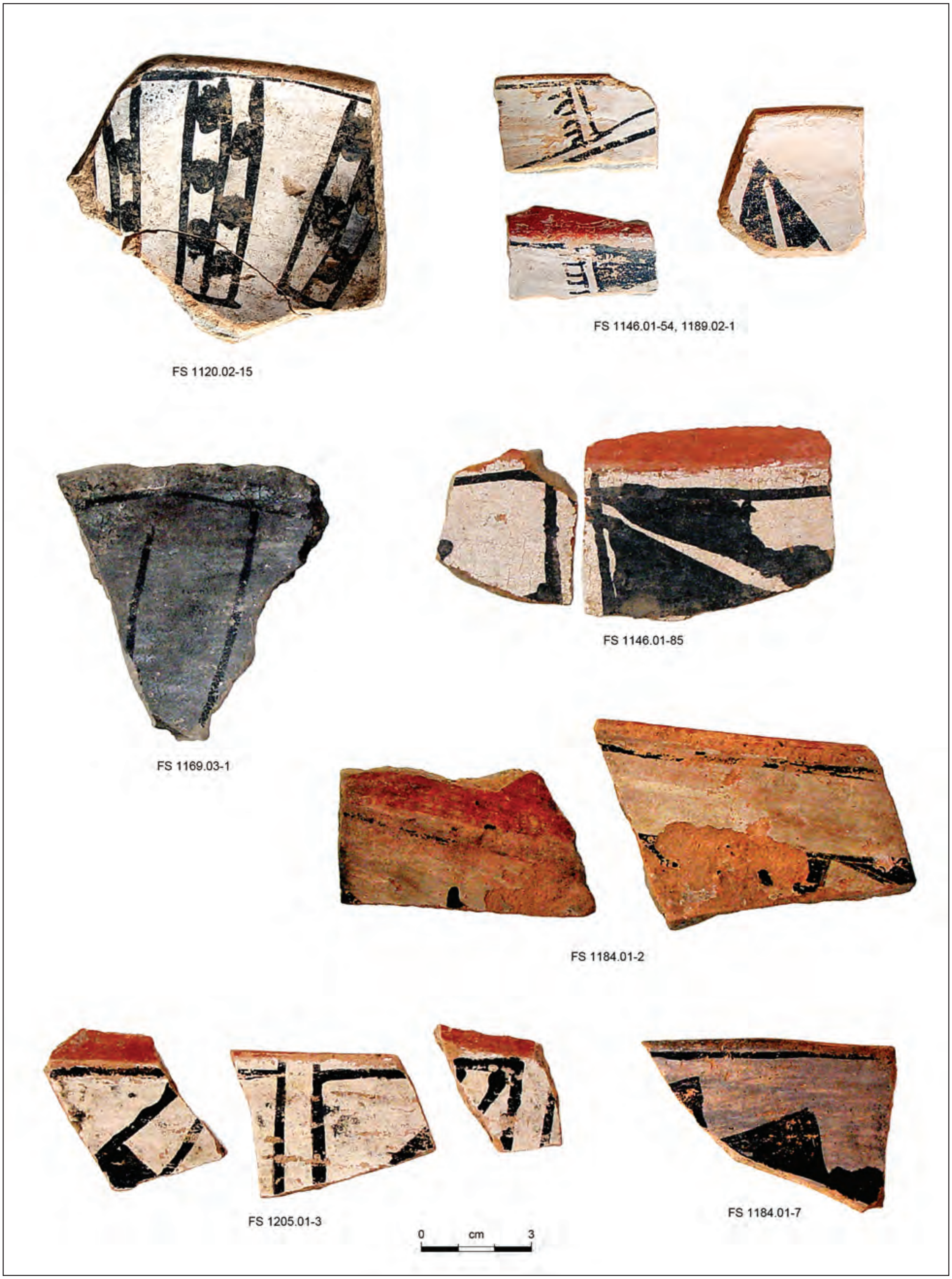


Figure 7.21. Powhoge Polychrome pottery.

mosphere. Painted decorations are different from earlier Tewa-tradition pottery types. They reflect a widespread shift from earlier design styles in favor of new decorative conventions. Decorations applied over very wide areas of the vessel consist of large geometric forms divided into a series of bold patterns. Decorations consist of wide panels framed by thin single- or double-framing lines. Designs on the exterior of jars and deep bowls are very wide bands covering at least two-thirds of the vessels framed by one or two lines and a red slip. Decoration on bowl interiors often covers all of the cream-slipped area below the red-slipped and first framing line. A red slip extends about halfway between the top of the rim and first framing line, forming a series of alternating thin horizontal red, cream, and back lines near the top of the vessel. A similar effect is created along the bottom band on exterior decorations. Framing lines tend to be thin, and framing lines and other parallel lines tend to be very close together.

In Powhoge Polychrome, earlier patterns of small motifs and thin lines are replaced with bold geometric designs that cover large portions of the vessel field. Design motifs tend to be very large and execution tends to be fairly crude in regard to evenness of shape and thickness of lines and motifs. The most common designs incorporated into these geometric fields are straight and curved triangles. Other motifs include short line segments, dots, solid circles and half circles, elliptical circles, open circles, solid squares, stylized clouds, leaf shaped elements, and stylized feathers. These design motifs are usually organized into two basic types of patterns. The first of these involves the organization of triangles and occasionally other motifs into simple arrangements. These include the repetition of isolated motifs, or their organization into linear connected arrangements, opposing arrangements, or in checkerboard sequences. Variations in such patterns produce a wide array of patterns still used by historic potters.

The wide variations in patterns and effects created by such arrangements have been described for vessels collected from various expeditions (Chapman 1970). These layouts commonly appear as linear patterns around jar necks, the upper portions of bowls, and the flat areas of soup plates. In some examples, a series of checkered triangles or diamonds may cover most or all the painted surfaces. In other cases, design motifs may be combined into bold medallion, floral, or shield patterns. These patterns may incorporate a single element such as triangles in stylized sun or flower patterns, or a number of other elements that end or are surrounded by radiating triangles or leafs. Other patterns are created by incorporating multiple elements into fairly complicated units. These units are usually surrounded by pointed triangles or elliptical circles. This creates an effect of the unit being surrounded by rays, petals, feathers, or fringes. Such an effect is created by the painted design or the negative impression of such a design. One or two of these patterns are often repeated across the exterior of jars. These may appear in isolation or may be separated by horizontal lines that go across the banded segment. This creates a series of framed units that form the overall banded design. These patterns may also be arranged into a single unit that may appear on the lower portion of a bowl.

Vessel forms include a range of distinct bowl and jar forms. Vessel shapes tend to be globular without the sharp keels common in earlier polychrome types (Harlow 1973). Jars are roughly spherical or may be depressed or elongated (Harlow 1973). At the opening is a short neck with more or less flare at the rim. Bowl forms include both deep forms with a flare near the top. The most common were short open bowls. Bowls slope gently, and the keels and angle noted in the earlier form are absent. A few examples exhibit a slight flare near the rim. These bowls are almost always slipped and painted on the interior surface and unpainted on the exterior surface. These bowls tend to be shallow and relatively small in size. Walls are even in thickness.

Most of the sherds from Tewa-tradition polychrome vessels did not exhibit styles indicative of a distinct type. While many are likely from Powhoge Polychrome vessels, a substantial frequency is probably derived from Tewa Polychrome vessels. Many of the sherds assumed to have derived from polychrome vessels could not be assigned to a distinct type but were assigned to descriptive categories based on combinations of paint and paste characteristics. Descriptive categories identified during the present study include Tewa Polychrome Painted Undifferentiated Two Slips (see Fig. 7.22 for a distinct and unusual example), Black-on-cream Undifferentiated, Historic Organic Paint Undifferentiated Unpainted, and Historic Unpainted Red and Cream Slipped.

Figure 7.22. Unknown Tewa polychrome pottery.

A very small number of sherds are decorated with designs executed in organic paint over an orange or red slip, and were classified as *Historic Tewa Black-on-red*. Sherds with these characteristics are similar in appearance to pottery described as Powhoge Black-on-red, which is described as a variant of Powhoge Polychrome (Frank and Harlow 1990). The painted surface of pottery assigned to this type exhibits a slip that is light red in color. The slip on lower portions of jars is often a darker red, and is similar in color to the lower red slip of Powhoge Polychrome. Vessels assigned to this type date to the nineteenth century, and may foreshadow the development of early twentieth century types such as San Ildefonso Black-on-red.

Glaze Ware Types

Glaze ware types refer to a ceramic tradition in the Middle Rio Grande spanning from the prehistoric Classic period to the early first century of the Spanish Colonial period, from about AD 1325 to the early 1700s (Franklin 1997; Kidder and Shepard 1936; Mera 1933). Glaze ware types were present in low frequencies at LA 146402 and several other sites investigated during the railyard project. The assignment of glaze ware sherds to temporally distinct types is primarily based on rim shape, and body sherds were usually placed into a series of descriptive types that are more difficult to assign to a specific temporal span. Glaze ware types identified from body sherds examined that could have derived from either prehistoric or historic vessels include Glaze Red Unpainted (Fig. 7.23), Glaze Polychrome Unpainted, Glaze Yellow Unpainted, Glaze-on-polychrome Undifferentiated, Glaze-on-red Undifferentiated, Glaze-on-yellow Undifferentiated, and Glaze Unslipped Undifferentiated. It is very likely that many but not necessarily all of the glaze ware body sherds from LA 146402 derived from historic types. This is indicated by both the very drippy and poorly executed designs on many of these glaze-painted sherds, as well as, the general absence of other prehistoric types at this site.

It also likely that glaze ware body sherds from

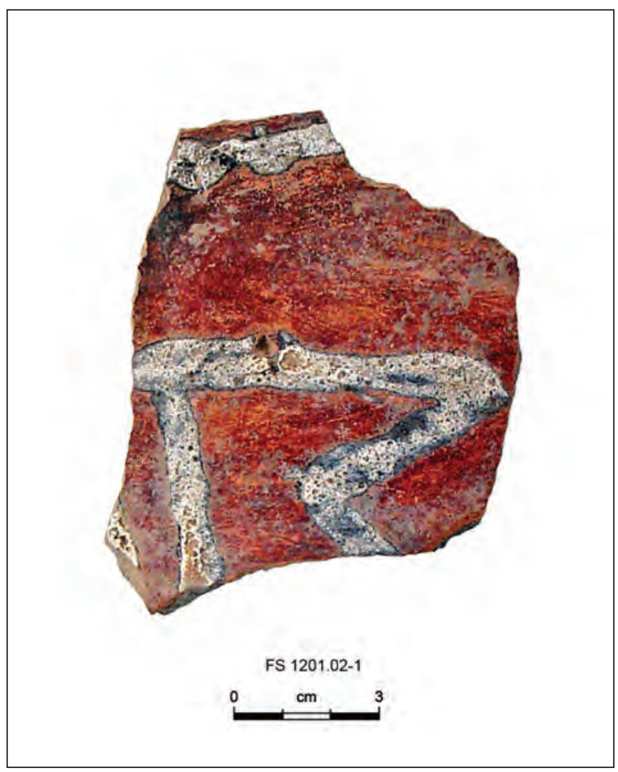


Figure 7.23. Other decorated pottery types: Late Glaze ware.

other sites were derived from prehistoric vessels. Rim sherds reflecting prehistoric types are represented by Cieniguilla Glaze-on-yellow, which displays straight rims indicative of early glaze ware forms. Historic types identified from rim sherds include *Puaray Glaze-on-yellow*, *Kotyti Glaze-on-red,* and *Kotyiti Glaze Polychrome*. Puaray or Glaze E is characterized by light- or red-slipped backgrounds with dark glaze designs, sometimes with red matte interiors. The diagnostic feature of this type is an elongated rim form with some thickening above the bases. The rim is clearly differentiated from the bowl walls by a curve in the angle of the rim (Mera 1933). Kotyiti or Glaze F is characterized by bowls that became increasingly straight with a rounded middle bulge above the low base. The quality of glaze paint on Glaze F types continues to deteriorate and painted designs tend to be poorly defined and drippy. Paints are characterized by a thick application and a tendency to run to the extent that designs are often obliterated. Slips are often unevenly applied and surfaces are rough.

Other Matte-Painted Polychrome Types

A very small number of sherds represent polychrome types are decorated with red and black mineral paints and pastes indicative of pottery by Pueblo groups to the south and west of Santa Fe. Polychrome pottery clearly not produced by Northern Tewa potters to the north were divided into types of a "Puname," or Middle Rio Grande, and a "Zuni Acoma," or Western Pueblo tradition or district.

The Puname district refers to the present-day location of Zia Pueblo, where matte mineral-painted polychrome pottery, replaced earlier glaze-painted decorated pottery during the early eighteenth century (Harlow 1973; Mera 1939). Historic matte-painted polychrome produced in the Zia area is characterized by a reddish-brown paste, basalt temper, and decorations painted in a combination of red and black mineral pigment. A series of types are defined based on gradual changes noted in the decoration of pottery produced in the Zia area (Harlow and Lanmn 2003).

Puname pastes are usually a deep-red, orange to tan, and some have dark gray cores. This polychrome is covered with a white to tan slip that is generally dull, rough, and poorly polished. Vessel forms include bowls and jars similar to those noted for Tewa Polychrome types. Pottery produced at Zia Pueblo is characterized by a white polished slip, a red-slipped underbody or band, and mineral-painted designs that are often filled with a red or reddish-yellow paint. The white slip covers most, or all, of the vessel, and the red slip, when present is a band on the underbody, or covers the underbody.

Designs occur in paneled bands or in all-over patterns on the upper part of the vessel, and are framed above and below with parallel lines with line breaks. Paneled designs on the upper body are separated by double vertical lines. Design elements include opposing geometric elements, arcs, feathers, and keys. On bowls, designs include a row of circular arcs on the interior below the rim and recurrent feather symbols. Rim lips are slipped with a red band, and often extend into the interior vessel wall. Bowl forms are rare and have a rounded underbody, with simple designs on the slipped vertical area. Pottery exhibiting temper, pastes, and painted decorations characteristic of pottery produced at Zia Pueblo were assigned to a series of *Puname Polychrome.* Sherds with white slips, red pastes, and basalt temper without painted decorations were classified as *Puname Polychrome Indeterminate*.

In the 1700s, the historic pueblo of Santa Ana (Tamaya) moved from the Jemez River near Zia, to farming lands along the Rio Grande (Batkin 1987). Potters at Santa Ana switched from using crushed basalt temper to river sand sources along the Rio Grande alluvium. Santa Ana pottery typically contains abundant sand temper in paste colors ranging from beige to orange or gray, and vessels are decorated with black and red mineral-painted designs. Santa Ana Area Polychrome refers to sherds containing sand temper, pastes, and black- and red-painted decorations characteristic of pottery produced at Santa Ana Pueblo. In general, surfaces are not well-polished and the white slip appears pinkish-white, white, or cream and easily flakes off the surface. The red slip is thick and smooth. The black mineral paint fires true black, but is light on some sherds, and dense black on others. The red mineral paint fires reddish-brown. Unpainted sherds with this paste were assigned to Santa Ana Area Red-Slipped Unpainted.

Western Pueblo Painted Ware

The production of matte paint polychrome vessels began in the Acoma, Laguna and Zuni areas sometime after the Pueblo Revolt. Pottery produced at these Pueblos is characterized by the continual use of sherd temper and low iron pastes and designs executed in black and red paint in styles characteristic of the Western Pueblos. Categories into which these were places include Acoma/Zuni Polychrome Undifferentiated (Fig. 7.24), Acoma Zuni Historic Black-on-cream, Acoma Zuni White Unpainted and Acoma Zuni Red Slip Unpainted.

Navajo Gray Ware

A single sherd was assigned to Dinetah Gray, and is assumed to have derived from a Navajo vessel (Brugge 1963). This sherd was very thin and unpolished on both sides. It was soft and crumbly and tempered with sandstone. It was dark gray in color, which is indicative of the reduction firing associated with this type.

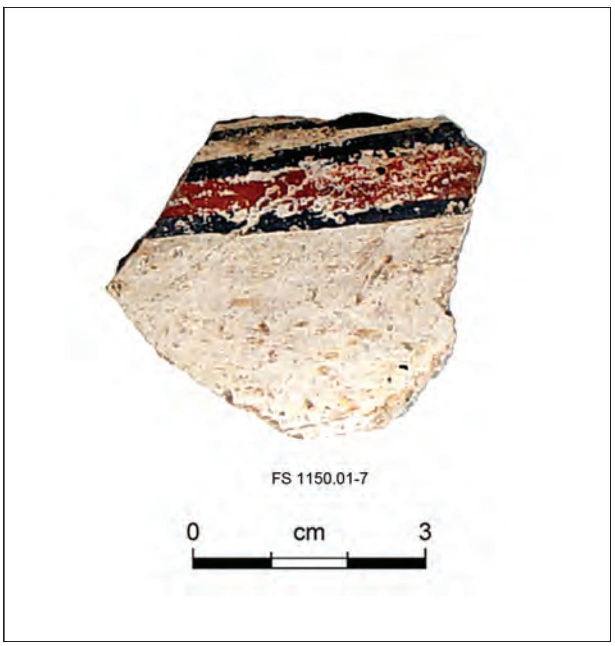


Figure 7.24. Other decorated pottery types: Acoma-Zuni Polychrome.

Trends in Eighteenth- and Nineteenth-Century Ceramic Production and Use at LA 146402

Characteristics of pastes and surface manipulations of native pottery from LA 146402 indicate that the great majority of pottery assigned to all three of the most abundant ware groups were produced by Northern Tewa Pueblos potters. This is not surprising given the location of LA 146402 just south of most of the Tewa Pueblos and just on the outskirts of Santa Fe, which may have served as a market and redistribution center for pottery produced in this area. The relative amount of native pottery at sites in the Santa Fe area produced in Northern Tewa Pueblo, which appears to steadily increase after the Pueblo Revolt and reconquest periods, was probably due to the abandonment and decline of other pottery-producing Pueblos. Low frequencies of pottery assigned to types thought to represent production in other Pueblo provinces include glaze ware and matte-painted polychrome produced in areas of the Middle Rio Grande and Western Pueblo provinces.

Temper Distributions

Characteristics including paste and temper noted for historic pottery types identified at LA 146402 indicate that the great majority of pottery vessels from this settlement were produced at Northern Tewa Pueblos just north of Santa Fe. Types assigned to historic micaceous utility ware types consist of 31.1% of the pottery. Temper noted in the great majority of micaceous ware sherds was dominated by some form of granite or metamorphic rock, and contrasts with tuff tempers that dominated other Tewa ware groups (Table 7.10). Temper recorded for the Historic Unpolished Micaceous types is represented by a fairly even mixture of that recorded as granite without abundant mica and highly micaceous residual paste. The majority of the temper in Historic Micaceous Polished types was recorded as granite without abundant mica although a significant frequency was also recorded as granite with abundant mica and sand.

The great majority of the paste and temper from Tewa historic plain and Tewa Polychrome types display similar ranges of temper (Tables 7.11, 7.12). Distributions of temper noted in both historic red-and historic buff-plain utility ware was very similar, as the great majority of pottery assigned to both groups was tempered with tuff. This distribution contrasts with that noted for gray/black plain utility types, which display a much wider range of temper that includes a significant frequency of sherds tempered with sand (Table 7.11). It is possible this may indicate smudged forms produced in areas outside the Tewa Basin, possibly by Hispanic potters, but it could also reflect variability in temper used at different Pueblos in the Tewa Basin

Most of the decorated pottery was assigned to Tewa Polychrome types. Almost all of these are tempered with some form of tuff (Table 7.11). Polychrome types assigned to other traditions display a range of tempers and decorations indicative of production at various Pueblo provinces. These include: sherd or sherd and sand, reflecting pottery from the Zuni/Acoma area; basalt, indicating production at Zia Pueblo; and sand or sandstone, which are indicative of production at Santa Ana Pueblo (Table 7.11). Glaze-painted pottery includes examples containing latite, basalt, and fine tuff and also appears to indicate pottery produced at number of different Pueblo provinces (Table 7.11). Pottery that can be assigned to these various nonlocal types consists of 3.6% of the total pottery (Table 3.41). This pottery is indicative of exchange with groups in provinces in the Middle Rio Grande south of Santa Fe that were more predominant during the seventeenth century. The frequency of Middle Rio Grande types from Colonial period features in the Civic Center location were variable, and include 1.5% of the total pottery from Feature 213, 3.3% from Structure 6, 6% from Feature 48, 8% from Feature 413, and 14.8% from Feature 193 (Tables 7.13, 7.14). This may reflect stronger ties with areas to the south in some Colonial period households in the Santa Fe area than others in the middle to late eighteenth century.

Vessel Shape and Function

In order to understand the nature of the relationship between Tewa Pueblo potters and Hispanic consumers of pottery it is important to determine the activities for which various pottery vessels were used. A variety of attributes may reflect the uses and function pottery; they include ware group, vessel shape, size, wear patterns, soot deposits, surface manipulation, technological attributes, and paste characteristics.

For pottery from many regions of the Southwest, useful functional information is provided by distributions of ware groups and vessel form categories. During most of the prehistoric periods, almost all the pottery can be divided into gray utility and decorated white ware forms. For pottery produced in the northernmost Pueblos in the Rio Grande, the most basic ware grouping consists of divisions into micaceous utility wares, plain utility wares, and decorated polychrome wares. These groups were subsequently divided into more categories based on observations concerning surface manipulation and basic decorations and assigned to vessel forms based on observations concerning basic shape and occurrence and location of polish, slip, and decoration. The consistent placement of all sherds into similarly defined vessel form categories allows for basic interpretations of functional trends, and involves form class definitions of varying degrees of resolution. Clues concerning the basic activities for which ceramic vessels were used are provided by examinations of vessel form distributions within basic ware groups.

Micaceous utility wares are represented by 32.7% of the pottery from LA 146402, which are represented by a mixture of unpolished (18.8% of micaceous pottery) and polished (81.2%) micaceous forms. Jars are the most common category identified for both unpolished and polished forms of micaceous ware vessels (Tables 7.15, 7.16). While jars were impossible to identify for body sherds, they are represented by 64.4% of micaceous rim sherds. Other vessel forms represented by micaceous rim forms include bowls (30.1%), soup plates (2.7%), and dough bowls (2.7%). Micaceous jar rims tend to be fairly wide as compared to other wares, with the majority ranging from 10 to 17 cm in radius. Bowls are much more rare, but tend to be fairly large as compared to other wares, with most measuring about 13 cm in diameter (Table 7.17). Most micaceous sherds are distinct from prehistoric micaceous gray ware forms in that they exhibit polished and sooted exteriors and that exteriors tend to be plain with a thin mica slip. These changes could reflect modifications resulting from changes in food preparation, which in turn resulted from the introduction of new combinations of foods by the Spanish that may have required different preparation methods.

Various evidence indicates their use in cooking, most likely for the boiling of food, with a possible increase importance in boiling stews and beans rather than the corn gruel that may have formed the bulk of the prehistoric Pueblo diet.

Most of the historic native pottery from LA 146402 represents plain ware types, which consist of 52.6% of the historic pottery. Most of the plain ware body sherds appear to have originated from shallow bowls (Tables 7.16, 7.18, 7.19). Bowls are the most common category represented consisting of 74% of the rim sherds. Other rim forms represented include jar rim (7.5%), soup plate (15,9%), dough bowl (.4%) and Tewa bowl (2.2%). Bowls and soup plates are more common in polished red-slipped forms, then polished gray/black forms, and are most rare in buff ware forms (Table 7.16). This indicates, as is the case for historic decorated ware types, historic plain ware types were primarily represented by bowl forms, although this trend is strongest for red-slipped forms and weaker for gray/black forms, where jars are more common.

It is difficult to determine the function associated with buff utility wares because of the lack of rim sherds associated with this ware group. For example, only .1% of the buff utility ware sherds represent rim sherds, where as they represent 13.7% of the red utility sherds. This appears to be the result of many of the buff sherds being derived from lower portions of red-on-tan vessels. Thus, the great majority of historic plain ware sherds appear to be derived from either red or red-on-tan bowls. Sizes of these plain ware bowls recorded is extremely variable, ranging from 8 to 10 cm in radius, but over half are somewhere between 7 and 19 cm radius, and tend to be larger than that noted for polychrome bowls. Soup plates measure between 7 to 13 cm, although half of those noted were at 13 cm. Plain ware bowls tend to also be larger than those noted for polychrome forms. Samples were not large enough to make interpretations regarding sizes of other forms.

Sherds assumed to be derived from Tewa Polychrome vessels are relatively rare in LA 146402, with that assemblage consisting of 11.9% of all pottery. Those derived from matte-painted vessels assumed to have been produced in Pueblo provinces to the south and west only make up .3% of the pottery. Distributions of both rim and body sherds appear to reflect a wide range of vessel forms similar to that noted for historic plain ware types (Table 7.16). Body sherds exhibit a variety of combinations of surface polish and decoration. Rim sherds were assigned to a range of categories including (shallow) bowl (37.1%), jar (12.9%), soup plate (27.9%), dough bowl (8.6%), and Tewa bowl (13.6%). The dominance of shallow bowls and soup plates in Tewa decorated assemblages mostly dominated by Powhoge Polychrome is interesting given previous descriptions of the pottery assigned to this type are almost exclusively based on jar vessels, with low examples derived from deep bowls painted on the exterior (Batkin 1987; Harlow 1973; Frank and Harlow 1990; Mera 1939). This emphasis appears to reflect the intentional acquisition of polychrome vessels by expeditions, museums, and collectors during the late nineteenth and early twentieth centuries (Wilson 2007). In fact, during the late Spanish Colonial period polychrome vessel forms were largely represented by serving vessel such as bowls or soup plates, and represent 64.9% of the polychrome rim sherds from LA 146402. The very few polychrome jars from LA 146402 for which the rim could be measured were quite small, ranging from 4.5 to 6 cm, with most measuring 6 cm (Table 7.20). Polychrome bowls also tended to be smaller than noted for other ware groups, ranging from 6 to 11 cm, with most of these measuring from 7 to 8 cm (Table 7.21). Soup plates measure from 9 to 13 cm in radius (Table 7.22), and for the most part, dough bowls and Tewa bowls measure from 13 to 24 cm, with almost half measuring 14 cm.

The small number of glaze ware sherds from the LA 146402 assemblage appears to be mainly derived from bowl sherds. Bowls represent 71.4% of the glaze ware rim sherds. Other forms represented include jars (9.5%) and soup plates (4.8%). Given the small sample, it was not possible to determine the range of associated vessel size.

Use, Production, and Specialization of Pueblo Pottery

Some of the trends noted for native pottery from LA 146402—and other sites occupied during the Spanish Colonial period—represent the continuation of technologies and forms long associated with Pueblo groups in the Northern Rio Grande, while others represent distinct changes that resulted from Hispanic influence. One pattern that continued from much earlier times is the basic dichotomy between utility and decorated wares. This trend reflects a long history of production and use of two specific functional classes, which include the utilitarian cooking/storage jar and the decorated bowl. These forms were the basic container tool kit required for the daily storage, preparation, and consumption of foodstuffs in almost all northern New Mexico households. This basic "container set" remained in use from the widespread introduction of agriculture and ceramics (about AD 600 to 1200), to the mid- to late nineteenth century when large-scale replacement of native ceramic storage cooking and serving containers by mass-produced Euroamerican goods took place.

Spanish Colonial Period

During the Spanish Colonial period shifting demographics proved to be an important influence on Pueblo pottery production resulting in the mass-production of pottery for the rapidly increasing populations of Spanish and Hispanic settlers. While specialized pottery forms were long produced within specific Rio Grande Pueblo villages and localities and distributed through formalized networks prior to Spanish colonization of northern New Mexico, the gradual increase in Hispanic settlers and decline in areas occupied by Pueblo groups, particularly after the Pueblo Revolt and reconquest, would have placed increasing demands on Pueblo potters. These increasing demands may have been particularly felt by Northern Tewa potters who produced the bulk of the pottery for the rapidly growing population of settlers in Santa Fe and other rapidly growing settlements to the north.

Utility Ware jars. One set of changes reflected in pottery produced by Northern Tewa potters during the Colonial period concerns changes in surface treatments of utility ware jars and a decrease in their total frequency. While sherds derived from utility ware jars make up from about 60% to 90% of the total pottery from sites prior to the Spanish Colonial period, this frequency tends to be much lower at sites dating to the Colonial period. For example, micaceous ware consists of only a third of the native pottery at LA 146402 and represents 11.5% to 44.4% of the Colonial period features from LA 1051 (Table 7.23). This lower frequency of utility ware jars may reflect a decrease in the use of pottery vessels to boil food that could have partly resulted from the introduction of metal cooking containers or bread ovens, although evidence of either seems to be sparse in Colonial period contexts. Changes in cooking techniques may also be reflected by consistent application of a polished and sooted interior and micaceous exterior to micaceous forms produced by Tewa potters. While micaceous pottery was made and exported by potters associated with a range of ethnic groups, materials and characteristics noted indicate the great majority of the pottery from LA 146402 and elsewhere in the Santa Fe area was probably produced by Northern Tewa potters, although lower frequencies appear to also have been produced by Northern Tewa potters.

Plain Polished Plain Ware. Another important innovation that appeared early in the Spanish Colonial period is the production of plain polished plain ware forms, which are often the most common ware group in assemblages dating to the Spanish Colonial period. While these forms are commonly characterized as utility wares, characteristics noted for pastes, temper, and vessel forms are much more similar to those noted for Tewa polychrome forms than micaceous utility wares. Thus, native ceramic assemblages dating to the Spanish Colonial period reflect a dramatic decrease in the frequency of utility cooking forms and an increase in plain ware and decorated ware serving forms.

Old World pottery forms. The most often cited Spanish influence on pottery forms during the Colonial occupation is the appearance of old world pottery forms, styles, and surface effects. This may largely reflect the importance of bowls in domestic activities of non-Indian households for which "Spanish" affiliation may have been emphasized. Many of the changes in decorated forms that took place during the late eighteenth and early nineteenth century reflect the shift to European-influenced decorated bowls and soup plates, which represent the majority of vessels utilized during that time. The shift of painted decoration of bowls primarily from the exterior to interior surfaces may also reflect a shift to decoration that would not have been a visible from a distance. In contrast, the exterior decoration on jars and to a lesser extent dough bowls would have been easily visible to people in villages during both the production and use of these vessels. This may have resulted in the use of more traditional Pueblo symbols on large jars, and may be one reason that jars were subsequently collected and used as prototypes to spur revivals of traditional Pueblo pottery during the late nineteenth and early twentieth centuries.

The combination of changes noted on plain ware and polychrome forms may ultimately reflect changes in techniques and conventions that allowed for the mass production of vessels for increasingly large populations of Hispanic settlers. Expanding demands for Pueblo-produced vessels by these rapidly growing populations may have also resulted in conventions to allow for the more expedient production of large numbers of vessels that would have been desirable to Hispanic consumers. Examination of changing characteristics for the Tewa-decorated forms, which dominated native assemblages dating to the late eighteenth and nineteenth century, may also provide clues about the nature of influences and pressures involved in the increased mass production of vessels by Tewa Pueblo potters for Hispanic settlers. The similarities between polished plain wares and polychrome pottery forms produced during the late Colonial period may indicate that many of the plain ware vessels identified, rather than representing utilitarian forms, are essentially unpainted versions of late eighteenth-century polychrome forms. Most of the plain ware vessels may simply represent a more expedient variant of decorative conventions used in decorated serving forms. The bold and stylized decorations and red-slipped band near the rim used to decorate Powhoge bowls and other forms could have been applied fairly rapidly, while at the same time providing relatively attractive painted vessels. The application of a band of red slip just below the rim of these vessels would have also provided a very expedient way to decorate them, and at the same time connect them aesthetically with more expediently produced plain ware forms.

It appears that production of pottery vessels during the late Colonial period was oriented toward a combination of simple forms suitable for use in every day activities organized around small Hispanic households. Frank (1991; 2000) notes that changes in overall vessel form and quality were related to mass production by Northern Tewa potters for Vecino consumers. These consumers' preference for Spanish vessel forms is evident when examining the pottery assemblage recovered from LA 146102, which contained a full range of vessel forms. The mass production of ceramic vessels by Northern Tewa potters would have resulted in an increasingly fluid technology resulting in the production of a wider range of ware groups and a decrease in the distinction between specific wares than is evident during than earlier periods.

Mexican and Territorial Period

Forms and styles of pottery produced by Northern Tewa Pueblo potters continued to be remarkably similar from the late eighteenth to the late nineteenth century. This indicates a period of technological stability resulting from the emergence of Vecino control and influence, which continued through the late Spanish Colonial, Mexican, and early Territorial periods. Significant changes in the overall form, style, and distribution of Northern Tewa pottery did not occur until the late nineteenth century. This change resulted from dramatic impacts of the railroad in New Mexico at the time. The wide-scale transportation of manufactured American goods by railroad resulted in the availability of affordable metal, ceramic, china, and glass to settlers in New Mexico, as well as a gradual shift to a cash-based economy, so that Hispanic settlers in New Mexico no longer required locally made Pueblo pottery. By the twentieth century, very little native pottery was being made for local use; Pueblo pottery-making survived as a result of demands of the Anglo tourist trade, which was enabled by the railroad and the motorized car. This resulted in the production of curio ware, which in some cases revived earlier pottery forms and styles by building on the appeal of "authentic Indian pots" to collectors and tourists. By the turn of the century, production of small bowls and soup plates had almost completely ceased, and the production of plain and micaceous wares had dramatically declined. These were largely replaced by the distinct forms of elaborately decorated jars produced at various Pueblos that are today considered to represent typical examples of Pueblo pottery.

Euroamerican Artifact Analysis for 13 Archaeological Sites Within the Santa Fe Railyard Project Area

MATTHEW J. BARBOUR

INTRODUCTION

Euroamerican artifacts represent those objects that were not available in the American Southwest prior to the establishment of European settlements in the sixteenth century. These types of assemblages typically include a variety of artifact types such as bottle glass, can or metal fragments, and wheel-thrown ceramics.

The vast majority of cultural materials recovered from archaeological investigations at the Santa Fe Railyard were Euroamerican artifacts (n = 106,311). These artifacts represent roughly 76 percent of the total artifact assemblage (n ~140,000) and consist primarily of metal (n = 38,631), glass (n = 44,045) and Euroamerican ceramic (n = 5,405) material types. A total of 28,305 Euroamerican artifacts from 13 sites were chosen for intensive study. Table 7.24 illustrates the raw and relative frequencies of Euroamerican artifacts collected and analyzed for each site within the Santa Fe Railyard project area. Collected counts were derived from the provenience designation log. Analyzed counts were gathered from Euroamerican artifact analysis results.

Euroamerican artifact analysis was conducted by Guadalupe Martinez and Virginia Prihoda of the Museum of New Mexico's Office of Archaeological Studies (OAS). These materials were analyzed following the standards and methodology outlined in Boyer et al. (1994), which was specifically created to quantify Euroamerican assemblages. General descriptive attributes such as material type, manufacturing technique, and color were recorded for each artifact. In order to address the questions presented in the data recovery plan, analysis focused on a function-based analytical framework for determining site use, consumption, and discard patterns of the site's occupants and the dates associated with artifact deposition.

Reporting for the European artifact section of this analysis chapter is organized into several subsections. It begins with a description of methods used in Euroamerican artifact analysis. This is followed by a more detailed discussion of techniques used to date the artifacts and assemblages and how artifacts were used to determine the relative socioeconomic status of the project's inhabitants relative to other residents in other portions of Santa Fe during the early twentieth century. Next, the analyzed assemblage is discussed collectively by function-based category. Assemblages are then summarized in archaeological context. Finally, a more complete summary of how Euroamerican artifacts from these archaeological sites can be used to address specific research questions proposed in the data recovery plans (Wenker et al. 2005) is offered, along with overall conclusions reached as a result of Euroamerican artifact analysis. (Detailed analysis and interpretation of these assemblage summaries are included in the "Euroamerican Artifact" section of each archaeological site and are presented in Chapters 2 through Chapter 6 of this report. In Chapter 2, artifact assemblages associated with the various acequia sites are examined closely to answer questions regarding ditch use and abandonment; in Chapter 3, sites associated with the Atchison, Topeka and Santa Fe Railway are assessed; Chapter 4 discusses Euroamerican artifact assemblages associated with the New Mexico Central Railway; those that appear to be related to twentieth-century neighborhood refuse are examined in Chapter 5; and in Chapter 6, twentieth-century industrial sites are examined. In all of those instances, Euroamerican material culture is used not only to date the features, but to inform on site use specifically in regard to changing land-use patterns in the late nineteenth and early twentieth centuries and the consumption and discard patterns evident in the industrial and residential landscapes.)

ANALYSIS METHODS

The OAS Euroamerican analysis format and procedures were developed over the last ten years and incorporate the range of variability found in sites dating from the sixteenth to twentieth centuries throughout New Mexico (Boyer et al. 1994). These methods are loosely based on South's (1977) Carolina and Frontier artifact patterns and the function-based analytical framework described by Hull-Walski and Ayres (1989) for dam construction camps in central Arizona. This detailed recording format allows for the examination of particular temporal and spatial contexts and for direct comparisons with contemporaneous assemblages from other parts of New Mexico and the greater Southwest. Recorded attributes were entered into an electronic database (in this case, the Statistical Package for the Social Sciences, or SPSS) for analysis and comparison with similar databases on file at the OAS.

Functional in nature, the Euroamerican artifact analysis focused on quantifying the utility of various objects. One benefit to this type of analysis is that "various functional categories reflect a wide range of human activities, allowing insight into the behavioral context in which the artifacts were used, maintained, and discarded" (Hannaford and Oakes 1983:70). It also avoids some of the analytic pitfalls associated with frameworks focused on categorizing artifacts strictly by material type (e.g., glass, metal, ceramic, mineral, etc.).

One weakness to material type–based analyses is that only a limited number of functional categories are represented in a single material class. For instance a metal analysis, while beneficial for examining construction and maintenance materials such as nails and wire, would not include patent medicines or other bottled goods. In addition, variables (such as finish) often chosen to analyze glass artifacts are appropriate for glass containers, but not for flat glass, decorative glass, or other glass items (e.g., light bulbs) that can serve different roles within a single spatial and temporal context. As such, the OAS analytic framework was designed to be flexible, documenting not only the qualities of each material type but the functional role of particular items as well. Like all analyses, there are inherent assumptions that require explicit explanation.

In functional analyses, each artifact is assigned a hierarchical series of attributes that classify an object by assumed functional category, artifact type, and its specific role within that matrix. These attributes are closely related and provide the foundation for additional variables that, with increasingly more detail, specify an artifact's particular function. In the Santa Fe Railyard analysis, the following 12 functional categories were used: economy/production, food, indulgences, domestic, furnishings, construction/maintenance, personal effects, entertainment/leisure, transportation, communication, military/arms, and unassignable. Each category encompasses a series of material types whose specific functions may be different but related. For example, a pickle jar and a meat tin are both assumed to have initially contained food. Therefore, both would be included in the functional category for food, but each container is made from a different material type and the contents had different functions.

In essence, this functional-based analysis represents an inventory of different artifact attributes where variables are recorded hierarchically to amplify the functional categories and to provide a detailed description of each artifact, when possible. Attributes that commonly provide detailed information about individual artifacts and in turn functional categories include material type, date and location of manufacture, and artifact form and portion.

Chronometric data are derived from a variety of descriptive and manufacturing attributes, especially the latter. If an artifact retains enough information to derive a "begin" or an "end" date, those variables are recorded under the *date* attribute. *Manufacturer* records the name of the company that produced a particular object. Together these data can be used to assign specific date ranges to an artifact based on known manufacture periods or the dates of operation for manufacturing companies. A related attribute is *brand name.* Many brand names also have known production periods that can provide temporal information. The manufacturer or brand name is generally listed as *labeling/lettering* on an artifact, and is used to advertise the product, describe its contents, or inform on its suggested use.

When evident, manufacture *technique*, such as wheel-thrown or forged, was also recorded. Since some manufacturing techniques have changed over time, this attribute can often provide a general period of manufacture. A related attribute is *seams*, which records how sections of an artifact, particularly cans and bottles, were joined together during the manufacturing process. Through time these processes were altered and are reflected in the types of seams used to construct various containers. The type of *finish/seal* was recorded to describe the opening of a container prior to adding the contents and the means of sealing it closed. Like *seams* many *finish/seal* types have known manufacturing periods offering general temporal information. In addition, *opening/closure* records the mechanism used for extracting the contents of a container.

For some artifacts, attributes such as *color*, *ware*, and *dimensions* can also provide information on the period of manufacture. Thus, the current color of an artifact was recorded if determined to have diagnostic value. A good example is glass, where the relative frequency of various colors in an assemblage can provide some temporal information since the manufacture and preservative processes have changed over time. *Ware* refers to china artifacts, and categorizes the specific type of ceramic represented, when known. Because temporal information exists for most major ware types, this attribute provides relatively more refined dating information compared to seams and color. Dimensions of complete artifacts can also provide chronometric data, especially artifacts like nails or windowpane glass, where thickness or length of the object can be temporally sensitive.

In addition to temporal information, the manufacturing process of particular object can be used to support functional inferences. *Material* records the type of material(s) from which an object was manufactured (e.g., glass, metal, paper, clay, etc.). *Paste* describes the texture of the clay used to manufacture ceramic objects, and is further defined by porosity, hardness, vitrification, and opacity. *Decoration* and *design* describe the type of technique used to apply distinctive decorative motifs to an object, such as china or glassware.

In addition to the attributes discussed above, several others were used to quantify an object's condition and use-life. For each item, the *fragment/part* variable described what portion of a particular form was represented. However, fragments of objects that were refit to be made complete, or partial objects recovered from a single excavation context, were recorded together as a *minimum number of vessels* (MNV) of one, and the number of specimens present represented by *count*.

Cultural alteration of an item to extend its use-life was recorded as *reuse*. This variable describes any evidence of a secondary function, and the *condition/modification* variable monitors any physical modifications associated with that secondary use. If environmental conditions have altered the surface of an artifact through either glass patination or metal corrosion, it was recorded as *aging*.

The appearance of an artifact was monitored using the *shape* variable. This variable was generally used to describe the physical contours of complete objects. Finally, quantitative data including *volume*, *length/height*, *width/diameter*, *thickness*, and *weight* were recorded for most Euroamerican artifacts. Where appropriate, some measurements were recorded using industry standards (i.e., pennyweight, caliber, gauge, etc.).

Artifact and Assemblage Dating Methods

Begin and end artifact dates were based on a number of attributes such as sealing and closure methods for bottles and cans, invention dates, and stylistic changes in design and advances in manufacturing techniques that have known dates. The begin date for an attribute is the earliest possible date that can be documented for its existence. These dates can be from patents, factory inventories, newspapers, and company records. An end date is the last documented date of attribute or artifact production. These dates can be determined through newspapers or magazines and industry newsletters or announcements of the introduction of new manufacturing techniques or inventions. Sometimes a change in production materials or the end of a certain pattern (as in a company's glassware or ceramic ware) will establish an end date for the production of an item or manufacturing technique. This is particularly true for mass-produced items whose attribute changes form a chronological sequence. Examples of dateable attributes include the location of seams on bottles, the kinds of seams on cans, identifiable maker's marks on glass and ceramic vessels, the color of glass, or the form of nails. Using a combination of the earliest and the last known date, a "bracketed" time range can be obtained.

Bracketed time ranges based on manufacture dates are often used to develop mean ceramic manufacture dates, and mean bottle glass manufacture dates, by using the mean ceramic dating method. Mean ceramic dating is a method of calculating the date of a deposit based on the frequency of recovered ceramic types (or in the case of bottles, manufacturer marks). Since a wide variety of ceramic types (or bottle glass manufacturer marks) have been assigned median manufacture dates, these data can be used to approximate the periods of manufacture for those types and, in turn, archaeological deposits.

Mean ceramic dates can be calculated using the formula found in Figure 7.25.

Simply put, the mean ceramic date is generated by multiplying the frequency of each type by the median manufacture date for that type, adding those products together, and then dividing that sum by the total number of individual types. Unlike more impressionistic dating methods that call on an analyst to offer a date based on the overall assemblage, this method generates a date that can be independently verified if using the same reported median manufacture date which in this case is the same as the mean because we are only using begin and end manufacture dates.

While mean ceramic dating has proved fruitful on Colonial period assemblages throughout the New World (Noel Hume 1970; South 1977), there are some drawbacks. For example, ceramic dishes can be curated by individuals for significant periods of time. This curation behavior can lead to mean ceramic dates far earlier than the period of occupation. To mitigate this effect, a more acceptable use of mean ceramic dating for nineteenth- and twentieth-century assemblages is to focus on container material types, such as bottle glass or can fragments, which were most often used and discarded during a site's occupation history. This allows for the greater sample size and truncates curation periods in order to derive a more precise occupation date. These data can then be compared to the mean ceramic date to scale the effects of curation, if any, on the overall assemblage. When possible mean ceramic, mean bottle glass, and mean can manufacture dates were calculated for each Santa Fe Railyard Euroamerican artifact assemblage.

However, in most cases, precise manufacture dates could not be ascertained for many of the artifacts due to the highly fragmented nature of the Euroamerican assemblage or manufacture dates were too few in number to provide statistically meaningful samples. In these instances, more impressionistic means were employed to the Euroamerican artifact assemblage. These involved using presence or absence of machine made bottle glass to determine if an assemblage dated to the nineteenth or twentieth century or the examination of the ratio of machine-cut square nails to wire-drawn nails to discuss the likelihood as to whether an assemblage was ca. 1880s or ca. 1920s.

One of the most useful impressionistic dating methods is to examine container types. Relative frequencies of glass, metal, and plastic containers over time can be seriated to form a chronology by which assemblages from various contexts can be ordered temporally. Glass materials were most heavily used as containers relative to the other material types in the nineteenth century, but saw a decline in popularity with the rise of the canning industry in the early twentieth century. Similarly, by the late twentieth century, plastics surpassed metal as the dominant material type used as a packaging container (Rathje and Murphy 2001). This method does not provide decade-specific resolution for discussions of chronology within the late nineteenth and early twentieth centuries, but can provide base information for gauging the relative age of any assemblage.

$$\text{mean ceramic date} = \frac{\Sigma(d_1 f_1)}{\Sigma f_1}$$

Figure 7.25. Mean ceramic date formula.

Another commonly used method is the use of bottle glass color to ascribe date of manufacture. However, for this project, color dating was avoided wherever possible. Most dates ascribed to specific colors are at best generalizations put forth by the uninformed collector. Furthermore, the assignment of these dates can drastically skew any statistical attempt to date an assemblage. If for example amber glass is given a date of 1860 to present (Fike 1987:13) and you have 100 amber glass bottles with one manufacturer mark that dates 1880–1892, the mean bottle glass manufacture date derived from the assemblage will be 1930 (std. deviation 4 years). This date is misleading. While amber bottle glass manufacture may have been popular from the mid-nineteenth century up until the present day, the single manufacture mark is a much more precise means of dating the assemblage. In this case, it may be better to the say the assemblage dates to the late nineteenth century (ca. 1886) than use color to date the assemblage.

Amethyst-colored bottles do provide a relatively accurate manufacture date range of 1880 to 1925 (Kendrick 1964:39–41), but for a clear-colored bottle to turn amethyst it must be exposed to sunlight for a considerable period of time. On a pedestrian survey, when you are dealing with a surficial Euroamerican artifact assemblage, this knowledge is incredibly useful for assigning dates. The contents of the bottle simply had to be consumed and then the bottle discarded. After exposure to sunlight, it will become amethyst in color. However, in buried contexts, this is unlikely to occur. If an artifact was not exposed to sunlight for long periods of time before discard, it may not have turned amethyst. Conversely, if a clear glass bottle was manufactured between 1880 and 1925, then sat on the surface for some unknown period of time while it changed color and then came to lie in its current buried context, the amethyst date associated with manufacture would not be useful in determining the date of the assemblage currently under excavation.

For this analysis, multiple methods were used to date the variable assemblages. Exact methods used for each Euroamerican artifact assemblage are explicitly stated in the assemblage description. Dates for individual assemblages are presented in the following sections.

Economic Scaling

The socioeconomic status of the inhabitants of the Santa Fe Railyard project area can be explored through the examination of specific objects within the Euroamerican artifact assemblages. One of the most commonly used forms of economic scaling within historical archaeology is the generation of mean ceramic values for domestic dishware to provide a relative scale by which the purchasing power of different consumers can be compared. Although using Euroamerican ceramics to scale socioeconomic status is a relatively new approach in the American Southwest, its validity to infer relative wealth among different historic households has been repeatedly demonstrated elsewhere (G. L. Miller 1974, 1991; Otto 1977; Rathje and McCarthy 1977; Shephard 1980; Henry 1987).

For the late nineteenth and early twentieth centuries, the consumer value of domestic dinnerware items can be determined using the ceramic price indices developed by Henry (1987). Her study used mail order catalogues produced between 1895 and 1927 (Montgomery Ward and Company 1895, 1922; Sears, Roebuck and Company 1897, 1900, 1902, 1909, 1927) to produce relative indices on open-stock items sold in the 1890s, 1900s, and 1920s. These indices are applicable across a wide regional network for comparison of economic status because of their utilization of nationally available products to develop average open-stock price indices. In her specific study, these indices were used successfully to gauge socioeconomic status within downtown Phoenix over several decades during the late nineteenth and twentieth centuries (Henry 1987).

Ceramic price indices are predicated on the assumption that open-stock, or individual set item, prices of any given ceramic dinnerware are relative to production costs of a particular vessel form and decorative technique. Open-stock prices for dinnerware listed in the catalogues were aggregated by vessel form and decorative technique, and then averaged. Dinnerware was then ranked hierarchically. The least expensive undecorated wares were assigned a rank of one while the more expensive wares, such as porcelain and white-bodied earthenware with decal designs, were assigned a rank relative to their retail cost in relation to undecorated wares (mean ceramic value = p/l where p = price of the tableware and l = price of the cheapest undecorated tableware).

The indices developed by Henry (1987) based on open-stock prices from the Sears, Roebuck and Company and Montgomery Ward catalogues are reproduced as Table 7.25. Mean ceramic values generated for specific assemblages from the Santa Fe Railyard project were created by averaging all dishware values within a given context. These mean ceramic values were then compared to other assemblages within the Santa Fe area, such as the Capitol Parking Structure (Barbour in production) and Santa Fe Judicial Complex (Lakatos 2011). The assumption is that the higher the value, the higher one's purchasing value and ultimately social status. A score at or near a 1.00 indicates the context consisted primarily of undecorated white-bodied earthenware and would suggest poverty level consumption and discard patterns whereas a score of 2.00 or above would indicate a wealthy person or persons eating off porcelain dishes almost exclusively.

Because open-stock prices vary through time as technology and aesthetic taste change, mean ceramic values cannot be utilized unless an assemblage can be accurately dated within one or two decades. Furthermore, comparisons between assemblages can only occur if those materials are roughly contemporaneous. One cannot compare a mean value developed from a 1890s domestic refuse pit with a 1930s privy. However, because the indices are developed using national market prices, the mean ceramic value produced for an assemblage dating to 1910 in Santa Fe can be compared to those developed in 1910 Atlanta.

Another method developed as a proxy for examining socioeconomic status in nineteenth-century assemblages is the utilization of prescription medicine bottles to determine access to health care. The nineteenth century and early twentieth century is often viewed as a golden age of patent medicine (Fike 1987:3–5). Patent medicines were often unproven cures for some specific, or in some cases, not so specific ailment. These cures were often homeopathic and ranged in scale from the use of ginger to relieve common cold symptoms to patented remedies manufactured for wide-scale distribution. In many instances the medicinal agents within patent remedies were benign, yet consumers did find symptomatic relief since their primary ingredient was typically alcohol or the opiate laudanum. Patent medicines were often purchased and consumed by individuals who had limited or no access to medical professionals due to monetary or social constraints.

Conversely, prescription bottles can be distinguished from patent medicine bottles by the presence of measured increments along the side of the bottle to allow accurate doses of its contents (Fig. 7.26). The materials within these products varied, but included pharmaceutical drugs we would recognize today, such as acetaminophen, and were often "prescribed" by a doctor, chemist, and/or pharmacist after medical consultation. As a result, the presence or absence of these materials may reflect access to healthcare. Professional healthcare, like today, was expensive and access to qualified personnel was often limited based on ethnicity, perceived race, age, and/or gender. The consumption and discard of prescription products not only indicates wealth, but status within society. By comparing the number of prescription to patent medicine

Figure 7.26. LA 146402, prescription medicine bottle.

bottles within domestic refuse, one can examine the frequency with which any specific household treated illness with costly medical consultation and prescribed products versus folk remedies. The assumption is that the wealthiest members of society will choose to treat illness through professional aide more frequently than lower income families. Hence a 2:1 ratio may represent the upper class whereas a 1:8 may indicate the poor.

Euroamerican artifacts varied across site-specific assemblages. While economic scaling was performed primarily using mean ceramic values and prescription to patent medicine bottle ratios, other methods were employed as necessary. These methods were typically site specific and are discussed as they are utilized throughout the text. Wherever possible multiple methods are used.

Analysis Results

Examination of the 28,305 analyzed Euroamerican artifacts from the Santa Fe Railyard project included a diverse array of products that encompassed all twelve of the broad functional categories used in the OAS Euroamerican Artifact Analysis (Table 7.26). While the project area is identified with the Atchison, Topeka and Santa Fe Railway, these materials are associated with a variety of contexts that include subsistence-based agricultural features, residential neighborhoods, and commercial-industrial endeavors. In this section, the analyzed Euroamerican artifacts are discussed collectively by function-based category to examine broad patterns in artifact distribution and the range of variability inherent in these distribution patterns.

Function-Based Analysis

Functionally Unassignable Items. In all, 17,522 artifacts or 62 percent of the analyzed Euroamerican assemblage could not be assigned a particular activity or behavior (Table 7.26). However, it is possible to speculate that many of these goods represent indulgence and food-related items as the category comprises primarily highly fragmented bottle glass (n = 5,636) and metal can fragments (n = 4,179) that do not retain enough diagnostic attributes to assign a specific function. However, these objects, such as machine-made bottle glass, do provide temporal indicators of the late nineteenth and early twentieth century and reflect participation by inhabitants of the project area within the national economy. Table 7.27 presents bottle manufacturing methods, period of use, and characteristic marks left behind. Table 7.28 presents the same data for canned products. Manufacturing processes for both glass bottles and cans are discussed at considerable length in other OAS publications (Grochowski et al. 2004; Lentz and Barbour 2010) and will not be reiterated for this current report.

Economy/Production Items. Economy and production materials include items associated with subsistence, industrial, and commercial endeavors. A total of 47 artifacts, less than 1 percent of the total Euroamerican artifact assemblage, were classified within this function-based category. These items include products associated with agriculture (n = 1), fishing (n = 2), machinery (n = 29), commercial establishments (n = 14), and brick production (n = 1). Materials within this function-based category appear to be under represented given the historic nature of the project area. Many of the artifacts associated with the Atchison, Topeka and Santa Fe Railway are classified under transportation, and those products identified with the Maloof Coors Distributorship are primarily indulgences (i.e., beer bottle fragments).

However, the distribution within even this limited category illustrates a broad range of activities occurring within the project area. The agricultural hoe (n = 1) is likely related to subsistence farming within the project area during the nineteenth century. The fishing hooks (n = 2) may have been utilized for recreational fishing on the Santa Fe River. Machinery parts (n = 22) are most likely indicative of railway activities, and the packing filler (n = 2) may have been utilized by the beer distributorship. Unfortunately, the business-card fragments (n = 4) were illegible and it is unclear if the brick mold recovered from the project area is representative of a brick manufacturing business or the creation of bricks by the Atchison, Topeka and Santa Fe Railway for private use.

Food Items. Euroamerican artifacts typically classified as food products are represented by their inorganic containers, which are distinguished by qualitative characteristics, such as container shape and size. These include condiment bottles and meat tins. Bottled and canned products were not commonly available to citizens of the Santa Fe area until the opening of the Santa Fe Trail in 1821. Throughout the nineteenth and early twentieth centuries, many Santa Fe residents continued to grow and raise most of their own food. The materials found within this function-based category represent some of the products that were consumed by the household that could not be grown locally or produced easily on a household level. At the Santa Fe Railyard, only 297 Euroamerican artifacts were identified as being food related and comprised only 1 percent of the Euroamerican artifact assemblage (Table 7.26).

The 297 artifacts in the food items category were further segregated by container type into canned goods (n = 163), bottled goods (n = 131), and miscellaneous (n = 3). The majority of can fragments were simply classified as unidentifiable containers (n = 123). However, based on their cylindrical shape and dimensional proportions, it is likely many of these artifacts are fragments of No. 303, 2, or 2-1/2 cans, which are typically used for packaging vegetables, fruits, or soups (Duran and McKeown 1980:1044–1045). Other can types identified include coffee (n = 8), condensed milk (n = 18), juice (n = 1), tapered meat (n = 5), sardine (n = 1) and spice (n = 2) related products.

Bottled food items consisted primarily of condiments (n = 43), such as ketchup (n = 1), mustard (n = 6), and pepper sauce (n = 1). These condiments included at least one bottles of Lea & Perrins Worcestershire Sauce. First manufactured in Worcester, England, in 1838, Lea & Perrins is one of the most common brand-name condiments recovered from nineteenth and twentieth century archaeological contexts in and around Santa Fe. Other identifiable brand-name condiment bottles found at Santa Fe Railyard included Heinz Ketchup (n = 2) and Best Foods Mayonnaise (n = 1).

The remaining bottled food items included 15 dairy-product bottle fragments. One is a complete half-pint bottle with a Fergusson Dairy of Santa Fe–embossed label. The Fergusson Dairy was located on Alto Street, roughly two blocks north of the project area. It was owned and operated by the Fergusson family between 1931 and 1947 (New Mexico Business Directory 1931; 1947). Another dairy bottle was a buttermilk product from Polmood Farms (Fig. 7.27) in the Tesuque Valley, which was operated by a Hunter Clarkson. In addition to dairy, a Pompeian Olive Oil bottle was also encountered. Established in 1906, the brand was the first nationally marketed olive oil product; it is produced in Baltimore, Maryland (www.pompeian.com/aboutus.html).

Indulgence Items. Indulgences (n = 2,959) represent items that are not a necessity for human subsistence, but are consumed for pleasure or recreation. At the Santa Fe Railyard, these types of items represent roughly 10 percent of the total Euroamerican assemblage (Table 7.26). Many of the products identified within this functional category were related to the consumption of alcoholic beverages (n = 1,287, 43 percent; Figs. 7.28a, 7.28b). These items include hard liquor (n = 479), beer (n = 418), and wine (n = 390) bottle and can fragments.

Identifiable brand names for the above-mentioned products and carbonated beverages (i.e., soda) are listed in Table 7.29. Liquor brands include

Figure 7.27. A bottled dairy product recovered from the Santa Fe Railyard project area: Polmood Farms of Tesuque creamer bottle.

Figure 7.28a. Bottled indulgence products recovered from the Santa Fe Railyard project area: (a) Coca-Cola soda bottle; (b) Lemp beer bottle; (c) Wine bottle; (d) Beer bottle; (e) Liquor flask.

Figure 7.28b. Bottled indulgence products recovered from the Santa Fe Railyard project area: (f) Anheuser-Busch beer bottle; (g) Beer bottle; (h) Gallo wine bottle; (i) Falstaff beer bottle; and (j) Virginia Dare wine bottle.

Hiram Walker & Sons (n = 3), Old Quaker (n = 23), National Distillers (n = 1), Sunny State Liquor (n = 6), and Taylor & Williams (n = 27). Beer brands include Budweiser (n = 11), Fischer & Co. (n = 6), Pabst Blue Ribbon (n = 42), Anheuser-Busch (n = 15), Falstaff (n = 10), Schlitz (n = 29), Lemp (n = 11), Northwestern Brewery (n = 1), Walter Bros. Brewery (n = 1), Shoenhofen Brewing (n = 2), Blatz (n = 2), Texas Splits (n = 1), and R & Co. (n = 3). Of the beer brands listed, Fischer & Co. was the only local brewery represented. Founded by Christian Frederick Adolph Fischer in 1881, the brewery existed for a little over a decade (1881–1892) and was frequented by the archaeologist Adolph Bandelier (Hannaford and Taylor 1995). Wine brands included Gallo (n = 2), Virginia Dare (n = 14), Old Mission (n = 6), Clicquot Club (n = 1), and United Vinters (n = 1). Soda brands included Coca-Cola (n = 15), RC (Royal Crown) Cola (n = 17), Sprite (n = 1), Seven-Up (n = 28), Nifty (n = 1) and Calso (n = 1).

Small quantities of other types of indulgences were also recovered. These included kaolin pipe fragments (n = 2), Ronson-brand packaged flint (n = 1), shards from a cuspidore (n = 4), and chewing gum wrappers (n = 13). While these counts are small, smoking and chewing tobacco items are strong indicators of men in the archaeological record, whereas candy-related products, such as bubble gum, may indicate the presence of children.

Interestingly, while a Coors distributorship was located within the project area during the early twentieth century, no Coors-brand products were identified within the Euroamerican artifact analysis. It is possible that Coors Brewing Co. used a paper label that did not survive in the archaeological record. The majority of identifiable labels were embossed upon glass or painted on cans. It is also possible that Coors bottled in any recycled beer bottle available. This would account for the diversity of products presented within the assemblage. However, this may not be the case and the diversity of products represented in the assemblage could simply be indicative of Santa Fe's participation in the national economy during the nineteenth and twentieth centuries.

Domestic Items. Domestic items include products used in food service, preparing or preserving food, childcare, or the care of household trappings. Items included in this category represented roughly 5.2 percent of the total Euroamerican assemblage (n = 1,477, Table 7.26) and primarily consisted of dinnerware china (n = 943). Analysis of Euroamerican dinnerware ceramics was accomplished by recording paste and ware as described in Boyer et al. (1994). Table 7.30 presents dinnerware by vessel form, ware, and manufacturer when known.

As exhibited in the table, only five manufacturing companies that produced the ceramic dinnerware recovered from the Santa Fe Railyard project could be identified. These companies included Haviland and Co. of Limoges, France (n = 1), Homer Laughlin of East Liverpool, Ohio (n = 2), Ott & Brewer of Trenton, New Jersey (n = 2), Edwin M. Knowles of East Liverpool, Ohio (n = 1), and Henry Alcock & Co. of Staffordshire, England (n = 2) (Debolt 1994; Kovel 1986). When possible portions of this data set were used to inform on the socioeconomic status of site occupants (see Euroamerican artifact write-ups for LA 146402, in Chapter 3, and 146413, in Chapter 5).

Other domestic items collected and analyzed from the Santa Fe Railyard project included glassware (n = 166), canning jars (n = 105), baby bottle fragments (n = 3), and cutlery or flatware (n = 13). Sewing items (n = 13) were also encountered in some abundance. These materials may reflect home tailoring of new garments and accessories or repairs to store-bought items to make such items last longer. Trade manifests from merchants traveling along the Santa Fe Trail, such as the one depicted in Table 7.31, illustrate the value in transporting such a commodity. Cloth could be purchased cheaply in the factories to the east and then sold in locales such as Santa Fe at appreciated prices.

Furnishing Items. Furnishing items are typically represented by non-consumptive consumer products that occur within a domestic structure or dwelling such as fragments of furniture, light fixtures, or appliances. Typically these artifacts are underrepresented in the archaeological record. This absence could be the result of burning of domestic refuse or municipal trash pick-up. However, as stated by Rathje and Murphy (2001), the primary reason for objects, such as major appliances and furniture, not appearing within the archaeological record has to do with their long-lasting value and a cultural commitment on the part of human groups to recycle these objects back into the community through garage sales, collection drives, and gifting.

When present, this category is generally represented, not by major appliances and furniture, but by the fasteners, hardware, or decorative items that were once attached to these larger objects. These types of artifacts, however, are problematic in a functional analysis since most hardware and fasteners are recorded as construction and maintenance items, not as furnishing items and can further diminish the frequency of furnishing items within the greater Euroamerican assemblage.

At the Santa Fe Railyard, furnishing artifacts (n = 158) accounted for less than 1 percent of the total Euroamerican artifact assemblage (Table 7.26). The majority of artifacts recorded as furnishing items (n = 109) were associated with heating, cooking, or lighting functions, such as kerosene lamp (n = 90) and lantern (n = 6) fragments and parts of a wood or coal stove (n = 4). Other artifacts include flowerpots (n = 12), a faucet fixture (n = 1), and Christmas ornaments (n = 2) and bulbs (n = 1). It seems probable that many of these products were used in commercial and industrial contexts during the late nineteenth and early twentieth century. The abundance of kerosene parts could suggest that some of the structures at Santa Fe Railyard may not have had electricity, at least not when it was initially built in the 1880s.

Construction and Maintenance Items. Artifact types in the construction and maintenance items category include tools, hardware, building materials, electrical items, storage items, fencing materials, plumbing and water supply materials, lubricants and solvents, and tent-related materials. In all, 4,698 construction and maintenance artifacts were recovered from the Santa Fe Railyard project. These artifacts represented 16.6 percent of the total Euroamerican artifact assemblage (Table 7.26) and are represented primarily by objects used in the manufacture and maintenance of buildings.

Nails (n = 1,332) and windowpane glass (n = 1,430) were amongst the most common construction and maintenance artifact functions identified. Table 7.32 illustrates whole nails by pennyweight (d) and manufacturing technique (machine-cut, or drawn). Pennyweight originally referred to the number of pounds per 1,000 nails, although today (and in this instance) it refers to length (Fontana and Greenleaf 1962:55). Immediately obvious from the table, is the diversity in nail size. However, the high frequencies of wire-drawn (n = 293) to square-cut nails (n = 41) suggests the majority of materials date to the twentieth century, as wire-drawn nails surpassed machine-cut nails in popularity in the last decade of the nineteenth century (Gillio et al. 1980).

The manufacturing technique used on most of the windowpane glass fragments appears to have been machined sheet/plate glass (n = 1,390), specifically either flat-drawn sheet glass or polished plate glass. Both of these techniques were developed in the early twentieth century. Visually, plate glass can be collectively differentiated from other forms of windowpane glass by striations or fine lines that are visible in cross section and run parallel to the polished surface, an effect created by the manufacture process (Roenke 1978:24). Earlier nineteenth-century cylinder glass has ovular bubbles; it appears in almost insubstantial quantities within the project area. However, these numbers may not be an accurate reflection of the Euroamerican flat-glass assemblage. Many of the glass fragments are relatively small, especially those recovered from acequias. If a piece of window glass was too small to have any bubbles it could be easily misidentified as plate glass. It is also important to note that, while in some instances the thickness of windowpane glass has been used to date an archaeological assemblage (Roenke 1978), due to questions of reliability (Deiss 1982) no attempt was made to derive temporal data from flat glass from any archaeological site within the current study.

While over half of all construction and maintenance items were either nails or window glass, the remaining 1,936 artifacts include a diverse array of tools (n = 35), electrical materials (n = 107), storage items (n = 1), fencing equipment (n = 56), plumbing hardware (n = 94), and tent-related accessories (n = 1). Among the most interesting of the products identified was a mercury-vapor lamp. Mercury-vapor lamps were a lighting source that gained popularity for use as streetlights in the late 1940s and early 1950s. The mercury-vapor bulb produced more light than fluorescent or incandescent light bulbs of the same wattage, but were criticized, as the light emitted initially had a bluish-white hue. This was corrected in the 1960s when the bulbs were coated with a special material made of phosphors to help correct the lack of orange/red light. However, over time, the light emitted from the bulbs begins to fade, but the lamp continues to consume the same amount of energy. As of 2008, the sale and use of mercury-vapor lamps has been banned in the United States (en.wikipedia.org/wiki/Mercury-vapor_lamp). While only one bulb was found, the presence of the material suggests that the railyard area was lit by streetlights.

Personal Effects. Personal effects are portable items belonging to individuals who presumably lived or worked at a site. These items can include such things as clothing, medicine, and jewelry. A total of 478 personal effects were recovered and analyzed from the Santa Fe Railyard project, accounting for roughly 2 percent of the total Euroamerican assemblage (Table 7.26). Low frequencies of a variety of personal effect products were identified including a pocketknife, political memorabilia (n = 2), coins (n = 14) and several plastic (n = 1) and glass (n = 2) beads. However, the majority of personal effect artifacts consisted of clothing (n = 130), boots and shoes (n = 187), grooming/personal hygiene (n = 57) or health or medicine related items (n = 68).

Clothing consisted primarily of buttons, including four-hole (n = 21) and two-hole (n = 14) varieties, and indeterminate cloth bits (n = 38). On average, these buttons were less than one centimeter in diameter. Generally the size of a functioning button and attachment reflect the type of the garment material and the force needed to fasten the garment. In this case, these small buttons likely represent delicates such as button-up undergarments or lightweight fabric shirts. This is not surprising as many of the buttons analyzed were recovered from LA 146402 Structures 5, 6, and 7, outhouses associated with the Atchison, Topeka, and Santa Fe Railway (see Chapter 3).

Footwear-related artifacts indicate a minimum of only three different adult dress shoes (represented by n = 145 fragments), two slippers (n = 7), two children's shoes (n = 5), and 10 work boots (n = 17). Because of the fragmentary nature of this assemblage no attempt was made to determine the minimum number of pairs. However, it appears likely that at least one pair of children's, women's and men's shoes are present along with a pair a slippers and at least five pairs of men's work boots.

Grooming/personal hygiene items were dominated by pomade-jar fragments (n = 43). The majority of these fragments did not have brand names. However, those that did suggest Noxzema (n = 3) and Ponds (n = 7) were preferred. Noxzema contained camphor, menthol, and eucalyptus, among other ingredients. Originally developed in 1914 as a sunburn remedy, it later became popular among women as a facial cleanser and make-up remover (Fig. 7.29, 1939 Noxzema ad; en.wikipedia.org/wiki/Noxzema). Similarly Ponds, founded in the nineteenth century, was also initially marketed as a pain reliever for skin ailments but was transformed into a product marketed to provide a gentle complexion (Fig. 7.30; Delineator, December 1912).

Health and medicine objects reflect a wide array of wellness products including laxatives (n = 5), liniments (n = 2), pills (n = 10), and ointments (n = 4). However, a specific medicinal benefit could not be identified for many of these products and therefore most were recorded as patent (n = 23) or prescription (n = 23) medicine. Brand names of medicinal products included complete and fragmentary bottles of Phillip's Milk of Magnesia (n = 2), California Fig Syrup Co. (n = 1), Dr. J. H. McLean (n = 2), E. R. Squibb (n = 1), Lyric (n = 1), Pluto Water (n = 1), and Whittemore (n = 1).

Entertainment, Leisure, and Educational Items. Artifacts in the entertainment, leisure, and educational category indicate activities intended to entertain, amuse, or provide relaxation or recreation. Similar to indulgences, these items are not essential to human subsistence. Many of these artifacts, such as toys and games, are indicative of children at a site.

In all, 284 entertainment, leisure, and educational items were collected and analyzed. These artifacts represented about 1 percent of the total Euroamerican assemblage (Table 7.26) and comprised a substantial number of reading material–related artifacts (n = 106), most of which were recovered from the Atchison, Topeka and Santa Fe Railway outhouses. Given the context in which these materials were collected, it appears unlikely that the relatively high frequencies of reading materials provide evidence of a highly literate population. Instead, it is probable that the majority of these items were actually used as toilet paper.

This is not to say that the population was not literate. To the contrary, writing/stationery equipment (n = 112) made up 39 percent of the artifacts

Figure 7.29. 1939 Noxzema ad from unknown magazine.

analyzed within the entertainment, leisure, and educational items category. These artifacts included numerous pencils (n = 11), pens (n = 12), and ink-bottle fragments (Fig. 7.31, n = 77). The bulk of these products were likely used in recordkeeping as products were carried on and off the trains.

While children's products, such as fragments of rubber balls (n = 5), dolls (n = 16), and marbles (n = 5), were present, these artifacts represented a relatively small portion of those materials classified under the entertainment, leisure, and educational items category. During the majority of the project area's history, the land served as agricultural fields and an industrial center. This was not a habitat conducive to children's leisurely activities. Those artifacts which do appear with the Euroamerican artifact assemblage are likely associated with children located in the nearby residential neighborhoods or use of the project area by children after its abandonment.

Transportation Items. Transportation items are used in the travel or conveyance of people or freight from one place to another. Less than 1 percent (n = 92) of the total Euroamerican artifact assemblage was identified as transportation items (Table 7.26). These artifacts consisted of products associated not only with the railroad (n = 49), but trucks and cars (n = 30) and animal and human locomotion (n = 11). The most common archaeological materials associated directly with the rails were railway spikes (n = 21) and steam engine parts (n = 21). The overall counts of railroad-associated artifacts are lower than one might initially expect. While the Atchison, Topeka and Santa Fe Railway and later the New Mexico Central Railway were the major industrial/commercial enterprises within the project area, these endeavors did not leave behind high quantities of materials directly related to the maintenance of steam and electrical engines. Instead many of the products in this category appear to be related to the unloading and transportation of the railway's cargo once it arrived in Santa Fe. In the late nineteenth and early twentieth centuries this conveyance of products was done by horse and then later by the automobile. However, most of the horse-related materials are riding shoes (n = 6). This is difficult to explain. The riding horse and their shoes are less ro-

Figure 7.30. Ponds ad from Delineator magazine December 1912.

Figure 7.31. Reconstructed ceramic ink bottle.

bust and meant to only carry a single passenger or have a pack directly tied to their back. Conversely, the draft horse is large and its respective draft shoes (n = 2) have chalks, which provide traction for the transportation of wagons and carts weighed down with commercial items or passengers. It is possible that many of the draft animals used to pull cargo (ox and horse) were shoed with leather boots, which subsequently were not preserved within the archaeological record. The use of cars beginning in the 1920s is clearly visible by the various car/truck parts present in the archaeological record, but no artifact can be tied to a specific make or model of automobile.

Communication Items. Communication items are involved in the long-distance transfer of information. Artifact types in the category include telephone, telegraph, postal, radio, and television, and radio communications items. This category is often underrepresented within an OAS functioned-based analysis as many of the parts of these products are often coded under the electrical type of construction and maintenance item categories. At the Santa Fe Railyard, a total of 254 Euroamerican artifacts, roughly 1 percent of the total Euroamerican artifact assemblage, was classified within the communication items functional category. Interestingly, all but one of the artifacts, a key to a telegraph machine, were likely not directly associated with the long-distance transfer of information.

The remaining 253 artifacts are fragments of wet-cell batteries, specifically crow's foot batteries (Fig. 7.32). Also known as Daniell or gravity cells, crow's foot batteries were named for their zinc electrodes, which are morphologically similar to a crow's foot and were developed by John Daniell in 1836 (www.chem1.com/acad/webtext/elchem/ec6.html). These were used primarily to power telegraph lines in the late nineteenth and early twentieth centuries. However, the batteries were also used by railroads to energize track and signal circuits (www.antiquebottles.com/edison). Given their con-

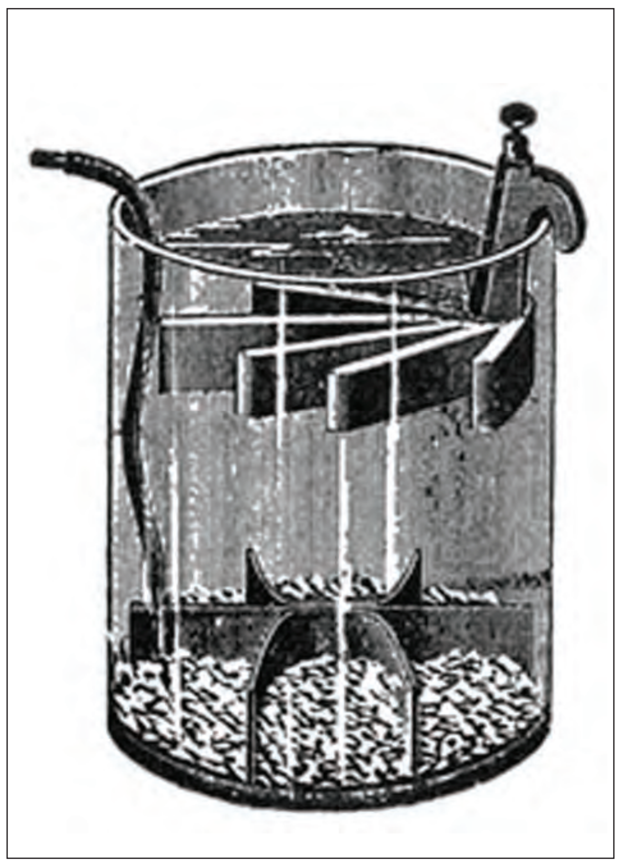


Figure 7.32. Conceptual drawing of an intact wet-cell battery (courtesy Morse Telegraph Club, moresetelegraphclub.org).

text at the Santa Fe Railyard, it seems that this latter function is likely for many, if not all, of the batteries.

Military and Arms Items. Military and arms items represent those objects associated with or used in warfare, self-protection, or hunting activities. These objects include firearms, munitions, explosive devices, military uniforms, and their various accoutrements. At the Santa Fe Railyard, 32 military and arms artifacts were identified, representing less than 1 percent of the total Euroamerican artifact assemblage (Table 7.26).

Although the Santa Fe Railyard was never a military setting, a U.S. Army coat button was recovered from the project. This is to be expected as soldiers from the nearby Fort Marcy Military Reservation often performed in parades and other events within the railyard area during the late nineteenth century. This particular artifact could be related to the 9th Cavalry Band, which played at the opening of the Atchison, Topeka and Santa Fe Railway Station in 1880 (Fig. 7.33; Lentz and Barbour 2010).

In addition, 1 lead ball, 9 centerfire cartridges, 1 indeterminate cartridge, 14 rimfire cartridges, and 2 shotgun shells were collected and analyzed. Unfortunately, the caustic depositional setting corroded or obscured diagnostic manufacturer identification on many of the munitions (Table 7.33). However, these munitions represent a variety of different calibers and gauges. Cartridges in which caliber could be determined (n = 19), included the following: .22 (n = 12), .30-06 (n = 1), .38 (n = 1), .44 (n = 1), .45 (n = 3) and .50 (n = 1). The two shotgun shells were from a 12 gauge. While few in number, this diverse assortment of munitions represents a minimum of seven different firearms. The majority of these firearms were of calibers not typically used by the U.S. Army, and it is likely that many of the arms represented by these munitions were civilian issue.

Euroamerican Artifacts in Archaeological Context

Euroamerican artifacts are associated with a variety of contexts. These include acequias, subsistence-based agricultural features, residential neighborhoods and commercial-industrial endeavors. In this section, the analyzed Euroamerican artifacts are summarized in context by site. The section is an overview and is not meant to present analysis, details, or results, the details of which are summarized and discussed in respective chapters of this report. The section is meant provide the reader with a framework with which to refer to specific report sections.

Acequias

Euroamerican artifacts (n = 11,615) from seven acequia sites were analyzed. These materials were used to inform upon ditch use and abandonment. Because acequias represent alluvial environments, many of the artifacts recovered were extremely small and water worn. By their very nature, these materials, unless explicitly stated, were found outside of their primary contexts. Assemblages derived from an acequia context are provided a rough summary below, but particulars of analysis are presented within the descriptive chapter for each site. The reader is directed to Chapter 2 (in this report) for acequia sites analysis and site-level interpretation. Tables 2.11–2.12, 2.19, 2.27, 2.37, 2.48, 2.60, and 2.69 summarize the distribution of Euroamerican material culture by category, type, and function.

LA 120957, a section of the Acequia Madre

LA 120957 was a section of the Acequia Madre within the Santa Fe Railyard project area. The Acequia Madre is thought to be the largest and oldest ditch in the Santa Fe area. A total of 18,606 Euroamerican artifacts were collected from LA 120957, of which 2,810 (15 percent) were subjected to intensive analysis. The vast majority of these materials (n = 2,762) were analyzed from within the Acequia Madre proper (Feature 1022). However, a small number (n = 48) were associated with a small lateral (Feature 1010). Table 2.60 summarizes the distribution of Euroamerican material culture by category, type, and function for each stratigraphic layer of LA 120957. The body of the analysis is presented in the LA 120957 section of Chapter 2.

While the Acequia Madre was likely in use during much of the Spanish Colonial period, Euroamerican artifacts suggest that no discrete deposits can be associated with the seventeenth or eighteenth centuries The lateral, Feature 1010, is likely contemporaneous with the alluvium found in the primary channel, Feature 1022, but this could not be proven through Euroamerican artifact analysis.

Figure 7.33. The Ninth Cavalry Band performing on the Santa Fe Plaza (MNM Neg. No. 050887).

LA 146407

LA 146407 and LA 146408 represent superimposed ditch segments. LA 146407 is the lower of the two ditches thought to represent the Juan Diego Romero Ditch (Features 42 and 56) and is believed to have been utilized in the nineteenth century. A total of 14,441 Euroamerican artifacts were recovered, of which 3,351 (23 percent) were subjected to intensive analysis. These artifacts included materials from Features 42 and 56, which represent the western and eastern expanses of the acequia respectively. It is unclear exactly how strata from each section correspond to one another. Table 2.11 summarizes the distribution of Euroamerican material culture by category, type, and function for each stratigraphic layer of the Juan Diego Romero Ditch (LA 146407, Features 42 and 56).

Earliest accumulation of sediments within LA 146407 could not be determined but appears to have occurred in the nineteenth century. There is no evidence of Spanish Colonial deposition. Railroad artifacts indicate the ditch was still in use after the coming of the railroad in 1880, but may have fallen out of commission shortly thereafter. Euroamerican artifacts dating to the 1960s suggest that final infill of the area did not occur until relatively recently.

LA 146408, a section of the Manhattan Street Ditch

LA 146407 and LA 146408 represent stratigraphically superimposed ditch segments. LA 146408 is the upper ditch, and is thought to be the Manhattan Street Ditch (Feature 28), which ran along Manhattan Avenue in the late nineteenth and early twentieth centuries. A total of 14,723 Euroamerican artifacts were recovered from LA 146408, of which 1,054 (7 percent) were subjected to intensive analysis. These artifacts were selected from final channel infill strata (Stratum 100, Stratum 105, and Stratum 119), i.e., the last alluvial episodes within the ditch. Table 2.19 summarizes the distribution of Euroamerican material culture by category, type, and function for each stratigraphic layer of the Manhattan Street Ditch (LA 146408, Feature 28).

The lowest strata may represent items associated with residential consumption and discard that were later moved by fluvial action. Euroamerican artifacts were only analyzed from the upper fluvial episodes. These artifacts may not represent use of the ditch but rather the movement of storm water through the feature after it was abandoned. Furthermore, because lower alluvium was analyzed, earlier episodes of use cannot be identified.

LA 146410, a section of the Acequia de los Pinos

LA 146410 represents a section of the Acequia de los Pinos, designated Feature 70, within the Santa Fe Railyard project area. A total of 4,833 Euroamerican artifacts were collected from the channel fill, which is thought to have been in use since the eighteenth century. These artifacts consisted primarily of large quantities of metal (n = 2,515), glass (n = 1,799), and European-manufactured ceramics (n = 254). From this assemblage, 2,557 Euroamerican artifacts (a 53-percent sample) were chosen for in-depth analysis.

Table 2.37 summarizes the distribution of Euroamerican material culture by category, type, and function for each extramural stratigraphic layer and Feature 70 filling episode. Extramural artifacts accounted for 33 percent (n = 848) of the Euroamerican artifact sample.

While upper strata at LA 146410 contain materials dating to the twentieth century, earlier products are interspersed within this lowest alluvium, providing strong indicators that the channel may have been in use centuries before its abandonment; this observation correlates well with archival sources, which place creation of the acequia sometime in the eighteenth century.

LA 149909, a section of the Acequia de los Pinos

LA 149909 is believed to represent another section of the Acequia de los Pinos, designated Feature 1000, within the Santa Fe Railyard project area. A total of 661 Euroamerican artifacts were collected from the channel, which is thought to have been in use since the eighteenth century (Wenker 2005:22). These artifacts included a diverse array of material types including large quantities of metal (n = 277), glass (n = 322), and European-manufactured ceramics (n = 39). From this assemblage, 615 Euroamerican artifacts (a 93-percent sample) were chosen for in-depth analysis. Table 2.27 summarizes the distribution of Euroamerican material culture by category, type, and function for each stratigraphic layer

Archival research suggests the Acequia de los Pinos was used in the eighteenth century. Majolica sherds were identified in the lower alluvium of LA 149909, though materials that would have survived yearly cleaning are mixed with mid-nineteenth century materials.

LA 146418, a section of an unnamed acequia

A total of 150 Euroamerican artifacts were recovered from LA 146418. All were subjected to intensive analysis. Table 2.69 summarizes the distribution of Euroamerican material culture by category, type, and function for each extramural stratigraphic layer and Feature 97 filling episode. No Euroamerican artifacts were recovered from lower alluvium. Extramural fill residing outside and above the acequia comprised modern mid- to late twentieth-century Euroamerican artifacts.

LA 149912, a section of the Arroyo de los Tenorios

LA 149912 represents a segment of the Arroyo de los Tenorios (Feature 1007). First mentioned in 1877 (D. H. Snow 1988:16), Arroyo de los Tenorios represents a lateral branch off the Acequia Madre. A total of 4,584 Euroamerican artifacts were collected from the site from which a 23-percent sample (n = 1,076) was chosen for in-depth analysis. Two hundred seventy-three of these materials were selected from fluvial filling episodes. The remainder (n = 803) were associated with post-abandonment refuse. Table 2.48 summarizes the distribution of Euroamerican material culture by category, type, and function for the post-abandonment refuse and each filling episode within the Arroyo de los Tenorios.

The three major alluvial episodes visible within the Euroamerican artifact assemblage appear to date to the nineteenth century. These dates are derived from small quantities of Euroamerican ceramic sherds.

Atchison, Topeka and Santa Fe Railway

LA 146402 and LA 146403 appear under this heading because their primary occupation periods were during the late nineteenth century when the Atchison, Topeka and Santa Fe Railway controlled much of the Santa Fe Railyard project area. While defined by the Atchison, Topeka and Santa Fe Railway, the Euroamerican artifacts analyzed under this heading (n = 4,481) are associated with many different temporal periods and contexts. The reader is directed to Chapter 3 for AT&SF sites analysis and interpretation. Tables 3.24 through 3.39 summarize the distribution of Euroamerican material culture by category, type, and function.

LA 146402, a multi-component site

LA 146402 is a multi-component site associated with the human occupation of the project area during the Spanish Colonial, Mexican, American Territorial, and Early Statehood periods. However, the majority of features appear associated with the Atchison, Topeka and Santa Fe Railway. A total of 29,809 Euroamerican artifacts were collected from the site from which 4,238 (14 percent) were chosen for analysis. Because the site represents a diversity of different activity areas dating to different temporal periods, the analysis was broken into several major components. These include the ditch segments (NSTR 100) associated with early nineteenth-century agriculture on the site, a Spanish Colonial and Mexican period midden (NSTR 101), privies (Structures 5, 6, 7) associated with the Atchison, Topeka and Santa Fe Railway and the original passenger dock (Structure 8). In each of these segments, Euroamerican artifacts were examined to date the feature and provide baseline data for understanding the use of their respective features and the people who used them.

LA 146402, ditch segments (NSTR 100)

Two hundred ninety-five Euroamerican artifacts were recovered from small ditch segments running across LA 146402. These segments likely represent small channels off more robust laterals or acequias. The segments were identified as Ditches A, B, and C. In addition, several segments could not be linked to a specific ditch and were identified as generic discontinuous segments. Artifacts from these features were analyzed primarily to date the features and characterize the nature of human occupation around these ditch segments during their use. Artifacts are summarized by ditch in Table 3.24 (Ditch A, n = 19), Table 3.25 (Ditch B, n = 2), and Table 3.26 (Ditch C, n = 150). Table 3.27 (discontinuous ditch segments) is discussed in detail in the LA 146402, NSTR 100, section of Chapter 3 in this report.

LA 146402, the residential midden (NSTR 101)

A total of 395 Euroamerican artifacts were collected and analyzed from NSTR 101, the residential midden. These materials were distributed across 11 distinct strata, but can be categorized into three major depositional episodes. These episodes are as assigned to three fill layers based on stratigraphy; the analyzed artifact content is summarized in Tables 3.28, 3.29, and 3.30 and discussed in the LA 146402, NSTR 101, section of Chapter 3 in this report. Artifacts from Lower Fill (Stratum 126 and 128, n = 24) consist primarily of small unidentifiable items (n = 13; Table 3.28). Those from the Middle Fill (Stratum 120, 120.02, 120.03, 120.04 and 120.05, n = 114) and Upper Fill (Stratum 119 and 120.01, n = 275) may date to the Mexican period. Combined artifacts from the Upper, Middle, and Lower Fill offer a substantial data set from which to compare eighteenth-century Colonial life in and around the Barrio de Guadalupe with other portions of the Santa Fe Villa and New Mexico Province; this comparison is presented in the LA 146402, Euroamerican Artifacts, section of Chapter 3 in this report.

LA 146402, Santa Fe Railyard privies (Structures 5, 6, and 7)

A total of 2,240 Euroamerican artifacts were recovered and analyzed from Structures 5, 6 and 7 (see Table 3.33 [Structure 5, n = 1,190], Table 3.36 [Structure 6, n = 280], and Table 3.37 [Structure 7, n = 770]). This represents only a sample of all Euroamerican artifacts recovered from Structure 5 (14-percent sample), but includes materials both found in the night soil and those collected from post-abandonment fill from all three structures. Euroamerican artifact assemblages from Structures 6 and 7 were analyzed in their entirety.

While Structures 5, 6, and 7 vary some in Euroamerican artifact complexion, combined these structures offer an unprecedented look at the general consumption and discard patterns associated with an industrial setting in the City Different. This data set can be used to examine differences within other sectors of Santa Fe.

LA 146402, passenger dock (Structure 8)

Structure 8 at LA 146402 represents the original passenger dock used by the Atchison, Topeka and Santa Fe Railway in 1880. Sometime in the early twentieth century, this dock was converted to a freight warehouse (Wenker et al. 2005c:25–26). A total of 1307 Euroamerican artifacts were recovered and analyzed in association with the structure the majority of which was associated with post-abandonment fill (n = 1,136, 87 percent). Table 3.39 presents the Euroamerican artifacts associated with both the original construction of the structure and post abandonment fill by category, type, and function.

Many of the materials were not associated with industrial use of the project area. The substantial quantities of indulgences (n = 343, 30 percent) could represent refuse associated with the nearby Maloof-owned Coors distributorship Unfortunately none of the analyzed material culture was useful in informing upon historic use of Structure 8.

LA 146403, Atchison, Topeka and Santa Fe Railway windmill and water tower

LA 146403 represents a windmill (Structure 1) and water tower (Structure 2) associated within the Atchison, Topeka and Santa Fe Railway. A total of 243 Euroamerican artifacts were collected and analyzed from LA 146403. These materials were found both in association with the two structures and in an extramural late nineteenth- or early twentieth-century surface area. Table 3.57b summarizes the distribution of Euroamerican material culture by category, type, and function for the windmill (Structure 1), water tower (Structure 2), and extramural area (NSTR 2). The majority of Euroamerican artifacts collected from the site were unassignable (n = 163, 67 percent; (Fig. 3.103b), specifically coal clinkers (n = 97) and scrap pieces of metal (n = 27). The coal clinkers are likely the result of fuel-product consumption by the steam engines and are directly associated with the industrial use of the area by the Atchison, Topeka and Santa Fe Railway. Construction and maintenance materials (n = 69) represented 28 percent of the assemblage and appear to largely correspond to materials associated with construction of the two structures. Based on the abundance of machine-cut square nails (n = 48) in the vicinity of Structures 1 and 2, it would appear that the wooden portions of the windmill and water tower were joined using this technology. Archival evidence provided by Scheick et al. (2003) suggests these buildings were constructed between 1879 and 1880. The use of machine-cut square nails would match well with known building practices during the mid- to late nineteenth century. The near absence of all other types of products, such as indulgences (n=4) and domestic (n=3) artifacts, is to be expected given the nature of the site.

New Mexico Central Railway

Euroamerican artifacts (n = 4,771) were collected and analyzed from two sites, LA 146405 and LA 149915, associated with the New Mexico Santa Fe Railway. These materials were analyzed to inform upon utilization of the project area by the railroad, but instead informed upon businesses that occupied the project area in the mid- to late twentieth century. The reader is directed to Chapter 4 (in this report) for NMC sites analysis and site-level interpretation. Tables 4.4 through 4.6, and 4.17 summarize the distribution of Euroamerican material culture by category, type, and function.

LA 146405, New Mexico Central Railway depot and Maloof distributorship

LA 146405 is the location of the original New Mexico Central Railway depot, ca. 1900, and later the Coors Brewery distributorship owned by the Maloof family after 1930. This building was labeled Structure 1. In addition, a basement below a portion of the Coors Brewery distributorship was designated Structure 2, and was believed to be an earlier structure because the walls of the cellar abutted but did not join the foundations of the Coors Brewery distributorship. A total of 8,533 Euroamerican artifacts were collected from the site, 30 percent (n = 2,593) of which were chosen for detailed analysis see Table 4.4.

LA 149915, New Mexico Central platforms and loading dock and old New Mexico Highway Department building

LA 149915 represents several structures associated with the New Mexico Central Railway and the New Mexico Highway Department. A total of 2,178 Euroamerican artifacts were collected and analyzed from the site. As depicted in Table 4.17, artifacts were distributed across two structures (Structures 1, 2), an extramural activity area (NSTR 1), and from a general collection of materials across the entire site. Materials from the assemblage are mixed, indicating contributions Spanish Colonial, American Territorial, and New Mexico Statehood periods.

Santa Fe Railyard Neighborhood Refuse Sites

Euroamerican artifacts (n = 7,433) from two sites (LA 146412 and LA 146413) associated with the Santa Fe Railyard Historic Neighborhood were examined to reveal patterns of consumption and discard related to residential households in the area during the early twentieth century. In addition, economic scaling was performed on ceramic dinnerware assemblages to compare the relative wealth of the neighborhoods inhabitants with families living elsewhere. The reader is directed to Chapter 5 (in this report) for refuse sites analysis and interpretation. Tables 5.4–5.5 and 5.16–5.17 summarize the distribution of Euroamerican material culture by category, type, and function.

LA 146412

LA 146412 represents an empty lot immediately east of an early twentieth-century residential development. Two refuse pits, Feature 66 and Feature 72, were identified at LA 146412 and are believed to be associated with the adjacent neighborhood. A total of 4,470 Euroamerican artifacts were collected, of which 4,016 (90 percent) were subjected to intensive analysis. The features are similar in Euroamerican artifact composition. Table 5.4 summarizes the distribution of Euroamerican material culture by category, type, and function for each feature by stratum.

Both features contain artifact content consistent with that of a 1940s-era domestic refuse pits. Unfortunately, no mean ceramic value indices have been developed for 1940s dishware, making economic scaling all but impossible. Even if indices were created there are no comparable assemblages collected outside of the Santa Fe Railyard project by which to evaluate the results.

LA 146413

Like LA 146412, LA 146413 represents a vacant lot immediately east of an early twentieth-century residential neighborhood. A total of 3,417 Euroamerican artifacts were collected and analyzed from the site. The majority was recovered from Features 91 and 92, large-scale refuse pits located within the site boundaries. The 3,417 Euroamerican artifacts represent a 100-percent sample of the materials recovered from LA 146413, with the exception of three license plates documented in the field and collected, but not found, for intensive artifact analysis. Table 5.16 summarizes Euroamerican material culture by category, type, and function and by surface or feature collection unit. All artifacts collected were within Stratum 2.

While artifacts associated with Feature 91 are associated with residential consumption, Feature 92 represents a palimpsest of materials associated with residential and industrial consumption and discard. Both pits likely date to Depression or World War II eras (ca. 1929–1945) and likely represent tertiary deposits in which the materials have been moved from their primary (i.e., the house or business) and secondary (i.e., the refuse pit/dump location) discard locations.

Addressing the Data Recovery Plan

Three major research domains were discussed in Wenker et al. (2005). These include *Research Domain 1: The Spanish Colonial to Late Territorial period Acequia and Field System at the Santa Fe Railyard; Research Domain 2: The Frontier Model for Social and Economic Acculturation, a Material Culture Study*; and *Research Domain 3: Bringing Archaeology and History to Bear on the Archaeological Buildings and Structures of the Santa Fe Railyard.* In this section Euroamerican artifacts are used to inform upon each research domain. Euroamerican material culture is better at addressing some of these topics than others. However, in all instances, analysis of Euroamerican artifacts can aid in addressing all three of these topics.

Research Domain 1: The Spanish Colonial to Late Territorial Period Acequia and Field System at the Santa Fe Railyard

Euroamerican artifacts were analyzed from seven different acequia archaeological sites within the Santa Fe Railyard project area. Euroamerican artifacts cannot indicate when a ditch was first used. Perennial cleanings would likely have removed most—if not all—Euroamerican materials washed in seasonally. However, artifacts from these features were used to determine dates of aggradation (i.e., sediment accumulation) within the channels. Table 7.35 summarizes the results of these findings. Most of the channels appear to have begun to infill sometime in the nineteenth century. After this initial period of sedimentation many of the channels may have been revitalized for agricultural purpose for unknown segments of time. By the late nineteenth and early twentieth centuries these channels had filled-in to the surrounding ground surface.

Artifacts found in these channels are typically small waterworn fragments of Euroamerican items consumed and discarded within a residential setting (Table 7.35). It is likely that many were transported by fluvial action from neighborhoods to the north and east of the project area. These artifacts are of limited analytical value given their highly fragmented nature and the inability to tie these materials firmly to a specific archaeological context. Furthermore, these materials do not appear to be related to utilization of the agricultural fields and cannot be used to inform upon the field systems or the acequias which fed them.

The only Euroamerican artifact that could be directly linked to agricultural pursuits was the head to a hoe, found in the upper strata of LA 146402, NSTR 101, the Spanish Colonial/Mexican period midden. The absence of Euroamerican agricultural detritus may indicate that much of the agricultural activity was performed using stone-age methods perfected by surrounding Indian tribes.

However, it is more likely that the absence of tools associated with agriculture is a reflection of the types of contexts in which Euroamerican materials were collected and analyzed. The acequias with their small artifacts carried into the feature by fluvial action are unlikely to contain heavy iron agricultural implements and only one midden was excavated. Also it is likely that most metal tools utilized in agricultural pursuits were not thrown away. Given the scarcity of metal in Spanish Colonial and Mexican period settings, any iron tools were likely refurbished by the local blacksmith rather than discarded and purchased anew.

Research Domain 2: The Frontier Model for Social and Economic Acculturation, a Material Culture Study

Throughout the historic period, Santa Fe served as a frontier setting for the Spanish Empire, Mexico, and the United States. In addition, throughout this same period, Santa Fe also served as an administrative core for the province, territory, and state of New Mexico. Analysis of Euroamerican artifacts from LA

146402, NSTR 101, a Spanish Colonial/Mexican period midden associated with the Barrio de Guadalupe, presented the opportunity to examine consumption and discard patterns of imported goods prior to and just after the opening of the Santa Fe Trail.

Admittedly, access to Euroamerican artifacts before the American Territorial period was very limited. However, if Santa Fe represents the core villa of New Mexico during the mid-eighteenth century, residents within the villa should have had greater access to imported materials, but as explored in the LA 146402, NSTR 101, Euroamerican artifact section of Chapter 3 in this report, residents of the Barrio de Guadalupe had the fewest Euroamerican ceramics when compared to other assemblages collected from the Baca-Garvisu estate in Santa Fe and the residents of Valencia. Furthermore, as discussed in the Frontier Model, Spanish residents living in peripheral environments should rely more heavily on indigenous products. This is not the case. Settlers at Valencia appear to have had greater access to imported products than inhabitants of the Barrio de Guadalupe. As noted in Akins (2001:128), proximity to the main trade route, *El Camino Real Tierra de Adentro*, may have influenced the consumption and discard patterns of imported goods at Valencia.

Certainly, ethnicity may have also played some part in the differential use of indigenous products. It has often been believed that areas south of the Santa Fe River were settled by local *genizaro* Indians and, potentially, Nahuatl populations from Central Mexico (Sze et al. 1988:21). The discard of Mexican Redwares into the midden may signify that some of the residents thought of themselves as *mestizo* or *indio* populations from the Mexico and Jalisco regions of New Spain. However, this cannot be proven or unproven within the limited sample size.

If examined on a larger level, New Mexico as whole fits well within the core and periphery model as inhabitants of Barrio de Guadalupe almost assuredly had fewer imported luxury items when compared to those living in Central Mexico and Spain. However, a comparison between a midden in the Valley of Mexico and the midden at the Barrio de Guadalupe was not undertaken.

Later Euroamerican artifact assemblages associated with utilization of the project area by the Atchison, Topeka and Santa Fe Railway and other late nineteenth and early twentieth-century businesses show an increased reliance on goods produced elsewhere. Dinnerware products include manufacturer marks from: Staffordshire, England; Limoges, France; and East Liverpool, Ohio. Bottled products include: Chicago, Illinois; St. Louis, Missouri; and Baltimore, Maryland.

The bulk of this diversity can be attributed to more reliable transportation networks and increased industrialization. In Colonial times, imported materials had to be hauled by mule from the core in and around Mexico City to the provincial government in Santa Fe. This distance not only decreased the availability of trade goods but increased the cost of transportation and led to the establishment of the Camino Real de Tierra Adentro. Stretching from Mexico City to Santa Fe, merchant ventures along the route were sporadic and complicated by the presence of hostile indigenous peoples along the way. In the case of the midden associated with the Barrio de Guadalupe (Fig. 7.34a; Table 7.36), roughly 2 percent (n = 495) of all artifacts were imported from outside the province (glass, metal, Euroamerican ceramic). The remaining 98 percent (n = 20,660) were raised (fauna), grown (macrobot) or fabricated (native ceramic and lithic) in the surrounding area.

Trade networks to Santa Fe expanded under Mexican rule including the establishment of the Santa Fe Trail in 1821. Anchored to St. Louis, Missouri, the Santa Fe Trail snaked across the plains of the American West to Santa Fe and afforded residents of the Northern Rio Grande a cheaper and more readily available alternative to goods shipped north from Chihuahua. This reduction in cost and increased availability was a product of industrialization sweeping the American East. These changes led to the participation of the Northern Rio Grande within the national economy as tied to St. Louis. No longer as reliant on locally produced goods, Euroamerican commodities became the dominant materials within refuse deposits. One assemblage that dates to this period is the ditch segments documented at LA 146402. These segments show an increased reliance on imported products with 12 percent (n = 761) of the entire assemblage (n = 6,289) represented by products manufactured elsewhere (Fig. 7.34a; Table 7.36).

However, many problems experienced by those traveling along the Santa Fe Trail were similar to those that plagued the earlier passage along the Camino Real. Cost of overland transportation and

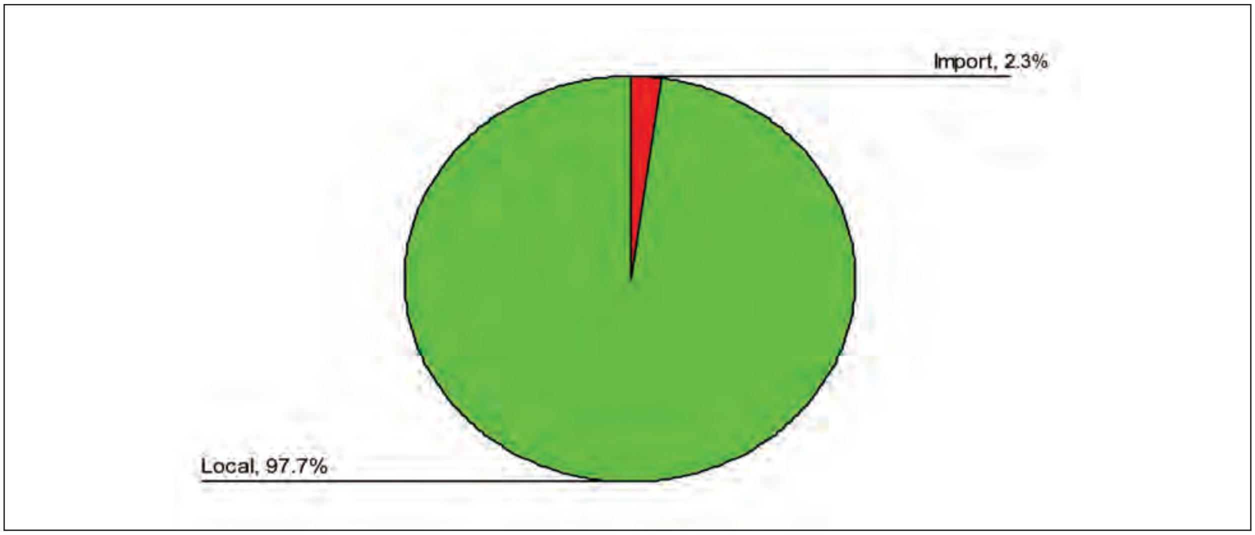


Figure 7.34a. LA 146402, NSTR 101, relative frequencies of imported and locally produced products recovered from El Camino Real de Tierra Adentro, the Santa Fe Trail, and Railroad-era contexts.

the presence of hostile indigenous peoples were still key impediments towards obtaining imported Euroamerican material culture. These problems were to be solved with the successful completion of the Red River War in 1874, and the arrival of the train into Santa Fe in 1880. These events ushered in a new period of trade where problems regarding accessibility and availability were diminished through an interconnected network of rail lines which tied the Northern Rio Grande to major ports along the east and west coast, and reduced native disruption to these networks achieved through settlement and acculturation of indigenous groups onto government monitored reservations. As witnessed by the artifact assemblage recovered from LA 146402, Structure 5 (Fig. 7.34a; Table 7.36), an outhouse dating to the 1890s, nearly 99 percent (n = 8,775) of the assemblage is imported products. Only 118 (1 percent) of 8,893 artifacts could have been produced or grown locally and many of those may have in fact been imported.

Certainly feature/assemblage type may play some role in the exact percentages witnessed in Figure 7.34a. However, by the 1900s, the overwhelming majority of products purchased by citizens of Santa Fe were produced elsewhere. This reliance on imports tied New Mexico into a greater national and international economy and helped pave the way for New Mexico's acceptance into statehood in 1912.

Research Domain 3: Bringing Archaeology and History to Bear on the Archaeological Buildings and Structures of the Santa Fe Railyard

Two of the archaeological sites, LA 146402 and LA 146403, chosen for Euroamerican analysis had architectural components associated with the Atchison, Topeka and Santa Fe Railway and others, such as LA 146405 and LA 149915, could be linked to the New Mexico Railway. Many of the buildings used by the railway have known construction dates. Analyzed construction and maintenance items, from these sites in particular, have the ability to inform upon materials used in the fabrication and renovation of the built environment.

LA 146403 contained the windmill (Structure 1) and water tower (Structure 2) associated with the Atchison, Topeka and Santa Fe Railway; both structures were believed to have been built in 1880. In this instance, construction and maintenance materials (n = 69) represented 28 percent of the assemblage and comprised primarily machine-cut square nails (n = 48). It is likely that many of these materials were associated with construction of the structure. The use of machine-cut square nails would match well with known building practices during the mid- to late nineteenth century. While more modern materials such as wire-drawn nails were becoming available on the open market and were in the process of replacing square nails for building purposes, the use of the square machine-cut nails could indicate that construction of Atchison, Topeka and Santa Fe Railway buildings was performed using materials which had proven reliable in the past and were in conformity with contemporaneous construction projects within the Santa Fe area.

However, construction and maintenance materials associated with the fabrication of LA 146402, Structure 8, the original 1880 passenger depot, tell a very different tale. Artifacts from contexts identified with the original construction of the depot included many more wire-drawn (n = 67) as opposed to machine-cut (n = 12) nails. The passenger depot is a considerably more public building. It is possible that the wire nails were used in this instance to put forward an attitude of innovation, but as discussed previously in Chapter 3 (LA 146402), it is unclear if these artifacts are truly associated with initial construction of the building. The light bulb, also recovered from these contexts, was only patented in 1880 and it would seem unlikely that a structure built in Santa Fe, New Mexico, the very same year would incorporate such a new technology.

The privies found at LA 146402, Structures 5, 6, and 7, are morphologically and compositionally (at least as far as construction and maintenance items) very similar to many of the privies constructed on the Fort Marcy Military Reservation during the 1860s and 1870s (Lentz and Barbour 2010). While morphological similarities are outside the realm of this discussion, it is important to note that not only were the privies similar in size but appear to have had their vaults fabricated using the same items, milled wood and machine-cut square nails. It is possible to speculate that the privies were built by the same plumber or at the very least, constructed using the same blueprint. Other instances of privies being manufactured in a standardized format by either the same firm or someone using the same blueprint have been witnessed elsewhere in the downtown Santa Fe area. At LA 158037, privies associated with 141 West Manhattan Avenue and 135 West Manhattan Avenue were identical in their size and manufacture methods (Barbour in production)

Less can be said regarding the New Mexico Central Railway. At LA 146405, artifacts found in association with Structure 2, originally the depot, appear to be associated with later add-ons to the building when it was used as a liquor distributorship. Construction and maintenance materials consisted primarily of window glass and it is possible that the building had large show windows during the 1930s and 1940s.

Euroamerican artifacts from Structures 1 and 2 at LA 149915 offered even less information regarding their construction and renovation as materials recovered from these buildings appeared to date to the late twentieth century. However, NSTR 1, thought to be an extramural area, has the highest frequencies of construction and maintenance (n = 209, 60 percent) objects relative to the total number of artifacts collected and analyzed. The majority of materials were wire-drawn nails (n = 115), typically used in building practices in twentieth century. These materials fit well with archival resources that place construction of the buildings at LA 149915 in the early twentieth century. These materials suggest the presence of a collapsed building. It seems likely that materials collected from NSTR 1 are associated with the demolition of one or both of these two buildings and/or Structure 3 from which no Euroamerican artifacts were collected. It is also possible that the area identified as being extramural was actually encapsulated by one of the buildings.

Apart from the structural remains of the railyard, economic speculation and the day-to-day activities of those working in the project area can also be explored through the Euroamerican artifact assemblage. For example, the bulk of entertainment, leisure, and educational items appear to have been used for record keeping, specifically to keep track of products as they were moved on to and off of the trains. In another example, the disposal of wet-cell batteries within the outhouses at LA 146402 suggests these structures may have served as a way to deal with hazardous materials within an industrial setting.

Several businesses adjacent to the railyard were also located within the project area, including a Coors distributorship. However, no Coors-brand products were identified within the Euroamerican artifact analysis. It is possible that Coors Brewing Co. used a paper label that did not survive in the archaeological record. The majority of identifiable labels were embossed on glass or painted on cans. It is also possible that Coors was bottled in recycled liquor or beer containers. This would account for the diversity of products presented within the assemblage. However, this may not be the case and the diversity of products represented in the assemblage could simply be indicative of Santa Fe's participation in the national economy during the nineteenth and twentieth centuries.

Perhaps the most compelling information about the railyard's inhabitants comes from Structures 5, 6, and 7 at LA 146402. While both passengers and workers at the Santa Fe Railyard used the privies, the population that used the outhouse would have been primarily males, businessmen or railyard laborers, outside of a residential setting. When compared to other Euroamerican artifact assemblages from privies found elsewhere throughout the downtown Santa Fe area, the artifacts from these structures are characterized by more indulgence-related artifacts (i.e., alcohol-related products) and suggests the primary gender of any privy users can be determined through the relative frequencies of alcohol-related products.

Summary and Interpretations

Analysis of Euroamerican artifacts from the Santa Fe Railyard project captures an important period of transition for the citizens of Santa Fe. Within the course of roughly 100 years (ca. 1800–1900), Santa Fe changed from a largely rural self-reliant population focused on subsistence-based agriculture to an administrative capitol tied to national and international commerce. By the twentieth century, most products consumed by the city's inhabitants were imported from elsewhere.

The manufacture dates of Euroamerican artifacts from the acequias could not determine when a specific section of ditch was first used, but could assist archaeologists in assessing when aggradation began to occur. In most instances, this seems to have occurred sometime in the mid- to late nineteenth century and may be related to the transition of the project area into an industrial center with establishment of the Atchison, Topeka and Santa Fe Railyway in 1880.

Midden artifacts from NSTR 101 offered an eighteenth-century data set that could be compared to other contemporaneous assemblages both within and outside of the Santa Fe area. Based upon this comparison, eighteenth-century residents of the Barrio de Guadalupe appear relatively poor compared to those living north of the Santa Fe River and south of Albuquerque in Valencia.

Archaeologists also tracked shifts in the number of imported goods present within eighteenth-, early nineteenth-, and late nineteenth-century period assemblages from the Santa Fe Railyard project area. While the Santa Fe Trail appears to have had a significant impact on the number of imported goods available and consumed by residents of Santa Fe, the number of imported goods utilized after the coming of the railroad is staggering. Up until the coming of the railroad the economy was largely self-sufficient. By the 1890s, less than 10 percent of the cultural materials collected from the archaeological record were produced or raised locally.

The materials used to fabricate the industrial complex that came to dominate the project area reflect the building practices of their day. Buildings such as the windmill and water tower built at LA 146403 were manufactured using machine-cut nails and other time-tested materials used on buildings throughout the Santa Fe area during the 1880s. The privy vaults at LA 146402 appear so similar to some of those created at the Fort Marcy Military Reservation that they may have even been fabricated by the same plumber or from the same blueprint.

General patterns of consumption and discard visible within the privy also proved useful. It appears the primary gender of any privy users can be determined through the relative frequencies of alcohol-related products. Furthermore, outhouses served as a way to deal with hazardous materials such as acid from depleted wet-cell batteries that were recovered from Structures 5 and 6 at LA 146402.

Lastly, while not explicitly stated in the Data Recovery Plan (Wenker et al. 2005), an effort was made to compare twentieth-century domestic refuse collected from the Santa Fe Railyard project with other projects recently conducted by OAS in the vicinity. Dinnerware sherds collected from LA 146413 were compared with other contemporaneous Depression-era assemblages, including the Santa Fe Judicial Complex and Capitol Parking Structure. Based on the economic-scaling derived from mean ceramic values, it appears that inhabitants at LA 146413 were relatively poorer than those located elsewhere in Santa Fe. While LA 146412 may not have been utilized for comparative purposes, the assemblage offers baseline data regarding the post-World War II era (1945+) material culture and may prove useful to future academic researchers.

Chipped Stone Analysis: Santa Fe Railyard Artifact Assemblages

James L. Moore

Introduction

A total of 188 chipped stone artifacts was recovered from eight of the sites examined by this study, as summarized in Table 7.37. The artifacts from these sites are described and inventoried in the corresponding site reports in this volume. The number of artifacts recovered per site ranged between 1 and 90, with only two sites yielding more than 20 specimens. These are very small assemblages, and there is a high likelihood that sample error will affect analytic results. This is especially true for the assemblages that contain fewer than 20 artifacts. In addition to this potential problem, many of these assemblages represent displaced materials with no direct association with the features in which they were found. This category includes all chipped stone artifacts from LA 120957, LA 146407, LA 146410, and LA 149912, which were all recovered from sediments that were naturally deposited in acequia channels after those water delivery systems fell into disuse. Nine chipped stone artifacts from LA 146402 were recovered from similar contexts. This accounts for 100 artifacts, or 53.19 percent of the total assemblage. One artifact from LA 146402 came from sediments that were used to cover abandoned structural foundations, and a second came from sediments used to fill an abandoned outhouse pit. Three other specimens were found in sediments used to fill a cellar at LA 146405 after abandonment, and one artifact was in an adobe foundation at LA 149915 that was built using materials obtained from unrelated cultural deposits. Thus, a total of 106 artifacts, or 56.38 percent of the chipped stone assemblage, came from artifact-bearing sediments that were redeposited in unassociated cultural features by natural processes or as artificial fill after abandonment. This category includes all chipped stone artifacts from six of the eight sites.

Less than half of the overall assemblage was recovered from primary deposits. The rest came from secondary deposits that were firmly associated with primary deposits at the same site. The latter refers to 10 chipped stone artifacts recovered from a layer of non-cultural fill that capped midden deposits in a Late Spanish Colonial-era trash-filled pit at LA 146402. Since it seems likely that this fill layer washed in from adjacent related deposits, these artifacts are combined with the 67 specimens that were obtained from primary midden strata. Other contexts that produced chipped stone artifacts in a primary depositional setting included a single specimen recovered from outhouse deposits at LA 146402, an artifact from field fill at LA 146402, and three specimens from a ca. 1930s–1950s trash pit at LA 149912.

Using these data, we can assign the chipped stone artifacts in this small assemblage to five basic contexts for the purpose of discussion: non-cultural deposits; midden deposits; outhouse deposits; field fill from LA 146402; and a trash pit at LA 149912. These subdivisions should facilitate examination of the assemblage and help determine whether any meaningful patterns are visible. In particular, does the combined assemblage from acequia fill resemble the midden assemblage, or do the patterns seen in the acequia assemblage differ significantly from those observed in the midden artifacts? If there is a close resemblance, we can suggest that the acequia artifacts ultimately derived from Spanish Colonial or Territorial period deposits similar to those in the LA 146402 midden, since all site assemblages (including those derived from acequia channels) are heavily dominated by historic pottery indicative of Spanish occupation. On the other hand, if there are extreme differences, the possibility that these materials originated in prehistoric contexts must be considered.

To facilitate this examination, information from a large chipped stone database created at the OAS is used for comparative purposes. That database currently contains information obtained from the analysis of over 165,000 artifacts recovered during 18 projects spread across New Mexico that examined 93 sites dating from the Archaic to Historic periods, including the present endeavor. Rather than using the entire database, we will concentrate on sites representing a more restricted time span and area. For this study, we will use information from 12 historic Spanish sites and 23 prehistoric to early historic Pueblo sites from northern New Mexico—a comparative assemblage containing nearly 65,000 artifacts (Table 7.38). By using these comparative data, we may be able to determine whether the assemblages recovered from the sites discussed in this chapter fit the pattern seen in other Spanish sites or are more similar to patterns seen in prehistoric sites.

Analysis of the Chipped Stone Assemblages

This analysis will address three general topics: (1) what types of materials were used and where were they obtained; (2) how was chipped stone reduced; and (3) what types of tools are present at these sites and what do they tell us about the activities that were performed using them. In association with these topics, we will assess the assemblages and attempt to determine whether they mainly represent materials produced during the Spanish occupation of Santa Fe, or are artifacts that originated in prehistoric sites that were transported by water flow to the locations where they were recovered. Because of the presence of multiple informal chipped stone tools in the LA 146402 midden and the nature of the ceramic assemblage from that feature, we assume that the chipped stone artifacts from this provenience are indicative of Late Spanish Colonial period manufacture and discard, except for certain artifacts as discussed below. This provides us with a project-specific baseline for comparison, in addition to the comparative sample discussed above.

Material Selection. Table 7.39 shows the distribution of material categories by context of recovery. The chert category contains four varieties, including Pedernal chert, Madera chert, unsourced cherts, and silicified wood. The obsidian category includes Polvadera (also known as El Rechuelos) obsidian in addition to unsourced types. As Table 7.39 shows, cherts dominate in all cases except for the field deposits from LA 146402, which yielded a single quartzite artifact. The largest assemblage recovered from acequia deposits was at LA 120957, where 95.12 percent of the artifacts were made from various cherts. Obsidian is the second most common material category in the two largest assemblages in Table 7.39, but percentages for this category are much smaller than are those for the cherts, suggesting a lower level of economic importance or availability.

Two assemblages—artifacts from non-cultural deposits and the midden deposits from LA 146402—can be further compared to determine whether they are parts of the same or different populations. In order to remove empty variables and sites containing too few examples, the various varieties of cherts are combined for this analysis, as are the different types of obsidian. All other materials are combined into a single "other material" category because very few examples of each material was represented in either assemblage. Chi-square analysis suggests that there are no significant differences between these assemblages at the 95 percent confidence level ($x^2 = 2.725$; df = 2; p = .256; phi = .122). Thus, in terms of basic material makeup, these two assemblages are not statistically separable and may represent subsets of the same population.

Material percentages might provide some temporal information that can be used to determine the relative date of the deposits from which the chipped stone artifacts found in the non-cultural context were eroded. Obsidian was the second most common material type in the LA 146402 midden, and this material was also found in 11 of the 12 comparative Spanish assemblages, with percentages ranging between 1.82 percent and 21.43 percent when it occurred, and averaging 7.14 percent for all twelve assemblages. While percentages of obsidian for the two largest assemblages in Table 7.39 are above the mean for the comparative assemblages, they are not out of line for Spanish sites. When compared with the 23 Pueblo assemblages, the proportions of obsidian in the two largest assemblages fall near the middle of the distribution, which ranges between 1.44 and 38.40 percent, and are well below the mean of 13.56 percent. Since obsidian percentages for the two largest assemblages in Table 7.39 could easily fit into either comparative group, they provide no good temporal indications.

Heavy reliance on cherts is a hallmark of Spanish chipped stone technology (Moore 2008). Indeed, examination of the comparative assemblages shows that cherts comprise 88.60 percent of Spanish assemblages but only 73.28 percent of Pueblo assemblages. This is because a wider variety of stone tool-using activities were performed at the prehistoric sites than at the Spanish sites. Indeed, the main task in which chipped stone artifacts were used by the Spanish was fire-making, either by striking a piece of chert (or similar material) with a steel *chispa* to create sparks, or as part of the ignition system in flintlock firearms. Cherts are well-suited to these uses because they possess very sharp edges that are strong enough to shear strips of metal from a *chispa* or frizzen and ignite them without shattering. Though edges on obsidian flakes are much sharper than are those on chert flakes, obsidian is too fragile for this type of use and shatters when struck against steel rather than sparking. Most other materials are also of little use in this task. While quartzite can be used to strike sparks, and occasional strike-a-light flints made from this material have been found, this type of use is rare for quartzite debitage, which only occurs as single examples of strike-a-light flints in two of the comparative assemblages. This is because small flakes are often removed from the edges of chert strike-a-light flints, particularly those with acute angles, reshaping and resharpening those edges. This extends the use-life of the tool without requiring intentional resharpening. Quartzite does not work in the same way, and its edges are more prone to crushing and crumbling than they are to regeneration. Thus, quartzite strike-a-light flints have much shorter use-lives than chert strike-a-light flints, and are not as serviceable.

To return to the discussion of chert proportions in assemblages, the percentage of cherts in the non-cultural deposits (87.74 percent) is higher than all but one of the Pueblo comparative assemblages. In contrast, higher percentages occur in four of the comparative Spanish assemblages. Three of the comparative Pueblo sites had higher percentages of cherts than did the midden deposits from LA 146402 (80.52 percent), while seven of the Spanish sites contained higher percentages of chert. Chert proportions seem pretty clearly suggestive of historic Spanish occupations for both types of deposits. Since the midden deposits from LA 146402 are most certainly of historic date, there is no question of their temporal affinity.

The dominance of cherts and obsidians in these assemblages is also evident in the distribution of material textures, with 88.30 percent of the composite assemblage comprised of glassy and fine-grained materials, and the remainder consisting of medium-grained materials. This type of distribution is consistent with selection for materials that would produce sharp edges for cutting and scraping, as well as those that would be useful in fire-making. However, in this case, comparison of the assemblages from the non-cultural deposits and the midden at LA 146402 reveals significant differences ($x2 = 10.755$; $df = 2$; $p = .005$; $phi = .242$). Material texture proportions are very different for these two cases, with the midden containing a considerably smaller percentage of fine-grained materials (68.83 percent versus 85.85 percent), and a much higher percentage of medium-grained materials (19.48 percent versus 4.72 percent) when compared to the assemblage from non-cultural deposits. Since percentages of glassy/fine-grained materials fall well within the range for both the prehistoric (67.07–96.49 percent) and historic (78.74–97.35 percent) period sites in the comparative assemblage, this difference is not an indication of temporal variation, and is more a sign of site-based variation.

Overall, 82.45 percent of the artifacts recovered during this project lack cortex, with some cortical coverage occurring on 33 specimens (Table 7.40). Only waterworn cortex was noted on these artifacts, indicating that they were originally obtained from secondary gravel deposits along streams. For materials like Madera chert, limestone, and quartzite, this suggests procurement from gravel beds along local streams tributary to the Santa Fe River, as well as along the river itself. Materials like Pedernal chert, rhyolite, unsourced obsidian, and Polvadera obsidian were not locally available and were probably collected from gravel deposits along the Rio Grande, which is the nearest source. Other materials like unsourced cherts and silicified wood could have been collected from either source. Whether the gravel beds along the Rio Grande were exploited by Spanish occupants of the Santa Fe area or these materials were simply salvaged from earlier Pueblo sites is uncertain, though the presence of a projectile point at LA 146402 that was, as is discussed later, almost certainly collected from a prehistoric Pueblo site suggests that salvaging from earlier sites occurred, perhaps with some regularity.

Reduction Strategy. Reduction strategy can only be tentatively approached because of the small size of the individual assemblages, as well as that of the overall assemblage. With that said, there is little evidence for formal tool manufacture in the overall assemblage, and little if any for the few assemblages from primary rather than secondary deposits. Table 7.41 shows the distribution of artifact morphologies by recovery context. The overall flake assemblage is dominated by core flakes (n = 101; 99.02 percent), with only a single biface flake occurring. Since the biface flake was found in colluvial/artificial fill in an acequia channel at LA 146410, its origin and affiliation are unknown. A single flake from LA 146402 exhibits an abraded single facet platform, which might be an indication of removal during formal tool manufacture. Though this specimen did not fit the polythetic set that models an ideal biface flake, the small size of this flake and the fact that it is made from chert could instead indicate that it was inadvertently removed from the edge of a strike-a-light flint early in the use-life of that tool, with strike-a-light use creating damage resembling that caused by platform preparation.

Biface flakes were recovered from 19 of the 23 prehistoric Pueblo sites in the comparative sample, and comprised an average of 2.62 percent of the debitage assemblages from those sites. The Pueblo assemblages in which biface flakes did not occur all contained fewer than 100 artifacts, accounting for two-thirds of the assemblages (n = 6) that contained fewer than 100 pieces of chipped stone. With all six of these assemblages removed from consideration, biface flakes made up an average of 3.26 percent of the remaining assemblages, which is not a huge increase. In contrast, biface flakes were missing from 5 of the 12 historic debitage assemblages in the comparative sample, including all three assemblages that contain fewer than 100 pieces of debitage. Overall, biface flakes comprise 0.94 percent of historic debitage assemblages, and with those assemblages containing fewer than 100 pieces removed from consideration, this type of flake still comprises only 1.23 percent. The presence of a single biface flake in the assemblage from non-cultural deposits is no more surprising than is the lack of biface flakes in the midden deposits. Evidence of biface manufacture occurs in historic Spanish assemblages, but in much smaller percentages, on average, than it does in prehistoric Pueblo assemblages from the same general area. This is undoubtedly an indication of lower reliance on formal chipped stone tools during the historic period than during the prehistoric period. Indeed, many of the formal tools identified in Spanish assemblages may represent artifacts that were salvaged from earlier sites.

The flake-to-angular debris ratio for the overall assemblage is 1.34:1, which is very low and indicative of an expedient core-flake reduction strategy. Similarly, the flake-to-angular debris ratio for the midden deposits at LA 146402 is 1.38:1, which is equally low. The other three assemblages from primary depositional contexts are too small to be examined in this way. They contain only small numbers of core flakes and angular debris, and no biface flakes or formal tools are present. When compared with other Spanish chipped stone assemblages, we find that the flake-to-angular debris ratio for LA 146402 is smaller than the average of 2.26:1 for the sample of 12 sites, though three assemblages had smaller ratios than did LA 146402. Though at the low end of the range—1.20:1 to 4.00: 1—the LA 146402 ratio generally fits with those of the historic sites in the comparative sample. The prehistoric Pueblo sites in the comparative sample have a higher average flake-to-angular debris ratio at 2.59:1, with a range between 1.33:1 and 5.94:1, with one anomalous assemblage removed because of obvious sample error. Thus, while flake-to-angular debris ratios for the midden at LA 146402 as well as the overall assemblage fit with the historic sites in the comparative sample, they also fit with the prehistoric sites.

Interestingly, no cores were recovered from any of the primary depositional contexts. While this is not surprising in most cases, considering the small size of those assemblages (1 to 3 artifacts apiece), the lack of cores in the midden deposits at LA 146402 is rather startling. Considering the comparative sample of Spanish sites, we find that only two of the twelve assemblages contained no cores, and in both cases the assemblages are smaller than that of the LA 146402 midden. Indeed, only one assemblage smaller than the LA 146402 midden contained any cores, while all nine of the larger assemblages did. This suggests that sample error may be responsible for this lack at LA 146402 rather than cultural processes. While it must be kept in mind that all chipped stone artifacts from the LA 146402 midden could have been salvaged from prehistoric sites rather than produced on-site by Spanish residents, this is unlikely. Cores were most likely discarded at or near the locations of reduction, which may have varied considerably from where chipped stone tools were used and discarded.

Only three formal tools were identified in the overall assemblage: a broken projectile point from LA 146402, a biface fragment from LA 146407, and a drill shaft from LA 149912. The style and flaking patterns on the projectile point indicate that it is a broken prehistoric Pueblo tool. Both the flaked surfaces of this point and the breaks at its proximal and distal ends appear to have experienced similar degrees of weathering, and all surfaces—including the breaks—exhibit scratches and scuff marks indicative of existence on the surface for an extended period of time. These characteristics suggest that this tool was broken prehistorically and salvaged by the historic occupants of LA 146402, eventually being discarded again in the midden without being further modified or used. Thus, the manufacture and use of this tool as a projectile point were not associated with the occupation of LA 146402. The biface fragment from LA 146407 is an indeterminate fragment of a middle stage tool that exhibits considerable scratching, scuffing, and rounding indicative of mechanical transport for a considerable distance down the acequia channel in which it was found. This tool, too, was undoubtedly manufactured and broken prehistorically. The drill from LA 149912 is only represented by a tip, which exhibits heavy rotary use from distal to proximal end, indicating that the hafting element is missing. Though the shape and flaking on this artifact suggest that it was of prehistoric origin, there is no way to confirm this possibility, and historic manufacture and use are also feasible, though less likely.

The lack of good evidence for formal tool manufacture in these assemblages and confirmation that two and probably all three of the formal tools in the composite assemblage are of prehistoric origin allows us to assert that a simple, expedient, core-flake reduction strategy dominated, at least in the assemblages recovered from primary refuse deposits. The same is probably also true for the assemblages that originally contained the artifacts recovered from acequia channel fill and the sediments that were used to artificially fill several features. Unfortunately, this last assertion must remain tentative as long as the actual point of origin for those artifacts remains uncertain.

Tool Use. The three formal tools in the composite assemblage were discussed above, and it was concluded that at least two and more likely all three are actually of prehistoric origin and reached the locations in which they were found in various ways. While possible that the drill shaft was used by the Spanish occupants of a nearby site somewhere upstream from where it was found at LA 146410, this is unlikely because of the rather fine flaking seen on the drill shaft, which tends to be uncharacteristic of Spanish-made tools. Perhaps this drill was collected from a prehistoric site and discarded in historic trash, much like the projectile point fragment from LA 146402, but this is conjectural. Further examination of the projectile point fragment and biface fragment demonstrated that they were not made and used during the historic period. Thus, only the informal tools actually seem to be related to the historic occupations that these sites represent.

The assemblage of informal tools includes a utilized obsidian core flake from acequia deposits at LA 146402, a Pedernal chert strike-a-light flake from acequia deposits at LA 120957, and 6 strike-a-light flints and a strike-a-light flake from LA 146402. Five of the strike-a-light flints and the strike-a-light flake were recovered from the midden at LA 146402, and the last strike-a-light flint was found in field deposits. The latter was made from quartzite, while the rest were made from a variety of cherts (1 Pedernal, 1 Madera, and 4 unsourced). Except for the Pedernal chert strike-a-light flint, which was made on a core flake, these informal tools were made on pieces of angular debris. Three specimens had only one utilized edge apiece, while the other three each had two utilized edges. The strike-a-light flake from LA 120927 is potentially important, because it indicates that historic period chipped stone artifacts were being washed into acequia channels at that site, which yielded the second largest assemblage of chipped stone artifacts from the project. Since 50 of 58 native sherds from LA 120957 were also of historic derivation, the occurrence of a definite historic chipped stone artifact raises the probability that most, or all, of the chipped stone artifacts from this site were also washed in from historic trash deposits.

The last informal tool recovered from the Santa Fe Railyard project sites was the utilized obsidian core flake from LA 146402 that was mentioned above. Since this artifact came from water-deposited sediments in an acequia channel, the damage used to define it as an informal tool can be questioned, because it might instead have been caused by mechanical transport. Unidirectional wear was noted on one edge of this specimen, and that edge has an angle of about 48 degrees. Though cutting and scraping motions do not consistently result in definable wear patterns (Vaughan 1985), the type of wear and angle of this edge suggest that it might have been used for scraping, providing the damage was not caused by mechanical transport rather than cultural use.

To summarize this discussion, we lack any evidence for the manufacture or use of the three formal tools in this assemblage at the locations where they were recovered, suggesting that all three are of prehistoric derivation. This was confirmed in two cases, but could not be similarly demonstrated in the last case. The small array of informal tools was dominated by debitage used in fire-making activities, including 6 strike-a-light flints and 2 strike-a-light flakes that were recovered from two sites, and was augmented by a single piece of debitage that may have been used for scraping, though this use is questionable considering the context of recovery. All of the informal tools except for one strike-a-light flake came from LA 146402, while the latter was recovered from LA 120957. Except for the utilized flake from LA 146402, the informal tools are all indicative of historic period occupations suggesting that, like the primary deposits at LA 146402, the secondary deposits at LA 120597 probably also derived from refuse originating during the historic occupation of the Santa Fe area.

Summary and Discussion

Comparisons of assemblage characteristics from non-cultural deposits and the LA 146402 midden with sets of data from other prehistoric and historic sites were rather inconclusive in helping to determine whether the artifacts in the non-cultural fill assemblage were of either prehistoric or historic origin. The four clues that point toward a historic origin for these artifacts are the predominance of chert in the assemblage from non-cultural deposits, a very low flake-to-angular debris ratio, a paucity of evidence for formal tool manufacture, and the presence of a type of artifact that could only have originated during the historic period. Even so, except for the latter, these characteristics also occur in some of the prehistoric Pueblo assemblages in the comparative sample, so these resemblances are not conclusively indicative of the period of origin for these artifacts.

Though the artifacts from non-cultural deposits at several sites were combined into a single database—admittedly a rather tenuous way in which to examine them—many of the artifacts in that small assemblage came from a single site: LA 120957. This assemblage contains 41 artifacts, which is 21.81 percent of the total assemblage and 31.68 percent of the artifacts recovered from non-cultural deposits, and is heavily dominated by cherts (n = 39; 95.12 percent). Indeed, only two artifacts from this assemblage are not chert. Though the LA 120957 assemblage and the artifacts from the LA 146402 midden cannot be compared by chi-square analysis, an independent samples t-test on material-type distributions suggests that they may still statistically represent parts of the same population ($t = -1.782$; $p = 0.077$). LA 120957 was also dominated by glassy/fine-grained materials (92.69 percent) to a far greater extent than was the LA 146402 midden (80.52 percent). Only debitage was recovered from LA 120957, none of which was derived from tool manufacture. The flake-to-angular debris ratio for LA 120957 was somewhat higher than the overall ratio at 1.50:1, but this is still quite low and indicative of an expedient core-flake reduction strategy. A single temporally diagnostic artifact was recovered from acequia deposits at LA 120957. As discussed earlier, this was a strike-a-light flake, which can only have been created during the historic period. Thus, this small assemblage can probably be comfortably assigned to the historic period, as was the assemblage from the LA 146402 midden.

Addressing the Research Questions

Information from analysis of the chipped stone assemblages recovered from the Santa Fe Railyard sites can be used to address some of the questions posed in the research design for this project. Unfortunately, there are limits to the amount of interpretation that will be possible because of the small size of the overall assemblage, as well as the context of recovery for most artifacts. The questions that can be discussed using these data are presented below.

Research Question 1

Research Question 1 asks whether or not the acequia segments and field remnant can be dated (Wenker et al. 2005:96–100). Unfortunately, chipped stone artifacts are not precise temporal indicators, and can usually only be used for relative dating. This is because most chipped stone artifacts with any degree of temporal sensitivity were usually manufactured for comparatively long periods of time. For example, while some prehistoric projectile point styles were only made for a century or two, other styles remained in use for up to a millennium. Whether made for a century or a millennium, projectile points cannot provide dates as precise as those that can be derived using radiocarbon, archaeomagnetic, or dendrochronological analyses. Diagnostic historic chipped stone artifacts like strike-a-light flints were used from the onset of the Spanish occupation into at least the early twentieth century—a span of over 300 years. Thus, while the presence of certain types of chipped stone tools can be diagnostic of a historic period occupation, the timing of that occupation can rarely be more accurately defined using this artifact class alone.

As discussed earlier, only two chipped stone artifacts point to a period of use for any of the acequia or field systems. One was recovered during examination of LA 120957, the Acequia Madre de Santa Fe. This artifact was a Pedernal chert strike-a-light flake, and its presence in the acequia channel suggests that materials derived from adjacent historic period refuse deposits were among those that filled this channel after it fell into disuse. The second artifact was a quartzite strike-a-light flint recovered from field deposits (Stratum 7) at LA 146402. Since this artifact was probably discarded or lost after it was used at this location, its presence can be taken as indicative of a historic period use of the field. That use probably predates 1900, since the use of strike-a-light flints for making fire seems to have greatly declined after the arrival of the railroad, except in areas with restricted access to the goods that began pouring into New Mexico in response to the decreased shipping costs and increased capacity and efficiency represented by the railroad. However, the occasional finding of strike-a-light flints at Spanish sites dating to the early twentieth century indicates that, though use of this type of tool declined after 1880, it did not disappear, even in urban settings.

This trend can be seen in the results of excavation at five sites. Deposits in a trash-filled borrow pit at the Trujillo House (LA 59658) near Abiquiu dated to the Early Railroad period between 1880 and 1900 (Boyer 2004; Moore 2004). Strike-a-light flints were quite common in the chipped stone assemblage from this site, and most came from the Railroad-era trash-filled borrow pit. The comparatively remote location of this site in relation to the centers of transportation and commerce probably contributed to the continued use of chipped stone artifacts until a fairly late date. This tendency is also demonstrated at LA 77861 near Talpa in northern New Mexico, a Spanish site that was also occupied in the early Railroad period. Fairly extensive excavations at LA 77861 recovered only 14 chipped stone artifacts, but they included four strike-a-light flints and a piece of utilized debitage, indicating the persistence of chipped stone tool use at this peripheral site. Two projectile points in this small assemblage represent salvaged tools from prehistoric sites, but whether or not they were reused during the occupation of LA 77861 was undetermined.

In contrast, test excavations at an early twentieth-century home site in Albuquerque (LA 78945) were much more limited in extent, but still recovered only two chipped stone artifacts, one of which was a strike-a-light flint (Mensel 2005; Moore 2005). The use of chipped stone tools may have been more limited in this context, which was within one of the centers of transportation and commerce. Excavations for the Capitol Parking Structure in Santa Fe examined LA 158037, which contained a series of early twentieth-century houses and nineteenth-century field deposits (Barbour n.d.). Only 18 chipped stone artifacts were recovered from these excavations, 11 of which were associated with twentieth-century remains and 7 with nineteenth-century fields (Moore and Bird n.d.). Specimens were found in features associated with several twentieth-century houses, suggesting that chipped stone may have still been in limited use at the time those structures were occupied. They included a core flake from a cesspit associated with Structure 1; three pieces of debitage from a trash pit and one from a privy associated with Structure 2; four artifacts from features associated with Structure 4, including one from a privy; a flake from a trash pit associated with Structure 5; and a piece of angular debris from a trash pit associated with Structure 7. Structures 4 and 7 were occupied by Anglo families, while Structures 1, 2, and 5 were Hispanic residences. Five of the artifacts recovered from nineteenth-century field deposits came from four agricultural pits, one was found in field deposits, and one came from an abandoned acequia.

The recovery of chipped stone artifacts from domestic refuse associated with houses as well as from features linked to an earlier agricultural use of the same area suggests that at least limited use of chipped stone continued into the early twentieth century. While this use appears to have been more prevalent among Hispanic occupants of this Santa Fe neighborhood, chipped stone artifacts were also found in features related to Anglo occupants. Interestingly, only two tools were found in the assemblage from LA 158037—a projectile point from a feature associated with the Anglo-occupied Structure 4 and a strike-a-light flint from a nineteenth century agricultural pit. While the projectile point was a prehistoric En Medio Point that had obviously been collected from an earlier site, the strike-a-light flint was definite evidence of historic period tool use.

Evidence from the Santa Fe Railyard project suggests that minor use of chipped stone artifacts may have continued as late as the 1930s–1950s. This evidence consists of three chipped stone artifacts recovered from a trash pit dating to this period at LA 146912. Unfortunately, these artifacts are unutilized debitage, and therefore do not demonstrate actual tool use. The presence of small amounts of native pottery could reflect a Spanish ethnicity for the people who used this trash pit, but this is impossible to verify and remains speculative. All that can be suggested from these data is that very limited chipped stone tool use may have continued to the mid-twentieth century.

What the examination of chipped stone assemblages from these five sites indicates is pretty much what would be expected. Chipped stone tool use remained a common part of the cultural repertoire among the Spanish population until at least the turn of the twentieth century, especially on the periphery. The economic position of households distant from the main transportation hubs were undoubtedly also factors in the survival of chipped stone tool use after the arrival of the railroad. In population centers like Albuquerque and Santa Fe, most use of chipped stone tools appears to have begun disappearing by the beginning of the twentieth century, with some survival past that date perhaps linked to the embedding of certain types of tools in Spanish culture. This may have included the continued use of strike-a-light flints, and informal cutting tools in some instances. One cannot also rule out the collection of chipped stone artifacts as curios, as demonstrated by the En Medio Point from Structure 4 at LA 158037. With this discussion in mind, we can suggest that the strike-a-light flint found in agricultural deposits at LA 120957 is probably indicative of a pre-1900 Spanish use of that field, rather than a later use. Beyond this, no more accurate date can be assigned to these features based on the chipped stone assemblage.

Research Question 4

Research Question 4 asks how the location of the Santa Fe Railyard project sites in the economic core might have affected the use of substitutes for imported manufactured goods (Wenker et al. 2005:115–117). This substitution mainly pertains to the Spanish Colonial period, when manufactured goods could only be obtained from Mexico, and direct commerce between Spanish colonies and other nations was actively discouraged. This led to high prices and a shortage of manufactured durable goods, especially in the periphery surrounding the economic core around Santa Fe, though the core was affected as well. One of the results of this shortage was that metal tools were in short supply and those that were available were expensive. Because of this, chipped stone tools were often used as substitutes for their metal cognates, especially in poor rural areas where there was little or no hard cash, and even goods for bartering were in short supply. This situation continued into the Santa Fe Trail period. Despite the relaxation of Spanish restrictive trade regulations when Mexico gained its independence, New Mexico remained a comparatively poor region and most inhabitants still could not afford to purchase the metal tools that had become more affordable and available.

While not common, there are some documentary references to this phenomenon in the late Santa Fe Trail period. Rebolledo and Márquez (2000) document many examples of the substitution of chipped stone for metal tools in the nineteenth-century Placitas area. Mention is made of "obsidian arrows," presumably meaning obsidian tipped, and sharp stones that were used to cut and scrape hides, in carpentry, and in leather rope-making (Rebolledo and Márquez 2000:268, 329, 353, 385, 434). Economic hardship is often cited in these stories as the reason for using stone rather than metal tools. Indeed, the shortage of affordable metal tools and the use of less efficient substitutes continued into and past the mid-1800s, and only appears to have begun to end well after the beginning of the American Territorial period. Many of the stories related by Rebolledo and Marquez (2000) took place in the 1860s and 1870s, showing that chipped stone continued to be used by poorer Spaniards even after the end of the Civil War.

The process of replacing the substitutes with metal tools appears to have been more rapid among affluent New Mexicans, but even the wealthy were forced to use substitutes for many metal tools until after the American annexation of the territory. This is illustrated by the types of agricultural tools that were in use at mid-century. Wooden plows were commonly used for cultivation in New Mexico, and only appear to have begun to be replaced with metal plows in the late 1840s. Garrard (1938:246) notes that wooden plows were still used for cultivation in 1846–1847, with Bent, St. Vrain, and Co. importing some American-made metal plows into New Mexico in 1846. Wislizenus (1848:23) also noted in 1846 that crop cultivation in New Mexico was accomplished using hoes or wooden plows. By 1853–1855, Davis (1857) noted that metal plows and plowshares were starting to come into more general use, especially among the wealthier landowners. However, poorer farmers continued to cultivate with hoes, which until a few years before Davis arrived in New Mexico were made entirely of wood, just as the plows had been (Davis 1857:201–202, 212).

Were chipped stone tools used as substitutes for metal tools as commonly in the core as they were in the periphery, or are there visible differences between these areas? Unfortunately, there simply are not enough data from the Santa Fe Railyard sites to allow a detailed examination of this question, though a more cursory discussion is possible. Analysis of Early Spanish Colonial–period chipped stone artifacts recovered during excavations at LA 54000, the La Fonda Parking Lot Site in downtown Santa Fe, indicates that chipped stone tools were indeed used as substitutes for metal tools during that early period of occupation. This collection of 133 artifacts includes 6 pieces of utilized debitage, 3 bifaces, a chopper, and 2 projectile points in addition to 20 strike-a-light flints (Moore 2004). Though one of the projectile points is a reused Archaic point, the other appears to be of Spanish manufacture. The small array of other formal and informal chipped stone tools, the strike-a-light flints excepted, suggest that there was some substitution of chipped stone for metal tools even in the capitol in the Early Spanish Colonial period, similar to that documented for the nineteenth-century Placitas area.

The fairly common occurrence of chipped stone artifacts in the Late Spanish Colonial–period midden at LA 146402 suggests continued use of chipped stone as a substitute for metal throughout the period of Spanish rule, though few tools were identified in that assemblage. This trend continued into the Santa Fe Trail period among fairly affluent Spaniards in the Santa Fe area, as demonstrated by the results of excavation at LA 160 and LA 4968 north of Santa Fe near Pojoaque Pueblo. This area can be considered part of the economic core in the nineteenth century, when both of these sites were owned by a fairly affluent family. Despite having better access to imported goods because of proximity to the core, and even though site occupants were comparatively well-off in comparison with the contemporary Placitas area, chipped stone tools were still common at these site (Moore n.d.a.). In addition to the expected tools used in fire-making activities, chipped stone projectile points were made and used by site residents, and a few informal tools were used to work wood and leather. Thus, even when imported manufactured goods became more common and affordable, chipped stone substitutes for metal tools continued to be commonly used well into the American period, even in the economic core.

Research Question 5

This question asks whether the location of the Santa Fe Railyard sites in the economic core affected the availability of imported manufactured goods (Wenker et al. 2005:117–118). If location affected the use of chipped stone as substitutes for metal tools, we would expect to find evidence that chipped stone tools other than gunflints and strike-a-light flints became much more common at sites on the periphery than at sites in the core as transportation and supply systems improved during the Santa Fe Trail and Railroad periods. Information from several sites dating between the Early Spanish Colonial and Railroad periods located in both the core and the periphery is available for comparison with the railyard data. The sites used in this analysis include LA 54000 in Santa Fe, LA 59658 near Abiquiu, LA 65005 near San Ildefonso Pueblo, LA 67321 at Valencia, LA 160 and LA 4968 near Pojoaque, and LA 99029 near Pecos.

Table 7.42 shows percentages for certain assemblage characteristics from these sites, which were selected for comparison because they contained no evidence of mixing with earlier deposits and they yielded enough artifacts that the percentages derived for them would not be severely affected by error related to small sample size. Quite a range can be seen in percentages of both the formal and informal tool categories in Table 7.42, suggesting that neither may be useful in measuring changes in stone tool use related to improvements in transportation systems despite the fact that both focus on different classes of tools. There are several potential reasons for this. Formal tools are prone to being lost or discarded in locations distant from where they were manufactured, which reduces the number available at residential sites. This problem is also encountered in prehistoric assemblages, and is especially prevalent for projectile points and, additionally in historic assemblages, gunflints. This means that these types of formal tools are usually under-represented in residential assemblages when the numbers that were potentially made and used there are considered. While informal tools are usually made, used, and discarded in the same location, they are almost always under-represented in residential assemblages because they can be very difficult to recognize during analysis. Experiments have demonstrated that most informally used edges display no consistent evidence of use, especially when soft materials were worked (Schutt 1980; Vaughan 1985). This means that most informal tools go unrecognized when using standard analysis techniques like those used here that rely on comparatively low-powered magnification. Variation in percentages of informal tools is more related to the hardness of the materials they are made from, the uses to which they were put, and the ability of analysts to recognize the subtle signs of cultural edge damage. Even in the assemblages that contain no informal tools in Table 7.42, many pieces of debitage were undoubtedly used to cut or scrape materials during processing but could not be distinguished from unused debitage during analysis. This means that only the most extreme examples of informal use are generally identified, and that informal tool use cannot be accurately quantified using the techniques that tend to be standard in chipped stone analysis. Thus, while tool percentages would logically seem to be the best indicator of the amount of stone tool use, this may not actually be the case.

The most interesting and perhaps best indicators of changing patterns of stone tool use may be the percentages of strike-a-light flints and cherts in assemblages. Spanish Colonial–period assemblages all contain less than 20 percent strike-a-light flints, while those from the Santa Fe Trail and Railroad periods all contain 22 percent or more. These proportions can be used as a proxy measure of the amount of chipped stone tool use occurring in assemblages that was unrelated to fire-making. A second proxy measure is the percentage of cherts in assemblages. Since cherts are the best materials for use in fire-making tasks, the higher the percentage of cherts, the greater the dominance of fire-making in chipped stone-related tasks. As more chipped stone-using activities other than fire-making occurred, percentages of both strike-a-light flints and cherts should decrease. This is because more debitage would need to be struck from cores of a larger variety of materials when chipped stone was being commonly used as informal processing tools as well as in fire-making tasks. This would dilute percentages of both strike-a-light flints and cherts. When fire-making was the dominant or only task in which debitage were used, less reduction of a smaller variety of materials would be necessary to supply household needs, boosting percentages of both strike-a-light flints and cherts.

Beginning our examination of percentages in Table 7.42 with the Early Spanish Colonial period, just over 14 percent of the chipped stone artifacts from LA 54000 were strike-a-light flints, while cherts comprised 82.71 percent of the assemblage. An average of about 13 percent of the Late Spanish Colonial period assemblages were comprised of strike-a-light flints, a proportion that is close enough to that of the Early Spanish Colonial period site that we can assume little change is indicated. Cherts made up an average of 77.66 percent of these assemblages, a slight decline over the Early Spanish Colonial period percentage. However, since only one Early Spanish Colonial assemblage is represented, this difference may be fairly meaningless and caused by sample error. The single Late Colonial assemblage from the Santa Fe core has the smallest percentage of strike-a-light flints and highest percentage of cherts, which are rather contradictory indicators. The low percentage of strike-a-light flints could indicate a higher proportion of chipped stone tool use for purposes other than to make fire. On the other hand, the higher percentage of cherts suggests that fire-making activities were more important than other tasks. Sample error may be the cause of this discrepancy, since the LA 146402 assemblage is the smallest, by far, of those shown in Table 7.42. In all cases, the means for each period are probably better indicators of the level of reliance on chipped stone tools than are the percentages for individual sites, since the use of means tends to smooth intrasite variation.

The three Santa Fe Trail period assemblages contain an average of 26.51 percent strike-a-light flints, double the percentages derived for both Spanish Colonial periods. They also contain an average of 83.26 percent cherts, a significant increase over the Late Spanish Colonial percentage. Further increases are apparent in the Railroad period, where the single assemblage in our sample contained over 37 percent strike-a-light flints and 94.18 percent cherts. While our sample size is small, the trends seem clear. The amount of substitution of chipped stone for metal tools appears to have been fairly constant during the Spanish Colonial periods, and may have been unaffected by location in the core versus on the periphery. An improved supply of imported manufactured goods during the Santa Fe Trail period appears to have reduced the use of stone substitutes for metal tools in both the core and periphery. Unfortunately, the few data we have are insufficient for comparing trends in the core to those on the periphery. Even on the periphery, the increased improvement in supply that is represented by the railroad resulted in a further reduction in the use of chipped stone tools in activities other than fire-making, as demonstrated by percentages of strike-a-light flints and cherts for LA 59658 in Table 7.42.

These trends continued into the twentieth century, with the use of chipped stone tools in any activities, including fire-making, continuing to decrease until it finally disappeared. Our discussion suggests that the use of chipped stone tools as substitutes for metal tools was directly influenced by the supply of manufactured goods. As improvements in transportation systems led to increased supplies of metal tools, chipped stone tool use steadily decreased, though it was long in disappearing, persevering until well after the railroad arrived in New Mexico. The possibility exists that Spanish stone tool use continued until much later than might have been expected because it had become part of the cultural repertoire, especially in fire-making. As such, chipped stone tools remained part of the tool kit long after they were no longer needed.

Conclusions

This chapter has provided a short discussion of the small assemblage of chipped stone artifacts recovered from eight sites examined by the Santa Fe Railyard project, and has addressed aspects of the questions generated in the research design for this study (Wenker et al. 2005). Analysis focused on three general questions: (1) what was the range of materials used in reduction and where did they come from; (2) what type of strategy was used in reduction; and (3) what types of tools were used by site occupants. Examination of material selection parameters indicated that mostly local materials were used at these sites, augmented by a few types of nonlocal rocks that are available in gravel beds along the Rio Grande. Since only waterworn cortex was found in this assemblage, all materials appear to have all been obtained from gravel deposits rather than outcrops. While potentially exotic materials were identified in some assemblages (Pedernal chert and obsidians), these materials were available relatively close by in gravel beds along the Rio Grande. Since the only cortical examples of these materials exhibited waterworn cortex, they were obtained from those secondary gravel deposits rather than from outcrops. Reduction was dominated by a core-flake strategy, and very little evidence for tool manufacture was found. All three of the formal tools in this assemblage appear to represent redeposited prehistoric specimens; this is definite in two cases and highly likely in the third. The informal tool assemblage was dominated by strike-a-light flints (and flakes). A single informally used obsidian flake was recovered from secondary deposits in an acequia, but cannot be assigned any firm temporal or cultural affinity. Fire-making activities dominated in the small assemblage of tools that appear to be directly related to historic period use of these sites, though the use of unaltered debitage as cutting or scraping tools cannot be ruled out.

Chipped stone analysis allowed us to partly examine three of the questions posed in the research design, though not in any great detail. This was because of the small size of the chipped stone assemblages and the fact that many of these artifacts were mechanically transported away form where they were originally discarded, and were redeposited an indeterminate distance downstream from those original locations. The first research question that was addressed concerned whether or not the acequia segments and field system could be dated. While it was not possible to provide precise dates for any features using the chipped stone assemblages, a few relative dates were proposed. In particular, the presence of a strike-a-light flint in field deposits at LA 120957 suggests in situ disposal of an artifact that could only have been created during the historic period, and indicates that this field was probably in use before 1900. The statistical similarity in material type distributions between the artifacts recovered from acequia fill, especially at LA 120957, and those from the Late Spanish Colonial midden at LA 146402 suggests that most of the chipped stone artifacts recovered from strata in acequias were probably washed in from adjacent historic period deposits. With this in mind, we can suggest the obvious—that the acequias were used historically, a fact that is well known from available documents. Unfortunately, no more precise dates for construction and use are available from this class of artifact.

The second of the research questions that was addressed asked how the location of the Santa Fe Railyard Project sites in the economic core might have affected the use of substitutes for imported manufactured goods. This question is closely linked to the last question we were able to address, which asked whether the location of the Santa Fe Railyard sites in the economic core affected the availability of imported manufactured goods. If imported manufactured goods were more easily and cheaply obtained in the core, we would expect to see less use of substitutes for metal tools occurring in that area in comparison with the periphery, where presumably it was more difficult and expensive to obtain metal tools. Indeed, if metal tools were comparatively abundant in the core, substitutes might not have been used at all. This would appear as a tight focus on tools associated with fire-making in the chipped stone assemblage, with little or no evidence for their use in other tasks for which metal tools were more efficient. Chipped stone artifacts would still occur, since there were no effective substitutes for chert strike-a-light flints and gunflints until well into the nineteenth century. Thus, in this case we would expect to find an assemblage that was heavily dominated by cherts, with few if any informal or formal tools other than strike-a-light flints and gunflints occurring.

Unfortunately, the amount of data available for addressing these questions is not yet sufficient to allow us to provide a comprehensive answer to them. However, we were able to begin examining these questions in light of data collected from a variety of Spanish sites in northern and central New Mexico. From this examination we tentatively concluded that the amount of substitution of chipped stone for metal tools appears to have been fairly constant during the Spanish Colonial periods, and may have been unaffected by location in the core versus the periphery. An improved supply of imported manufactured goods during the Santa Fe Trail period reduced the use of stone substitutes for metal tools in both the core and periphery. Still, chipped stone substitutes for metal tools continued to be used throughout the Santa Fe Trail period. This was especially true of places like the Placitas area, where people were poor and unable to purchase the metal tools they needed. Whether this was true of the economic core as well remains uncertain, but the presence of such substitutes at two sites near Pojoaque, which were occupied by a comparatively well-off family, suggests that it was. These trends continued into the twentieth century, with the use of chipped stone tools continuing to decrease until it finally disappeared, even in fire-making. Thus, chipped stone tools were used by the Spanish as substitutes for metal tools well into the American period, both in the periphery and the core. At least limited use of chipped stone tools continued into the early twentieth century, though whether this was occasioned by continued need or because some uses—like fire-making—had worked their way into the cultural repertoire and continued to occur even when no longer needed remains uncertain. Whether there were significant differences between core and periphery in the use of substitutes for metal tools after the Spanish Colonial periods remains uncertain, but the small assemblage from LA 146402 adds to the growing data base that can eventually be used to resolve this question.

While this study was unable to conclusively answer any of the questions posed in the research design for this project (Wenker et al. 2005), certain trends were identified that are closely related to the changing economic landscape in New Mexico through time. When used in combination with other artifact categories, a clearer and more accurate picture of how changes in transportation and supply systems affected the use of substitutes for imported manufactured goods in both the economic core and on the frontier can be obtained.

Chipped Stone Analytic Methods

Introduction

Chipped stone artifacts were analyzed using a standardized format developed by the Office of Archaeological Studies (OAS 1994a) that includes both typological and attribute-based approaches. In typological approaches, "individual artifacts are classified into types that have some kind of technological or functional meaning" (Andrefsky 2001:6). A benefit of this type of analysis is that behavior can be immediately inferred from the identification of a single artifact (Andrefsky 2001:6). For instance, the presence of a single notching flake indicates that a notched tool was made at a certain location, even if no notched tools were found. However, this method can be criticized because there is often a lack of verification between artifact type and functional or technological interpretation (Andrefsky 2001:7). Attribute analysis examines the distribution of one or more characteristics through an entire population, usually of debitage (Andrefsky 2001:7). Among other things, various attributes can be used to assess the prevalence of specific reduction methods in a debitage population. However, problems can also crop up when using this analytic strategy, "for a variety of reasons related to the small size of attributes and the number of observations" (Andrefsky 2001:12). Typological and attribute analyses vary in scale; typological analysis is applied to individual artifacts, while attribute analysis is applied to entire assemblages (Andrefsky 2001:12). Andrefsky (2001) notes that there is no one "right" approach to debitage analysis, and that the approach used can vary according to the types of information desired. The analysis methods employed by the OAS assign typological interpretations to individual artifacts, while at the same time gathering attribute data that can be used to test and augment the typological data. For instance, a rigorous set of characteristics is used to define flakes struck from bifaces versus those struck from cores. Flakes that do not fulfill the set of characteristics used to define biface flakes are, by default, considered core flakes. However, the definition used to assign debitage to the biface flake category models ideal examples, and all flakes struck from bifaces (especially those removed in the early stages of manufacture) do not always fit that ideal. By combining attribute analysis with a typological approach, we are able to determine which flakes were definitely struck from bifaces (typological approach), as well as those that were probably struck from bifaces but do not fit the model (attribute analysis). In essence, the two approaches are complementary and help provide a better understanding of reduction technology and tool use.

Since these methods are routinely applied to chipped stone artifacts studied by the OAS, their use provides comparability for assemblages from sites of varying date and cultural affiliation excavated across New Mexico. A series of mandatory attributes is included in this format that is used in all analyses. The mandatory attributes describe materials, artifact type and condition, cortex, striking platforms on flakes, and dimensions. Optional attributes are also available that are useful for examining specific questions, and several were used in this analysis in addition to the mandated attributes. The main questions the OAS analytic scheme was designed to explore include what types of materials were selected for reduction, where those materials were obtained, what techniques were used for chipped stone reduction, and what types of chipped stone tools occur in an assemblage. These topics can provide information about ties to other regions, mobility patterns, and site function. Material selection studies will not always reveal *how* materials were obtained, but they can usually provide information on *where* materials came from. The type of cortex present on artifacts can be used to determine whether materials were obtained at outcrops or came from secondary gravel deposits. Studies of reduction technologies can help show how different people solved the problem of producing the types of chipped stone tools they needed from resources at hand. Various approaches could have been used, depending upon the level of residential mobility, the types of stone available, and the range of other materials that could be used to make tools. Examination of the types of chipped stone tools recovered from a site can help define the range of activities that occurred there, and in many cases this will also aid in defining site function. Chipped stone tools can sometimes be used to provide temporal data, but are usually less time sensitive than other artifact classes, like pottery and charcoal. Each chipped stone artifact was examined using a binocular microscope to define morphology and material type, examine flake platforms, and determine whether they were used as tools. The level of magnification used varied between 10x and 80x, with higher magnification used to identify wear patterns and platform modifications. Utilized and modified edge angles were measured with a goniometer; other dimensions were measured with a sliding caliper, and artifacts were weighed on a digital or balance beam scale. Four general classes of chipped stone artifacts were recognized: flakes, angular debris, cores, and tools. Flakes are debitage that exhibit definable dorsal and ventral surfaces, bulbs of percussion, and/or striking platforms. Angular debris are debitage that lack all of these characteristics. Cores are nodules from which debitage were struck and on which negative flake scars originating from one or more platforms are visible. Tools are debitage or cores whose edges were damaged during use or that were modified to create specific shapes or edge angles for use in certain tasks.

Analytic Attributes

Attributes recorded for all artifacts included material type and texture/quality, artifact morphology and function, amount of surface covered by cortex, portion, evidence of thermal alteration, edge damage, and dimensions. Platform and dorsal surface information were recorded for flakes only, as was termination type. Two attributes were used to record information on materials used in chipped stone reduction. Material type was coded by gross category unless specific sources or distinct varieties were recognized. Codes were arranged so that major material groups fell into sequences of numbers, progressing from general groups to specific varieties. Material texture and quality provided information on the basic flaking characteristics of materials. Texture subjectively measured grain size within rather than across material types and was scaled from glassy to coarse, with glassy textures exhibiting the smallest grains and coarse the largest. Quality recorded the presence of flaws that could affect flaking including crystalline inclusions, fossils, visible cracks, and voids. Inclusions that did not affect flaking, such as specks of different colored material or dendrites, were not considered flaws. Material texture and quality were recorded together in a single code. Two attributes were used to provide information about artifact form and use. The first was artifact morphology, which classified specimens by general form as well as more specific attributes, placing them in categories like flake or early stage biface. The second was artifact function, which placed artifacts into typological categories by inferred use, such as utilized debitage or scraper. These attributes were coded separately. Cortex is the chemically or mechanically weathered outer rind on nodules; it is often brittle and chalky, and does not flake with the ease or predictability of unweathered material. The amount of cortical coverage was estimated and recorded in 10 percent increments for each artifact. The percentage of dorsal surface covered by cortex was estimated on flakes, while for all other artifact classes the percentage of the total surface area covered by cortex was estimated, since artifacts other than flakes lack definable dorsal and ventral surfaces. Cortex type can be a clue to the origin of an artifact. Waterworn cortex indicates that a nodule was mechanically transported by water and that its source was a gravel bed. Nonwaterworn cortex suggests that a material was not mechanically transported away from its source and that it was obtained where it outcrops naturally. Cortex type was identified for artifacts on which it occurred; when identification was not possible it was coded as indeterminate. Dorsal cortex coverage and cortex type were recorded separately. Two attributes were examined for flake platforms, when present. Platform type recorded the shape of and any modifications to the striking platform on whole flakes and proximal fragments. Platform lipping recorded the presence or absence of a lip at the ventral edge of a platform. This attribute provides information on reduction technology, and can often be used to help determine whether a flake was removed from a biface or core. Platform lipping was coded as either present or absent. All artifacts were classified as whole or fragmentary; when broken, the portion was recorded if it could be identified.

Artifact portions can provide important functional information for sites. For example, the occurrence of mostly whole formal tools has a completely different meaning than if the tools were predominantly broken and worn out. Proportions of flake sections can also provide data on post-reduction impacts to an assemblage. If most flakes are broken, the assemblage may have been exposed on the surface for a long period of time and damaged by traffic across the site. In this case, any wear patterns observed on debitage edges could have been caused by non-cultural impacts rather than cultural use. Thus, an examination of the condition and distribution of artifact portions can provide critical interpretive information. Thermal alteration was recorded for all artifacts on which it occurred, nearly all of which were chert. Cherts can be modified by heating at high temperatures to improve their flaking characteristics. This process realigns the crystalline structure of chert and can sometimes heal minor flaws like microcracks. Heat treatment can be difficult to detect unless mistakes were made during processing, or there is an obvious visible difference between untreated and treated specimens from the same source. When present, the type and location of evidence for thermal alteration were recorded to determine whether an artifact was purposely or incidentally altered. Use of debitage or cores as informal tools can cause damage, producing patterns of scars that may be indicative of the use to which they were put. Two attributes were used to record edge damage caused by cultural use. The first described the type of wear pattern observed. A series of codes was used to describe the different types of edge damage caused by use of debitage or cores as informal tools. A separate series of codes was used to record formal tool edges. The utilized edge angles of all formal and informal tools were measured and recorded separately; edges lacking cultural damage were not measured. Maximum length, width, and thickness were measured in millimeters for all chipped stone artifacts. On angular debris and cores, length was the largest measurement, width was the longest dimension perpendicular to the length, and thickness was perpendicular to the width and was the smallest measurement. On flakes and formal tools, length was the distance between the platform (proximal end) and termination (distal end), width was the distance between edges paralleling the length, and thickness was the distance between dorsal and ventral surfaces. Weights were measured in grams, and were obtained for all chipped stone artifacts.

Flake Categories. Several types of flakes can occur in an assemblage, and one analytic goal was to distinguish between flakes removed from cores and bifaces. Flakes were initially divided into these categories using a polythetic set of variables (Fig. 7.34b). A polythetic framework is one in which fulfilling a majority of conditions is both necessary and sufficient for inclusion in a class (Beckner 1959). The polythetic set contains an array of conditions that model an ideal biface flake, and includes data on platform morphology, flake shape, and earlier removals from the parent artifact. In order to be considered a biface flake, an artifact needed to fulfill at least 70 percent of these conditions in any combination. Those that did not match that percentage of conditions were classified as core flakes by default. This percentage was considered high enough to isolate flakes produced during the later stages of biface production from those removed from cores, while at the same time it was low enough to permit flakes that did not fulfill the entire set of conditions to be properly classified. While not all flakes removed from bifaces were identified in this way, those that were can be considered definite evidence of biface reduction. Instead of rigid definitions, the polythetic set provided a flexible means of categorizing flakes and helped account for some of the variation in flake form and attributes observed during flintknapping experiments. Other flake types were identified by certain distinguishing characteristics. Two subvarieties of biface flakes were categorized separately. Notching flakes were produced when the hafting elements of bifaces were notched. This type of flake generally exhibits a recessed, U-shaped platform and a deep, semi-circular scallop at the junction of the platform and dorsal flake surface. Resharpening flakes were removed from formal tool edges that became dull from use, and usually fit the polythetic set for biface flakes. This category is often impossible to separate from other types of biface flakes, but can sometimes be identified by an extraordinary amount of damage on the platform and dorsal surface adjacent to the platform. Another type of flake that can be defined by the type and amount of damage to its platform are strike-a-light flakes. These pieces of debitage were inadvertently removed from the edges of strike-a-light flints dur-

Whole flakes

1. Platform:
   a. has more than one facet.
   b. is modified (retouched and/or abraded).
2. Platform is lipped.
3. Platform angle is less than 45 degrees.
4. Dorsal scar orientation is:
   a. parallel
   b. multidirectional
   c. opposing
5. Dorsal topography is regular.
6. Edge outline is even.
7. Flake is less than 5 mm thick.
8. Flake has a relatively even thickness from proximal to distal end.
9. Bulb of percussion is diffuse.
10. There is a pronounced ventral curvature.

Broken flakes or flakes with collapsed platforms

1. Dorsal scars orientation is:
   a. parallel
   b. multidirectional
   c. opposing
2. Dorsal topography is regular.
3. Edge outline is even.
4. Flake is less than 5 mm thick.
5. Flake has a relatively even thickness from proximal to distal end.
6. Bulb of percussion is diffuse.
7. There is a pronounced ventral curvature.

Figure 7.34b. Polythetic set for defining biface flakes.

ing use, and tend to exhibit extreme amounts of battering damage along the back edge of the platform and often have small blobs of rusted steel adhering to that edge or the adjacent surface.

Core and Tool Categories. Cores are nodules of raw material that were modified by having debitage removed from them. Some cores were efficiently reduced in a standardized fashion, while flakes were removed from others in a more haphazard manner. Core shape and size are often clues to the relative availability of materials. Materials represented by small, carefully reduced cores may have been uncommon or highly desired. Materials represented by large cores, often with haphazard or badly planned flake removals, tend to be common and not highly valued. Cores were classified by the direction of removals, and in rare circumstances by shape. Unidirectional cores had a single platform from which flakes were removed in one direction or along one continuous surface. Blade cores are unidirectional cores that are pyramidal in shape, with specially prepared platforms that allow the consistent removal of long, narrow flakes (blades). This category tends to only occur in Clovis-era Paleoindian assemblages in the Southwest. Pyramidal cores are another subdivision of the unidirectional category, and resemble blade cores in shape but lack the specially prepared platforms of that type. Pyramidal cores represent an attempt to maximize the number of flakes removed by systematically reducing a core from one platform. Bidirectional cores have two opposing platforms or a single platform from which flakes were removed from two opposing surfaces. Multidirectional cores exhibit multiple platforms, with flakes being struck from any suitable edge.

Bipolar cores tend to be rare, and result from the smashing of small nodules or exhausted cores between a hammerstone and an anvil. This is usually done when materials were rare or highly prized, or nodules of high quality materials were small and difficult to flake in other ways. Tools were separated into formal and informal categories. Formal tools are debitage or cores that were intentionally altered to produce specific shapes or edge angles. Alterations take the form of unifacial or bifacial retouch, and artifacts were considered intentionally shaped when retouch scars obscured their original shape or significantly altered the angle of at least one edge. Informal tools are debitage that were used in various tasks without being purposely altered to produce specific shapes or edge angles. This class of tool was defined by the presence of marginal attrition caused by use. Evidence of informal use was further divided into wear and retouch categories. Scars that were 2 mm or more in length were classified as retouch, while those that were less than 2 mm long were categorized as wear. While informal tools can also provide direct evidence of the reduction process, formal tools tend to provide indirect evidence unless they were discarded before being finished. Formal tools were divided into cobble tools, unifaces, and bifaces. Cobble tools were usually massive, and were shaped by unifacial or bifacial flaking along one or more edges while retaining enough unflaked surface that their original form was recognizable. Unifaces were pieces of debitage that had one or more edges intentionally modified by flaking across a single surface. Bifaces were pieces of debitage that were intentionally flaked across two opposing surfaces. In all three of these tool categories, flaking was used to alter edge shape or angle into a needed or desired form. Both cores and formal tools are nuclei from which flakes were removed, but differ in the reason for those removals. Flakes were struck from cores for use as informal tools or to be modified into formal tools. Flakes were removed from formal tools to create desired shapes or edge angles. Thus, cores were classified with debitage as byproducts of the reduction process. Formal tools were considered separately because they are evidence for the performance of unrelated tasks in their finished form. Since all chipped stone artifacts result from similar reductive processes, this division is in many ways artificial, and some formal tools can also be used to provide evidence of reduction strategy.

Ground Stone Analysis: Santa Fe Railyard

Karen Wening

Introduction

The ground stone assemblage consists of two slab metates, both of which were recovered from LA 146402 (PD 1182.7 and 1189.3). Both metates were recovered from a large area of midden deposits in stratum 120.2 of NSTR 101.

Methods

The ground stone analysis consists of the standardized methodology (OAS 1994b), with some additional attributes. All artifacts will be analyzed for material type, texture and induration, function, portion, preform morphology, production input, plan view outline, transverse and longitudinal cross section shapes, shaping methods, number of uses, number of wear surfaces, evidence of heating, presence of residues, artifact dimensions and weight. Utilized surfaces are analyzed for wear patterns, degree of use, rejuvenation and contour. Wear patterns are examined macroscopically and microscopically with 40X power. Finally, the stroke used to manipulate the mano will be determined based on these wear surface attributes.

Ground Stone Assemblage

Concave Slab Metate (PD 1182.7)

The most complete metate is manufactured from dense, well-indurated granite composed mainly of feldspar and quartz minerals. The material outcrops in the Sangre de Cristo Mountains east of the project area, occurring as large angular rocks in the mountains and foothills, and as cobbles in the Santa Fe River gravels. No water worn cortex is present, indicating that the raw material does not originate from an alluvial context, or that the cortex was removed during shaping. While the material is large grained, it is not highly abrasive. The hardness, density, and induration of the granite create a surface similar to quartzite. This material requires considerable effort to shape, but the resulting tool is more durable and produces less granular material in the food or other substance being processed.

This concave slab metate is shaped over most of the surface (Fig. 7.34c). PD 1182.7: Concave slab metate, LA 146402 (including both XS views)). However, there is considerable difference in the methods used and the time invested in shaping each portion of the tool. The sides of the metate are the most crudely shaped. Large flakes are removed around the entire perimeter, and the resulting flake ridges are moderately ground to remove sharp edges. This minimal shaping contrasts with the regularity of the use surface. It is evenly rectangular in plan, and evenly biaxially concave in contour. This suggests that the use surface was shaped prior to grinding. This cannot be definitively stated, as grinding obliterates shaping on the use surface. However, the extreme hardness of the material would seem to require some modification to the use surface prior to grinding. This is certainly true of the base of the metate, 3/4 of which is rather heavily ground to a biconvex contour (Fig. 7.34c). Only the extreme proximal portion of the base is unshaped.

The use surface is heavily ground to a depth of 8 mm, with the grains sheared flat with the matrix over most of the use surface. The surface is pitted in some areas, but this appears to represent natural granular interstices rather than rejuvenation. Considering the hardness and density of the material, this smooth surface is particularly demonstrative of the heavy use the tool has received. The use surface extends over the full length and width of the metate, though the proximal end is more lightly ground. Use-wear striations and surface contour indicate use of a rocking, reciprocal stroke. This indicates that the stroke was often terminated before the mano had reached the proximal end of the tool.

Only one proximal corner is missing, so the complete dimensions can be determined (37.7 x 20.8 x 8.1 cm, 14,500 grams). No surface adhesions were observed. Charcoal flecks adhere to the bottom of the metate, but the tool does not appear to have been exposed to heat. These charcoal flecks probably adhered to the metate after it was discarded

Figure 7.34c. LA 146402, NSTR 101 (midden), concave slab metate, PD# 1182.7.

in the refuse area, as the fill of Stratum 120.2 from which the metate was recovered, is charcoal flecked. Stratum 120.2 was the basal deposit of the midden in NSTR 101.

Concave Slab Metate (PD 1189.3)

This metate (Fig. 7.34d) is the more fragmentary of the two. It appears to be a large corner fragment of a subrectangular concave slab metate. It is manufactured from a large angular slab of fine-grained, indurated yellow-brown sandstone. Because the tool is shaped over the entire surface, no cortex remains to determine the status of a riverine or outcrop source. Sandstone outcrops in the pre-Cambrian Magdalena formation of the Sangre de Cristo Mountains, occurring as large rounded boulders up to 4 feet in diameter (Cabot 1953:91).

The sandstone metate differs from the granite specimen in the more abrasive quality of the material, and the extensive shaping modification. The user of this tool clearly desired a more abrasive use surface than that of the granite metate. This is evidenced by the sandstone raw material and the rejuvenated surface. Though the sandstone is well-indurated, it produces more granular material during use, which would become mixed with the processed substance.

The entire tool is shaped. The sides are flaked, pecked and ground to form a smooth, slightly convex surface. The base is more crudely shaped by the removal of large flakes. Projecting areas are moderately ground to create an irregular biconvex surface. The grinding surface attributes indicate that the tool has not received a high degree of use. The surface displays a shallow, biaxially concave contour, which is worn to a depth of only 3 mm. It is rejuvenated, with remaining high spots sheared flat, suggesting that the surface had become quite smooth prior to rejuvenation. Parallel striations indicate that a slightly rocking, reciprocal stroke was employed during use. Grinding wear extends to both edges of the tool, suggesting that the entire surface was used. However, because the tool is fragmentary, this cannot be decisively stated. No adhesions were observed on the use surface. The metate has not been exposed to heat. Only the thickness is complete (35.7 x 24.0 x 9.4 cm, 12,000 grams).

Figure 7.34d. LA 146402, NSTR 101 (midden), concave slab metate, PD# 1189.3

Discussion and Conclusions

Both metates from LA 146402 originate from stratum 120.2, which forms the basal deposit over most of the midden area at the site. This charcoal flecked stratum yielded abundant and variable cultural material. While both tools originate from the same stratum, they occur within different levels, and therefore may have contrasting cultural affiliations. The sandstone metate is from a fairly secure context, occurring in the lower levels of stratum 120.2 (PD 1189.3, XU 113, level 10). Based on the ceramic assemblage, the lower levels of stratum 120 are thought to date between 1700 and 1780, associated with Spanish Colonial or early Mexican period occupations.

The granite metate derives from a less secure context in a low area near the center of the midden which was subjected to recurring alluvial disturbance (PD 1183.7 XU 110, level 6). As a result, considerable mixing of strata may have occurred, denoting a less secure context for this tool. Estimated dates for this substrata range between 1700 and 1800, affiliated with the Spanish Colonial period in New Mexico.

Several researchers describe the interaction between the Pueblos and colonists, noting their influence on food preparation techniques, tools and domestic items such as ceramic vessels (Trigg 2003, 2004; Ivey 1994, Deagan 1996). Trigg (2003:67) notes that while colonists preferred Old World crops such as wheat, peas, lentils, watermelon, muskmelon, peaches and apricots, they were often forced to subsist on traditional Native American foods during periods of famine and low crop yields and so also consumed foods such as maize and goosefoot seeds. As many Old World crops did not thrive in the arid Southwest environs, Native American staples such as corn, beans, and squash were consumed (Trigg 2004:245). Archaeobotanical remains from the Sanchez site in Santa Fe provided evidence that colonists were consuming maize that may have been grown by the Pueblos. Excavations at La Fonda and the Sanchez site yielded goosefoot, purslane, groundcherry seeds, and piñon nuts, all traditional Native American foods (Trigg 2004:231). The Pueblos may also have depended on colonists during famine years when priests distributed wheat from their stockpiles.

Wheat, introduced in the early seventeenth century by Oñate, was probably processed using manos and metates during the first century of settlement (Gritzner 1974:519). These tools gave way to water-powered gristmills, the earliest of which is documented in Santa Fe in 1756. By 1776, Santa Fe boasted three gristmills. While the mills did not produce large quantities of flour, they "at least lighten the labor of grinding by hand" (Dominguez 1956:40 cited by Gritzer 1974:519). Some accounts state that 50 pounds of flour could be ground in an hour. However, milling was seasonal, dictated by water flow, rendered impossible in subfreezing temperatures. During these times, hand grinding replaced milling. Colonists paid for milling services in pesos or flour.

Trigg (2003, 2004) documents the numerous ways in which goods and services were exchanged between Pueblo and Spanish groups of New Mexico. The exchange of corn and wheat by trade, theft, compensation for services and other means must have involved the processing of both grains. However, the specific method of flour production is not described. Spanish colonists in seventeenth century Santa Fe were not only consuming Old World crops such as wheat, but also Native American foods such as maize and goosefoot seeds (Trigg 2003:67). Corn and wheat were also staples of the Pueblo diet, with wheat becoming rapidly incorporated following Spanish introduction (Lopinot 1988 cited by Trigg 2003:70). Maize and corn were among the "standard goods used for exchange" (Trigg 2003:77).

Colonial economy relied heavily on trade and the extraction of goods and services from the Pueblos, as well as maize-based agriculture (Kessell 1997:51). While tribute payment in the form of the *encomienda* system was abolished in 1693, colonists continued to demand labor and goods from Puebloans through *repartimiento*, a rotational labor draft (Gutierrez 1991:155). This brought Pueblo women into town to grind flour and spin wood, often with dire circumstances. Abuses such as these were chronicled by Fray Pedro Serrano in his reports from New Mexico. For example, in his 1761 discussion of the barter of native crops and the use of Spanish mills in Colonial New Mexico, Fray Pedro Serrano reported that "when Indian women enter Santa Fe to mill wheat or spin wool, they return to their pueblos deflowered and crying over their dishonor or are pregnant" (Gutierrez 1991:155–156). While the explicit use of mills by Native Americans is not stated here, it appears likely that forced labor through the repartimiento system may have involved the use of Spanish mills and Pueblo crops.

Most southwestern Native American groups continued to use manos and metates to grind wild and domesticated foods into the twentieth century. Numerous ethnographic studies document the use of these tools (Bell and Castetter 1937; Castetter and Bell 1951; Castetter and Opler 1936; Euler and Dobyns 1983; Hrdlika 1908; Russell 1908; Schneider 1996 and references therein). Gasco (1992) notes that many indigenous groups continued to use manos and metates into the late eighteenth century in the Spanish Colonial town of Ocelocalco, in coastal Chiapas, Mexico.

These studies indicate that while both the Pueblo population and colonists preferred their traditional cuisine, various factors forced each group to absorb non-traditional foods into their diets. Both groups consumed grains that required grinding to produce flour. In the earliest Colonial years, manos and metates were probably used by both Pueblo and Spanish groups. In the eighteenth century, however, with the introduction of gristmills, colonists were probably eager and financially able to abandon the labor required for manual grinding using manos and metates. As gristmills required payment of services, and may have been located some distance from many pueblos, continued reliance on hand milling tools may have been more affordable and practical for the Pueblos. However, while quantities of grain flour were a staple for both groups, wild foods were an important resource as well. As many wild seeds are processed into flour by hand grinding, manos and metates may have continued in use for Native American and Colonial groups alike. Gristmill processing of relatively small quantities of small, fragile wild seeds would be impractical, and likely required hand milling. Given the extended use of these tools by Puebloan groups and the increasing use of mills by Spanish colonists in the eighteenth century, as well as the socioeconomic relationship between the two groups, the LA 146402 metates are more likely to have been used by Santa Fe's indigenous population; however, while Puebloans were most likely the users of the tools, the grain they ground with them may have been intended for the tables of Spanish Colonials as much as their own.

Archaeobotanical Remains from a Spanish Colonial/Early Mexican Period Midden and Historic Outhouses, (LA 146402)

Pamela J. McBride

Introduction

Plant remains were identified from macrobotanical and flotation samples collected from several depositional levels in the Spanish Colonial/Early Mexican period midden and from two historic outhouses at LA 146402. The features were identified during data recovery conducted by OAS for the Santa Fe Railyard Community Corporation, hired by the City of Santa Fe to direct the Santa Fe Railyard urban development program.

Methods

Flotation

Flotation Processing. The eight soil samples collected during excavation were processed at the Museum of New Mexico's Office of Archeological Studies by the simplified "bucket" version of flotation (Bohrer and Adams 1977). Volumes of flotation soil samples ranged from 2.32 to 5.55 liters. Each sample was immersed in a bucket of water, and a 30–40 second interval allowed for settling out of heavy particles. The solution was then poured through a fine screen (about 0.35 mm mesh) lined with a square of "chiffon" fabric, catching organic materials floating or in suspension. The squares of fabric were lifted out and laid flat on coarse mesh screen trays until the recovered material had dried.

Full-Sort Analysis. Each of the eight flotation samples was sorted using a series of nested geological screens (4.0, 2.0, 1.0, 0.5 mm mesh), and then reviewed under a binocular microscope at 7-45x. Charred and uncharred reproductive plant parts (seeds and fruits) were identified and counted. Flotation data are reported as a standardized count of seeds per liter of soil, rather than an actual number of seeds recovered. Relative abundance of non-reproductive plant parts such as pine needles and juniper twigs was estimated per liter of soil processed.

To aid the reader in sorting out botanical occurrences of cultural significance from the considerable noise of post-occupational intrusion, data in tables are sorted into categories of "Cultural" (all carbonized remains), "Possibly Cultural" (indeterminate cases, usually of unburned, economically useful taxa, in this case, found in outhouse deposits), and "Non-Cultural" (unburned materials, especially when of taxa not economically useful, and when found in disturbed contexts together with modern roots, insect parts, scats, or other signs of recent biological activity).

Macrobotanical Specimens

Macrobotanical samples consist of specimens fortuitously collected in the field during excavation. Those samples submitted for analysis were examined, identified, and measured where appropriate. Specimens were weighed on a digital, top-loading balance with .01g accuracy whenever possible. Fig seeds from Outhouse 6 were imbedded in fecal matter and were impossible to weigh. Peach and apricot pits and grape seeds were measured as to length, width, and thickness with dial calipers, to the nearest 0.1mm. The single burned maize kernel was broken off on the dorsal side, precluding a thickness measurement, so only height and width were measured. When necessary, fragile specimens were wrapped in acid-free tissue or polyester fiber and placed in rigid containers to protect them from any further breakage.

Analysis Results

Four strata from the Spanish Colonial/Early Mexican period midden were examined. Midden stratum 128 represents the initial infill layer of the midden prior to the use of the area for refuse disposal. The sample from this deposit yielded only ponderosa pine needles that could represent the remains of persistent needles on branches burned for fuel, leaving the needles as evidence of this activity (Table 3.48). To confirm this, it would have been fortuitous to have recovered ponderosa pine wood from this context, but there were no fragments of wood charcoal large enough in the sample to identify. Plant material from one of the earliest midden deposits (Stratum 120.2) was much more diverse, consisting of both wild and domesticated taxa. Cultivars included two Old World taxa (lentils and wheat) and the most frequently encountered plant remains from the midden: kernels, cupules, and embryos of the New World cultivar, maize. Lentils were a very rare occurrence in early historic assemblages, but recent studies in the Santa Fe area have produced further evidence of this illusive cultivar (see Discussion, below).

Wild plant material consisted of seeds of bulrush (Scirpus), goosefoot (Chenopodium), knotweed family (Polygonaceae), purslane (Portulaca), sage (Salvia), and spurge (Euphorbia). Douglas fir and ponderosa pine needles were also recovered. Although all of the seed taxa have documented economic uses, the recovery of a single burned seed of an invasive species presents questions of cultural integrity. Recovered in the sample from level 6 of the midden, the seed has morphological traits similar to that of Russian thistle (or tumbleweed), suggesting at least some potential contamination from more recent weed burning or other events that would result in burned plant material that may not represent deposition associated with the Spanish Colonial/Early Mexican period. Tumbleweed was accidentally introduced into this country sometime in the 1870s in a shipment of flax (Martin 1987:43), well past the Spanish Colonial/Early Mexican period. While this does not rule out the possibility that occupants were gathering wild plants for food or medicine, it precludes making conclusions with any certainty. Wood from this stratum was predominately juniper, with one fragment of wood that resembled piñon and one resembling ponderosa pine (Table 3.49). Two fragments of diffuse porous wood were classified as unknown non-conifer and may actually be carbonized root or perhaps from an undetermined riparian taxon.

Another of the earliest midden deposits (Stratum 120.4) contained only maize, bulrush, groundcherry, unknown plant parts, and unidentifiable seeds. Wood was again primarily juniper by weight, followed by piñon and pine with a small quantity of unknown conifer. Finally, Stratum 120.3 that may represent spoil from a fireplace cleanout or remodel, produced the only chile seeds (another New World cultigen), maize, unknown bark, juniper twigs, and piñon needles. Wild taxa included groundcherry, purslane, and sage. Wood mirrored other strata, but considerably more of the assemblage consisted of cf. ponderosa pine.

In contrast to the midden deposits, maize was absent from the Outhouse 6 sample, which is not very surprising because people normally do not consume cob parts, but rather use shelled cobs for fuel and recognizable kernels normally do not survive the digestive process. However, a relatively large number of blackberry/raspberry, fig, and strawberry seeds were recovered along with chile, watermelon, grape, mulberry, and tomato seeds. Wood was absent from the outhouse deposits.

Macrobotanical material from Outhouse 6 is repetitive of that found in the flotation sample, with more of the most frequently encountered taxa (Table 3.50). Floral remains from another outhouse (Structure 5) consisted of many of the same taxa found in the flotation sample from Outhouse 6 with the exception of peach pits in the northern half of the feature. Half of an apricot pit was identified from Stratum 120.2 of the midden as well as a single maize kernel.

Discussion

A mixture of wild and domesticated plants was present at other sites in north and south-central New Mexico with Late Colonial deposits (Table 7.43). Plant material from LA 146402 is compared with that from: the Palace of the Governors in downtown Santa Fe; the Spanish Colonial Baca-Garvisu home, excavated as part of data recovery efforts at LA 1051 prior to the construction of the new Civic Center in Santa Fe; a Spanish Colonial farm on a terrace above the Santa Fe River about two miles southwest of Santa Fe (LA 16769); LA 6579, a four-room Spanish Colonial house with extramural features north of Santa Fe along U.S. Highway 84/285; La Puente (LA 54313, possibly the original plaza of Santa Rosa de Lima) near Abiquiu; and finally, trash pits and midden deposits from what is believed to be the original settlement of Valencia (LA 67321) in Valencia County south of Albuquerque.

There is a high correlation between the number of samples analyzed with the total number of taxa recovered, except at LA 6579. This disparity may be related to context, site location, or simply sampling vagaries. There is the appearance that during the Spanish Colonial period, those sites situated in the capitol and to the south, had first choice of goods brought from Mexico and perhaps by the time supply wagons made it to northern New Mexico, commodities were depleted. The floral assemblage from the two projects carried out at Valencia documents the use of a wide variety of New and Old World domesticates, including a chile pod fragment and seeds, as well as maize parts and cantaloupe (*Cucumis melo*), bean, wheat, watermelon (*Citrullis*), and squash seeds. With three exceptions, this assemblage is nearly identical to that from the Palace of the Governors: melons and coriander (*Coriandrum sativum*) were absent from the record at the Palace and lentils were found at the Palace and not at Valencia. In contrast, the only evidence for European domesticates use at the two sites north of Santa Fe in the late Colonial period is peaches at La Puente.

One of the late Colonial floral assemblages from Valencia (McBride 2001) displays a wide variety of wild plant taxa as does that of the Palace of the Governors, but materials probably derive from a mixture of trash burning and naturally deposited sources. Trash burned in pits could have included any number of weed seeds deposited in the feature by rodents or wind prior to or in between trash burning events. The pits could also contain not only household waste, but debris from field clearing. Other sites compared have much more moderate wild plant assemblages but may derive from similar sources. This is not to discount the use of wild plants, especially purslane (*verdolagas*) and goosefoot (called *quelites*, a general term for greens in Spanish), which would have proliferated in agricultural fields or other areas of disturbed ground. Recipes for each are included in *The Good Life* (Cabeza de Baca Gilbert 1982:65) and *Flora's Kitchen* (Romero 1998:75), two books of New Mexico traditions and food. In fact, the use of verdolagas is an Old World tradition as well, still used extensively in Portugal (personal observation).

Wood assemblages from five of the six sites where data was available are dominated by coniferous taxa (Table 7.44). The most unusual wood assemblage comes from Valencia where cottonwood/willow was found in nearly every sample analyzed, attesting to the site's proximity to the Rio Grande River and perhaps to the shortage of conifers in the immediate vicinity and their inaccessibility without the expenditure of either time or money. Spanish colonists were using locally available arboreal species and where access to higher elevation species was not as far a journey, ponderosa pine may have been used for construction, but certainly not to a large extent.

Unfortunately, flotation samples were not collected from either the earlier (Structure 5) or later (Structure 7) of three outhouses associated with the early twentieth century use of the railyard. The use of the Structure 6 outhouse dates to around AD 1913. A large number of fruit seeds comprise the majority of plant material recovered from the privy (Table 3.48). These include blackberry/raspberry, fig, and strawberry. Some of these, like fig and strawberry, might seem to imply access to expensive imports, but the fig seeds could have come from Fig Newtons, cookies that, with the invention of a double-funnel machine in 1891 by James Henry Mitchell, began to be mass produced in that same year (Bellis 2009). The strawberry and blackberry/raspberry seeds could have originated in jam, either commercially or home-produced. Seeds of mulberry, grape, and watermelon were present in considerably lower numbers, but probably represent the consumption of fresh fruit, purchased from local farmers or gathered in the case of mulberries from trees in nearby landscapes.

Another potential source of all but figs could have been Bishop Lamy's garden that he established in the 1800s next to his home between St. Francis Cathedral and Alameda Street. Although Lamy's death in 1888 meant the slow deterioration of his garden, it was still producing to some extent until a new dam was built in the late 1920s on the upper Santa Fe River that caused the water table in town to lower and the spring that watered Lamy's garden dried up (Simmons 1980, cited in Nabhan 2010). Several varieties of fruit trees grew in his garden including peach and mulberry. He also grew unusual varieties of grapes, including Malaga and Catawba (Horgan 1975:411). The strawberries he grew were the most well known of the crops grown in his garden; he sold them for a dollar a box and donated the profits to charity (Horgan 1975:411). The enormous productivity of Lamy's garden is clear in this account from the book, *Lamy of Santa Fe* by Paul Horgan.

> In the next summertime [after his passing in 1888], the archbishop's garden yielded fifteen hundred quarts of strawberries, forty gallons of cherries, one thousand of currants, and two hundred of raspberries; while five thousand shrubs, vines, and young trees which were ready for transplanting from the garden were auctioned for charity in the plaza of Santa Fe (Horgan 1975:440)

Tomatoes and chile in particular, were traditional ingredients found in local cuisine as a quote in Regina Romero's book (1998:35) emphasizes: "Comida sin Chile, no es comida" or food without chile is not food. Macrobotanical remains from Structure 6 mirror those found in the flotation sample (Table 3.50). Those found in the north and south half of the Structure 5 privy are identical to flotation sample remains from Structure 6 with one exception, the recovery of four peach pits. Likely this has no relationship to differential access to goods, but is merely a product of random trash disposal into privy vaults.

The lentil (*Lens culinaris*) is one of the oldest cultivated legumes; archaeological evidence for their use dates from the earliest Neolithic in the Old World (Renfrew 1973:113). Lentils spread from their place of origin in the Near East to the Mediterranean in the Bronze Age. Lentils were brought to the Rio Grande Valley by way of Spain and Mexico between 1598 and 1630 (Dunmire 2004:272).

The seeds usually form two to a pod, and are circular and flattened with a convex cross section (Renfrew 1973:114). Their diameter can range from 2 to 6mm, and thickness from 1 to 3mm. Diameters and thicknesses of the two lentil cotyledons recovered from Stratum 6 of the midden at LA 146402 are compared with others from sites in the Santa Fe area dating to the Early Colonial (AD 1609–1729), Late Colonial (AD 1772-1821), and the Santa Fe Trail period (AD 1821–1880) (Table 7.45). Dimensions of these specimens fall within a fairly narrow range (3.2 to 4.6mm in diameter) except for three very degraded specimens from LA 160. The indication from this small morphometric sample is that the lentils grown in the Santa Fe area were probably of the same variety.

Dimensions of apricot and peach pits and grape seeds (called pips) are provided in Table 7.46. The average dimensions of the peach pits from the railyard closely match those of the larger category of pits found at Romero Cabin on the Pajarito Plateau (Tierney 1999:52). The Romero Cabin assemblage had considerably smaller dimensions than peach pits observed by Tierney at local markets in the Santa Fe area, but measurements were consistent with the range of pit sizes found beneath productive trees in orchards in the Rio Grande valley. Tierney concluded that the peaches could be from heirloom varieties. "That is, they are the progeny of trees grown from early times that were hardy in New Mexico winters, self-fertile, and easily propagated from seed" (Tierney 1999:52). Most likely the same can be said of both the apricots and peaches consumed during the Late Colonial/Early Mexican period and the early twentieth century in Santa Fe.

The grapes, on the other hand, may be a wild variety or from a smaller cultivated edible type. The best way to distinguish between wild and domesticated varieties is by calculating length/breadth indices. Seeds of the wild European grape (*Vitis silvestris)* have an index of 54–82 with the peak around 64–65, while those of the cultivated variety (*Vitis vinifera*) have an index ranging from 44–75 with a peak around 55 (Stummer 1911, cited in Renfrew 1973:129). The seeds or pips of grapes found at the railyard have an average index of 67, ranging from 0.52–0.84, which fits into the wild grape indices rather than the domesticated given by Stummer. However, baseline measurements are not available for wild grape varieties found in New Mexico or of those varieties brought by Lamy to Santa Fe, so distinguishing wild versus domesticated seeds is tentative at best.

Summary and Conclusions

Plant material from the Spanish Colonial/Mexican period midden at the railyard reflect a diet composed primarily of Old and New World cultigens, mirroring that found elsewhere in the region. The short list of wild plants recovered may represent residue from burning weeds in fields or the consumption of goosefoot, purslane, groundcherry, and bulrush. Considering the context, the plant assemblage from privies dating to the early twentieth century is understandably different, consisting of seeds from fruits like fig, mulberry, grape, raspberry, strawberry, tomato, and watermelon that resulted from either the consumption of fresh fruit, jam, or cookies. Wood procurement during the Spanish Colonial/Mexican period focused on juniper with minor-percent presence of piñon, ponderosa pine, and unknown non-conifer.

Faunal Analysis: Santa Fe Railyard

Britt M. Starkovich

Introduction

A sample of 6,342 faunal specimens from 13 sites excavated at the Santa Fe Railyard can be used to address one of the research questions presented in the research design outlining the Santa Fe Railyard project (Wenker et al. 2005). Specifically, Research Question 6 from Research Domain 2 asks how animal exploitation patterns changed during the Santa Fe Trail and Railroad periods as traditional Spanish consumption patterns were influenced by Anglos immigrating to New Mexico (Wenker et al. 2005). It is hypothesized that the importance of sheep and goat in the diet decreased through time, while beef, pork, poultry, and fish became more common (Crass and Wallsmith 1992). Wild game should be uncommon at all of the sites. In a study from the Palace of the Governors, Akins (in prep.) saw a drop in the frequency of wild game by the Late Spanish Colonial period, which is essentially where the railyard sample begins. Butchery techniques are expected to change as saws become more common and purchased meat cuts replace in-home butchery. These questions are addressed below as animal use and taphonomic processes are investigated based on the sites sampled from the Santa Fe Railyard. The sites are then compared to contemporary occupations in and around Santa Fe in order to establish a broader context in which human behaviors reflected at the railyard sites can be evaluated.

The sites discussed here represent three temporal units and three basic deposit types: acequias, middens, and industrial architecture. Sites included in each category are presented in Table 7.47. For our purposes middens include trash pits as well as outhouses, wherever domestic refuse was primarily deposited. It is important to consider the different deposit types before analyzing them in their temporal context because in many cases, particularly in terms of taphonomy, deposit type may have more to do with observed patterns than does time period.

It must be noted that LA 146402 contained three discrete components of different time periods, which is reflected in Table 7.47. Unfortunately, due to dating uncertainty and the extended-use lives of certain sites, the temporal units are not as clean cut as the periods outlined in the research design (Wenker et al. 2005). The earliest set of assemblages spans from the late Spanish Colonial period through the end of the Santa Fe Trail period, terminating with the building of the railroad. The second set is firmly in the Early Railroad period, ending shortly after the turn of the century. The most recent set of assemblages spans from the end of the Early Railroad period into Statehood, and in some cases as late as the 1950s. After a brief description of the methods employed in this study, the faunal remains from each time period will be discussed.

Methods

The faunal sample analyzed from the Santa Fe Railyard was selected by Steven S. Post and mirrors the sample of historic artifacts that were analyzed. All remains were identified using the Office of Archaeological Studies comparative collection, and were recorded following the established OAS computer coding format. Observed parameters include species and body part, as well as a range of human and non-human taphonomic processes. Measurements were taken on complete sections of bone, following von den Driesch (1976). A more detailed description of recorded variables follows.

Provenience Related Variables. All recorded observations were entered directly into Microsoft Excel, and were imported into SPSS following the faunal analysis. Provenience, component, and dating information for each assemblage were linked from a master SPSS file, designed by the project director, to the file containing faunal information through Provenience Designation (PD) numbers. Each line contains a northing and easting, stratigraphic designation, depth, feature or structure type, the PD number, and a lot number that identifies the specimen or group of specimens that correspond to the recorded data. Count indicates how many specimens are described by the data line.

Taxon. Taxonomic identifications were made to the most specific level possible. A certainty variable indicates how sure the analysis is about a specific designation, and less certain specimens are still included in the taxon count. If species cannot be determined, body size categories are assigned, such as small or medium ungulate, or broader categories such as bird, mammal, or indeterminate. It is often difficult to distinguish small fragments of similar taxon, such as sheep and goat, so though a more precise designation is attempted whenever possible, indeterminate specimens are assigned to a generalized "sheep/goat" category. In many assemblages, fragments identified to body size are the most common, which supplement information from the identified taxa. This is a useful strategy for the Santa Fe Railyard assemblages because the two key large-bodied animals are cattle and sheep/goat. Thus, specimens recorded as large ungulate and small ungulate likely correspond to these species, respectively. Some specimens simply identified to "mammal" were too damaged to determine the body size class to which they belong.

Each specimen was counted only once when broken during or after excavation. If a break occurred prior to excavation, the pieces were counted separately and noted in the "articulation" variable. This variable was also used for different elements that were articulated when found and pieces that appear to be from the same individual (e.g., virtually all pieces of a foot or several elements from a very young animal).

Element (Body Part). Each skeletal element (e.g., cranium, femur, scapula) was identified then described by side, age, and the portion recovered. Side was recorded for paired elements, and axial elements were recorded as such. Age was recorded at a general level: fetal or neonate, immature (a third to two-thirds mature size), young adult (near or full size with unfused epiphyses) and mature. Criteria for assigning age were recorded, such as size, epiphyseal fusion, and bone texture. Estimated ranges of the age at death were recorded based on the fusion of long bone epiphyses, which fuse at a known, predictable rate, and by tooth eruption, also a well-documented process (Hillson 2005; Schmidt 1972; Silver 1969; Reitz and Wing 1999). The portion of the skeletal element represented by a particular specimen was recorded for estimating the minimum number of elements (MNE) and minimum number of individuals (MNI). Understanding species and body-part representations are critical for evaluating processing patterns.

Completeness. Completeness is a variable used in conjunction with portion to estimate the MNE or MNI. It also provides information concerning whether a species is intrusive, as well as the extent of human and non-human taphonomic damage. Completeness refers to how much of a skeletal element is represented by a particular specimen: whether it is analytically complete, 75 to 95 percent complete, 50 to 75 percent complete, 10 to 50 percent complete, or less than 10 percent complete.

Taphonomy. Taphonomy refers to all processes affecting faunal remains from the selection of the animal, until it ends up on an analyst's table. The goal is generally to identify and distinguish between the human and non-human processes affecting the condition of bone in order to link an excavated faunal assemblage with human behavior. Non-human taphonomic processes recorded in this study include environmental damage and animal alterations, and human taphonomic processes include burning and butchering. Environmental alterations include pitting or corrosion from soil conditions, sun bleaching, checking or exfoliation from extended exposure, root etching from contact with plant materials, and polish or rounding from sediment movement. Animal alterations include carnivore and rodent gnawing, as well as digestion. Burning can be a non-human process if there is a fire after deposition, but at the railyard it seems that humans were responsible for the majority of the burned remains.

Human Processes—Burning, Butchering and Processing. Burning by humans can occur under several circumstances: during cooking or during disposal if bone is used as a fuel or is discarded in a fire. Burn color is often a gauge of burn intensity. A light tan or scorch is superficial burning, while charred or blackened bone occurs when the collagen is carbonized. When the carbon is oxidized, the bone becomes white or calcined (Lyman 1994:385, 388). Burns can be graded, reflecting the thickness of the flesh protecting portions of the bone, or if a bone is burned while dry it is often light on the exterior and black at the core. Graded or partial burns can indicate a particular cooking process, generally roasting, while completely charred or calcined bone is related to bone being used as fuel, post-depositional burning, or discard into a hearth. Uniform degrees of burning are only possible after the meat has been removed and typically indicate a disposal practice (Lyman 1994:387). In this analysis, bone was recorded as discard burn if the intent was judged to be disposing of the bone. Roasting burn was used when the burn is partial and could be the result of the cooking process. Potential boiling is recorded if a bone appears waxy and rounded.

Evidence of butchering was recorded as chops, cuts, substantial cuts, saws, impact breaks, spiral fractures, marrow breakage, defleshing, steak and chop cuts (sawn on both faces) and snaps. The location of such damage on the element was also recorded. Since the railyard assemblages all date to the late historic period, butchery marks were fairly obvious and there was little chance in confusing them with environmental processes. Despite this, a conservative approach was taken and ambiguous damage was recorded in the comments section. Because the assemblage is historic, many cuts of meat present at the railyard are the same as those used today (Ashbrook 1955). Specific cuts (e.g., short loin, chuck) were recorded.

Modifications. Some extensively worked bone (including a toothbrush) was recorded. Tools, ornaments, manufacturing debris, and utilized bone were recorded as modified, and possibly worked bone was recorded as such. The worked bone is discussed in the individual site reports and in the historic artifact analysis section.

Measurements. Measurements taken on fauna recovered from historic sites have the potential to differentiate breeds of sheep and goat, between castrates and bulls, and among species of equids. These data provide insight into animal use patterns; if an animal was raised for food or draft, or if different economic status went along with owning particular breeds of animals. It is difficult to compile a large data set of measurements because an exceptionally large sample is needed, but all measurements that could be taken were recorded in this study. Measurements follow von den Driesch (1976), who provides a comprehensive list of measurements for almost all elements of relevant species. The small data set available from the Santa Fe Railyard sites can be compared with those from other sites when enough data is accumulated.

Data Analysis. Data for each site or assemblage were tabulated and analyzed using SPSS and provide the basis for the site-specific reports and tables. Relevant provenience information including discussions based on individual feature and stratigraphy is available in the individual site reports. This synthetic chapter, however, looks at broad trends in the three deposit types and time periods from the Santa Fe Railyard sites.

Results

Late Spanish Colonial through Santa Fe Trail Period

The first set of assemblages dates to as early as the seventeenth or eighteenth century until the construction of the railroad and includes five acequias and one Spanish Colonial or Early Mexican period trash midden (Table 7.47). The acequias had been in use for tens, possibly hundreds, of years, but were truncated by the railroad tracks. In some cases they were simply diverted and continued to be used; those acequias are included in the discussion of later time periods. The acequia sample is large (n = 1950), as is the sample from the trash midden (n = 2306). It is expected in this earlier time period that the focus of human subsistence activities would be on sheep or goat, and the primary method for butchering animals would be in-home with axes and cleavers, and possibly saws, to a limited extent (Wenker et al. 2005). Wild game may be expected to be more abundant in later sites, though it should not comprise a large portion of the sample.

The species composition of the acequias is dominated by sheep/goat or small ungulate, making up about two thirds of the assemblage (Table 7.48). Cattle or large ungulate makes up much of the remainder of the assemblage, though they are not even half as abundant as sheep/goat. Sheep/goat or small ungulate comprises the bulk of the midden deposit, followed by cattle or large ungulate, though the contrast is not nearly as stark as the acequia sample, which is evident by the proportion of sheep/goat (caprine) to cattle in Table 7.49. Wild animals are scarce in the acequia assemblage and only include the incidental remains of an unspecified woodrat, black-tailed jackrabbit, and coyote (Table 7.48). This is somewhat surprising because an animal could easily fall into an acequia and die, or the remains of a wild animal could be disposed of in an acequia. Wild animals are likewise scarce in the midden remains, with a few squirrel specimens as well as cottontail rabbit. The proportions of domestic to wild species in Table 7.49 illustrates the domination of domesticates at these early assemblages.

From a taphonomic standpoint, the remains under discussion are highly fragmented and damaged. Ninety-one percent of the specimens from the acequia sample and about 96 percent of the specimens from the midden are less than 10 percent complete (Table 7.50). The acequia sample has a fairly high frequency of environmental damage; about 17 percent of the remains show environmental alterations, most of which are exfoliation and root etching. Additionally, one percent of the specimens are rounded from being transported through an alluvial system. Only 7 percent of the midden remains have environmental damage, and like the acequia sample, the majority is in the form of exfoliation and root etching (Table 7.50). Animal alterations are uncommon in both site types, though they are slightly more frequent in the acequia sample.

Not surprisingly, the two assemblage types are very different in the frequency of burning. Less than two percent of the remains from the acequias were burned, whereas 25 percent of the midden sample was burned (Table 7.50). This is consistent with the discard of domestic refuse in the midden, which may have occurred as discrete events, and likely includes the waste from hearth and fireplace cleanings. Evidence of butchery is fairly infrequent at the early assemblages; about 6 percent of the acequia specimens and three percent of the midden sample are butchered.

As is evident from the preceding description of species representation and both human and nonhuman taphonomic factors, it is clear that the assemblages from the midden and acequias are quite different. The key difference between the two assemblage types is that the midden represents primary deposition, while remains in the acequias had the potential to travel through a very active alluvial system. Thus, there is some level of "control" over who utilized the midden (probably a single household) as opposed to the acequias, in which trash could have been introduced at any point in the system. These different site formation processes must be kept in mind when interpreting differences between the two assemblage types.

The first major difference between the two assemblages is the proportions of sheep/goat or small ungulate and cattle or large ungulate. This may reflect an anomalous household, where the people utilizing the midden consumed more beef than the larger community, or it may be related to sheep/goat being more likely to be butchered in-home and people having to discard larger portions of a carcass. It may also be related to the movement of objects through an alluvial system; lighter objects (such as small fragments of sheep/goat) tend to sort out and be moved more easily at lower velocities than heavier objects (such as large fragments of cattle) (Waters 1992) that may result in accumulations of smaller objects. The second difference between the two samples is the higher degree of environmental damage on the acequia remains. This is probably due to the relatively fast burial of objects in the midden, as opposed to the specimens in the alluvial system that were exposed to water movement and plant growth for long periods of time.

Major differences in human butchery practices are apparent. High frequencies of burning in the midden deposits may be the result of single events of fireplace cleanings being thrown away, whereas a similar discard of burned remains into an acequia would disperse rapidly, resulting in a much smaller sample of burned specimens. The relative lack of processing damage on the remains from the early assemblages is interesting, but the kind of butchery damage is perhaps more significant. Notably absent in the midden assemblage is any evidence of bones that were sawn, either by a hand-held or mechanical saw. This supports the argument that in the earlier time periods, animals were probably primarily butchered in-home, and the use of saws did not become widespread until the railroad was built in 1880. Sawn specimens were found, however, in the acequia assemblage. This may reflect the broader universe of the acequia sample; the household utilizing the midden may not have owned saws, but someone down the line may have, and then threw their sawn food remains into the acequia. Another explanation is that the acequias were abandoned with the construction of the railroad, so sawn bone may have been introduced in the final infilling of the channels.

Early Railroad Period

The second set of assemblages date from the construction of the railroad in 1880 until about the early twentieth century and include an acequia, a series of outhouse features (considered here in the "midden" category), and two industrial architecture sites (Table 7.47). The acequia was in use prior to 1880, but it was diverted when the railroad was built and remained in use. The acequia sample is the largest of the three deposit types (n = 454), and the midden/outhouse (n = 108) and industrial architecture (n = 115) have small sample sizes. Since this set of assemblages post-dates the building of the railroad, it is expected that a greater reliance on beef will be apparent, and there will be increased evidence of the use of saws.

Sheep/goat or small ungulate by far outweighs cattle or large ungulate in the acequia sample (Table 7.48). Wild animals are scarce, as is depicted in the proportion of domestic to wild species in Table 7.49, and include pocket gopher, cottontail, and mallard. The midden/outhouse deposits are by far the most unique at the Santa Fe Railyard. Very few remains of sheep/goat or cattle are present, and several partial or nearly complete skeletons of small animals were recorded, including a domestic rabbit, a puppy, a Canada goose, and a pigeon or dove. It is unlikely that all of these animals represent meal refuse. There are actually more wild animals than domesticates in the midden/outhouse assemblage (Table 7.49), though this figure may be skewed by the partial skeletons of the goose and pigeon or dove. The majority of the specimens from the industrial architecture deposits are cattle or large ungulate followed by sheep/goat or small ungulate (Table 7.48). No remains of wild animals were found.

The taphonomy of the Early Railroad assemblages is highly variable depending on the deposit type. Fragmentation rates are high for the acequia sample, with about 85 percent of the remains less than 10 percent complete (Table 7.50). The midden/outhouse remains are remarkably complete, with only 23 percent of the remains less than 10 percent complete, and 42 percent of the remains representing whole elements. The lack of fragmentation can be explained by the partial or near complete skeletons found in the assemblage. Sixty-five percent of the specimens from the industrial architecture sample are less than 10 percent complete, which is a fairly low rate of fragmentation. Environmental alterations are common in the acequia sample, with 18 percent of the specimens damaged by environmental factors (Table 7.50). Exfoliation and root etching are the most common forms of damage, which is similar to the acequia sample from the earlier time period. The midden/outhouse assemblage has very little environmental damage, which is not surprising since the outhouse contents were probably not exposed to the elements. About 17 percent of the industrial architecture sample has environmental damage, mostly exfoliation, but root etching was also recorded. Animal alterations are infrequent for all of the deposit types.

Burning is uncommon among all of the assemblages; only the acequia has any evidence of burning at all. Roughly 22 percent of the acequia sample is butchered, most of which are saw or steak cuts, but elements that were cut through are also present (Table 7.50). This kind of butchering, the steak cuts in particular, is significant because the precision necessary to cut them and uniformity of the cuts indicates that they were probably processed by a professional butcher with a mechanical saw. Eighteen percent of the outhouse/midden remains have processing damage; mostly specimens that have been cut through and steak cuts, but sawn through elements were also recorded.

The three different assemblage types from the Early Railroad period are very different in many respects. The species composition for the midden/outhouse is unlike any other deposit or component in the Early Railroad period, or in the entire Santa Fe Railyard data set. The acequia sample has a greater proportion of sheep/goat than cattle, while the industrial architecture is the opposite (Table 7.49). This may reflect the discard of home-butchered sheep/goat sections into acequias, as opposed to refuse from meals that railyard employees brought to work. As mentioned above, fragmentation rates are highly variable; this is probably the result of the partial or near complete skeletons of small mammals and birds from the midden/outhouse deposits, and the highly fragmented, extensively damaged portions of larger animals from the acequia. This is also reflected in the frequency of environmental alterations, where the acequia has a much higher frequency of damaged specimens, while the midden has a low rate of environmental damage.

The differences in human butchery practices are fairly negligible. The main observation is that the acequia and midden assemblages have many specimens that were cut through, while sawn bones account for the vast majority of the processed remains in the industrial architecture sample. Again, this may represent the difference between some degree of home butchery still occurring at residences, and pre-processed meals taken to work. The most significant point about the butchery patterns at the Early Railroad assemblage is that clearly, by the time these sites were in use, saws were widely available and professional butchers were common.

Early Railroad Period through Statehood

The most recent set of assemblages dates to the turn of the nineteenth century, through the middle of the twentieth century and include an acequia, two middens, and two industrial architecture deposits (Table 7.47). The acequia was in use prior to the turn of the century, but it continued to be used and the artifacts date to the twentieth century so it is included in this later group of assemblages. The acequia sample is extremely small (n = 14), so little can be said about it, but species and taphonomic data for the assemblage are presented in Tables 7.48 and 7.49. The midden sample is large (n = 1056) and the industrial architecture is comparatively small (n = 339), but is still useful for comparisons. An even greater reliance of beef is expected in these late historic deposits.

The species representation of the midden assemblage is split fairly evenly between sheep/goat or small ungulate and cattle or large ungulate (Table 7.48). Significantly, chicken makes up a large proportion of the remains (16 percent) and eggshell, much of which is presumably from chicken, is also fairly abundant. The only wild fauna present are mallard and catfish, and the proportion of domestic to wild fauna (Table 7.49) is fairly high. Cattle or large ungulate are twice as frequent in the industrial architecture assemblage as sheep/goat or small ungulate, though chicken also comprises an appreciable portion of the sample (Table 7.48). Wild fauna make up a very small proportion of the remains (Table 7.49), but they include an unspecified fish, as well as a fairly diverse set of avian fauna including flicker, whistling swan, mallard, and pigeon or dove (Table 7.48). These bird remains may not be related to anthropogenic activities.

From a taphonomic standpoint, the remains at the Early Railroad through Statehood assemblages are not exceptionally fragmented. About 78 percent of the midden specimens and 57 percent of the industrial architecture remains are less than 10 percent complete (Table 7.48). This is reflected in the lack of environmental and animal damage on the specimens. Ten percent of the midden remains have evidence of environmental damage, mostly exfoliation and root etching. Only 5 percent of the industrial architecture assemblage was damaged by the environment, also by exfoliation and root etching. Gnawing by carnivores or rodents is negligible in both of the samples.

Evidence of human alterations is interesting in that burning is fairly infrequent while processing damage is extremely common. Twelve percent of the midden sample exhibits burning, and less than one percent of the industrial architecture assemblage is burned. Conversely, 33 percent of the midden sample is butchered, the majority of which is sawing or steak cuts (Table 7.48). Similarly, almost 40 percent of the industrial architecture sample has evidence of human processing, and again the majority of the damage is from sawing or is in the form of steak cuts.

Unfortunately, the sample from the Early Railroad through Statehood acequia is too small to make any comparisons with the other two deposit types. The midden and industrial architecture samples provide an interesting contrast, however. The species compositions are quite different, with the midden having a more even representation of sheep/goat and cattle, while cattle dominate the industrial architecture sample. This may indicate a continuation of in-home butchery of small-bodied ungulates such as sheep and goats, while the architectural sample may represent prepared meals brought by railroad workers. Significantly, in both of the deposit types, fowl is increasingly important, mostly in terms of chicken, though turkey is also present. The higher fragmentation rates in the midden assemblage may also be related to in-home butchery.

Slight differences in human butchery practices are apparent between the two assemblage types. The frequency of burning is higher in the midden sample, which may be related to fireplace cleaning events that deposited concentrations of burned bone. The differences in processing seem to support the hypothesis that railroad workers brought prepared meals to work. The rate of butchered remains is higher in the industrial architecture sample than in the midden assemblage. It must be noted that the high frequency of saw damage indicates that by the early 1900s, mechanical saws and professional butchers were widespread.

Overall Railyard Comparisons

In discussing the time periods by assemblage type, it is apparent that many differences in the faunal record of the Santa Fe Railyard can be attributed to site function. Though these differences are mostly related to non-human taphonomic factors, they are apparent to a lesser extent in species representation and carcass processing. The series of box plots depicted in Figures 7.35 through 7.40 were derived by lumping the railyard assemblages by function, without considering time period. Assemblages with sample sizes of less than 100 were excluded for this analysis. Non-human taphonomic factors are considered in Figures 7.35 through 7.37. Fragmentation rates are the highest among acequia assemblages, which makes sense because the context is turbulent and wet bones are readily susceptible to being broken. Midden assemblages have higher fragmentation rates than do the samples from industrial architecture, probably from intensive in-home processing that result in extensively broken bone. This is supported by Figure 7.36, in which the higher incidence of environmental damage among acequia deposits is depicted. Though overall, animal alterations are uncommon, midden assemblages have the lowest frequency of such damage (Fig. 7.37). This may be the result of grouping the outhouse assemblage with the middens, where a low incidence of animal damage is expected due to the lack of access to the remains.

Differences in the human use of animals are also apparent across the different deposit types. As is shown in Figure 7.38, the midden assemblages tend to be much more burned than those from the other two types. This is probably due to the disposal of fireplace cleaning waste. Processing rates are considerably higher in the midden samples, followed by the industrial architecture assemblages (Fig. 7.39). The acequia sample is the least heavily processed. The high processing rates in the midden sample are to be expected, since it is composed of domestic re-

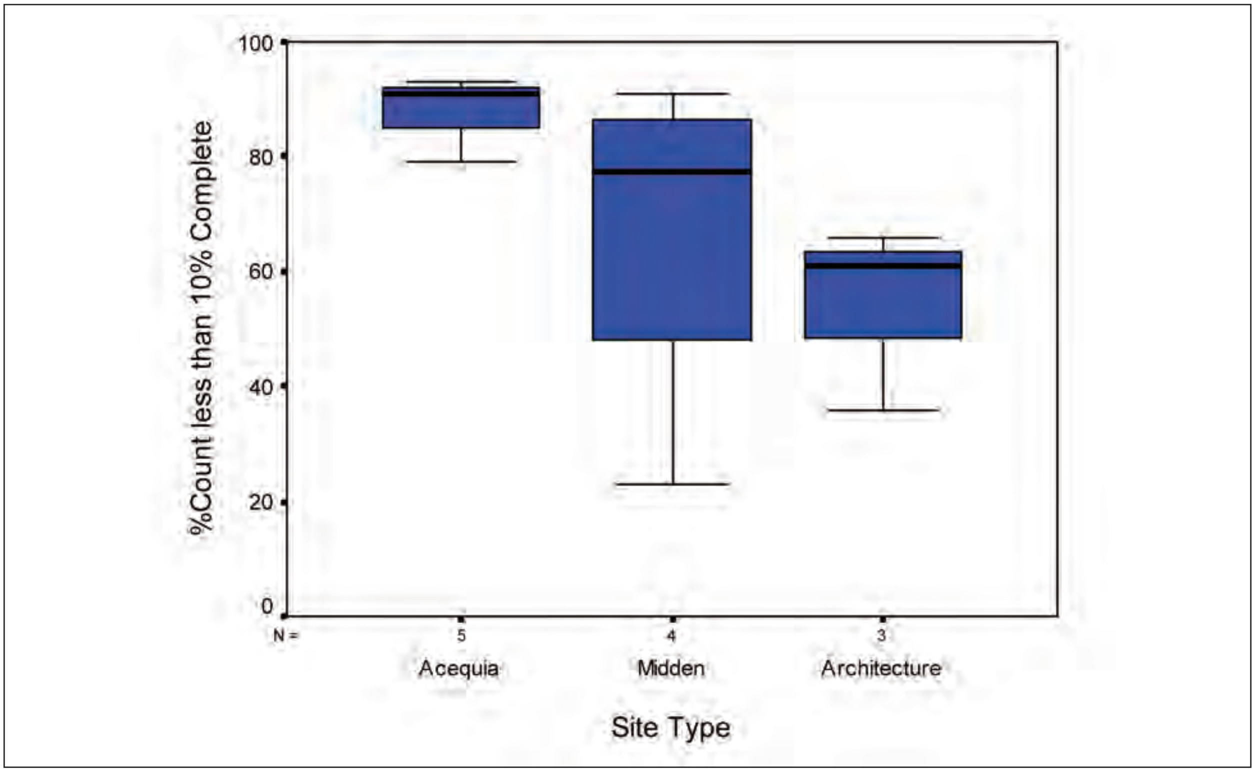


Figure 7.35. Fragmentation rates for the three different assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

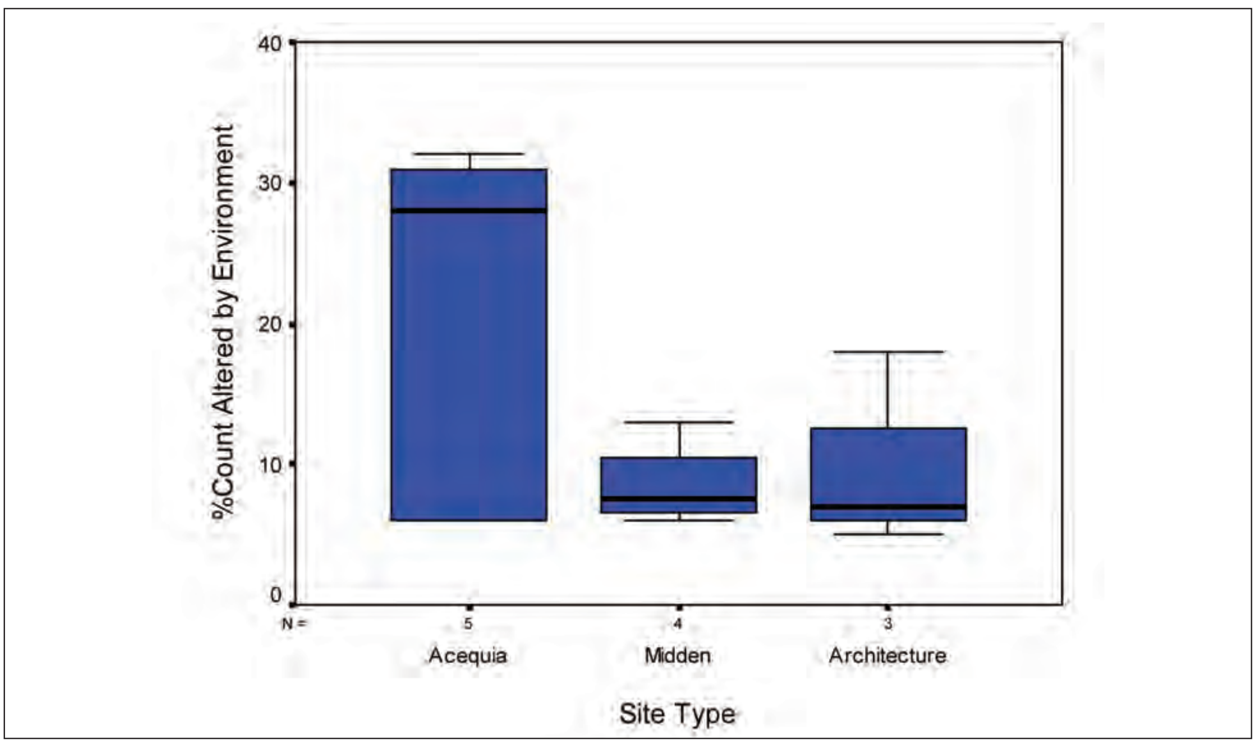


Figure 7.36. Total environmental alterations for the three assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

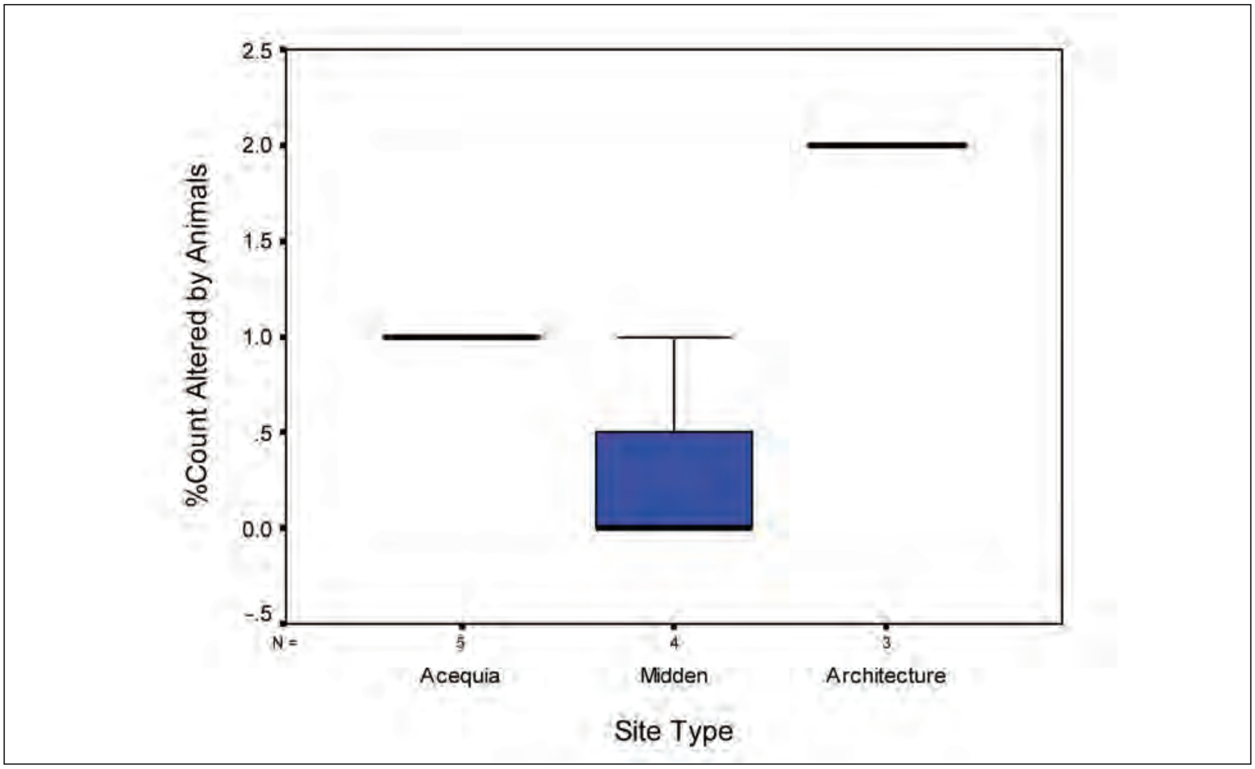


Figure 7.37. Total animal alterations for the different assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

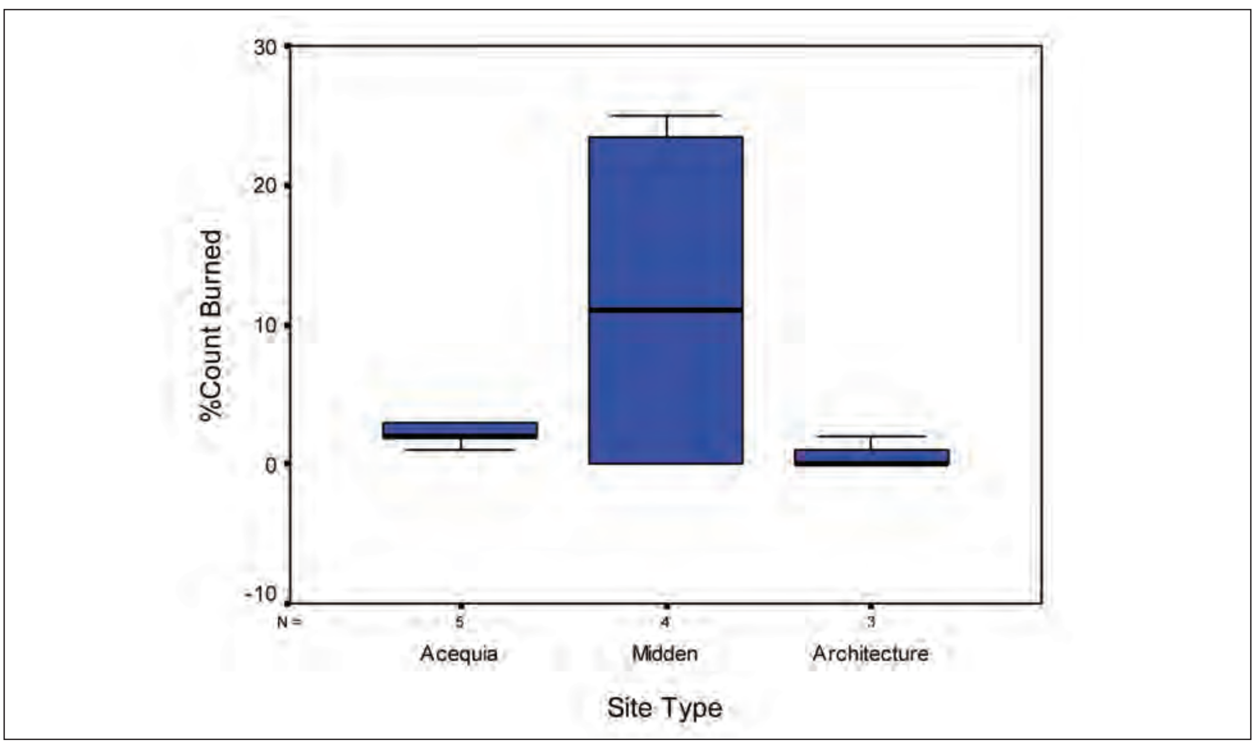


Figure 7.38. Burning at the three assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

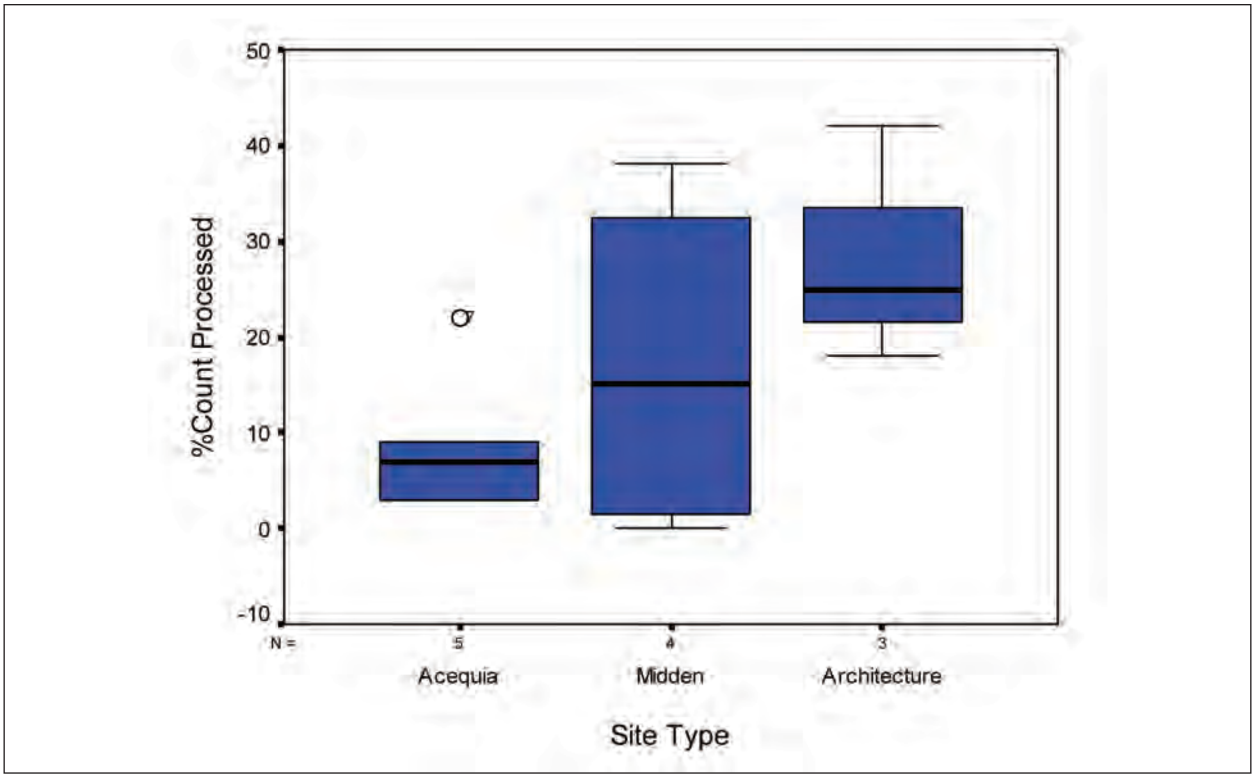


Figure 7.39. Processing frequency among the different assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

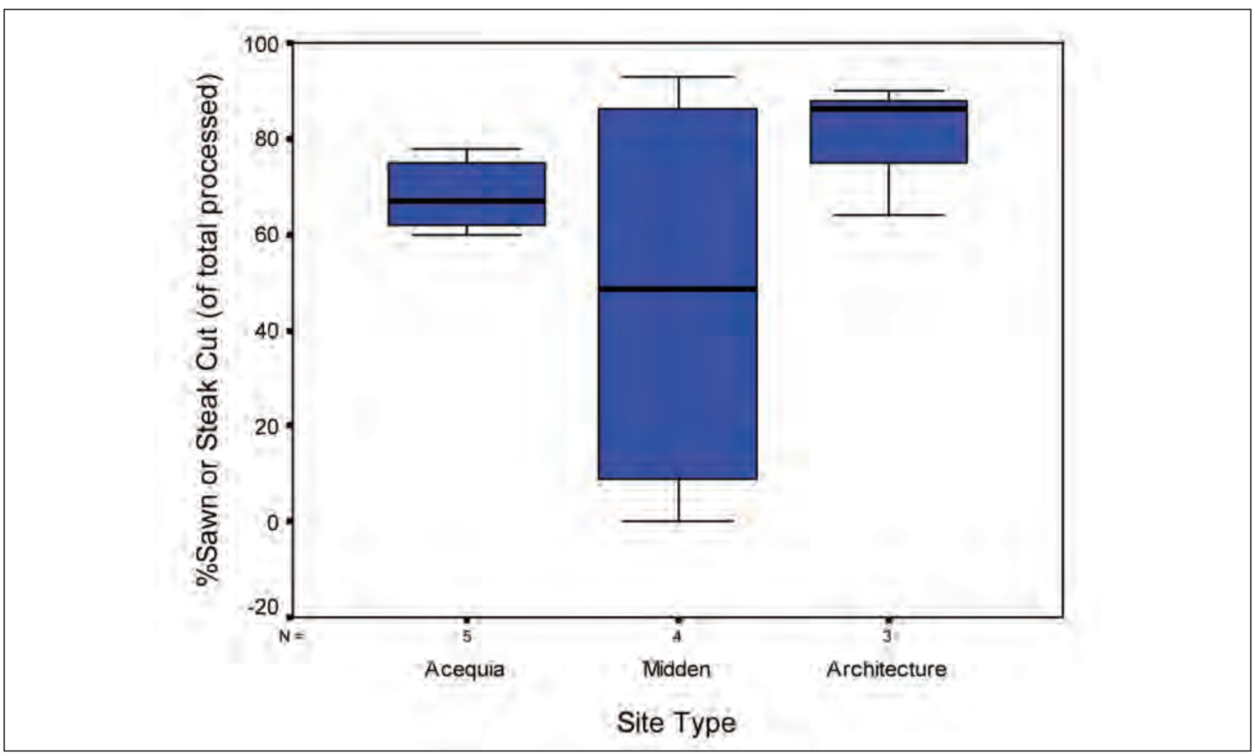


Figure 7.40. Saw frequency of the total processed specimens at the different assemblage types at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

fuse, and the processing rates in the industrial architecture are consistent with pre-processed meal refuse. The lack of processing in the acequia sample may be explained by the high fragmentation rates, largely caused by environmental factors, and that the refuse discarded in the acequias may have been the unbutchered leftovers from carcasses processed in-home. In Figure 7.40, the percent of sawn specimens from all of the butchered remains is depicted. The industrial architecture sample has the highest incidence of sawn or steak cuts, consistent with prepared meals brought to the site, possibly by workers. In terms of species representation, there is a difference between the representation of sheep/goat or small ungulate and cattle or large ungulate depending on deposit type, as is shown in Figure 7.41. In this figure, the assemblages are considered separately, as opposed to as a group. The acequia assemblages have a consistent bias toward more sheep/goat rich assemblages, and the architecture assemblages tend to have a higher representation of cattle. The middens are less consistent. The abundance of sheep/goat at the acequia deposits is likely due to one of the explanations presented above; either the remains of animals butchered in-home (which were more likely to be sheep/goat) were discarded, or there is a taphonomic explanation having to do with transport in an alluvial system. These differences in proportion are also related to the time period, which is explored in the next section.

Understanding changes from the Spanish Colonial through Railroad periods, specifically in terms of species use and butchery patterns, were two of the main objectives of the Santa Fe Railyard study, outlined in Wenker et al. (2005). The overall trend of species preferences through time is a shift from sheep/goat or small ungulate to cattle or large ungulate as the most common species, which is also accompanied by an increased use of chicken (Tables 7.48, 7.49). This follows expectations outlined in Crass and Wallsmith (1992), where it is argued that an increased use of pork, beef, poultry and fish reflects a shift from Spanish to Anglo tastes. Figure 7.42, which is similar to Figure 7.41 except the points represent time period as opposed to assemblage type, supports this point. In all cases, the earliest set of assemblages (Late Spanish Colonial through Early Railroad period) all contain higher proportions of sheep/goat than cattle. Later assemblages typically, though not always, contain a higher proportion of cattle than sheep/goat, and one of the assemblages that diverges from this pattern is an acequia. As discussed above, all acequia deposits have a higher proportion of sheep/goat than cattle, which may explain this aberration.

As hypothesized in the research design (Wenker et al. 2005), there are substantial differences in processing patterns through time. The earliest set of assemblages contain a considerably lower frequency of processed remains overall (Fig. 7.43). One of the expectations is that after the construction of the railroad, there should be an increase in saw cuts and steak cuts as mechanical saws came into use. The proportion of steak cuts at compared to the total fraction of butchered bone is depicted in Figure 7.44. A clear increase in steak cuts is apparent through time, with the largest jump occurring between the end of the Santa Fe Trail period and the beginning of the Early Railroad period, supporting the proposed expectations (Wenker et al. 2005). It is also apparent that the style of butchery damage on the remains is related to species (Table 7.51). Butchery damage increases through time for both sheep/goat and cattle, but the proportion of butchered to unbutchered remains is much higher for cattle in every time period. Additionally, though saw cuts do occur on sheep/goat specimens, this is not the dominant form of damage until the latest set of assemblages (Table 7.51). Conversely, sawn bone and steak cut damage is the most common form of butchering on cattle remains. This is likely related to more in-home butchery of sheep/goat and the availability of saws, particularly mechanical saws.

With the shift from in-home butchery to the purchase of meat cuts, it is expected that body-part representation should change, specifically that elements from regions of the body that contain little meat should become less abundant in the assemblage (Wenker et al. 2005). This is because with in-home butchery the whole animal is present initially, so waste from all parts of the body is expected to turn up in refuse. When meat is purchased, however, the whole animal is never at the home, rather only the specific meaty portions are present to begin with. The body-part representation data for sheep/goat and cattle are presented in Tables 7.52 and 7.53, and a modified version is depicted in Figures 7.45 and 7.46. This body-part representation is based on the number of specimens and is a fairly rough estimation because it does not take into account dif-

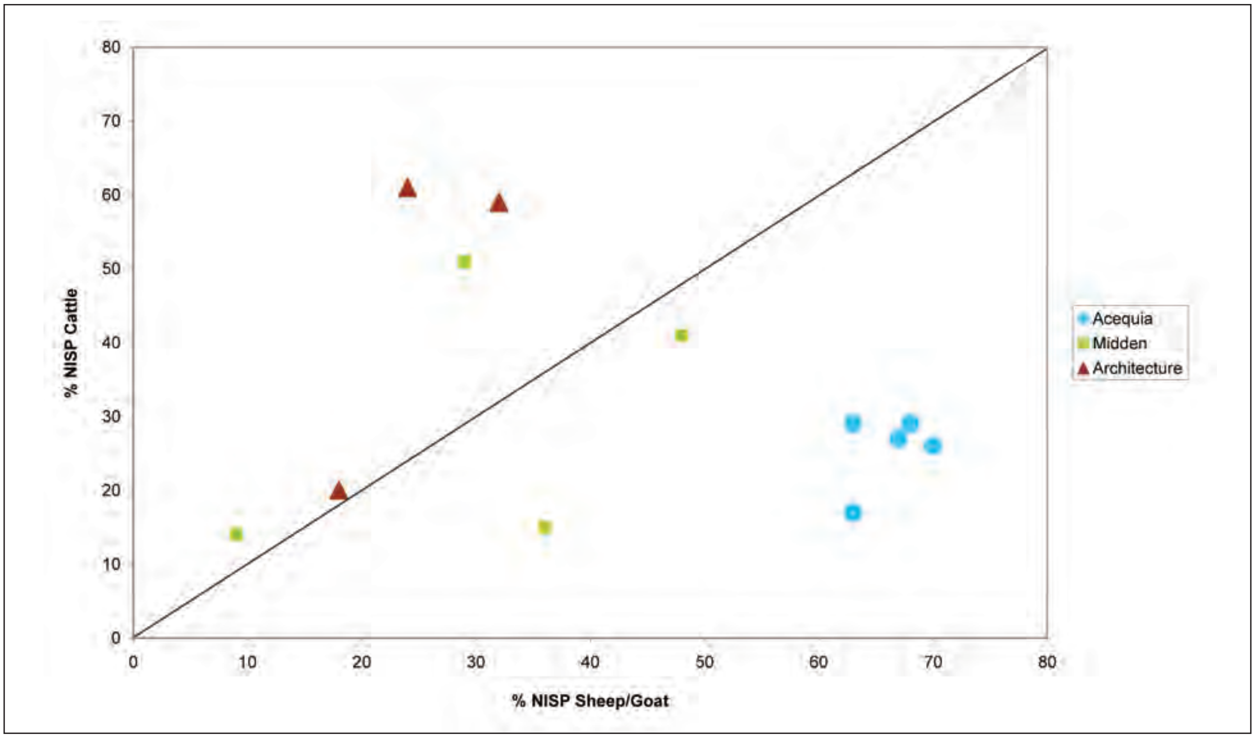


Figure 7.41. Proportion of sheep/goat to cattle by assemblage type at the Santa Fe Railyard, as a percentage of the total assemblage. Assemblages below the diagonal line have more sheep/goat remains and those above it have more cattle. All site samples have assemblages larger than 50 specimens. NISP = number of identifiable specimens.

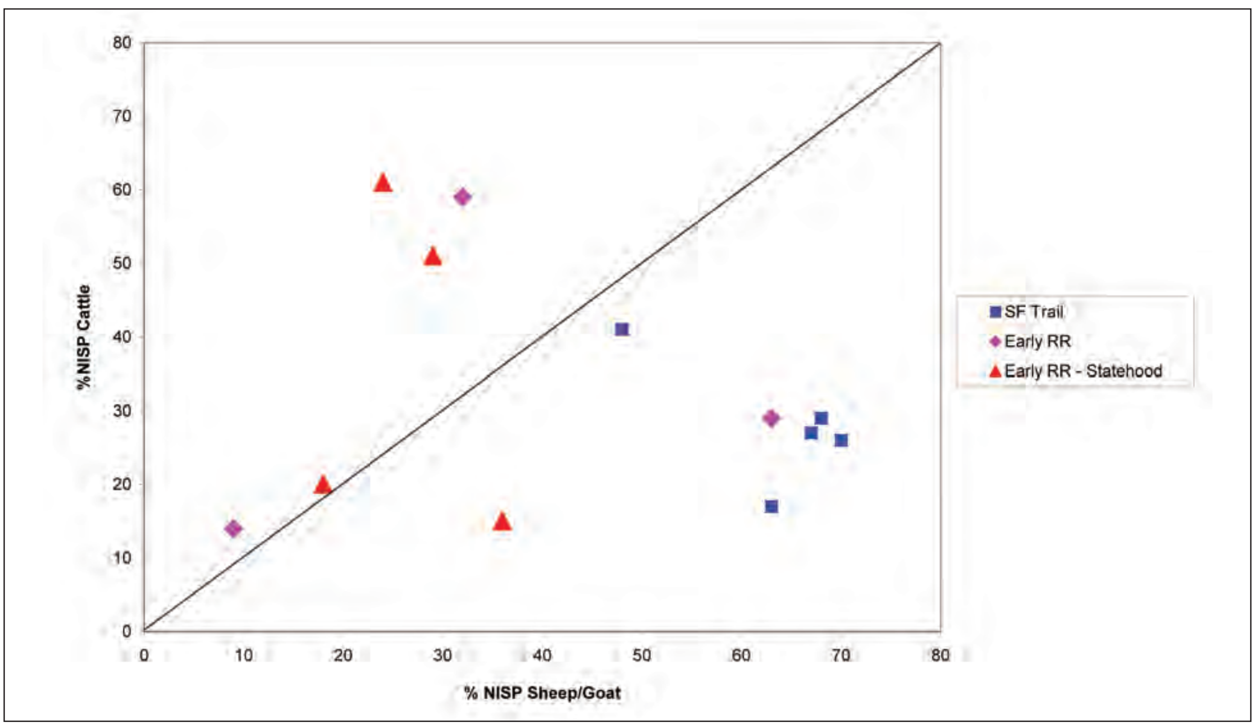


Figure 7.42. Proportion of sheep/goat to cattle by time period at the Railyard, as a percentage of the total assemblage. Assemblages below the diagonal line have more sheep/goat remains and those above have more cattle. Only site samples with more than 50 specimens are included.

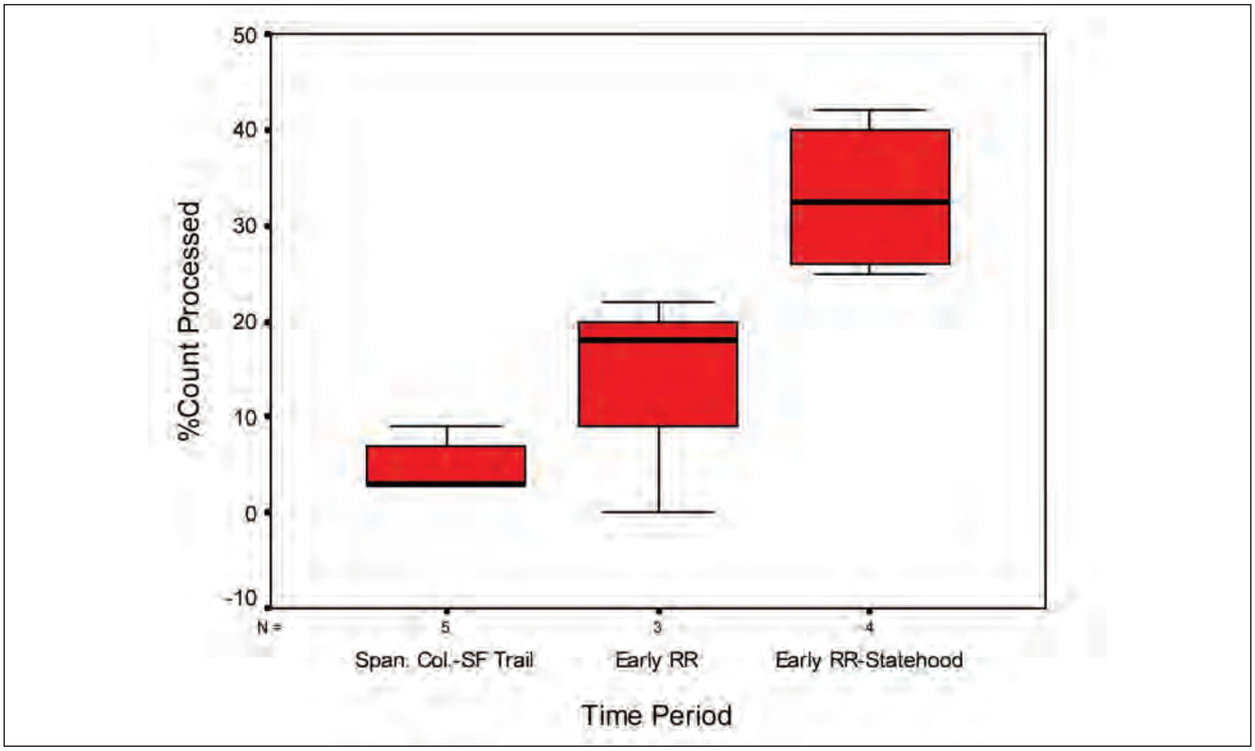


Figure 7.43. Processing frequency through the three different time periods at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

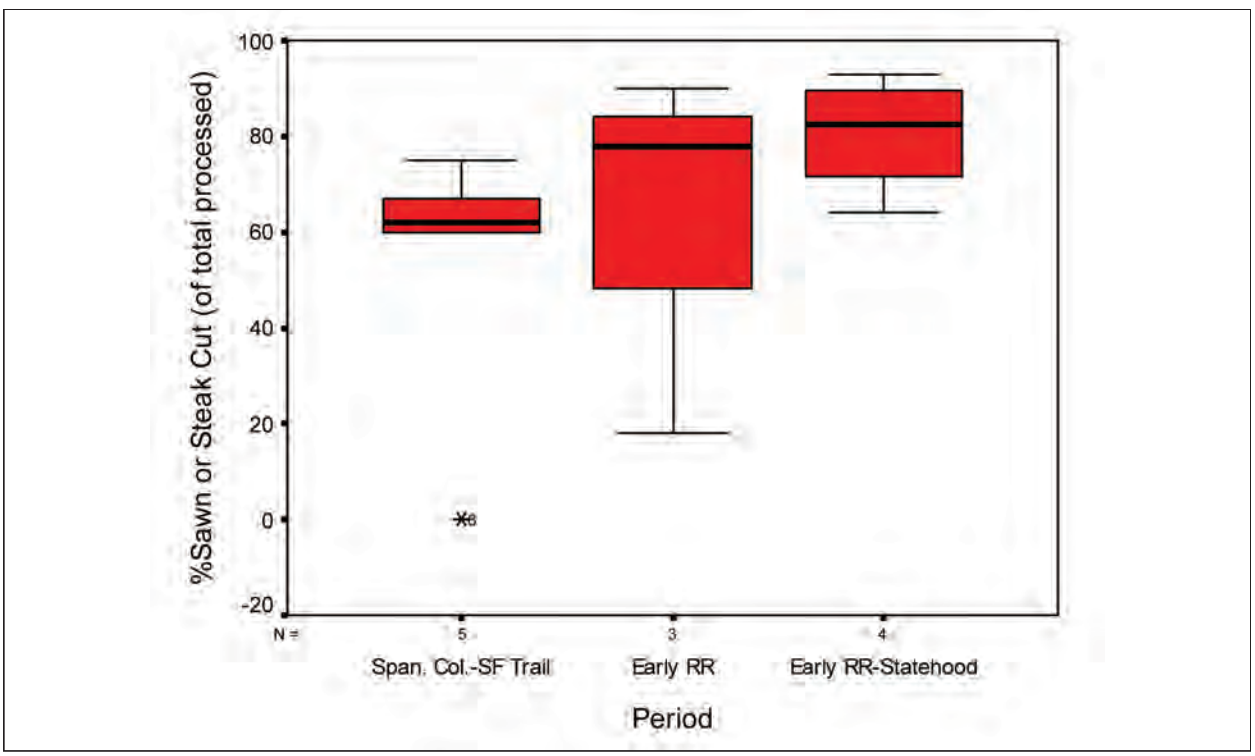


Figure 7.44. Saw frequency of the total processed specimens during the different time periods at the Santa Fe Railyard (only site samples with counts greater than 100 are included).

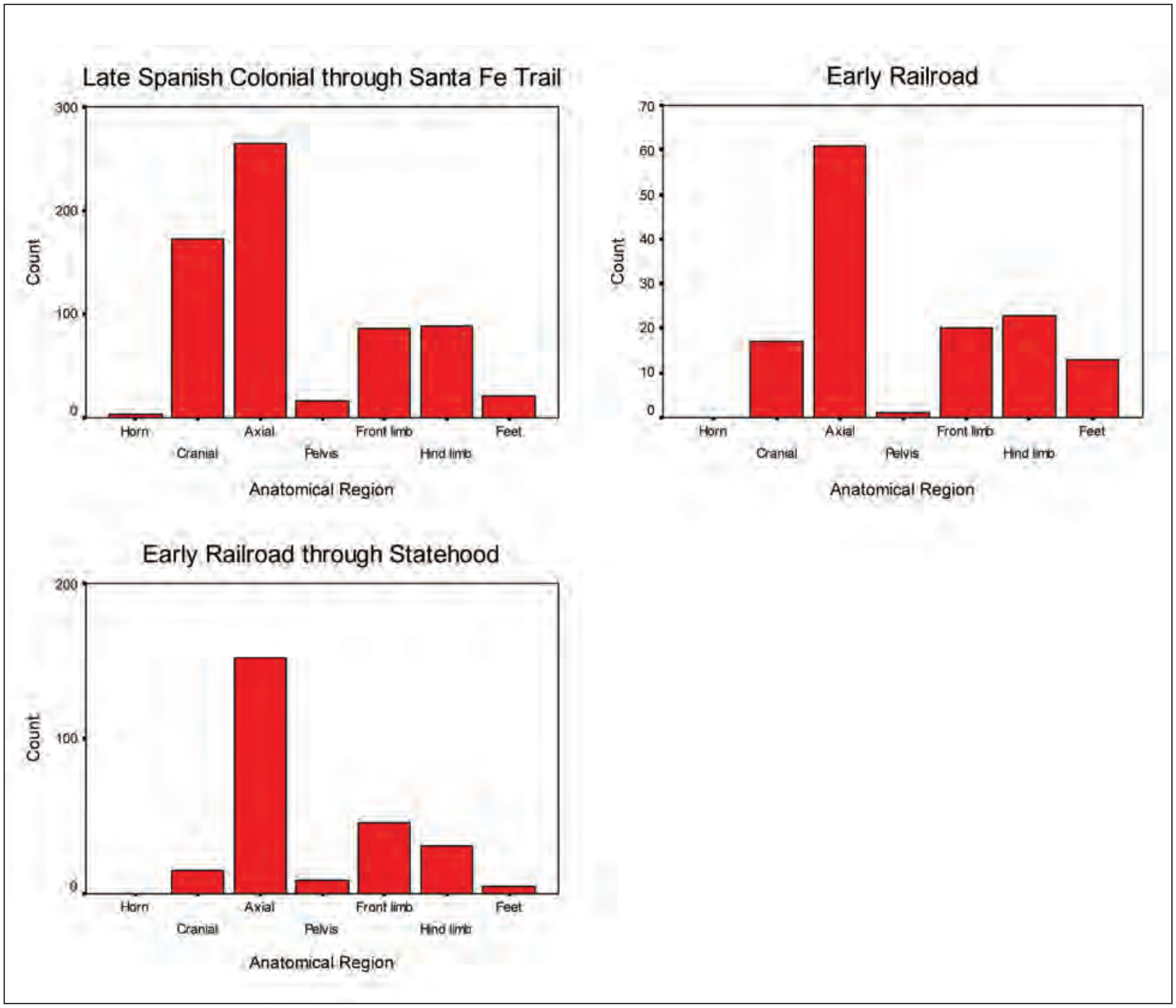


Figure 7.45. Changes in body part representation for sheep/goat from the Late Spanish Colonial period through Statehood at the Santa Fe Railyard assemblages. Note changes in the frequency of cranial fragments.

ferential fragmentation of the anatomical regions, nor does it consider differing numbers of elements in the various regions. For example, the overrepresentation of axial elements in the graphs is likely related to the fact that this portion of the body contains more whole elements in a living animal than does the cranial front limb region. Important for our purposes, however, is the changing frequencies of less meaty parts, the horn, cranial, and foot regions in particular. Though it is true that the cranial region includes the nutrient-rich tongue and brain, these meat sections are often purchased without any residual bone. The decrease in cranial parts is the most obvious shift of these three regions, in both sheep/goat and cattle (Figs. 7.45, 7.46). Horn parts are never common in either of the taxa, but by the latest time period they are completely absent. The representation of the foot region is more variable, and seems to be over-represented for sheep/goat, but this may be the result of the attachment of feet to the leg of lamb portion and these parts are simply riders on the meatier portion of the animal. This is a fairly well-documented process where small, low-utility parts are connected to high-utility parts and thus occur more frequently than expected in an archaeological assemblage (Binford 1978). Overall, the change in frequency of these low-utility parts, particularly the cranial portion, is consistent with a shift from in-home butchery to predominately purchased meat.

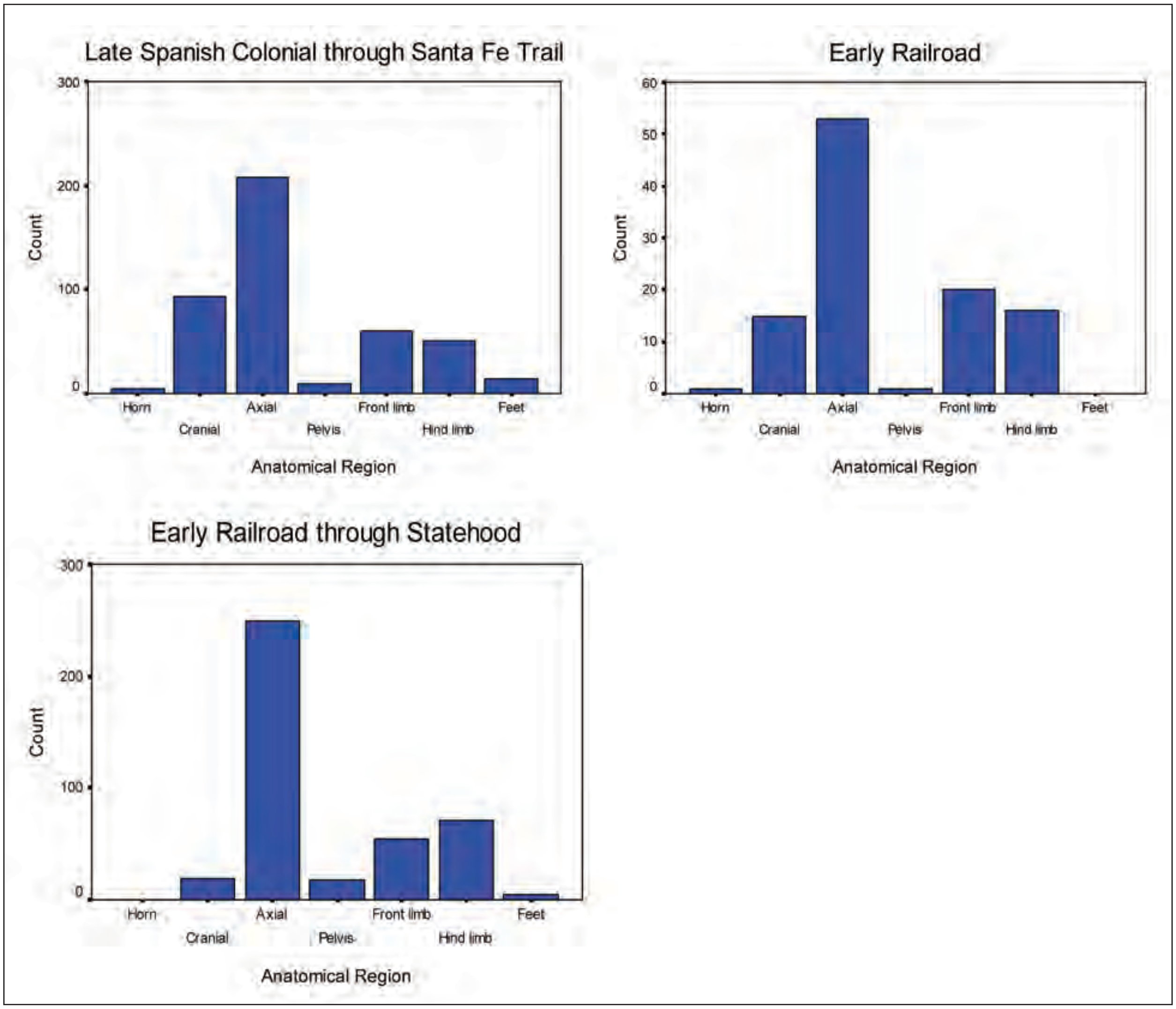


Figure 7.46. Changes in body part representation for cattle from the Late Spanish Colonial period through Statehood at the Santa Fe Railyard assemblages. Note changes in the frequency of cranial fragments.

Another useful method for discussing the utilization of different portions of animals at a historic site relates to specific meat cuts. These cuts have remained consistent for over a century, and are listed in Table 7.54 (see Fig. 7.47 for their placement in the body). In the modern and historic economic systems, different cuts of meat have different costs based on the desirability of the portion. It is hypothesized that higher quality, and thus more expensive, cuts of meat tend to be purchased by wealthier households, while lower quality, cheaper cuts are purchased by people on the lower end of the economic scale. Following this model, faunal remains from archaeological sites can be used as something of a proxy to understand the economic situations of the people depositing remains. Schulz and Gust (1983) construct a ranking system for beef cuts based on relative prices at the turn of the nineteenth century in Sacramento, California that has widely been applied to historic data sets in the western United States. This ranking system is used as an example in the individual site reports and is useful in a broad sense.

Lyman (1987) argues that price ranking are not necessarily the best tool for interpreting historical faunal data. Rather, cost-efficiency based on the price per pound and pounds of edible meat for each beef cut is a more logical way to understand historic spending patterns. Following Lyman's model, the cuts of beef in Table7.54 are assigned to differ-

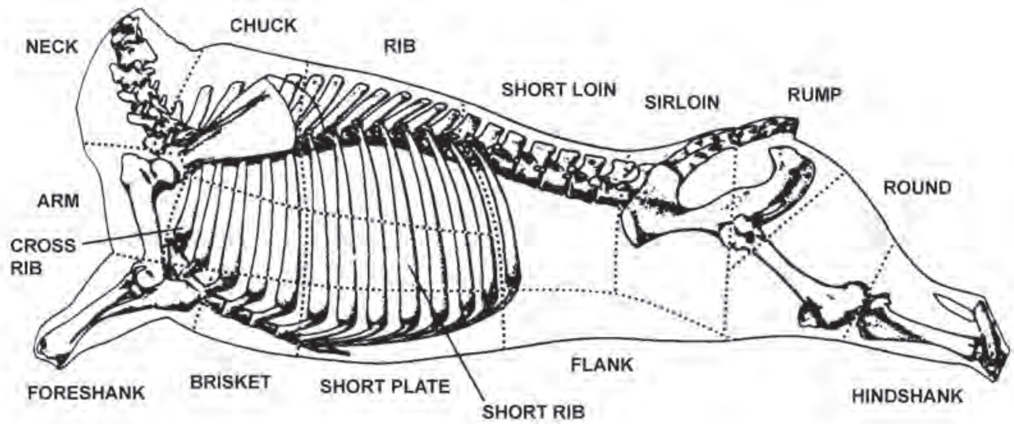


Figure 7.47. Meat cuts.

ent levels of cost-efficiency. One of the most striking comparisons of the different time periods is that moderately priced cuts of beef are by far the most abundant in all three sets of deposits (Fig. 7.48). Additionally, in the late Spanish Colonial through the Early Railroad period, the frequency of highly cost-efficient cuts of meat is more than twice the frequency of the least cost-efficient cuts. From the end of the Early Railroad period through Statehood, however, the frequency of highly cost-efficient and the least cost-efficient cuts of beef are about even. This is a fairly drastic shift that may reflect an upturn in the economic position of the people utilizing the area in and around the Santa Fe Railyard, or it may reflect increased access to beef in general, accompanied by a drop in beef prices. Based on the faunal evidence alone, it is impossible to say which of the two scenarios are more likely; other lines of evidence from different artifact classes are necessary to confirm or refute the hypotheses.

The ages of animals at a site are indicative of what quality of meat was eaten, for example if lamb or mutton was preferred, or if veal was consumed instead of older animals. Summarized age data based on bone fusion and tooth eruption are presented in Tables 7.55 and 7.56, respectively. At the earliest set of assemblages, most of the ageable elements of both sheep/goat and cattle can be accounted for by animals between 18 and 42 months. This is older than animals consumed as lamb or veal, but is within the range of ages of sheep/goats raised for meat. The cattle were all full-sized animals in the age range for those used for milking and breeding (Ashbrook 1955). There is evidence of at least one cattle older than 84 months. In the Early Railroad period deposits, the sheep/goat again can be accounted for by animals between 18 and 42 months. The cattle, however, seem to span several age ranges and include at least one animal younger than 10 months and one older than 84 months. The younger animal was likely consumed as veal, and the older one may have been a draft animal. The sample of ageable cattle remains from the Early Railroad assemblages is fairly small, so a solid pattern is not apparent. The most recent set of assemblages mostly includes cattle younger than 48 months, at least two of which were younger than 10 months at the time of death. These animals were likely consumed as veal (Ashbrook

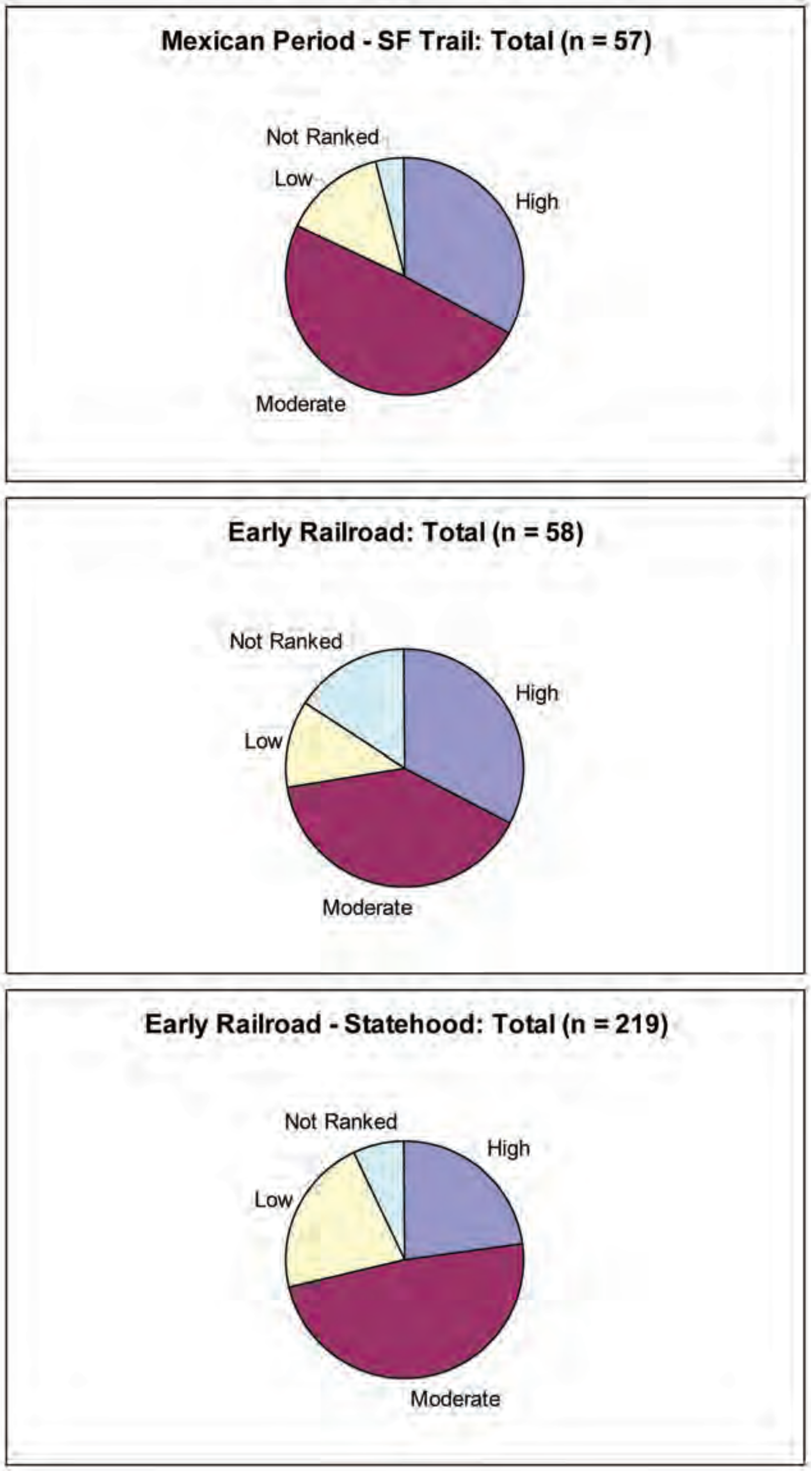


Figure 7.48. Cost-efficiency (following Lyman 1987) of beef cuts from the different time periods at the Santa Fe Railyard (data from Table 7.54).

1955). At least three elements belonged to a much older animal (>84 months), which may have been a draft animal that was no longer useful. Most of the sheep/goat remains belonged to animals older than 18 months, with at least one animal younger than 10 months. The younger animal would have been consumed as lamb, while the older animals were either at the prime age for eating, or older. Throughout the different time periods, the ages of sheep/goats remained consistent. No clear preference was shown for cattle age, however, and it seems that animals of all ages were utilized.

Overall, several shifts are apparent from the earliest set of assemblages at the Santa Fe Railyard, to the latest. Most of these changes reflect a difference in animal use in the sense that the butchery of animals moved from the home to a butcher shop, where animals were processed by professionals. This is evidenced by the anatomical portions of animals present at the different assemblages, as well as by the increased frequency of mechanical saw and steak cuts. The other major shift is the increasing importance of beef and chicken, as traditional Hispanic eating patterns were replaced by meats preferred by Anglos. These temporal changes could only be analyzed in the context of the non-human taphonomic factors that affected the assemblage, which correlate more with site function than time period.

The Santa Fe Railyard within a Broader Context

One of the goals of the research design is to understand the faunal materials from the Santa Fe Railyard in the context of contemporary assemblages in and around Santa Fe (Wenker et al. 2005). This includes the main questions that have been addressed throughout this report, specifically the shift of importance of sheep/goat to cattle as more Anglos moved into Santa Fe, changes in body-part representations as butchering activities moved out of the home, and an increase in saw marks and steak cuts that accompanied the wider availability of saws after the construction of the railroad in 1880. Unfortunately, major differences exist in the quality of faunal analyses and publications available, which accentuates the importance of the Santa Fe Railyard sites in terms of filling a void in our knowledge about the late historic period. Because of these differences, certain research questions can be addressed more thoroughly than others. Abundant data are available to discuss basic species representation trends from the Late Spanish Colonial period through Statehood (Table 7.57). Questions pertaining to body-part representation and butchery patterns, conversely, can only be addressed using a fraction of the assemblages listed in Table 7.57.

Late Spanish Colonial Period (1696–1821)

A fairly large sample of Late Spanish Colonial sites exists in northern New Mexico, from a variety of locations. The bulk of the sample is from various components at the Palace of the Governors in Santa Fe, though sites from Placitas, Cochiti Dam, Cieneguilla, San Ildefonso, Albuquerque, Abiquiu, Valencia, and Pojoaque are also included. The assemblages include a range of site functions such as urban settings, small residential sites and isolated trash middens. Sample sizes are fairly large for each of the assemblages; only one is less than 100 specimens (Table 7.57). The unidentifiable fraction of the remains is high, with all of the assemblages having between 55 and 92 percent of the specimens only identifiable to general body-size classes. In all cases except for one, sheep/goat outweigh cattle in the samples, based on specimen count. Horse or burro is nearly absent in all of the assemblages and pig remains are fairly rare. Chicken comprises a small but significant portion of two Palace of the Governors components, as well as of the Valencia assemblage. The importance of native fauna is variable, though it seems to range from absent to composing more than five percent of the assemblage, depending on the site or component. Fish are fairly rare, and account for less than two percent of the assemblage when they are present.

Late Spanish Colonial Period Through the Santa Fe Trail Period (1696–1879)

The majority of the assemblages that fall into the Late Spanish Colonial through the Santa Fe Trail time bracket are acequias from the Santa Fe Railyard. This category overlaps the time periods discussed directly above and below because the acequias were used for an extended period of time. Two components from the Palace of the Governors are included here because their dates terminate well into the Santa Fe Trail period. The unidentifiable component is significant but variable, and comprises between

50 and 90 percent of each of the assemblages. All of the assemblages have a higher proportion of sheep/goat than cattle (Table 7.57). Other species are relatively unimportant; pig, horse or burro, and chicken are present in negligible amounts, and native fauna and fish are rare.

Santa Fe Trail Period (1821–1879)

Assemblages dating solidly within the Santa Fe Trail period are from several different areas in northern New Mexico, including Placitas, Pecos, Albuquerque, Abiquiu, Santa Fe, Cochiti Dam, Taos, and Pojoaque. The assemblages from this time period come from urban settings, isolated ranchos, and a U.S. military fort, and all have ample sample sizes (Table 7.57). The unidentifiable component is high, and makes up at least 60 percent of all of the assemblages. Sheep/goat outweighs cattle by far; in fact the proportions are consistently higher in favor of sheep/goat in this time period than in those previously discussed. Other domesticates, such as pig, horse or burro, and chicken are present in small amounts, though they never make up more than one percent of any assemblage. Wild species and fish are rare to absent.

Early Railroad Period (1879–1912)

The Early Railroad period mostly contains assemblages from Santa Fe, though there are also sites from Cochiti Dam, Abiquiu, and Talpa (Table 7.57). The sample sizes from this time period are highly variable; Trujillo House and La Puente both have large samples, while LA 12449 and some of the railyard assemblages are extremely small. Excluding the two smallest samples, about half of the assemblages have a higher proportion of sheep/goat than cattle, and the other half are the opposite (Table 7.57). Pig and chicken both compose between one and three percent of the assemblages in which they are present. Horse or burro is rare, as are fish. Native fauna are absent at most of the sites, and are over-represented in the outhouse component of LA 146402 because several partial skeletons of small animals (e.g., goose and jackrabbit) were recovered.

Railroad through Statehood (1900+)

The most recent group of assemblages is made up of those from Santa Fe, the Pojoaque Corridor, Pecos, and Albuquerque (Table 7.57). Other large studies with historic components centered in Santa Fe, such as the Palace of the Governors (Akins, in prep) lack this latest component, and few isolated sites around Santa Fe have been investigated. This is probably because the latest sites (some at the railyard date well into the 1940s) only recently became eligible for site status because they were not older than 50 years. Also, many of these later occupations were simply destroyed to make way for the construction of new buildings. The sparseness of information about this time period makes the excavations at the Santa Fe Railyard particularly important, as they will serve as a baseline to which future late historic assemblages can be compared. The sample for these later assemblages is quite small and the assemblages are split fairly evenly between those with a higher proportion of sheep/goat and those at which cattle dominate (Table 7.57). Equids are entirely absent from this later set of assemblages, and domestic pigs, wild animals and fish are rare. Chicken is proportionally far more abundant in this later set of assemblages and makes up between seven and 26 percent of the site samples when they are present.

Temporal Trends

Several challenges are involved when trying to understand the Santa Fe Railyard sites within their broader context. Perhaps the most important and influential factor is the variation that exists between faunal analysts. Tentative trends appear to be apparent, but the small sample size in many of the time periods requires cautious interpretations of these patterns. Also, particularly in the later time periods, the Santa Fe Railyard assemblages comprise a disproportionately large portion of the site samples. With this in mind, changes in species representation and butchery patterns are explored.

Figure 7.49 represents an expansion of Figure 7.42, in which the percentages of the total assemblage for sheep/goat and cattle (and small and large ungulate, when appropriate) are plotted against one another by time period. The diagonal line indicates an even representation of sheep/goat and cattle. Only assemblages with specimen counts greater than 100 are included. Interestingly, the assemblages dating to the Late Spanish Colonial through Santa Fe Trail periods all contain more sheep/goat than cattle, with the exception of one Late Spanish Colonial site (Fig. 7.49). This follows our expecta-

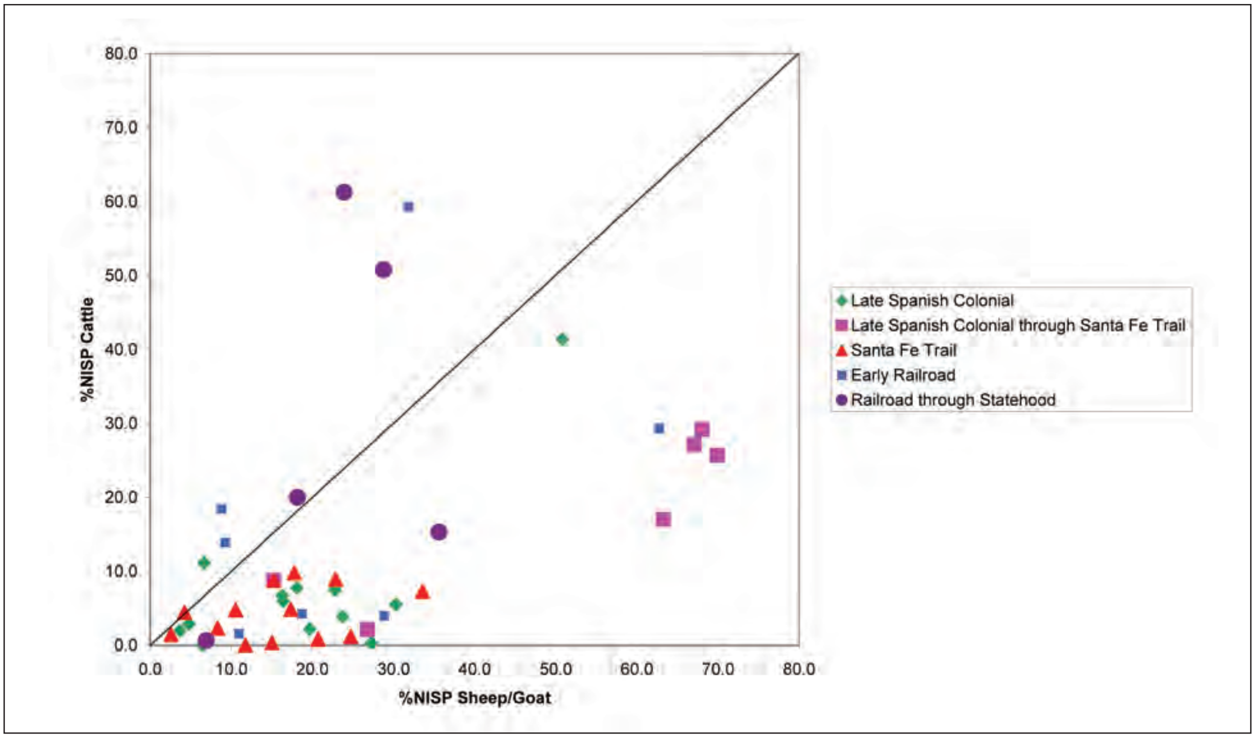


Figure 7.49. Proportion of sheep/goat to cattle at northern New Mexico sites from the Late Spanish Colonial–period through Statehood. Sites below the diagonal line have more sheep/goat remains and those above have more cattle. Only sites with more than 100 specimens are included.

tions that before the construction of the railroad and the subsequent influx of Anglo immigrants, residents of northern New Mexico followed a more traditional Spanish diet that focused on the consumption of caprines. The later assemblages, utilized after the construction of the railroad, are more variable in terms of the proportions of sheep/goat to cattle, with caprines dominating at about half of the assemblages and cattle making up the bulk of the sample at the other half (Fig. 7.49).

Butchering information is presented in Table 7.58 for assemblages with samples larger than 100. Due to potential differences in the treatment of animals with different body classes (for example it is expected that sheep/goat are more likely to be butchered in-home than cattle), sheep/goat and cattle are considered separately. It must be noted that some assemblages include the combination of sheep/goat/small ungulate and cattle/large ungulate. This is only done when sheep/goat and cattle are the only small and large ungulates identified to species, and corresponding butchery data are available. Because percentages are ultimately used, assemblages with lumped data can appropriately be compared to assemblages that only include species-specific identifications. The percentage of saw or steak cuts of all specimens with butchery damage is also included in Table 7.58. This butchering technique is expected to become more common after the construction of the railroad as saws became more widely available and mechanical saws were introduced. Figures 7.50 and 7.51 are box plots of the saw and steak cut damage on cattle and sheep/goat, respectively. While there is a clear jump in the frequency of sawn and steak cut cattle specimens after the construction of the railroad, assemblages that range from the Late Spanish Colonial through Santa Fe Trail have an unexpectedly high frequency of sawn cattle bone (Fig. 7.50). This may be explained by the fact that three out of the four assemblages in this group are acequias, and some faunal remains dating to a later time period may have been introduced into the channels. The spike in sawn cattle specimens after the construction of the railroad fits previously outlined hypotheses (Wenker et al. 2005). The sheep/goat saw data (Fig. 7.51) is slightly dif-

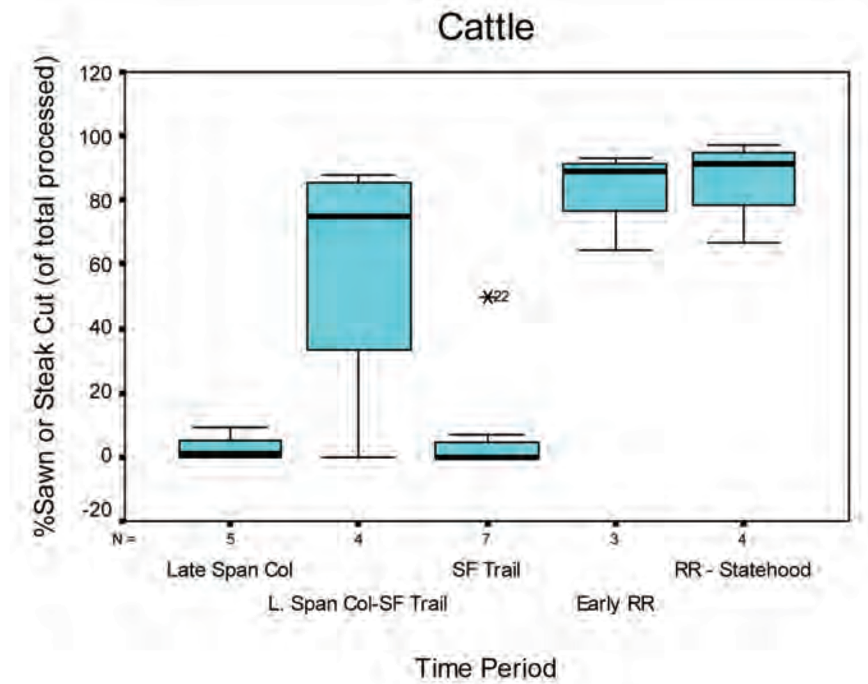


Figure 7.50. Saw frequency of the total processed cattle specimens during the five different time periods. Only sites with counts greater than 100 are included. Note the Late Spanish Colonial– through Santa Fe Trail–period seems to be an outlier. This may be from intrusive later material into the acequias that comprise most of the site types from this time period.

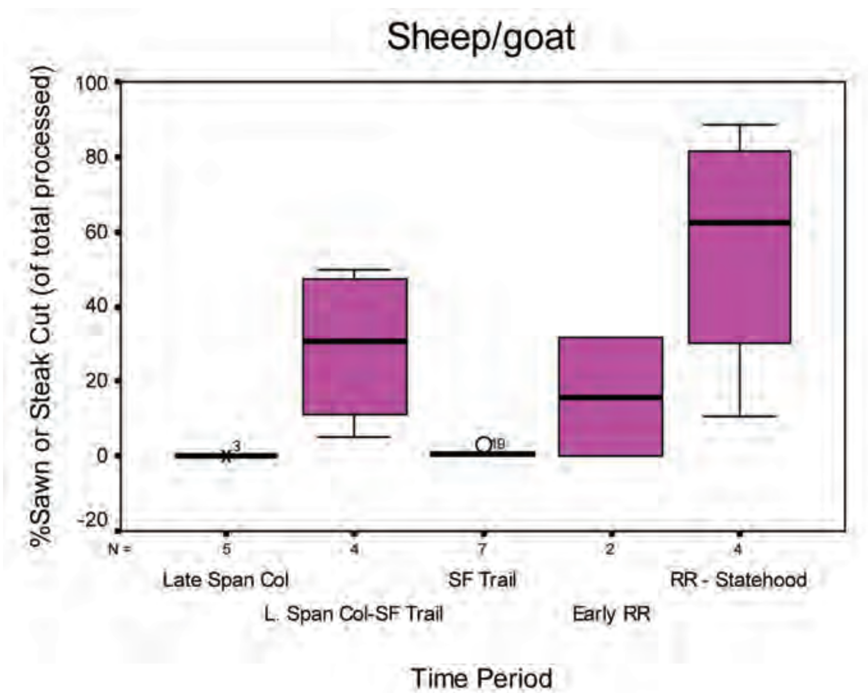


Figure 7.51. Saw frequency of the total processed sheep/goat specimens during the five different time periods. Only sites with counts greater than 100 are included. Note the Late Spanish Colonial through Santa Fe Trail period seems to be an outlier. This may be from intrusive later material into the acequias that make up most of the site types from this time period.

ferent from the cattle data. In general, the frequency of sawn bone is never as high for sheep/goats as cattle, possibly because sheep/goats are more likely to be butchered at home, whereas cattle are more often butchered by a professional with a mechanical saw. This is especially apparent during the Early Railroad period, where the frequency of sawn sheep/goat is slightly higher than it was previously, but not as high as in the latest historic period under consideration. Again, the assemblages spanning the Late Spanish Colonial through Santa Fe Trail periods seem to be aberrant for sheep/goat saw damage. This supports the idea that the acequias from this time may have included some temporally later remains.

Unfortunately, changes in body-part representations through time cannot be investigated with the data set currently available. Though these data are available for the pre-railroad assemblages from the Santa Fe Railyard, Palace of the Governors, and Pojoaque Corridor excavations, the post-railroad sample is only composed of Santa Fe Railyard sites. Thus, the overrepresentation of railyard sites would dilute the sample to the point that the body-part representations from all of the northern New Mexico sites would look almost the same as those presented in Figures 7.45 and 7.46, particularly in the crucial post-railroad time period. Current projects being conducted by the Office of Archaeological Studies include the late historic time period, so an enhanced data set for comparison will be available in the near future.

Conclusions

The faunal sample analyzed from the Santa Fe Railyard is ample to address research questions proposed by Wenker et al. (2005). It is clear that animal exploitation patterns changed considerably during the Santa Fe Trail and Railroad periods as an influx of Anglo immigrants brought new lifeways and food preferences. In general, a shift from a diet of predominately sheep/goat to cattle, along with an increase in chicken, occurred as outlined in Crass and Wallsmith (1992). This holds true for the broader regional context in and around Santa Fe. There does not seem to be a complete replacement of caprines by cattle after the construction of the railroad, however. Rather, later assemblages are variable with a dominance of either caprines or cattle, whereas in earlier time periods sheep/goat dominate all assemblages except for one. As expected, wild game did not make up a significant proportion of the diet at any of the sites.

Butchery techniques changed through time, particularly with the widespread use of saws after the railroad was built in 1880. This shift is particularly evident on the remains of cattle. The Late Spanish Colonial through Santa Fe Trail period provides a striking outlier to this pattern, which is likely explained by the intrusion of more recent fauna into the acequias that comprise the majority of the assemblages in this time period. To the extent that status can be understood from the cost-efficiency of the meat cuts at the Santa Fe Railyard sites, moderately cost-efficient cuts of meat dominate in all time periods, indicating that the occupants were toward the middle of the economic scale. In the late historic period, an increase in the proportion of less cost-efficient to highly cost efficient cuts of meat may have more to do with the increased availability of beef and corresponding lower prices than with an increased socioeconomic status of the people using the sites.

A major point that was perhaps not anticipated at the outset of this project relates to taphonomy. Though the ultimate goal of this research was to understand changes in the use of animals through time, it is abundantly clear that understanding the taphonomic context is equally important. In many cases, taphonomic observations correlate much more closely with assemblage type than with time period, which has the potential to affect interpretations of the data. In this sense the faunal analysis of the Santa Fe Railyard was extremely important in highlighting these differences at a variety of assemblage types. Additionally, this project has greatly enhanced our understanding of subsistence changes during the Santa Fe Trail and Railroad periods, with a specific emphasis on the late historic period that is thus far largely undocumented in Santa Fe.

8 | Summary and Conclusions

Santa Fe Railyard Project Summary and Conclusions

Jessica A. Badner

Summary

Work at the Santa Fe Railyard identified 32 archaeological sites assigned to five cultural temporal components. These were: Spanish habitation; acequias and field remnants; Atchison, Topeka and Santa Fe Railway infrastructure; New Mexico Central Railroad infrastructure; early- to mid-twentieth century neighborhood refuse; and twentieth-century industrial installations.

Evidence of a late Spanish Colonial- or Mexican-period occupation was provided by a large pit midden (NSTR 101) excavated at LA 146402. This was the only feature of its kind in the project area and one of only two extensive Spanish Colonial middens excavated to date south of the Santa Fe River. Artifacts recovered from its deposits provided a rich and varied assemblage with which to evaluate *Research Domain 2: Frontier Model for Social and Economic Acculturation: A Material Culture Study*. Analysis used proxies of imported goods to evaluate material wealth through access to imported goods. The Euroamerican artifact assemblage revealed that some aspects of Spanish Colonial acculturation within the villa may have been more similar to rural and isolated locales than areas north of the Santa Fe River. The assemblage had high relative frequencies of imported serving dishes from central Mexico. These ceramics with small amounts of porcelain and ferrous metal hint at a family of limited means with some Indio or mestizo heritage or affiliation (Barbour 2010:213).

Native ceramic analysis suggests a mid-eighteenth-century deposit with ware types predominantly contributed by northern Tewa potters. Vessel forms indicate a predominance of Tewa Polychrome bowls and micaceous cooking vessels, which had ware characteristics consistent with preparation of traditional Spanish foods. In deposits from the earliest context, two large metates indicate local processing of both cultigens and wild grains. Both cow and sheep were likely butchered at home; sheep tended to be butchered at a younger age. A mean ceramic date of 1738 for Euroamerican ceramics recovered from lower fill corroborates the early eighteenth-century date assigned to the midden from native ceramics.

Artifacts from upper strata reflect a Mexican-period component with both recognized and unidentified nineteenth and twentieth disturbance. Research design questions specific to midden context are addressed in Chapter 3 and in synthetic reporting for all artifact classes and archaeobotanical remains, the majority of which were recovered from sampled midden deposits.

Six acequias, representing seven archaeological sites (LA 146407, LA 146408, LA 149909, LA 146410, LA 149912, LA 120957, and LA 146418) were excavated in the project area. LA 146407 and LA 146408 likely correspond to the archivally documented course of Acequia de Diego Romero and the Manhattan Street Ditch. LA 149909 and LA 146410 were likely the course of Acequia de los Pinos (aka Acequia Madre) or a nearby lateral of that ditch. LA 149912, Arroyo de los Tenorios, was likely the same water course as Arroyo en Medio and Arroyo de las Cruces and provided an example of a natural water way appropriated and incorporated into the acequia system. LA 120957, the Acequia Madre de Santa Fe, is one of Santa Fe's last operable and oldest irrigation ditches. LA 146418 was an unnamed ditch located approximately a mile downstream from those excavated in the Railyard Park section of the project area, but OSL dating tentatively indicates a pre-Pueblo revolt date of 1630. In addition to these acequias there were east to west laterals of the Acequia Madre. These "*sangrias*" associated with field remnants excavated at LA 146402 dated to the mid-nineteenth century.

Santa Fe's irrigation system is arguably one of the oldest in New Mexico. Established in 1610 when Spanish colonists relocated from San Gabriel it is predated only by a system installed by Oñate in 1598 and Native American water diversion documented in various early scouting forays by the Spanish. Acequia segments that run through the Santa Fe Railyard are, to date, some of the only acequias excavated in Santa Fe's south side system and the only irrigation features extensively investigated as a group. Excavation and archival research of these sites informs on the integral role that the water system played in the founding and growth of the villa. Acequias are recorded and discussed as pertinent to *Research Domain 1: The Spanish Colonial to Late Territorial Period Acequia and Field System at the Santa Fe Railyard.* Most are presented in Chapter 2, although field sections and sangrias at LA 146402 are described and discussed in Chapter3.

The project area traversed remnants of the former railyard. The initial construction for the AT&SF began in the late months of 1879 and within 20 years the yard accommodated three rail lines. By the turn of the century, the Atchison, Topeka and Santa Fe Railway (AT&SF), the New Mexico Central Railway (NMC), and the Denver and Rio Grande (D&RG) shared some facilities resulting in a layout that somewhat conformed to three zones likely created as the railyard grew and evolved. AT&SF facilities were predominantly located in the area designated as the North Railyard development parcel. In addition to remnant and intact tracks, these facilities included some of the first structures installed in 1879–1880. This industrial-scale infrastructure, discussed in Chapter 3, included foundations to a well and a water tower (LA 146403), train maintenance bays, loading docks, a water crane, coal pits, various plumbing and drainage pipes, a freight scale and foundation to the original depot later converted to a freight warehouse (LA 146402 and LA 146409), as well as remnants of a stockyard (LA 146411, reported in Chapter 6). All these were part of a venture that by 1881 had constructed the nation's second trans-continental railroad. Infrastructure erected by AT&SF was unique to Santa Fe and was constructed of imported materials made to standard specifications. In addition to a departure from vernacular architecture, facilities represent an institutional investment on a par with the U.S. military and the Catholic Church. Even so these facilities, so important to the emergent growth of Santa Fe's economy, were not particularly remarkable for the AT&SF, which installed much larger amenities along a division point on the main line in Albuquerque.

The NMC facilities documented in Chapter 4 were located further to the south and east. They included a depot (LA 146405), loading dock (LA149915), stockyard (LA 146415 and LA 146417), tracks necessary to facilitate locomotion (LA 146417 and LA 149911), and a large alluvial diversion channel built to prevent floodwaters from crossing directly over the NMC railroad tracks (LA 149913). The NMC was a small regional railroad developed as speculative venture by New Mexico entrepreneurs. The rail line ran south from Santa Fe, through the Estancia Basin and to El Paso. In contrast to the AT&SF infrastructure, excavation indicates that building practices were largely ad hoc reflecting its less substantial revenue base.

D&RG facilities were located in eastern railyard area. The D&RG may have leased the maintenance bays from AT&SF but no infrastructure primarily associated with the line was excavated during the project though the Union Depot (now Tomasita's restaurant) and the foundation to the turntable are nearby as well as associated track and sidings. All railroad-associated infrastructure addresses questions posed in *Research Domain 3: Bringing Archaeology and History to Bear on the Archaeological Buildings and Structures of the Santa Fe Railyard* and are discussed in Chapters 3 and 4 of this report.

In addition to railroad infrastructure, the project excavated and tested two twentieth-century middens (LA 146412 and LA 146413) associated with the surrounding neighborhood; both dated to the early twentieth century. Assemblages from both sites were initially assigned earlier dates, but still peripherally contribute to understanding patterns of Spanish acculturation outlined in *Research Domain 2*. Perhaps more importantly they provide assemblages that document the processes of urban evolution spanning pre- and post-World War II eras and provide insight into urban site formation processes. Artifact content recovered from LA146412 indicates some mixing with colonial era deposits even in modern context south of the Santa Fe River.

Though native ceramics only made up of 0.07 percent of the assemblage, they demonstrate the intrusion of earlier deposits observed elsewhere in the downtown area north of the Santa Fe River.

Modern industrial sites were predominantly located in the South Railyard along Cerrillos Road. Half of the sites (LA 146411, LA 149916, LA 149917, and LA 149918) were linked to bulk oil stations. The fluorescence and final demise of these stations chronicle larger economic shifts taking place regionally and throughout the United States in the Post-World War II-era. Stations were built as distributorships that may have been marginalized as commercial transportation relied more heavily on the interstate highway system than rail transport. Other modern industrial sites included a creamery (LA 149914), a transmission line (LA 153442), and three sites (LA 149909, LA 149910, and LA 149919) presumably tied to the transportation and/or freight storage. Wholesale Building Supply Co. (LA 149909) provided warehouse space for both CL Bowlds Packing Co. and the U.S. War Department. The remaining four sites (LA 149910, LA 149914, LA 149919, and LA 153442) had a variety of site-specific functions. However, all appear to have been tied into the existing Santa Fe Railyard infrastructure in some way.

Like the bulk stations, the Santa Fe Creamery and Ice Company (LA 149914) appears to have used railroad transport to move perishable milk products. Lastly, LA 153442 represents the adaptive reuse of the existing transmission lines. Archival records suggest these lines were initially used for a telegraph in the nineteenth century.

Conclusions

Transportation has been a perennial theme in appraising sites excavated at the Santa Fe Railyard. Acequias were the first efficient commodity transport system constructed by Spanish settlers in New Mexico. Assuming favorable yearly precipitation within a watershed, farmers who were geographically economically isolated could at least plan on water delivery. This is in contrast to over land trade that suffered from bad roads and dangerous circumstances.

The research design defines Spanish Colonial New Mexico as a semi-periphery that operated at an economic disadvantage but served along with Mexico to mediate between the Spanish Old World core and the New World indigenous periphery. D. H. Snow makes a convincing argument against this view, pointing out that New Mexico's isolation and lack of marketable raw materials relegated it to a peripheral condition, if that. Semi-periphery, periphery or "anomalous position" (Elder and Weber 1996:xxxiii, in D. H. Snow, Chapter 7, this report), it is clear that Spanish Colonial New Mexico was isolated and beset by transportation and trade problems that made internal communication difficult and goods importation prohibitively expensive for a majority of its residents.

The frontier model of acculturation (Moore, Chapter 1, this report) attempts to evaluate the acculturative process through trade interaction and the degree to which involved groups, both native and immigrant, adopted each other's material culture. Excavation of the artifact assemblage from the Spanish Colonial midden context, such as minor amounts of majolica or porcelain discard, demonstrates a limited amount of trade with central Mexico by residents who were not wealthy by any other measure. This is in sharp contrast to local assemblages recovered from both the Palace of the Governors and the Baca-Garvisu estate, both of which demonstrated purchase of significant amounts of majolica and porcelain. This picture is further complicated by the farmstead's relative wealth when compared to an assemblage from Trujillo House in Valencia. Residents of Valencia had better access to a wider variety and greater quantity of products than inhabitants of the Barrio de Guadalupe.

In addition to throwing a wrench into expectations outlined by the frontier model, evaluation of regional data also demonstrates gaps in our current knowledge regarding relative wealth among residents within any given hamlet. One avenue to better understanding economic societal stratification, or lack of it, could be to evaluate contemporaneous assemblages from residences located within a given watershed. This might provide better baseline data regarding local trade, relative wealth and access to remote markets forged by ties within a community.

Ditch systems were core infrastructure, mandated by the Spanish Crown. They were a community's first construction and were critical to its existence and growth. In order to adjudicate water allotments, users of any one acequia system formed an association that provided a social and organizational framework in the absence of other forms of civic control. To appropriate water for survival, residents had to participate in this community. It is reasonable, then, to postulate that social, religious, and economic ties may have been strong within an acequia system and furthermore, other than family ties, were stronger than those social contracts forged with users from another watershed. Given historically documented transportation problems that often prevented farmers from selling surplus, it may be that users from different watersheds had better access to trade with central Mexico than perhaps, in some cases, with each other.

Attempts proposed by the research design to evaluate Spanish acculturation during the Santa Fe Trail era through the Mexican period and into the early Railroad era using the *Frontier Model for Social and Economic Acculturations* were unsuccessful due to a lack of data (Chapter 3). Various artifact assemblages were simply not temporally sensitive enough to evaluate such a compressed time period.

World systems theory is predicated on the concept that "contemporary change within national societies is conditioned by linkages with global networks comprising "developed" societies in the core regions, "less developed" peripheral nations, and intermediate semi-peripheral regions" (Chase-Dunn and Hall 1991; Sanderson 1991; Payne 1999:267). Societies in core areas exercised economic control and pursued geographic economic expansion through military efforts.

During the Spanish Colonial era and into the Mexican period, New Mexico suffered from geographic and economic isolation exacerbated by lack of financial support. Neither the Spanish Crown nor the Mexican government was able or willing to spend the necessary capital either to fully support the colony or to completely bring the territory into its economic orbit. Only the U.S. Army and the Catholic Church (arguably a nation state in its own right) levied and expended sufficient funds to construct large public works. This changed with the railroad. By its very nature the railroad solved the herculean problem of overland transport and communication that had so plagued previous administrative entities and negated the value of New Mexico's natural resources. Engineers scouted raw materials along the line, and built accordingly. Coal from the Cerrillos coal fields, timber from Pecos River canyon, proximity to gold placer mines and agricultural goods from the Rio Grande valley (D. H. Snow, Chapter 7, this report) all added up to an equation that determined the rail line's route. The result secured Albuquerque's destiny as a division point, and its subsequent development as a major metropolitan area.

The necessity of railroad construction efficacy illustrates the difficulties involved in connecting the western territories to the power base and economic center of the United States on the east coast. By 1850 the United States was in much the same position as the Spanish Crown, and the Mexican government, before it. The nation had 1.4 billion acres of public land that was inaccessible and almost worthless because of lack of transportation. To remedy this situation, railroad companies were provided huge incentives in the form of land grants by congress to build west which was justified by national security and unification (Riskin 2005:8). Senator William R. King summed up the situation in congressional hearings on passage of the Railroad Land Grant bill

> it [the land]will be there for five hundred years; and unless some mode [of transportation] of the kind proposed be adopted, it will never command ten cents.

The AT&SF required a huge funding base to continue operations across the sparsely populated territory and this is evident in its facility construction. Infrastructure installed at the Santa Fe Railyard at the spur's inception focused first and foremost on technical infrastructure necessary for locomotion. Depot construction, while not necessarily an afterthought, was simple. Capital investments by the city, the rail line and, indirectly the U.S. federal government were necessary for spur construction. Though these incentives were available to regional rail lines, archaeological investigations demonstrate the AT&SF's superior funding base for the task at hand in the form of substantial building foundations constructed of imported materials. This is in contrast to NMC construction, which appeared to have been more of a hodgepodge constructed of outdated supplies. There may also have been a temporal component to these contrasts in development. AT&SF facilities were remodeled roughly at the same time period (Structure 2 at LA 146402, Chapter 3) and demonstrated more loose construction techniques and material selection, namely recycling of original materials to build an addition.

This may demonstrate economic stress experienced in the 1890's when the AT&SF was placed into receivership and could be demonstrative of economic conditions experienced by both companies. Overall, facilities indicate an emphasis on freight and stock rather than passenger service. This is consistent with archival sources (C. T. Snow 2003) that document a spotty passenger service, which ceased in 1932.

Though eastern architectural styles were first imported by the U.S. Army in 1846, when the Army of the West occupied Santa Fe in the wake of the Mexican War, railroad construction provided access to materials that would make renovation of adobe buildings with small windows and dirt roofs affordable for the civilian population. This also had a radical effect on commercial construction. Eastern building styles and newly available materials like brick and milled lumber were adopted with fervor, and "modernization" changed the character of the downtown area quickly. This enthusiasm reflects the willingness of Santa Fe's businessmen and community lenders to provide capital for the spur from Lamy and a desire to shift their political, economic, and cultural affiliation with a Mexican frontier to a member of the Union as a U.S. Territory.

This movement, coupled with Santa Fe's population growth, also had consequences for the acequia system. Flooding had periodically decimated downtown Santa Fe and dam construction was seen as a way to deal with both this situation and the denuding of foliage caused by a burgeoning population. By 1880 the first dam was built, and ten years later, wealthy residents had access to indoor plumbing. Although damming eventually had deleterious consequences for acequias, the railroad itself didn't impede water flow. Surprisingly, the most consistent evidence of acequia realignment was provided by modifications likely undertaken by AT&SF and NMC, generally to preserve the channels' flows. While archaeological evidence suggests that Arroyo de los Tenorios may have been truncated by the AT&SF, archival documentation indicates that the watercourse was diverted between 1880 and 1882. Modifications made to acequias to accommodate various railroad tracks and berms are documented at many of the railyard acequia sites. The Acequia Madre's channel was modified to accommodate the NMC train track; and water boxes were constructed by the NMC to guide the course of an acequia that followed the course of the Manhattan Street Ditch.

After World War II both acequia and railroad institutions were declining and New Mexico, a state since 1912, was fully intertwined economically with the fortunes of the United States. Railyard archaeology demonstrates the gradual abandonment of acequias, and a growing urban neighborhood and commercial landscape. Bulk oil stations along Cerrillos Road testify to the city's growth, as do modern middens near Baca Street. By 1960, only two oil stations remained, while other companies had likely transitioned to acquiring their oil by using truck or pipeline. Into the modern era, the rise of the U.S. interstate system and air travel, coupled with declining public subsidies favored other forms of transportation.

Archaeological investigations and archival research have provided a rich data set with which to perceive the changing urban landscape south of the Santa Fe River. The project chronicles 200 years of land use affected by geopolitical and economic forces, the results of which are visible in the material culture and architecture. The process of industrialization and the progression from rural farmland to industrial landscape is emblematic of urbanization processes across the western United States.

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