



**Archeological Monitoring and Exhumations
City of Austin's Oakwood Cemetery Chapel
Restoration Project
Travis County, Texas**

April 2020

**HICKS &
COMPANY**

ENVIRONMENTAL
ARCHEOLOGICAL
AND PLANNING
CONSULTANTS

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**ARCHEOLOGICAL MONITORING AND EXHUMATIONS
FOR THE CITY OF AUSTIN'S
OAKWOOD CEMETERY CHAPEL RESTORATION PROJECT
TRAVIS COUNTY, TEXAS
VOLUME I**

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Texas Antiquities Permit No. 7709
Hicks & Company Archeology Series #298

Submitted to:
City of Austin

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April 2020

Abstract

Between November 2016 and January 2018, Hicks & Company Environmental/Archeological Consultants (Hicks & Company) performed archeological monitoring and excavations at the Oakwood Cemetery Chapel prior to planned restoration efforts there by the City of Austin (the City). The Oakwood Cemetery is listed on the National Register of Historic Places and is also a Historic Texas Cemetery and a City of Austin Historic Landmark. As the City is a political subdivision of the State of Texas, the project is subject to the Antiquities Code of Texas (ACT) (Texas Natural Resource Code, Title 9, Chapter 191), which requires state agencies and political subdivisions of the state to notify the Texas Historical Commission (THC) of ground-disturbing activity on public land and work affecting state-owned historic buildings. The law also established the designation of State Antiquities Landmarks (SAL), which may be applied to historic buildings and archeological sites. The accompanying Rules of Practice and Procedure for the ACT are subsumed under Texas Administrative Code (TAC), Title 13, Chapter 26. Cemeteries are specifically addressed under TAC, Title 13, Chapter 22. In addition to the ACT, burials and cemeteries in Texas are also protected under the Texas Health and Safety Code, Chapter 711. Investigations were conducted under Texas Antiquities Permit No. 7709 issued to Principal Investigator Josh Haefner. Together with the Texas Historical Commission and the City of Austin, Hicks & Company developed a plan for monitoring the chapel restoration work to avoid unnecessary impacts to graves anticipated to be encountered below the chapel, as well as outside and adjacent to the chapel. The monitoring of various construction activities between November 2016 and January 2018 resulted in the discovery of 59 unmarked graves of individuals who died in the late nineteenth or early twentieth century (including several infants) and a series of archeological excavations to exhume 37 of those graves from the chapel's interior. Only 37 of the graves were proposed for exhumation as the remaining 22 were in locations that would not be impacted by the planned improvements to the chapel or the improvements were altered to avoid the graves. Exhumed human remains will be reinterred with the coffin fragments, coffin hardware, and personal effects recovered from their respective graves within the Oakwood Cemetery and commemorated by a plaque and reburial ceremony. This report consists of two volumes; Volume I (this document) describes the archeological investigations and Volume II discusses the bioarcheological analysis of the exhumed remains conducted by Texas State University's Forensic Anthropology Center (Spradley et al. 2020).

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Acknowledgments

Josh Haefner served as Principal Investigator for the project. Brittany McClain, Gregg Cestaro and Amy Goldstein all served as Project Archeologist during different periods of the investigations. Brandon S. Young oversaw completion of all reporting and project closeout. Archeological crew members included Keith Faz, Ryan Hechler, Bryan Heisinger, John Jorgensen, Emily McCuiston, and Will Pratt. Bioarchaeologists who performed exhumations include Avery Check, Kate Flor-Stagnato, Chloe McDanel, Lauren Meckel, Briana New, Annie Riegert, Courtney Siegert, Shelly White, and Chris Wolfe. Additional archeological crew during exhumations include Alexis Baide, Molly Cravey, Debra Desarmeaux, Chris Lamon, Samuel Brigham-McLellan, Galen Randall, and Shannon Smith, with help from TRC's Meghan Bruckse Bury, Erin Hamilton, Jodi Jacobson, Ashleigh Knapp, and Paul Matchen. Skeletal analysis was conducted by Texas State University's Forensic Anthropology Center under the supervision of Dr. Kate Spradley.

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Chapter 1: Introduction

This report discusses archeological investigations undertaken by Hicks & Company Environmental/Archeological Consultants (Hicks & Company) on behalf of the City of Austin (the City) for their Oakwood Cemetery Chapel restoration project near downtown Austin, Travis County, Texas (**Figures 1 and 2**). As the City is a political subdivision of the State of Texas, the project is subject to the Antiquities Code of Texas (ACT) (Texas Natural Resource Code, Title 9, Chapter 191), which requires state agencies and political subdivisions of the state to notify the Texas Historical Commission (THC) of ground-disturbing activity on public land and work affecting state-owned historic buildings. The law also established the designation of State Antiquities Landmarks (SAL), which may be applied to historic buildings and archeological sites. The accompanying Rules of Practice and Procedure for the ACT are subsumed under Texas Administrative Code (TAC), Title 13, Chapter 26. Cemeteries are specifically addressed under TAC, Title 13, Chapter 22. In addition to the ACT, burials and cemeteries in Texas are also protected under the Texas Health and Safety Code, Chapter 711. Investigations were conducted under Texas Antiquities Permit No. 7709 issued to Principal Investigator Josh Haefner.

The historic Oakwood Cemetery Chapel was constructed in 1914 to function as a mortuary chapel. In the 103 years since its construction, the chapel suffered from uneven foundation settlement and deferred maintenance of other structural deficiencies. Given such conditions, rehabilitation of the Oakwood Cemetery Chapel was identified as a priority for cemetery improvements that were funded under the City's 2012 General Obligation Bond. The proposed improvements project was undertaken by the City to rehabilitate the chapel for services, as well as a visitor's center and community space. The scope of the rehabilitation included structural stabilization of the foundation; surface drainage improvements; Americans with Disabilities Act (ADA) access improvements; rehabilitation of the single-occupant restroom; mechanical, electrical, and lighting overhaul; and restoration of interior and exterior finishes, including doors, windows, masonry, roof, and plaster.

Because the cemetery is listed on the National Register of Historic Places (NRHP), and is also a Texas Historic Cemetery and a City of Austin Historic Landmark, it was necessary to include archeological monitoring as part of all restoration activities with potential to disturb previously undocumented archeological resources including unmarked burials. This monitoring work was assigned to Hicks & Company as a subcontractor to AECOM under a contract with the City for engineering and environmental services. The THC requested that Hicks & Company archeologists monitor ground disturbing activities associated with all drilling of shafts for the chapel support piers, site regrading, and mechanical excavations associated with the early phases of the restoration. Monitoring efforts began on November 2, 2016, during excavations for a temporary power pole and soil removal and site regrading around the northern exterior of the chapel. This work continued until a partial headstone was uncovered approximately eight feet north of the chapel's northwest corner (**Figure 3**). A second headstone was uncovered in the area proposed for parking north of the chapel. Monitoring of the grading work in this area resulted in the discovery of 12 burial stains, one of which was associated with the second headstone. All uncovered headstones were mapped for inclusion on the plan map of the chapel area available as **Figure 3**. Following those discoveries, all work was halted in the area north of the chapel to allow for consultation between the City, the THC, and Gadberry Construction, the contractor responsible for the restoration. During those consultations, the THC asserted that no new impacts could take place over any graves, including the 12 grave shaft stains identified north of the chapel in the proposed improved parking area. Thus, the THC indicated that the City would

either have to avoid impacting the 12 burials or they would have to consider exhumation if avoidance was not possible. As a result of the follow up consultation, the City opted to redesign the project by removing the planned parking lot improvements and associated landscaping from the project to avoid impacting the burials in this area.

Following the initial monitoring efforts in early November 2016, monitoring of drilling for support piers within the interior of the chapel began on November 29, 2016, resulting in the discovery of human remains (Burial 1) during the drilling of the second pier shaft at the northeast corner of the Tower Room (see **Figure 3**). Construction activities were again halted to allow for coordination among the City, the THC, and Hicks & Company to develop a mitigation plan. Following this consultation, hand-dug test units were excavated within the chapel's northern extent. Burial stains and coffin hardware were identified as a part of these efforts; however, due to the compaction of the sediment, hand excavations proved temporally infeasible. At this point, systematic mechanical scraping and sediment removal began under the supervision of archeologists to locate all unmarked burials in the chapel's interior. Mechanical excavations were performed to an agreed-upon level of 110 centimeters (cm) below a datum (cmbd) established at the south entrance. The excavator removed roughly 30 cubic meters of material in 10- to 20-centimeter thick levels. During this work, 37 burial stains were documented within the chapel interior (see **Figure 3**). Following this initial excavation, all work was halted within the interior so that the City could solicit and consider the community's feedback regarding a plan to exhume and possibly identify the persons buried beneath the chapel. After careful consideration of the community's response, the City decided that the best course of action was to initiate exhumations.

From May 23, 2017, to October 27, 2017, burials (Burials 1, 2, 4, 6–28, and 30–39) were systematically excavated, with exhumations occurring primarily within the interior of the chapel and exterior excavations occurring only when necessary to exhume complete skeletons bisected by a chapel wall. Burials 3, 5, and 29 were just on the outside of the chapel and were not excavated.

Following completion of the interior and exterior excavations, pier drilling activities were resumed on November 2, 2017. Three additional burials were discovered during subsurface drilling and were documented as Burials 40, 41, and 42. Burial 40 was the only burial of these three to be exhumed. Burial 41 was left in place as it was located on the exterior of the chapel and was not anticipated to be impacted again by pier drillings, shoring, or future work. The City adjusted the placement of adjacent piers to mitigate further impacts to Burial 42 (see **Figure 3**). As Burials 3, 5, 29, 41 and 42 were left in place, their presence will be recognized as part of the commemorative process and interpretive planning for the project. The locations of the graves will be recorded in the cemetery records and a marker or plaque will be erected in one or more places to commemorate and interpret the unmarked graves. Given that there are numerous unmarked graves throughout the cemetery, the marker or plaque is an opportunity to tell a broader story about this section of the cemetery.

Monitoring of the installation of a new wastewater line occurred around the exterior of the chapel on January 23–26, 2018. This required the gradual scraping of a three-foot-wide, three-foot-deep trench running north to south from the Tower Room to the Oakwood Cemetery main road to identify grave shafts. Burials 43 through 47 were identified through this work; however, these were not exhumed as the proposed improvements would not impact the burials. As with Burials 3, 5, 29, 41 and 42, Burials 43 through 47 will be recorded in the cemetery records and a marker or plaque will be erected in one or more places to commemorate and interpret the unmarked graves.

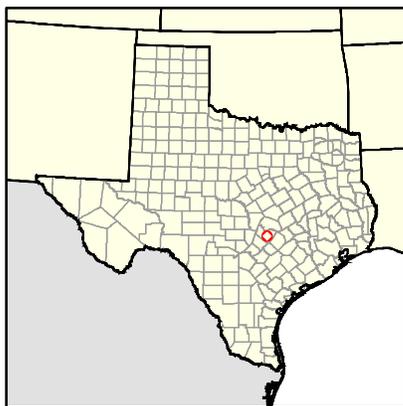
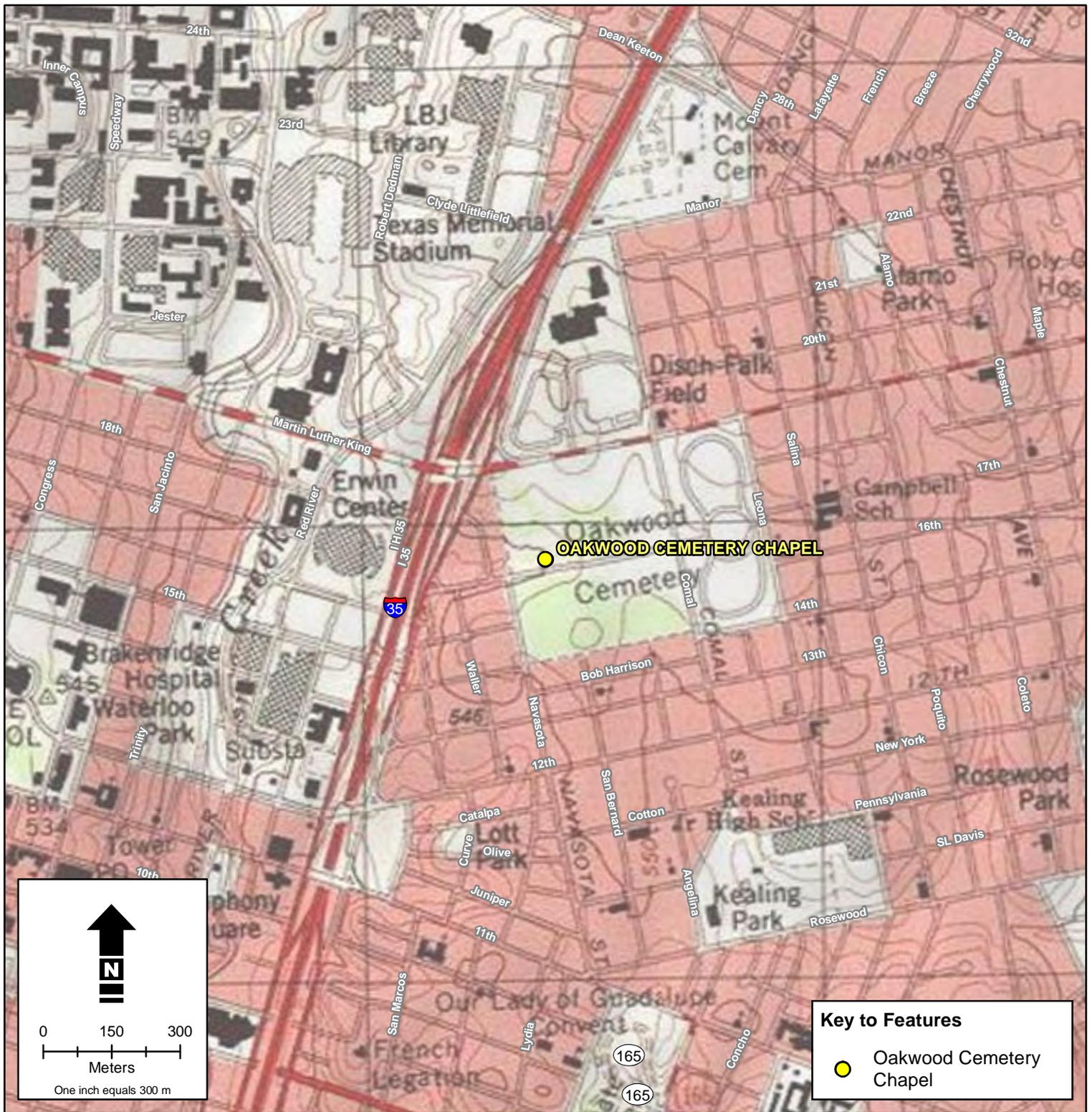
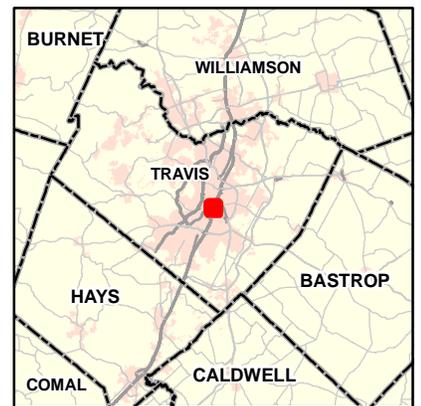


Figure 1

**Project Location Topographic
Oakwood Cemetery**

USGS 7.5-minute Topographic Quadrangle:
Austin East (USGS# 30097-C6), TX

Revised November, 2019



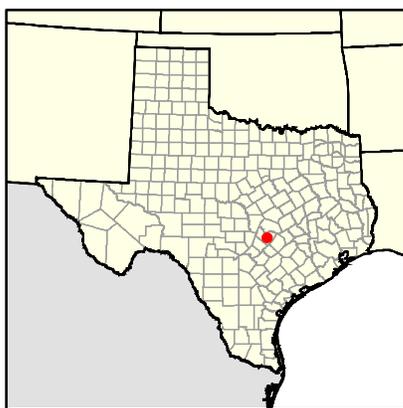
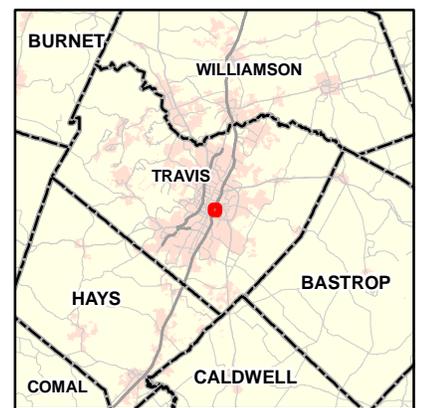


Figure 2

**Project Location Aerial
Oakwood Cemetery**

Revised November, 2019



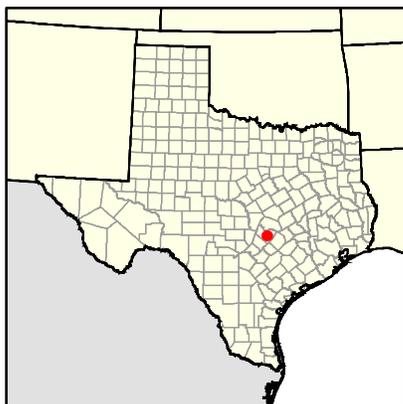
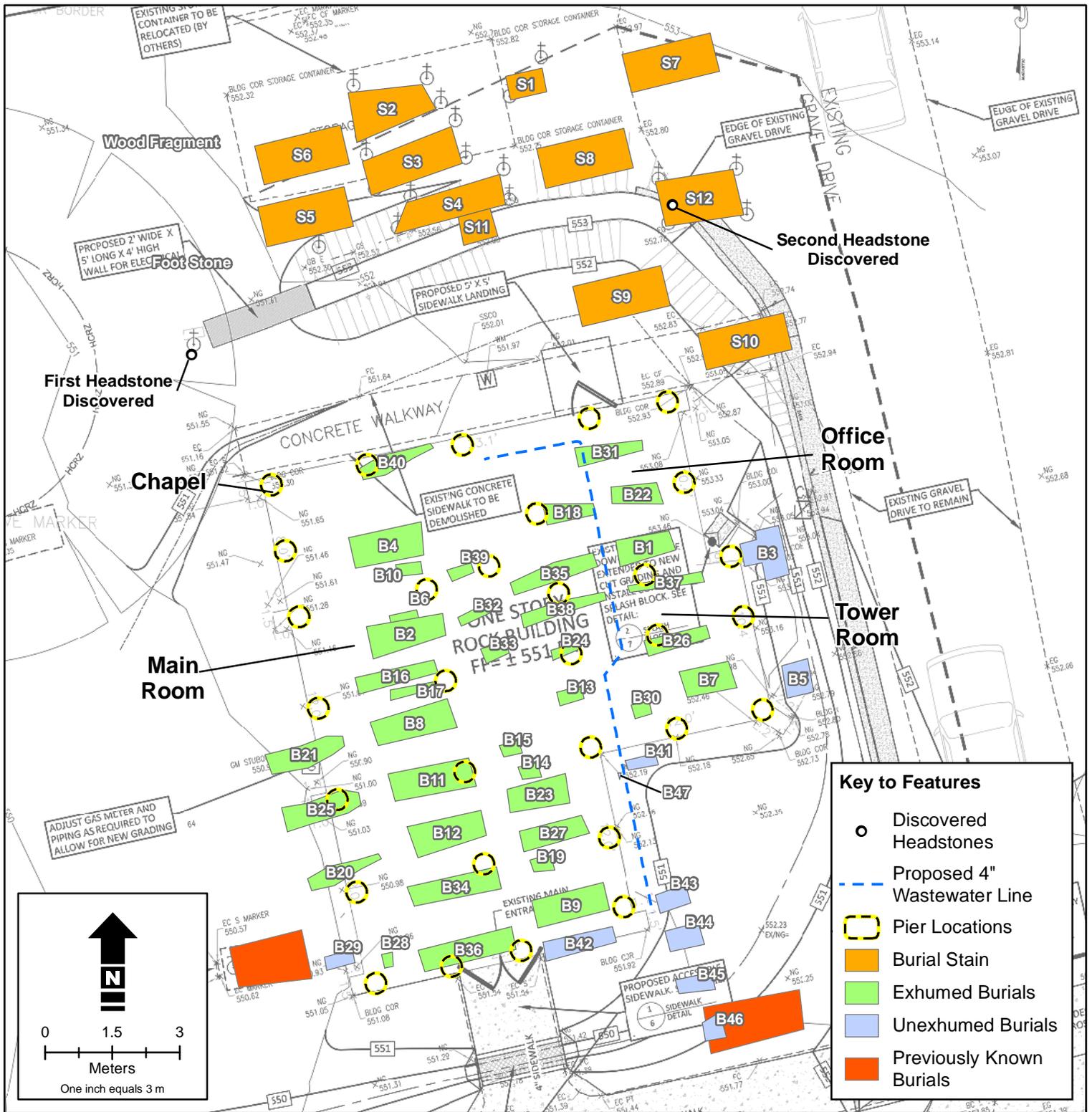
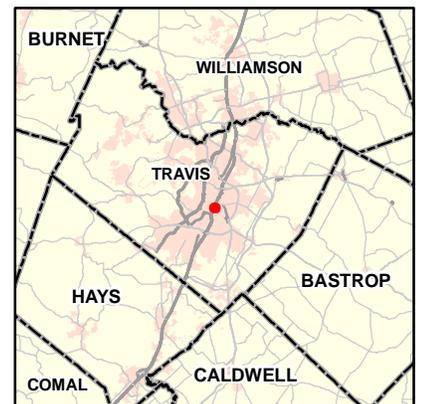


Figure 3

**Documented Burials and Exhumations
Oakwood Cemetery**

Revised April, 2020



In total, Hicks & Company discovered 59 burials, labeled Burials 1 through 47 and Burial Stains 1 through 12, during various phases of work at Oakwood Cemetery (see **Figure 3**). Of these, 37 burials (Burials 1, 2, 4, 6–28, and 30–40) were exhumed due to unavoidable construction impacts. One identified burial (Burial 2) contained no human remains. Because the proposed construction would not disturb Burial 42, beneath the southeast Main Room foundation, and Burials 3, 5, 29, 41, and 43–47, near or adjacent to the exterior perimeter of the chapel, those 10 graves were left in place. The 12 burial stains identified north of the chapel were also not exhumed, as the City removed the planned parking lot and landscaping from the project to avoid disturbing those graves. As with the 10 unexhumed burials, the 12 identified burial stains have been recorded in the cemetery records and a marker or plaque will be erected in one or more places within the cemetery to commemorate and interpret the unexhumed and unmarked graves.

This report, therefore, documents the excavation of 37 of the unmarked graves, all dating to the mid- to late nineteenth or early twentieth century. The burial assemblage—all human bones, remnants of the wooden coffins and coffin hardware, and personal items—recovered from each of the 37 exhumed burials have been treated with the utmost respect and dignity and will be reburied in a new location safely inside Oakwood Cemetery. Specifically, each of the exhumed individuals will be reinterred within Oakwood Cemetery by the City during a public ceremony, with the coffin fragments, coffin hardware, and personal effects recovered from their respective graves.

The restoration of the Oakwood Cemetery Chapel was completed in June 2018. The successful completion of the project required frequent and timely communication among the City, Hicks & Company, the THC, the contractor, and the public. This included weekly and often more frequent field meetings, as well as worksite inspections, between City staff and Hicks & Company to keep City staff apprised of field progress and any encountered challenges. Hicks & Company submitted regular report summaries to the City and THC, allowing opportunities for review. Additional regularly occurring field meetings and inspections involved the THC. Throughout this process, the City shared the results of ongoing public outreach with the team, allowing the public's concerns, thoughts, and ideas about the project to be considered.

To accommodate the City's efforts to maintain an open dialogue about the project and interpretive opportunities with the residents of Austin, the City hosted two public meetings in 2017. On Saturday, March 25, 2017, the City held a public outreach meeting at the Delores Duffie Recreation Center in Austin, Texas. Hicks & Company staff, City Parks and Recreation Department (PARD) staff, and approximately 50 members of the community attended to discuss the Oakwood Chapel findings to date, assess the future of the project, gain public feedback and comment, and establish the criteria that would guide the department's future decision making process. A second public outreach meeting was held on Tuesday, April 11, 2017, at the Britton, Durst Howard & Spence Building in Austin, Texas, and public comments and feedback were collected. Ultimately, PARD recommended that the recently discovered burials within the footprint of the Oakwood Chapel, where safely recoverable, be exhumed and reinterred (COA 2017).

This report consists of two volumes; Volume I (this document) describes the archeological investigations and Volume II discusses the bioarcheological analysis of the exhumed remains (Spradley et al. 2020). Volume I begins with a brief history of Oakwood Cemetery (Chapter 2) to contextualize the project area, with a focus on the development of the cemetery and its internal arrangement. Chapter 3 describes the various field and laboratory methods used during the investigations and subsequent laboratory analyses. Included with Chapter 3 is a high-level review of the bioarcheological analysis; however, a detailed

discussion of those methods is available in Volume II of this report. In Chapter 4, the report presents the general results of archeological monitoring and excavations, then proceeds to describe each exhumed burial (including abstracted bioarcheological analysis results), as well as an accounting of identified burials that were not exhumed due to a lack of project impacts. Chapter 5 describes the various artifacts recovered from the general monitoring and excavation efforts, as well as the materials collected from each exhumed burial, including coffin fragments, coffin hardware, and personal effects interred with the deceased. Finally, Chapter 6 provides a summary and recommendations concerning the project and future construction in and around the Oakwood Cemetery Chapel.

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Chapter 2: Historic Background

Oakwood Cemetery was first established in 1839 as City Cemetery and was utilized as the first municipal burial grounds within Austin (Knott 2005). The cemetery was renamed the Austin City Cemetery in 1859 and Oakwood Cemetery in 1908 (Austin Parks and Recreation 2017). Over the years it has grown from a small, 10-acre cemetery to its present size of 40 acres. Oakwood Cemetery is located on a small hill just east of Interstate 35, which, historically, would have been the edge of the city (**Figure 4**). Bounded by East Martin Luther King Jr. Boulevard to the north, Comal Street to the east, East 14th Street to the south, and Navasota Street to the west, the cemetery is mostly oriented in a grid fashion that aligns northwest to southeast. Two main traffic-circulation routes (Main Avenue and Central Avenue) divide the grounds into four distinct quadrants (**Figure 5**) (Tieman n.d.). The oldest dated interments are in the southwest quadrant (Section 1). The first interments appear to be arranged opportunistically, with irregular sized plots and placement, as opposed to the planned grid system found otherwise in the four quadrants.

The first interment at Oakwood Cemetery is reputedly that of an enslaved person murdered while traveling from Bastrop to Austin in 1839 (Knott 2005). His body was interred to the south of the west entrance of Oakwood Cemetery. The first recorded burial is that of George W. Logan, dating to 1841, though the exact location of this grave is unknown. Many prominent people and families (as well as impoverished and disadvantaged individuals) are buried within the cemetery grounds, including: Governors Andrew Hamilton and Elisha Marshall Pease; U.S. Attorney General Thomas Watt Gregory; state senator and “Father of the Texas Navy” Thomas Freeman; generals James Johnson, Andrew Neil and George Terrell; architects Abner Cook, Christopher Conrad Stremme (also an engineer credited with developing a method to inexpensively reproduce maps for the Texas Land Office), E.M. Scarborough, and E.C. Kreisle; Julia Maria, one of the initial members of the Texas State Historical Association; Swante Palm, who championed Swedish immigration into Central Texas during the mid-nineteenth century; Colonel Andrew Jackson Zilker, known best for donating the land for Austin’s Zilker Park; and Jacob Fontaine, founder of six area churches, including the First Baptist Church for African Americans in Austin (Knott 2005: 11–16) and the St. John Missionary Baptist Association.

Numerous organizations have acquired and maintained plots within Oakwood Cemetery over the years. These include the Austin Fire Department, the Texas Confederate Women’s Home, the Austin Typographical Union, the Texas School for the Deaf, the Carpenters and Joiners of America, the Woodsmen of the World (Knott 2005: 16), and the Masonic Lodge, Independent Order of Odd Fellows Capital Lodge #23. Additionally, two traditional Jewish burial grounds, Congregation Beth Israel Number 1 and Congregation Beth Israel Number 2, were established and are perpetually maintained.

The design and layout of Oakwood Cemetery is organized in such a way that it provides insight into mid-nineteenth-century life regarding societal, religious, and socioeconomic views. Much of the northern half of the southeast quadrant is dedicated to socially prominent families while three sections are devoted to the interment of “inhabitants of the city of Austin,” “paupers,” “strangers,” and “people of color” (Austin Parks and Recreation 2017). The chapel was constructed in Section 4, specifically in an area that was set aside as a “potter’s field” for the burial of “strangers and paupers” and referred to as “Colored Grounds” (Amaterra Environmental 2015). A large African-American section was also designated within the original Oakwood Cemetery. The practice of segregating the burials within Oakwood Cemetery continued even after 1916 when the Oakwood Cemetery Annex was established (**Figure 6**) and a Hispanic section was designated within the Oakwood Annex grounds.

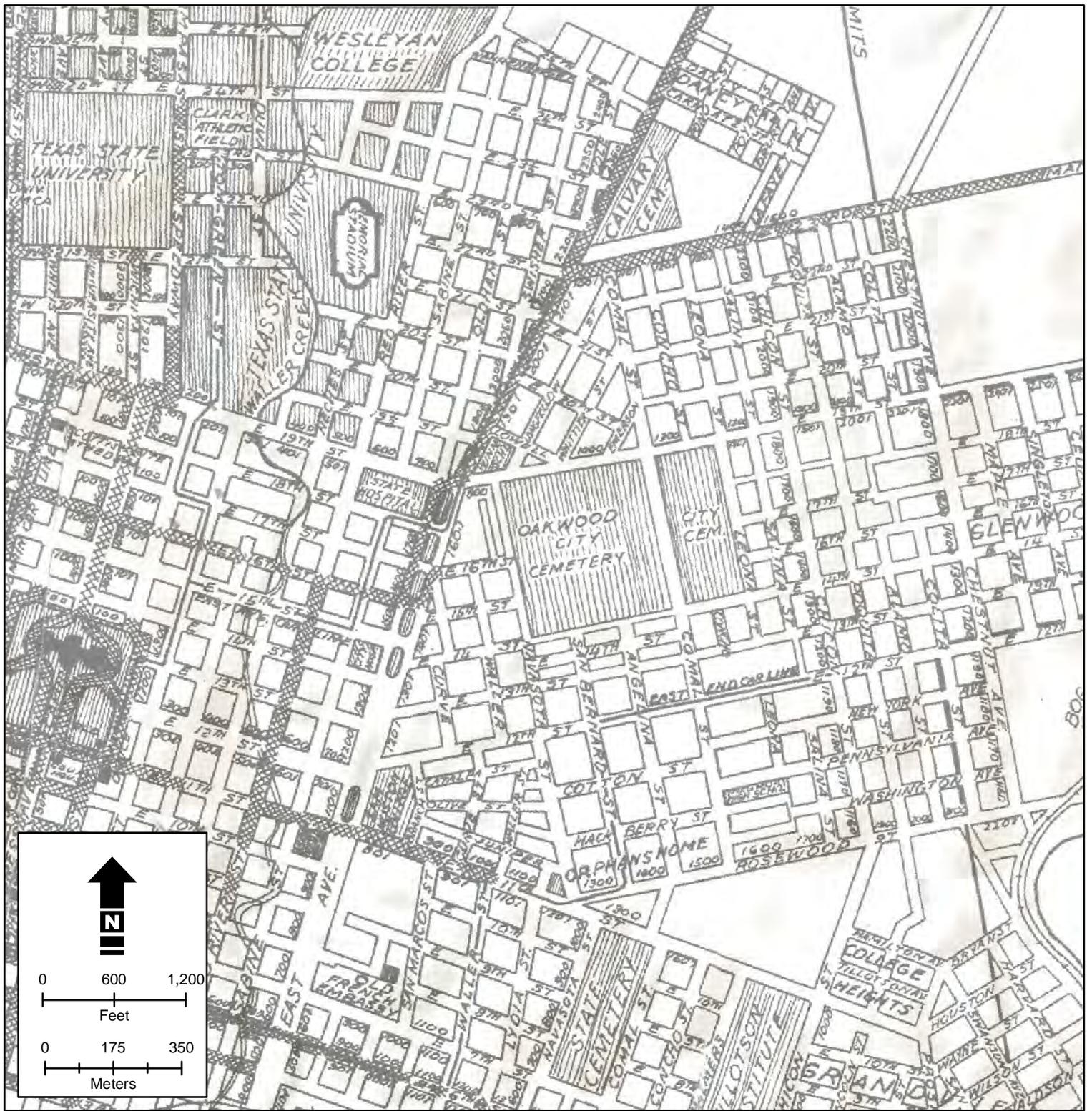
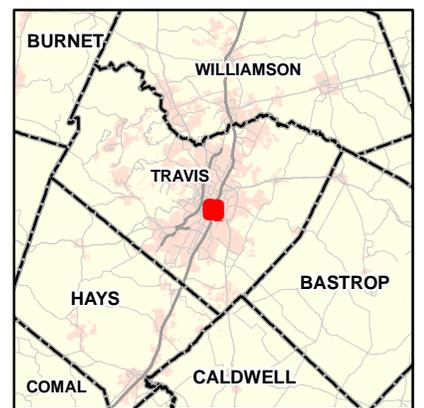


Figure 4

**City of Austin Map
 Penick, 1925
 Oakwood Cemetery**

Revised November, 2019



OAKWOOD CEMETERY - Austin, Texas

MARTIN LUTHER KING BLVD.

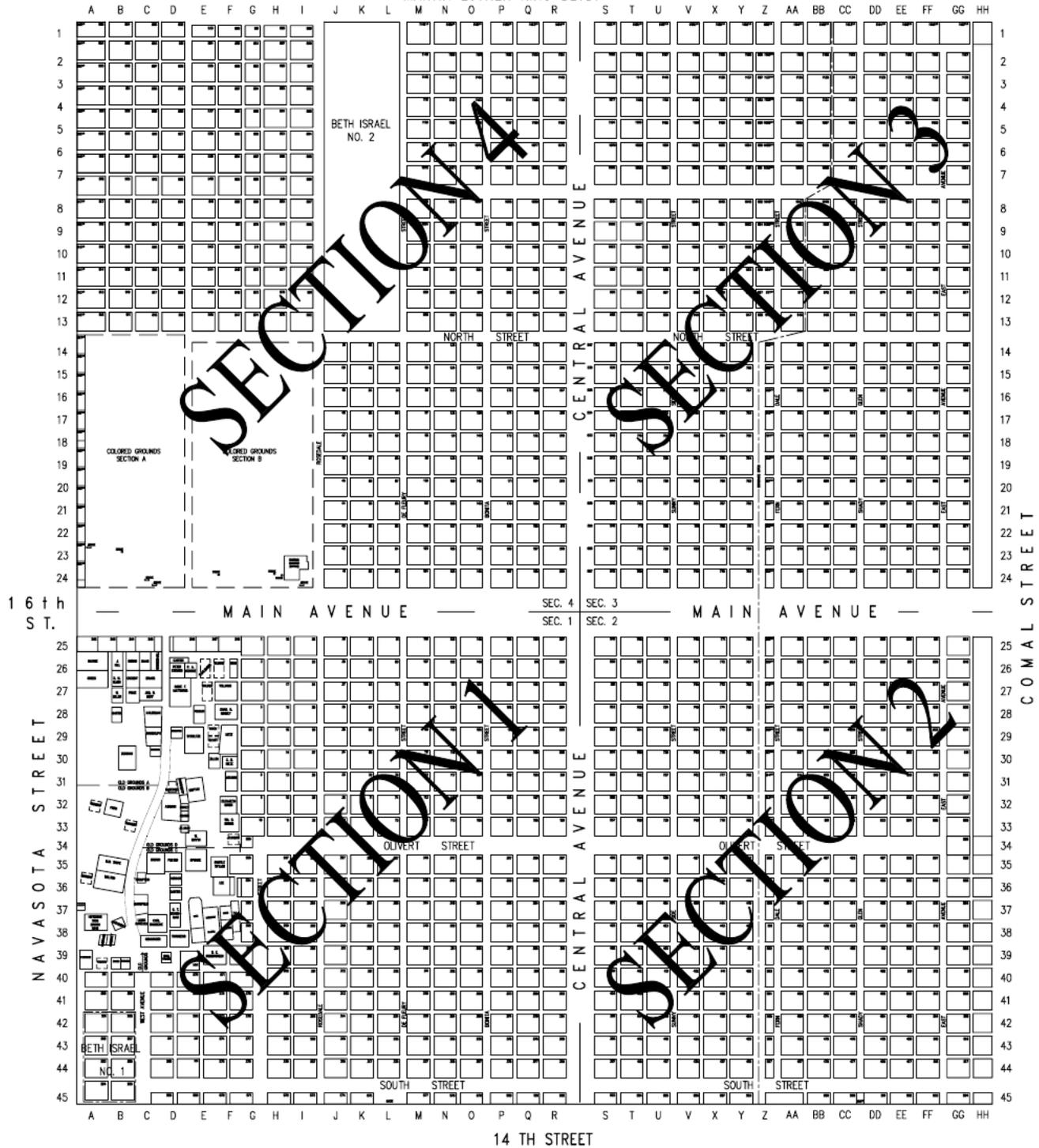
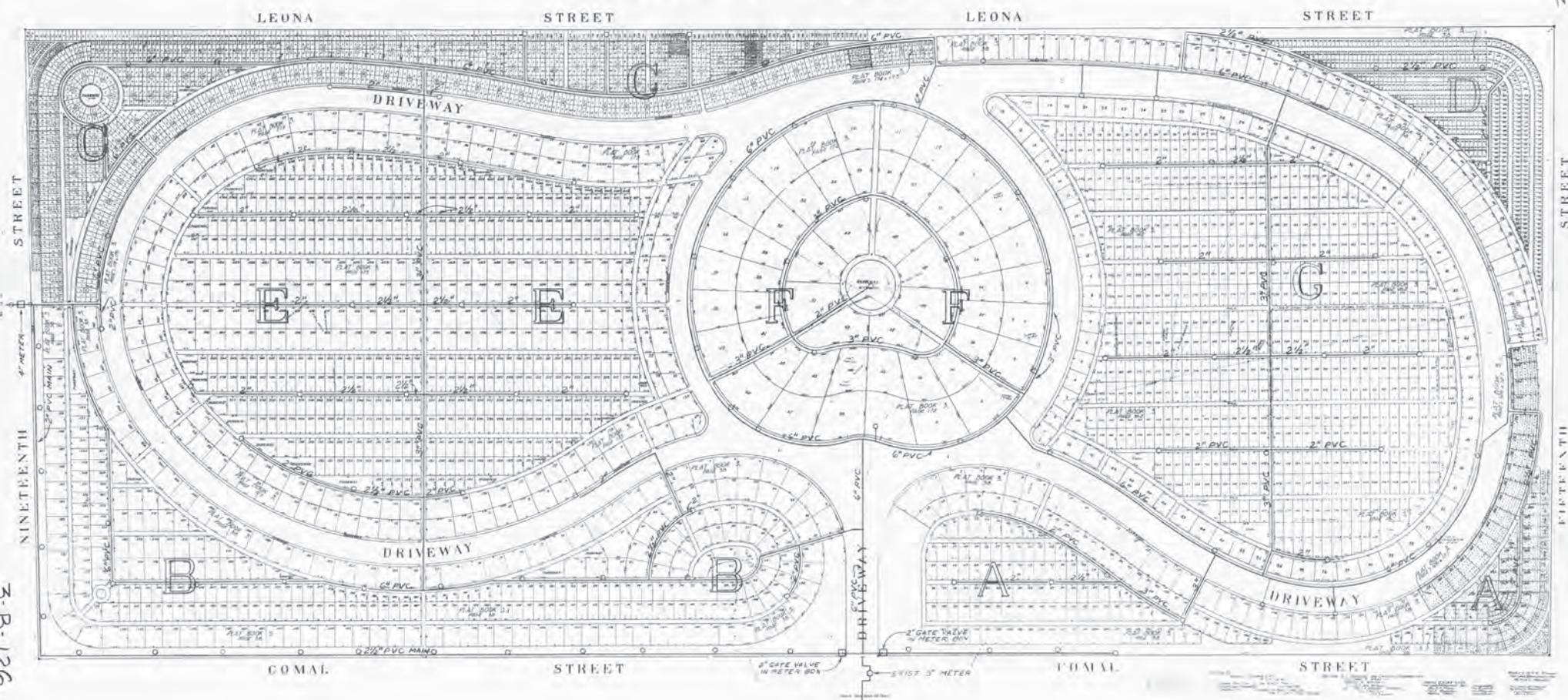


Figure 5
Oakwood Cemetery Sections

OAKWOOD CEMETERY ANNEX AUSTIN TEXAS



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3-B-126

FIFTEENTH STREET

Figure 6

**Oakwood Cemetery Annex Plan
Metcalf, 2019**

Revised November, 2019

After a renewed interest in cemetery upkeep and maintenance in the first decades of the twentieth century, the City initiated several improvements to Oakwood Cemetery, including road building, vegetation management, and, in 1914, the construction of Oakwood Cemetery Chapel. The chapel is an ashlar limestone building designed by Austin architect Charles H. Page, and constructed in an area known to be designated as racially segregated (Austin Parks and Recreation 2017). The chapel has a rectangular sanctuary with a tower on its east side. In function, the chapel was intended to serve as a mortuary (Knott 2005). In 1944, the interior of the chapel underwent a significant renovation, which included the addition of a restroom and floating concrete slab (Austin Parks and Recreation 2017). These improvements certainly disturbed the soils under the chapel and likely impacted some of the discovered burials documented in this report.

In addition to the Oakwood Cemetery Chapel, other notable structures were built within the cemetery, including mausoleums and monuments. The mausoleums range in style from Art Deco to Art Moderne and all but one remain in good condition (Knott 2005). Other structures within the cemetery include family plot enclosures, walls, entrance ways, unit piers, fences, and curbs. Site furnishings recorded within the cemetery include grave markers and other commemorative items such as ledgers (grave-sized markers installed on the ground or low to the ground). Grave markers range in date from the mid nineteenth century to present day. The construction materials from which these markers were fabricated have a wide range, but the most common are grey granite and limestone.

From the 1890s to 1970, maintenance and care of the grounds was primarily managed by cemetery associations (such as the Austin Cemetery Association) and interested individuals. In 1970, the City formally accepted the responsibility, management, and care of Oakwood Cemetery (Austin Parks and Recreation 2017). On July 3, 1972, an Official Texas Historic Marker was erected at Oakwood Cemetery, and, in 1985, Oakwood Cemetery was nominated to the NRHP (Knott 2005). In 2001, the cemetery was listed as a City of Austin Historic Landmark, and in 2010, it was designated a Historic Texas Cemetery. In 2013, the Austin Parks and Recreation Department (PARD) assumed full management and oversight of all municipal cemeteries, including Oakwood Cemetery.

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Chapter 3: Methodology

Given the nature of the Oakwood Cemetery Chapel Restoration Project, specific field and laboratory methodologies were necessary and are described below. The Field Methodology section describes the multiple stages of field work completed, which include interior excavations, interior and exterior explorations, and monitoring of the installation of a wastewater line and trench excavation. The Laboratory Methodology section consists of the Artifact Analysis, Coffin Morphology, and Bioarchaeology Analysis. The Artifact Analysis and Coffin Morphology section describes the methods used for analysis of artifacts in the interpretation of personal effects, in addition to a methodology for dating burials through the analysis of coffin hardware and coffin morphology. Together, this information can be employed with the intent to place undated burials into a temporal period. The bioarchaeology analysis section describes the methodologies utilized for the analysis of skeletal remains in the construction of biological profiles consisting of estimations of age, sex, biological affinity, stature, and any pathologies or trauma present on the skeletons.

Field Methodology

In order to reveal burial shaft stains within the interior of the chapel, bulk removal of overburden material laid down during renovations of the chapel in 1944 was accomplished by mechanical excavation to a depth of 110 centimeters (cm) below the modern grade marked by an elevation datum established at the chapel's south entrance. During the removal of the overburden, burial shaft stains were noted and shovel scraping was employed to clean the presumed 1944 ground surface throughout the chapel in search of additional staining. Hand excavations were then concentrated where staining was apparent; however, it was noted that a number of the stains were not well-defined. In such cases, archeologists used shovels and trowels to carefully scrape the negative spaces between known burials, yielding additional staining. Prior to the excavation of individual burials, sub-datums were established within the interior of the chapel on the presumed 1944 ground surface, relative to the elevation datum at the chapel's south entrance. Once hand excavations of individual burials commenced, the sub-datums provided a vertical control point to determine the depth of burials below the 1944 ground surface. Thus, documented burial depths were recorded as centimeters below surface (cmbs), with the surface being the presumed 1944 ground surface, 110 cm below the modern grade.

The excavation methodology for the burials included the recording of burial orientation, morphology of the coffins when preserved, and the collection of coffin hardware and other funerary goods for lab analysis. Photographic documentation and recording of pertinent information occurred prior to utilizing hand excavation techniques in the exhumation of skeletal remains.

Laboratory Methodology

Artifact Analysis

The artifacts removed from the various excavations were cataloged by type, material, and description. The categories for burial artifacts include coffin hardware and personal effects included at the time of interment. Coffin elements include fabric, nails, lining tacks, screws, diamond-shaped screw caps, filigreed screw caps, dummy tacks, and more formal hardware such as thumbscrews, handles, and escutcheons. All coffin

hardware was analyzed and categorized following descriptions and methods in Davidson (2000; 2004) and Hill and Pye (2012) with more generalized nail and screw types compared to types in Kimbark (1876). When complete enough (intact head and enough of the shaft for comparison), square-cut nails were sized in comparison to the full-size illustration of Common Cut Nails presented in Kimbark (1876:90).

Clothing and personal effects recovered from the excavations were identified and separated by material type. Personal effects included buckles, fasteners, numerous types of buttons, a gold ring, a crucifix, beads, coins, and a coin purse. Additional artifacts recovered during monitoring and excavation of sediment within and outside of the chapel, but not definitively associated with any particular burial, include ceramic sherds, glass shards, and miscellaneous metal fragments. Those materials cannot be considered associated with a particular grave given previous horizontal and vertical disturbances (e.g., construction of the chapel in 1914 and subsequent renovations of the chapel in 1944). While it is possible that the ceramic sherds, glass shards, and metal fragments were remnants of items placed at or on the graves as offerings by friends and family of the deceased, these materials are out of their original context and cannot be directly assigned to a particular grave. Additionally, these materials may also be nothing more than items left behind by visitors to the cemetery or workers during the construction of the chapel in 1914 and 1944.

Artifacts were compared to type descriptions in resources such as *Encyclopedia of Marks on American, English, and European Earthenware, Ironstone, and Stoneware 1780-1980* (Kowalsky and Kowalsky 1999), *Historic Ceramic typology With Principal Dates of Manufacture and Descriptive Characteristics for Identification* (Brown 1982); *The Parks Canada Glass Glossary For The Description of Containers, Tableware, Flat Glass and Closures* (Jones and Sullivan 1989); *An Archaeologist's Guide to Nineteenth Century Glass* (Lorrain 1968); *Alexandria Archaeology Laboratory Reference Book* (Magid 2010); *A Dating Key for Post-Eighteenth Century Bottles* (Newman 1970); and reference websites on historic glass (Lindsey 2019), celluloid collars (Schock 2015), and the collared shirt (Sheong 2011) for temporal assignment. Other sources consulted during analysis include U.S. Patents.

Hardware Methodology

The methodology for the analysis and classification of coffin hardware followed that of Davidson (2000), the source utilized for the classification of coffin and casket hardware recovered during the Freedman's Cemetery project in Dallas, Texas. The same source was later utilized by Tine and Boyd (2003) for similar analysis of hardware from the Pioneer Cemetery project in Brazoria, Texas.

Button Analysis

Buttons may be analyzed through the identification of material type, button type, shape, color, the presence and classification of a shank, eye hole count, and measurements. Buttons are well-suited as diagnostics useful in dating archeological deposits, as the date of manufacture provides an excellent *terminus post quem*. Additionally, the analysis of buttons may also help infer socioeconomic status among individuals and identify specific garments worn by the deceased.

The button analysis for this project followed a methodology adapted from the Digital Archaeological Archive of Comparative Slavery (DAACS) Cataloging Manual on Buttons (Aultman and Grillo 2012), modified for the identification and analysis of Prosser buttons as informed by Sprague (2002). This hybrid methodology was chosen to provide consistency not only with current comparative collections but also in

the archeological record for comparisons and interpretation. Following this methodology, buttons recovered from the exhumations were classified according to the following criteria: material, completeness, type, shape, quantity of eye holes, shank type, and measurements of diameter, length, width, and height. Prosser buttons were further classified according to their design.

Bioarchaeology Analysis

For each exhumed burial at Oakwood Cemetery, skeletal remains were collected according to skeletal element, recorded on standardized field forms, and placed into tissue paper and wrapped in foil. All skeletal elements from each burial were placed into designated boxes and transported to the locked laboratory at Hicks & Company's Austin office. Once all of the exhumations were complete, skeletal remains were transported to Texas State University where they were analyzed by a team of bioarchaeologists and forensic scientists from the Texas State Forensic Anthropology Center, led by Dr. Kate Spradley.

Data from skeletal material was collected using Osteoware, a computerized data entry system created by the Smithsonian Institution (SI). This system incorporates guidelines for recording osteological data from the SI Osteological Repatriation Laboratory and guidelines from *Standards of Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). When possible, cranial and postcranial metrics were collected for each skeleton to create a profile containing basic demographic data for each burial. The biological profile includes the estimation of various identifiable characteristics that make up the individual during their lifetime: sex; age-at-death; biological affinity; stature; pathologies; and trauma. The completion of the biological profile is contingent on the presence of key skeletal elements and the condition of the remains.

The methods utilized for the skeletal estimations of sex, age-at-death, biological affinity, and stature were adjusted as needed based on the condition of the remains. Additionally, the use of paleopathological indicators such as porotic hyperostosis, cribra orbitalia, and/or enamel hypoplasias, if present, provide an understanding of socioeconomic status and overall health during this period.

The pelvis is the best indicator of the sex of an exhumed individual and can be estimated best by visually scoring three characteristics: subpubic concavity; medial aspect of the ischio-pubic ramus; and ventral arc (Phenice 1969). Statistical analysis can then follow a method proposed by Klales et al. (2012). When pelvic traits are not observable, the postcranial skeleton provides the second-best estimate of sex (Spradley and Jantz 2011). Multivariate discriminant function formulae were used if the particular skeleton contained the multiple required measurements. In cases of fragmentary remains, univariate sectioning points were used. Sex estimates from the postcrania were provided using population specific criteria. The Walker (2008) method was used to score the degree of expression for five cranial traits (glabella, mental eminence, orbital margin, occipital protuberance, and mastoid process). This method incorporates logistic regression of cranial traits to provide a statistical probability of sex in the absence of the pelvis and postcranial data or to help strengthen the overall sex estimation.

The estimation of age was completed by scoring numerous features of the pubic symphysis and auricular surface for degenerative changes, following the descriptions outlined in Milner and Boldsen (2011). Cranial sutures were also scored as to whether they were open, fused, partially fused or completely obliterated. All scores were entered into the ADBOU program, which applies transition analysis to the observed suite of age-related characteristics (Boldsen et al. 2002).

To estimate biological affinity, the discriminant function program, FORDISC 3.1, uses measurements from the cranium to statistically compare an unidentified cranium to documented population groups (Jantz and Ousley 2005). In the case of Oakwood, reference groups that best matched the reported demographics from the cemetery records were considered most appropriate for use. The program predicts the probability of group membership and how typical the individual is within that population group.

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005). The FORDISC program calculates stature using all possible postcranial data available and generates stature formulae based on linear regression.

The presence or absence of pathologies, or trauma, was recorded following guidelines outlined in Osteoware. The data collected is archived in Osteoware and used to identify health patterns, levels of childhood or adult stress, and overall health, as part of the overall interpretation of socioeconomic status.

Because the City's available historical burial records for Oakwood Cemetery do not allow the matching of names of individuals with the actual physical locations of burials in this area, individual and next of kin identifications are not possible.

Chapter 4: Results of Investigations

Monitoring Results

Exhumed Burial Descriptions

Archeological investigations at Oakwood Cemetery began on November 2, 2016, with the monitoring of the excavation north of the chapel for placement of a temporary power pole necessary to power mechanical equipment during construction. This event was without incident. Monitoring continued through initial removal of sediment within the chapel's interior, which did not reveal any significant cultural finds, burial staining, or grave goods. Following the completion of this activity, archeologists began monitoring the site grading around the perimeter of the chapel, and it was during this activity that a partial headstone was uncovered approximately eight feet north of the chapel's northwest corner (**Photo 1**). As per the City, the grading work was halted within a 12-foot radius of this headstone (per THC recommendations) and site grading continued elsewhere until an additional headstone was encountered (**Photo 2**). Following these discoveries, all work was halted in the area north of the chapel and the THC was consulted.



Photo 1. Headstone discovered north of the chapel.



Photo 2: Second headstone discovered north of the chapel, on the edge of a gravel road.

On November 29, 2016, drilling for support piers within the interior of the chapel began. Human remains (Burial 1) were discovered as the second pier shaft was being drilled in the northeast corner of the Tower Room of the chapel (**Photo 3**). This discovery prompted the contractor to cease mechanical work in the vicinity to allow for consultation with the City and the THC. Following additional consultation, it was determined that to better facilitate the discovery of burials, a series of mechanical scrapes across the interior of the chapel was warranted. To accomplish the mechanical investigations, a bobcat with a miniature backhoe attachment slowly stripped away soil in 10-20-cm thick linear strips to a maximum depth of six feet below the original ground surface to expose grave shafts to target for methodical hand excavations and exhumations. At no time were burials excavated or exhumed with machinery; the mechanical work was conducted solely to identify grave shafts and areas requiring hand excavations and exhumations.

Exploratory backhoe scraping within the chapel began on December 13, 2016, beginning near the northwest corner of the chapel interior and working south. Approximately eight feet south of the north interior wall, pieces of corroded metal, nails, and wood were observed (Burial 2 [**Photo 4**]). Due to space constraints and the sensitive nature of these cultural finds, mechanical work inside the chapel was halted until archeologists could exhume the burials that had already been exposed; grading and archeological monitoring outside the chapel continued.



Photo 3: Pier shaft where Burial 1 was discovered.

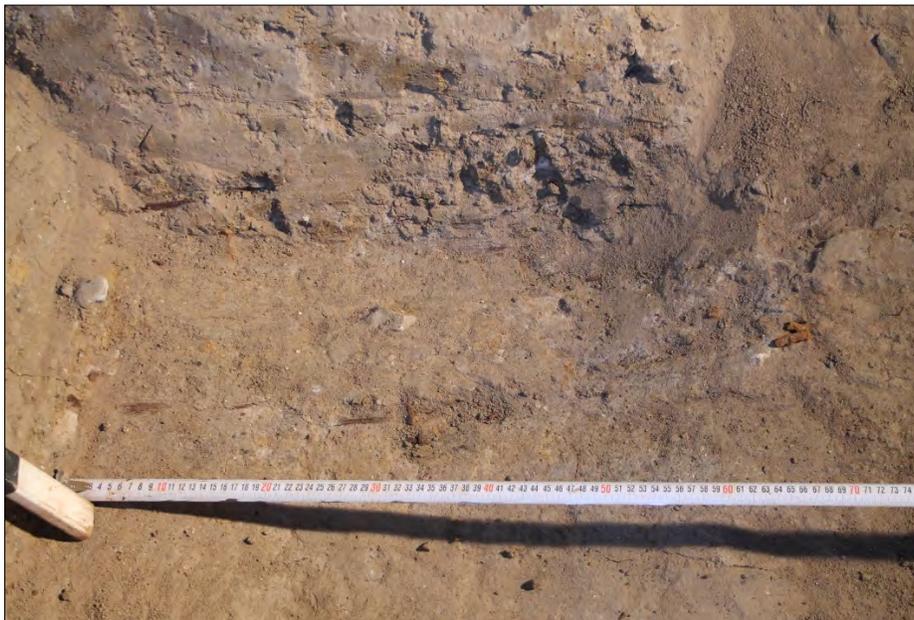


Photo 4: Coffin fragments from Burial 2.

Following cessation of trenching in the chapel interior, archeologists began exposing Burial 2 in order to define its extent. Simultaneously, archeologists assisted by City staff began hand excavation on the outside of the chapel's east wall immediately opposite Burial 1 to define its extent.

To define the extent of Burial 2, archeologists set up four one-meter-by-one-meter excavation units and a site datum along the east side of the initial exploratory trench (**Photo 5**). The units were excavated by hand

using shovels, trowels, and eventually, chisels and hammers. Progress was slow due to the extremely dry and compact clay soils in this area; however, several pieces of wood, a few square nails, one phalanx bone, and other highly fragmented pieces of bone were discovered in the unit. Archeologists believed that these remains represented a third burial in the Main Room of the chapel. Along with the discovery of the headstone outside the chapel, the presence of burials suggested a strong possibility that this area was once a platted section of Oakwood Cemetery, and the discovery of additional undocumented burials was anticipated.



Photo 5: Plan view of interior excavation units.

In total, 59 burials were identified during the investigations inside and outside the chapel. Thirty-seven of the burials were excavated and 22 were left in place as they would not be disturbed by the planned chapel renovations. One burial (Burial 2) contained no skeletal remains. Data for the burials can be found in **Appendix A**. The City will reinter the exhumed burials within Oakwood Cemetery; the locations of the graves of the unexhumed burials have been recorded in the cemetery records and a marker or plaque will be erected in one or more areas within Oakwood Cemetery.

Burial 1

The coffin outline for Burial 1 was located at a depth of 43 cmbs and is one of five burials that archeologists identified in the Office Room of the chapel. This burial was bisected by the chapel foundation effectively placing the head and torso within the Office Room and the lower extremities, from the distal femora down, underneath the foundation outside the building (**Photo 6**). Fill material in this area was very hard and compact, though a little less so near the skull, as sediment there had higher silt content. During exhumation of this burial, it was noted that bone preservation was poor and smaller skeletal elements were displaced from their proper anatomical position. This was likely due to the close proximity of the burial to the chapel exterior, in addition to water inundation seeping beneath the foundation.

Based on bioarcheological analysis, Burial 1 was determined to be the remains of a Black male between the ages of 49.6 and 91.3 with evidence of trauma to the right tibia midshaft. Due to the incompleteness of the skeleton, it was not possible to determine the individual's stature (Spradley et al. 2020). This skeleton was oriented east to west, with the body facing east. The arms were extended with each forearm located beneath the left and right ossa coxae, respectively.



Photo 6. Overview of Burial 1 prior to exhumation and tunneling.

Stain and Coffin Wood/Hardware Description: The burial was first observed as yellowish-orange staining at a depth of approximately 27 cmbs followed by the presence of coffin wood fragments and nails. Positioning of coffin wood and the stain outline indicated the coffin morphology was indeterminate in shape. Nevertheless, fragmented coffin wood, coffin nails, and other hardware were located and collected upon exhumation. The remnants of a thin, small wire nail was present in the hardware assemblage in

addition to more than 100 nails and nail fragments, three diamond-shaped decorative screw caps, and five screw cap fragments.

Associated Artifacts: Personal items recovered during exhumation of Burial 1 include one gold-plated collar stud for a shirt and two fragments of a single wood button.



Plate 1. Representative hardware from Burial 1 includes nails, nail fragments, diamond-shaped screw caps, and screw cap fragments. Personal items include one gold-plated collar stud and two fragments of a single wood button.

Burial 2

Burial 2 was in the northern portion of the Main Room of the chapel (**Photos 7 and 8**) at a depth of 35 cmbs. Although bone was found around this location during initial exploratory excavations, this area did not yield skeletal remains or a definitive coffin outline. Therefore, Burial 2 was recorded as negative. The largest amount of coffin wood (200 grams/0.5 pound) was collected from this burial, however, in addition to over 150 wood fragments. The absence of skeletal remains is likely a result of disturbance and destruction associated with the installation of indoor plumbing in 1944; Burial 2 was possibly exhumed at that time, though there are no cemetery records indicating any graves were exhumed in 1944.



Photo 7. Overview of Burial 2 and associated *in situ* coffin wood and nails.

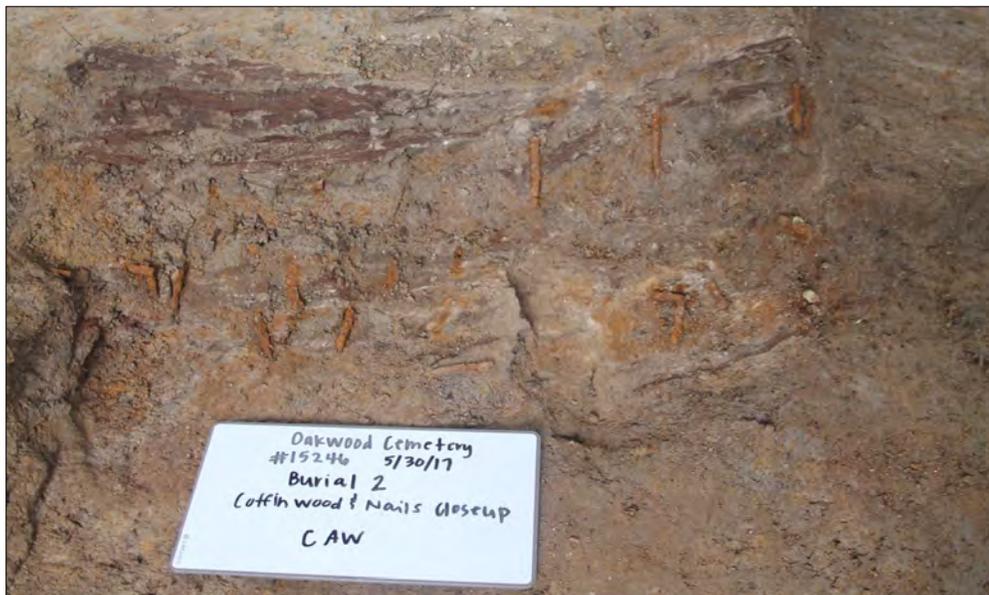


Photo 8. Close up of associated *in situ* coffin wood and nails for Burial 2.

Stain and Coffin Wood/Hardware Description: While no skeletal remains were recovered from Burial 2, coffin wood and a series of nails were observed *in situ* within the south wall. Analysis of the Burial 2 hardware indicates the majority of materials (**Plate 2**) were fragmented square cut nails. Additionally, a single wire nail was identified in the assemblage, as was a single tack, larger in size than those identified as likely being coffin lining tacks. Four screws with three probable cap fragments were also collected, though these were too fragmented for style identification.

Associated Artifacts: No personal items were recovered in this previously disturbed burial.



Plate 2. Representative hardware from Burial 2 includes nails, nail fragments, screws, and a lining tack.

Burial 4

Burial 4 was in the northern portion of the Main Room of the chapel at a depth of 53 cmbs. Excavations initially identified fragments of coffin wood but there was no definitive coffin outline (**Photo 9**) and only small fragments of indeterminate bone were recovered. Given the minimal skeletal remains, determination of sex, age, biological affinity, or pathologies was not possible (Spradley et al. 2020). As this area of the Main Room had been previously impacted by plumbing repairs in 1944, this burial may have been disturbed during that time and possibly exhumed. Modern construction materials, including metal and mortar fragments, were recovered during excavation. Hardware recovered during exhumation of Burial 4 was limited to a long tack (**Plate 3**); however, it may be an intrusion associated with chapel construction.



Plate 3: A single long tack recovered from Burial 4.



Photo 9. Overview of burial shaft for Burial 4.

Burial 6

Burial 6 was found at a depth of 50 cmbs in the north section of the Main Room of the chapel in the row of interments between Burials 2 and 4 (**Photo 10**). This burial was initially discovered while extending a hand-dug trench north from Burial 2 when small bone fragments were noted during screening. The hand excavations had impacted the lower half of the skeleton. Following this discovery, trowel scraping was employed and a discrete stain outlining the boundary of a small coffin was noted at 40 cmbs. Analysis of the skeletal remains suggested that the deceased was an infant ranging in age from newborn to 1.7 months old (Spradley et al. 2020). This skeleton was oriented east-west, with the body facing east. Poor preservation and the lack of a complete skeleton made identifying positioning of the arms indiscernible.



Photo 10. Overview of Burial 6.

Stain and Coffin Wood/Hardware Description: During stain exploration and exhumation of Burial 6, both fragmented coffin wood and square cut nails were recovered. The positioning of coffin wood remains and the stain outline indicated that the coffin morphology was likely rectangular in shape. Tacks were also identified and collected upon exhumation. Hardware recovered during the exhumation of Burial 6 includes corroded nail fragments, mostly unidentifiable as to size or type; screw-body elements (such as dummy tacks and diamond-shaped screw caps); and square cut nails (**Plate 4**). Hardware recovered during exhumation of Burial 6 includes three decorative dummy tack heads, 28 fat head lining tacks for the interior, and more than 40 nail fragments.

Associated Artifacts: Personal items include one Prosser dish-shaped shirt button (**Plate 4**).



Plate 4. Representative hardware from Burial 6 includes dummy tack heads, fat head lining tacks, and nail fragments. Personal items include one Prosser dish-shaped button.

Burial 7

Burial 7 was in the southeast corner of the Tower Room of the chapel at a depth of 16 cmbs and bisected beneath the east wall (**Photos 11 and 12**). Bone condition in this burial was extremely well-preserved despite presumed long-term exposure to intermittent periods of inundation due to water seepage from under the chapel foundation. Burial 7 is of particular interest due to medical alterations on the cranial vault and a healed fracture with extensive bone growth on the midshaft of the right femur, as well as the array of associated artifacts. Skeletal analysis estimates that the individual was an adult Black male approximately 14.9 to 25 years of age (with a possible narrower age range of 20 to 25), approximately 5'3" to 5'8" in height, and exhibiting a circumferential cut of the skull for the removal of the calotte (skullcap) presumably during a cranial autopsy or dissection (Spradley et al. 2020). This skeleton was oriented with its head to the west and facing east with the forearms bent at the elbow and placed over the midsection.



Photo 11. Overview of Burial 7.



Photo 12. Closing photo of Burial 7.

Stain and Coffin Wood/hardware Description: The positioning of coffin wood, nails, and the stain outline for Burial 7 indicated the coffin morphology was hexagonal. Fragments of coffin wood and square cut nails were collected during exhumation; 11 square cut nails, some corroded together (**Plate 5**), and two dummy tacks were also recovered within this assemblage. These tacks were of the same size and double-filigree design as others in the overall assemblage, though noticeably smaller.

Associated Artifacts: Personal items recovered during exhumation include eight white dish-shaped Prosser buttons located along the midline of the torso, and six black vulcanized rubber buttons stamped with “Novelty Rubber Co. Goodyears, Patent 1851.” One button was located at the left proximal humerus and three buttons were at the right proximal, mediolateral, and distal humerus. Two crimp-sided metal buttons were also found with this individual. A single oval metallic jewelry piece, a pendant perhaps, was recovered with this individual (see **Plate 5**).



Plate 5. Representative hardware from Burial 7 includes nail packets, nails, and dummy tacks. Personal items include buttons (porcelain Prosser dish-shaped buttons, Goodyear hard-rubber coat buttons, and crimped metal buttons) and an oval metallic jewelry piece.

Burial 8

Burial 8 was discovered in the center of the Main Room of the chapel (**Photos 13** and **14**) at a depth of 45 cmbs. The grave shaft was initially discerned by textural changes in sediment during initial soil scrapings. Closer examination discovered a nail pattern in the southern extent of the coffin while fragmented coffin wood was noted at the north. During exhumation, skeletal preservation was noted to be good, though the skull had been impacted by the compaction of the coffin lid. Analysis of the skeletal remains suggests that the individual was an adult Black male approximately 24 to 48 years of age and 5'3" to 5'8" in stature (Spradley et al. 2020). This skeleton was oriented with the head in the west, facing east, with the forearms crossed left over right and hands placed over the midsection.



Photo 13. Archeologist working next to Burial 8 (left).



Photo 14. Overview of Burial 8.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterns, and stain outline for Burial 8 indicated the coffin morphology was hexagonal in shape. More than 235 square cut nail fragments were collected during exhumation. In addition, a few fragmented, corroded wire nails were also collected.

Associated Artifacts: Personal items recovered during exhumation of Burial 8 include three bone buttons, three porcelain white Prosser dish-shaped buttons, one porcelain white Prosser pie crust button, and a plain gold ring found on the middle finger of the right hand (**Plate 6**).



Plate 6. Representative hardware from Burial 8 includes nails and nail fragments. Personal items include buttons (Prosser dish-shaped buttons, bone buttons, and a Prosser pie crust button) and a gold ring.

Burial 9

Burial 9 was found in the southeast corner of the Tower Room of the chapel at a depth of 63 cmbs (**Photo 15**) and was initially identified based on soil discoloration. This was the deepest burial exhumed during the Oakwood Cemetery Chapel investigations. During excavation of this burial, it was discovered that the ribs, vertebrae, arms, and pelvis were displaced. For example, a calcaneus and other foot bones were located near the thorax and both femora were disarticulated with the femoral heads facing laterally. This indicates Burial 9 may have been impacted by a considerable amount of water seepage, the effects of which displaced the remains within the burial from their correct anatomical position. Skeletal analysis suggests that the individual was an adult Black female aged 27.3 to 61.5 years of age (with a maximum likelihood of 39.7 years of age) and approximately 5'1" to 5'5" in stature with evidence of healed blunt force trauma above both eye orbits (Spradley et al. 2020). This skeleton was oriented with the head to the west and facing east. The positioning of the arms was indeterminate due to the disarticulated nature of this burial.



Photo 15. Overview of Burial 9.

Stain and Coffin Wood/Hardware

Description: During stain exploration and exhumation of Burial 9, the coffin morphology was recorded as indeterminate in shape due to an absence of burial stain and lack of *in situ* coffin nail patterns. This is one of only two burials that yielded coffin handles. In total, six handles were collected from the perimeter of the skeleton (see **Chapter 5, Plate 40**). In addition, coffin nails and dummy tacks, more than 50 highly fragmented square cuts nails and wire nails, five diamond-shaped screw caps, and 19 undesignated screw caps were also recovered with this burial.

Associated Artifacts: Personal items recovered during exhumation of Burial 9 include one white shell button.



Plate 7. Representative hardware from Burial 9 includes nail fragments, diamond-shaped screw caps, and undesignated screw caps. Personal items consist of one shell button.

Burial 10

Burial 10 was located at a depth of 53 cmbs in the north section of the Main Room of the chapel near Burials 2, 4, and 6. This burial was initially identified as a rectangular burial shaft stain at 36 cmbs (**Photos 16 and 17**). The bones were extremely friable due to poor preservation causing the bones to fragment during exhumation. Skeletal analysis suggests that the individual represented an intrauterine fetal death (stillbirth) occurring during the 36+ week of gestation (Spradley et al. 2020). Due to the minimal skeletal development at that early age, the deceased's sex, biological affinity, and stature could not be determined. This skeleton was oriented with the head to the west and facing east. Positioning of the arms was indeterminate due to the poor preservation of the skeletal remains.



Photo 16. Overview of Burial 10.



Photo 17. Close up of Burial 10 hexagonal coffin outline.

Stain and Coffin Wood/Hardware Description: The positioning of cut nails and associated coffin outline for Burial 10 indicated the coffin morphology was hexagonal in shape. Square-cut nails were collected upon exhumation as was a single wrought nail, along with screw fragments.

Associated Artifacts: Two copper or brass fragments, approximately two millimeters (mm) in size, were recovered from Burial 10; these may have been part of a pin or fastener. No personal items were found associated with this burial.



Plate 8. Representative hardware from Burial 10 includes nail fragments.

Burial 11

Burial 11 was first identified as a rectangular burial shaft stain between Burials 8 and 12 during mechanical scraping in the Main Room of the chapel. The burial was located at a depth of 38 cmbs (**Photo 18**). When defining the burial shaft stain limits, portions of the coffin lid were observed at 17 cmbs at the eastern end of the burial shaft. The overall skeleton was moderately well-preserved. Bioarcheological analysis of the skeletal remains suggests that the individual was a White female 32.5 to 85.7 years of age (with a maximum likelihood of 32.5 years of age) with evidence of a copper shroud pin stain on the back of the skull (Spradley et al. 2020). Due to a lack of some skeletal elements, an estimate of stature was not possible. This skeleton was oriented with the head in the west and facing east with the forearms bent at the elbow with the hands (right over left) resting on the pelvis.



Photo 18. Overview of Burial 11.

Stain and Coffin Wood/Hardware Description: While pedestaling the skeleton, it was noted that the majority of the coffin walls and sections of the coffin bottom were well preserved. From these coffin elements it was determined that the shape of the coffin was hexagonal. Coffin hardware included approximately 213 nails and nail fragments, 21 decorative dummy tacks, and 23 lining tacks.

Associated Artifacts: Personal items recovered during exhumation of Burial 11 include four decorative black glass buttons with a French jet design (see **Plate 9**).



Plate 9. Representative hardware from Burial 11 includes nails, nail fragments, lining tacks, and dummy tacks. Personal items include glass French jet buttons.

Burial 12

Burial 12 was in the Main Room of the chapel and located between Burials 11 and 34 at a depth of 54 cmbs. Initially observed as a rectangular burial shaft stain during mechanical scrapings, the burial shaft was excavated until a hexagonal outline of coffin wood and nail patterns were encountered (**Photo 19**). The soil matrix was dark brown wet clay with sandy inclusions. During excavations, it was noted that a white powdery substance was present on the left hand, the right ilium, and on the sacrum (**Photo 20**). This white substance was also encountered in Burial 32. Samples from both burials were submitted for chemical analysis to determine the chemical composition. The result of the chemical analysis revealed the white powder to be calcium; the origin of the calcium is unknown. The overall skeletal preservation of this burial was in excellent condition; however, upon exhumation some skeletal elements became extremely friable, including the vertebrae, ribs, and distal and proximal ends of long bones. The majority of the skeletal remains were still in articulation with the exception of the left tibia and some foot bones. Skeletal analysis suggests that the individual was a White female, 21.6 to 34 years of age (with a maximum likelihood of 21.6 years of age), and approximately 4'6" to 5'0" in stature (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east with the right arm extended pronate along the side of the skeleton. The left arm is slightly flexed at the elbow and pronated over the pelvis.



Photo 19. Overview of Burial 12.



Photo 20. Close up of Burial 12, detail of calcium on pelvis.

Stain and Coffin Wood/Hardware

Description: The positioning of the coffin wood and nails in Burial 12 indicated the coffin morphology was hexagonal in shape. Remnants of coffin nails and small screws were located and collected upon exhumation. These artifacts included a high number of square cut nail fragments (Plate 10). Fragmented screw fastener elements were also recovered from Burial 12, though not complete enough for identification.

Associated Artifacts: No personal items were recovered from Burial 12.



Plate 10. Representative hardware from Burial 12 includes nail fragments and lining tacks.

Burial 13

Burial 13 was located between the Main Room and the Tower Room of the chapel at a depth of 24 cmbs (**Photo 21**). Initially observed as a rectangular burial shaft stain, this area was excavated by hand until a small hexagonal coffin outline, fragments of collapsed coffin lid, and nail patterning were encountered. The excavated soil was a gray/orange compact clay mottled throughout with a silty dark brown/gray fill. Skeletal analysis indicated that the deceased was approximately 7.5 to 10.5 months of age. Due to the incompleteness of the skeletal remains, which were poorly preserved due to soil conditions and the fragile nature of infant remains, it was not possible to assign gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west, facing east, and with the elbows slightly flexed and hands placed over the midsection.



Photo 21. Archeologist at Burial 13.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood outline and nails in Burial 13 indicated that the coffin morphology was hexagonal. Over 70 coffin nails and nail fragments were located and collected during exhumation, as well as coffin wood fragments. Nails were identified as square cut fragments. Additionally, 34 fragments of large-sized coffin fasteners, termed fat head tacks, were recovered along with other large fastener fragments which may be of the same type.

Associated Artifacts: Personal items recovered during exhumation of Burial 13 include one blue Prosser dish-shaped button that was located on the torso (**Plate 11**).



Plate 11. Representative hardware from Burial 13 includes nails, nail fragments, a screw, and fat head lining tacks. Personal items include a blue Prosser dish-shaped button.

Burial 14

Initially identified by the exposure of coffin wood and nails during mechanical scrapings, Burial 14 was in the Main Room of the chapel along the east wall at a depth of 15 cmbs (**Photo 22**). Troweling was employed to further delineate the burial and to reveal the coffin outline, as eventually identified by coffin hardware and coffin wood fragments. During excavation, the topsoil was very hard compact clay, while coffin fill was softer sandy dark brown clay. This individual was missing various skeletal elements due to poor preservation most likely attributable to soil conditions. Skeletal analysis suggests that the deceased was approximately 7.5 to 10.5 months of age. Due to the incompleteness of the skeletal remains, which were poorly preserved due to soil conditions and the fragile nature of infant remains, it was not possible to assign gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east. The positioning of the arms was indeterminate due to the lack of arms and poor skeletal preservation.



Photo 22. Overview of Burial 14.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood and stain outline for Burial 13 indicated the coffin morphology was hexagonal in shape. Coffin hardware included more than 102 nail fragments, five screws, 23 lining tacks from the interior, 20 decorative dummy tacks, and three miscellaneous decorative metal fragments from the exterior of the coffin (**Plate 12**).

Associated Artifacts: Personal items recovered during exhumation of Burial 14 include 24 straight pins, probably associated with clothing (see **Plate 12**, far right).



Plate 12. Representative hardware from Burial 14 includes nails, nail fragments, screws, lining tacks, dummy tacks, and miscellaneous metal fragments. Personal items include straight pin fragments.

Burial 15

Burial 15 was in the Main Room of the chapel along the east wall at a depth of 8 cmbs. This burial was initially identified by the exposure of coffin wood and nails during mechanical scrapings and was not associated with an apparent burial shaft stain (**Photo 23**). Hand troweling was employed to further delineate the burial revealing the coffin outline and nails in each of the four corners of the burial. The burial was encased in very dry, hard compact clay making excavation a difficult and damaging process. The burial was very poorly preserved due to soil conditions and the friable nature of the skeletal remains. As a result, the individual is missing various skeletal elements. Skeletal analysis suggests that the deceased was approximately 1.5 months of age or less. Due to the incompleteness of the skeletal remains and the fragile nature of infant remains, it was not possible to assign gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head to the west and facing east. The positioning of the arms was indeterminate due to the poorly preserved condition of the remains.



Photo 23. Close up of Burial 15.

Stain and Coffin Wood/Hardware

Description: The positioning of the coffin wood and nail patterning in Burial 15 indicated the coffin morphology was rectangular in shape. Hardware analysis indicates that fasteners consist of square cut nail types; thirty-six nail fragments were recovered in total (see **Plate 13**).

Associated Artifacts: No personal items associated with this individual were recovered from Burial 15.



Plate 13. Representative hardware from Burial 15 includes nail fragments.

Burial 16

Burial 16 was in the Main Room of the chapel at a depth of 34 cmbs and appeared to be buried within the same burial shaft as Burial 17 (**Photo 24**). This burial was located during explorations to delineate Burial 8 when soil staining and the presence of coffin nails and wood became apparent. When further delineating the area, two distinct hexagonal burial outlines were identified (Burial 16 and 17) (**Photo 25**). Based on the coffin placements in Burial 16 and 17, these two individuals represent the only example to be in such close proximity to one another—potentially representing a familial relationship. The soil surrounding Burial 16 was dense dark brown compact clay encasing the burial and exacerbating the poor preservation. Based on skeletal morphology, size, and extreme dental wear, the remains were determined to be those of a nearly edentulous (lacking teeth) adult. Skeletal analysis suggests that the individual was a Hispanic male, 52 to 90.9 years of age (with a maximum likelihood of 76.8 years of age); an approximation of stature was not possible (Spradley et al. 2020). Analysis also revealed a healed fracture of the first left metatarsal (foot bone). This skeleton was oriented with the head in the west and facing east with the forearms crossed and hands placed over the pelvis.



Photo 24. Burial 16 with Burial 17, smaller, and just to the side.



Photo 25. Burials 16 and 17 were in the same burial shaft.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterns, and stain outline in Burial 16 indicated the coffin morphology was hexagonal in shape. Coffin hardware included over 100 nails and nail fragments, one lining tack and one undesignated decorative screw cap. Two screws with bolt head caps were recovered and may have been used to affix a plate to the coffin lid.

Associated Artifacts: Personal items recovered during exhumation of Burial 16 include one suspender buckle and 11 buttons, including eight white porcelain Prosser dish-shaped shirt buttons, two fragmented bone buttons (usually used for pants), and two copper alloy buttons (**Plate 14**).



Plate 14. Representative hardware from Burial 16 includes a nail, nail fragments, screws, a lining tack, and an undesignated screw cap. Personal items include a suspender buckle and buttons (white porcelain Prosser dish-shaped buttons, a fragmented bone button, and copper alloy buttons).

Burial 17

Burial 17 (**Photo 26**) was in the Main Room of the chapel at a depth of 36 cmbs and appears to be buried within the same burial shaft as Burial 16 (see **Photo 25**). This burial was located during explorations to delineate Burial 8 when soil staining and the presence of coffin nails and wood became apparent. When further delineating the area, the outline of two distinct hexagonal burial outlines were identified (Burials 16 and 17). Based on the coffin placements in Burials 16 and 17, these two individuals represent the only example to be in such close proximity to one another—potentially representing a familial relationship. The soil surrounding Burial 17 was dense, dark brown compact clay encasing the burial and exacerbating the poor preservation; not all skeletal elements were present. As a result of the skeletal morphology and size, in addition to coffin size, the remains are those of a subadult. Skeletal analysis suggests that the individual was 3.5 to 4.5 years of age. Due to the incompleteness of the skeletal remains, which were poorly preserved due to soil conditions and the fragile nature of children’s remains, it was not possible to assign gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west, and facing east, with the arms slightly flexed at the elbows. Placement of hands was indeterminate due to lack of skeletal elements.



Photo 26. Overview of Burial 17 following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nails, and stain outline in Burial 17 indicated the coffin morphology was hexagonal in shape. Coffin hardware included 30 nail fragments, four screws, and four lining tacks from the interior.

Associated Artifacts: Personal items recovered during exhumation of Burial 17 include a white dish-shaped Prosser button, a white shell button, and two glass beads (**Plate 15**).



Plate 15. Representative hardware from Burial 17 includes nail fragments, screws, and lining tacks. Personal items include buttons and glass beads.

Burial 18

Burial 18 was one of five burials in the Office Room of the chapel, four of which were bisected laterally by the chapel foundation (Photo 27). This burial was located at a depth of 44 cmbs and was situated directly beneath a safe located within the west wall of the Office Room. The chapel foundation bisected the burial at the pelvis. Only the lower limbs were exposed, which required tunneling beneath the foundation to exhume the complete skeleton. During exhumation it was noted that the lower long bones were articulated and in good condition, while the feet were jumbled and not articulated anatomically. When tunneling for the remaining skeleton under the foundation, it was noted that the upper body, including the vertebrae, ribs, arms, and hands, were also not in anatomical position and very friable. The soil matrix surrounding this burial was very hard, compact light brown clay with softer sandy clay where organic material was present. The portion of the burial beneath the foundation was extremely compact, dense light brown clay, making tunneling considerably difficult. The overall skeleton was poorly preserved due to encasement in dense clay. Based on the skeletal morphology and size of the individual, in addition to coffin size, these represent the remains of an adult.



Photo 27. Overview of Burial 18 in the Office Room beneath the chapel safe.

Skeletal analysis suggests that the individual was a possible Asian male, 41 to 89.5 years of age (with a maximum likelihood of 73.2 years of age). Due to missing skeletal elements, an approximation of stature was not possible (Spradley et al. 2020). The assignment of biological affinity was based on analysis of the teeth and is a broad, generalized conclusion. This skeleton was oriented with the head in the west and facing east. Placement of the arms was indeterminate due to the fragmented nature of the remains and the location under the chapel foundation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nails, and stain outline in Burial 18 indicated the coffin morphology was hexagonal in shape. Approximately 47 nail fragments and six undesignated screw caps were recovered from the exterior of the coffin. The six screw caps include two that are intact enough to be identified as diamond shaped.

Associated Artifacts: Personal items recovered during exhumation of Burial 18 include two round copper alloy buttons that were located near the pelvis, with four more recovered during screening, and a suspender buckle (Plate 16).



Plate 16. Representative hardware from Burial 18 includes nails, nail fragments, diamond-shaped screw caps, and undesignated screw caps. Personal items include a suspender buckle and copper alloy button fragments.

Burial 19

Burial 19 was in the Main Room of the chapel along the east wall at a depth of 42 cmbs (**Photo 28**). During burial scraping, soil texture and color indicated a subadult burial. The soil matrix was a dense, hard brown mottled clay that transitioned to a sandier dark brown dense clay the closer in proximity to the skeletal remains. Red flaking was also observed on the skeletal remains. Skeletal preservation was extremely poor and friable due to the age of the individual and the soil conditions. Based on the skeletal morphology, size of the individual, and coffin size, the remains are those of an infant. Skeletal analysis suggests that the deceased represented an intrauterine fetal death (stillbirth) occurring during the 36+ week of gestation (Spradley et al. 2020). Due to the minimal skeletal development at that early age, the deceased's sex, biological affinity, and stature could not be addressed. This skeleton was oriented with the head in the west, and facing east. Placement of the arms was indeterminate due to fragmented and poor condition of the remains.



Photo 28. Overview of Burial 19 prior to exhumation.

Stain and Coffin Wood/Hardware Description: Nail patterning and the positioning of the skeletal remains in Burial 19 indicated the coffin morphology was rectangular in shape. Numerous fragments from screws and square-cut coffin nails were located and collected during exhumation. In addition, five lining tacks were recovered, as were three fragments that are likely wire nails (**Plate 17**).

Associated Artifacts: No personal items were recovered during exhumation of Burial 19. However, possible fabric or blanket may once have been interred with the individual due to the presence of a textile imprint and red soil flakes found near the cranial and postcranial remains.



Plate 17. Representative artifacts from Burial 19 hardware includes nail fragments and smaller lining tacks.

Burial 20

Burial 20 was located along the west wall of the Main Room of the chapel and was one of four burials, along with Burials 21, 25, and 28 that required exterior excavations as it was bisected laterally by the chapel foundation (**Photos 29–31**). The burial shaft stain was initially discovered during exploratory work along the west wall of the chapel. During burial shaft excavation, excavators identified the eastern most extent of a coffin as indicated by the coffin wood outline and nail patterns. The lower limbs and feet of Burial 20 were located within the chapel interior at a depth of 50 cmbs, the remainder of the skeleton extended to the exterior. The soil surrounding the burial, both on the interior and exterior, was dark brown silty clay that dried out easily making exhumation difficult. Skeletal preservation was moderate.

Based on the size of the coffin, morphology and size of the skeletal remains, edentulous nature of the maxilla, and arthritic lipping observed on various joint surfaces, it was determined that these are most likely the remains of an older adult. Skeletal analysis suggests that the individual was a Hispanic male, 30.6 to 89 years of age (with a maximum likelihood of 69.6 years of age), and approximately 5'1" to 5'6" in stature (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east. The right forearm was flexed at a 90-degree angle and extended across the lumbar vertebrae with the right hand resting on the left elbow. The left arm was flexed with the ulna and radius resting on top of the left humerus. The carpals and phalanges were articulated with the distal ends of the ulna and radius and were located on top of the left medial clavicle and medial portions of the left rib shafts.



Photo 29. Overview of Burial 20 prior to exhumation.



Photo 30. Overview of Burial 20 bisected by the chapel foundation from within the chapel interior facing west towards the chapel exterior.



Photo 31. Close up of Burial 20 on the interior west wall of the chapel

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 20 indicated the coffin morphology was hexagonal in shape. In comparison to the other exhumations, there was an abundance of coffin wood and coffin nails associated with this burial.

Coffin wood fragments, square-cut coffin nails, and one partially deteriorated diamond-shaped screw cap were collected during exhumation. Some thin wire-like fragments were also collected. In total, coffin hardware included more than 67 nail fragments, one diamond-shaped screw cap, and two undesiged screw caps.

Associated Artifacts: Personal items recovered from Burial 20 include 16 button types in total including: two shell buttons, five copper alloy buttons, two white porcelain Prosser pie crust buttons, and seven Prosser dish-shaped buttons for the shirt (**Plate 18**).



Plate 18. Representative artifacts from Burial 20 includes nail fragments, undesiged screw caps, and a diamond-shaped screw cap. Personal items include buttons (shell buttons, copper alloy buttons, white porcelain Prosser pie crust buttons, and Prosser dish-shaped buttons).

Burial 21

Burial 21 was located along the west wall of the Main Room of the chapel and north of Burial 25 at a depth of 40 cmbs (**Photo 32**). This burial was one of four (including Burials 20, 25, and 28) that required exterior excavations. During stain exploration for Burial 21, a small square stain identifying a portion of the eastern most extent of the coffin was noted along the chapel wall. Upon excavation, the feet were identified indicating the remainder of the coffin extended west towards the outside of the chapel, requiring exterior excavations. The soil surrounding the burial, both on the interior and exterior, was dark brown silty clay that easily dried making exhumation slightly more difficult. Overall bone preservation was good; however, the vertebrae and ribs became friable and fragmented upon removal. Based on coffin size and the skeletal size and morphology of the individual, the remains are those of an adult. Skeletal analysis determined that the individual was a Hispanic male, 29.3 to 84.5 years of age (with a maximum likelihood of 55.1 years of age), and approximately 5'1" to 5'7" in stature (Spradley et al. 2020). This skeleton was oriented with the head in the west, facing east with the forearms flexed at the elbows placed over the midsection (**Photo 33**).



Photo 32. Interior close up of Burial 21.



Photo 33. Exterior close up of Burial 21.

Stain and Coffin Wood/Hardware Description: The positioning of the stain outline, coffin wood, and nail patterns for Burial 21 indicated the coffin morphology was hexagonal in shape. Square-cut nails, four large-sized screws, three lining tacks, and a small amount of coffin wood were located and collected during the exhumation.

Associated Artifacts: Personal items recovered during exhumation of Burial 21 include five white porcelain Prosser two-hole panty waist buttons, one copper alloy button, and one bone button for the pants (**Plate 19**).



Plate 19. Representative hardware from Burial 21 includes nails, nail fragments, screws, and a diamond-shaped screw cap fragment. Personal items include white porcelain two-hole panty waist buttons, a copper alloy button, and a bone button.

Burial 22

Burial 22 was located at a depth of 12 cmbs and was one of five burials in the Office Room of the chapel (**Photo 34**). Burial 22 was bisected by the chapel foundation in such a way that the skull, torso, and proximal femora were within the chapel interior. The distal femora and lower limbs were on the exterior, requiring tunneling to fully expose and exhume the remains. Fill material was an extremely dry medium brown compact clay making excavation incredibly challenging and extensive. Bone preservation was extremely poor and many skeletal elements were displaced and disarticulated, most likely a result of water movement from water seepage under the foundation. Based on the size and skeletal morphology of the individual, the remains are consistent with those of an adult. Skeletal analysis suggests that the individual was a White male, 27.6 to 45 years of age (with a maximum likelihood of 27.6 years of age); due to poor bone preservation and missing skeletal elements, an estimate of the individual's stature was not possible (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east with the arms extended along the outside of the skeleton.



Photo 34. Overview of of Burial 22 beneath the east Office Room wall.

Stain and Coffin Wood/Hardware Description: During stain exploration, the burial shaft was identified based on soil texture changes with a faint coffin outline. This made the coffin morphology of Burial 22 indistinguishable. The positioning of the coffin wood remains and stain outline may indicate the coffin morphology was rectangular in shape. Coffin nails, screws, tacks, and a sample of coffin wood were located and collected from this burial during exhumation. Analysis of the hardware identified 181 nail fragments, one screw, three screw fragments, one undesignated screw cap, two diamond-shaped screw caps, and coffin fabric fragments from the interior of the coffin.

Associated Artifacts: Personal items recovered from Burial 22 include one suspender buckle and six buttons, possibly of bone material (**Plate 20**).



Plate 20. Representative hardware from Burial 22 includes 11 nails, nail fragments, a screw, screw fragments, an undesignated screw cap, diamond-shaped screw caps, and coffin fabric fragments. Personal items include a suspender buckle and buttons.

Burial 23

Burial 23 was in the Main Room of the chapel along the east wall, between Burials 14 and 27, at a depth of 37 cmbs (**Photo 35**). Soil staining was initially very nebulous, making it difficult to discern the burial shaft. As a result, the burial was delineated using soil texture changes until a coffin outline and nail patterns were observed. The soil matrix was a dark brown silty clay with yellow/gray mottled areas, which increasingly became more of a tan sandy clay closer to the skeletal remains. The majority of the skeleton was located within the Main Room; however, the distal tibiae, fibulae, and feet were beneath the chapel foundation. All of the skeletal elements appeared to be in anatomical position; however, the cranium was displaced and rolled back exposing the occipital bone and foramen magnum. Based on the skeletal morphology, the size of the individual, and the coffin, the remains were estimated to be those of an adult. Skeletal analysis suggests that the individual was a Hispanic female, 26.6 to 43.9 years of age (with a maximum likelihood of 26.6 years of age); due to poor bone preservation and missing skeletal elements, an estimate of the individual's stature was not possible (Spradley et al. 2020). This skeleton was oriented with the head in the west, and facing east with the arms flexed and crossed, right over left, on top of the lower thoracic vertebrae.



Photo 35. Overview of Burial 23, following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood and nail patterning for Burial 23 indicated the coffin morphology was hexagonal in shape. Hardware recovered from exhumation of Burial 23 included two square-cut nail fragments (too deteriorated to measure), dummy tacks, and lining tacks. In total, 255 nails and nail fragments, 16 lining tacks from the interior of the coffin, and 13 dummy tacks from the exterior of the coffin were recovered.

Associated Artifacts: Personal items recovered during exhumation of Burial 23 include brass clothing fasteners (three hook-and-eye fasteners possibly associated with an undergarment), and one glass French jet button with a wire shank (**Plate 21**).



Plate 21. Representative hardware from Burial 23 includes nails, nail fragments, lining tacks, and dummy tacks. Personal items include hook-and-eye fasteners and a French jet button.

Burial 24

Burial 24 was located between the Main Room and Tower Room of the chapel at a depth of 20 cmbs (**Photo 36**). This burial was discovered when large pieces of coffin wood were uncovered after hand scraping when looking for remaining burials. No defined burial shaft or coffin boundary was initially identifiable until a large piece of coffin wood was removed revealing a distinct hexagonal coffin stain. Sediment encasing the burial was a hard compact clay that transitioned into a sandy clay near the skeletal remains. Based on the skeletal morphology, size of the individual, and coffin, the remains are those of an infant. The skeletal remains were in poor condition due to soil conditions and the fragile nature and age of the individual. As a result, not many skeletal elements were easily recoverable or complete. Skeletal analysis suggests that the deceased represented an intrauterine fetal death (stillbirth) occurring during the 36+ week of gestation (Spradley et al. 2020). Due to the minimal skeletal development at that early age, the deceased's sex, biological affinity, and stature could not be determined. This skeleton was oriented with the head to the west, facing east with the arms flexed at the elbows crossing near the pelvis area.



Photo 36. Overview of Burial 24 prior to exhumation.

Stain and Coffin Wood/Hardware Description:

The positioning of the coffin wood, nail patterns, and stain outline for Burial 24 indicate the coffin morphology was hexagonal in shape. Hardware recovered from exhumation of Burial 24 was limited to approximately 30 square-cut nail fragments, too deteriorated to measure, and three lining tacks.

Associated Artifacts: There were no personal items recovered from Burial 24.



Plate 22. Representative hardware from Burial 24 includes nail fragments and lining tacks.

Burial 25

Burial 25 was located along the west wall of the Main Room of the chapel at a depth of 30 cmbs, and was one of four burials (along with Burials 20, 21, and 28) that required exterior excavations, as it was bisected laterally by the chapel foundation (**Photos 37** and **38**). The burial shaft stain was initially discovered during exploratory work along the west wall of the chapel. During burial shaft excavation, excavators identified the eastern most extent of the coffin as indicated by a coffin wood outline and nail patterning. The lower limbs and feet were located within the chapel interior, while the remainder of the skeleton was on the exterior. The soil surrounding the burial, both on the interior and exterior, was dark brown silty clay that dried out easily making exhumation difficult. The skeletal preservation was good; however, upon exhumation the bones became highly fragmented. Based on the size of the coffin, skeletal morphology, and size of the skeletal remains, these are the remains of an adult. Skeletal analysis suggests that the individual was a Hispanic male, 21.3 to 39.6 years of age (with a maximum likelihood of 29.4 years of age), and approximately 5'1" to 5'7" in stature (Spradley et al. 2020). Additionally, the skeleton exhibits robust muscle attachments, possibly suggesting habitual horseback riding or other habitual activity involving the legs. This skeleton was oriented with the head to the west and facing east with the forearms flexed at 90-degrees and placed over the midsection.



Photo 37. Close up of Burial 25 located along the exterior west wall of the chapel prior to exhumation.



Photo 38. Burial 25 following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 25 indicated the coffin morphology was hexagonal in shape. Amongst the fragmented and corroded hardware materials recovered were 57 individual square-cut nails and 57 lining tacks (**Plate 24**).

Associated Artifacts: Personal items recovered during exhumation of Burial 25 include six white, dish-shaped Prosser buttons located along the midline of the torso, and a single two-piece copper alloy button.



Plate 23. Representative hardware from Burial 25 includes nails, nail fragments, and lining tacks. Personal items include buttons (white porcelain Prosser dish-shaped buttons and a copper alloy button).

Burial 26

Burial 26 was in the Tower Room of the chapel at a depth of 10 cmbs (**Photo 39**). The soil matrix was a silty wet yellow/brown clay with gravel concretions. Upon initial scraping, a distinct dark shaft was identified with a subtle outline of a hexagonal coffin. Bone preservation was moderate to poor in this area as it was repeatedly inundated with water from a leaking roof and water seepage from rainwater filtering beneath the chapel foundation. As a result, some vertebrae were displaced and located near the cranium. These are the remains of an adult based on skeletal morphology, the size of the individual, and coffin size. Skeletal analysis suggests that the individual was a Black male, 48.8 to 91.2 years of age (with a maximum likelihood of 76.6 years of age); due to poor bone preservation and missing skeletal elements, an estimate of the individual's stature was not possible (Spradley et al. 2020). Analysis also revealed the individual was a pipe smoker, as a pipe notch is evident in teeth of the lower jaw. This skeleton was oriented with the head in the west, facing east with the forearms bent at the elbow and crossed at the chest over the thoracic vertebrae, left over right.



Burial 39. Overview of Burial 26 prior to exhumation.



Plate 24. Representative hardware from Burial 26 includes nail fragments and lining tacks.

Stain and Coffin Wood/Hardware Description:

The positioning of the staining, the coffin wood outline, and nail patterning for Burial 26 indicated the coffin morphology was hexagonal in shape. Recovered hardware elements include over 95 square-cut nail fragments, seven lining tacks, and three unidentified metal fragments (**Plate 24**).

Associated Artifacts: There were no personal items recovered from Burial 26.

Burial 27

Burial 27 was in the Main Room of the chapel along the east wall, between Burials 19 and 23, at a depth of 5.5 cmbs (**Photo 40**). The soil matrix was a dark brown compact clay with yellow/gray mottled areas, which increasingly became more of a tan sandy clay closer to the skeletal remains. This individual was a subadult as indicated by the incomplete fusion of various epiphyses and coffin size. Bone preservation was moderate to poor, while some of the skeletal elements were displaced and disarticulated. Skeletal analysis determined that the individual was a juvenile, 4.5 to 6.5 years of age; due to poor bone preservation and missing skeletal elements, an estimate of the individual's stature was not possible and biological affinity is undetermined (Spradley et al. 2020). This skeleton was oriented with the head in the west, facing east with the left arm slightly flexed at the elbow and resting on the pelvis. The right humerus is parallel and flexed towards the cranium, while the right ulna and radius are resting west to east on top of the right rib shafts.



Photo 40. Overview of Burial 27 following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 27 indicated the coffin morphology was hexagonal in shape. A total of 93 nails and nail fragments, one screw, and eleven undesignated screw caps were found on the exterior of the coffin (**Plate 25**).

Associated Artifacts: Personal items recovered during exhumation of Burial 27 include a porcelain crucifix and one small bead (**Plate 25**).



Plate 25. Representative hardware from Burial 27 includes nails, nail fragments, one screw, and undesignated screw caps. Personal items include a porcelain crucifix and a small seed bead (a “rocaille”).

Burial 28

Burial 28 was located on the west wall of the Main Room of the chapel at a depth of 13 cmbs and was one of four burials that required exterior excavations (the other three include Burials 20, 21, and 25) (**Photo 41**). The burial shaft stain was identified when troweling identified coffin hardware. The soil matrix encasing the remains was thick dense clay that could only be excavated in thin layers and extreme fragmentary nature of the skeleton. This was an infant burial based on the extremely small size of remains, length of the long bones, and coffin size. Many skeletal elements were missing, and bone preservation was extremely poor. Due to the extreme fragmentation of Burial 28, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to a fetal donor which was aged at 36 weeks intrauterine. The pars petrosa of Burial 28 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated. Skeletal analysis, due to the fragmentary nature of the remains, was unable to estimate gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west, and facing east. The position of the arms was indeterminate due to the extreme fragmentary condition and/or missing skeletal elements.

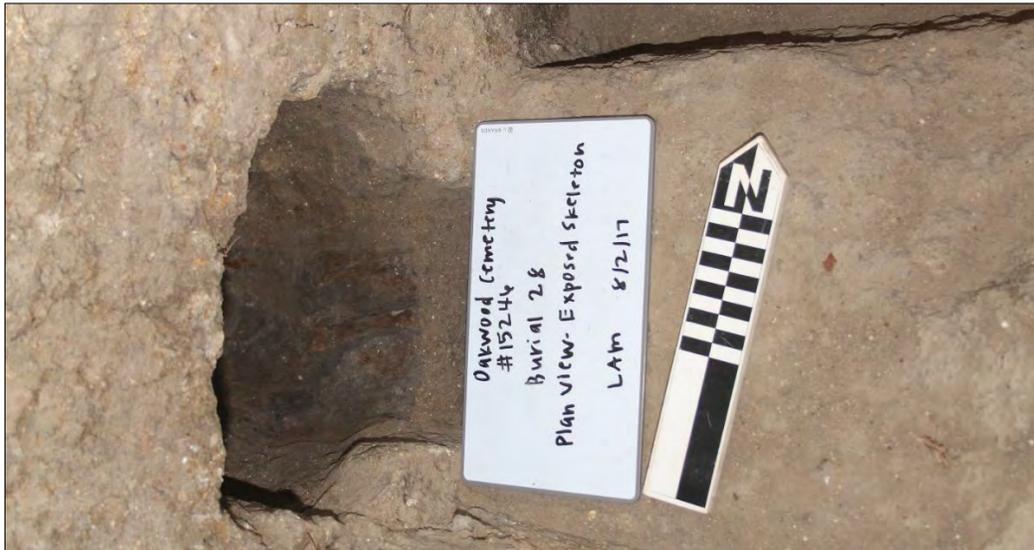


Photo 41. Interior view of Burial 28.



Plate 26. Representative hardware from Burial 28 includes nail fragments.

Stain and Coffin Wood/Hardware Description: The coffin morphology for Burial 28 was indeterminate. More than 40 coffin nail fragments were located and collected upon exhumation. These hardware artifacts were too deteriorated to properly type during exhumation (**Plate 26**).

Associated Artifacts: No personal items were recovered during exhumation of Burial 28.

Burial 30

Burial 30 was within the Tower Room of the chapel west of Burial 7 near the south wall at a depth of 28 cmbs (**Photo 42**) identified by a visible burial shaft stain. The soil surrounding this burial was very dense hard yellow/brown mottled clay interspersed with sandy pockets of clay near the skeletal remains. This burial was an infant based on the skeletal morphology, size of the individual, and coffin size. The overall condition of the remains was poor and highly fragmented, likely due to both the age of the individual and the general preservation and/or burial conditions. Skeletal analysis suggests that the deceased was 4.5 to 7.5 months of age; due to the fragmentary nature of the remains it was not possible to identify gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west, and facing east with the arms bent at the elbow and hands positioned towards the ribs/vertebrae.



Photo 42. Overview of Burial 30 following exhumation.



Plate 27. Representative hardware from Burial 30 includes nails, nail fragments, and tacks

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood outline, nail patterning, and stain outline for Burial 30 indicated the coffin morphology was hexagonal in shape. Coffin hardware includes 56 nails and nail fragments, as well as 32 tacks (**Plate 27**).

Associated Artifacts: No personal items were recovered during exhumation of Burial 30.

Burial 31

Burial 31 was the only burial in the Office Room of the chapel that did not require extensive tunneling as only the feet were beneath the foundation. This burial was discovered at a depth of 29 cmbs (see **Photos 43** and **44**). The soil matrix surrounding this burial was very hard, compact light brown clay that softened to a darker brown sandy clay. This individual was an adult based on the skeletal morphology, size of the individual, and coffin size. Overall bone preservation was good enough to observe linear enamel hypoplasias on the maxillary incisors, a pathological indicator of stress, and trepanation on the occipital bone. Skeletal analysis suggests that the individual was a White male, 29.3 to 56.2 years of age (with a maximum likelihood of 39.2 years of age) and approximately 5'5" to 5'8" in stature (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east with the arms extended straight along the side of the skeleton.



Photo 43. Overview of Burial 31 prior to exhumation.



Photo 44. Close up of Burial 31 following exhumation.

Stain and Coffin Wood/Hardware Description: During stain exploration and exhumation of Burial 31, positioning of coffin wood, nail patterning, and stain outline indicated the coffin morphology was a type of rounded hexagonal coffin. Four metal coffin handles were present within this burial—one located adjacent to each elbow and knee (see **Plate 41**). Coffin hardware includes five escutcheons and five thumb screws, four bar handles, more than 279 nails and nail fragments, eight screws, three lining tacks, 11 undesignated screw caps, miscellaneous metal and lead fragments, and some coffin fragments. The extensive coffin hardware, particularly the four bar handles, escutcheons, and thumb screws, when compared to the simple bail handles and general lack of extensive decorations noted in other burials exhumed during the project (see **Chapter 5; Artifact Analysis**), suggests that this coffin may represent the highest monetary investment of any interment from the excavations.

Associated Artifacts: Personal items recovered during exhumation of Burial 31 include a buckle, 23 copper alloy buttons including a row recovered from along the spine and from each wrist indicating a long sleeve button up shirt (**Plate 28**). Two of these buttons were once covered in fabric. A celluloid collar or cuff stud and six wood collar or cuff studs were also recovered. Additionally, a small remnant of a woven fabric, similar to a tweed variety, was collected during exhumation. This exhumation included the highest number of personal items found, totaling 25 buttons, which include two cloth-covered coat buttons, and 23 copper alloy buttons possibly for a vest and shirt. Five studs, four of which are wood and one white celluloid, were used for removable collars and cuffs.



Plate 28. Representative hardware from Burial 31 includes escutcheons, bar handles, nails, nail fragments, screws, lining tacks, undesignated screw caps, miscellaneous metal and lead fragments, and coffin fragments. Personal items include a belt buckle, buttons (cloth-covered coat buttons and copper alloy buttons) and collar studs (wood and one white celluloid).

Burial 32

Burial 32 was in the Main Room of the chapel adjacent to the east wall at a depth of 11 cmbs (**Photo 45**). The burial and skeleton were encased in very dense brown compact clay, making excavation difficult and preservation poor. This burial was an infant based on the size of the individual, skeletal morphology, and size of the coffin. Bone preservation was poor with the only recoverable skeletal elements consisting of long bones and teeth. However, there was an abundance of recoverable coffin wood and coffin nails present in this burial. A powdery white substance situated in clumps throughout the burial was identified underneath the bone—similar to Burial 12—and was sent for chemical analysis. The result of the chemical analysis revealed the white powder to be calcium; the origin of the calcium is unknown. Skeletal analysis suggested that the deceased was 7.5 to 10.5 months of age; due to the fragmentary nature of the remains it was not possible to identify gender or biological affinity (Spradley et al. 2020). This skeleton was oriented with the head in the west, facing east. The placement of the arms was indeterminate due to the lack of skeletal preservation.



Photo 45. Overview of Burial 32.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 32 indicated the coffin morphology was hexagonal in shape. Hardware recovered included 60 nail fragments; 27 lining tacks and coffin fabric fragments from the interior of the coffin; and 25 undesignated screw caps from the exterior of the coffin.

Associated Artifacts: Personal items recovered include seven white Prosser dish-shaped shirt buttons and five blue glass buttons with four dot inlays for a possible second garment (**Plate 29**).



Plate 29. Representative hardware from Burial 32 includes nail fragments, lining tacks, undesignated screw caps, and coffin fabric fragments. Personal items include blue spun back cast glass buttons with dot inlays.

Burial 33

Burial 33 was in the Main Room of the chapel adjacent to the east wall, and south of Burial 32, at a depth of 10 cmbs (**Photo 46**). The burial and skeleton were encased in very dense, hard compact brown clay, making excavation difficult and preservation poor. This burial was an infant based on the size of the individual, dental morphology, and size of the coffin. Skeletal analysis suggests that the individual represented an intrauterine fetal death (stillbirth) occurring during the 20 to 36 weeks of gestation (Spradley et al. 2020). Due to the minimal skeletal development at that early age, the deceased's sex, biological affinity, and stature could not be addressed. Bone preservation was poor and fragmented. There was an abundance of coffin wood and nails present within this burial. This skeleton was oriented with the head in the west and facing east. The positioning of the arms was indeterminate due to poor skeletal preservation.



Photo 46. Overview of Burial 33 following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 33 indicated the coffin morphology was hexagonal in shape. Hardware and a sample of coffin wood fragments were located and collected upon exhumation. Recovered hardware included 47 nails and nail fragments and 15 liner tacks from the interior of the coffin.

Associated Artifacts: Personal items recovered included one porcelain Prosser dish-shaped button, one milk glass Prosser inkwell-shaped button, one glass button, and one hook-and-eye fastener (possibly from an undergarment) (**Plate 30**).



Plate 30. Representative hardware from Burial 33 includes nails, nail fragments, and liner tacks. Personal items include a porcelain Prosser dish-shaped button, a milk glass Prosser inkwell-shaped button, a gray glass button, and a hook-and-eye fastener.

Burial 34

Burial 34 was discovered in the Main Room of the chapel at a depth of approximately 55 cmbs (**Photos 47** and **48**) during exploratory work south of Burial 12. The burial shaft was identified by soil texture changes followed by the location of coffin nails in the eastern most section of the burial shaft. The soil surrounding the burial was initially hard compact yellow/brown mottled clay that transitioned into a softer brown wet clay that encased the bones. Bone preservation was moderate and not all of the skeletal elements were in anatomical position at the time of exhumation. The vertebrae and ribs were displaced within the thorax, the anterior tibiae and fibulae had rolled outwards and were now facing posteriorly, while both femora had turned out and the femoral heads were facing laterally. The displacement of these smaller skeletal elements may be an indicator of hydraulic disturbance. Due to their highly friable nature, the bones fragmented upon removal.

Skeletal analysis indicated that the deceased individual was a Hispanic male between the ages of 20.9 and 48.2 years of age (with a maximum likelihood of 31.8 years of age) and approximately 5'2" to 5'8" in stature. (Spradley et al. 2020). This skeleton was oriented with the head in the west and facing east. Although the majority of skeletal remains were displaced, the positioning of the forearms was discernible. The forearms were bent at the elbows and crossed near the chest.



Photo 47. Overview of Burial 34 prior to exhumation.



Photo 48. Overview of Burial 34 following exhumation.



Photo 49. Close up of metal coin clasp behind left section of the pelvis.

Stain and Coffin Wood/Hardware Description:

The positioning of the coffin wood, nail patterning, and stain outline for Burial 34 indicated the coffin morphology was hexagonal in shape. Hardware recovered included 93 nails and nail fragments.

Associated Artifacts: Personal items recovered during exhumation of Burial 34 include five blue, porcelain calico-design Prosser buttons, four Prosser dish-shaped buttons, two bone buttons, and two cone-shaped milk glass buttons from three possible garments (**Plate 31**). Buttons were recovered from underneath the ribs, vertebrae, right scapula, cervical

vertebrae, and in and around the pelvis. Deteriorated fabric was noted near the femora.

Additionally, a metal clasp from a coin purse (**Photo 49**) was located beneath the left section of the pelvic bone and several coins were found clustered underneath the right section of the pelvic bone. One coin is corroded beyond recognition (see **Plate 53**). Another coin is identified as a Seated Liberty Dime/Half Dime, with mint dates of 1837–1873 (see **Plate 54**). A third possible coin is thin with undistinguishable faces. A small hole near the edge suggests that this coin may in fact be a pendant (see **Plate 55**).



Plate 31. Representative hardware from Burial 34 includes nails and nail fragments. Personal items include blue, porcelain calico-design Prosser buttons, Prosser dish-shaped, bone buttons, and cone-shaped milk glass buttons, as well as a metal clasp from a coin purse and coins.

Burial 35

Burial 35 was in the Office Room along the west wall at a depth of 23 cmbs (**Photo 50**). Once the top layer of dry brown compact clay was removed, the burial shaft outline appeared followed shortly by a very distinct coffin outline. The tibiae, fibulae, feet, and a small portion of the distal femora were initially easily exposed. Both anterior tibiae and fibulae are turned in on each other, facing posteriorly. However, the rest of this burial required extensive tunneling, as the majority of the skeleton was beneath the foundation. Bone preservation was very poor and crumbled upon exhumation. Skeletal analysis suggested that the deceased individual was possibly a White male of middle to adult age. The assignment of gender and biological affinity is only probable as the bones fragmented upon removal. Similarly, the individual's stature could not be determined due to missing skeletal elements. This skeleton was oriented with the head in the west and facing east with arms crossed over the pelvis.



Photo 50. Overview of Burial 35 within the Office Room.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 35 indicated the coffin morphology was hexagonal in shape. Hardware recovered includes 101 nails and nail fragments, and five undesignated screw caps from the exterior of the coffin.

Associated Artifacts: Personal items recovered during exhumation of Burial 35 include nine Prosser buttons, which include eight dish-shaped buttons and one gingham-design button; one bone button; and one suspender buckle (**Plate 32**).



Plate 32. Representative hardware from Burial 35 includes a nail and nail fragments, and undesignated screw caps. Personal items include Prosser buttons, a bone button, and a suspender buckle.

Burial 36

Burial 36 was located at a depth of 85 cmbs along the south wall of the Main Room of the chapel, south of Burial 34 (Photos 51 and 52). The soil surrounding the burial was initially hard compact yellow/brown mottled clay that transitioned into a softer brown wet clay that had encased the bones. The majority of the skeletal elements were all extensively displaced and not in anatomical position. Most long bones had shifted, however both femora faced posteriorly with the femoral heads facing laterally. The vertebrae, ribs, fibulae, and cranium were all extremely displaced. Bone preservation was moderate, however, upon exhumation the bones became highly fragmented at the epiphyseal ends due to preservation. As indicated by the disorganized nature of the remains, this burial had a high likelihood of being a secondary burial or one that had been affected by water movement. Skeletal analysis indicated that the deceased individual was a Black male between the ages of 20.2 and 28.4 years of age (with a maximum likelihood of 20.2 years of age) and approximately 5'2" to 5'7" in stature. This skeleton was oriented with the head in the west and facing east with forearms bent at elbows and crossed over the midsection.



Photo 51. Overview of Burial 36 prior to exhumation.



Photo 52. Burial 36 following exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 37 indicated the coffin morphology was hexagonal in shape. Coffin nail fragments representing both square cut and wire varieties were noted during hardware analysis (**Plate 33**). Coffin hardware includes 64 nails and nail fragments, and nine undesignated crew caps from the exterior of the coffin.

Associated Artifacts: No personal items were recovered during exhumation of Burial 36.



Plate 33. Representative hardware from Burial 36 includes nails and nail fragments and undesignated screw caps. No personal items were found.

Burial 37

Burial 37 was located in the Tower Room of the chapel north of Burial 26 and east of Burial 38 at a depth of 5 cmbs (**Photos 53** and **54**). This burial was bisected perpendicularly beneath the foundation footer and was first observed during monitoring of pier drilling when bone was noted in an augur hole. Later during shovel scraping of the Tower Room floor, a distinct rectangular dark burial shaft stain was identified. As a result of initial auguring, the majority of the lower legs and feet had been destroyed prior to exhumation. The remaining *in situ* bone was in fair condition and well preserved despite long term exposure to intermittent periods of inundation from a leaking roof directly over the burial and water seepage from under the chapel foundation. The soil around the remains was very dark brown, wet sandy clay. The smaller skeletal elements within the thorax were displaced and disarticulated due to the inundation. Both femora had turned outwards and were now facing posteriorly with the femoral heads facing laterally. Skeletal analysis indicated that the deceased individual was approximately 74.3 to 91.3 years of age (with a maximum likelihood of 74 years of age), male, and of indeterminate biological affinity and stature. This skeleton was oriented with the head in the west and facing east with arms crossed over the pelvis.



Photo 53. Overview of Burial 37, prior to exhumation.



Photo 54. Close up of the foundation footer and Burial 37.

Stain and Coffin Wood/Hardware Description: Due to the soil displacement prior to exhumation from the construction activities, water inundation, and a structure placed on top of Burial 37, coffin morphology was indeterminate. However, 70 nail fragments, one diamond-shaped screw cap, and one undesignated screw cap were recovered from the exterior of the coffin (**Plate 34**).

Associated Artifacts: Personal items recovered during exhumation of Burial 37 include a white porcelain Prosser dish-shaped button, a white porcelain Prosser inkwell-shaped button, a single dyed brown bone button, and a belt buckle (see **Plate 34**).



Plate 34. Representative hardware from Burial 37 includes nail fragments, a diamond-shaped screw cap, and an undesignated screw cap. Personal items include a bone button, a buckle fragment, a white porcelain Prosser dish-shaped buttons, and a porcelain Prosser inkwell-shaped button.

Burial 38

Burial 38 was located between the Main and Tower Rooms of the chapel west of Burial 37 and east of Burial 33 (Photos 55–57). This burial was discovered during trowel scraping of the area and extended under the footer to the north of Tower Room wall. Excavation of this burial required extensive tunneling as only the right distal femur, patella, tibia, and fibula initially were exposed. Similar to Burial 37, the soil around the remains was very dark brown, wet sandy clay, and as a result of years of water exposure, bone preservation was extremely poor and friable. Skeletal analysis indicated that the deceased individual was a Hispanic male between the ages of 17.8 and 82.1 (with a maximum likelihood of 39 years of age). The individual’s stature could not be determined due to missing skeletal elements. This skeleton was oriented with the head in the west and facing east with arms crossed over the pelvis.



Photo 55. Burial 38 burial shaft stain.



Photo 56. Overview of Burial 38 following exhumation.



Photo 57. Closing photo of Burial 38 and example of tunneling beneath the chapel foundation.

Stain and Coffin Wood/Hardware

Description: The positioning of the coffin wood outline and nail patterning for Burial 38 indicated the coffin morphology was hexagonal in shape. Coffin hardware includes more than 90 nail fragments.

Associated Artifacts: Personal items recovered during exhumation of Burial 38 include 16 buttons: four iron coat buttons and 12 copper alloy buttons (possibly for a vest and shirt) (**Plate 35**).



Plate 35. Representative hardware from Burial 38 includes nail fragments. Personal items include buttons (iron buttons and copper alloy buttons).

Burial 39

Burial 39 was in the northeast corner of the Main Room of the chapel at a depth of 16 cmbs, where fragmented coffin wood was identified after a light shovel scraping along the northeast wall of the Main Room (**Photo 58**). At 20 cmbs, the remains of a small hexagonal-shaped coffin were encountered. Overall bone preservation was poor and only a few cranial elements were distinguishable. Skeletal analysis indicated that the individual represented an intrauterine fetal death (stillbirth) occurring during the 36+ week of gestation (Spradley et al. 2020). Due to the minimal skeletal development at that early age, the deceased's sex, biological affinity, and stature could not be determined. This skeleton was oriented with the head to the west and facing east. Both humerii were extended on the outside of the skeleton. Due to poor preservation, forearm placement is indeterminate.



Photo 58. Overall view of Burial 39 prior to exhumation.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline for Burial 39 indicated the coffin morphology was hexagonal in shape. Hardware recovered included eleven nail and nail fragments and three lining tacks from the interior of the coffin.

Associated Artifacts: Personal items recovered during exhumation of Burial 39 include one porcelain Prosser inkwell-shaped button and two bone buttons (**Plate 36**).



Plate 36. Representative hardware from Burial 39 includes a nail and nail fragments, and three lining tacks. Personal items include a porcelain Prosser inkwell-shaped button and bone buttons.

Burial 40

Burial 40 was located under the north chapel wall in the Main Room at a depth of 18 cmbs (**Photos 59 and 60**). The skull of this burial was impacted during drilling for pier shafts and was first observed during monitoring the second phase of pier drilling when bone was identified in the screened soil from the augur hole. The soil surrounding the skeleton was extremely compact yellow/brown mottled clay. Tunneling was necessary to access the burial and to expose the coffin outline and exhume the skeleton. Similar to other burials, the skeletal elements within the thorax of Burial 40 were disarticulated, jumbled, and stacked on one another. Burial 40 was disarticulated most likely as a result of water inundation. The right femur had rolled outwards and faced posterior while the femoral head was now lateral. Additionally, tarsal bones were located between the legs. Overall bone quality was very poor and extremely friable. Skeletal analysis indicated that the deceased individual was a possible White male of indeterminate stature, being 48.8 to 91.2 years of age (with a maximum likelihood of 76.8 years of age). The assignment of biological affinity was based on analysis of the teeth and is a broad, generalized conclusion. The individual's stature could not be determined due to missing skeletal elements. This skeleton was oriented with the head in the west and facing east. Positioning of the arms was indeterminate due to the extreme disarticulation of the skeletal remains.



Photo 59. Overview of Burial 40 prior to exhumation with circular auguring impact.



Photo 60. Close up of Burial 40 located under the north chapel wall.

Stain and Coffin Wood/Hardware Description: The positioning of the coffin wood, nail patterning, and stain outline indicated the coffin morphology was hexagonal in shape. Hardware recovered includes 49 nails and nail fragments, one screw fragment, and one undesignated screw cap fragment from the exterior of the coffin (**Plate 38**).

Associated Artifacts: Personal items recovered during exhumation of Burial 40 include two bone buttons, two large Prosser dish-shaped buttons, and five smaller Prosser dish-shaped shirt buttons (**Plate 37**).



Plate 37. Representative hardware from Burial 40 includes nails and nail fragments, a screw fragment, and an undesignated screw cap. Personal items include bone buttons and large and small Prosser dish-shaped buttons.

Unexhumed Burials

Burials 3, 5, 29, and 41–47 were recorded and left in place, unexhumed. Archeologists identified Burials 3, 5, and 29 on the outside of the chapel at various locations around the perimeter of the chapel work area (see **Figure 3**). Excavations identified Burials 41 and 42 parallel to and beneath the chapel foundation along the south wall of the Tower Room. Burials 43 through 47 were identified on the outside of the chapel south of the Tower Room along the new proposed wastewater line alignment. Following coordination with the THC, it was determined that because these burials would not be further impacted by pier drilling—Burials 41 and 42—the wastewater line—Burials 43 through 47—or other project elements, they could remain in place. The locations of these graves will be recorded in the cemetery records and a marker or plaque will be erected in one or more places to commemorate and interpret the unexhumed and unmarked graves.

Monitoring the installation of the wastewater line on the exterior southeast corner of the Oakwood Cemetery Chapel was conducted on January 23–26, 2018. As the existing wastewater line, which exited the restroom on the north side of the chapel, was no longer suitable, a new wastewater line that would exit the chapel from the south side of the building was necessary. This work required the monitoring and mechanical scraping of the ground surface prior to construction in order to assure a clear path for the wastewater line. An area measuring 1.2 meters in width and 10 meters in length extending north to south was opened up along the southeast section of the chapel. Scrapings went down to a depth of one meter. Within this area, a total of six burials (Burial 41 and Burials 43–47) running in a row from north to south were identified either by soil staining, coffin nails, or in two instances the presence of skeletal remains. Burial shaft stains were delineated with string, and flags were placed at the western most extent of the burials (**Photo 61**). On the south wall of the Tower Room, just west of Burial 41 and north of Burial 47, lay an 11-inch space in which the four-inch wastewater line exited the building, passed between these two burials and continued south towards the main road, avoiding the western most extent of Burials 43–46. Archeologists monitored the installation of the wastewater line to make certain that the line was not placed over any of the identified burials.



Photo 61. Burials 41 and 43–47 delineated by pin flags and pink string during monitoring

Burial 3

Archeologists identified Burial 3 at a depth of 40 cmbs when burial shaft staining was noted. This burial was adjacent to the eastern wall of the Tower Room outside of the chapel (see **Figure 3**). As a result of a redesign in the project eliminating potential impacts, Burial 3 was recorded and left in place.

Burial 5

Archeologists identified Burial 5 at a depth of 40 cmbs when burial shaft staining was noted during the first phase of monitoring. This burial was adjacent to the eastern wall of the Tower Room and outside of the chapel. Artifacts collected from the upper levels of the excavation well above the depth of the grave included a horseshoe and five amethyst glass shards from a press molded with a blown glass handle. While these items could be remnants of previous grave decorations, given the extensive horizontal and vertical impacts to the area from chapel construction and subsequent improvements in the 1940s, these items cannot be presumed to be associated with the burial itself. As a result of a redesign in the project and elimination of potential impacts to the exterior, Burial 5 was recorded and left in place.

Burial 29

Burial 29 was discovered on the exterior of the west chapel wall at a depth of 108 cmbs when attempting to locate Burial 28 for exhumation. This burial was likely a juvenile based on the size and shape of the coffin as delineated by diamond-shaped copper escutcheons (**Photo 62**). The burial was oriented west to east with the widest point of the coffin (shoulder area) oriented towards the west with the tapered foot portion towards the east. As this burial was not located within the chapel interior and would not be impacted by construction, exhumations did not occur. Burial 29 was recorded and left in place.



Photo 62. Location of Burial 29 prospective juvenile and coffin hardware detail.

Stain and Coffin Wood/Hardware Description: The positioning of the stain outline indicated the coffin morphology from Burial 29 was hexagonal in shape. Hardware recovered from Burial 29 includes six nails and nail fragments and one diamond-shaped screw cap found as seven fragments (**Plate 38**).

Associated Artifacts: There were no personal items collected from Burial 29.



Plate 38. Representative hardware from Burial 29 includes a nail, nail fragments, and a fragmented diamond-shaped screw cap.

Burial 41

Burial 41 was oriented west to east, and parallel to the Tower Room's south wall on the exterior of the chapel (**Photo 63** and **Figure 3**). The left distal femur, and proximal tibia and fibula were impacted during monitoring of the second phase of pier drilling. To avoid exhumation of Burial 41, the City adjusted the placement of the pier to mitigate further impacts and allow the burial to be left in place.



Photo 63. Plan view of Burial 41 at south Tower Room exterior wall as delineated by string and marked with a pin flag.

Burial 42

Burial 42 is located beneath the southeast wall of the chapel's Main Room and lies parallel to the foundation. The left distal tibia and fibula were impacted during drilling. To avoid further disturbances of Burial 42, the City adjusted the placement of adjacent piers. This burial was not anticipated to be impacted again by pier drillings, shoring, or future work.

Burial 43

Burial 43 was identified based on burial shaft staining observed during monitoring of the scraping of the wastewater line trench south of the Tower Room. This burial is oriented east to west, with the body facing east. The proposed wastewater line was installed just west of the western most extent of Burial 43, allowing the burial to be left in place.

Burial 44

Burial 44 was identified based on burial shaft staining and the presence of coffin nails observed during monitoring of the scraping of the wastewater line trench south of the Tower Room. This burial is oriented east to west, with the body facing east. The proposed wastewater line was installed just west of the western most extent of Burial 44, allowing the burial to be left in place.

Burial 45

Burial 45 was identified based on burial shaft staining, and the presence of coffin nails and skeletal remains observed during monitoring of the scraping of the wastewater line trench south of the Tower Room. This burial is oriented east to west, with the body facing east. The proposed wastewater line was installed just west of the western most extent of Burial 45, allowing the burial to be left in place.

Burial 46

Burial 46 was identified when the backhoe made contact with the cranium during mechanical scraping for the wastewater line. This burial is oriented east to west, with the body facing east. Based on the presence of concrete curbing on the ground surface near the location of this burial (see **Figure 3**), archeologists anticipated finding a burial in or near the proposed waterline trench. However, the depth of the remains in this burial was shallower than those of others in the immediate vicinity, resulting in the unanticipated disturbance of the cranium. The remains were left in place, and the wastewater line was installed to the west of the westernmost extent of this burial.

Burial 47

Burial 47 was identified based on burial shaft staining observed during monitoring of the scraping of the wastewater line trench south of the Tower Room. This burial is oriented east to west, with the body facing east. This burial is separated from Burial 41 by a narrow distance allowing the four-inch wastewater line to be installed between the two burials avoiding further disturbance and allowing Burial 47 to be left in place.

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Chapter 5: Artifact Analysis

The overall artifact assemblage from investigations at the Oakwood Cemetery Chapel includes thousands of specimens of coffin hardware or artifacts recovered from burial contexts, as well as items recovered from excavation units, backhoe trenches, and scraped areas (completed during exploratory investigations) that cannot be definitively associated with any burials. Materials not specifically associated with one of the excavated burials consist of bottles, glass shards, keys, earthenware sherds, and miscellaneous items. The following provides a description of the variety of coffin hardware and personal items recovered during investigations, as well as the artifacts not definitively associated with burials. **Appendix B** tabulates the overall artifact assemblage.

Burial Containers and Hardware

As recovered artifacts from grave and cemetery settings, coffin hardware can have high value regarding burial context. In the absence of dated grave markers or burial records, the proper identification of type and style of container hardware can be determined through comparisons with trade catalogs, patent records, and other reports and articles concerning cemetery exhumations. Because casket and coffin hardware reflect the societal meaning, identification of the range of variation can provide chronological data regarding individual interments or cemetery plats (Davidson 2000; Pye 2007). Hardware style, form, and material can provide insight into socioeconomic status as well as individual and community investment into the burial process (Little et al. 1992; Pye 2007; Pye 2016).

Burial Containers

There are two distinct burial container shapes: coffin and casket. These two types of burial containers were utilized simultaneously throughout Texas and the United States during the nineteenth century. The terms coffin and casket have often been used interchangeably; however, in North America, there is a distinguishable difference between the two typologies. A coffin is constructed with six sides, is wide at the shoulders, and tapers at the foot and head. This shape is most commonly described as hexagonal, and conforms to the individual's body.

During the eighteenth and nineteenth centuries, hexagonal box shapes, or coffins, were the standard burial container within the United States. There are two types of hexagonal coffin shapes: the mitered shoulder and the kerfed (or steam bent) shoulder (Davidson 2000). The two coffin construction types, mitered or kerfed, involved quite different levels of complexity. Mitered, as a cheaper, more crude, and earlier type was a simple design where the two long-axis boards were joined together at the corners with a mitered joint, a task accomplished with simple tools and rudimentary wood-working knowledge. In contrast, the kerfed type of hexagonal coffin was a more complex construction, requiring an increased skillset and specialized tools. Instead of two long-axis boards, this design utilized a single board per side with these boards "bent" to unite at a head board. The boards were bent by either kerfing (the cutting of small incisions into the interior of the long board), or by steaming and then bending the board into a curved shape to meet at a head board (Davidson 2000). With a kerfed coffin needing carpentry expertise it is likely that this form is indicative of commercial manufacture. Both methods produce a much less sharp corner than the mitered method. Even in the absence of well-preserved wood, differentiation in the two types has been achievable during archeological excavation/exhumations in the past (Davidson 2000).

Rectangular caskets were introduced in the mid-nineteenth century in the eastern United States, as a more aesthetically pleasing design (Habenstein and Lamers 1985; Davidson 1990). By the late 1860s and early 1870s, caskets (which was once a common French word for a jewelry box) were observed in mainstream catalogues and became more commonplace (Davidson 1990). This shift may have been due to an increasingly common view that the hexagonal coffin shape was too representative of the human body and stark in appearance. While the first use of the term “casket” in the United States is assigned to an advertisement in an 1849 City of Boston Directory, the first issued U.S. Patent for a rectangular-shaped coffin was not issued until 1859, to a Charles Richardson of Philadelphia, Pennsylvania (U.S. Patent No. 22,537).

While the transition from coffin to casket was well underway in the eastern United States by the late 1860s, the transition in the Austin, Texas area was less delineated. Davidson (2000:247) reports that for the Dallas area, the first known use was in 1874, occurring in an advertisement run in the *Dallas Weekly Herald*. It is presumed that the introduction of the casket in Austin was in that same time frame. Still, evidence shows that at this time the use of coffins and caskets would have overlapped in Oakwood Cemetery (Davidson 2000). Based on the results of the chapel investigations, the burials exhumed in Oakwood Cemetery utilized coffins as opposed to caskets.

Coffin Wood

No complete or whole elements of coffins, such as the sides, surfaces, or floors were recovered during the exhumations. In Burials 1, 2, 7–9, 11, 13–15, 16, 18, 20–23, 26, 27, 29–33, 36, and 38–40 remnants of coffin wood were recovered. In most all cases wood was recovered in sparse amounts and was very fragmentary, rarely exceeding two inches in length following the grain (**Plate 39**). Due to limited amounts of material and its delicate nature, no analysis was conducted on recovered coffin wood. In some cases, there were enough *in situ* remains of this material to help define coffin shape and general size.



Plate 39: Common size and shape of recovered coffin wood fragments.

Hardware

At the onset of the nineteenth century, funerary trappings, fancy burial vessels, and trimmings on these containers was an exception and not an expectation unless one was wealthy, famous, or highly revered (Rauschenburg 1990). In the early 1800s, coffin adornments would likely have been limited to plates attached to a headboard naming the deceased, and swing-bail handles for easier carrying. Even by mid-century, trimming options were limited to the selections of handles, hinges, and silver-plated or white-metal coffin screws. During the early nineteenth century, a coffin or casket lid was secured with nails, common screws, or the more decorative silver- or white-metal coffin screws (a composite design consisting of a cast head affixed to a gimlet iron or steel body). The screw heads were decorated with debossed double, triple, or flared filigree designs. Most often, four or six screws (gimlet or coffin screw style) were needed to secure a lid to its body (Davidson 2000). Paralleling the mid-nineteenth-century introduction of coffin screws were dummy screws, a type of ornamental tack designed to imitate coffin screws.

Coffins often included a variety of handles, including swing bail handles and short or long bar types. Typically, handles consisted of four parts: a lug or plate that attached the handle to the side of a coffin; an arm or bracket that attached the bar to the lugs; and a bar as the handheld part of the apparatus (Hacker-Norton and Trinkley 1984). The two major categories of handles are distinguished according to mobility wherein a handle can “swing” or be affixed to the coffin in a “stationary” position. Both types can be subdivided into two categories: handles that run the length of a coffin side; or individual stationary handles, typically attached three to a side (although two to a side occur as well). In the latter instance, this may be due to a reduced number of pallbearers, an economic choice, or may have indicated a smaller coffin for a child’s burial. While hardware was typically manufactured from a variety of metals, including white metal, Argentine metal, German silver, steel, white bronze/gun metal, antimonial lead, Britannia metal, tinned copper, or tin, it should be noted that wood was commonly used for handles up to the end of the nineteenth century (Hacker-Norton and Trinkley 1984:11–12).

While preceding studies have suggested coffin hardware can be an indicator of socioeconomic status, Bell (1990) suggests that adornments were reflective of the beautification of death. This romanticism, paired with mass production of hardware in the nineteenth century, would have done more to blur socioeconomic distinctions than to define them. Social distinctions evident in life became blurred at death, making interpretation difficult. Davidson (2000) reports a number of coffin adornments and hardware for the Freedman’s Cemetery, likening this to a “... fight for an equality in death that was denied them in life” (Bell 1990:57).

Swing Bail Handles

Six double lug swing-bail handles were recovered from Burial 9 consisting of two decorative lugs (**Plate 40**) with a feather and woven vine pattern. They are “shield shaped” with a near flat edge on the inner terminus that has a slight curvature that meets at a rounded point. The outer terminus exhibits well with pronounced roundings (three rises per each of the two sides) that reach their widest point near the pin-housing’s midway point. The pin housings themselves are inornate and bullet-shaped.



Plate 40. Swing bail handles from Burial 9.



Plate 41. Bar handle from Burial 31.

The swing bar handles (**Plate 41**) found in Burial 31 are relatively undecorated but several retain two finials on the tip of each handle. In comparison with Burial 9, decoration is less discernible but appears more linear and geometric in nature.

Nails

Three nail types are commonly recorded within the archeological record in North America: hand wrought, square-cut, and wire nail. The hand-wrought nail was used commonly throughout the seventeenth and eighteenth centuries, replaced at the turn of the nineteenth century by the square-cut nail. This type held predominance for nearly a century until the introduction of the wire nail into the United States in the late nineteenth century, following the successful production of steel wire by the H.P. Nail Company of Cleveland, Ohio (Fontana and Greenleaf 1962). Davidson (2000) citing research by Garrow (1987) and Garrow and Symes (1987), as well as his own work on the Freedman's Cemetery assemblage, suggests that it is unlikely that wire nails were a mainstay of coffin manufacturing until about the mid-1890s to 1900. Davidson (2000:250) surmises that the square-cut nail may have been a better fastener of corner joints, which tended to fall apart under considerable strain.

Machine square-cut nails were produced as early as the 1790s but their popularity waned beginning in the 1890s when the Bessemer Process allowed production of inexpensive, soft steel (Visser 1997). After this time, most nails produced were the steel wire type nails still used today. Some machine-cut nails have continued to be produced to the present day with the same method used before the 1890s. Today, these nails are generally used for fastening hardwood floors and for other specialty uses. Given that the chapel originally had hardwood flooring, it is difficult to determine what proportion of the collected nails are from coffins beneath the chapel or from the later installation of the wood flooring of the chapel. While wire nails were in use by the late nineteenth century, coffin manufacturing was for at least a decade or two after still predominately done with square-cut nails. This could be due to selection bias where the square cut nail was a preferred fastener or was chosen for economic reasons. Availability may have also been an issue as the production and distribution to the west would not have been completely synchronic. In most cases, the early appearance of wire nails in hardware assemblages indicates that during the late nineteenth century they were used in tandem with square cut nails.

Diagnostic hardware artifacts recovered at Oakwood Cemetery include the above-described nails with the vast majority being classified as square-cut nails. An instance of a wrought nail was identified in Burial 10, and is similar to the L-heads as described in Nelson (1968). Even when highly corroded and lacking head elements, fragments of square-cut nails were generally readily identifiable in a laboratory setting from other more ambiguous fastener fragments. With all exhumations having an interment date of pre-1914, and broad general dates based on nail typology, these data are not the best indicators of interment date for individuals. As comparative data, what is observed at Oakwood Cemetery is similar to other burials dated to this period.

Screw Caps (Diamond Shaped)

The diamond-shaped screw cap, patented in 1862 (U.S. Utility Patent No. 36,365), became one of the first forms of coffin lid closures. Their use during the nineteenth century was short-lived, with their appearance largely absent from coffin hardware catalogues by about 1880 (Davidson 2000). The lone example of this screw cap type recovered during exhumations at Freedman's Cemetery in Dallas, Texas, was associated with a child, approximately one year in age (Davidson 2000).

Thumbscrews

Thumbscrews developed from earlier forms of coffin screws; the earliest identified form proposed in an 1859 patent issued to Mr. H. Marshall (U.S. Utility Patent No. 25659) (Hill and Pye 2012: 199). As the development of coffin lid fasteners became more complex, the popularity of thumbscrews declined between 1900 and 1920 (Hill and Pye 2012:199).

Thumbscrew Escutcheons

Escutcheons refer to decorative plates through which a thumbscrew would pass for mounting to the coffin. Early evidence of these items is on page 331 of the 1980 [1865] Russell & Erwin Manufacturing Company hardware catalog (Hill and Pye 2012). The earlier varieties tended to be diamond-shaped (Hill and Pyle 2012:201–202). By the 1870s, escutcheons were in wide use, and designs developed that allowed escutcheons to be sold with thumbscrews as matched sets. This type of artifact has a broad temporal range of approximately 1865–1920s (Hill and Pyle 2012: 202 citing Mainfort and Davidson 2006:147).

Plate 42 provides a representative view of the escutcheon plates and thumbscrews recovered from Burial 31 that shows the relative degree of intactness, with the thumbscrews retained within the escutcheons on four of the five specimens recovered. The escutcheon is convex and sub-rectangular in form with scalloped decorative edges.



Plate 42. Escutcheon plates and thumbscrews recovered from Burial 31.

Presence and Absence of Hardware Types

Presence and absence of select hardware types recovered from the exhumations is presented in **Table 5-1**. As proxy-data for dates of interment, the author's note that Burials 2, 10, 17, 18, 27, and 29 have fastener materials identified as representing early iterations of fastener screws with remnant white or silver finishing, widely in use during the first half of the nineteenth century. Two of these (Burial 10 and 18) also have an identified wrought nail element in their assemblages. This may be an indicator that these are amongst the

earliest interments at Oakwood Cemetery. Caution in this assumption is warranted as identification of both wrought nails and screw heads was subjective due to the highly corroded nature of these materials.

Burials 7, 9, 11, 14, 23, and 27 all had identified coffin screws or dummy tacks within their assemblages. In all cases, the body element had largely been corroded away making an identification as a screw or “pseudo-screw” near impossible. With heads made of lead, the identification element for this hardware type was easily marked when present in the Oakwood Cemetery assemblage. Though contemporary in their use, the presence of either suggests that these interments likely occurred in the mid-nineteenth century.

Burials 1, 9, 18, 22, 29, and 37 all had diamond-shaped screw caps recovered in their assemblages. With a short-span use range of this coffin-specific hardware type, these burials can be tentatively dated from 1860–1880. The co-presence of this hardware type with a coffin screw/dummy tack in Burial 9 may indicate an earlier interment amongst these six.

Exhumations at the Oakwood Cemetery chapel recovered five thumbscrews from Burial 31 (see **Plate 29**), which are all considered flat-bodied thumbscrews that initially appeared in an 1874 patent issued to W. M. Smith (U.S. Utility Patent 7797). Thumbscrews recovered from Burial 31 were better preserved and this type appears in the 1905 *Chattanooga Coffin: A Casket Company Catalogue*. Presumably dating to the very early 1900s, Burial 31 could be one of the later burials exhumed.

Though not as useful as temporal indicators, lining tacks were recovered from Burials 2, 11, 13, 16–19, 22–26, 30, and 33. As a measure of coffin types, at least 13 burials had interior fabric—an indication that these people may have been buried with ceremony and may not have been paupers.

Table 5-1. Presence and Absence for Select Hardware Type						
Burial #	Nail Type(s) W = Wire C = Cut Wr = Wrought	Coffin Screws/ Dummy Tacks (1840–1870)	Thumbscrews & Escutcheon (1874–1920)	Diamond- Shaped Screw Caps (1860–1880)	Lining Tacks	Silver/white capped- Screws (1800–1850)
1	W & C	N	N	Y	N	N
2	W & C	N	N	N	Y	Y
4	W	N	N	N	N	N
6	C	N	N	N	N	N
7	C	Y	N	N	N	N
8	W & C	N	N	N	N	N
9	W & C	Y	N	Y	N	Y
10	Wr & C	N	N	N	N	Y
11	C	Y	N	N	Y	N
12	C	N	N	N	N	N
13	C	N	N	N	Y	N
14	C	Y	N	N	N	N
15	C	N	N	N	N	N
16	C	N	N	N	Y	N

Table 5-1. Presence and Absence for Select Hardware Type						
Burial #	Nail Type(s) W = Wire C = Cut Wr = Wrought	Coffin Screws/ Dummy Tacks (1840–1870)	Thumbscrews & Escutcheon (1874–1920)	Diamond- Shaped Screw Caps (1860–1880)	Lining Tacks	Silver/white capped- Screws (1800–1850)
17	C	N	N	N	Y	Y
18	C	N	N	Y	Y	Y
19	C	N	N	N	Y	N
20	C	N	N	Y	N	N
21	C	N	N	Y	N	N
22	C	N	N	Y	Y	N
23	C	Y	N	N	Y	N
24	C	N	N	N	Y	N
25	C	N	N	N	Y	N
26	C	N	N	N	Y	N
27	W & C	Y	N	N	N	Y
28	N/A	N/A	N/A	N/A	N/A	N/A
29	C	N	N	Y	N	Y
30	C	N	N	N	Y	N
31	Wr & W	N	Y	N	N	N
32	W & C	N	N	N	N	N
33	W	N	N	N	Y	N
34	W & C	N	N	N	N	N
35	C	Y	N	N	N	N
36	C	Y	N	N	N	N
37	C	N	N	Y	N	N
38	C	N	N	N	N	N
39	C	N	N	N	N	N
40	C	N	N	N	N	N

Personal Items

Buttons

Of the artifacts classified as personal items recovered during the investigations, buttons were the most numerous with 188 specimens collected and analyzed. Twenty-three of the 37 exhumations contained buttons. Porcelain buttons, specifically of the Prosser type, were the most common ($n=78$). Other documented button types include: copper alloy ($n=54$), bone ($n=25$), glass ($n=13$), hard rubber ($n=6$), wood ($n=4$), iron ($n=3$), shell ($n=3$), metal ($n=2$), celluloid plastic ($n=1$), and brass ($n=1$). These were comprised of either two-hole, four-hole, or five-hole sew-through buttons, in addition to buttons attached by a shank, and ring shanks that were most likely used for cloth covered buttons.

Of the 188 buttons identified, 78 were Prosser buttons ranging in size from .034 inches to .064 inches in diameter. The most common Prosser button sizes within this assemblage were measured at 0.44 inches (22 buttons), followed by 0.43 inches (12 buttons), and 0.39 inches (eight buttons). Four types of Prosser buttons were recovered within Oakwood Cemetery: the two-hole panty waist (used for women's undergarments), the four-hole dish, the pie crust, and the hobnail design. These classifications consist of 69 four-hole dish type (**Plate 43**), three pie crust, five two-hole panty waist, and one hobnail design.



Plate 43. Four-Hole Prosser Button.

Additionally, seven Prosser buttons were not of the typical white button variety. There was one blue button and six with applied decorations. The blue Prosser button was recovered in Burial 13 (**Plate 44**). Of the six appliqué-style Prosser buttons, five were white based with a blue calico imprint pattern and one was white with a blue gingham pattern. Burial 34 contained all of the recovered calico-patterned buttons, and the one blue gingham button was located within Burial 35.

Prosser buttons were patented in 1840 by Richard Prosser from London, and were produced from the 1840s up until the 1960s. Sprague (2002) notes that the four most common Prosser forms (panty waist, calicoes, four-hole, and pie crust) comprise 99 percent of finds noted in the archeological literature. While the four-hole dish type accounts for 98 percent of the noted archeological samples (Sprague 2002). Within the Oakwood Cemetery button assemblage, the Prosser buttons account for 44 percent of the total assemblage, while the four-dish type account for 88 percent of the total Prosser button assemblage.

Despite how common Prosser buttons were during this period, due to their mass production and being readily available, not every exhumed burial at Oakwood Cemetery contained this specific type of button. The second most common button located within the recovered assemblage was the copper alloy button. These buttons ranged in size between 0.53 inches to 0.74 inches in diameter. The presence of button eyes or a shank on some buttons was unable to be distinguished due to their extreme ferrous nature as a result of decomposition processes. However, 13 buttons were able to be identified as four-hole sew-through, and 16 type ring shank copper alloy buttons. Ring shank buttons were used as a base for the top to be covered by

cloth. All the ring shank buttons were located within Burial 31. While the cloth is no longer present, the woven cloth pattern, imprinted into the copper, is distinguishable in some cases.

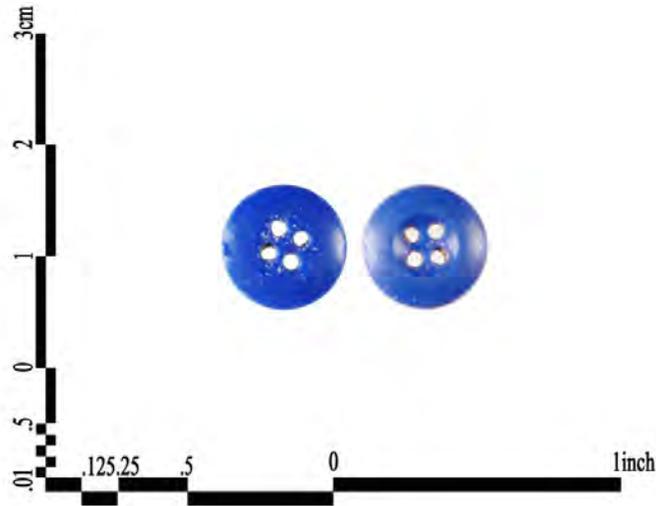


Plate 44. Blue Prosser Button from Burial 13 (both sides pictured).

Three shell buttons (one two-hole and two four-hole sew-through) made of mussel shell (**Plate 45**) were located in three separate burials: Burials 9, 17, and 20 (two adult and one subadult). One button was incomplete while two measured 0.37 and 0.38 inches in diameter. The manufacture of marine shell or mussel shell buttons dates back as early as 1855 within the United States (Marcel 1994).

Bone buttons were also represented within the assemblage and were often made from cattle bones as a result of being readily available (Owens 2000). These bone buttons ranged from 0.55 inches to 0.79 inches in diameter with the larger button (at 0.79 inches) representing a five-hole sew-through. While all other bone buttons collected from the exhumations were a four-hole sew-through.

Various types of glass buttons were also observed within the Oakwood assemblage. These include colored glass, milk glass, French jet, and decorated glass buttons. These buttons measured between 0.41 to 0.47 inches in diameter. The types of glass buttons were as follows: one milk glass button that resembled a Prosser button, one gray glass button, two domed white glass, and five blue glass buttons designed with four white painted spots on the top. Additionally, French jet buttons (0.45 in diameter) were located and present within two burials (Burials 11 and 23). This is a type of black glass that was used to emulate jet. As jet was expensive during this time, French jet was a cheaper alternative that was manufactured in France and used as mourning or fashion jewelry (Spruce Crafts 2018). Burial 11 contained four of the five French jet buttons that displayed a design on the button face, while the French jet button (0.43 in diameter) in Burial 23 was plain and unadorned.



Plate 45. Mussel shell button recovered from Burial 9.

Hard rubber buttons were in use beginning in the 1850s and patented by Nelson Goodyear in 1851. Rubber buttons were often molded with slogans and used as advertisements (Marcel 1994). Six hard rubber buttons were present within the assemblage, all of which come from Burial 7 (**Plate 46**). These buttons were made of black rubber that reads “NOVELTY RUBBER CO., GOODYEARS PATENT 1851” and measure 1.24 inches in diameter. These were the only buttons observed within the assemblage that were believed to be utilized as advertisements and were manufactured between 1855 and 1870 (Marcel 1994).

Iron as a button material was used from 1800 up until 1870. Only three iron buttons were present within the assemblage, all recovered from Burial 38. These large circular iron buttons measure 0.80 inches in diameter.

Panty waist buttons are typically two-hole sew through and were used on women’s undergarments. While wooden four-hole buttons were typically used for utilitarian purposes such as men’s undergarments and suspender attachments (Owens 2000; Norment and Boyd 2016).



Plate 46. Goodyear Rubber button, front and back faces, from Burial 7.

Collar Studs

Specialized buttons called collar studs (**Plate 47**) were observed within the Oakwood assemblage from two burials (Burials 1 and 31). Burial 1 contained one collar stud made of gold-plated brass and measured 0.39 inches in diameter. Burial 31 contained five collar studs made of two material types, wood and celluloid plastic. Due to Burial 31 containing five collar studs, they may have been used to attach disposable collars to men's shirts. Prior to the use of modern washing machines, patented in 1910, men's shirts were worn for extended periods. To solve the problem of shirts that became dirty after a day's use, detachable collars and cuffs were in use after 1827. The shirts had a tunic collar with a hole at the back and on each side at the front to which to attach the collar (Scheong 2011). The individual in Burial 31 could have used two of the wood collar studs for his cuffs, two for the front of the shirt, and the celluloid one for the back. Celluloid was the first plastic created from nitrocellulose and camphor. It was in use by 1870 as a less expensive substitute for ivory. Also, in that year, celluloid detachable collars replaced starched fabric collars (Schock 2015). The celluloid collar stud was identified from the concentric circles on the base and lines on the sides, indicating a mold. The celluloid plastic stud was the largest and had a diameter of 0.46 inches, the four wood collar studs measured 0.42 inches and 0.44 inches.

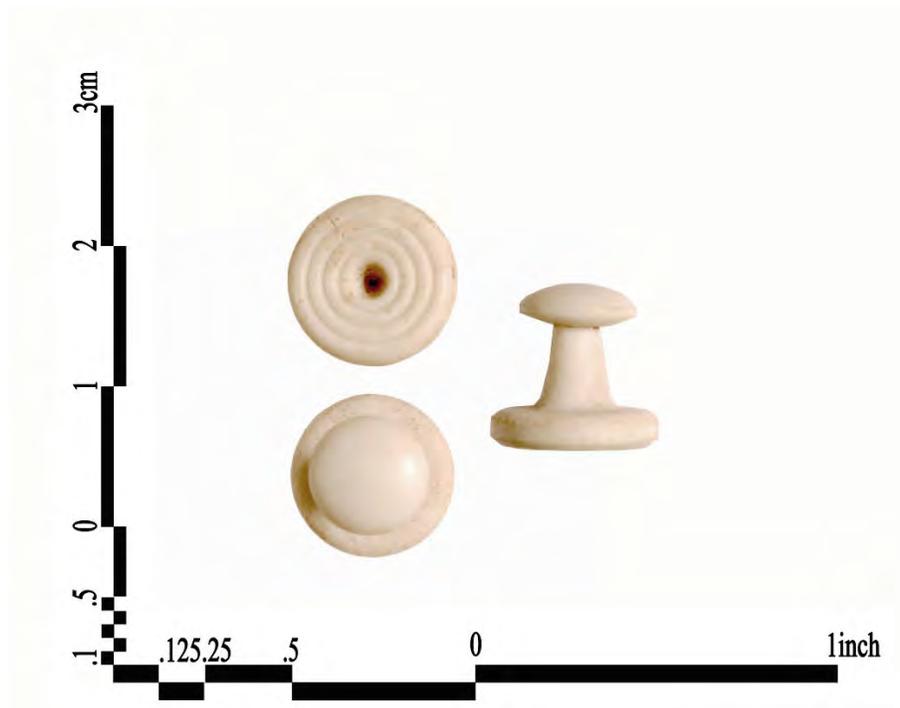


Plate 47. Obverse, reverse, and side view of white celluloid collar studs from Burial 31.

Gold Ring

The exhumation of Burial 8 revealed an almost wire-thin gold ring (**Plate 48**) *in situ* on the right middle finger of the adult male skeleton, possibly representing a wedding band. It has an interior diameter of 20 millimeters (mm) and is approximately two-mm thick. No additional jewelry was noted within the burial.



Plate 48. A gold ring from Burial 8.

Glass Beads

Burial 17 contained two glass beads, each five mm in size and manufactured from thin white glass. They are globular and ovate in shape with one flat side (see **Plate 15**).

Burial 27 also contained a single glass seed bead (a “rocaille”) that is black or dark blue in color. It is approximately one mm in diameter and complete. No additional beads were recovered from the burial (see **Plate 25**).

Buckles

Six small buckles (**Plate 49**) were recovered from Burials 16, 18, 22, 31, 35, and 37. Each is no bigger than one inch by one-half inch in size and manufactured from ferrous metal. Given their small size, it suggests they may be suspender buckles if a male interment or perhaps a fastener associated with undergarments if the interment is female. The buckles are not robust enough to be belt buckles.



Plate 49. Buckles from Burials 16, 18, 22, 31, 35, and 37.

Hook-and-Eye Closures

Burials 23 and 33 contained hook-and-eye fastener fragments; presumably the remainder of the associated hook-and-eye closures from an unidentified garment had deteriorated. Based on the approximate time of interment for the exhumed burials at Oakwood Cemetery, which is believed to have been from 1889 to 1916, the fastener fragments from Burial 33 (female) may be from an early form of women's brassieres called the Breast Supporter patented in 1893 by Marie Tucek (U.S. Patent Office US494397A). The fragment with Burial 23 (infant) may be associated with an article of children's clothing that fastened in the back.

Crucifix

The exhumation of Burial 27 (**Plate 50**) recovered a single white porcelain crucifix. Measuring 13.5 cm by 8.5 cm, the crucifix is unpolished porcelain with a slightly rough texture except for globular terminations on the four ends of the cross and the figure of Christ, all of which are glossy vitreous porcelain. At the top of the crucifix, the globular termination has a hole through which a cord or ribbon would be attached. There are no manufacturer's or maker's marks visible, suggesting it may have been produced locally and not a mass production item.



Plate 50. White porcelain crucifix from Burial 27.

Coin Purse

Burial 34 contained a coin purse (**Plate 51**) clasp manufactured from ferrous metal. The remainder of the purse was likely fabric or leather, as there was no other trace of the purse found in the grave.



Plate 51. A metal coin purse clasp found in Burial 34.

Coins

Associated with the metal clasp from a coin purse were several coins found clustered underneath the right pelvic bone within Burial 34. One coin is corroded beyond recognition (**Plate 53**). Another coin is identified as a Seated Liberty Dime/Half Dime, with mint dates of 1837–1873 (**Plate 54**). A third possible coin is thin with undistinguishable faces. A small hole near the edge suggests that this coin may in fact be a pendant (**Plate 55**).



Plate 53. A corroded coin found in Burial 34 (both sides pictured).



Plate 54. A Seated Liberty Dime/Half Dime, with mint dates of 1837–1873, found in Burial 34 (both sides pictured).



Plate 55. A thin coin, or possibly a pendant, with a small hole (both sides pictured).

Artifacts Recovered from Outside the Chapel

The majority of artifacts found during the monitoring of construction or mechanical scraping outside of the chapel were recovered from the upper 30 cm of soil. Few of the artifacts observed that were diagnostic date to the mid-twentieth century or later, meaning they are unlikely to have an association with any of the burials in this area of the cemetery. They may be associated with chapel use or visitation to other areas of the cemetery. For example, several pull tabs from aluminum cans were recovered from north of the chapel, but these date to the 1970s. Two coins with 1960s dates and a plastic fork were also found during mechanical scraping of the same area. Based on the late dates of these artifacts it seems likely that this soil was fill brought in from elsewhere or is the result of runoff moving down slope to the southwest from upslope northeast. Numerous keys were recovered among these more recent artifacts. This set has both more modern designs and older key types (**Plate 56**) and could have once belonged to a groundskeeper or maintenance personal.



Plate 56. Keys found outside the chapel.

After triaging of obvious modern-era intrusions in the field (i.e., plastic cutlery, Styrofoam, etc.) a number of artifacts, when analyzed, do provide dates that may correlate with interments here or from adjacent plots. Some artifacts found north and east of the chapel, and inside it above the burials, were manufactured in the 1820s through 1891 with production of some extending to 1930. North of the chapel, a transfer-printed

whiteware ceramic sherd was recovered that was produced until 1860 (Brown 1982). Glass shards that range in date from 1820 through 1885 include: an aqua three-piece mold container base, colorless and amethyst glass packer bottle lips (**Plate 57**); an aqua embossed mold-blown bottle base; a colorless turn mold container shard; and three manganese cut glass tableware shards, two of which were machine made. A manganese glass ball-shaped decanter stopper was also found (Jones 1989; Lindsey 2019; Lorrain 1968; Newman 1970).



Plate 57. A manganese glass ball-shaped decanter stopper recovered from outside chapel.

Manganese glass refers to glass that began as colorless and turned a light to deep purple hue when exposed to UV light, due to the manganese dioxide used in its manufacture. The majority of these bottles were produced from the 1880s through the end of World War I (Lindsey 2016). Aqua glass has a wider diagnostic date range. Aqua glass containers were common from at least the early nineteenth century and mostly fell out of use by the 1920s. One major exception was Ball Mason jars, which continued to be manufactured with aqua glass through the 1930s (Lindsey 2016). The variety of glass types reflects innovations using molds that occurred in glass manufacturing in the nineteenth century in a growing economy eager to increase production volume beyond that possible with blown glass.

An ironstone ceramic sherd was recovered east of the chapel, along with glass items represented by an amethyst glass press mold lip and handle mug shards, an aqua turn mold bottle shard, manganese tinted shards and a machine-made medicine bottle base. The base to a ceramic bowl, a Rockingham type buff paste earthenware, was dated to 1891 by the manufacturer's "WARDLE ENGLAND" emblem (Kowalsky 1999) (**Plate 58**). These markings indicate this vessel was produced by Wardle & Co. of Staffordshire,

England. A complete horseshoe and a metal belt buckle were recovered very close to where the ceramic base was found.



Plate 58. The base to a ceramic bowl found outside the chapel, dated to 1891.

Trenching inside the chapel unearthed cobalt blue glass, aqua three-piece mold and green press mold glass shards, in addition to a colorless press mold drinking glass base. Flow blue whiteware, last produced in 1860, was also found (Magid 2010).

Chapter 6: Summary

The Oakwood Cemetery Chapel was constructed in 1914 in the southwest quadrant of Section 4 (see **Figure 5**), in an area previously labeled as “Colored Grounds, Section B” (Tieman, n.d.). This area has also been referred to as a “potter’s field” (AmaTerra 2015), the term commonly used to refer to burials of strangers and the indigent. Given the location of the chapel’s construction, it was presumed that the chapel was built over the graves of individuals from the mid- to late nineteenth to early twentieth century who were unknown to the community or otherwise unable to pay much, or any, money for burial.

In the 103 years since its construction, the chapel suffered from uneven foundation settlement and deferred maintenance of other structural deficiencies. Given such conditions, rehabilitation of the Oakwood Chapel was identified as a priority for cemetery improvements that were funded under the City’s 2012 General Obligation Bond. The proposed improvements project was undertaken by the City to rehabilitate the chapel for use again for services, as well as a visitor’s center and community space. The scope of the rehabilitation included structural stabilization of the foundation; surface drainage improvements; ADA access improvements; rehabilitation of the single-occupant restroom; mechanical, electrical, and lighting overhaul; and restoration of interior and exterior finishes, including doors, windows, masonry, roof, and plaster.

Between November 2016 and January 2018, Hicks & Company conducted archeological monitoring and burial exhumations in and around the Oakwood Cemetery Chapel. Investigations were conducted pursuant to the ACT under Texas Antiquities Permit No. 7709 (issued to Principal Investigator Josh Haefner) and the Texas Health and Safety Code (Chapter 711) prior to the proposed rehabilitation of the building, which had the potential to impact burials.

Field efforts resulted in the identification of 59 burials and grave shafts beneath, and adjacent to, the Oakwood Cemetery Chapel. Because the proposed improvements would have resulted in disturbances to many of the discovered burials, the City decided to exhume the burials (that would be impacted) for reinterment in a different location within Oakwood Cemetery. Of the 59 identified burials, 37 were selected for exhumation; one contained no human remains and investigations ultimately exhumed 36 burials. The remaining 22 burials were not exhumed but their locations have been recorded in the cemetery records and a marker or plaque will be erected in one or more places to commemorate and interpret the unexhumed and unmarked graves.

The exhumed burials will be reburied elsewhere within Oakwood Cemetery during a reinterment ceremony conducted by the City. In addition to the 22 burials left in place, the City will reset the two headstones (uncovered north of the chapel in November 2016) in their original locations. However, individual and next of kin identifications are not possible due to a general lack of headstones or markers and because the City’s historical burial records for Oakwood Cemetery do not allow for matching names of individuals with the actual physical locations of burials in this area.

Of the 36 individuals analyzed, the biological affinities of 16 could not be determined, mainly due to the age of the individuals at their time of death (mostly infants). Of those 20 that could be determined, six of the individuals were Black, six were White, seven were Hispanic, and one was determined broadly to be Asian. The sex of 21 of the 36 individuals was able to be determined, with 17 being male and four being

female. The stature of only ten of the individuals was determined, and average heights generally ranged from 5'2" to 5'7".

The age of the individuals at their time of death was the measure most discernible following the skeletal analysis. Thirty-four of the individuals yielded an age range, with the highest percentage of them being infants or very young (a year old or less). Two individuals were juveniles under the age of seven. Of the 21 adults, two were considered to be under the age of 30, six were under the age of 50, and eight individuals could have been past the age of 80 when they died. The remaining five adults were considered middle- to older-age (between 27 and 61 years of age).

The biological affinity of the individuals exhumed is presented in **Figure 7**, and, based on an examination of these burials by location, there would not appear to be any discernible pattern suggesting that segregation of the burials based on biological affinity occurred. Three Hispanic individuals appear to have been buried alongside one another (Burials 20, 21, and 25); however, without similar data on burials to the west (outside the chapel) or north, there would not be enough evidence to suggest true patterning. There also appears to be a cluster of infant and juvenile burials in the center of the excavated area, although, again, without additional data it would be conjecture at best to suggest that this was intentional.

Based on the paucity of identifiable pathologies associated with the exhumed burials that might suggest how the 36 individuals died, and the predominance of infant or juvenile burials, it seems reasonable to infer that the majority of the deaths were the result of infectious or other disease(s). Although there is evidence of trephination in the skull found in Burial 31, there is no indication of trauma that may have resulted in death. Similarly, while the skull from Burial 7 exhibits a circumferential cut for the removal of the calotte for autopsy or dissection purposes, other than a previously fractured and healed right femur, there are no pathologies suggesting the cause of death.

Coffin hardware recovered from the various burials provides a broad estimate of the timeframe of interment of the exhumed burials (**Figure 8**). Utilizing reported dates of use for select hardware types presented in **Table 5-1**, the authors note that Burials 2, 10, 17, 18, 27, and 29 have fasteners identified as representing early iterations of capped screws with remnant white or silver finishing, widely in use from the early nineteenth century to about 1850.

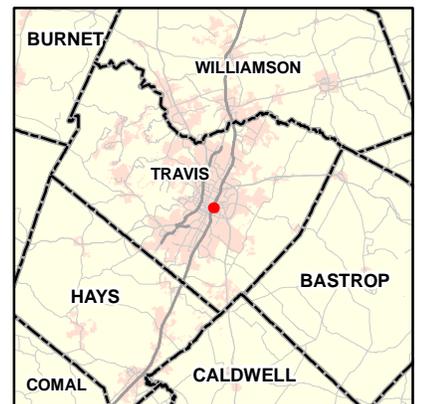
Burials 7, 9, 11, 14, 23, and 27 all had identified coffin screws or dummy tacks, and their presence suggests that these interments occurred circa 1850–1870. Burials 1, 9, 18, 20–22, 29, and 37 all had diamond-shaped screw caps; with a short-span of use, these burials can be tentatively dated circa 1860–1880. Thumbscrews were recovered from Burial 31 which, in style, are all considered flat-bodied thumbscrews that initially appeared in an 1874 patent issued to W. M. Smith (U.S. Utility Patent 7797). Thus, the interment of Burial 31 presumably occurred post-1874. In a consideration of burials that contained coffin hardware (see **Table 5-1**), there appears to be a fairly equal distribution of the presence of exterior hardware relative to biological affinity.



Figure 7

Burials by Biological Affinity

Revised November, 2019



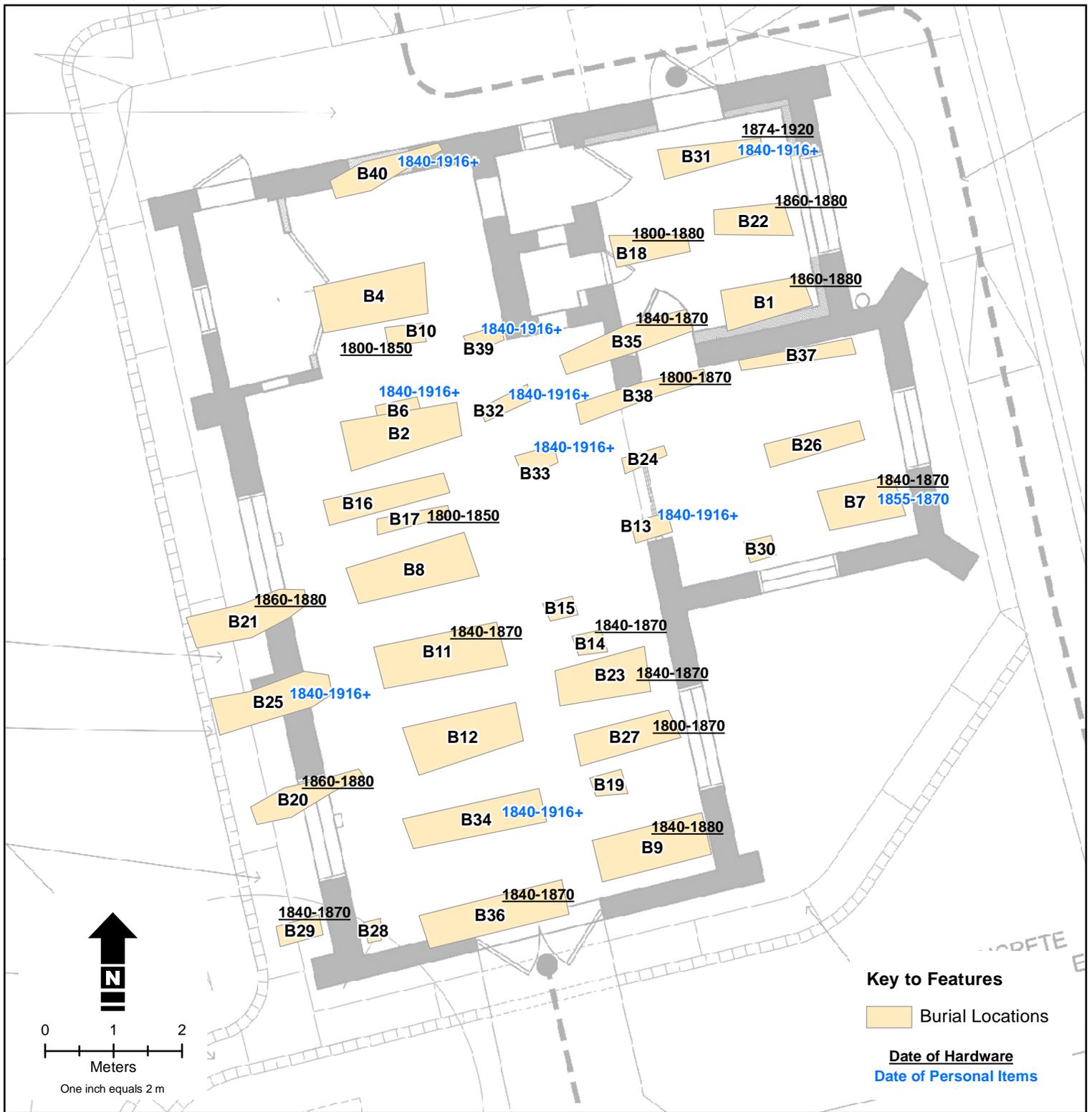
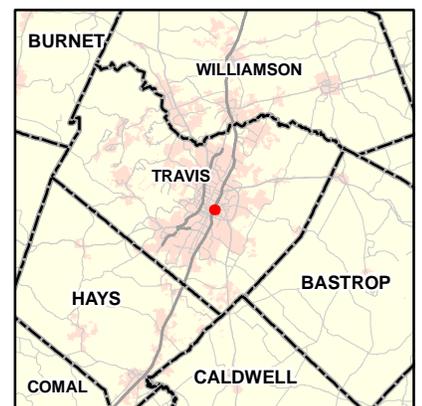


Figure 8

Burials by Estimated Interment Date

Revised November, 2019



While the data set on handles is limited to two occurrences (Burial 9 and Burial 31), we can also use these items to estimate a timeframe for these interments. While a direct match in the archival record has not been identified for either specimen, the swing-bail handles identified in Burial 9 are similar to a few of the types identified at Freedman's Cemetery (Davidson 2000). While not a direct match, the lugs from the Oakwood specimen are similar in design and morphology to those depicted in **Figure 31** by Davidson (2000:299), which are assigned a date range of 1869–1899 (Davidson 2000:298–300). The lug handles most resemble those identified in the same volume as Handle 10 in Figure III-35a and has an introductory date at Freedman of circa 1891 (Davidson 2000:310, Table III-37). Given these dates, Burial 9 may be more accurately dated no earlier than 1860 and perhaps as recent as 1900. While there is less of a match between the swing bar handles recovered from Burial 31, the style is similar to those that Davidson (2000) orders into his Late Period Burials at Freedman's with an interment date of approximately 1900–1907.

Personal items recovered from the excavated burials are generally simple everyday items. Burial 8 contained a very plain almost wire thin gold band *in situ* on the right middle finger, while other noted personal items are primarily associated with clothing the deceased was wearing (such as buttons, collar and cuff studs, and suspender buckles). Other examples of everyday items associated with excavated burials include coins, the metal clasp from a coin purse (Burial 34), and a large porcelain crucifix (Burial 27). However, there is a general lack of personal items associated with the excavated burials, again suggesting the deceased generally were of limited economic means. Unfortunately, this sheds little light on the individuals themselves.

As with coffin hardware, the dates of manufacture and use of personal items provide additional tentative date ranges for the exhumed burials (see **Figure 8**). Prosser buttons (recovered in Burials 6–8, 13, 17, 20, 25, and 32–40) were manufactured from 1840–1960s; using the date of chapel construction as a terminal date, the burials containing Prosser buttons date to circa 1840–1914. Additional recovered buttons that offer temporal information include Goodyear Rubber buttons (1851–1870, recovered in Burial 7) and iron buttons (1800–1870, recovered in Burial 38).

In summary, examination of bioarcheological data in tandem with analysis of grave goods and burial hardware indicates no apparent division among the treatment of the deceased based on biological affinity or gender. In addition, the authors see parallels in that juvenile or infant burials had trappings similar to those of adults. Ultimately, it appears that economic circumstances or a lack of local residency were the determining factors in terms of who was buried in the chapel area from approximately 1840 to 1914.

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Archeological Monitoring and Exhumations for the City of Austin's Oakwood Cemetery Chapel Restoration Project, Travis County, Texas

Volume II: Bioarcheology

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Background

The Forensic Anthropology Center at Texas State (FACTS) was requested to analyze burials from the Oakwood Cemetery Chapel, built in 1914, located in Austin, Texas. These burials originate from what is referred to as the “Colored Grounds” section within the Oakwood Cemetery, established in 1839. The “Colored Grounds” is located in the southwest corner of Section 4 on Main Avenue and Navasota Street. This portion of Section 4 is referred to both as a “Potter’s Field” and as the “Colored Grounds” (Amaterra Environmental Inc 2015:82). Both “strangers” and “paupers,” as well as African Americans, were buried within this section. Further, it was common for poor European Americans to be buried within the Colored Grounds (Amaterra Environmental Inc 2015). Based on publicly available historical cemetery records, the “Colored Grounds” contains African Americans, European Americans, and Mexicans.

The goals of skeletal analysis for the burials excavated from the Oakwood Cemetery Chapel area were to 1) develop a biological profile including sex, age, biological affinity, and stature; 2) identify and describe any trauma and pathological conditions; and 3) provide a dental inventory and assessment of oral health. The methodological approach to each component of the biological profile varied based on the overall condition and availability of required skeletal material. The generation of biological profiles was challenging considering the majority of remains were moderately to highly fragmentary and encased in soil matrix. All soil was cleaned from the remains prior to any reconstruction and analyses. Once cleaning took place, the remains were carefully laid out in anatomical position and inventoried. For most individuals, the cranium required reconstruction in order to collect cranial measurements for estimation of biological affinity. Data were collected following procedures outlined in *Osteoware* (2012), developed by the Smithsonian Osteological Repatriation Laboratory, which includes collection procedures outlined in *Standards for Data Collection from Human Skeletal Remains* (Buikstra and Ubelaker 1994). A summary of the biological profiles is provided in Table 1.

Biological Profile Methods, Pathology, and Oral Health

Sex

The pelvis provides the best estimate of sex. The Klales, et al. (2012) revision of the Phenice (1969) method was utilized when enough features of the pubic and ischium were present. The ventral arc, ischopubic ramus ridge, and subpubic concavity are scored on a scale of 1–5, with 1 indicating female, 5 male, and 3 suggesting ambiguity. The Klales, et al. method uses ordinal logistic regression and provides a probability of the sex estimation. In burials that had partial or incomplete innominate bones, the postcranial skeleton was used for sex estimation as the postcranial skeleton provides the second best estimate of sex (Spradley and Jantz 2011). Population specific discriminant function formulae were used if enough measurements were present, as multivariate equations are more robust than univariate. However, if discriminant formulae were not possible due to incomplete measurements, univariate sectioning points were used. Cranial sex estimation was utilized if the cranium was the only indicator of sex present or to support sex estimates in cases where sex was ambiguous. Walker’s (2008) modification of Acsádi’s and Nemeskéri’s (1970) cranial non-metric traits was used for cranial sex estimation.

Table 1: Biological profile summary of Oakwood Cemetery Chapel Burials

<i>Burial</i>	<i>Age Category</i>	<i>Age</i>	<i>Sex</i>	<i>Biological Affinity</i>	<i>Stature</i>
01	Adult	49.6–91.3	Male	Black	N/A
07	Adult	14.9–25	Male	Black	5'3" – 5'8"
08	Adult	24–48	Male	Black	5'3" – 5'8"
09	Adult	27.3–61.5	Female	Black	5'1" – 5'5"
11	Adult	32.5–85.7	Female	White	N/A
12	Adult	21.6–34	Female	White	4'6" – 5'0"
16	Adult	52–90.9	Male	Mexican	N/A
18	Adult	41–89.5	Male	Asian (Broad Estimation)	N/A
20	Adult	30.6–89	Male	Mexican	5'1" – 5'6"
21	Adult	29.3–84.5	Male	Mexican	5'1" – 5'7"
22	Adult	27.6–45	Male	White	N/A
23	Adult	26.6–43.9	Female	Mexican	N/A
25	Adult	21.3–39.6	Male	Mexican	5'1" – 5'7"
26	Adult	48.8–91.2	Male	Black	N/A
31	Adult	29.3–56.2	Male	White	5'5" – 5'8"
34	Adult	20.9–48.2	Male	Mexican	5'2" – 5'8"
35	Adult	middle to older adult	Male	White	N/A
36	Adult	20.2–28.4	Male	Black	5'2" – 5'7"
37	Adult	74.3–91.3	Male	Indeterminant	N/A
38	Adult	17.8–82.1	Male	Mexican	N/A
40	Adult	48.8–91.2	Male	White (Broad Estimation: European/Narrow)	N/A
04	Indeterminant	N/A	N/A	N/A	N/A
06	Infant	birth–1.7 months	N/A	N/A	N/A
10	Infant	36–56 weeks intrauterine	N/A	N/A	N/A
13	Infant	7.5–10.5 months	N/A	N/A	N/A
14	Infant	7.5–10.5 months	N/A	N/A	N/A
15	Infant	birth–1.5 months	N/A	N/A	N/A
19	Infant	36–56 weeks intrauterine	N/A	N/A	N/A
24	Infant	36–56 weeks intrauterine	N/A	N/A	N/A
28	Infant	36–56 weeks intrauterine	N/A	N/A	N/A
30	Infant	4.5–7.5 months	N/A	N/A	N/A
32	Infant	7.5–10.5 months	N/A	N/A	N/A
33	Infant	20–36 weeks intrauterine	N/A	N/A	N/A
39	Infant	36–56 weeks intrauterine	N/A	N/A	N/A
17	Juvenile	3.5–4.5 years	N/A	N/A	N/A
27	Juvenile	4.5–6.5 years	N/A	N/A	N/A

These cranial sex traits include the glabella, nuchal crest, mastoid process, supra-orbital margin, and mental eminence. Each trait is scored on scale of 1–5, with a score of 1 indicative of female, 5 indicative of male, and 3 suggestive of indeterminate. Walker’s method uses logistic regression with a combination of traits to produce probability estimates of sex. If sex was not estimated using the cranium due to the presence and utility of other, more reliable features and a cranium was present, data were collected and archived.

Age

Adult age is best estimated from degenerative changes observed on the skeleton. Adult age was estimated using ADBOU (Boldsen, et al. 2002). Degenerative changes from the pubic symphysis and auricular surface along with degree of cranial suture closure were scored following Milner and Boldsen (2016) and entered into ADBOU. ADBOU uses transition analysis which produces maximum likelihood age estimates with 95% confidence intervals using documented priors. There were 12 infants and two juvenile skeletons within the Oakwood Cemetery Chapel burials. For the infants and juveniles, overall development of the skeleton, including epiphysial appearance and ossification, along with dental development and eruption were used to provide an age estimation.

Biological Affinity

Based on 3,153 digitized burial records from the Oakwood Cemetery, from 1866–1914, downloaded from the Austin Public Library, with the exception of only a few, African Americans, European Americans, and Mexicans were buried within the cemetery (Austin History Center). With this documentation, estimation of biological affinity used three groups that best matched the cemetery demographics: 19th Century American Black, 19th Century American White, and 20th Century Mexican. Based on 1850 US Census records, common terminology of the time included Black and White, terminology that is still used on the US Census (Pew Research Center 2019). The most frequently used method to estimate biological affinity is discriminant function analysis and craniometric data (cranial measurements). The program FORDISC 3.1 (Jantz and Ousley 2005) was used to run the analyses, modified by a custom craniometric database containing the three reference groups [(19th Century American Black (41 females and 59 males), 19th Century American White (22 females and 72 males), and 20th Century Mexican (50 females and 195 males)]. These groups were obtained from Spradley (2006) and the Forensic Anthropology Data Bank maintained at the University of Tennessee Department of Anthropology and use cranial measurements with definitions outlined in Howells (1973) (see Table 1). A 20th Century Mexican sample was chosen as there is no available or appropriate 19th Century Mexican sample. This Mexican sample is from Spradley (2013) and represents Mexican nationals that died near the US/Mexico border.

The majority of all adult skeletons had a highly fragmented craniofacial region, thus, for most individuals, vault measurements were heavily relied upon. In some cases, only a few measurements were present. In these cases, the ability of the measurements to correctly classify 75% or more of the reference groups into their correct group indicated that these particular

Table 2: Howells Cranial Measurements and Abbreviations

<i>Abbreviation</i>	<i>Measurement</i>	<i>Abbreviation</i>	<i>Measurement</i>
GOL	glabella-occipital	PAS	parietal subtense
NOL	nasion-occipital	PAF	parietal fraction
BNL	basion-nasion	OCC	occipital chord
BBH	basion-bregma	OCS	occipital subtense
WFB	minimum frontal breadth	OCF	occipital fraction
XCB	max cran br	FOL	foramen magnum length
XFB	max frontal br	FOB	foramen magnum breadth
ZYB	byzygomatic breadth	NAR	nasion radius
AUB	biauricular breadth	SSR	subspinale radius
ASB	biasterionic breadth	PRR	prosthion radius
BPL	basion-prosthion length	DKR	dacryon radius
NPH	nasion-prosthion height	ZOR	zygoorbitale radius
NLH	nasal height	FMR	frontomalare radius
JUB	bijugal breadth	EKR	ectoconchion radius
NLB	nasal breadth	ZMR	zygomaxillare radius
MAB	external palate breadth	AVR	M1 alveolar radius
MAL	external palate length	BRR	bregma radius
MDH	mastoid height	VRR	vertex radius
OBH	orbital height	LAR	lambda radius
OBB	orbital breadth	OSR	opisthion radius
DKB	interorbital br	BAR	basion radius
NDS	nasion-dacryon subtense	NAA	nasion angle
WNB	simotic chord	PRA	prosthion angle
SIS	simotic subtense	BAA	basion angle, nasion-prosthion
ZMB	bimaxillary br	NBA	nasion angle
SSS	zygo-maxillary subtense	BBA	basion angle, nasion-bregma
FMB	bifrontal breadth	BRA	Bregma angle
NAS	nasio-frontal subtense	SSA	zygomaxillary angle
EKB	bi-orbital breadth	NFA	nasio-frontal angle
DKS	dacryon subtense	DKA	dacryal angle
IML	inferior malar length	NDA	o-dacryal angle
XML	maximum malar length	SIA	simiotic angle
MLS	malar subtense	FRA	frontal angle
WMH	minimum malar height	PAA	parietal angle
SOS	supraorbital projection	OCA	occipital angle
GLS	glabella projection	RFA	radio-frontal angle
STB	bistephanic breadth	RPA	radio-parietal angle
FRC	frontal chord	ROA	radio-occipital angle, lambda-opisthion
FRS	frontal subtense	BSA	basal angle, prosthion-opishtion
FRF	frontal fraction	SBA	sub-bregma angle
PAC	parietal chord	SLA	sub-lambda angle

measurements had good discriminating power and, thus, could yield a good classification. If the reference group classification was lower than 75% but greater than random chance (33.3%) the estimation of affinity was qualified as ‘moderate’ or ‘probable.’ No classifications fell below random chance.

In cases where craniometrics could not be collected due to overall fragmentation, macromorphoscopic data were used in conjunction with a beta version of the MaMD Analytical Program v. 0.2 (Hefner 2018) which “uses artificial neural network to classify an unknown cranium into a reference group.” Within MaMD, the American Black, American White, and Southwest Hispanic groups were selected for estimation purposes as they closely align with the reference groups used in the craniometric analysis. The American groups contain both 19th and 20th Century individuals. The Southwest Hispanic group differs slightly from the Mexican craniometric sample in that it consists of individuals who died near the US/Mexico border in Arizona. Not all of the individuals are identified; however, of the positively identified, approximately 90% are from Mexico (Anderson and Parks 2008). As with the craniometric data, the full suite of macromorphoscopic traits were not available due to fragmentation and, at times, only a few traits were utilized. As with the craniometric analyses, the ability of the traits to correctly classify the reference groups was used as an indicator to assess the strength of the overall classification.

In cases where craniometric and macromorphoscopic analysis was not possible, dental metric analysis was employed. Dental metrics, using a global reference data set in conjunction with random forest classification, were used to provide a broad-based geographic ancestry estimation using a freely available GUI provided by Kenyhercz, et al. (2019). The program contains African, European, and Asian reference groups. Because the only reference groups are continental, African, European, and Asian, a broad classification was made. In these instances, if the broad classification was African or European, these designations could be translated to probable American Black or probable American White.

Stature

Stature was estimated using FORDISC 3.1 which estimates stature “on the fly” using all possible measurements and linear regression (Jantz and Ousley 2005:33). In some cases, the remains were too fragmentary for stature estimation. Further, stature cannot be estimated in subadults as currently no methods exist. FORDISC provides a 95% prediction interval. The 19th Century cadaver statures were selected as the best reference for stature estimation due to the contemporaneous time period.

Pathology and Trauma

Skeletal pathological indicators were identified via gross morphological assessment according to standardized methodology, terminology, and visual guidelines (Buikstra and Ubelaker 1994; Mann and Hunt 2012; Ortner 2003); dental/oral pathologies are described in the dental inventory and oral health section. Where skeletal elements were mostly intact, all bone surfaces were examined for the presence or absence of bone modification resulting from pathological changes, as opposed to postmortem taphonomic damage. In cases where the condition of skeletal elements

ranged from fragmentary to extremely fragmented, all fragments were individually assessed. Pathologies were categorized as present when they met any of the four criteria outlined by Ortner (2012): 1) abnormal bone formation, 2) abnormal absence of bone, 3) abnormal size, or 4) abnormal shape. The majority of skeletal pathologies found in bioarchaeological skeletal remains (and by extension, historical skeletal remains) involve osteoarthritis, infection, and trauma (Ortner 2003). As a result, even extremely fragmentary elements that might preferentially demonstrate these more common pathological categories were carefully examined (e.g., vertebral bodies for osteoarthritis, tibiae for periosteal or osteomyelitic infections, and limbs/cranial fragments for fractures and blunt force injuries, etc.).

Indicators of skeletal pathologies, or damage, were classified according to time of insult: antemortem, perimortem, or postmortem. Antemortem pathologies are characterized by healed or actively healing bone response at the site of injury, indicating the individual lived through the injury or disease process. Perimortem pathologies are those that are classified as occurring at or around the time of death and can be indicative of the cause of death. Postmortem damage occurs after an individual has already died, and thus is not a true pathology. Postmortem modification can result from diagenetic and environmental processes, such as depositional environment, animal scavenging, and other taphonomic agents, and as such, is not within the purview of analysis.

Overall, the health and illness histories of the Oakwood Cemetery Chapel individuals present with fewer skeletal pathologies than might be expected from a late 19th to early 20th century cemetery. However, the vast majority of human illnesses do not affect the skeleton, and even in cases of diseases capable of affecting the skeleton, only a small portion of them actually go on to modify the skeleton. A skeleton with no pathologies does not mean the individual did not suffer from a particular disease; it may simply mean that the individual died before the disease process had a chance to affect their bones (Wood, et al. 1992).

Dental Inventory and Oral Health

The dental inventories, wear, and assessments of oral health (e.g., recording of dental caries, calculus, abscesses, hypoplasias, antemortem tooth loss) were documented using *Osteoware* following documentation procedures outlined in Buikstra and Ubelaker (1994). The dentition was noted as present or absent and whether missing teeth were lost antemortem or postmortem. Individual teeth from the permanent and deciduous dentition are referred to using the universal numbering system (i.e., 1–32 for permanent or A–T for deciduous). Location of linear enamel hypoplasias were measured and the Cares Henriquez and Oxenham (2019) method was used to calculate hypoplastic age at formation from the anterior dentition. Hypoplasias are macroscopic enamel defects, resulting in lines or pits on the tooth with no enamel. Hypoplasias are generally thought to result from illness, disease, or weaning. Any unusual morphologies or habitual activity indicators were also noted during examination and included in the report.

Burial 01

General Description

This mostly complete skeleton represents a Black male, between 49.6 to 91.3 years of age at death, with an indeterminate stature.

Inventory and Condition of Remains

The remains of Burial 01 are mostly complete, with high fragmentation in the craniofacial, thoracic, and pelvic regions. Proximal and distal epiphyses of the long bones are fragmentary, however, the epiphyses of the femoral head remained in fair condition and were used in the sex estimation analyses. A full maxillary and mandibular dentition were available for dental analyses. In addition, the skull, along with portions of the pubic symphysis and auricular surface, were available for age estimation analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 01 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Sex was estimated based on the statistical evaluation of the pelvis, postcranial metrics, and cranial traits. The only portion of the pelvis available for sex estimation was the sciatic notch, which was assessed based on qualitative features outlined in Buikstra and Ubelaker (1994). The sciatic notch suggests probable male based on a slightly narrow width.

Following Spradley and Jantz (2011), postcranial sectioning points for American Blacks were used to estimate sex. Only sectioning points with classification accuracies greater than or equal to 80% were used. Sectioning points from the femoral head and tibia circumferences at nutrient foramen all suggest Burial 01 is male (see Table 2).

Table 2: Univariate sex estimation of Burial 01

Measurement	Sectioning Point	Burial 01	Classification Accuracy (%)	Estimated Sex
Femur max. head diameter	44	50	86	Male
Tibia circumference nutrient foramen	92	100	81	Male
Tibia max. diameter nutrient foramen	35	36	80	Male

Using Walker (2008), sex was estimated from fragments of the cranium, including the mastoid process (score=2), the supra-orbital margin (score=5), and the mental eminence of the mandible (score=4). Using the orbit and mental eminence, the Walker method provides a 100% probability of male. Based on methods found in Buikstra and Ubelaker (1994), presented by Spradley and Jantz (2011) and by Walker (2008), the estimated sex for Burial 01 is male.

Age: 49.6–91.3 years

The auricular surface was the primary indicator evaluated for age estimation. Numerous features of the right and left auricular surfaces were scored, such as morphology, topography, and texture, following descriptions outlined in (Milner and Boldsen 2016). The auricular surface topography was flat to irregular while the morphology was flat without billows. The inferior surface texture showed microporosity. There were no fragments of the pubic symphysis or cranial sutures available for age estimation analysis.

Auricular surface scores were entered into ADBOU (Boldsen, et al. 2002). Burial 01 is estimated to be 49.6–91.3 years of age at death, with a maximum likelihood (point estimate) of 79.6 years. Overall, the joint surfaces appear free of osteoarthritis, suggesting Burial 01 is younger than the point estimate rendering the age estimation closer to 49–60.

Biological Affinity: Black

Although the cranium was fragmented, a total of ten measurements were available for analysis: FMB, FRC, FRS, GOL, MDH, NLB, PAC, PAS, WMH, and XCB. These craniometric measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 77.7% of the time, greater than chance alone. Burial 01 is most similar to the 19th Century American Black group with a posterior probability of 0.998 and a typicality of 0.05. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005). Due to the number of available craniometric variables, the overall classification rate of reference groups, and the posterior and typicality probabilities, the overall group membership for Burial 01 is estimated as Black and represents a good classification.

Stature: Indeterminate

Due to the fragmentation of the remains, stature estimation was not possible.

Skeletal Pathology: None

The right tibia shows remodeling and a pronounced bulge at lateral midshaft with periosteal new bone formation externally; cortical flaking shows periosteal response sub-cortex. There is no obvious sign of a fracture callus; therefore, this is potentially a traumatic or infectious periostitis response. Mastoid sinuses on both right and left temporal bones are exposed, likely taphonomic in nature.

Trauma: None

No trauma was observed on Burial 01.

Dental Inventory and Oral Health

The maxilla is fragmentary and the mandible is mostly complete, missing the ascending rami. All teeth are fully developed, present, and can be fit into an alveolar socket with the exception of

teeth #22 and 23. Mild to moderate calculus is present on the overall dentition along with moderate dental wear and brown staining. Mild periodontal disease is noted. Shoveling is present on the maxillary central incisors. No dental caries or abscesses are noted. Tooth #20 is rotated distally. A linear enamel hypoplasia is present on tooth #1. Using the Cares Henriquez and Oxenham (2019) method, this hypoplasia corresponds to age at formation of 2.07 years of age.

Burial 04

General Description

This burial is represented by a few small bone fragments of a possible infant individual of indeterminant age, sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 04 are highly fragmentary, with only four small bone fragments present and encased in hard clay. Cleaning the clay from the remains would further fragment the already fragile and friable bone. Due to the extreme fragmentation of the remains, age, sex, biological affinity, and stature analyses were indeterminant.

Minimum Number of Individuals: Indeterminant

Due to the fragmentation of the skeletal elements, the minimum number of individuals could not be estimated.

Sex: Indeterminant

Due to the fragmentation of the skeletal elements, sex estimation is not possible.

Age: Indeterminant

Due to the fragmentation of the skeletal elements, age estimation is not possible.

Biological Affinity: Indeterminant

Due to the fragmentation of the skeletal elements, biological affinity estimation is not possible.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: Indeterminant

Due to the fragmentation of the skeletal elements, skeletal pathologies were not observed.

Trauma: None

No trauma was observed on Burial 04.

Dental Inventory and Oral Health

No dentition is present for observation or analysis.

Burial 06

General Description

This skeleton represents the fragmentary remains of an infant individual between birth and 1.67 months of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 06 are highly fragmentary, with extreme fragmentation in the region of the skull, limbs, and thorax. Due to the fragmentation of the remains, many analyses were indeterminant; however, two deciduous tooth crowns were available and used in the age estimation analysis.

Minimum Number of Individuals: One

The skeletal elements of Burial 06 represent one individual. All elements are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 06 has no complete long bones. Therefore, the sex was indeterminant.

Age: Birth \pm .32 to 1.5 \pm .17 months

For juvenile remains, age is estimated from the eruption and development of the available deciduous dentition. The only teeth available for Burial 06 were tooth B (deciduous maxillary right first molar crown) and a fragment of tooth F (left maxillary central incisor crown). Using AlQahtani, et al. (2010) for the development of the deciduous dentition, tooth B was less than one-fourth formed, indicating that the Burial 06 was a newborn \pm .32 to 1.5 \pm .17 months old at the time of death.

Biological Affinity: Indeterminant

Due to the fragmentation of the skeletal elements, biological affinity estimation is not possible.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: Indeterminant

Due to the fragmentation of the skeletal elements, skeletal pathologies are not possible.

Trauma: None

No trauma was observed on Burial 06.

Dental Inventory and Oral Health

Fragmentary tooth crowns are present for teeth F (left maxillary central incisor) and B (right maxillary first molar) with no pathological or traumatic modification.

Burial 07

General Description

This mostly complete skeleton represents a Black male, between 14.9 to 25 years of age at death, with an estimated stature of approximately 5'3" to 5'8". The cranium exhibits an autopsy cut and the right femur displays a healed fracture.

Inventory and Condition of Remains

The skeletal remains of Burial 07 are mostly complete, with exception of the craniofacial complex. The available skeletal remains are fragmentary with severe exfoliation of the cortical bone on most of the postcranial skeleton, consistent with historic burial taphonomy.

Minimum Number of Individuals: One

The skeletal remains of Burial 07 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

The pelvis is the best indicator of sex, although it was too fragmented for observation. Therefore, sex was estimated using postcranial metrics following Spradley and Jantz (2011) and cranial non-metrics following Walker (2008).

For postcranial sex estimation, a multivariate equation and univariate sectioning points were used from Spradley and Jantz (2011) for American Blacks (see Biological Affinity section below). The clavicle was available for use in a multivariate discriminant function equation for the clavicle, resulting in a discriminant score of 4.66, indicating male, as scores above 0 are male and scores below 0 are female. The clavicle was the only element that could be used in a multivariate function; however, other single measurements were used in sectioning points that have a classification rate above 80% (see Table 3). Values above the sectioning point are considered male and values below are considered female.

Table 3: Univariate sex estimation of Burial 07

Measurement	Sectioning Point	Burial 07	Classification Rate (%)	Estimated Sex
Clavicle Maximum Length	150	155	93	Male
Humerus Head Diameter	44	46	86	Male
Humerus Epicondylar Breadth	60	63	86	Male
Ulna Maximum Length	271	282	83	Male

Assessment of cranial morphology indicates that Burial 07 lacks a prominent nuchal crest (score=3), has small mastoid processes (score=2), narrow but rounded orbital margin (score=3) and a flat (non-projecting) glabella region (score=1). Using these traits in Walker (2008), Burial 07 is most similar to females with a 95% probability based on a logistic regression equation using the glabella and mastoid process scores. Although the cranium indicates female, the skull

is the second-best estimator of sex. Superior to the cranium is the post-crania in the absence of the pelvis (Spradley and Jantz 2011). Based on the multivariate classification of the clavicle and the univariate classification from measurements from the clavicle, humerus, and ulna, and the overall robusticity of the postcranial skeleton, the sex of Burial 07 is estimated as male.

Age: *14.9–25 years*

Age was estimated through ossification of the clavicle, vertebral bodies, and sacrum. The right medial clavicle presents an unfused epiphyseal flake visible on approximately 50% of the sternal end. Using Langley-Shirley and Jantz (2010), the medial clavicle scored a 2, suggesting an age range of 14.9–28.5 with a 95% confidence interval for males. Additionally, the vertebral rings appear fused and youthful in appearance, suggesting early 20s. The sacral elements appear unfused suggesting less than 25 years of age (Schaefer, et al. 2009). Based on the preponderance of age indicates, it is most likely that Burial 07 is between 15–25 years of age, with a possible narrower age range of 20–25 years of age at death.

Biological Affinity: *Black*

Although the cranium of Burial 07 was fragmented, a total of 11 measurements were available for analysis: DKB, FMB, FRC, FRS, GOL, MDH, NLB, PAC, PAS, WMH, and XCB, representing three facial and eight vault measurements. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 81% of the time, greater than chance alone. Burial 07 is most similar to the 19th Century American Black group with a posterior probability of 0.998 and a typicality of 0.12. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups. Due to the number of available craniometric variables, the overall classification rate of reference groups, and the posterior and typicality probabilities, the overall group membership for Burial 07 is estimated to be American Black and represents a good classification.

Stature: *5'3" to 5'8"*

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements from the clavicle, scapula, humerus, ulna, tibia, and calcaneus. The 19th Century cadaver stature option for Black males was selected to generate the stature estimation. The measurements with the highest correlation to stature were the humerus and tibia maximum length with an R-square of .756. Using these measurements, the stature for Burial 07 is estimated to be between 63.3 to 69.1 inches or 5'3" to 5'8".

Skeletal Pathology: *Cranial autopsy and healed femoral fracture*

Burial 07 had a cranial autopsy, resulting in a full circumferential cut that removed the calotte. Healed fracture of the right femur at midshaft (mid-1/3–107 cm inferior to neck in anterior aspect). As a result, bone is shortened in length by about 3.8 cm (1½ inches). The fracture is diagonal with displacement of distal shaft joined by associated callus on the posterior side. Abundant healing and remodeling are present across all surfaces (including ends of the fractured

shafts, which have been sealed off by cortical bone). The degree of remodeling indicates some duration passed between initial injury and death. Schmorl's nodes are located on thoracic vertebrae seven through twelve and the first lumbar.

Trauma: None

No trauma was observed on Burial 07.

Dental Inventory and Oral Health

The maxilla is fragmentary and the mandible is fragmented, but mostly complete. The majority of teeth are present, fully developed, and in occlusion. Tooth #7 was lost postmortem and tooth #8 was coded as unobservable as the portion of the maxilla containing this tooth is missing postmortem. Tooth #10 is peg shaped. Staining is present on the maxillary and mandibular anterior dentition. The overall dentition shows little to moderate signs of wear, with no dental caries. Hypoplastic pitting was noted on tooth #22.

Burial 08

General Description

This mostly complete skeleton represents a Black male, between 24 to 48 years of age at death, with an estimated stature of approximately 5'3" to 5'8".

Inventory and Condition of Remains

The remains of Burial 08 exhibit high fragmentation in the region of the craniofacial complex, thorax, and pelvis. Although some skeletal elements were fragmentary, portions of the post-crania and dentition were complete and available for analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 08 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Although the pelvis is the best indicator for sex, the os coxae were too fragmentary for observation. Therefore, sex was estimated using postcranial metrics following Spradley and Jantz (2011), cranial non-metrics following Walker (2008), and a multivariate analysis of the cranial measurements.

The only skeletal element available for discriminant function analysis was the humerus which scored a 5.67, indicative of male (see Table 4). Because only one postcranial bone was available for multivariate analysis, additional univariate sectioning points, which included measurements from the femur, tibia, and humerus, were used. Only classifications with accuracies greater than 80% were reviewed. The sectioning points from the femur, tibia, and humerus show ambiguity in the sex estimation for Burial 08 (see Table 5).

Table 4: Multivariate sex estimation of Burial 08

Bone	Score	Classification Accuracy (%)	Estimated Sex
Humerus	5.67	94	Male

Table 5. Univariate sex estimation of Burial 08

Measurement	Sectioning Point	Burial 08	Classification Accuracy (%)	Estimated Sex
Femur max. head diameter	44	48	86	Male
Humerus epicondylar breadth	60	59	86	Female
Humerus head diameter	44	47	86	Male
Femur ant-post subtroch diameter	27	26	83	Female
Humerus maximum length	325	323	81	Female
Tibia diameter of nutrient foramen	35	38	80	Male

Using Walker (2008), sex was estimated from fragments of the skull, including the nuchal crest (score=3), mastoid process (score=2), orbital margin (score=3), and mental eminence (score=4). Walker (2008) uses discriminant function analysis to estimate sex based on features of the skull. Using the features listed above, the Walker method provides a 99% probability of male.

Because of the ambiguity in postcranial sex estimation, a multivariate analysis using cranial measurements was performed, comparing Burial 08 to males and females of the 19th Century Black and White and 20th Century Mexican reference groups. Burial 08 was most similar to 19th Century Black males with a posterior probability of .471, followed by 19th Century White males with a posterior probability of .221, suggesting that Burial 08 is most similar to males.

Although the postcranial measurements indicate ambiguity, the overall results from the discriminant function analysis of the humerus, the results of the Walker (2008) method, and the multivariate analysis of the cranial measurements, estimate Burial 08 as male.

Age: 24–48 years

The auricular surface and cranial sutures were the primary indicators evaluated for age estimation. Only two features of the auricular surface could be scored along with one cranial suture, following descriptions outlined in Milner and Boldsen (2016). There were no fragments of the pubic symphysis available for analysis. All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 08 is estimated to be 48.5–110 years of age at death, with a maximum likelihood (point estimate) of 79.6 years. However, the fusion line is still apparent, although faint, on the right distal radius suggesting an age around 24 years (Schaefer 2008). Based on the lack of degenerative, arthritic changes and the fact that only three features were available for scoring following Milner and Boldsen, Burial 08 is likely younger than the mid-point age estimate provided through ADBOU. When considering the faint fusion line on the radius in conjunction with lack of degenerative skeletal changes, and the ADBOU estimate, Burial 08 is estimated to be 24–48.

Biological Affinity: Black

Although the cranium of Burial 08 was fragmented, a total of eight measurements were available for analysis: GOL, MDH, OCC, OCS, PAC, WMH, and XCB. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 78.6% of the time, greater than chance alone. Burial 08 is most similar to the 19th Century American Black group with a posterior probability of .627 and a typicality of 0.6. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Ousley and Jantz 2005: 96).

Although the reference group classifies correctly at a high percentage, the posterior probability is below 0.70. Burial 08 is most similar to the 19th Century American Black group, but the estimation is considered tentative.

Stature: 5'3" to 5'8"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements from the humerus, ulna, femur, and tibia using the 19th Century cadaver statures for Black males' option. The measurement with the highest correlation to stature was the humerus maximum length with an R-square of .670. Using this measurement, the stature for Burial 08 is estimated to be between 63.0 to 69.0 inches, or 5'3" to 5'8".

Skeletal Pathology: None

No pathologies were observed on Burial 08.

Trauma: None

No trauma was observed on Burial 08.

Dental Inventory and Oral Health

The maxilla and mandible are fragmented but mostly complete. All teeth are present and can be fitted into an alveolar socket except for tooth #1, due to postmortem loss of the alveolus. Burial 08 has generalized calculus on the entire dentition. The maxillary and mandibular first molars, teeth #3, 14, 19, and 30 have significant wear, with little to moderate wear on the remaining dentition. No dental caries or abscesses are present, although moderate periodontal disease is present. Linear enamel hypoplasias are observed on teeth #6, 7, and 10, and linear vertical grooves are located on teeth #22 and 27. Using the Cares Henriquez and Oxenham (2019) method, these hypoplasias correspond to age at formation between 1.8–2.7 years of age.

Burial 09

General Description

This mostly complete skeleton represents a Black female, between 27.3 to 61.5 years of age at death, with an estimated stature of approximately 5'1" to 5'5". Two healed episodes of blunt force trauma are noted above each eye orbit.

Inventory and Condition of Remains

Burial 09 has major fragmentation of the craniofacial complex and minor fragmentation in the region of the thorax, pelvis, and distal limbs. Proximal and distal epiphyses of the long bones were mostly complete and were used in the analyses of sex and stature. The skull, along with small portions of the pubic symphysis, the auricular surface, and cranial sutures, were available for age estimation analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 09 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Female

The pelvis is the best estimator of sex and Burial 09 has a complete pelvis, therefore, sex was estimated based on statistical evaluation of the non-metric traits of the pelvis following Klales, et al. (2012). The Klales method is modified from Phenice (1969), which provides a posterior probability of sex based on logistic regression analysis of ordinal scores. The subpubic concavity, the medial ischio-pubic ramus, and the ventral arc all scored as three, which estimated the sex of Burial 09 as female with a posterior probability of 0.78. Due to a posterior probability under 0.80, measurements from the postcranial skeleton were also used for sex estimation.

Multivariate discriminant function formulae for American Blacks (Spradley and Jantz 2011) were used in lieu of sectioning points for Burial 09 due to good preservation and complete measurements available from multiple skeletal elements. Discriminant function scores for the humerus, clavicle, and femur are all suggestive of female (see Table 6).

Based on the pelvis and postcranial discriminant function formulae, Burial 09 is estimated as female.

Table 6: Multivariate sex estimation of Burial 09

Bone	Score	Classification Accuracy (%)	Estimated Sex
Humerus	-4.40	94	Female
Clavicle	-1.95	93	Female
Femur	-2.476	92	Female

Age: 27.3–61.5 years

The auricular surface, pubic symphysis, and cranial sutures were the primary indicators evaluated for age estimation. Numerous features of the pubic symphysis and auricular surface were scored, such as morphology and topography, following descriptions outlined in (Milner and Boldsen 2016). Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Burial 09 had cranial sutures that were open, juxtaposed, punctuated, or obliterated, indicating a wide age range. The right auricular surface showed slight osteophytic lipping along with minor degenerative joint disease in the lower spine. Portions of the pubic symphysis were damaged, so only available features were scored.

All traits were entered into the ADBOU program (Boldsen, et al. 2002). Burial 09 is estimated to be 27.3–61.5 years of age at death, with a maximum likelihood (point estimate) of 39.7 years.

Although antemortem tooth loss is evident, the joint surfaces of Burial 09 do not exhibit arthritic changes and the vertebrae exhibit only minimal concavity. Both suggest an age closer to the point estimate.

Biological Affinity: Black

Although the cranium was fragmented, a total of 12 measurements were available for analysis: FRC, FRS, GOL, IML, MDH, NOL, OCC, OCS, PAC, PAS, XCB, and XML. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 63.4% of the time, greater than chance alone. Burial 09 is most similar to the 19th Century American Black group with a posterior probability of 0.82 and a typicality of 0.05. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005).

While the posterior probability was over 80% for the classification of Black, the overall classification of the reference groups was only 63.4%. While greater than chance alone, the classification is lower than 75% rendering the classification estimate for Burial 09 a moderate classification.

Stature: 5'1" to 5'5"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements with the 19th Century cadaver stature for Black females' option. The measurements with the highest correlation to stature were clavicle maximum length, femur bicondylar length, and femur maximum length, with an R-square of 0.781. Using these measurements, the stature for Burial 09 is estimated to be between 62 to 66 inches or 5'1" to 5'5".

Skeletal Pathology: None

No pathologies were observed on Burial 09.

Trauma: Healed blunt force trauma to anterior cranial vault

Burial 09 exhibits a healed fracture defect on the right side of frontal superior to eye orbit, indented with evidence of healing on the ectocranial surface, modified endocranially. This defect is located approximately 20 mm from glabella and is approximately 30 mm long. Also noted is a possible healed blunt force depressed fracture on the left side of the frontal superior to the left orbit. This depression is small and circular, located approximately 40 mm superior to the inner left superior eye orbit. The right and left acetabula of the femora demonstrate acetabular notches, which are not pathologies but are normal anatomical variants (Mann and Hunt 2012).

Dental Inventory and Oral Health

The maxilla is fragmented and the mandible is complete. Teeth #1, 2, 24, and 25 were lost postmortem. Teeth #5, 14, 17–19, and 29–32 were lost antemortem. Teeth #15 and 16 have no associated alveolar bone, therefore, it is indeterminate if they were lost antemortem or postmortem. Little wear is noted on available teeth. Tooth #3 has a carious lesion that destroyed the crown and presents radicular hypercementosis on the roots. Tooth #4 has a carious lesion on the buccal surface near the cemento-enamel junction and tooth #21 has a carious lesion at the cemento-enamel junction on the facial surface. Mesial-interproximal carious lesions are noted on teeth #7 and 10, although tooth #24 is a postmortem loss with periodontal abscessing. Linear enamel hypoplasias are noted on teeth #6 and 26. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 2.2–2.7 years of age.

Burial 10***General Description***

This skeleton represents the highly fragmentary remains of an infant individual between 36–56 weeks intrauterine at time of death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 10 present extreme fragmentation in the region of the long bones and craniofacial complex. Many skeletal elements were unavailable for analyses, however, the right and left pars petrosa were available and used for age estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 10 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in infants, however, Burial 10 has no complete long bones.

Age: 36–56 weeks intrauterine

Due to the extreme fragmentation of Burial 10, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to a fetal donor which was 36 weeks intrauterine. The pars petrosa of Burial 10 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Because of the fragmentation of the remains and lack of available biological affinity techniques for infant remains, biological affinity for Burial 10 is indeterminant.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for infant remains, stature for Burial 10 is indeterminant.

Skeletal Pathology: None

No pathologies were observed on Burial 10.

Trauma: None

No trauma was observed on Burial 10.

Dental Inventory and Oral Health

No dentition is present for observation.

Burial 11

General Description

This fragmentary skeleton represents a White female, between 32.5 to 85.7 years of age at death, with an indeterminant stature, and a possible shroud pin stain on the anterior portion of the frontal bone.

Inventory and Condition of Remains

Burial 11 exhibits high fragmentation of the thorax, pelvis, and proximal and distal ends of the long bones. The cranium was reconstructed after cleaning, and some of the maxillary and mandibular dentition was available for analyses, although most of the mandible was edentulous. The skull and measurements from the post-crania were the only elements available for sex estimation.

Green staining is located on the anterior portion of the frontal bone. This staining most likely results from a copper shroud pin stain (Morris 1981).

Minimum Number of Individuals: One

The skeletal remains of Burial 11 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Female

Due to the highly fragmented pelvis and post crania, sex was estimated from cranial non-metric and metric analysis.

Following Walker (2008), Burial 11 was scored as having a slight nuchal crest (score=2), small mastoid (score=2), sharp orbital margins (score=2), and a non-projecting glabella (score=1), with a prominent mental eminence (score=4). The scores using Walker's six discriminant functions classified Burial 11 as both male and female (see Table 7). However, the resulting classifications that have both high accuracy and high probabilities (glabella, mastoid, mental eminence and glabella, mastoid) suggest that Burial 11 is female.

Table 7: Sex Estimation of Burial 11 using Walker's Discriminant function formula

Estimation	Probability Male	Probability Female	Accuracy	Variables in Analysis
Female	0.31	0.69	88/86	Glabella, mastoid, mental eminence
Female	0.05	0.95	85/83	Glabella, mastoid
Male	0.52	0.48	87/82	Glabella, mental eminence
Male	0.88	0.12	70/78	Mental eminence, mastoid
Male	0.97	0.03	78/78	Supra-orbital, mental eminence
Female	0.31	0.69	77/83	Nuchal crest, mastoid

Using FORDISC 3.1 (Jantz and Ousley 2005), Burial 11 was compared to both males and females of all reference groups (19th Century American Blacks and Whites and 20th Century Mexicans). Burial 11 is most similar to American White females with a posterior probability of 0.630, followed by American Black females with a posterior probability of 0.259, suggesting Burial 11 is most similar to females than males.

Based on the discriminant function analyses of cranial nonmetric and metric traits, Burial 11 is estimated as female.

Age: 32.5–85.7 years

Many of the age indicators from the skeleton were fragmentary or unobservable. Only three of the cranial sutures were scored following the descriptions outlined in Milner and Boldsen (2016), the sagittal obelica, lamdoidal asterica, and zygomaticomaxillary.

The suture scores were entered into the ADBOU (Boldsen, et al. 2002). Burial 11 is estimated to be 32.5 to 85.7 years of age at death, with a maximum likelihood (point estimate) of 32.5 years.

Biological Affinity: White

Although the cranium of Burial 11 was fragmented, a total of nine measurements were available for analysis: ASB, FMB, FRC, GOL, OCC, OCS, PAC, WMH, and XCB. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 74% of the time, greater than chance alone. Burial 11 is

most similar to the 19th Century American White group with a posterior probability of 0.76 and a typicality of 0.13. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Ousley and Jantz 2005:96).

Based on the overall classification rate of reference groups, and high posterior and typicality probabilities, Burial 11 is estimated as White.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on Burial 11.

Trauma: None

No trauma was observed on Burial 11.

Dental Inventory and Oral Health

The maxilla is fragmentary, and the mandible is mostly complete. Most of the dentition is missing antemortem or unobservable. The only teeth present are #6, 7, and 21–27 and they are fully developed. Teeth #1–3 and 11–16 are scored as unobservable as there is no associated alveolar bone. Teeth #4, 5, 8–10, 17–20, and 28–32 are missing antemortem with active or full resorption. Tooth #18 is represented by root fragments only. Teeth #19, 20, 27, and 28 are also represented by roots and with total crown destruction. Slight to moderate wear is noted on the anterior dentition. Dental caries are noted on teeth #6 and 21–22. Tooth #6 exhibits a distal interproximal carious pit, tooth #7 exhibits a carious lesion on the facial surface superior to the CEJ, tooth #21 exhibits mesial and distal interproximal carious lesions, and tooth #22 exhibits an interproximal pit at the cemento-enamel junction. Moderate dental calculus is present on the anterior dentition, especially marked on the lingual surface. Periodontal disease is extreme, with the posterior dentition exhibiting active and complete resorption. Two linear vertical hypoplasias are noted on tooth #27.

Burial 12

General Description

This mostly complete skeleton represents a White female, between 21.6 to 34 years of age at death, with an estimated stature of approximately 4'6" to 5'0".

Inventory and Condition of Remains

The remains of Burial 12 have a highly fragmented craniofacial region and some fragmentation in the thoracic and pelvic region. Proximal and distal epiphyses of the long bones are in good condition and were used in the analysis of sex. Parts of the cranial vault were reconstructed after

cleaning and a nearly complete set of adult maxillary and mandibular dentition were available for dental analyses. In addition, the auricular surface was available for age estimation analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 12 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Female

Although the pelvis was fragmentary, the sciatic notch and the auricular surface were used to estimate sex. The sciatic notch and auricular surface were assessed based on qualitative features as outlined in Buikstra and Ubelaker (1994). The sciatic notch is semi-wide, the auricular surface is raised, and a well-defined pre-auricular sulcus is present. Both the sciatic notch and auricular surface indicate a probable female.

Post-cranial sex was estimated based on available postcranial measurements following Spradley and Jantz (2011) criteria for American Whites. Multivariate formulae are preferred over sectioning points, however, Burial 12 only had enough complete, non-estimated measurements for one discriminant function (DF) formula using the clavicle. Therefore, several sectioning points were also used to bolster the estimation. For discriminant scores, values above zero are estimated male and values below zero, female. The DF score for the clavicle was -7.47 with a classification accuracy of 94%. For sectioning points, values above the sectioning point are estimated as male, while values below the sectioning point are estimated as female. Sectioning points from the femur, humerus, and clavicle (see Table 8) also provide a sex estimation of female. There were not enough features present on the skull to use Walker's sex estimation formulae. However, the supra-orbital margin scored a three and the glabella projection a one, suggestive of female.

Based on morphological observations of the pelvis and postcranial estimation of sex and the overall gracility of the remains, Burial 12 is estimated as a female.

Table 8: Univariate sex estimation of Burial 12

Measurement	Sectioning Point	Burial 12	Classification Accuracy (%)	Estimated Sex
Femur Head Diameter	45	42	88	Female
Humerus Head Diameter	46	40	83	Female
Clavicle	148	124	82	Female

Age: 21.6–34 years

Because of the fragmentation of the cranium and pubic symphysis, the right and left auricular surface were the only indicators evaluated for age estimation. Numerous features of the right and left auricular surfaces were scored, such as morphology, topography, texture, and posterior iliac exostoses following descriptions outlined in (Milner and Boldsen 2016). Auricular surface topography displayed either a median elevation, an undulating appearance, or both

characteristics. The morphology was less than one-third covered by billows and flat. The inferior surface texture was smooth. Posterior iliac exostoses were smooth, rounded, or both.

All auricular surface traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 12 is estimated to be 21.6–34 years of age at death, with a maximum likelihood (point estimate) of 21.6 years. Additionally, the fusion is incomplete for the first and second sacral segments, indicating that Burial 12 is a younger individual and closer in age to the point estimate of 21.6 years.

Biological Affinity: White

Although the cranium was fragmented, a total of 11 measurements were available for analysis: ASB, FMB, FRC, FRS, GOL, IML, NOL, PAC, PAS, XCB, and XML. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 70.6% of the time, greater than chance alone. Burial 09 is most similar to the 19th Century American White group with a posterior probability of 0.76 and a typicality of 0.30. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups.

Even though the posterior probability is high, the classification of reference groups is 70%. While greater than chance alone, the classification is lower than 75% rendering Burial 12 a moderate classification.

Stature: 4'6" to 5'0"

Stature was estimated with FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements using the 19th Century cadaver stature for White females option. The measurements with the highest correlation to stature were the femur, humerus, and radius maximum lengths, with an R-square of 0.733. The stature for Burial 12 is estimated to be between 55.2 to 60.3 inches, or 4'6" to 5'0".

Skeletal Pathology: None

No pathologies were observed on Burial 12.

Trauma: None

No trauma was observed on Burial 12.

Dental Inventory and Oral Health

The maxilla is highly fragmented although the mandible is complete. The majority of the dentition is complete; however, no information is available for teeth #5–8, as associated alveolar bone is missing postmortem. Teeth #29–30 are missing postmortem, although periodontal abscessing is present in the alveolus with bone loss and resorption present. Generalized dental calculus is present on most of the dentition. A cementum pearl is located on tooth #11 and a supernumerary tooth is located superior to the apex of Tooth #9. Dental caries are noted on the

disto-occlusal surface of tooth #19 and the occlusal surface of #32. Enamel hypoplasias are noted on teeth #9, 11, 21, 22, and 24. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 1.3–5.8 years of age.

Burial 13

General Description

This skeleton represents an infant, approximately $7.5 \pm .18$ to $10.5 \pm .24$ months old at time of death, with an indeterminate sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 13 are fragmentary. Extreme fragmentation was present in the craniofacial complex, limbs, and thorax. However, some large portions of the cranium and a complete deciduous dentition was available for analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 13 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 13 has no complete long bones.

Age: $7.5 \pm .18$ to $10.5 \pm .24$ months

For juvenile remains, age is estimated from the eruption and development of the available deciduous dentition. Using the methods outlined by AlQahtani, et al. (2010), development and eruption of the deciduous dentition was noted. Further, teeth A, B, K, and L (the maxillary right and mandibular left first and second molars) were unerupted, however, the alveolar bone disintegrated upon cleaning. Based on overall development and eruption, Burial 13 is estimated as $7.5 \pm .18$ to $10.5 \pm .24$ months of age at death.

Biological Affinity: Indeterminant

Because of the fragmentation of the remains and lack of available biological affinity techniques for infant remains, biological affinity for Burial 13 is indeterminate.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for infant remains, stature for Burial 13 is indeterminate.

Skeletal Pathology: None

No pathologies were observed on Burial 13.

Trauma: None

No trauma was observed on Burial 13.

Dental Inventory and Oral Health

The maxilla and mandible are not present; however, all deciduous teeth are present. The upper right molars (#A and B) and the lower left molars (#K and L) were unerupted. Incomplete crown development was noted for maxillary and mandibular second molars (#A, J, K, and T). All other crowns are complete, but roots are damaged and can't be scored. No pathology noted on crowns.

Burial 14***General Description***

This skeleton represents the highly fragmentary remains of an infant that was 7.5 ± 0.18 to 10.5 ± 0.24 months of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The skeletal remains of Burial 14 were encased in compact soil, making cleaning and analyses difficult to attain. Cleaning of the remains would further fragment the existing skeletal elements, so they were left within the soil to maintain the integrity of the remains and to gather information for the skeletal inventory. The cranium, craniofacial complex, pelvis, thorax, and limbs were completely fragmentary. However, a mostly complete deciduous dentition was present.

Minimum Number of Individuals: One

The skeletal remains of Burial 14 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however Burial 14 has no complete long bones.

Age: 7.5 ± 0.18 to 10.5 ± 0.24 months

For juvenile remains, age is estimated from the eruption and development of the available deciduous dentition. The dentition for Burial 14 was mostly complete. Using the methods outlined by (AlQahtani, et al. 2010), development and eruption of the deciduous dentition was noted. Teeth D–G and N–Q (the deciduous maxillary and mandibular incisors) had roots that were broken post-mortem and this indicator was used to narrow down the age range. However, teeth A, B, I, J, K, L, S, and T (the deciduous maxillary and mandibular molars) showed no signs of root formation, only crown completeness. Because of this, Burial 14 was estimated as 7.5 ± 0.18 to 10.5 ± 0.24 months of age at death.

Biological Affinity: Indeterminant

Because of the fragmentation of the remains and lack of available biological affinity techniques for subadult remains, biological affinity for Burial 14 is indeterminant.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 14 is indeterminant.

Skeletal Pathology: Indeterminant

Burial 14 is too fragmented for observation of skeletal pathologies.

Trauma: None

No trauma was observed on Burial 14.

Dental Inventory and Oral Health

The deciduous dentition is almost complete, only lacking the mandibular canines (M and R), postmortem loss. Tooth A, left maxillary second molar, is fragmentary. There is no alveolar bone as the entire skull is fragmentary. There are no permanent teeth found with these remains. Development based on the crown and root formation cannot be scored because of postmortem destruction, although the incisors indicate some root development.

Burial 15

General Description:

This skeleton represents the fragmentary remains of an infant individual between birth \pm 0.32 to 1.5 \pm 0.17 months of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains:

The skeletal remains of Burial 15 are fragmentary, with the majority of the cranium and craniofacial complex fragmented post-mortem. However, the right and left sides of the mandibular body were present with deciduous dentition unerupted in the alveolar bone, aiding in age estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 15 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 15 has no complete long bones.

Age: *Birth ± 0.32 to 1.5 ± 0.17 months*

For juvenile remains, age is estimated from the eruption and development of the available deciduous dentition. The dentition for Burial 15 was mostly fragmentary, however, teeth N and O (left deciduous mandibular central and lateral incisors) were visible in the alveolar bone of the mandible. Using the methods outlined by AlQahtani, et al. (2010), development and eruption of the deciduous dentition was noted. Teeth N and O were unerupted in the mandible with the crowns 3/4 complete. Because the mandibular incisors were unerupted, Burial 15 was estimated to be newborn ± 0.32 to 1.5 ± 0.17 months of age at death.

Biological Affinity: *Indeterminant*

Because of the fragmentation of the remains and lack of available biological affinity techniques for subadult remains, biological affinity for Burial 15 is indeterminant.

Stature: *Indeterminant*

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 15 is indeterminant.

Skeletal Pathology: *None*

No pathologies were observed on Burial 15.

Trauma: *None*

No trauma was observed on Burial 15.

Dental Inventory and Oral Health

No dentition is present for observation or analysis.

Burial 16

General Description

This mostly complete skeleton represents a Mexican male, between 52 and 90.9 years of age at death, with an indeterminant stature. A healed fracture is noted on the left first metatarsal.

Inventory and Condition of Remains

The remains of Burial 16 are mostly complete, although fragmentary in the craniofacial complex. Additionally, there is high fragmentation in the region of the thorax and pelvis. Proximal and distal epiphyses of the long bones are also fragmentary. The maxilla was fragmentary, and the mandible was completely edentulous, leaving few teeth for analyses.

Minimum Number of Individuals: *One*

The skeletal remains of Burial 16 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Because of the fragmentation of the pelvis, sex was estimated using the postcranial skeleton and the cranium.

Post-cranial sex was estimated based on available measurements following Spradley, et al. (2015) criteria for Mexican Hispanics. Although multivariate formulae are preferred over sectioning points, Burial 16 does not have enough measurements for discriminant function formulae. Therefore, sectioning points were used for available measurements. Values above the sectioning point are estimated as male, while values below the sectioning point are estimated as female. Sectioning points from the tibia and humerus (see Table 9) provide a sex estimation of male.

Tibia circumference at nutrient foramen and humerus least circumference at mid-shaft were the only available postcranial measurements for sex estimation, both with a reported accuracy of 83%. Based on these measurements falling above the sectioning point, Burial 16 is estimated as male.

Sexually dimorphic cranial traits defined in Buikstra and Ubelaker (1994) included the mastoid process (score=3), the supra-orbital margin (score=3), nuchal crest (score=2) and the glabella prominence (score=3). These scores were used in the Walker (2008) logistic regression equations to estimate sex based on features of the skull. Using the glabella and mastoid scores, the Walker method provides an estimation of male with a probability of 0.84.

Based on the postcranial sectioning points, the logistic regression of cranial trait scores, and the overall robustness, Burial 16 is estimated as male.

Table 9: Univariate sex estimation of Burial 16

Measurement	Sectioning Point	Burial 16	Classification Accuracy (%)	Estimated Sex
Tibia Ant./Post. Diameter Nutrient Foramen	31	34	83	Male
Humerus Least Circumference at Midshaft	56	60	83	Male

Age: 52–90.9 years

The auricular surface and cranial sutures were the primary indicators evaluated for age estimation. The sagittal suture of the cranium and the auricular surface were the only features present to score, such as morphology and topography, following descriptions outlined in Milner and Boldsen (2016).

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 16 is estimated to be 52 to 90.9 years of age at death, with a maximum likelihood (point estimate) of 76.8 years. Further, the mandible for Burial 16 is completely edentulous, suggestive of an age range close to the point estimate.

Biological Affinity: Mexican

The cranium was highly fragmented resulting in too few cranial measurements for analysis. However, four macromorphoscopic features were available for observation and statistical analysis. These macromorphoscopic traits were utilized in the MaMD program by Hefner (2018). Traits scored include the inferior nasal aperture (3), malar tubercle (0), posterior zygomatic tubercle (0), and zygomaticomaxillary suture course (0). Using reference groups comprised of American Blacks and Whites and Southwest Hispanics in the MaMD program, Burial 16 is most similar to Southwest Hispanics with a posterior probability of 1.0. The posterior probability indicates the probability of group membership based on the unknown belonging to one of the reference groups. The reference group overall classification is 75% and the posterior probability of the classification is 1.0. The overall morphology of the cranial vault is short and broad which is also consistent with Hispanic crania.

Based on the high posterior probability and the overall classification of the reference groups, Burial 16 is classified as Mexican and is a good classification. The Southwest Hispanic reference group MaMD is comprised mostly of migrants that died in Arizona attempting to cross the U.S./Mexico border. According to Anderson (2008), 90% of migrant deaths in Arizona are from Mexico, therefore, the label Mexican is utilized for this estimation.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: Healed fracture

The first left metatarsal exhibits bone formation and remodeling present at the distal portion (phalanx articulation), with healed fracture present at proximal end. Slight osteoarthritic lipping is noted on the superior and inferior vertebral bodies.

Trauma: None

No trauma was observed on Burial 16.

Dental Inventory and Oral Health

The maxilla is fragmentary and the mandible is almost complete. The entire mandibular dentition was lost antemortem, in addition to maxillary teeth #8 and 9, all with full resorption. A large portion of the maxilla is missing postmortem resulting in no information for teeth #1–3, 6, 7, and 13–16. Only teeth #4, 5, and 10–12 are present and exhibit moderate wear. Teeth #4 and 5 exhibit interproximal mesial and distal caries and teeth #11 and 12 exhibit interproximal distal caries. Hypoplasias are present on teeth #11 and 12. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 2.8–4.4 years of age.

Burial 17

General Description

This mostly fragmentary skeleton represents a juvenile between 3.5 ± 0.48 to 4.5 ± 0.58 years of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 17 are highly fragmentary. Only portions of the cranial vault, the dentition, four long bones and seven rib fragments are present. Both the permanent and deciduous dentition were present and available for age estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 17 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 17 has no complete long bones.

Age: $3.5 \pm .48$ to $4.5 \pm .58$

For juvenile remains, age is estimated from the eruption and development of the available deciduous and permanent dentition. The deciduous dentition for Burial 17 was mostly complete, with permanent crowns available for analysis. Using the methods outlined by AlQahtani, et al. (2010), development of the deciduous and permanent dentition was noted. All deciduous teeth had root formation, however, most of the roots were fragmented post-mortem; therefore, crown formation was the focus of the analysis. All deciduous crowns were completely formed. Additionally, the crowns of teeth #3, 14, 23–26, and 30 were completely formed. However, these crowns were not in the alveolar bone, and this did not allow for eruption estimations to be made. However, tooth 27 was present in the alveolar bone, allowing for dental eruption estimation. Based on the crown formation and eruption of the dentition, Burial 17 is estimated as 3.5 ± 0.48 to 4.5 ± 0.58 years of age at death.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of juveniles. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 17 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for juvenile remains, stature for Burial 17 is indeterminant.

Skeletal Pathology: None

No pathologies were observed on Burial 17.

Trauma: None

No trauma was observed on Burial 17.

Dental Inventory and Oral Health

Burial 17 is characterized by a mixed dentition. The maxilla is fragmentary although the mandible is mostly complete. All deciduous teeth are present except C–G. Tooth A is scored as root 1/4 complete, B is root 1/2 complete, P is root apex 1/2 closed, and K and L are root 3/4 complete. The remainder of the teeth are scored as unobservable due to postmortem destruction. Permanent teeth #3, 9, 14, 19, 22–27, and 30 are present. Teeth #19, 23–26, and 30 are scored as crown 3/4 complete and teeth #22 and 27 are scored as crown 1/2 complete. The maxillary permanent teeth cannot be scored due to postmortem damage. No dental caries are noted on any teeth and no hypoplasias are noted on the permanent dentition.

Burial 18***General Description***

This mostly complete skeleton represents a Broad Estimation Asian male, 41 to 89.5 years of age at death, with an indeterminant stature.

Inventory and Condition of Remains

The remains of Burial 18 are highly fragmented in the craniofacial complex, pelvis, and thorax. The long bones were mostly complete, with some post-cranial measurements available for sex estimation. Additionally, the permanent dentition was mostly complete.

Minimum Number of Individuals: One

The skeletal remains of Burial 18 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

The only pelvic trait available for sex estimation was the greater sciatic notch which scored as intermediate (score=3) as outlined in Buikstra and Ubelaker (1994). Due to the ambiguity of this trait's score, sex was estimated based on postcranial metrics and cranial nonmetric traits. Post-cranial sex was estimated based on available measurements following criteria for Mexican Hispanics from Spradley, et al. (2015). Although multivariate formulae are preferred over sectioning points, Burial 18 does not have enough measurements for discriminant function formulae. Therefore, sectioning points were used for available, non-estimated, measurements. Values above the sectioning point are estimated as male, while values below the sectioning point are estimated as female. Sectioning points from the humerus and tibia (see Table 10) provide a sex estimation of male.

Sexually dimorphic traits of the cranium were scored according to Buikstra and Ubelaker (1994) and utilized in a logistic regression following Walker (2008). Cranial traits include the nuchal crest (score=4), mastoid process (score=3), orbital margin (score=4), glabella (score=4) and mental eminence (score=3). Walker (2008) uses logistic regression to estimate sex based on features of the skull. Using the features listed above, the Walker method provides a 99% probability of male.

Based on the univariate sex estimation of the humerus and tibia, as well as the statistical evaluation of nonmetric traits, Burial 18 is estimated as male.

Table 10: Univariate sex estimation of Burial 18

Measurement	Sectioning Point	Burial 18	Classification Accuracy (%)	Estimated Sex
Humerus Epicondylar Breadth	56	63	84	Male
Tibia Ant./Post. Diameter Nutrient Foramen	31	38	83	Male

Age: 41–89.5 years

The right auricular surface and the zygomaticomaxillary suture were the primary indicators used for age estimation. Cranial suture closure and the morphology, topography, and texture of the auricular surface were scored following descriptions outlined in (Milner and Boldsen 2016). The auricular surface topography was flat to irregular. Morphology of the auricular surface was also flat. The inferior texture displayed smoothness and microporosity, while the posterior iliac exostoses were smooth or rounded. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Burial 18 had a zygomaticomaxillary suture that was juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 18 is estimated to be 41 to 89.5 years of age at death, with a maximum likelihood (point estimate) of 73.2 years.

Biological Affinity: *Broad Estimation Asian*

There are too few cranial measurements and nonmetric traits for statistical biological affinity estimation. Therefore, dental metrics, using a global data set in conjunction with random forest classification, were used to provide a broad-based geographic ancestry estimation using a freely available GUI provided by Kenyhercz, et al. (2019). The program contains African, European, and Asian reference groups and Burial 18 was compared to all reference groups with pooled sex. The analysis suggests that Burial 18 is most similar to Asians with a posterior probability of 0.634, followed Europeans with a posterior of 0.322. The results suggest that the individual is more similar to Asians than Europeans and is not similar to Africans.

The overall reference group classification was 97.6%, well above random chance. However, the posterior probability is less than 75%. Therefore, both the broad and narrow estimations should be considered probable.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

Burial 18 is fragmented and friable with cortical destruction that obscures identification of potential pathological features; none were noted on identifiable fragments.

Trauma: None

No trauma was observed on Burial 18.

Dental Inventory and Oral Health

The maxillary and mandibular bone is fragmentary and incomplete, as a result, a portion of the dentition was unobservable due to loss of the alveolus. Teeth #2, 4, 6–9, 11, 12, 17, 18, 20–24, 26–29, 31, and 32 are present and fully developed. Tooth #30 was lost antemortem. The remaining teeth have no associated alveolus. Then anterior maxillary dentition and mandibular right posterior dentition wear scores indicate moderate dental wear. The mandibular left dentition has less wear than the right indicating an asymmetric wear pattern. Tooth #2 has an occlusal pit (caries lesion) in the beginning stages. Tooth #4 has an occlusal pit that has destroyed 1/4 of the surface. Tooth #9 exhibits abscessing the alveolar socket, although the tooth is still present. Moderate periodontal disease is noted based on resorption of the alveolar bone. Tooth #23, 24, and 26 each exhibit one linear enamel hypoplasia. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 2.5–2.6 years of age.

Burial 19***General Description***

This skeleton represents the fragmentary remains of an infant individual between 36–56 intrauterine weeks old at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

Burial 19 was highly fragmentary, with many skeletal elements missing post-mortem. The cranium, long bones, thorax, pelvis, and dentition were all highly fragmentary.

Minimum Number of Individuals: One

The skeletal remains of Burial 19 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in infants, however, Burial 19 has no complete long bones.

Age: 36–56 weeks intrauterine

Due to the extreme fragmentation of Burial 19, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to a fetal donor that was 36 weeks intrauterine. The pars petrosa of Burial 19 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of infants. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 19 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for infant remains, stature for Burial 19 is indeterminant.

Skeletal Pathology: None

No pathologies were observed on Burial 19.

Trauma: None

No trauma was observed on Burial 19.

Dental Inventory and Oral Health

No teeth are present for inventory or analysis.

Burial 20

General Description

This skeleton represents the remains of a Mexican male, between 30.6 to 89 years of age at death, with an estimated stature of approximately 5'1" to 5'6".

Inventory and Condition of Remains

Most of the skeleton is severely fragmented, including the facial, thoracic, and pelvic regions. The long bones are primarily represented by shafts. However, the femoral heads and distal epiphyses of the humerii were available for the analysis of sex.

Minimum Number of Individuals: One

The skeletal remains of Burial 20 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

The pelvis was too fragmented for sex estimation. Therefore, post-cranial sex was estimated based on available measurements following criteria for Mexican Hispanics from Spradley, et al. (2015). Using a multivariate equation, the ulna provided a sex estimation of male (see Table 11).

Because only one bone was available for estimation, cranial traits were also used. The Walker (2008) method provided conflicting and ambiguous results (see Table 12). Therefore, using the custom reference data in FORDISC 3.1 (Jantz and Ousley 2005), Burial 20 was compared against 19th Century Black and White and 20th Century Mexican males and females for a multivariate estimation of sex through cranial measurements (see Biological Affinity section below for measurements utilized). The results indicate that Burial 20 is most similar to males, specifically Mexican males, with a posterior probability of 0.477, followed by American White males with a posterior probability 0.223. Further, Burial 20 is most distant from all females, as judged by the rank order of Mahalanobis distances.

Based on the multivariate estimation of sex from the ulna and cranial measurements, Burial 20 is estimated as male.

Table 11: Multivariate sex estimation of Burial 20

Bone	Score	Classification Accuracy (%)	Estimated Sex
Ulna	3.92	81	Male

Table 12: Sex Estimation of Burial 20 using Walker’s Discriminant function formula

Estimation	Probability Male	Probability Female	Accuracy	Variables in Analysis
Female	0.22	0.78	70/84	Mental eminence, mastoid
Male	0.67	0.33	78/78	Orbit, mental eminence
Female	0.31	0.69	77/83	Nuchal crest, mastoid

Age: 30.6–89 years

Due to the fragmentation of the remains, only the right and left auricular surfaces and cranial sutures were available to estimate age following Milner and Boldsen (2016). The auricular surface topography displayed a median elevation or was flat to irregular. The morphology was less than one-third covered by billows and/or flat. The inferior surface texture was smooth and had some microporosity. Cranial sutures were scored as to whether they were open, fused, partially fused, or completely obliterated. Coronal pterica was partially obliterated and punctuated. Sagittal obelica was juxtaposed and partially obliterated. Lamdoidal asterica was juxtaposed. Zygomaticomaxillary sutures were punctuated and obliterated.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 20 is estimated to be 30.6 to 89 years of age at death, with a maximum likelihood (point estimate) of 69.6 years.

The maxilla is completely edentulous, however, there is little arthritic and/or degenerative change on most joint surfaces suggesting that Burial 20's age is likely between the lower estimate to the mid-point.

Biological Affinity: Mexican

Although the cranium was fragmented, a total of nine measurements were available for analysis: ASB, AUB, MDH, OCC, OSC, PAC, PAS, WMH, and XCB. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 77% of the time, greater than chance alone. Burial 20 is most similar to the Mexican group with a posterior probability of 0.67 and a typicality of 0.89. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups.

With the posterior probability of 0.67 and the classification of reference groups at 77%, the overall classification for Burial 20 is considered moderately strong.

Stature: 5'1" to 5'6"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements using the 19th Century cadaver stature reference data for "any" group, as only population specific criteria exist for American Blacks and Whites. The measurements with the highest correlation to stature were calcaneus maximum length and ulna physiological length, with an R-square of 0.623. The stature for Burial 20 is estimated to be between 61.3 to 68.0 inches or 5'1" to 5'6".

Skeletal Pathology: Osteoarthritis

Osteoarthritic lipping is noted on the first and second lumbar vertebrae.

Trauma: None

No trauma was observed on Burial 20.

Dental Inventory and Oral Health

The anterior portion of the maxilla was present and indicative that Teeth #5–12 were lost antemortem to complete resorption. Teeth #1–4 and 13–16 have no associated alveolar bone and are coded as unobservable due to postmortem loss of alveolar bone. The mandible is complete, and the majority of teeth are present with the exception of teeth #18, 22, 25, and 31, which were lost antemortem as evidenced by complete alveolar resorption. The teeth that are present are developmentally complete. Moderate dental wear is noted on the mandibular dentition. Dental caries are present on #17 and 32, both teeth exhibit moderate pits at the facial cemento-enamel junction. Burial 20 exhibits extreme periodontal disease, over 3/4 of all roots are exposed, resorption is active, and teeth are held in place largely by soft tissue attachments. Mild to moderate calculus is apparent on all teeth; incisors have calculus build up on lingual surface. Dental wear is minimal to moderate. One linear enamel hypoplasia is noted on the lower right

canine (#27). Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasia indicate that age at formation occurred at approximately 3.5 years of age.

Burial 21

General Description

This mostly complete skeleton represents a Mexican male, between 29.3 to 84.5 years of age at death, with an estimated stature of approximately 5'1" to 5'7".

Inventory and Condition of Remains

The remains of Burial 21 are mostly complete, with fragmentation in the craniofacial, thoracic, and pelvic regions. Fragmentation and cortical flaking are consistent with historical burial taphonomy.

Minimum Number of Individuals: One

The skeletal remains of Burial 21 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Although the pelvis was fragmentary, the sciatic notch was available for the analysis of sex. However, this feature scored as ambiguous (score=3). Because of the ambiguity of the greater sciatic notch, post-cranial sex was estimated based on available postcranial measurements following the criteria for Mexican Hispanics in Spradley, et al. (2015).

Multivariate formulae are preferred over sectioning points and Burial 21 had enough complete measurements for three discriminant function (DF) formulae using the clavicle, humerus, and radius (Spradley, et al. 2015). For DF scores, values above zero are estimated male and values below zero, female. All DF scores for Burial 21 were above zero (see Table 13) providing a sex estimate of male.

Table 13: Multivariate sex estimation of Burial 21

Bone	Score	Classification Accuracy (%)	Estimated Sex
Clavicle	0.52	89	Male
Humerus	3.42	87	Male
Radius	7.55	90	Male

Using Walker (2008), sex was also estimated from fragments of the cranium, including the nuchal crest (score=2), mastoid process (score=3), supra-orbital margin (score=4), glabella (score=4), and mental eminence (score=3). Walker (2008) uses logistic regression to estimate sex based on a combination of these features. Using the glabella, mastoid, and mental eminence sex is estimated as male with a probability of .97.

Based on the postcranial estimation of sex, Burial 21 is estimated as a male.

Age: 29.3–84.5 years

Due to the fragmentation of the remains, only the auricular surface and cranial sutures were available to estimate age to estimate age following Milner and Boldsen (2016). The right and left side auricular surface topography, morphology, inferior surface texture and superior posterior iliac exostoses were scored. The auricular surface topography displayed a median elevation and was flat to irregular. The morphology showed that the surface was less than one-third covered by billows and flat in some areas. The inferior surface texture was smooth while the superior posterior iliac exostoses was smooth and had rounded exostoses. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Coronal pterica was punctuated, sagittal obelica was obliterated, interpalatine was obliterated, and the zygomaticomaxillary suture was juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 21 is estimated to be 29.3 to 84.5 years of age at death, with a maximum likelihood (point estimate) of 55.1 years.

Biological Affinity: Mexican

Although the cranium was fragmented, a total of 7 measurements were available for analysis: PAC, MAB, PAS, XCB, FMB, FRS, and FRC. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 76% of the time, greater than chance alone. Burial 21 is most similar to the 19th Century American White group with a posterior probability of 0.79 and a typicality of 0.25. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005).

Burial 21 has a high posterior probability is high and the classification of reference groups is greater than 75%, providing a strong classification.

Stature: 5'1" to 5'7"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements using the 19th Century cadaver stature reference data for "Any" group, as only population specific criteria exist for Blacks and Whites. The measurements with the highest correlation to stature were the humerus and radius maximum lengths with an R-square of 0.733. The stature for Burial 21 is estimated to be between 61.0 to 68.3 inches, or 5'1" to 5'7".

Skeletal Pathology: Mandibular hypoplasia

The mandible is asymmetric, with the left side higher at the body than the right, lateral to the mental symphysis. Burial 21 does not appear to have affected biomechanical functions of chewing. This is likely a congenital condition known as unilateral mandibular hypoplasia (Barnes 2012). Schmorl's nodes are noted on thoracic vertebra 7–12. The left talus exhibits os trigonum, a detached posterior tubercle resulting in a separate bone/ossicle (Mann and Hunt 2012).

Trauma: None

No trauma was observed on Burial 21.

Dental Inventory and Oral Health

The maxilla and mandible are complete and only tooth #28 is missing, antemortem. As the maxilla and mandible were present and complete, teeth were observed in occlusion. There is no dental crowding, all teeth are in full occlusion. The maxillary central incisors exhibit shoveling and mild winging. Mild dental wear is noted on the anterior maxillary and mandibular dentition. Burial 21 exhibits no dental caries and minimal calculus. Tooth #27 displays periodontal abscessing with bone loss. Teeth #22 and 27 each exhibit a linear enamel hypoplasia. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 3.0–3.5 years of age.

Burial 22

General Description

This mostly complete skeleton represents a White male, between 27.6 to 45 years of age at death, with an indeterminant stature.

Inventory and Condition of Remains

The remains of Burial 22 are incomplete, with high fragmentation in the craniofacial, thoracic, and pelvic regions. Proximal and distal epiphyses of the long bones are also fragmentary. A full set of adult maxillary and mandibular dentition were available for dental analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 22 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

The only portion of the pelvis available for sex estimation was the greater sciatic notch, which was assessed based on qualitative features outlined in Buikstra and Ubelaker (1994). The sciatic notch suggests probable male based on a slightly narrow width. Due to the fragmentation of the remainder of the pelvis, sex was estimated from the postcranial skeleton and statistical evaluation of nonmetric cranial traits.

Following Spradley and Jantz (2011), postcranial sectioning points for American Whites were used to estimate sex. Only sectioning points with classification accuracies greater to or equal to 80% were used. Postcranial measurements from the humerus, femur, and tibia were available for estimation and suggest that Burial 22 is male (see Table 14).

Using Walker (2008), sex was estimated from fragments of the cranium, including the nuchal crest (score =3), mastoid process (score = 2), supra-orbital margin (score = 4), and glabella

(score = 4). Walker (2008) uses logistic regression to estimate sex based on a combination of these features. Using the glabella and mastoid, sex is estimated as male with a probability of .85.

Based on Spradley and Jantz (2011), the greater sciatic notch morphology, and the Walker (2008) method, the estimated sex for Burial 22 is male.

Table 14: Univariate sex estimation of Burial 22

Measurement	Sectioning Point	Burial 22	Classification Accuracy (%)	Estimated Sex
Femur max. head diameter	45	53	88	Male
Humeral epicondylar breadth	60	64	87	Male
Tibia circumference nutrient foramen	92	104	81	Male

Age: 27.6–45 years

Due to the fragmentation to the skeletal remains, only the middle surface morphology of the right and left auricular surfaces and all cranial sutures were available for age estimation analysis. The middle surface morphology and cranial sutures were scored as scored as outlined in Milner and Boldsen (2016). The auricular surface morphology was less than one-third covered by billows. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Coronal pterica was juxtaposed, sagittal obelica, zygomaticomaxillary, and interpalatine sutures were punctuated and obliterated, and lamdoidal asterica was juxtaposed. The cranial sutures on Burial 22 were juxtaposed, punctuated, and obliterated.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 22 is estimated to be 27.6–45 years of age at death, with a maximum likelihood (point estimate) of 27.6 years.

Additionally, little to no degenerative changes were seen on the skeletal elements suggesting that Burial 22 is likely close to the point estimate for age.

Biological Affinity: American White

Although the cranium was fragmented, a total of ten measurements were available for analysis: ASB, BBH, FRC, GOL, NLB, OBH, OCC, PAC, WMH, and XCB. These craniometric measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 90.3% of the time, greater than chance alone. Burial 22 is most similar to the 19th Century American White group with a posterior probability of 0.959 and a typicality of 0.60. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that he unknown belongs to any of the reference groups.

Due to the number of available craniometric variables, the overall classification rate of reference groups, and the posterior and typicality probabilities, the overall group membership for Burial 22 is estimated to be American White and represents a strong classification.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on Burial 22.

Trauma: None

No trauma was observed on Burial 22.

Dental Inventory and Oral Health

The maxillary bone is fragmentary and incomplete, however, teeth associated with the missing alveolar bone are present. The mandible is fragmentary although mostly complete. Teeth #3, 4, 7, and 9 are missing antemortem. Tooth #8 is present; however, the crown and root are fragmented, postmortem. Teeth #12–15 are present with no associated alveolar bone as it was lost postmortem. Tooth #16 is missing and unobservable. Tooth #21 is missing from the mandibular dentition postmortem; the remainder of the mandibular dentition is present. Tooth #15 has a large carious lesion on the distolingual cusp, although signs of moderate wear are present on the remaining and occlusal surface. Tooth #31 also has a large carious lesion located on the distolingual and occlusal surface. Tooth #26 has a carious lesion on the mesial interproximal and labial surface. Mild dental wear is noted on the majority of the dentition, the maxillary anterior dentition exhibits the most wear (moderate) and the left maxillary and mandibular molars have greater wear scores than the right, indicating an asymmetrical wear pattern. Hypercementosis is noted on teeth# 18 and 30. No hypoplasia or periodontal disease is observed.

Burial 23

General Description

This mostly complete skeleton represents a probable Mexican female, between 26.6 to 43.9 years of age at death, with an indeterminant stature.

Inventory and Condition of Remains

The remains of Burial 23 are mostly complete, with high fragmentation in the craniofacial and thoracic regions. Although the craniofacial region was fragmentary, a mostly complete set of maxillary and mandibular dentition were available for analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 23 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Female

Sex was estimated from nonmetric features of the innominate and statistical evaluation of cranial nonmetric traits. The only portion of the pelvis available for observation was the greater sciatic

notch, which was assessed based on qualitative features outlined in Buikstra and Ubelaker (1994). The sciatic notch is wide and is suggestive of female.

As Burial 23 was estimated as Mexican, only a limited number of postcranial sectioning points are available for comparison to Hispanic reference groups. Therefore, sex from the postcranial elements could not be estimated, thus the cranial non-metric traits were used for analysis.

Using Walker (2008), sex was estimated from fragments of the cranium, including the nuchal crest (score=1), mastoid process (score=1), the supra-orbital margin (score=1), glabella (score=1) and the mental eminence of the mandible (score=2). Walker (2008) uses discriminant function analysis to estimate sex based on features of the skull. Using the glabella, mastoid, and mental eminence, the Walker method provides a 0.99 probability of female.

Based on available pelvic and cranial traits, Burial 23 is estimated as female.

Age: 26.6–43.9 years

Due to the fragmentation to the skeletal remains, only the right and left auricular surfaces and two sutures, the sagittal obelica and lamdoidal asterica, were available for the estimation of age. All characteristics were scored as outlined in Milner and Boldsen (2016). The superior demiface topography displayed a median elevation and was flat to irregular. The morphology was less than one-third covered by billows or flat without billows. Posterior iliac exostoses were smooth or rounded. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. The cranial sutures on Burial 23 were open.

All traits were entered into the ADBOU program (Boldsen, et al. 2002). Burial 23 is estimated to be 26.6–43.9 years of age at death, with a maximum likelihood (point estimate) of 26.6 years. Based on the state of the auricular surface, fusion lines on the vertebrae, and eruption of teeth 17 and 32, Burial 23 is most likely closer in age to the point estimate.

In addition to these scores, fusion lines on the annular rings of the vertebrae were still visible. Further, the medial epiphysis of the left clavicle appears to be fusing or in fusion, and teeth 17 and 32 are unerupted from the alveolar bone, with the apex for the root of tooth 17 still open.

Biological Affinity: Probable Mexican

Although the cranium was fragmented, a total of four measurements were available for analysis. These craniometric measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 46% of the time, greater than chance alone. Burial 23 is most similar to the Mexican group with a posterior probability of 0.72 and a typicality of 0.36. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that he unknown belongs to any of the reference groups (Jantz and Ousley 2005).

Due to the limited number of available craniometric variables, the overall classification rate of reference groups, and the posterior and typicality probabilities, the overall group membership for Burial 23 is estimated as Mexican and represents a probable classification.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on Burial 23.

Trauma: None

No trauma was observed on Burial 23.

Dental Inventory and Oral Health

The maxilla is fragmentary although mostly complete and the mandible is complete. All teeth are present with the exception of tooth #5, missing postmortem. Teeth #17 and 32 are present with associated alveolar bone and are unerupted, therefore a dental radiograph was taken to assess root development to assist with aging (see age section above). The associated alveolar bone is not present for teeth #1, 2, and 16. Tooth #30 has a carious buccal pit located superior to the CEJ. There is little to no wear on the entire dentition, no abscesses or periodontal disease is noted. Linear enamel hypoplasias observed are on teeth #22, 23, and 27. Using the (Cares Henriquez and Oxenham 2019) method, measurements of the hypoplasias indicate that age at formation occurred between 2.5–4.5 years of age.

Burial 24

General Description

This skeleton represents the remains of an infant individual between 36–56 intrauterine weeks old at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The skeletal elements of Burial 24 are fragmentary, with high fragmentation in the craniofacial and limb regions.

Minimum Number of Individuals: One

The skeletal remains of Burial 24 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 24 has no complete long bones.

Age: 36–56 weeks intrauterine

Due to the extreme fragmentation of Burial 24, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to fetal donors which were 36 weeks intrauterine. The pars petrosa of Burial 24 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 24 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 24 is indeterminant.

Skeletal Pathology: None

No skeletal pathologies were observed on Burial 24.

Trauma: None

No trauma was observed on Burial 24.

Dental Inventory and Oral Health

Three tiny tooth fragments are present. One fragment can be identified as a deciduous maxillary right first molar. The other fragments likely represent a deciduous incisor—arch, number, and side not possible due to fragmentation—and possibly a deciduous canine or molar fragment—its small size does not permit further classification. It is not possible to code the development of the deciduous molar due to postmortem fragmentation.

Burial 25

General Description

This mostly complete skeleton represents a Mexican male, between 21.3 and 39.6 years of age at death, with an estimated stature of approximately 5'1" to 5'7".

Inventory and Condition of Remains

The remains of Burial 25 are mostly complete, with high fragmentation in the region of the thorax and pelvis. The cranium and mandible, although fragmentary, were reconstructed after cleaning. Proximal and distal epiphyses of the long bones are fragmentary; however, the epiphyses remained in good condition and were used in the analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 25 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Sex was estimated from the pelvis, post-cranial measurements, and cranial non-metric traits. Using the non-metric traits of the pelvis, sex was estimated based on statistical evaluation of the os coxae following Klales, et al. (2012), modified from Phenice (1969), which provides a posterior probability of sex based on logistic regression of ordinal scores. The subpubic concavity scored a five, the medial ischio-pubic ramus scored a four, and the ventral arc scored a five. All pelvic features were indicative of male with a 100% probability.

For postcranial sex estimation, multivariate discriminant function formulae for Hispanics (Spradley, et al. 2015) were used in lieu of sectioning points for Burial 25 due to good preservation and complete measurements from multiple skeletal elements. Multivariate formulae are preferred over sectioning points, and Burial 25 had enough complete measurements for two discriminant function (DF) formulae using the tibia and calcaneus. For DF scores, values above zero are estimated male and values below zero, female. DF scores for the tibia and calcaneus for Burial 25 were above zero (see Table 15) providing a sex estimate of male.

Non-metric traits of the skull were also scored following Walker (2008). Walker (2008) uses discriminant function analysis to estimate sex based on features of the skull. The cranial traits scored as four or higher, with a posterior probability of .99 for male.

Based on the pelvis and the overall skeletal morphology, including the skull, Burial 25 is estimated to be male.

Table 15: Multivariate sex estimation of Burial 25

Bone	Score	Classification Accuracy (%)	Estimated Sex
Tibia	5.232	91	Male
Calcaneus	5.004	82	Male

Age: 21.3–39.6

The skull, along with small portions of the right and left pubic symphysis and auricular surfaces were available for age estimation analysis. Numerous features of the pubic symphysis and auricular surface, such as morphology and topography, and cranial suture closure, were scored following descriptions outlined in Milner and Boldsen (2016). The auricular surface topography was flat, while the morphology less than one-third covered by billows and/or flat. Symphyseal relief had soft, shallow and residual billowing. The texture of the symphyseal face was coarse-grained, while the dorsal symphyseal margin had complete flattening.

Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Coronal pterica, zygomaticomaxillary were juxtaposed. The sagittal obelica and lamdoidal asterica sutures were open and juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 25 is estimated to be 21.3 to 39.6 years of age at death, with a maximum likelihood (point estimate) of 29.4 years.

Biological Affinity: Mexican

A total of 21 measurements were available for analysis due to the completeness of the cranium. These craniometric measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 90% of the time, greater than chance alone. Burial 25 is most similar to the Mexican group with a posterior probability of 0.96 and a typicality of 0.64. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that he unknown belongs to any of the reference groups (Jantz and Ousley 2005).

Based on the overall classification rate of reference groups and the posterior and typicality probabilities, the overall group membership for Burial 25 is estimated as Mexican and represents a strong classification.

Stature: 5'1" to 5'7"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements with reference data from "Any" group. The measurements with the highest correlation to stature were calcaneus maximum length and tibia condylo-malleolar length, with an R-square of 0.684. The stature for Burial 25 is estimated to be between 62.1 to 68.4 inches or 5'1" to 5'7".

Skeletal Pathology: Extreme robusticity

Extremely robust muscle attachments are present on the posterior femora along the linea aspera superiorly and laterally. This region is an attachment locality for a number of leg muscles, including the vastus lateralis and medialis, adductors longus, brevis, and magnus, and the short head of biceps femoris. The tibiae also show robust muscle attachments in the area of the nutrient foramina, a region that houses muscle attachment sites for the tibialis posterior and other muscles. These robust muscle markings on both the femora and tibiae may reflect a habitual occupational activity such as horse riding (Djukic, et al. 2018) or some other type of repetitive activity involving the legs.

Trauma: None

No trauma was observed on Burial 25.

Dental Inventory and Oral Health

The maxillary and mandible are present and in good condition. All teeth are present and fit into their alveolar socket except for tooth #1 as the maxillary alveolus was lost postmortem. Overall, the dentition is in good condition, fully developed and in occlusion, with minimal wear, mild periodontal disease, and no carious lesions or abscesses. Mild dental calculus is noted on the majority of the dentition. Teeth #7 and 9 are small and peg like. Teeth #5, 8, 9, 11, 22, 23, 25, 26, and 27 exhibit enamel hypoplasias. Teeth #11, 22, and 27 have multiple hypoplasias. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 1.9–4.38 years of age.

Burial 26

General Description

This mostly complete skeleton represents a Black male, between 48.8 to 91.2 years of age at death, with an indeterminant stature. A pipe notch is noted in the dentition.

Inventory and Condition of Remains

The remains of Burial 26 are mostly complete, with high fragmentation in the craniofacial complex, and the thoracic and pelvic regions. Proximal and distal epiphyses of the long bones are fragmentary; however, the epiphyses remain in good condition and were used in the analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 26 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

The only portion of the pelvis available for sex estimation was the sciatic notch, which was assessed based on qualitative features outlined in Buikstra and Ubelaker (1994). The sciatic notch presents ambiguous traits for sex.

Because of the ambiguity and fragmentation of the pelvic traits, postcranial sectioning points for American Blacks were used to estimate sex following Spradley and Jantz (2011). Only sectioning points with classification accuracies greater than or equal to 80% were used. Postcranial measurements from the humerus, femur, and tibia (see Table 16) also provide ambiguity as to sex.

In addition to the pelvis and post crania, sex was estimated from fragments of the cranium, using Walker (2008), including the nuchal crest (score=3), mastoid process (score=3), the supra-orbital margin (score=1), and the mental eminence of the mandible (score=4). Walker uses discriminant function analysis to estimate sex based on features of the skull. Using the mastoid and mental eminence, the Walker method provides a 97% probability of male and the orbit and mental eminence provide a 92% probability of male.

Table 16: Univariate sex estimation of Burial 26

Measurement	Sectioning Point	Burial 26	Classification Accuracy	Estimated Sex
Humeral head diameter	44	41	86	Female
Femur head diameter	44	46	86	Male
Femur subtrochanteric ant/post	27	28	83	Male
Tibia diameter at nutrient foramen	35	33	80	Female

Additionally, a craniometric multivariate analysis of sex was performed in FORDISC 3.1 (Jantz and Ousley 2005). The cranial measurements were compared to all reference groups, both male and female. Burial 26 classified as most similar to American Black males, followed by American White males, with combined posterior probabilities equaling 0.747, indicating that multivariate craniometric analysis suggests Burial 26 is most similar to males.

Based on methods presented by Walker (2008) and the multivariate analysis of cranial measurements, Burial 26 is estimated as male.

Age: 48.8–91.2 years

Due to the fragmentation to the skeletal remains, only the right and left auricular surface, and two sutures, the sagittal obelica and lamdoidal asterica, were available for age estimation analysis. All characteristics were scored as outlined in Milner and Boldsen (2016). The auricular surface topography was flat to irregular. The morphology was also flat. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. The available cranial sutures on Burial 26 were open.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 26 is estimated to be 48.8–91.2 years of age at death, with a maximum likelihood (point estimate) of 76.6 years. Based on the lack of dental wear and degenerative changes seen on the skeleton, Burial 26 is most likely closer in age to the lower end of the age range.

Biological Affinity: Black

Although the cranium of Burial 26 was fragmented, a total of eight measurements were available for analysis: ASB, FRS, GOL, MDH, OCC, OCS, PAC, and PAS representing vault measurements. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 75% of the time, greater than chance alone. The results suggest that Burial 26 is most similar to the 19th Century American Whites, followed by American Blacks with respective posterior probabilities of 0.428 and 0.339 and typicalities of 0.16 and 0.24. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that he unknown belongs to any of the reference groups (Ousley and Jantz, 2005: 96).

Because the posterior probabilities are below .5 and both similar to one another, indicating that Burial 26 could be either White or Black, postcranial biological affinity estimation was utilized in FORDISC 3.1 (Jantz and Ousley 2005) using the forensic Black and White male reference groups. A total of nine measurements were available for analysis: FEMHDD, FEMSAP, FEMSTV, HUMHDD, TIBCIR, TIBNFT, TIBNFX, ULNDVD, and ULNTVD. The reference groups correctly classified 76.5% of the time, greater than chance alone. The results suggest that Burial 26 is most similar to the 19th Century American Blacks with a posterior probability of 0.86 and a typicality of 0.38.

Although the craniometric analysis provided ambiguous results, the postcranial analysis provides a strong classification of American Black.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on Burial 26.

Trauma: None

No trauma was observed on Burial 26.

Dental Inventory and Oral Health

The maxillary bone is highly fragmentary and only a few teeth could be observed in the alveolus. Only tooth #10 is missing as is the associated alveolar bone, therefore it was scored as unobservable. The mandible is complete and all mandibular teeth are present. All present teeth are complete, fully developed, and in occlusion. Minimal wear is noted on the entire dentition. Teeth #4, 5, 14, and 28 have dental caries. Teeth #4, 8, and 28 have distal interproximal pits and #14 has a mesial interproximal pit. Mild calculus is observed on the entire dentition and is especially noticeable on the lingual surface of the incisors. The dentition also exhibits mild periodontal disease. An unaligned array of hypoplastic pits is noted on tooth #22. Circular wear is noted on teeth #22 and 23 that corresponds to wear on teeth #11 and 12. This type of wear is characteristic of a pipe notch.

Burial 27

General Description

The mostly complete skeleton represents a juvenile between $4.5 \pm .58$ to $6.5 \pm .57$ years of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 27 are fragmentary, with high fragmentation in the region of the craniofacial complex, thorax, pelvis, and limbs. Although fragmentary, deciduous and permanent dentition were available for age estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 27 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 27 has no complete long bones.

Age: 4.5 ± 0.58 to 6.5 ± 0.57 years

For juvenile remains, age is estimated from the eruption and development of the available deciduous and permanent dentition. The deciduous dentition for Burial 27 was mostly complete, with permanent crowns also available for analysis. Using the methods outlined by AlQahtani, et al. (2010), development of the deciduous and permanent dentition was noted. All deciduous teeth had root formation, however, most of the roots were fragmented post-mortem. Therefore, crown formation was the focus of the analysis. All deciduous crowns were completely formed. Additionally, the permanent mandibular first molar crowns were completely formed, with one-fourth of the formed root present, although the roots were broken post-mortem. These crowns were not in the alveolar bone, not allowing for eruption estimations to be made. Based on the crown and root formation of the deciduous and permanent dentition, Burial 27 is estimated as $4.5 \pm .58$ to $6.5 \pm .57$ years of age at death.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 27 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 27 is undetermined.

Skeletal Pathology: None

No pathologies were observed on Burial 27.

Trauma: None

No trauma was observed on Burial 27.

Dental Inventory and Oral Health

The deciduous dentition is present and complete along with some of the permanent mandibular dentition. There is no associated alveolar bone with the maxilla. However, a portion of the anterior and right body of the mandibular alveolar bone is present and was radiographed. Teeth #19 and 30 are present and loose. Radiographs of the mandible fragment indicate that teeth #25–

29 are also present, still in development, and unerupted. Teeth #22–24 are also present, still in development, and loose with no associated alveolar bone. The crown of tooth #22 is over 2/4 complete. Teeth #23–26 have complete crown development. The crown of tooth #27 is 3/2 complete and for teeth #28 and 29, the crowns are 1/4 and 1/2 complete, respectively. For teeth #17 and 32, the crowns are complete with some root development. Most deciduous incisor and canine roots are complete, however, postmortem damage prevents assessment of development root development on the remainder of the deciduous dentition. It is apparent that all crowns are complete, and the roots that are present, most were likely complete prior to taphonomic damage.

Carious lesions are present on tooth C (deciduous maxillary right canine) and teeth K and L (mandibular left first and second molar). Tooth C presents a beginning pit on the distal crown surface. Tooth L a smooth surface lesion on the distal crown. Tooth K has a small pit on the mesial crown and a large lesion with destruction of the distal, facial, and occlusal crown surface. The permanent dentition has no lesions, abscesses, or evidence of hypoplasia.

Burial 28

General Description

This burial represents the remains of a possible infant individual between 36–56 intrauterine weeks old at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 28 are highly fragmentary. In addition, hard clay encompasses many of the remaining skeletal elements, hindering analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 28 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 28 has no complete long bones

Age: 36–56 weeks intrauterine

Due to the extreme fragmentation of Burial 28, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to a fetal donor which was aged at 36 weeks intrauterine. The pars petrosa of Burial 28 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the

permanent dentition, Burial 28 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 28 is undetermined.

Skeletal Pathology: None

No pathologies were observed on Burial 28.

Trauma: None

No trauma was observed on Burial 28.

Dental Inventory and Oral Health

No dentition was available for inventory or oral health analysis.

Burial 30

General Description

This skeleton represents an infant between of 4.5 ± 0.18 to 7.5 ± 0.18 months of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 30 are incomplete, with high fragmentation in the region of the craniofacial complex, thorax, and pelvis. Although fragmentary, a partially complete deciduous dentition was available for analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 30 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 30 has no complete long bones.

Age: $4.5 \pm .18$ to $7.5 \pm .18$ months

For juvenile remains, age is estimated from the eruption and development of the available deciduous and permanent dentition. The deciduous dentition for Burial 30 was fragmentary, with only three maxillary incisors, one mandibular canine, and two mandibular molars present. There was also an unidentifiable molar fragment available, however, fragmentation made this tooth unusable for age estimation. Using the methods outlined in the London Atlas AlQahtani, et al. (2010), development of the deciduous dentition was noted. All deciduous tooth crowns were

three-fourths to fully complete. There was no root formation on any deciduous teeth. Based on the crown formation of the deciduous, Burial 30 is estimated as 4.5 ± 0.18 to 7.5 ± 0.18 months of age at death.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 30 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 30 is undetermined.

Skeletal Pathology: None

No pathologies were observed on Burial 30.

Trauma: None

No trauma was observed on Burial 30.

Dental Inventory and Oral Health

The deciduous dentition is represented teeth D, E, (deciduous maxillary right central and lateral incisor), Q (deciduous mandibular right lateral incisor), N (left canine), T (right second molar), and L and K (left first and second molar). Only crowns are present and while some are damaged postmortem, others suggest that all crowns are still in development and not yet complete. The maxillary incisors and mandibular left first molar and right second molar display crowns that are $\frac{1}{2}$ complete. The remainder of the crowns are damaged postmortem and cannot be scored for development. No pathologies or lesions are noted.

Burial 31

General Description

This mostly complete skeleton represents a White male between 29.3 to 56.2 years of age at death, with an estimated stature of approximately 5'5" to 5'8". A trepanation is located on the posterior cranial vault at the right parietal/occipital border.

Inventory and Condition of Remains

The remains of Burial 31 are mostly complete, with most long bones intact. Although the entire cranium is fragmented, the vault and craniofacial complex are present and were used in the analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 31 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Because the pelvis was intact and complete, sex was estimated based on the statistical evaluation of the pelvic traits following Klales, et al. (2012), modified from Phenice (1969), which provides a posterior probability of sex based on logistic regression analysis of ordinal scores. The subpubic concavity scored as four, the medial ischio-pubic ramus scored as three, and the ventral arc scored as five. Based on the Klales method, Burial 31 is estimated as male with a posterior probability of .99.

The overall skeletal morphology, including the robusticity of the postcrania and cranial features are also indicative of male.

Age: 29.3–56.2 years

The cranium, along with right and left sides of the pubic symphysis and auricular surface were available for age estimation. Numerous features of the pubic symphysis, auricular surface, and cranial suture closure were scored following descriptions outlined in Milner and Boldsen (2016).

The auricular surface topography displayed a median elevation. The morphology was bumpy. The auricular surface texture was smooth or had microporosity. The posterior exostoses displayed some smoothness and jagged exostoses. Symphyseal relief showed residual billowing while the symphyseal texture displayed microporosity. The superior protuberance was late stage. The central and dorsal symphyseal margins had a rampart complete without the anterior sulcus or a rim, respectively. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. Lambdoidal asterica and the left interpalatine and zygomaticomaxillary sutures were open and/or juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 31 is estimated to be 29.3 to 56.2 years of age at death, with a maximum likelihood (point estimate) of 39.2 years.

Burial 31 shows little degenerative changes. The only exception was the maxillary and mandibular dentition, which showed antemortem tooth loss, disease, and heavy wear patterns. The scores for the pelvis and cranium, in conjunction with the dental wear and disease, suggest that Burial 31 is close to or above the point estimate.

Biological Affinity: White

A total of 22 measurements were available for analysis representing the overall craniofacial region and vault. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified at 87.2%, greater than chance alone. The results suggest that Burial 31 is most similar to the 19th Century

American Whites with a posterior probability of 0.98 and a typicality of 0.46. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005).

Due to the high reference group classifications, the high posterior probability, and the typicality score, the estimation of American White for Burial 31 is strong.

Stature: 5'5" to 5'8"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements and the 19th Century White male group as a reference. The measurements with the highest correlation to stature were femur bicondylar length, femur maximum length, and tibial length, with an R-square of .0.746. Using the three measurements, the stature for Burial 31 is estimated between 5'5" to 5'8".

Skeletal Pathology: Trepanation

Surgical trepanation (craniectomy or craniotomy) is present on right posterior parietal/occipital border. Trepanation is complete with bone plug present. Diameter of the bone plug measures 17mm, while diameter of circular defect is 20mm. This surgical defect is not associated with any cranial fracture or trauma. There are no signs of healing or bone reaction present, indicating this surgical procedure was performed in the perimortem or postmortem period.

Trauma: None

No trauma was observed on Burial 31.

Dental Inventory and Oral Health

The maxilla is fragmented, although mostly complete and the mandible is present and complete. Teeth #1 and 5 are missing antemortem tooth #10 is missing postmortem from the maxillary dentition. Teeth #19, 30, and 31 are missing antemortem with complete resorption from the mandibular dentition. Extreme dental wear is noted on the maxillary and mandibular anterior dentition. Extensive dental caries, some with complete crown destruction, are noted on Burial 31.

Tooth #3 has a carious pit on the disto-occlusal surface. Tooth #4 displays carious lesions on the mesial interproximal crown and cervical root. Tooth #7 has mesial interproximal caries near the occlusal surface, #8 and #9 both exhibit mesial and distal interproximal caries that is also apparent on the labial surface. Tooth #11 has mesial interproximal caries. Teeth #12–14 have carious lesions with complete crown destruction with observed periapical abscessing on #13 and 14. Teeth #18, 25, 26, and 28 have complete crown destruction from caries with roots still present. Tooth #29 presents a periapical abscess. Hypercementosis of the root is noted on tooth #14. Hypoplasias are noted on teeth #22 and 27. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 3.0–3.1 years of age.

Burial 32

General Description

This skeleton represents an infant between $7.5 \pm .18$ to $10.5 \pm .24$ months of age at death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 32 are fragmentary, with high fragmentation in the region of the craniofacial complex, thorax, pelvis, and long bones. Although the remains are fragmentary, the deciduous dentition was available for analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 32 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 32 has no complete long bones.

Age: 7.5 ± 0.18 to 10.5 ± 0.24 months

For juvenile remains, age is estimated from the eruption and development of the available deciduous and permanent dentition. The deciduous dentition for Burial 32 was mostly complete, allowing for age estimation from the developed crowns. Using the methods outlined by AlQahtani, et al. (2010), development of the deciduous dentition was noted. All available deciduous crowns were fully complete. Root formation was present on the maxillary and mandibular incisors; however, the roots were broken post-mortem. Based on the crown formation of the deciduous teeth, Burial 32 is estimated as $7.5 \pm .18$ to $10.5 \pm .24$ months of age at death.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 32 has no permanent teeth for an estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 32 is undetermined.

Skeletal Pathology: None

No pathologies were observed on Burial 32.

Trauma: None

No trauma was observed on Burial 32.

Dental Inventory and Oral Health:

The maxilla and mandible are not present and were lost postmortem. The dentition is mostly complete and represented by deciduous teeth. Teeth C, F, M, and R are missing postmortem, the remainder are present and in the developmental process. Teeth A, B, I, J, K, and T are characterized by crowns that are 3/4 complete. Tooth G's crown is 1/2 complete. Teeth L and S have complete crowns. Teeth E, N–R have roots that are 1/4 complete. No dental caries or other pathologies are noted on Burial 32.

Burial 33

General Description

This skeleton represents an infant between 20–36 intrauterine weeks old at time of death, with an indeterminant sex, biological affinity, and stature.

Inventory and Condition of Remains

The remains of Burial 33 are highly fragmentary. The deciduous dentition is also highly fragmentary; however, some small tooth crown fragments remain for analysis.

Minimum Number of Individuals: One

The skeletal remains of Burial 33 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 33 has no complete long bones.

Age: 20–36 weeks intrauterine

Due to the extreme fragmentation of Burial 33, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to two fetal donors, one which was 27 weeks intrauterine and another which was 36 weeks intrauterine. The pars petrosa of Burial 33 was slightly smaller than the 27-week intrauterine fetal donor. Therefore, a broad age range of 20–36 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 33 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

Because of the fragmentation of the remains and lack of available stature techniques for subadult remains, stature for Burial 33 is indeterminant.

Skeletal Pathology: None

No pathologies were observed on Burial 33.

Trauma: None

No trauma was observed on Burial 33.

Dental Inventory and Oral Health

The dentition is represented by Teeth E, F, O, and P (deciduous maxillary and mandibular left and right central incisors). No roots are present and the teeth are represented by crowns only, in the process of development. The right maxillary central incisor crown is 3/4 complete in development, as is the mandibular left central incisor. The remainder of tooth crowns are too fragmented to assess crown development. No pathologies or lesions are noted.

Burial 34

General Description

This mostly complete skeleton represents a Mexican male between 20.9 to 48.2 years of age at death, with a stature of approximately 5'2" to 5'8". Schmorl's nodes are located on two thoracic vertebrae.

Inventory and Condition of Remains

The remains of Burial 34 are incomplete, with high fragmentation in the areas of the craniofacial complex, thorax, and pelvis. Although the proximal and distal ends of the long bones are fragmentary, most of the limbs were used in analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 34 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Sex was estimated based on observation of nonmetric pelvic traits, postcranial metrics, and statistical evaluation of cranial nonmetric traits. The only portion of the pelvis available for sex estimation was the sciatic notch, which was assessed based on qualitative features outlined in Buikstra and Ubelaker (1994). The sciatic notch suggests probable male based on a narrow width.

Following Spradley et. al (2015), postcranial sectioning points for Mexican Hispanics were used to estimate sex. Only one measurement was available, the tibial maximum diameter at the nutrient foramen with a classification accuracy of 80% (see Table 17) suggesting that Burial 34 is male.

Using Walker (2008), sex was estimated from fragments of the cranium, including the nuchal crest (score=1), mastoid process (score=3), the supra-orbital margin (score=2), glabella

(score=2), and the mental eminence of the mandible (score=4). Walker (2008) uses discriminant function analysis to estimate sex based on features of the skull. Using the mental eminence and mastoid, the Walker method provides an 85% probability of male. Additionally, using the supra-orbital margin and mental eminence, the method provides an 82% probability of male.

Based on methods presented by Walker (2008), Spradley, et al. (2015), and found in Buikstra and Ubelaker (1994), the estimated sex for Burial 34 is male.

Table 17: Univariate sex estimation of Burial 34

Measurement	Sectioning Point	Burial 34	Classification Accuracy (%)	Estimated Sex
Tibia max. diameter nutrient foramen	31	38	83	Male

Age: 20.9–48.2 years

Due to the fragmentation to the skeletal remains, only the right and left auricular surfaces, and three sutures, the coronal pterica, sagittal obelica, and lamdoidal asterica, were available for age estimation analysis. All characteristics were scored as outlined in Milner and Boldsen (2016). The auricular surface topography displayed a median elevation and/or was flat to irregular. The auricular surface morphology was flat and/or bumpy. The inferior surface texture was smooth on the right side, Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. All of the cranial sutures on Burial 34 were juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 34 is estimated to be 20.9 to 48.2 years of age at death, with a maximum likelihood (point estimate) of 31.8 years.

There are no signs of osteoarthritis or degenerative changes suggesting that Burial 34 is most likely closer in age to the point estimate.

Biological Affinity: Mexican

Although the cranium of Burial 34 was fragmented, a total of eight measurements were available for analysis: ASB, AUB, FRC, GOL, NOL, OCC, PAC, and XCB. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 75.6% of the time, greater than chance alone. Burial 34 is most similar to the Mexican group with a posterior probability of 0.757 and a typicality of 0.844. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Ousley and Jantz, 2005:96).

Due to the number of available craniometric variables, the overall classification rate of reference groups, and the posterior and typicality probabilities are both strong. The overall group membership for Burial 34 is estimated as Mexican and represents a strong classification.

Stature: 5'2" to 5'8"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements. However, the only measurement available for estimation of stature was calcaneus length (83 mm). Calcaneus length was entered into FORDISC and referenced against the 19th Century Cadaver Statures for “any” group. The calcaneus correlated with stature and provided an R-square value of .257. Stature is estimated as 62.7 to 70.4 inches or 5’2” to 5’8”.

Skeletal Pathology: Schmorl’s nodes

Schmorl’s node are noted on two thoracic vertebral bodies.

Trauma: None

No trauma was observed on Burial 34.

Dental Inventory and Oral Health

The maxilla is fragmented, and the mandible is complete. Tooth #1 was lost antemortem or congenitally missing. Tooth #19 was lost antemortem with full resorption. The remainder of the dentition is present and fully developed, with the exception of tooth #16 which is fully developed but not in occlusion. Wear is minimal on the entire dentition with the most wear on the anterior dentition. The crown of tooth #3 was destroyed by a carious lesion, only roots are present. Periodontal abscessing is also noted on teeth #3, 4, and 5. Minimal dental calculus is noted on the posterior dentition. Linear enamel hypoplasias are noted on teeth #6, 7, 22, and 25–27 and a linear vertical groove is also noted on tooth #22. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 1.7–3.69 years of age.

Burial 35

General Description

This highly fragmentary skeleton represents a White, probable male of middle to adult age at time of death.

Inventory and Condition of Remains

The remains of Burial 35 are severely fragmented throughout the entire skeleton. Most skeletal elements were missing or highly fragmentary, making much of the analyses for the biological profile undetermined. The cranium was not able to be reconstructed, but much of the mandibular and maxillary dentition were present and complete.

Minimum Number of Individuals: One

Although the skeleton is highly fragmentary, the remains of Burial 35 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Probable Male

The pelvis is the best estimator of sex, followed by the postcranial skeleton and lastly the skull. Due to highly fragmentary remains, sex was estimated using available features of the cranium. Using Walker's (2008) statistical assessment of nonmetric cranial traits, including the mastoid process (score=3), the supra-orbital margin (score=2), and the mental eminence of the mandible (score=3), Burial 35 is most likely male. Using the mental eminence and mastoid, the Walker (2008) method provides an 85% probability of male. Further, using the supra-orbital margin and mental eminence, the method provides an 82% probability of male.

Based on the three observations of cranial traits, Burial 35 is a probable male.

Age: Middle to Older Adult

There were no auricular surfaces, pubic symphyses, or cranial sutures present for age estimation. The skeletal elements present appear to be from a fully fused adult. The third molars were examined for root development, however, the apices of tooth #1 are unobservable due to taphonomic damage. Because of the fragmentation of the remains, no further precise age estimation is possible.

Biological Affinity

Broad Estimation: Probable European

Narrow Estimation: Probable White

Metric and nonmetric statistical analysis of the cranium was not possible due to the fragmentation and incompleteness. Therefore, dental metric analysis was utilized for a broad biological affinity estimation. A total of six teeth were available for analysis. A freely available GUI provided by Kenyhercz, et al. (2019) with a global, although continental data set, was utilized for the estimation. The reference groups consisted of global European, African, and Asian samples and correctly classified 97.4% of the time. The results suggest that Burial 35 is most similar to the European group with a 0.69 posterior probability followed by Asians, with a 0.30 posterior probability. Although Burial 35 classified as European, there are three groups listed in the Oakwood Chapel Cemetery: Black, White, and Mexican. Because individuals considered White have European ancestry, Burial 35 is considered White.

Although the reference groups classify correctly at a high percentage, the posterior probability is below 75%, therefore both the broad and narrow estimations are considered probable.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on the available skeletal material.

Trauma: None

No trauma was observed on Burial 35.

Dental Inventory and Oral Health

The maxilla is highly fragmentary and incomplete and the mandible is fragmentary represented by the left and right bodies. The majority of the dentition is present for Burial 35 and all teeth are fully developed. Teeth #2–4, 8–10, and 14–16 are missing with no associated alveolar bone. Teeth #23–25 are also missing, however, fragmentary alveolar bone is present and it is not possible to determine if these teeth were lost antemortem or postmortem. Burial 35 exhibits little to moderate wear although generalized, severe periodontitis is noted. Additionally, the roots of all teeth present have heavy accretions of calculus. The advanced state of periodontal dental disease must have been long-standing and painful as there is no evidence of any dental treatment. Dental caries are noted on tooth #1, in the mesial cemento-enamel junction, and on tooth #19 on the occlusal surface in the form of a pit. Linear enamel hypoplasias are documented on teeth #8, 22, and 27. Using the Cares Henriquez and Oxenham (2019) method, measurements of the hypoplasias indicate that age at formation occurred between 2.7–4.29 years of age.

Burial 36

General Description

This mostly complete skeleton represents a Black male between 20.2 to 28.4 years of age at death, with a stature of approximately 5'2" to 5'7". A Schmorl's node is located on one unsequenced thoracic vertebrae.

Inventory and Condition of Remains

The remains of Burial 36 are mostly complete, with high fragmentation in the areas of the craniofacial complex and thorax. Although the long bones were fragmented post-mortem, many measurements were attained and used in the skeletal analysis. Cranial reconstruction allowed for biological affinity estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 36 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Sex was estimated based on observation of pelvic features, statistical analysis of postcranial measurements, and cranial nonmetric traits. Despite fragmentation of the pelvis, the greater sciatic notch and ischiopubic ramus ridge were available for analysis. Using the sciatic notch and the definitions in Buikstra and Ubelaker (1994), this trait is in between narrow and wide, the ischiopubic ramus ridge is narrow, and a ventral arc is present although small. The combined indicators suggest ambiguity in the pelvic traits.

For postcranial sex estimation, multivariate discriminant function formulae for American Blacks (Spradley and Jantz 2011) were used in lieu of sectioning points. Multivariate formulae are preferred over sectioning points, and Burial 36 had enough complete measurements for two discriminant function (DF) formulae using the clavicle and humerus. For DF scores, values

above zero are estimated male and values below zero female. DF scores for the clavicle and humerus for Burial 36 were above zero (see Table 18) providing a sex estimate of male.

Using Walker (2008), sex was estimated from fragments of the cranium, including the nuchal crest (score=3), mastoid process (score=3), the supra-orbital margin (score=2), and the mental eminence of the mandible (score=4). Walker (2008) uses discriminant function analysis to estimate sex based on features of the skull. Using the mental eminence and mastoid scores, the Walker method provides an 85% probability of male.

Based on methods presented by Spradley and Jantz (2011) and by Walker (2008), the estimated sex for Burial 36 is male.

Table 18: Multivariate sex estimation for Burial 36

Bone	Score	Classification Accuracy (%)	Estimated Sex
Clavicle	2.95	93.8	Male
Humerus	14.18	93.4	Male

Age: 20.2–28.4 years

Due to the fragmentation to the skeletal remains, only the right and left auricular surfaces, a small portion of the left pubic symphysis, and the sagittal obelica suture were available for age estimation analysis. All characteristics were scored as outlined in Milner and Boldsen (2016). The dorsal symphyseal margin of the left pubic symphysis was serrated. The auricular surface topography was flat to irregular. The auricular surface morphology was less than one-third covered by billows or flat. Cranial sutures were scored as to whether they were open, fused, partially fused or completely obliterated. The cranial sutures on the sagittal obelica of Burial 36 were open or juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 36 is estimated to be 20.2 to 28.4 years of age at death, with a maximum likelihood (point estimate) of 20.2 years.

There are no signs of osteoarthritis or degenerative changes and the flake on the left medial clavicle was partially fused, while the flake on the right medial clavicle was unfused. Based on the fusion of the medial clavicle, Burial 36 is most likely closer in age to the point estimate.

Biological Affinity: Black

Although the cranium of Burial 36 was fragmented, a total of eight measurements were available for analysis: FMB, FRC, FRS, GOL, MDH, PAC, PAS, WMH, and XCB. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexican reference groups. The reference groups correctly classified 73.5% of the time, greater than chance alone. The results suggest that Burial 36 is most similar to the 19th Century American Blacks with posterior probabilities of 0.946 and a typicality of 0.915. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference

groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005).

Based on the overall reference group classifications, the posterior probability and typicality, Burial 36 is estimated as American Black and is considered a strong classification.

Stature: 5'2" to 5'7"

Stature was estimated using FORDISC 3.1 (Jantz and Ousley 2005) and all available postcranial measurements and the 19th Century Black male group as a reference. The measurement with the highest correlation to stature was humeral length, with an R-square of 0.670. Using the humeral length measurement, the stature for Burial 36 is estimated between 62.2 to 68.2 inches or 5'2" to 5'7".

Skeletal Pathology: Schmorl's node

A Schmorl's node is located on one unsequenced thoracic vertebral body.

Trauma: None

No trauma was observed on Burial 36.

Dental Inventory and Oral Health

The maxilla is highly fragmentary, and the mandible is mostly complete, although fragmentary. Tooth #19 is missing antemortem with full resorption. Tooth #32 is missing antemortem or congenitally absent. Tooth #3 is partially erupted, with the root 1/2 complete, but not in occlusion and the crown is rotated lingually. Tooth #1 exhibits a 1/2 closed root apex. Tooth #30 has a carious lesion that has destroyed the majority of the mesial half of the crown. The anterior dentition is crowded with tooth #10 occluded on the lingual surface of tooth #9. Moderate calculus is present on the entire dentition with heavy calculus accretions on the right posterior dentition, especially on the buccal surface. Burial 36 exhibits minimal dental wear. Hypoplasias are present on teeth #7, 10, and 11. Using the Cares Henriquez and Oxenham (2019) method, measurement of the hypoplasia on tooth #11 indicate that age at formation occurred at approximately 2.8 years of age.

Burial 37

General Description

This partially complete skeleton represents a probable male, between 74.3 to 91.3 years of age at death.

Inventory and Condition of Remains

The remains of Burial 37 are partially complete, with high fragmentation in the region of the thorax, pelvis, tibiae and fibulae. Proximal and distal epiphyses of the long bones are fragmentary; however, the femoral heads remain in good condition and were used in the analyses. The cranium was reconstructed after cleaning, but the majority of the craniofacial complex was highly fragmentary, making it difficult to reconstruct. Adult maxillary and

mandibular dentition were available for dental analyses, but the teeth exhibit extremely heavy wear. Additionally, the skull and a small fragment of the greater sciatic notch were used for sex estimation.

Minimum Number of Individuals: One

The skeletal remains of Burial 37 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Sex was estimated based on the greater sciatic notch, postcranial metrics, and statistical evaluation of the non-metric traits of the skull. The greater sciatic notch was narrow (score=4) indicating a probable male (Buikstra and Ubelaker 1994).

Because only one trait from the pelvis was available, postcranial sex estimation was assessed using sectioning points for femoral head diameter for American Blacks, American Whites, and

Hispanics from Spradley and Jantz (2011) and Spradley, et al. (2015), as biological affinity estimation was indeterminant. Postcranial sectioning points are all suggestive of male.

Table 19: Univariate sex estimation of Burial 37

Measurement	Sectioning Point	Burial 37	Classification Accuracy (%)	Estimated Sex	Group
Femur head	44	51	86	Male	Black
Femur head	45	51	88	Male	White
Femur head	40	51	88	Male	Hispanic

To strengthen the overall sex estimation, non-metric traits of the skull were used following the descriptions in Walker (2008). Walker uses discriminant function analysis to estimate sex based on features of the skull and gives a posterior probability. The mastoid was large and rugose (score=4) and the mental eminence (score=3) and nuchal crest (score=3) are medium in size. The orbital thickness had the lowest score of all the cranial traits (score=2). Using the mental eminence and mastoid scores, the Walker method provides an 96% probability of male.

Based on methods provided by Buikstra and Ubelaker (1994), Spradley and Jantz (2011), Spradley, et al. (2015) and Walker (2008), the estimated sex for Burial 37 is male.

Age: 74.3–91.3 years

Due to the fragmentation of the remains, only the cranial sutures were available for transition analysis, therefore, they were the primary indicators evaluated for age estimation. Multiple features of the cranial sutures were scored, following descriptions outlined in Milner and Boldsen (2016). Cranial sutures were scored as to whether they were open, fused, partially fused, or completely obliterated. Coronal pterica was punctuated, sagittal obelica was obliterated, and the left zygomaticomaxillary suture was juxtaposed.

Suture scores were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 37 is estimated to be 74.3–91.3 years of age at death, with a maximum likelihood (point estimate) of 74.3 years.

Biological Affinity: Indeterminant

Due to the fragmentation of the skeletal elements, biological affinity estimation is not possible.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Trauma: None

No trauma is observed on Burial 37.

Skeletal Pathology: None

Burial 37 is fragmented with cortical destruction that obscures identification of potential pathological features; none noted on identifiable fragments.

Dental Inventory and Oral Health

The maxilla is highly fragmentary, and the mandible is complete with some postmortem alveolar destruction. The present dentition is fully developed, heavily worn, fragile, and friable. Teeth #1–3, 12, and 19 are scored as unobservable there is no associated alveolar bone. Teeth #4 and 6 are missing postmortem and the alveolar socket for teeth #4 and 5 exhibit periodontal abscessing with active resorption. Teeth #31 and 32 are missing antemortem with full alveolar resorption. Tooth #30 exhibits periodontal abscessing with destruction of the majority of the alveolar socket. The dentition exhibits extreme wear, with facial rollover wear present on tooth #15. Maxillary anterior dentition has extreme wear on entire lingual surface. Tooth #16's crown is fractured, perimortem, on the distal 1/2 of the tooth. Tooth #14 is represented by only one facial root. No hypoplasias are noted. The mandibular condyles display temporomandibular joint disease with moderate to extreme erosion and destruction of the condyles and cortical bone.

Burial 38

General Description

This fragmentary skeleton represents a Mexican male between 17.8 to 82.1 years of age at death.

Inventory and Condition of Remains

The remains of Burial 38 are incomplete, with high fragmentation in the regions of the thorax, pelvis, and craniofacial complex. Much of the skeleton is unavailable for analyses, however, the maxillary and mandibular dentition were present for some analyses. Cortical flaking is present on the long bones.

Minimum Number of Individuals: One

The skeletal remains of Burial 38 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Male

Due to the high fragmentation of the pelvis and cranium, sex was estimated from post-cranial elements for Hispanics following Spradley, et al. (2015). However, there were no complete elements available for the multivariate equations. Therefore, univariate sectioning points were used from available measurements from the femur and tibia (see Table 20). Values above the sectioning point are considered male, while values below the sectioning point are considered female. Using sectioning points with classification rates of 83% and above, Burial 38 is estimated to be male.

Further, sex was estimated based on non-metric assessment of the skull following Walker (2008). The nuchal crest was rugose, indicative of male (score=5), and the mental eminence was ambiguous (score=3). Based on the postcranial metrics, cranial nonmetric trait scores, and the overall size and robusticity of the postcranial remains, Burial 38 is estimated as male.

Table 20: Univariate sex estimation of Burial 38

Measurement	Sectioning Point	Burial 38	Classification Rate (%)	Estimated Sex
Femur Maximum Diameter of Head	40	45	88	Male
Tibia A-P Diameter of Nutrient Foramen	31	40	83	Male

Age: 17.8–82.1 years

Due to the fragmentation of the skeletal remains, only the right auricular surface and the sagittal obelica suture were available for age estimation analysis. All characteristics were scored as outlined in (Milner and Boldsen 2016). Slight billowing is seen on the right auricular surface. The cranial sutures on Burial 38 were juxtaposed.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 38 is estimated to be 17.8 to 82.1 years of age at death, with a maximum likelihood (point estimate) of 39.2 years.

The skeleton remains are fully fused and there are no signs of osteoarthritis or other degenerative changes suggesting Burial 38 is most likely closer in age to the point estimate.

Biological Affinity: Mexican

The cranium of Burial 38 was highly fragmented and only four measurements from the vault were available for analysis: OCC, OCS, PAC, and PAS. These measurements were entered into FORDISC 3.1 (Jantz and Ousley 2005) using a custom discriminant function with 19th Century American Black and White and 20th Century Mexicans reference groups. The reference groups correctly classified 63.2% of the time, greater than chance alone. The results

suggest that Burial 38 is most similar to the Mexican group with a posterior probability of 0.959 and a typicality of 0.875. The posterior probability indicates the probability of group membership based on the assumption that the unknown is from one of the reference groups. The typicality indicates how likely it is that the unknown belongs to any of the reference groups (Jantz and Ousley 2005).

The overall reference group classification is above random chance, although below 75% and based only on four cranial measurements. However, the classification for the Mexican group is 83%, therefore the four measurements separate the Mexican group from 19th Century American Blacks and Whites. Though, based on the overall reference group classifications, the posterior probability and typicality, Burial 38's classification of Mexican is rated as moderate.

Stature: Indeterminant

Due to the fragmentation of the remains, stature estimation is not possible.

Skeletal Pathology: None

No pathologies were observed on Burial 38.

Trauma: None

No trauma was observed on Burial 38.

Dental Inventory and Oral Health

The maxilla and mandible are fragmentary. Teeth #1, 3, 5, 11, 16, 28, and 29 were scored as unobservable as they are not present and no associated alveolar bone is present. Teeth #18 and 19 are missing postmortem and tooth #30 was lost antemortem. All teeth present are fully developed with minimal wear. Teeth #8 and 9 have complete crown destruction from dental caries. Tooth #17 has an occlusal carious pit. Tooth #21 has distal carious lesion that has destroyed 1/4 of the distal surface. Tooth #32 has a carious lesion on the disto-facial surface that has destroyed 1/2 of the surface. Mild calculus is present and no hypoplasias are noted.

Burial 39

General Description

This skeleton represents a highly fragmentary perinatal individual aged at 36–50 weeks intrauterine at death.

Inventory and Condition of Remains

The remains of Burial 39 are highly fragmentary, especially in the region of the cranium, thorax, and long bones. Because of the fragmentation of the remains, many elements were unidentifiable. From the cranium, only the right parietal and the pars petrosa for right and left sides were available for analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 39 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Indeterminant

Secondary sexual characteristics that are detectable in the skeleton do not appear until puberty. Long bone lengths have recently been shown to provide reliable estimations of sex in juveniles, however, Burial 39 has no complete long bones.

Age: 36–56 intrauterine weeks

Due to the extreme fragmentation of Burial 39, only the pars petrosa of the temporal were available for age estimation. Size and formation of the pars petrosa were compared to a fetal donor which was aged at 36 weeks intrauterine. The pars petrosa of Burial 39 was slightly larger than the fetal donor. Therefore, a broad age range of 36–56 weeks intrauterine was estimated.

Biological Affinity: Indeterminant

Currently, it is not considered good practice to estimate biological affinity of subadults. While it is possible to get a broad-based biological affinity estimation using dental metrics from the permanent dentition, Burial 33 only has too few permanent teeth for a reliable estimation attempt.

Stature: Indeterminant

There are currently no methods for estimating the stature of subadult remains.

Skeletal Pathology: None

No pathologies were observed on Burial 39.

Trauma: None

No trauma was observed on Burial 39.

Dental Inventory and Oral Health

There are not teeth available for inventory or analysis.

Burial 40

General Description

This skeleton represents a probable adult White male between 48.8 to 91.2 years of age at death.

Inventory and Condition of Remains

The remains of Burial 40 were found while drilling for a pier in the Oakwood Cemetery Chapel. The remains are incomplete, with high fragmentation in the region of the skull and thorax. Proximal and distal epiphyses of the long bones, the cranium, and mandible could not be

reconstructed. However, a mostly complete set of adult maxillary and mandibular dentition were available for dental analyses.

Minimum Number of Individuals: One

The skeletal remains of Burial 40 represent one individual. All elements present are consistent in terms of size, development, articulation, and taphonomic history. There are no duplicated elements.

Sex: Probable Male

Because the skull and pelvis are mostly fragmentary, sex was estimated using the greater sciatic notch on the left side. The sciatic notch is narrow (score=5). Because of the small width of the greater sciatic notch, the sex estimation for Burial 40 is estimated as probable male.

Because only one trait was observable from the pelvis, postcranial sex estimation formulae for American Whites (Spradley and Jantz 2011) was used to provide an additional sex estimate. Single measurements from the femur, humerus, and tibia were utilized (see Table 21).

Table 21: Univariate sex estimation of Burial 40

Measurement	Sectioning Point	Burial 40	Classification Rate (%)	Estimated Sex
Femur Maximum Head Diameter	45	49	88	Male
Humerus Epicondylar Breadth	60	62	87	Male
Tibia Circumference at Nutrient Foramen	92	87	81	Female

The femur head diameter and humerus epicondylar breadth provided estimates of males with reported classification rates of 87% and 88%, however, the tibial circumference suggests female at 81% accuracy. Based on the sciatic notch morphology, femur and humerus measurements, Burial 40 is considered a probable male.

Age: 48.8–91.2 years

Due to the fragmentation of the skeletal remains, only the right and left auricular surfaces were available for age estimation. However, both right and left sides of the auricular surface have slight cortical damage. Numerous features of the right and left sides of the auricular surface were scored, such as morphology and topography following descriptions outlined in Milner and Boldsen (2016). Topography traits were flat or irregular, and morphology was also flat.

All traits were entered into the ADBOU (Boldsen, et al. 2002) program. Burial 40 is estimated to be 48.8–91.2 years of age at death, with a maximum likelihood (point estimate) of 76.8 years.

There is no osteoarthritis or degenerative changes on the skeleton. Additionally, the first sacral segment, which is fragmentary, has a youthful appearance on the anterior promontory. Further, a fusion line for the distal right radius is still visible on the bone at the ulnar notch, suggesting an age range on the lower end of the estimate.

Biological Affinity**Broad Estimation:** Probable European**Narrow Estimation:** Probable White

Due to the high fragmentation of the cranium, there are no cranial measurements or nonmetric traits for statistical biological affinity estimation. Therefore, dental metrics, using a global data set in conjunction with random forest classification, were used to provide a broad-based geographic ancestry estimation using a freely available GUI provided by Kenyhercz, et al. (2019). The program contains African, European, and Asian reference groups and Burial 18 was compared to all reference groups with pooled sex. The analysis suggests that Burial 40 is most similar to Europeans with a posterior probability of 0.61, followed by Asians with a posterior of 0.37. The results suggest that the individual is more similar to Europeans than Asians and is not similar to Africans.

The overall reference groups classification was 97.6%, well above random chance. However, the posterior probability is less than 75%. Therefore, both the broad and narrow estimations should be considered probable.

Stature: Indeterminant

Due to the fragmentation of the skeletal elements, stature estimation is not possible.

Skeletal Pathology: None

See Trauma section below.

Trauma:

Burial 40 exhibits a complete fracture to the distal third of the right ulnar shaft. The fracture exhibits healing and callous formation, although with non-union at the fracture site. General periosteal formation and reaction is also noted. Internally, the medullary cavity is infiltrated by the additional bone growth.

Dental Inventory and Oral Health

The maxilla is not present and only a fragment of the mandible is present. All teeth are present and fully developed with the exception of tooth #4, which was scored as unobservable as the tooth is missing and there is no associated alveolar bone. Minimal wear is present on the dentition and generalized calculus is present on majority of dentition, more markedly on the posterior dentition. Slight to moderate wear is noted on the anterior and posterior dentition, with the exception of the maxillary and mandibular second and third molars. No dental caries are present. Hypoplasias are present on tooth #6, 7, 22, and 27. Using the Cares Henriquez and Oxenham (2019) method, measurement of hypoplasias on teeth #6, 22, and 27, indicate that age at formation occurred at approximately 2.85–3.62 years of age.

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