

**Reconstruction of Worth Street from Hudson Street to Park Row,
Borough of Manhattan, New York County, New York project
(Federal Project: X759.19.321, NYC Project: HWMWTCA7E, PIN:
8502015HW0028C, and NY SHPO Project: 11PR04244)**



Prepared for
ATANE Construction
40 Wall Street,
New York, NY 10005

City of New York Department of Design and Construction

City of New York Landmarks Preservation Commission

Prepared by
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Edited by
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Christopher Ricciardi, Ph.D., R.P.A.
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December 2020

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EXECUTIVE SUMMARY TABLE

New York SHPO Project Review Number:	11PR04244
Involved City/State/Federal Agencies:	New York State Office of Parks, Recreation and Historic Preservation City of New York - Landmarks Preservation Commission
Phase of Survey:	Phase IB (Field Monitoring)
Location Information:	Worth Street, from Hudson Street to Park Row, New York, New York County, New York
Survey Area:	n/a
USGS 7.5 Quad Map:	Jersey City, NJ Quadrangle (2016)
Archaeological Survey Overview:	The APR was highly disturbed from repeated construction episodes – although small pockets of pre-twentieth century remains exist, all were disturbed. No further testing within this specific APE is recommended
Sensitivity Assessment:	Low sensitivity for intact cultural resources
Results of Architectural Survey:	
Buildings within Project Area:	n/a
Buildings adjacent to Project Area:	n/a
Previous N/R Buildings:	n/a
Eligible N/R Buildings:	n/a
Report Authors:	Alyssa Loorya, Ph.D., R.P.A. Alexander Agran
Report Editors:	Lisa Geiger, MA, R.P.A. Christopher Ricciardi, Ph.D., R.P.A.
Date:	November 2020

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I. INTRODUCTION

ATANE Design and Construction Consultants (ATANE), formerly HAKS Engineering, contracted with Chrysalis Archaeological Consultants, Inc. to provide all Cultural Resource Management (Archaeological) services for the Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York project (Federal Project Number: X759.19.321, NYC Project Number: HWMWTCA7E, PIN: 8502015HW0028C, and NY SHPO Project Number: 11PR04244) (Worth Street Project), on behalf of the City of New York – Department of Design and Construction (NYC DDC). This Phase IB report presents the results of Archaeological Monitoring of construction activities from October 2018 through March 2020.

The Project Area as established by NYC DDC covers the Worth Street roadbed and sidewalks from Hudson Street east to Park Row (Map 1). The Area of Potential Effect (APE) includes Worth Street's roadbed and sidewalks from its intersection with Centre Street to its intersection with Mott Street. A Project Area extension was added after the initial 2013 HPI Phase IA assessment to extend the APE north across Mulberry Street to between Mosco and Bayard Streets, continuing east down Mosco Street to Mott Street (Map 2). The City of New York – Landmarks Preservation Commission (NYC LPC) established the APE based on portions of the Project Area deemed archaeologically sensitive (HPI 2013). Chrysalis followed the Archaeological Work Plan (AWP), approved November 15, 2018, to employ Archaeological Monitoring during excavation within archaeologically sensitive areas (see Appendix B). Construction began in 2016 in areas deemed not archaeologically sensitive.

The purpose of the Project is to upgrade Worth Street utilities and replace the existing roadway and parts of the sidewalk. Work included the installation of a new 36-inch steel water main, installation of new catch basins to meet existing combined sewers, installation of a section of new sewer, and roadbed and sidewalks reconstruction. Excavation occurred curb-to-curb at the roadway surface to facilitate its reconstruction but extended deeper below the road base to various depths based upon the routes of existing and new utilities installed as part of the project.

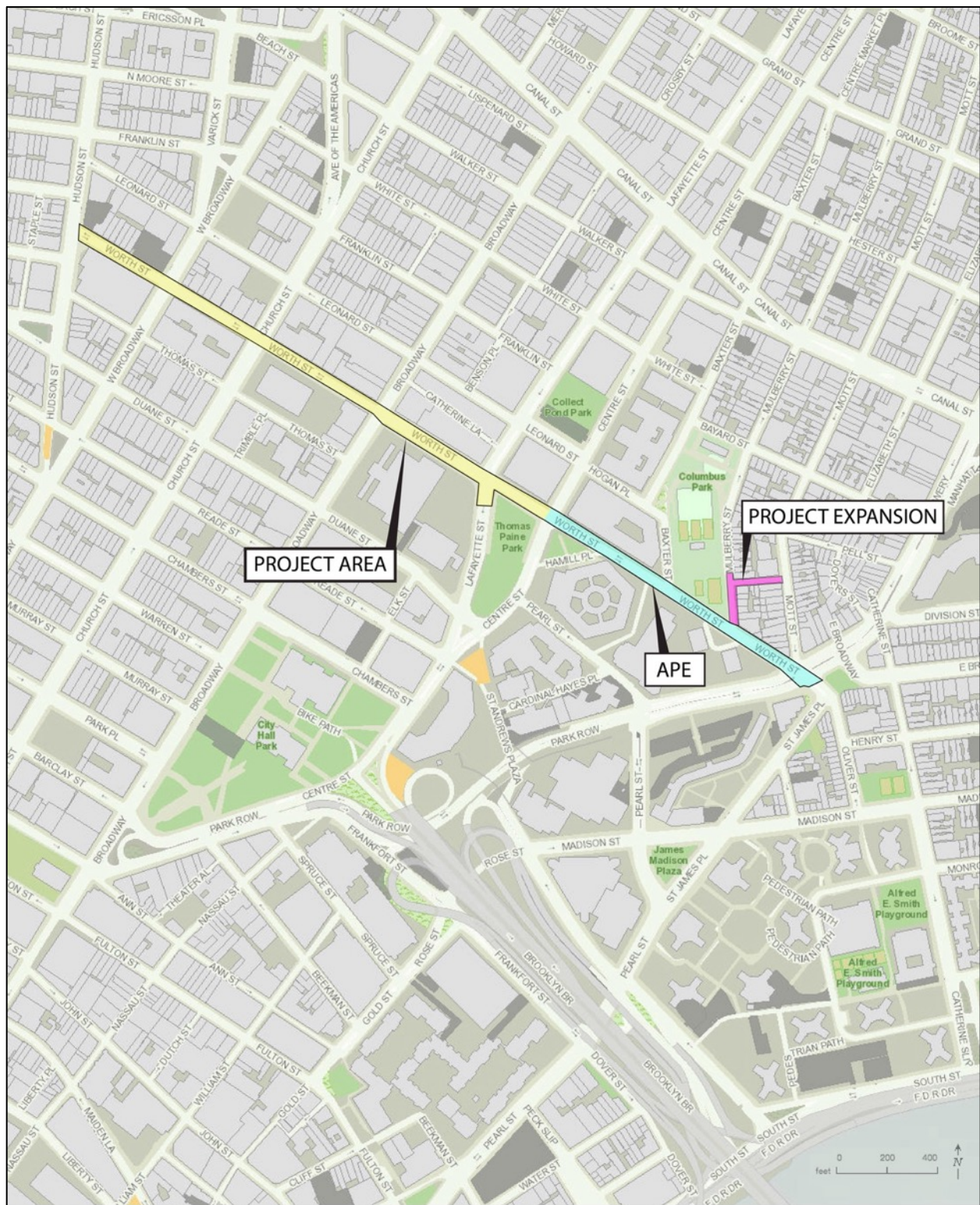
The Phase IB investigations summarized in this report were designed to determine the presence/absence of archaeological resources within the APE and to assess whether they, if found, would be adversely affected by project construction plans. The ultimate goal of the investigation was to determine whether significant (i.e. National Register eligible) resources were present in the APE and to provide mitigation recommendations if necessary.

Between October 2018 and March 2020, a total of 25 trenches were excavated via backhoe and by hand on Worth Street and Mulberry Street between Centre Street and St. James Place. A total of 28 archaeological features were identified. Of these, 11 were previously impacted mortared brick piers from the ca. 1870 through early twentieth century trolley line on Worth Street. The 17 additional features represented disturbed portions of previously razed and infilled stone and brick substructure walls, defunct utility boxes, and one partially exposed brick shaft. No undisturbed historic contexts were uncovered, as utilities were encountered from curb to curb, at depths ranging from 7'2" bgs to 12' bgs depending on depth of excavation. Soils encountered were primarily loamy sand fills. Artifacts from 36 contexts were collected and processed but deemed to have originated from disturbed contexts with little research value; these were culled after analysis (Appendix A). No additional archaeological investigation is recommended for the project.

Alyssa Loorya, Ph.D., R.P.A., President, served as Principal Investigator, Alex Agran served as Field Director, and Caitlin Welks served as Field Technician for this project. The report was edited by Lisa Geiger, M.A., R.P.A. and Christopher Ricciardi, Ph.D., R.P.A.



Map 1: USGS – Jersey City, NJ Quadrangle (United States Geological Survey 2016).



Map 2: Project area map, area of archaeological sensitivity (APE) highlighted in blue, and the 2018 expanded area highlighted in pink. New York City Tax Map (Department of Finance 2018).

PROJECT INFORMATION

Project Name	Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York (Federal Project Number: X759.19.321, NYC Project Number: HWMWTCA7E, PIN Number: PIN: 8502015HW0028C and NY SHPO Project Number: 11PR04244)
Street Address	N/A (see Project Area Map 2)
Borough/Block/Lot	Manhattan (Block and Lot not applicable)
LPC PUID (If Yet Assigned)	
Applicant Name	ATANE Design and Construction Consultants and MFM Contracting
Lead Agency (Contact Person)	City of New York – Department of Design and Construction
Principal Investigator	Alyssa Loorya, Ph.D., R.P.A.
Field Director	Alex Agran

II. SYNTHESIS OF PREVIOUS WORK

The APE is located in Lower Manhattan, just north of the city's seventeenth century core area and the town Commons (now City Hall Park). The APE's development history dates to at least as early as the beginning of the eighteenth century, although it was possibly utilized as seventeenth century farmland or grazing land and inhabited by indigenous peoples before European colonization. Numerous archaeological sites and historic resources have been previously identified and investigated within a 1-mile radius of the APE (Table 1).

Table 1: Documented archaeological sites within 1 mile of APE (HPI 2013).

NYSM or NYSOPRHP Site Number	Site Name/Description	Location	Site Type/Time Period
NYSM 4059	Shell Point	Near Canal St.	Unknown Precontact
NYSM 4060	N/A	Lower East Side vicinity	Unknown Precontact
A06101.006981	Pearl Street, Worth Street, Five Points Area	Straddles Cardinal Hayes Plaza between Pearl and Worth Streets	19 th century
A06101.000604	209 Water Street	South Street Seaport area	c.1775-1800
A06101.000623	Telco Block	South Street Seaport area	c.1740-1775
A06101.001283	Barclay's Bank	Financial District	1750s-1820s
A06101.001284	Assay Site	Financial District	Revolutionary era
A06101.001272	64 Pearl Street	Financial District	Late 17 th century

A06101.001282	Broad Street Plaza	Financial District	17 th century-modern
A06101.001271	175 Water Street	Near South Street Seaport	c.1740-1780
A06101.006763	Schermerhorn Row	South Street Seaport area	1780-1810
A06101.001286	Sullivan Street Historic Site	Sullivan Street (NYU campus)	Early 19 th century resources
A06101.017265	Spring Street Presbyterian Church Cemetery/Vaults	244-266 Spring St.	Burials, 19 th century
A06101.015708	97 Orchard Street	97 Orchard Street	School privy
A06101.007671	Broome Street Historic Site	576 Broome Street	Unknown
A06101.018212	50 Bayard	Bowery Historic District	19 th century
A06101.017777	145-147 Mulberry St former pianoforte factory	Chinatown and Little Italy Historic District	19 th century
A06101.001304	City Hall Park	City Hall Park	18 th -19 th century
A06101.013335	Tweed Courthouse Area Deposits	City Hall Park	Burials, structures, deposits, 19 th century
A06101.006980	African Burial Ground	North of City Hall Park	18 th -19 th century
A06101.015825	Block 100, Lot 1	New York Downtown Hospital	19 th century
A06101.015801	WTC – Vesey Street Site	Vesey Street	Unknown
A06101.018000	WTC – VSC Ship	Vehicular Security Center/World Trade Center	18 th or early 19 th century ship
A06101.000503	<i>Tyger</i>	Greenwich and Dey Streets	Ship, ca. 1613
A06101.017931	Historic well beneath Corbin Building	Fulton Street area	
A06101.012569	Worth Street Historic Site	Worth Street and Lafayette Street	19 th century
A06101.016117	Columbus Park Pavilion cistern	Columbus Park, north of Worth Street	19 th century
	7 Hanover Square	Financial District	Late 17 th century
	Old Slip and Cruger's Wharf	Financial District	1690-1800
	Stadt Huys Site	Financial District	17th-19 th centuries

The density of continuous occupation of Lower Manhattan has led to the large number of historical archaeological sites documented around the Project Area. The area initially lay outside the city proper and was divided into agricultural land, but it quickly began to develop into more dense mixed-use development in the late eighteenth century. Until 1811, the Collect Pond, a 48-acre body of fresh water, covered the APE at Worth Street and Centre Street. The area became attractive as a source of fresh water, then later for use of the waters in businesses like tanning. After partially unsuccessful landfilling in the first decades of the 1800s created a marshy zone, the area began developing into the notorious Five Points neighborhood. Archaeological documentation of the area's development into a dense, mixed residential and commercial nineteenth century district suggested similar resources were most likely to appear within this project's APE.

The APE is immediately north of the Five Points archaeological site at Foley Square, where excavation beginning in 1991 uncovered 50 yard features and over 850,000 artifacts across 14 city lots. Features included cisterns and shaft features as shallow as four feet below modern grade, as well as cellars and courtyard around ten feet below grade. Excavation also uncovered evidence of tanning vats and liming barrels associated with a tanner working at the edge of the Collect Pond likely before it was infilled in the early 1800s (Milner 1993, Yamin 2002).

Also close to the APE is the African Burial Ground, identified 0.1 mile south at 290 Broadway. Excavation uncovered the remains of 419 persons interred from around 1697 to 1794, after which the burial ground was covered with up to 25' of landfill and redeveloped along with the surrounding neighborhood. The boundaries of this burial ground are not distinct, but as the area is thought to have contained up to 20,000 individuals, likely including former slaves and freedmen who resided in the liminal areas just north of the city center and general Project Area (Blakely 2009).

Other recent archaeological studies have been carried out in areas near the APE. Testing at the north side of City Hall Park revealed outbuildings of municipal structures on the city Commons 0.2 miles to the south. Testing for redevelopment of a postal building at 1 Peck Slip revealed shared mid- to late-nineteenth century rear yard shaft features. Monitoring of street reconstruction and utility replacements in and around the South Street Seaport 0.5 miles to the southeast revealed a mix of landfill structures and architectural and commercial deposits (Chrysalis and URS 2013, HPI 2014, Chrysalis 2018a). While these and other regional projects indicate the modern city street beds have been largely disturbed by twentieth century utility installations, areas of intact archaeological features remain below and between existing utilities, especially where street layouts have shifted historically.

The Phase IA study for this project found the APE passes through approximately 60 historic property lots. Although the APE is presently all modern street bed, designated as Worth Street, Mulberry Street, and Mosco Street, these streets historically ran in different layouts, with the modern streets crossing areas previously occupied by developed lots (HPI 2013). These likely would have been developed similarly to those lots uncovered in densely packed Foley Square, with a mix of commercial spaces and residential lots with shared yards or courtyards. According to the Phase IA, the majority of the properties and structures within the APE had a high turnover of occupants, but there was a demonstrated consistency of "types of occupants or businesses within

these structures” that “often endured over multiple years” lending to the potential significance of yard features in shedding light on the life of known occupants or businesses (HPI 2013).

The portion of the APE within Worth Street, formerly known as Anthony Street, was once part of several large land tracts allotted during the seventeenth and early eighteenth centuries. It is presumed that either farms or tanneries occupied portions of these tracts. The 1813 Grim map depicting ca. 1744 Manhattan shows farm buildings in portions of the APE, although its accuracy in pinpointing structure locations is not known (HPI 2013:11). Streets began to be established in the general area of the APE in the 1750s. Structures appear on the 1755 Maerschalk map along modern Chatham Square, just east of the project APE, with tanning yards depicted at the southeast side of the Collect Pond possible within the APE.

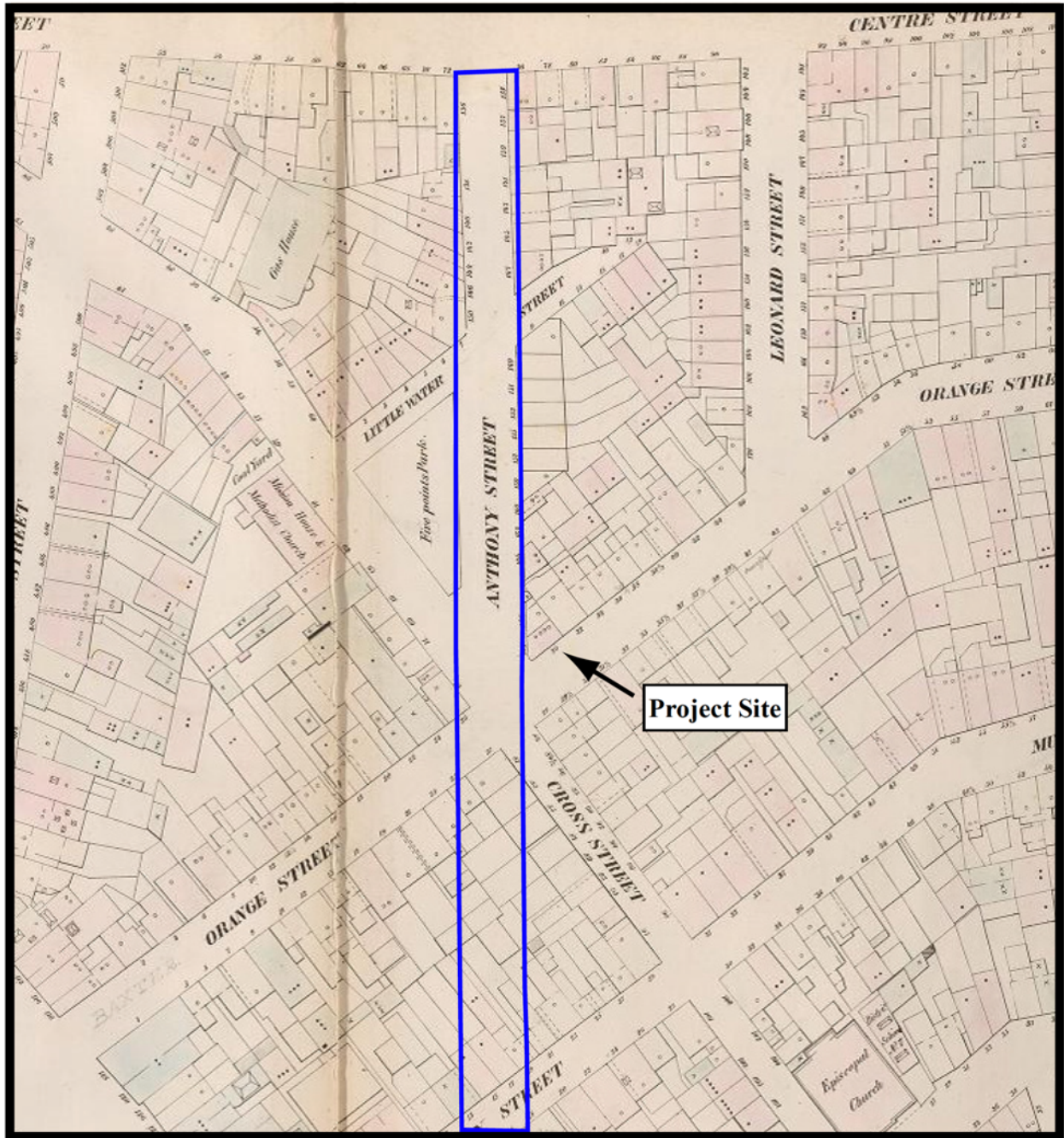
Nineteenth century tax assessment records show that almost the entire APE was developed by 1808 (HPI 2013:1). Documentary research indicated the area consisted of a mix of working-class residents and business owners. The majority of the lots were typically configured with two houses, one at the front of the property and one in the back, to maximize occupancy and rental income.

By 1817, the Collect Pond had been filled and Anthony Street, present-day Worth Street, was laid. Anthony Street’s intersection with Cross and Orange Streets created the Five Points name for the neighborhood. By the 1830s Five Points would become one of the most densely populated areas within the city; its reputation was one of slum-housing and brothels (HPI 2013:13). Maps 3 and 4 depict the mid-nineteenth century configuration of the area, with the APE following modern Worth Street superimposed (Maps 3 and 4).

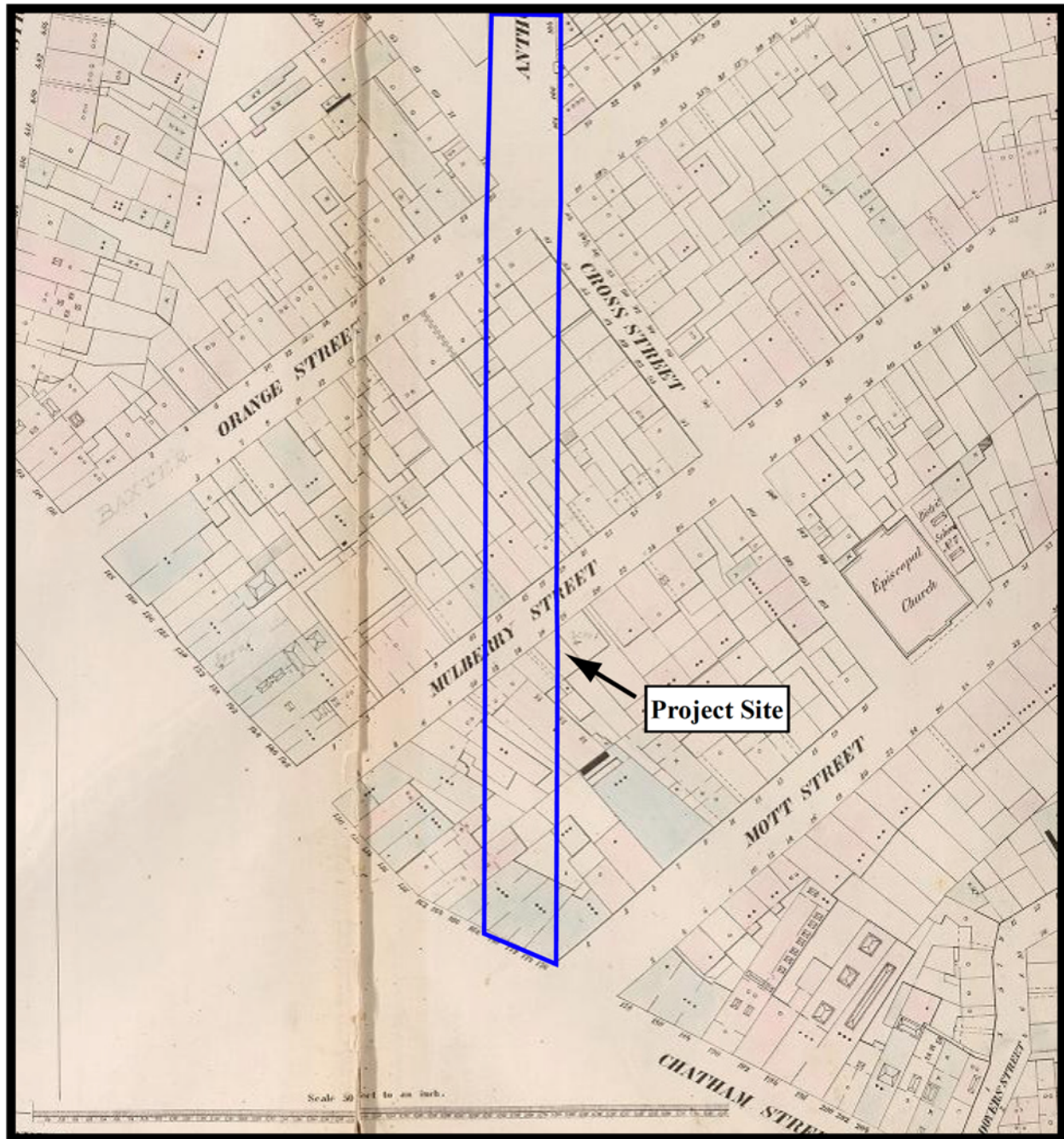
Anthony Street was widened between Cross and Little Water Streets in 1833 and renamed Worth Street in 1855. Around this time, the triangular lot west of Worth and Cross Streets was supposedly cleared. Worth Street was widened 20 ft to the south between Hudson and Baxter Streets in 1860. In 1868, Worth Street was extended east to Park Row, razing the two formerly developed blocks evident in Maps 3 and 4. Mott Street and Mosco Street (formerly Cross Street) were likely laid around 1751. Trolley lines were added running down Worth Street in the 1870s (HPI 2013).

Based on documentary research, possible historical resources expected within the APE included:

1. Eighteenth century farm buildings, associated refuse deposits, wells, privies, or cisterns.
2. Tannery related resources such as organic soils or refuse pits related to the industry at the east side of the Collect Pond.
3. Resources associated with the nineteenth century residential or commercial lots around Worth, Mott, and Mosco Streets, including trash deposits and backyard shaft features such as privies and cisterns in areas



Map 3: Western portion of the APE overlaid on Perris 1853 map (HPI 2013: Figure 14a).



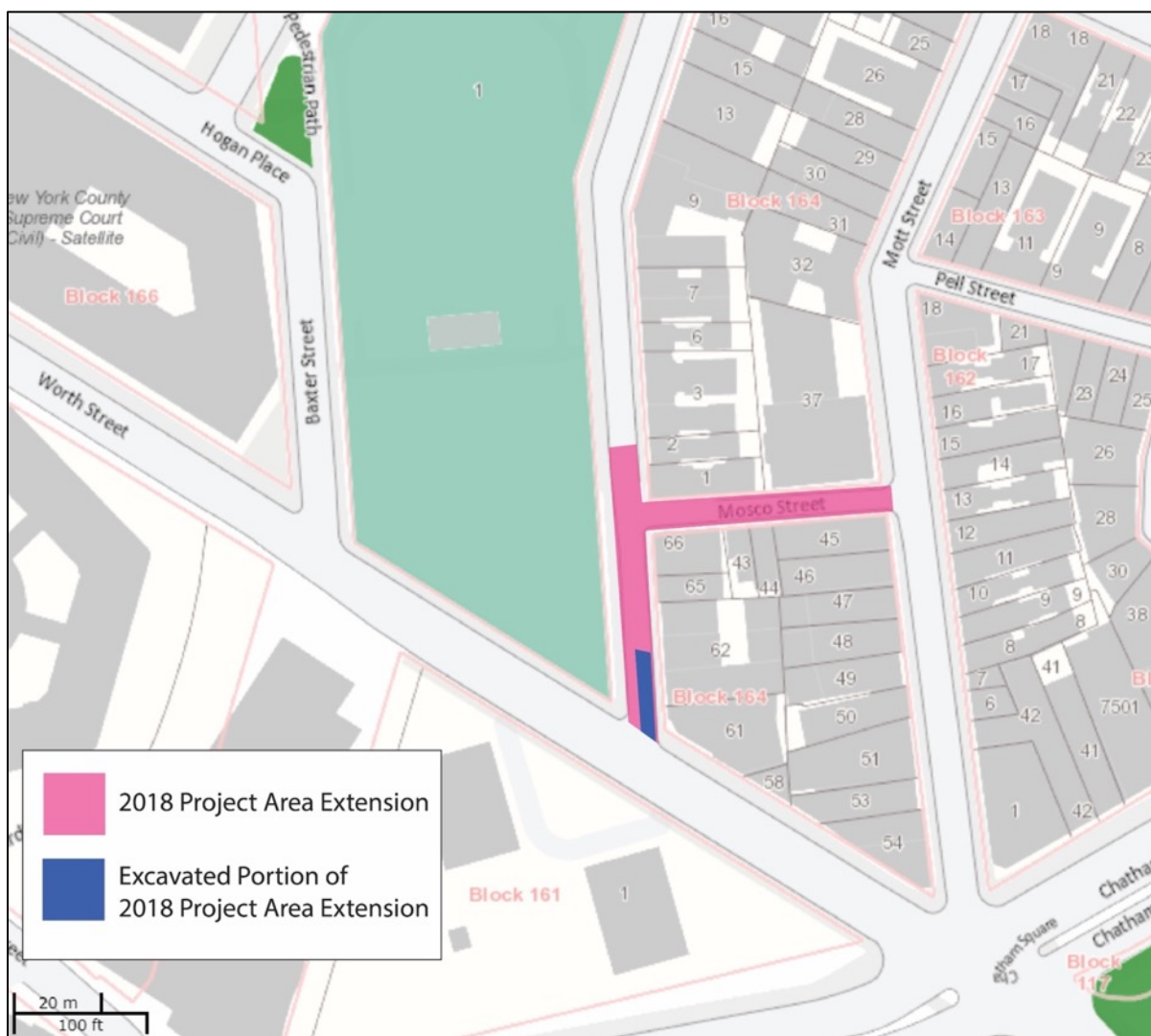
Map 4: Eastern portion of the APE on Perry 1853 map (HPI 2013: Figure 14b).

PHASE IA ADDENDUM

While the current Project Area includes Worth Street from Hudson Street to Park Row, NYC LPC determined in its initial project evaluation that only the area between Centre Street and Mott Street was of archaeological concern, based on the extent of excavation called for in pre-2018 project plans (HPI 2013). The initial 2013 Phase IA study thus considered only Worth Street from Centre to Mott Streets as the archaeological APE. In 2018 project plans were altered to include Mulberry Street between Worth and Mosco Streets and Mosco Street between Mulberry and Mott Street (Chrysalis 2018b). NYC LPC recommended a Phase IA Addendum study of this extension of the

APE across Mott and Mosco Streets, with archaeological monitoring of excavation in this area if the addendum could not be reviewed before start of construction (NYC LPC 15 November 2018).

As excavation was underway within the APE by October 2018, Chrysalis monitored any excavation activities enacted within the extended project area, per these recommendations. Despite project plans forecasting work on Mulberry and Mosco Streets within the extended APE, the only excavation actually carried out was limited to a small portion of Mulberry Street between Worth and Mosco Streets (Map 5).



Map 5: 2018 project area extension and excavated portion of this area (OASISnyc 2020).

As construction impacts in the extended project area were extremely limited (see Section V. Field Results, Mulberry Street from Worth Street to Mosco Street, Trench 23), this Phase IA Addendum is limited to the properties at the east side of Mulberry Street between Worth Street and Mosco Street. This Phase IA Addendum examines the history of the land within Block 164, Lots 61-66. Based on its close proximity to the original project APE and its composition within the same Five Points neighborhood, the general history of the Phase IA Addendum area is consistent with that of

the previous Phase IA covering the initial project area (HPI 2013). The extended project area was on agricultural land on the periphery of the city in the seventeenth and eighteenth centuries, and it was part of pre-1811 industrial development on the eastern edge of the Collect Pond. Filling of the Collect Pond and nineteenth century urbanization lead to construction of mixed residential and commercial development in the city blocks fronting the extended project area. The Phase IA Addendum land is confined to an area developed into the Mulberry Street roadway from the mid-eighteenth century to present.

Historical map review confirms the general development history of the Phase IA Addendum study area. In 1767, the Phase IA Addendum study area was the Mulberry Street roadway, bound by developed blocks around Mulberry Street and Cross Street (later Mosco Street) east of the Collect Pond (Map 6). The 1789 McComb map indicates the addendum study area was essentially unchanged as Orange Street began developing east of the Collect Pond (Map 7). The blocks surrounding Mulberry Street were increasingly laid out by 1797 (Map 8). Block 164 (then Block 161) was partially developed with buildings fronting Mulberry Street by 1852, with additional separate structures at the lot rears (Lots 43 and 44) (Map 9). Buildings completely fill the area fronting Mulberry Street in the more detailed 1853 Perris map (Map 10).

A thorough review of historical records for Block 164 Lots 61-66 examines specific land ownership and modification within the extended project area (see also Appendix C – Phase IA Addendum Conveyance Records)(NYC – Office of the City Register 1654-present). At the time of their division into blocks and lots, Block 164 was identified as Block 161, and this APE contained Lots 61, 62, 63, 64, 65, and 66. The current Block 164 Lot 62 encompasses lots previously divided into Lots 62, 63, and 64. When examining the records at the Department of Finance in Manhattan, it was discovered that the conveyance records for years 1962-1965 were missing from the collection.

Block 161/164 and its constituent lots were all part of larger tracts of farmland prior to the nineteenth century. As of 1752, the earliest dates for this area on file, the addendum study area was within the farm of John Kingston and Jacob Reed, whose interests were acquired at the same time. The area was subdivided into lots by 1763, when John and Rachel Kingston granted Lots 61, 62, and 63 to Obadiah Wells. Block 161 was renumbered as Block 164 around 1969.

LOT 61

After John Kingston's initial subdivision of this portion of the former farm plot into lots through the conveyance of Lots 61-63 to Obadiah Wells in 1763, the area was further subdivided into Lot 61 in 1803. Lot 61 changed ownership 61 times between 1809 and 1975. It was registered to apparent individual private owners until 1900s, when it was conveyed to the Stewart & Pottery Company. In the twentieth century, Lot 61 transferred from the Stewart & Pottery Company to the Worth Company (1903), the Second Avenue Railroad Company (1910), the Tragesor Realty Company (1926), the Atlantic District of the Evangelical Lutheran Synod of Missouri Ohio and Other States (1947), the City of New York (1969), and the True Light Lutheran Church (1975).

LOT 62

After the initial conveyance of Lots 61-63 by John Kingston to Obadiah Wells in 1763, Obadiah and Abigail Wells subdivided the area into Lot 62, granted to Frederick Jay in 1784. Lot 62 changed hands 13 times between 1784 and 1954. After this, Lot 62 and Lots 63 were transferred together three times from 1954 to 1966. In 1969, the entire block was recorded as being controlled by the City of New York. Beginning in 1970, the entire block is now numbered as Block 164, and Lot 62 changed hands between seemingly related ownership groups four times until a 2008 sale.

LOT 63

Lot 63's initial independent subdivision following the conveyance of Lots 61-63 by John Kingston to Obadiah Wells in 1763 occurred shortly thereafter in 1771. In this year, John Adams granted Lot 63 to John Beekman. Lot 63 was transferred seven times after 1771 to 1842. In late 1842, Lots 63 and 64 were transferred together by Mary Winter to John Gilmartin. From 1842 to 1949, Lots 63 and 64 were transferred 14 times together as a unit. In 1954, Lot 63 was conveyed alone from Jafs Realty Corporation to Stephen J. Peirano. Lots 62 and 63 were transferred together three times from 1954 to 1966 to different elements of a realty group. Block 161 became Block 164 after 1969 turnover by the City of New York. Lot 63's final sole transfer was recorded in 1971.

LOT 64

The initial conveyance of Lot 64 was by John and Rachel Kingston to Magnus Garrit in 1786. Lot 64 transferred hands eight times from 1786 to 1842, mostly between members of the Garrit/Garret family. Lot 64 conveyance records included Lot 63 in 1842 and 13 times from 1859 to 1949. Lot 64 records end with the block's 1969 transfer by the City of New York.

LOT 65

The first record of Lot 65 is in 1804, when Mary and Cornelius Fradenburgh granted Lots 43, 44, 65, and 66 to John O'Neale. Lots 43 and 44 were transferred along with Lots 65 and 66 five times between 1804 and 1866. Lots 43 and 44 form the modern rear portion of Lots 65 and 66. Lot 65 was first conveyed as an individual unit in 1866, when the Cornelius Schenck's heirs transferred it to Laurence J. Callanan. Lot 65 changed hands 10 times between 1866 and 1969, when Block 161 was renumbered to Block 164. Real estate companies transferred Lot 65 six times after 1969.

LOT 66

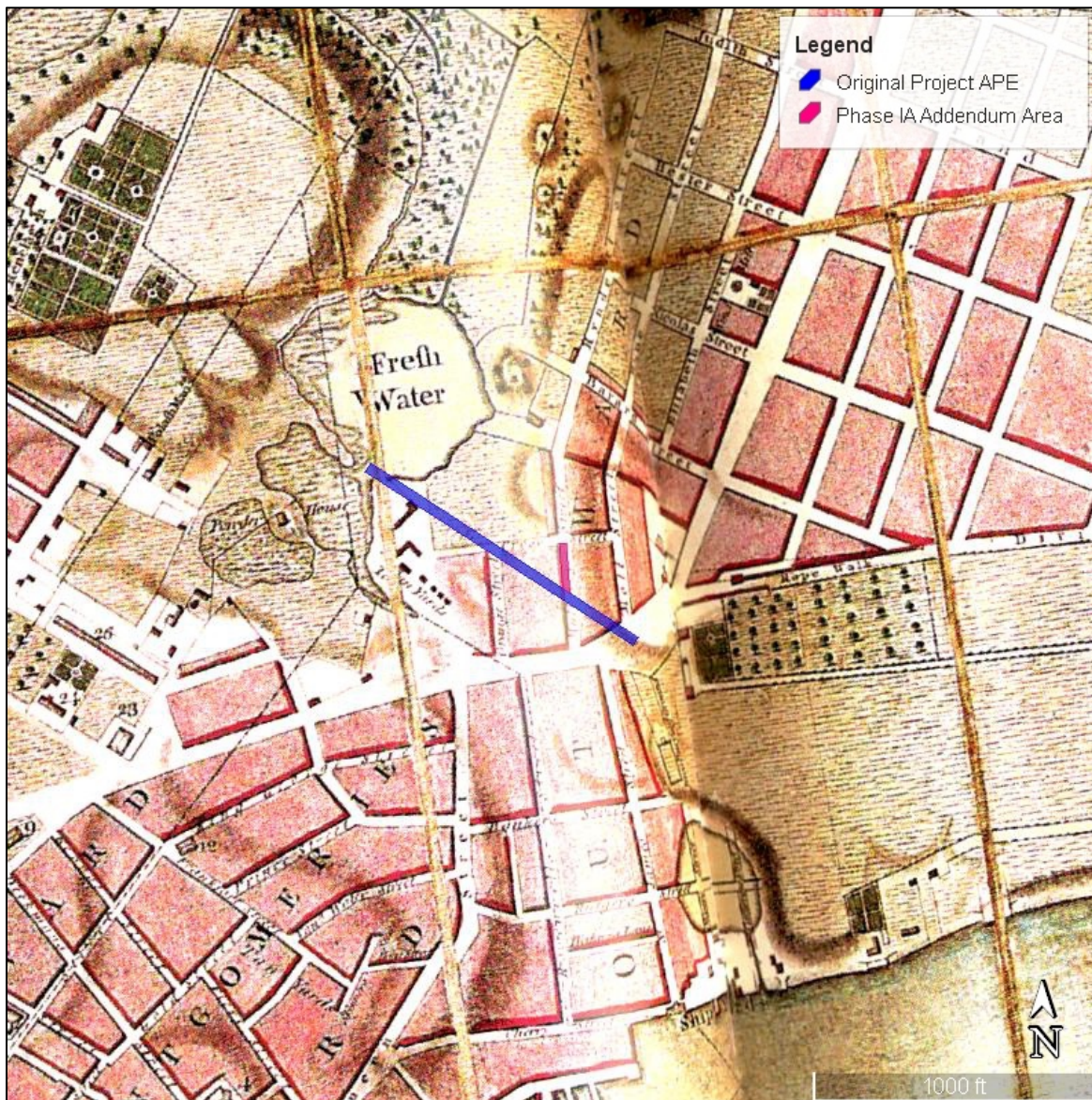
As noted above, Lot 66 was initially grouped with Lots 43, 44, and 65 until 1866. Lot 66 was transferred five times after 1866 to 1969, when the City renumbered Block 161 to Block 164. Lot 66 changed hands twice after the block's 1969 renumbering.

PHASE IA ADDENDUM SUMMARY

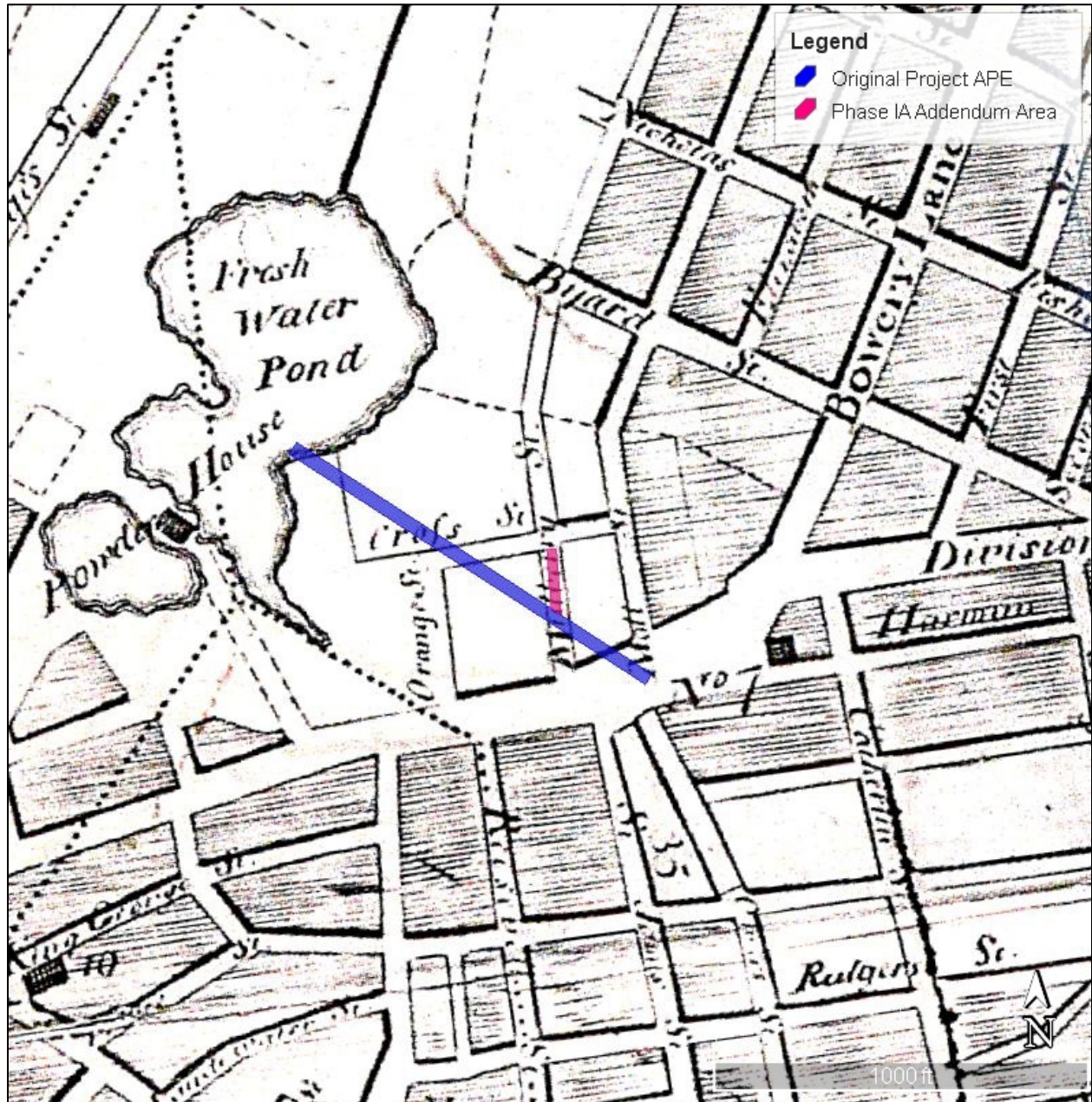
The Phase IA Addendum study area was part of the John Kingston and Jacob Reed farm by 1752. There is no indication that any structures, particular agricultural activity of note, or industrial activity taking advantage of the nearby Collect Pond were developed in the addendum study area in the eighteenth century. By 1767, Mulberry Street was in place in its current location. Conveyance records subdividing Block 161/164 into smaller lots from 1763-1804 suggest private owners began developing the block east of Mulberry Street in the late eighteenth century, but there is no indication construction around Mulberry Street would have encroached into the roadway.

By 1852-1853, buildings were in place fronting the entire east side of Mulberry Street where Trench 23 excavation occurred between Worth and Mosco Streets, the limit of excavation within the Phase IA Addendum/2018 Project Area Extension. It is likely water, sewer, and later electric and gas utilities were installed across Mulberry Street in the late nineteenth and early twentieth centuries to serve these and other nearby structures.

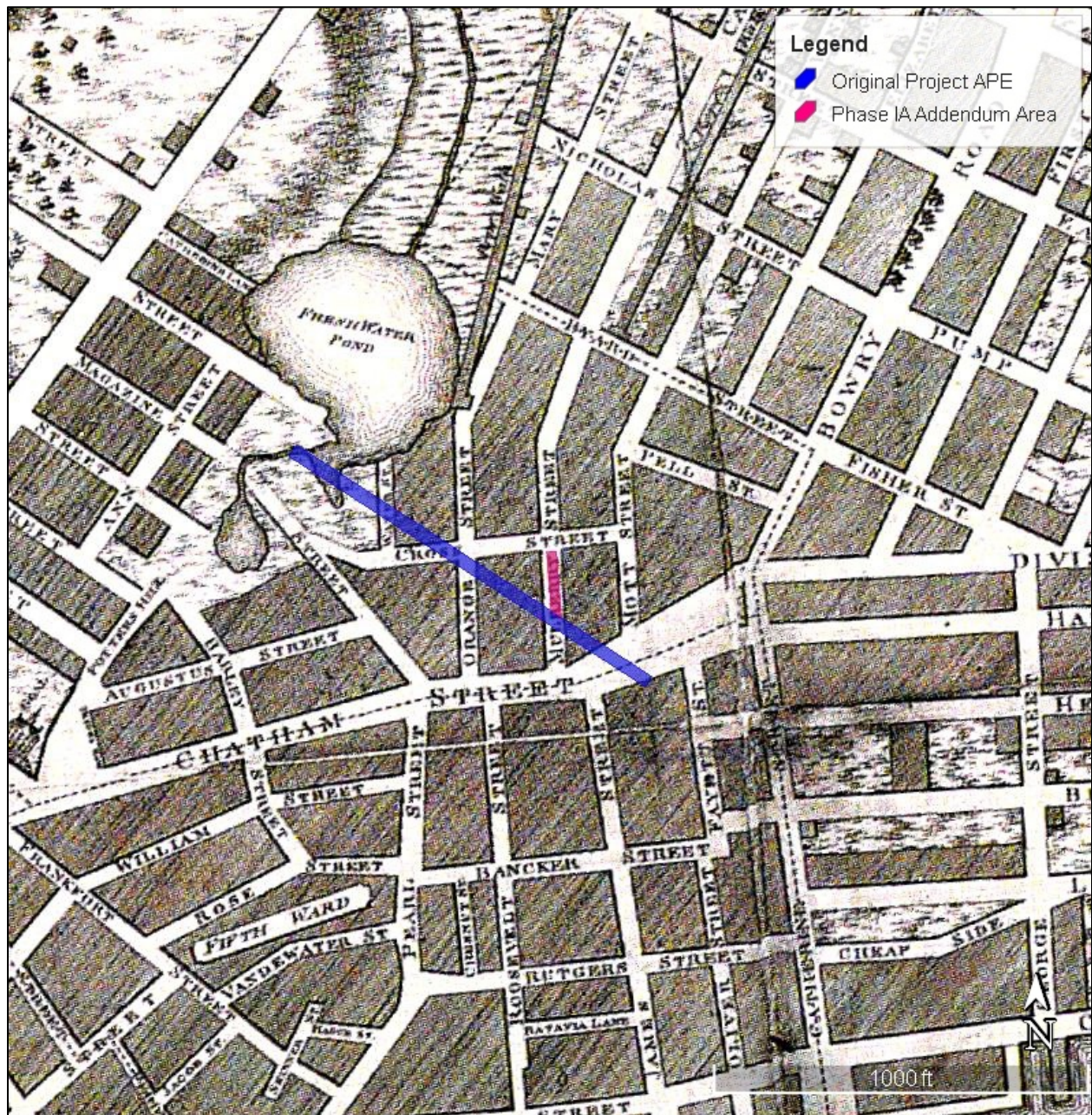
The Phase IA Addendum study area is thus considered sensitive for similar elements as the original Phase IA study area. Although no concrete evidence of seventeenth century or early-to-mid eighteenth century development was found, the area has the potential to contain agricultural buildings or associated deposits, as well as the potential to contain tannery related resources such as organic soils or refuse pits related to the industry near the Collect Pond. Further, the Phase IA Addendum area is sensitive for nineteenth and twentieth century utilities and services for the residential and commercial structures that characterize the Five Points and later Chinatown neighborhoods. However, unlike the original project area that includes blocks razed for the extension of Worth Street, there is no indication the Phase IA Addendum study area includes land that would harbor backyard features such as privies, cisterns, or trash deposits. The extensive filling and grading and city block development is expected to have destroyed any intact prehistoric contexts that may have once lay within the area.



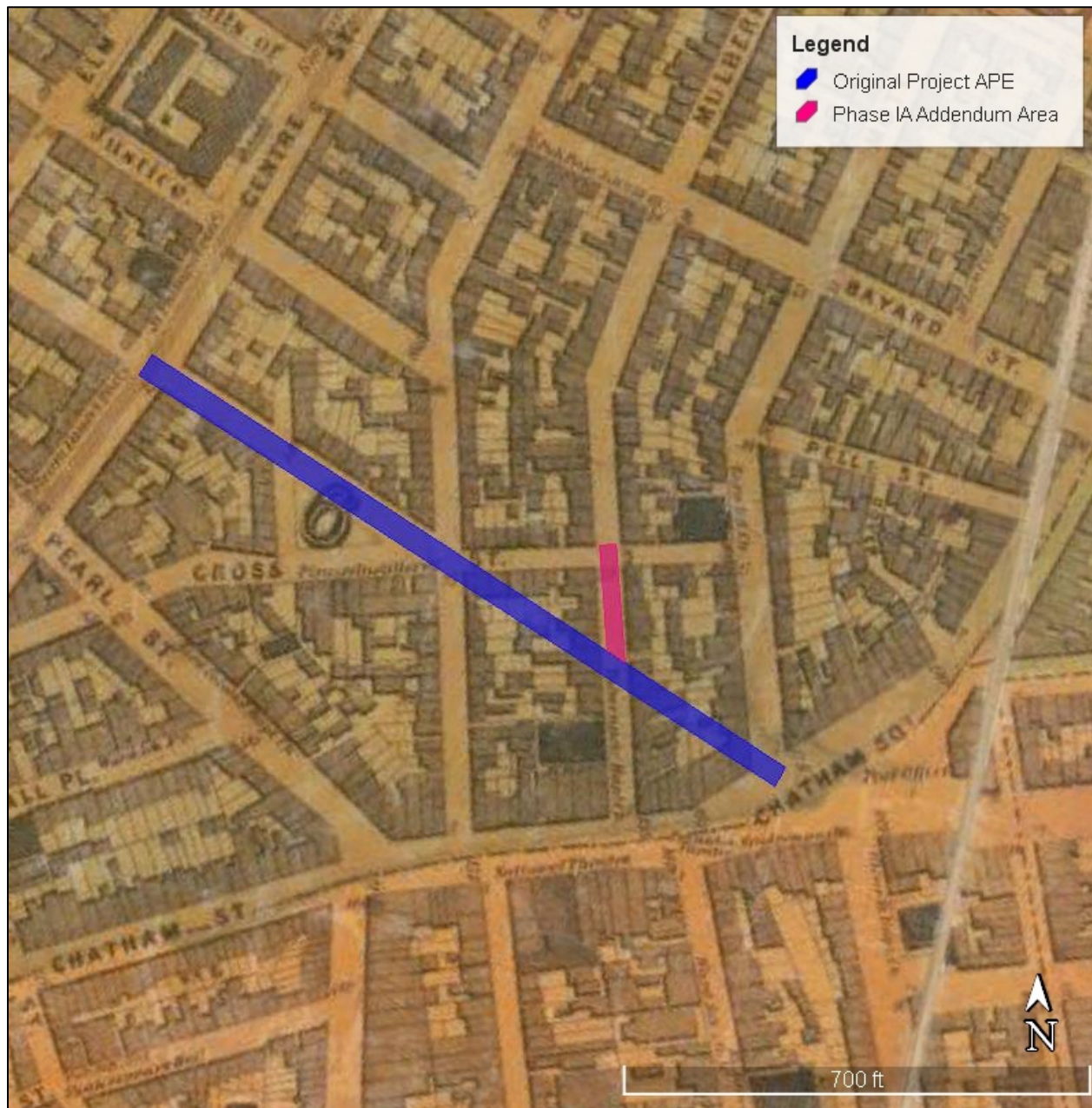
Map 6: Detail of 1767 Ratzer map of New York (Ratzer 1767).



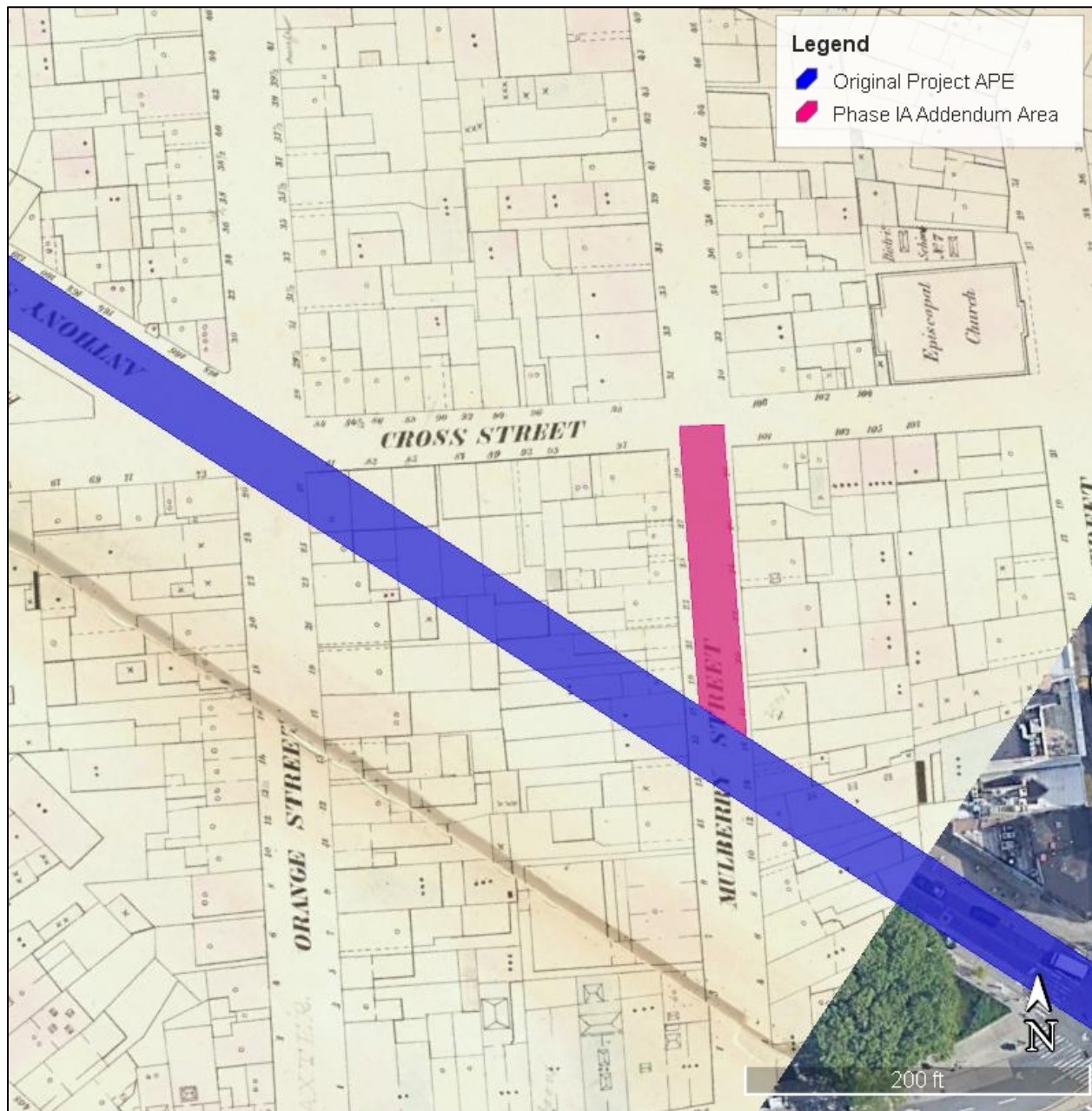
Map 7: Detail of 1789 McComb map of New York (McComb 1789)



Map 8: Detail of 1797 Plan of the City of New York (1797 Taylor and Roberts).



Map 9: Detail of 1952 map of City of New York (Dripps 1852).



Map 10: Detail of 1853 city map, overlaid atop 2020 Google Earth satellite imagery (Perris 1853).

III. CONTEXT AND RESEARCH DESIGN

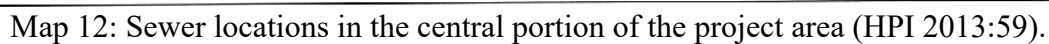
The project APE was found sensitive for historic archaeological resources, particularly those associated with the Five Points neighborhood in the first half of the nineteenth century. Of special concern were the two blocks razed for Worth Street's 1868 east extension from Orange Street (modern Baxter Street) to Mulberry Street and Mulberry Street to Mott Street, bound by Cross Street (Mosco Street) to the north. Excavation of similar areas immediately to the south at Foley Square has yielded yard features and architectural remains and spurred numerous research projects surrounding the daily life of working-class New Yorkers. Other potential historic archaeological resources include eighteenth century tanneries or other commercial industry at the eastern side of

the Collect Pond and possible farmhouse or related materials from the seventeenth- and eighteenth-century use of the area as a space on the urban periphery. Archaeological evidence of industrial activity and agricultural work from these eras of City history remains limited. No assessment of prehistoric sensitivity was indicated in Phase IA study for this project, but prehistoric sensitivity is usually considered low in the highly developed and landformed areas of Lower Manhattan.

The depth of any potential remaining historic archaeological materials remained unknown at the project outset. Documented landfilling episodes include the filling of the Collect Pond around the turn of the nineteenth century, leveling or grading to construct the mixed commercial and residential Five Points neighborhood immediately thereafter, and landfilling associated with the demolition and grading of the formerly developed lots that Worth Street extended over in 1868. Previous work indicates historic materials are extant at a variety of depths across this portion of Lower Manhattan. A small sample of soil borings from nearby construction indicated the east side of the Collect Pond may be buried under 7' to 15' of fill (HPI 2013). Excavation around Foley Square produced materials related to tanning operations from 12' to 18' below modern grade (Yamin et al. 1995). Excavations around Fulton Street and the South Street Seaport have uncovered historic materials as shallow as 3' and as deep as 10' below modern grade (Chrysalis 2018a).

The extent of impacts to historic archaeological materials from previous installation of water mains, sewers, and other utilities along Worth Street also remained unknown at the project outset. Worth Street has had documented utility installations as early as 1842 for water service, with additional utilities and sewers added in 1855, 1872, 1901, and likely later in the twentieth century. Utilities were expected to lay from 1.5' below surface (electrical lines) to at least 12' below surface (sewers), although it was unknown if excavation for installation of deeper utilities impacted the area curb-to-curb (Maps 11-13).

Phase IB fieldwork is designed to ascertain the presence/absence of archaeological resources within a site. The goal is to determine whether significant (i.e., National Register [NR] eligible) resources are extant within the APE and to ascertain whether they could be adversely affected by project construction work. Specific research aims for this project were to assess the extent of historic and twentieth century impacts to the sidewalks and streetbeds below Worth, Mulberry, and Mosco Streets; evaluate soils within the project APE for evidence of landfilling episodes; and determine if extant archaeological features or materials remain, especially those related to the seventeenth to nineteenth century development episodes described above. Extant resources associated with the razed Five Points neighborhood blocks might act as a complement and aid to previous studies of working class and immigrant lifeways conducted using the results of Foley Square excavations.



IV. PROJECT METHODS

Phase IB Archaeological Monitoring was deemed necessary for the current project as the Phase IA report concluded the APE could be sensitive for historic resources, but the project location within active streets and sidewalks coupled with the potential for intact resources well below surface (3' to 18', based on nearby studies) precluded pre-construction archaeological testing (HPI 2013).

Archaeological Monitoring took place during all excavation activities within the archaeologically sensitive APE. Monitors oversaw a mix of mechanical excavation by backhoe and hand excavation, typically required in areas dense with utility lines. Trenches varied in length and width based on the existing utilities they were intended to follow or the size and depth of planned new utility installations, but most of Worth Street and many sidewalk areas within the APE were impacted to at least the streetbed.

Archaeological monitors recorded all exposed soils using the Munsell color system and standard texture classifications, with depths taken using both NAVD88 elevation and depths below ground surface (typically the road surface) in Imperial units. Artifacts recovered during excavation were to be bagged according to their unique provenience and transported to the laboratory for processing and analysis. An artifact catalog recording the provenance of each recovered artifact was utilized. Bulk materials, such as concrete rubble, brick, large metal objects, ash coal, cinders, and slag, were recorded but not saved. Modern refuse was noted but not retained. Soil profiles and archaeological features were described, photographed in digital format, and illustrated by measured drawings in Imperial scale in plan and vertical perspective, as appropriate.

Archaeological Monitoring was performed in accordance with the National Historic Preservation Act of 1966, as amended, the Advisory Council on Historic Preservation's "Protection of Historic and Cultural Properties" (36 CFR 800.4), the NY SHPO's Guidelines for Archaeological Projects, the New York Archaeological Council's (NYAC) 2004 Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State, and the revised 2018 Landmarks Preservation Commission's (NYC LPC) "Guidelines for Archaeological Work in New York City."

A site datum (0N, 0E) was set at the northwest corner of 60 Center Street, located at global Latitude 40.71455 (N 40°42'52.36672") and Longitude -74.00197 (W 74°0'7.08678"). Northings and eastings for trench and feature locations presented in the Field Results section reference this site datum.

V. FIELD RESULTS

Archaeological monitoring began in October 2018 and continued through February 2020, as needed when work occurred in the archaeologically sensitive APE. A total of 25 trenches were excavated, 15 of which were large enough to require division into sections for ease of documentation. The largest trenches were Trench 2, spanning 39 sections, and Trench 4, spanning 26 sections down Worth Street. Excavation generally began at the west side of the APE at Centre Street and moved east, with some backtracking and reexcavation of previously backfilled project areas, as noted within trench documentation below.

Although an extension was added to the original project APE on Mulberry Street from Worth Street to Mosco Street and Mosco Street from Mulberry Street to Baxter Street, these areas only saw minor disturbance. One trench was excavated on Mulberry Street (Trench 23). No excavation below the roadbase occurred on Mosco Street.

Field results and excavation maps of Phase IB Archaeological Monitoring are divided into six segments for clarity:

- Worth Street from Centre Street to Baxter Street
- Worth Street from Baxter Street to Mulberry Street
- Mulberry Street from Worth Street to Mosco Street
- Worth Street from Mulberry Street to Park Row
- Intersection of Worth Street and Park Row
- Oliver Street from Park Row to St. James Place

While documentation for trenches within these segments is presented separately below, most of these trenches were excavated as long, fairly continuous stretches across Worth Street. Trenches were divided into arbitrary sections typically up to 25' long during documentation. Trench sections are noted in the field maps and results and were sometimes based on portions of excavated areas left open before backfilling and changes in stratigraphy.

FEATURES

Twenty-eight features were identified during archaeological monitoring, all of them architectural in nature (Table 2). Detailed feature information is presented with the results of the trenches they appeared within. Most features (n=11) were identified as brick and concrete bases for the trolley track that ran down Worth Street from ca. 1870 to the early twentieth century (see Figure 1 below). One feature, Feature 7, was a brick-lined shaft likely associated with the lot at 72 Cross Street prior to 1833.

The additional 16 features represented previously razed and infilled stone and brick walls or utility boxes. Features 3, 11, 12, 13, and 14, walls found to the west of the former location of Little Water Street, were likely associated with the lot at 72/74 Centre Street or with 138 Anthony/Worth Street, created after 1817 as Anthony Street and Centre Street were formed and likely razed when Anthony Street was widened in 1833. Features 9, 18, and 19, found between historic Cross Street and Mulberry Street and aligned with Anthony/Worth Street, are walls likely associated with structures or utilities constructed post-1868, after Worth Street's extension through the area. Features 20, 21, and 22 were walls built aligned with Anthony/Worth Street after its 1868 extension east to Mott Street. Features 25, 26, and 27 were deep brick and concrete walls likely associated with the elevated rail station and lines at Chatham Square. Features 8 and 15 were portions of defunct brick utility boxes.

None of these features were associated with intact historic soil deposits or distinctive artifact assemblages. These features help confirm the mapped locations of nineteenth century structures razed and newly constructed in the expanding path of Anthony/Worth Street, but the lack of undisturbed soils or intact assemblages limits the information to be gathered about the lifeways of people in the former Five Points neighborhood.

Table 2: Features identified during Worth Street Monitoring.

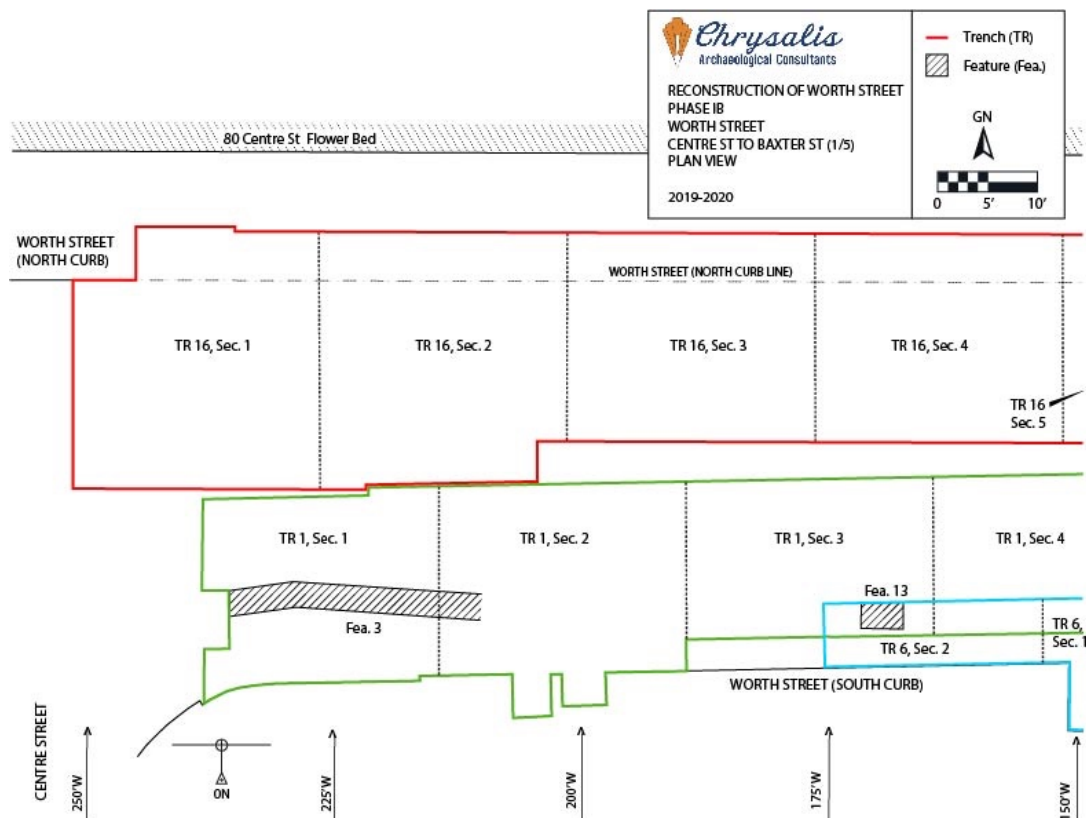
FEATURE NUMBER	LOCATION	DESCRIPTION	INTERPRETATION
1	Trench 2 Section 5	two north-south mortared brick walls, present from 1'4" bgs to 6'4" bgs	Trolley track support
2	Trench 2 Section 7	two north-south mortared brick walls, present from 1'4" to 6'4" bgs	Trolley track support
3	Trench 1 Section 1	brick foundation wall 2'6" wide north-south, 25'3" long east-west	Post-1817 foundation wall with Feature 13 (72/74 Centre Street or 138 Anthony/Worth Street)
4	Trench 1 Sections 5-6	two north-south mortared brick walls, present from 1'1" bgs to 5' bgs, on concrete slab	Trolley track support
5	Trench 1 Section 6	two east-west mortared brick walls, present from 1'1" bgs to 3' bgs, on concrete slab	Trolley track support
6	Trench 2 Section 4	three mortared brick walls, the north wall made up of one layer of bricks, the east and west walls made up of two layers	Trolley track support or defunct utility box
7	Trench 3 Section 8	brick-lined shaft two courses thick, filled with redeposited brown sand	Pre-1833 shaft feature (72 Cross Street)
8	Trench 4 Section 4	east-west mortared single-course brick wall 7' long, present from 1'1" bgs to below trench floor at 5'bgs	Wall from utility box
9	Trench 4 Sections 7-8	east-west mortared stone wall 35' 3" long, present from 2'2" bgs into trench floor at 5'6" bgs	Post-1868 wall
10	Trench 2 Section 11	two north-south mortared brick walls, present from 1'2" bgs to 5'6" bgs, on a concrete slab	Trolley track support
11	Trench 6 Section 1	East-west mortared stone wall, present from 3' bgs into trench floor at 4' bgs	Post-1817 wall with Feature 12 (72/74 Centre Street or 138/140 Anthony/Worth Street)
12	Trench 6 Section 1	east-west mortared stone wall 1'6" thick, present from 3'4" bgs into trench floor at 7' bgs	Post-1817 wall with Feature 11 (72/74 Centre Street or 138/140 Anthony/Worth Street)
13	Trench 6 Section 2	east-west mixed brick and stone mortared wall, 2'3" wide, present in trench floor at 3'8" bgs	Post-1817 foundation wall with Feature 3 (72/74 Centre Street or 138 Anthony/Worth Street)
14	Trench 6 Section 2, Section 3	east-west mortared stone wall, present from 1'8" bgs into trench floor at 5' bgs	Post-1817 wall (140 Anthony/Worth Street)

15	Trench 2 Section 16	north-south mortared brick wall 1' wide, present from 2' bgs to 8.5' bgs	Wall from post-1905 utility box
16	Trench 2 Section 17	two north-south mortared brick walls, present from 1'2" bgs to 5' bgs, on concrete slab. The top formed a stepped arch or pair of buttresses from 1'2" bgs to 3'6" bgs	Trolley track support
17	Trench 2 Section 23	two north-south mortared brick walls, each 1'6" thick, present from 1'2" bgs to 6' bgs	Trolley track support
18	Trench 4 Sections 13-16	East-west mortared stone wall in north profile, present from 1'2" bgs into the trench floor at 5' bgs. Brick areas filling gaps in stone wall profile.	Post-1868 wall
19	Trench 4 Section 15	north-south 1' wide mortared brick wall, present from 1'2" bgs into trench floor at 5' bgs	Post-1868 wall, utility box, or trolley support
20	Trench 4 Sections 16-17	East-west mortared brick wall 1'6" thick, with a cement facing, south face flush with Trench 4's north wall, present from 1'2" bgs into trench floor at 6'6" bgs	Post-1905 wall
21	Trench 4 Sections 23-24	East-west mortared stone wall in north profile, present from 1'2" bgs into the trench floor at 6' bgs	Post-1868 wall
22	Trench 4 Sections 25-26	mortared stone wall running along north trench wall, present from 1'6" bgs into trench floor 6' bgs. Gap from previous demo in Section 26	Post-1868 wall
23	Trench 2 Sections 29-30	Two north-south mortared brick walls supporting a steel trolley rail at 1' bgs. Walls extended from 1'6" bgs to 5' bgs, where they rested on a concrete slab 6" thick	Trolley track support
24	Trench 2 Section 35	Two east-west mortared brick walls separated by 1'5". Present from 1'2" bgs to 2'6" bgs, resting on 6" concrete slab	Trolley track support
25	Trench 25 Section 1	mortared brick wall 7' long with concrete elements and piping, oriented northwest by southeast. Present 4'10" bgs into trench floor at 14' bgs	Post-1852 elevated rail support or utility structure
26	Trench 25 Section 1	a composite wall consisting of mortared stone, concrete top, and brick, 3'2" long. Present 2' bgs into trench floor at 14' bgs.	Post-1852 elevated rail support or utility structure

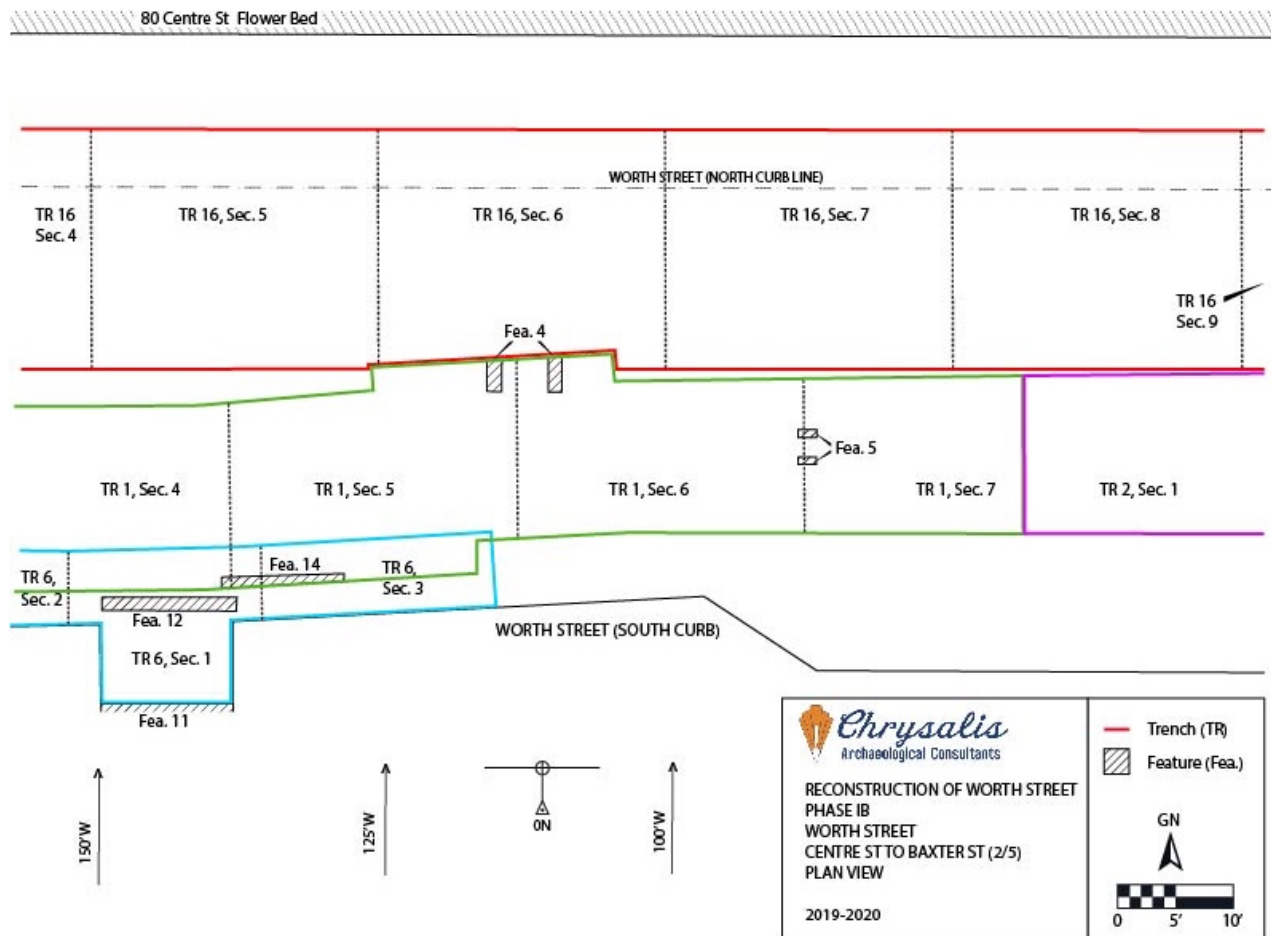
27	Trench 25 Section 2	mortared brick wall, oriented northeast by southwest, present from 5' bgs into trench floor at 9' bgs. Previously impacted, remnant found in trench south wall.	Post-1852 elevated rail support or utility structure
28	Trench 2 Section 35	Two north-south mortared brick walls separated by 3'5", supporting a steel trolley rail at 1'8" bgs. Walls present to 5' bgs, resting on 6" concrete slab	Trolley track support

WORTH STREET FROM CENTRE STREET TO BAXTER STREET

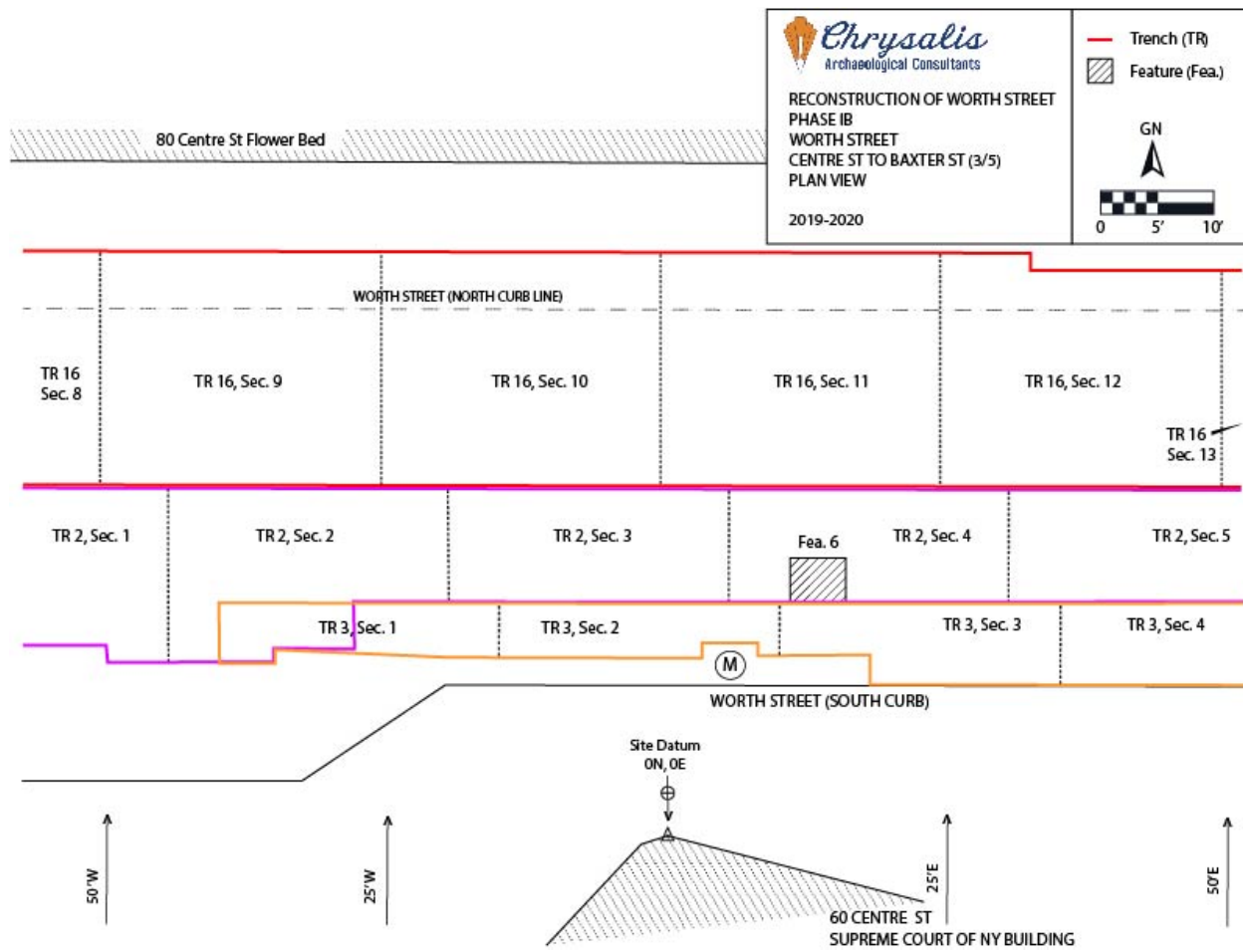
Excavation across Worth Street from Centre Street to Baxter Street included seven trenches (Trenches 1-4, 6, 16, and 21), curb-to-curb streetbed removal, and excavation below the street bed into nearly all of the street area and parts of the north sidewalk (Maps 14-18). Excavation in this area revealed twelve features (Features 1-7, 10-14). Documented features appeared to primarily represent bases or supports for trolley routes running down Worth Street from the 1870s through early twentieth century (Features 1, 2, 4, 5, 10). Also identified were a 2' 6" thick, 25' long mortared brick wall (Feature 3), one- and two-course thick wall structures (Feature 6), a brick shaft with redeposited infill (Feature 7), a mixed brick and stone wall (Feature 13), and several mortared stone walls (Features 11, 12, 14).



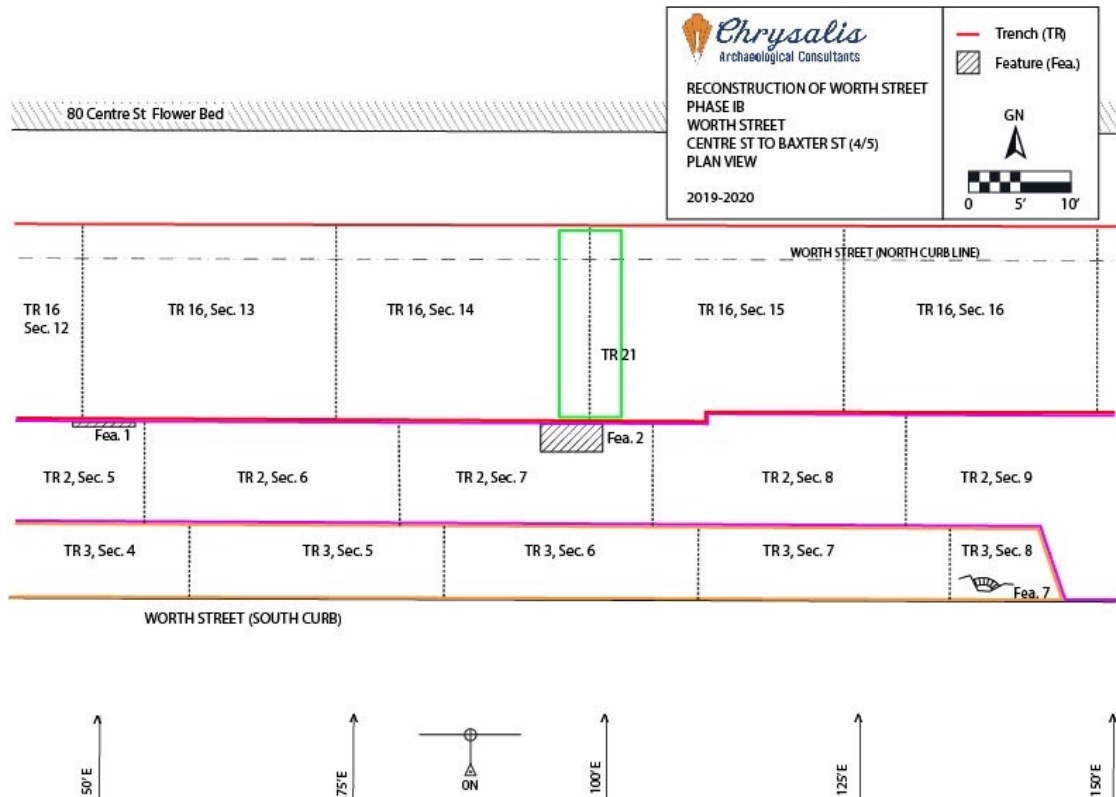
Map 14: Plan view of Worth Street excavation from Centre Street to Baxter Street, part 1 of 5.



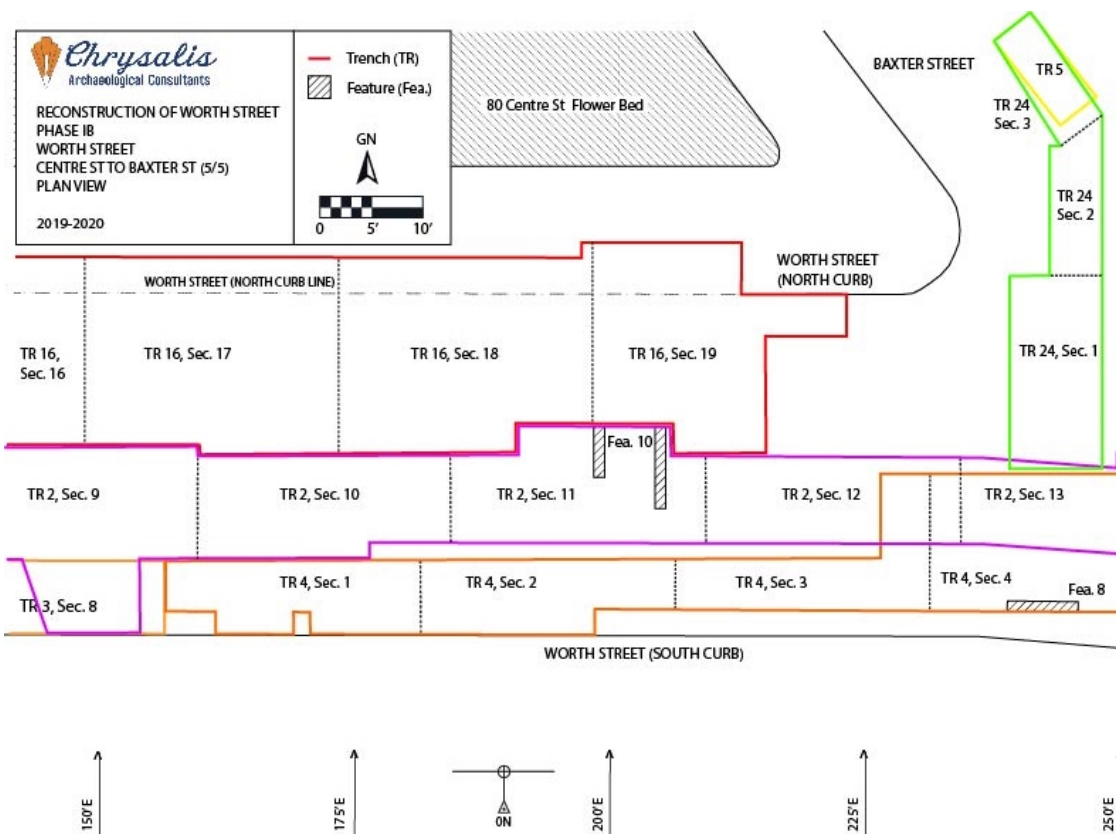
Map 15: Plan view of Worth Street excavation from Centre Street to Baxter Street, part 2 of 5.



Map 16: Plan view of Worth Street excavation from Centre Street to Baxter Street, part 3 of 5.



Map 17: Plan view of Worth Street excavation from Centre Street to Baxter Street, part 4 of 5.



Map 18: Plan view of Worth Street excavation from Centre Street to Baxter Street, part 5 of 5.

TRENCH 1

Archaeological monitoring began on October 24, 2018. Previous work outside of the archaeologically sensitive APE had occurred on Worth Street from Howard Street to Centre Street. When an existing work trench was extended into the intersection of Worth Street and Centre Street, it crossed into the archaeologically sensitive portion of the project area and spurred start of archaeological monitoring. This was labeled Trench 1, with trench numbers continuing in numerical order within the monitored APE. Much of Trench 1 excavation was conducted by machine, but the high density of existing utility lines necessitated hand digging throughout a large portion of the trench. Trench 1 measured 167'8" east-west, with a north-south width varying from 16' to 19'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 1 Section 1 extended from 238'2" W to 214' W, abutting the south curbline, which varied from 4' N at the west end to 7' N at the east (Map 14). Section 1 measured 19' north-south, and was excavated to a depth of 8.5' NAVD88 (8'6" bgs), with a 12'6" east-west by 9'6" north-south area in the southeast corner reaching 6.51' NAVD88 (10'6" bgs). Numerous utility lines crossed the trench at depths ranging from 16' to 12' NAVD88 (1' bgs to 4' bgs), including the 20" water main, a 10" oilstatic line, and many prefab concrete duct banks (Image 1).

The majority of Trench 1, Section 1's stratigraphy was composed of a 10YR 3/2 very dark grayish loamy sand, with pebble, ash and slag inclusions. A 10YR 4/3 brown sandy loam fill was encountered underlying the 20" water main in the north half of the trench (Image 2). A scattering of artifacts was recovered from this section, making up FS 1, 2, and 11 (Table 3). FS 1 and 2, both found in strat II, included a Bristol-glazed stoneware bottle neck, a plain whiteware body sherd, a blue-painted pearlware based sherd with a chinoiserie-style motif, and four nondiagnostic colorless glass fragments. FS 11, found in strat III, included two stoneware sherds, one from a Bristol-glazed bottle, a whiteware rim sherd with a blue transfer-printed floral motif, and a pearlware base sherd with a black transfer-printed landscape motif. These materials were found in disturbed fill.

Feature 3, a brick foundation wall 2'6" wide north-south and 25'3" long east-west, appeared in Trench 1, Section 1 at 11.42' NAVD88 (5'7" bgs), 13'N, 235'6" W, where it abutted the east wall of a Con Edison manhole (Image 3). The feature ran eastward, passing under the 20" water main and angling downward, reaching a max depth of 9.33' NAVD88 (7'8" bgs) at 223'2" W. The southeast corner of Feature 3 was at 12'9" N, 210'3 W. After documentation, Feature 3 was dismantled to a depth of 6.51' NAVD88 (10'6" bgs) from 226'6" W to 210'3" W, revealing boulder-sized stones to be part of its composition below this point (Image 4).

Feature 3 lay in similar orientation to Feature 13, identified further east in Trench 6 with a mixed stone and brick construction. Similar dimensions, construction, and orientation suggest Features 3 and 13 formed the same northern boundary foundation wall for the 72/74 Centre Street or 138 Anthony/Worth Street lot (see Map 27, VII. Conclusions for historic overlay).

Table 3: North profile soil stratigraphy – Trench 1 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17'–15.7' NAVD88 (0 – 1' 4" bgs) (0 – 0.4 m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	15.7' – 6.51' NAVD88 (1' 4" – 10' 6" bgs) (0.4m – 3.05m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with pebble, ash, and slag inclusions. FS 1 and FS 2 found within this stratum.
III	10.66' – 8.5' NAVD88 (6' 4" – 8' 6" bgs) (1.93m – 2.59m bgs)	10YR 4/3 brown	Sandy loam underlying the 20" water main in the north half of the trench. FS 11 found within this stratum.
IV	15' – 13' NAVD88 (2' – 4' bgs) (0.61m – 1.22m bgs)	10YR 6/4 light yellowish brown	Clean sand. Associated with the 10" oilostatic line in the north profile.



Image 1: Trench 1 Section 1 – utilities below surface.



Image 2: Trench 1 Section 1 – Strat III underlying 20” water main.



Image 3: Trench 1 Section 1 – Feature 3 exposed below water main.



Image 4: Trench 1 Section 1 and 2, dismantling Feature 3 at 6.51' NAVD88 (10'6" bgs).

Section 2

Trench 1 Section 2 extended from 214' W to 189' W, measured 19' north-south, the south wall abutting the curbline at 7' N at the west end and 7'10" N at the east end (Map 14). The trench was excavated to a depth of 12.2' NAVD88 (5' bgs) across most of the floor, with a deeper channel reaching 10.2' NAVD88 (7' bg) from 18' N to the north wall.

The 20" water main continued running east down the trench at 12.7' NAVD88 (4'6" bgs), associated with stratum II, the 7.5YR 4/3 loamy sand fill deposit which made up the majority of the trench, as did the clay ECS ducts at 15.62' NAVD88 (1'7" bgs) and the 10" oilostatic line at 14.87' NAVD88 (2'4" bgs), associated with stratum III, a 10YR 6/4 clean sand (Image 5) (Table 4). The trench was extended southward into the sidewalk by 3'4" from 201.9' W to 197'6" W, where it encountered broadly similar soil strata (Image 6) (Table 5). FS 12 and 13, a tile fragment and a whiteware sherd, respectively, were recovered from strat II (Table 4).

Table 4: South profile soil stratigraphy – Trench 1 Section 2.

STRATUM	DEPTH NAVD88 (bgs)	MUNSELL	DESCRIPTION
I	17.2' – 16.12' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.12' – 10.2' NAVD88 (1'1" – 7' bgs)	7.5YR 4/3 brown	Loamy sand with pebble, ash, and slag inclusions. Associated with 20" water

	(0.33m – 2.13m bgs)		main. FS s 12 and 13 found within this stratum.
III	15.2' – 13.2' NAVD88 (2' – 4' bgs) (0.61m – 1.22m bgs) (north profile) (1.1' – 3'4" bgs) (0.34m – 1.02m) (south profile)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and 10" oilstatic line.

Table 5: Soil stratigraphy beneath sidewalk – Trench 1 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.2' – 16.12' NAVD88 (0' – 1'1" bgs) (0m – 0.33m bgs)	N/A	Concrete sidewalk pavement.
II	16.12' – 14.28' NAVD88 1'1" – 2'11 bgs (0.33m – 0.89m bgs)	10YR 5/2 grayish brown	Loamy sand with pebble and concrete fragment inclusions.
III	14.28' – 11.87' NAVD88 (2'11" – 5'4" bgs) (0.89m – 1.63m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and concrete fragment inclusions. Large concrete slab in west profile.



Image 5: Trench 1 Section 2 – North profile in progress.



Image 6: Trench 1 Section 2 – South extension west profile.

Section 3

Trench 1 Section 3 extended from 189' W to 164' 6" W and measured 16' north-south, its south wall moving from 7'10"N to 10'10" N at 189' W, 11'4" N at 164'6" W (Map 14). It was excavated to a depth of 11.8' NAVD88 (5'6" bgs) from the south wall up to 8' north of the south wall, and to 9.8' NAVD88 (7'6" bgs) from 8' north of the south wall to the north wall. The stratigraphy of the section was composed of modern utility fill and an older redeposited fill, similar to that seen in Section 2 (Image 7) (Table 6). The 20" main, associated with strat II, and the clay ducts and 10" oilostatic line, associated with strat III, continued eastward along the trench. A concrete utility vault was removed from the NW corner of the section, to a depth of 11.3' NAVD88 (6' bgs). FS 14, 15, and 16 were recovered from this section. These included a porcelain sherd with a blue transfer-printed Willow pattern motif, a whiteware rim sherd with a polychrome painted floral motif, and two salt-glazed stoneware sherds with blue painted decoration (Table 6).

Table 6: General soil stratigraphy – Trench 1 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.3' – 15.13' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	15.13' – 9.8' NAVD88 (1'2" – 7'6" bgs)	7.5YR 4/3 brown	Loamy sand with pebble inclusions. Associated with 20" water main. FS 14, 15, and 16 were found within this stratum.

	(0.36m – 2.29m bgs)		
III	15.3' – 13.3' NAVD88 (2' – 4' bgs) (0.61m – 1.22m bgs)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and the oilostatic line.



Image 7: Trench 1 Section 3, south profile in progress.

Section 4

Trench 1 Section 4 extended from 164'6" W to 139'6" W and measured 16' north-south, its south wall angling from 11'4" N at 164'6" W to 11'11" N at 139'6" W (Maps 14 and 15). It was excavated to a depth of 11.8' NAVD88 (5'6" bgs) from the south wall up to 8' north of the south wall, and to 9.8' NAVD88 (7'6" bgs) from 8' north of the south wall to the north wall. The section's stratigraphy was similar to that seen in Section 3 (Image 8) (Table 7). The 20" main, associated with strat II, and the clay ducts and 10" oilostatic line, associated with strat III, continued eastward along the trench.

Table 7: General soil stratigraphy – Trench 1 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.3' – 16.22' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.

II	16.22' – 9.8' NAVD88 (1'1" – 7'6" bgs) (0.33m – 2.29m bgs)	7.5YR 4/3 brown	Loamy sand with pebble inclusions. Associated with 20" water main.
III	16.22' – 13.3' NAVD88 (1'1" – 4' bgs) (0.33m – 1.22m bgs)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and the oilstatic line.



Image 8: Trench 1 Section 4 – North profile in progress.

Section 5

Trench 1 Section 5 extended from 139'6" W to 114'6" W and measured 16' north-south at 139'6" W, widening to 18'6" north-south at 127' W. The south wall ranged from 12' N at 139'6" W to 13' N at 118' W, where it then moved to 16' N bringing the north-south width to 15'6" (Map 15). It was excavated to a depth of 11.85' NAVD88 (5'6" bgs) from the south wall to 8'6" north of the south wall. From 139'6" W to 127' W, 8'6" north of the south wall to the north wall was excavated to a depth of 9.85' NAVD88 (7'6" bgs), while from 127' W to 114'6" W it reached a maximum depth of 5.85' NAVD 88 (11'6" bgs) (Image 9).

Trench 1 Section 5's stratigraphy was composed of modern utility fill and redeposited fill, similar to that seen in Section 4 (Image 10) (Tables 8 and 9).

Feature 4 was encountered intruding into the trench from the north at 117'6" W to 111' W in Sections 5 and 6. The feature was composed of two north-south oriented mortared brick walls extending from the bottom of the concrete roadbase at 16.27' NAVD88 (1'1" bgs) to 5' bgs, where they rested on a concrete slab 8" thick. The walls were each 1'3" thick, composed of three layers

of brick and separated by a deposit of coal ash and concrete rubble 4' thick (Image 11). The western wall had the remains of a steel rail sitting on top of it, at a depth of 16.52' NAVD88 (10" bgs). Feature 4 appeared to be a pier supporting the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century. The 20" main, associated with strat II, and the clay ducts and 10" oilostatic line, associated with strat III, continued eastward along the trench.

A profile drawing of Feature 4 is provided as characteristic of all 11 trolley support features identified, which typically included parallel mortared brick walls immediately below the road base, coal ash and rubble fill between the walls, a concrete slab base at least 6" thick, and remnants of steel rail, depending on the extent of the feature exposed and level of preservation (Figure 1).

Table 8: General soil stratigraphy – Trench 1 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.35' – 16.27' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.27' – 5.85' NAVD88 (1'1" – 11'6" bgs) (0.33m bgs – 3.51m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, coal ash, slag, and loose brick inclusions. Associated with 20" water main.
III	16.27' – 13.35' NAVD88 (1'1" – 4' bgs) (0.33m – 1.22m bgs)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and the oilostatic line.

Table 9: North Extension soil stratigraphy – Trench 1 Section 5 127' W to 114'6" W.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.35' – 16.27' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.27' – 10.85' NAVD88 (1'1" – 6'6" bgs) (0.33m – 1.98m bgs)	10YR 4/3 brown	Loamy sand with pebble inclusions. Associated with 20" water main.
IV	16.27' – 5.85' NAVD88 (1'1" – 11'6" bgs) (0.33m – 3.51m bgs)	7.5YR 4/3 brown mottled with 7.5YR 5/1 gray	Loamy sand with some pebble and cobble sized inclusions, very few brick fragments.



Image 9: Trench 1 Sections 5 and 6 – North extension.



Image 10: Trench 1 Section 5 – Excavation in progress.



Image 11: Trench 1 Section 5 – Feature 4 north profile in progress.

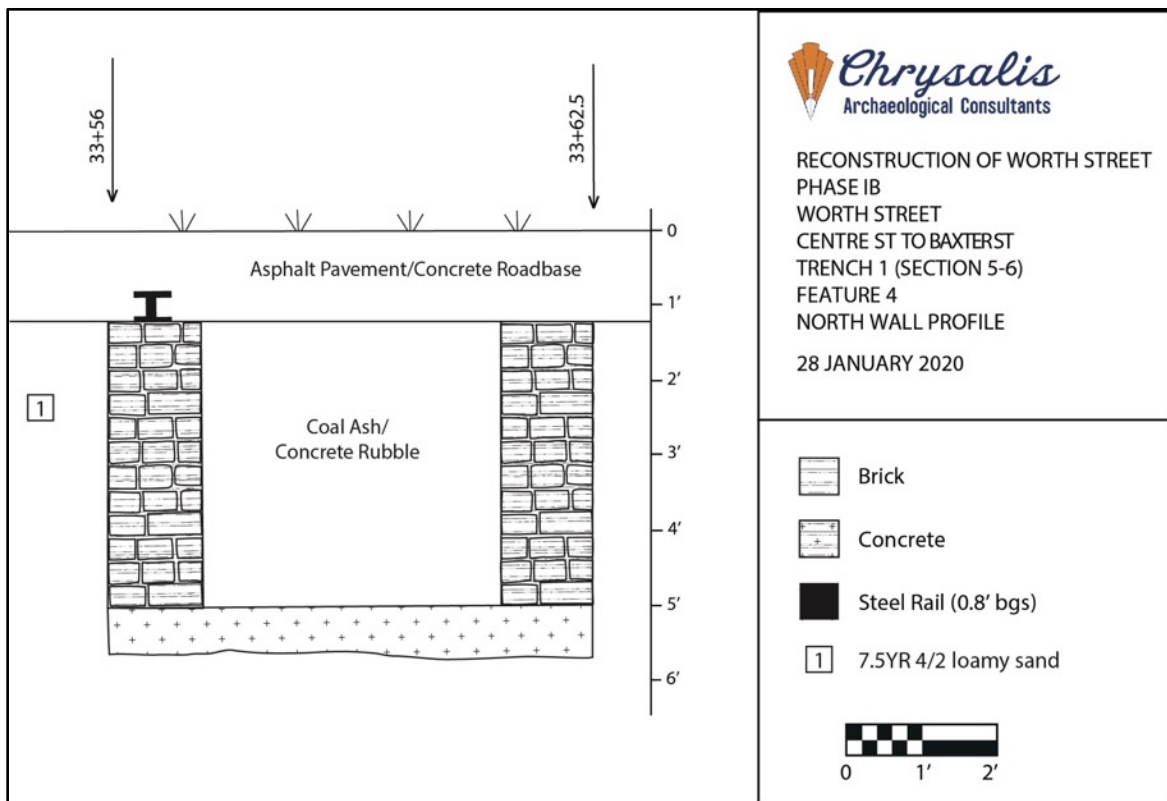


Figure 1: Feature 4 trolley support, north profile drawing.

Section 6

Trench 1 Section 6 extended from 114'6" W to 89'6" W, measuring 15'6" wide north-south from 114'6" W to 106' W, where it narrowed by 2' from the north for a new north-south width of 13'6". The south wall angled from 16'3" N at 114'6" W to 16'10" N at 105'6" W (Map 15). The trench was excavated to a depth of 11.85' NAVD88 (5'6" bgs) from the south wall to 5'6" north of the south wall, to a depth of 5.85' NAVD88 (11.5' bgs) from 8'6" north of the south wall to the north wall from 114'6" W to 123' W, and to a depth of 8.85' NAVD88 (8'6" bgs) from 5'6" north of the south wall to the north wall from 123' W to 89'6" W.

Trench 1 Section 6's stratigraphy was composed of modern utility fill and redeposited older fill, similar to that seen in Section 5 (Image 12) (Tables 10 - 11). Feature 4, as described under Section 5, continued into this section.

Feature 5 was encountered at 90' W, from 22'10" N to 25'10" N. Feature 5 was composed of two mortared brick walls extending from the bottom of the concrete roadbase at 1'1" bgs (0.33m) to 3' bgs (0.91m), where they rested on a concrete slab 6" thick. The walls were each 8" thick, composed of two layers of brick and were separated by a deposit of coal ash and concrete rubble 1'7" thick (Image 13). Feature 5 was likely a pier supporting the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century. It was fully removed during excavation

The 20" main, associated with strat II, and the clay ducts and 10" oilostatic line, associated with strat III, continued eastward along the trench, the oilostatic line turning northwards at 98'6" W.

Table 10: General soil stratigraphy – Trench 1 Section 6.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.35' – 16.27' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.27' – 8.85' NAVD88 (1'1" – 8'6" bgs) (0.33m – 2.59m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with pebble, cobble, ash, slag, and loose brick inclusions. Associated with 20" water main.
III	16.27' – 13.35' NAVD88 (1'1" – 4' bgs) (0.33 – 1.22m bgs)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and the oilostatic line.

Table 11: North Extension soil stratigraphy – Trench 1 Section 6 114'6" W to 106' W.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.35' – 16.27' NAVD88 (0 – 1' 1" bgs)	N/A	Asphalt pavement overlying concrete roadbase.

	(0 – 0.33m bgs)		
II	16.27' – 10.85' NAVD88 (1'1" – 6'6" bgs) (0.33m – 1.98m bgs)	10YR 4/3 brown	Loamy sand with pebble inclusions. Associated with 20" water main.
IV	16.27' – 5.85' NAVD88 (1'1" – 11'6" bgs) (0.33m – 3.51m bgs)	7.5YR 4/3 brown mottled with 7.5YR 5/1 gray	Loamy sand with some pebble and cobble sized inclusions, very few brick fragments.



Image 12: Trench 1 Section 6 – North profile in progress.



Image 13: Trench 1 Section 6 – Feature 5, east profile in progress.

Section 7

Trench 1 Section 7 extended from 89'6" W to 71'10" W, measuring 13'6" north-south, its south wall at 16'10" N (Map 15). The trench was excavated to a depth of 11.88' NAVD88 (5'6" bgs) from the south wall to 22'4" N, and to a depth of 8.88' NAVD88 (8'6" bgs) from 22'4" N to the north wall. Trench 1 Section 7's stratigraphy was composed of modern utility fill and redeposited older fill, similar to that seen in Section 6 (Image 14) (Table 12). The 20" main, associated with strat II, and the clay ducts and 10" oilostatic line, associated with strat III, continued eastward along the trench, the oilostatic line disappearing into the north wall at 84'6" W. At 71'10" W the trench connected with the west end of Trench 2 Section 1.

Table 12: General soil stratigraphy – Trench 1 Section 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.38' – 16.3' NAVD88 (0 – 1'1" bgs) (0 – 0.33m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.3' – 8.88' NAVD88 (1'1" – 8'6" bgs) (0.33m – 2.59m bgs)	7.5YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with 20" water main.
III	16.3' – 12.88' NAVD88 (1'1" – 4'6" bgs) (0.33m – 1.37m bgs)	10YR 6/4 light yellowish brown	Medium sand. Clean sand. Associated with clay duct banks and the oilostatic line.



Image 14: Trench 1 Section 7 – North profile in progress.

TRENCH 2, SECTIONS 1-12

Trench 2 was opened on October 25, 2018. Much of the excavation was conducted by machine, but the high density of existing utility lines necessitated hand digging throughout a large portion of the trench. Trench 2 measured 957' east-west, with a north-south width varying from 5'6" to 18'6" (Maps 14-15). The monitoring and documentation of the trench was broken up into arbitrary sections up to 30' long. Trench 2 extended from west of Baxter Street to the intersection with Park Row. Sections 1 through 12 were located on the block from Centre Street to Baxter Street.

Section 1

The first section of Trench 2 extended from 70'6" W to 45.5' W, measuring 14' wide north-south, its south wall at 16'10" N up to 51' W, at which point the section widened southward, bringing the south wall to 15'4" N, and the total north-south width to 15'6" (Maps 14-15). The trench was excavated to a depth of 8.95' NAVD88 (8'6" bgs), exposing a defunct steam utility from 13.45' to 11.45' NAVD88 (4' to 6' bgs). The section's stratigraphy was composed of a modern utility fill deposit and redeposited older fill (Image 15) (Table 13). FS 3, including a bone china base sherd with a molded floral decoration, an unidentified porcelain base sherd, and a fragment of a refined earthenware tile, was encountered in this section.

Table 13: General soil stratigraphy – Trench 2 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.45' – 16.03' NAVD88 (0 – 1'5" bgs) (0 – 0.43m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.03' – 8.95' NAVD88 (1'5" – 8'6" bgs) (0.43m – 2.59m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with steam pipe. FS 3 found within this stratum
III	16.03' – 13.45' NAVD88 (1'5" – 4' bgs) (0.43m – 1.22m bgs)	10YR 7/4 very pale brown	Medium sand. Clean sand.



Image 15: Trench 2 Section 1 – North profile in progress.

Section 2

Trench 2 Section 2 extended from 45'6" W to 20'6" W, measuring 15'6" wide north-south, its south wall at 15'4" N. At 38' W the south wall moved to 16'6" N, and at 29' W the south wall moved to 20'10" N, giving the east side of the section a north-south width of 10' (Map 16).

Trench 2 Section 2 was excavated to 9.07' NAVD88 (8'6" bgs) from 45'6" W to 27'6" W, and to 8.57' NAVD88 (9' bgs) from 27'6" W to 20'6" W. The section's stratigraphy was composed of a modern utility fill deposit and redeposited older fill, similar to that seen in Section 1 (Image 16) (Table 14). The steam pipe continued running east-west down the trench at a depth of 4' bgs.

Table 14: General soil stratigraphy – Trench 2 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.57' – 16.15' NAVD88 (0 – 1'5" bgs) (0 – 0.43m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.15' – 8.57' NAVD88 (1'5" – 9' bgs) (0.43m – 2.74m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with steam pipe.
III	16.15' – 13.57' NAVD88 (1'5" – 4' bgs) (0.43m – 1.22m bgs)	10YR 7/4 very pale brown	Medium sand. Clean sand.



Image 16: Trench 2 Section 2 – Fill strata.

Section 3

Trench 2 Section 3 extended from 20'6" W to 4'6" E, measuring 10' wide north-south, its south wall at 20'10" N (Map 16). The section was excavated to 8.65' NAVD88 (9' bgs) from 20'6" W to 18.5' W, and to 9.15' NAVD88 (8'6" bgs) from 18'6" W to 4'6" E. The section's stratigraphy was completely composed of older redeposited fill, with boulder-sized concrete fragments appearing from 10.65' to 8.65' NAVD88 (7' to 9' bgs) (Image 17) (Table 15). The steam pipe continued running down the trench east-west, rising from a depth of 13.65' NAVD88 (4' bgs) at 20'6" W to 15.15' NAVD88 (2'6" bgs) at 4'6" E.

Table 15: General soil stratigraphy – Trench 2 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.65' – 16.23' NAVD88 (0 – 1'5" bgs) (0 – 0.43m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.23' – 8.65' NAVD88 (1'5" – 9' bgs) (0.43m – 2.74m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Boulder-sized concrete fragments from 10.65' to 8.65' NAVD88 (7' to 9' bgs) (2.13m to 2.74m bgs). Associated with steam pipe.



Image 17: Trench 2 Section 3 – Excavation in progress.

Section 4

Trench 2 Section 4 extended from 4'6" E to 29'6" E, measuring 10' wide north-south, its south wall at 20'10" N (Map 16). It was excavated to a depth of 9.21' NAVD88 (8'6" bgs). A pit measuring 2'6" east-west by 3'6" north-south, its SW corner at 18'4" N, 17'6" E, was excavated to 8.21' NAVD88 (9'6" bgs). Wooden sheeting from a previous excavation was encountered within this pit (Image 18).

Feature 6 was encountered intruding into the trench from the south at 10' E to 15' E from 15.71' NAVD88 to the trench floor at 9.21' NAVD88 (2' to 8'6" bgs), its north wall at 18'4" N. Feature 6 was comprised of three mortared brick walls, the north wall made up of one layer of bricks, the east and west walls made up of two layers, enclosing a space filled with 10YR 4/2 dark grayish brown loamy sand with slag inclusions (Image 19). Feature 6's walls were oriented on the same east-west axis as Worth Street, and its position did not match any historic mapped structures predating Worth Street. The loamy sand and slag fill within was similar to fill noted within trolley track supports found across the APE. Feature 6 likely was a previously damaged trolley track support or a defunct utility box dating after the 1833 expansion of Worth Street between Little Water and Cross Streets (see Map 27, VII. Conclusions for historic overlay).

Trench 2 Section 4's stratigraphy was completely composed of the older redeposited fill similar to that seen in Section 3, with boulder-sized concrete fragments appearing from 10.71' to 8.71' NAVD88 (7' to 9' bgs) (Image 20) (Table 16). Several artifacts, comprising FS 4, 5, and 6, were recovered in this section. These included a Bristol-glazed stoneware bottle neck, a plain whiteware body sherd, a whiteware body sherd with an indeterminate molded design, a whiteware rim sherd with a polychrome painted floral design, a piece of butchered animal bone, and an embossed green glass Mountain Dew® bottle fragment. All artifacts were found within the same context (Table 16). The steam pipe continued running down the trench east-west at a depth of 15.21' NAVD88 (2'6" bgs).

Table 16: General soil stratigraphy – Trench 2 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.71' – 14.38' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	14.38' – 8.21' NAVD88 (1'4" – 9'6" bgs) (0.41m – 2.9m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 4–6 found within this stratum.



Image 18: Trench 2 Section 4 – Old sheeting in test pit.



Image 19: Feature 6 – Plan view.



Image 20: Trench 2 Section 4 – Boulder-sized concrete fragment.

Section 5

Trench 2 Section 5 extended from 29'6" E to 54'6" E, measuring 10' wide north-south, its south wall at 20'10" N. It was excavated to a depth of 9.5' NAVD88 (8'6" bgs) (Maps 16-17). The section's stratigraphy was composed of two layers of the redeposited older fill, differing only in color (Image 21) (Table 17). FS 7 was recovered from this section. This included one plain whiteware sherd, six blue transfer-printed whiteware sherds, a plain pearlware sherd, two painted pearlware sherds with a floral motif, a plain creamware sherd, a porcelain sherd with a blue-painted chinoiserie-style motif, five stoneware sherds, and a fragment of colorless glass (Table 17). The steam pipe continued running down the trench east-west at a depth of 15.5' NAVD88 (2'6" bgs).

Feature 1 was encountered in the north wall of Trench 2 Section 5 from 47'6" E to 53'6" E. The feature was composed of two north-south oriented mortared brick walls extending from the bottom of the concrete roadbase at 16.66' NAVD88 (1'4" bgs) down to 11.66' NAVD88 (6'4" bgs). The walls were 1' thick, composed of 3 layers of brick and were separated by a deposit of 10YR 4/2 dark grayish brown loamy sand and concrete rubble 4' thick (Image 22). This feature was likely

a pier supporting the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century.

Table 17: General soil stratigraphy – Trench 2 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18' – 16.66' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.66' – 11.33' NAVD88 (1'4" – 6'8" bgs) (0.41m – 2.03m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 7 found within this stratum.
III	11.33' – 9.5' NAVD88 (6'8" – 8'6" bgs) (2.03m – 2.59m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 21: Trench 2 Section 5 – Fill strata



Image 22: Trench 2 Section 5 – Feature 1 north profile in progress.

Section 6

Trench 2 Section 6 extended from 54'6" E to 79'6" E, measuring 10' wide north-south, its south wall at 20'10" N (Map 17). It was excavated to a depth of 9.7' NAVD88 (8'6" bgs). The section's stratigraphy was composed of layers of the redeposited older fill, similar to that seen in Section 5 (Image 23) (Table 18). FS 8 was recovered from this section. This included a Bristol-glazed stoneware bottle sherd, three plain whiteware sherds, one molded whiteware sherd, one shell-edged pearlware rim sherd, one polychrome-painted pearlware base sherd, one red glass bottle fragment, and one olive glass bottle fragment. The steam pipe continued running down the trench east-west at a depth of 15.7' NAVD88 (2'6" bgs).

Table 18: General soil stratigraphy – Trench 2 Section 6.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.2' – 17.03' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	17.03' – 11.7' NAVD88 (1'2" – 6'6" bgs) (0.36m – 1.98m bgs)	10YR 4/2 dark grayish brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 8 found within this stratum.
III	11.7' – 9.7' NAVD88 (6'6" – 8'6" bgs) (1.98m – 2.59mm bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 23: Trench 2 Section 6 – Excavation in progress.

Section 7

Trench 2 Section 7 extended from 79'6" E to 104'6" E, measuring 10' wide north-south, its south wall at 20'10" N at 79'6" E, angling to 20'7" N at 104'6" E (Map 17). It was excavated to a depth of 10.1' NAVD88 (8'6" bgs). The section's stratigraphy was composed of the redeposited older fill seen in Section 6 (Table 19). FS 9 was recovered from this section. This included two Bristol-glazed stoneware bottle neck sherds, three indeterminate stoneware sherds, a porcelain rim sherd, a whiteware chamber pot rim sherd, a blue-painted whiteware shell edge sherd, two plain whiteware sherds, a molded white granite rim sherd, a black-glazed redware sherd, an olive glass bottle fragment, and a colorless glass bottle fragment (Table 19). The steam pipe continued running down the trench east-west at a depth of 16.1' NAVD88 (2'6" bgs).

Feature 2 was encountered intruding 3' into the trench from the north from 93'6" E to 99'6" E, its south edge at 22'4" N (Image 24). The feature was composed of two mortared brick walls, extending from the bottom of the concrete roadbase at 17.27' to 12.27' NAVD88 (1'4" to 6'4" bgs). The walls were 1' thick, composed of three layers of brick and were separated by a deposit of 10YR 4/2 dark grayish brown loamy sand and concrete rubble 4' thick. This feature was likely a pier supporting the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century.

Table 19: General soil stratigraphy – Trench 2 Section 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.6' – 17.27' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	17.27' – 10.1' NAVD88 (1'4" – 8'6" bgs) (0.41m – 2.59m bgs)	7.5YR 4/2 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 9 found within this stratum.



Image 24: Trench 2 Section 7 – North profile showing Feature 2.

Section 8

Trench 2 Section 8 extended from 104'6" E to 129'6" E, measuring 10' wide north-south from 104'6" E to 110' E, where the north wall was cut back by 1', for a total north-south width of 11'. The south wall of the section was at 20'7" N at 104'6" E, angling to 20'6" N at 129'6" E (Map 17). Trench 2 Section 8 was excavated to a depth of 10.4' NAVD88 (8'6" bgs). The section's stratigraphy was composed of the redeposited older fill, similar to that seen in Section 7 (Image 25) (Table 20). FS 10, one Bristol-glazed stoneware bottle base sherd was recovered from this section (Table 20). The steam pipe continued running down the trench east-west at a depth of 16.4' NAVD88 (2'6" bgs).

Table 20: General soil stratigraphy – Trench 2 Section 8.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.9' – 16.86' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.86' – 10.4' NAVD88 (1'4" – 8'6" bgs) (0.41m – 2.59m bgs)	7.5YR 4/2 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 9 found within this stratum.



Image 25: Trench 2 Section 8 – South profile in progress.

Section 9

Trench 2 Section 9 extended from 129'6" E to 159'6" E, measuring 11' wide north-south from 129'6" E to 142'6" E, where the south wall falls back, widening southward from 20'6" N to abut the south curblin at 13'4" N, giving a north-south width of 18'2". From 154' E to 159'6" E the south wall moved back to 20'6" N (Maps 17-18). It was excavated to 14.85' NAVD88 (4'6" bgs) from 13'3" N to 20'6" N and to a depth of 10.85' NAVD88 (8'6" bgs) from 20'6" N to the north wall at 31'6".

Trench 2 Section 9's stratigraphy was primarily composed of the redeposited older fill and layers of modern fill associated with the various utilities as well as some sheeting from a previous excavation, encountered in the north wall at 153'6" E (Images 26-27) (Table 19). The steam pipe continued running down the trench east-west at a depth of 17.35' NAVD88 (2' bgs), turning southwards and disappearing into the south wall at 145'9" E.

Table 21: General soil stratigraphy – Trench 2 Section 9.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.35' – 17.93' NAVD88 (0 – 1'5" bgs) (0 – 0.43m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	17.93' – 10.85' NAVD88 (1'5" – 8'6" bgs) (0.43m – 2.59m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	17.93' – 14.85' NAVD88 (1'5" – 4'6" bgs) (0.43m – 1.37m bgs)	10YR 7/4 very pale brown	Clean sand associated with duct bank, appearing in south wall at 140'6" E (42.82m E).
IV	17.93' – 12.85' NAVD88 (1'5" – 6'6" bgs) (0.43m – 1.98m bgs)	10YR 7/4 very pale brown	Clean sand associated with wooden sheeting appearing in the north wall at 153'6" E (46.79m E).



Image 26: Trench 2 Section 9 – South profile in progress.



Image 27: Trench 2 Sections 9 & 10 – Old sheeting in wall.

Section 10

Trench 2 Section 10 extended from 159'6" E to 184'6" E, measuring 10'3" wide north-south with the south wall at 20'6" N from 159'6" E to 176'6" E, narrowing to 8'5" wide north-south from 176'6" E to 184'6" E, where the south wall moved to 22'4" N (Map 18). The section was excavated to a depth of 9.69' NAVD88 (10' bgs). The 10" oilstatic line emerged from the north wall at 159'11 E, proceeding south-eastwards along the section at a depth of 14.19' NAVD88 (5'6" bgs), its centerline reaching 24'8" N at 184'6" E, while the clay-lined duct bank continued running eastwards down the trench along the south wall at 17.69' NAVD88 (2' bgs), from 20'5" N to 22'6" N (Image 28). The north wall of the section abutted a concrete utility vault from 177'6" E to 191' E in Section 11, extending from 18.52' to 11.19' NAVD88 (1'2" to 8'6" bgs) (Image 29).

Trench 2 Section 10's stratigraphy was composed of layers of modern utility fill, as well as the redeposited older fill similar to that seen in Section 9 (Table 22).

Table 22: General soil stratigraphy – Trench 2 Section 10.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.69' – 18.52' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	18.52' – 9.69' NAVD88 (1'2" – 10' bgs) (0.36m – 3.05m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.52' – 16.19' NAVD88 (1'2" – 3'6" bgs) (0.36m – 1.07m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with RCA gravel, associated with the clay lined ducts running along the south wall.
IV	18.52' – 12.69' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 28: Trench 10 Section 10 – Utility lines.



Image 29: Trench 10 Section 10 – Utility vault in north profile.

Section 11

Trench 2 Section 11 extended from 184'6" E to 209'6", its south wall at 22'4" N, measuring 8'5" wide north-south from 184'6" E to 191' E, where the section expanded northwards by 3'1" , for a north-south width of 11'6" from 191' E to 206' E, where the section narrowed from the north by 3', giving a north-south width of 8'6" from 206' E to 209'6" E (Map 18). The oilostatic line continued running east-west down the trench, its centerline reaching 23'4" N at 193'6" E and remaining at that northing from there eastward. A 3' diameter brick-lined manhole was present in the section at 29'7" N, 208'3" E (Image 30).

The trench was excavated to 10.78' NAVD88 (9'6" bgs), save for the area from 187'6" E to 207'6" E, where the trench reached 8.28' NAVD88 (12' bgs) from 26'10" N to the north wall. The sewer was encountered at this depth (Image 31). The section's stratigraphy composed of layers of modern utility fill and redeposited older fill, similar to that seen in Section 10 (Table 23).

Feature 10 was encountered from 198'6" E to 205'6" E, emerging from the north wall and reaching 25'10" N (Image 32). The feature was composed of two mortared brick walls, extending from the bottom of the concrete roadbase at 1'2" bgs to 5'6" bgs, where they rested on a 6" thick concrete slab. The west wall was 1' thick, composed of 3 layers of brick, with an overhang extending to 200'6" E from 19.11' to 18.28' NAVD88 (1'2" to 2' bgs). The east wall was primarily of the same dimensions, with a portion of the wall at 30'10" N to 33'10" N sloping inwards from bottom to top, from 2' wide at 19.11' NAVD88 (1'2" bgs) to 1' wide at 14.78' NAVD88 (5'6" bgs). A sampled brick from the feature bore the maker's mark "LYNCH" (Image 33). This mark may be associated with one of the brickyards operated by Patrick Lynch in Haverstraw, NY or Ulster, NY

from 1887 to 1910 (Graves 2020). The two walls were separated by a deposit of 10YR 3/2 very dark grayish brown loamy sand with pebble and cobble inclusions 5' thick. This feature was likely a pier supporting the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century.

Table 23: General soil stratigraphy – Trench 2 Section 11.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.28' – 19.11' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.11' – 8.28' NAVD88 (1'2" – 12' bgs) (0.36m – 3.66m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	19.11' – 14.28' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.
IV	19.11' – 15.28' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 3/3 dark brown	Loamy sand with pebbles and brick fragments. Overlies strat II in deeper area from 187'6" E to 207'6" E (57.15m E to 63.25m E), associated with clay-lined ducts.



Image 30: Trench 2 Section 11 – Brick manhole in north wall.



Image 31: Trench 2 Section 11 – Sewer at 8.28' NAVD88 (12' bgs).



Image 32: Trench 2 Section 11 – Feature 10, north profile in progress.



Image 33: Trench 2 Section 11 – Feature 10, brick detail.

Section 12

Trench 2 Section 12 extended from 209'6" E to 234'6" E, its south wall at 22'4" N, measuring 8'6" wide north-south (Map 18). The oilstatic line continued running east-west down the trench at 5'6" bgs, its centerline at 23'4" N. The section was excavated to a maximum depth of 11' NAVD88 (9'6" bgs) at 209'6" E, sloping up to 11.5' NAVD88 (9' bgs) at 234'6" E. The trench largely overlapped the former location of Trench 4 Sections 3 and 4, which had previously been excavated and backfilled, from the south wall to 29'4" N, 226'6" E to 234'6" E, however, Trench 2 Section 12 reached a greater maximum depth than the previous excavation, so previously untouched areas were encountered across the entire trench floor.

Trench 2 Section 12's stratigraphy was mostly composed of redeposited older fill, with boulder-sized asphalt fragments appearing at 15' NAVD88 (5'6" bgs). There was also the modern clean fill, associated with the oilstatic line, and a pocket of 10YR 7/2 light gray ash in the north wall from 227'6" E to 229'6" E (Image 33) (Table 24).

Table 24: General soil stratigraphy – Trench 2 Section 12.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.5' – 19.33' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.33' – 11' NAVD88 (1'2" – 9'6" bgs) (0.36m – 2.9m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Large asphalt fragments appearing at 15' NAVD88 (5'6" bgs) (1.68m bgs).
III	19.33' – 13.5' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.
IV	16.5' – 15' NAVD88 (4' – 5'6" bgs) (1.22 – 1.68m bgs)	10YR 7/2 light gray	Ash pocket appearing in the north wall from 227'6" to 229'6" (69.34m E to 69.95m E).



Image 34: Trench 2 Section 12 – North profile in progress.

TRENCH 3

Trench 3 was opened on March 11, 2019. Much of the excavation was conducted by machine, but the high density of existing utility lines necessitated hand digging throughout a large portion of the trench. Trench 3 measured 197'6" east-west, with a north-south width varying from 5'2" to 8'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 3 Section 1 extended from 41' W to 16' W, measuring 6'6" wide north south with its south wall at 15'4" N from 41' W to 36' W, moving to 16'7" N at 36' W for a north-south width of 5'2", and from there angling to 15'10" N at 20'6" W for a final north-south width of 6' (Map 16). The section overlapped the previously excavated Trench 2 Section 2 fully from 41' W to 29' W (12.5m W to 8.84m W), overlapping with Trench 2 Sections 2 and 3 from 20'10" N to the north wall at 21'10" N from 29' W to 16' W.

Trench 3 Section 1 was excavated to a depth of 11.14' NAVD88 (6' bgs) at 41' W, rising to 12.14' NAVD88 (5' bgs) at 16' W. Other than backfill from Trench 2 Sections 2 and 3, the section's stratigraphy was composed entirely of redeposited historic fill (Image 35) (Table 25). The defunct 20" water main was encountered with its centerline at 18'6" N, at a depth of 12.14' NAVD88 (5' bgs) at 41' W, rising to a depth of 13.14' NAVD88 (4' bgs) at 16' W.

Table 25: South profile stratigraphy – Trench 3 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.14' – 15.56' NAVD88 (0 – 1'7" bgs) (0 – 0.48m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	15.56' – 11.14' NAVD88 (1'7" – 6' bgs) (0.48m – 1.83m bgs)	7.5YR 4/2 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 35: Trench 3 Section 1 – South profile.

Section 2

Trench 3 Section 2 extended from 16' W to 9' E, measuring 6' wide north-south, its south wall at 15'10" N, up to 2'3" E, where the wall moved to 17'4" N to divert around a manhole vault. From 7'3" E to 9' E the south wall moved to 13'4" N, with the pavement and roadbase stripped away to a depth of 15.98' NAVD99 (1'6" bgs) from 13'4" N to 16' N (Map 16). The section overlaps the former location of Trench 2 Sections 3 and 4 from 20'10" N to the north wall at 21'10" N. The section was excavated to a depth of 12.48' NAVD88 (5' bgs).

The section's stratigraphy was composed entirely of the redeposited historic fill recorded elsewhere in this block (Image 36) (Table 26). The defunct 20" water main continued running east-west down the trench at a depth of 13.48' NAVD88 (4' bgs), its centerline at 18'6" N up to 7'11" E, where the main shifted southwards, reaching 17' N at 9' E.

Table 26: General soil stratigraphy – Trench 3 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.48' – 15.98' NAVD88 (0 – 1'6" bgs) (0 – 0.46m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	15.98' – 12.48' NAVD88 (1'6" – 5' bgs) (0.46m – 1.52m bgs)	7.5YR 4/2 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 36: Trench 3 Section 2 – Excavation in progress.

Section 3

Trench 3 Section 3 extended from 9' E to 34' E, measuring 8'6" wide north-south, its south wall at 13'4" N (Map 16). The section overlaps the former locations of Trench 2 Sections 4 and 5 from 20'10" N to the north wall at 21'10" N. The trench was excavated to a depth of 12.6' NAVD88 (5' bgs), except for the following areas: from 13'4" N, 9' E to 16' N, 15'3" E the pavement and roadbase was stripped to a depth of 16.1' NAVD88 (1'6" bgs) (Image 37); from 13'4" N, 15'3" E to 16'4" N, 19'3" E reached 11.6' NAVD88 (6' bgs), exposing a water connection line at 12.1' NAVD88 (5'6" bgs) (Image 38); from 13'4" N, 19'3" E to 15'4" N, 34' E the pavement and roadbase was stripped to a depth of 16.93' NAVD88 (8" bgs).

Other than MFM's backfill from Trench 2 Sections 4 and 5, the section's stratigraphy was composed entirely of a 7.5YR 4/2 brown loamy sand with pebble, cobble, and loose brick inclusions (Image 37) (Table 27). The defunct 20" water main continued running east-west down the trench at a depth of 12.6' NAVD88 (4' bgs), its centerline at 18'6" N from 9' E to 19'3"E where it began shifting northwards, reaching 17'8" N at 34' E.

Table 27: General soil stratigraphy – Trench 3 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.6' – 16.27' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	16.27' – 12.6' NAVD88 (1'4" – 5' bgs) (0.41m – 1.52m 1bgs)	7.5YR 4/2 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 37: Trench 3 Section 3 – Pavement stripped to 16.1' NAVD88 (1'6" bgs).



Image 38: Trench 3 Section 3 – Water connection line at 12.1' NAVD88 (5'6" bgs).

Section 4

Trench 3 Section 4 extended from 34' E to 59' E, measuring 8'6" wide north-south, its south wall at 13'4" N (Maps 16-17). The section overlaps the former locations of Trench 2 Sections 5 and 6 from 20'10" N to the north wall at 21'10" N. The trench was excavated to a depth of 12.77' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 15'4" N at 34' E and from 13'4" N to 16'4" N at 59' E. This area was excavated to 17.1' NAVD88 (8" bgs) at 34' E, reaching 15.1' NAVD88 (2'8" bgs) at 59' E (Image 39). The defunct 20" water main continued running east-west down the trench at a depth of 13.77' bgs (4' bgs), its centerline at 17'8" N at 34' E, moving to 18'1" N at 42'6" E and remaining at that northing through to 59' E.

The section's stratigraphy was composed primarily of the redeposited historic fill noted across the area, along with several layers of fill in the south half of the trench associated with various Con Edison ducts and MFM's backfill from Trench 2 Sections 5 and 6 (Image 39)(Table 28).

Table 28: General soil stratigraphy – Trench 3 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.77' – 16.6' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 17.1' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	16.6' – 12.77' NAVD88 (1'2" – 5' bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions. Begins at 15.1' NAVD88

	(0.36m – 1.52m bgs)		(2'8") (0.81m bgs) bgs to the south of the water main, underlying strat IV.
III	17.1' – 16.6' NAVD88 (8" – 1'2" bgs) (0.2m – 0.36m bgs)	7.5YR 3/2 dark brown	Loamy sand fill with pebble inclusions. Only present to the south of the water main.
IV	16.6' – 15.1' NAVD88 (1'2" bgs – 2'8" bgs) (0.36m – 0.81m bgs)	2.5Y 6/3 light yellowish brown	Clean loamy sand associated with Con Edison ducts. Only present to the south of the water main.



Image 39: Trench 3 Section 4 – South profile and berm.

Section 5

Trench 3 Section 5 extended from 59' E to 84' E, measuring 8'6" wide north-south, its south wall at 13'4" N (Map 17). The section overlaps the former locations of Trench 2 Sections 6 and 7 from 20'10" N to the north wall at 21'10" N. The trench was excavated to a depth of 12.95' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 16'4" N, which was excavated to a depth of 15.28' NAVD88 (2'8" bgs) (Image 40). The defunct 20" water main continued running east-west down the trench at a depth of 15.95' NAVD88 (4' bgs), its centerline at 18'1" N.

Other than MFM's backfill from Trench 2 Sections 6 and 7, the section's stratigraphy was composed primarily of the redeposited historic fill noted across the block, with a layer of modern fill to the south of the water main (Table 29).

Table 29: General soil stratigraphy – Trench 3 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.95' – 16.78' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 17.28' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	16.78' – 12.95' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Begins at 15.12' NAVD88 (2'10" bgs) (0.86m bgs) to the south of the water main, underlying strat III.
III	17.28' – 15.12' NAVD88 (8" – 2'10" bgs) (0.2m – 0.86m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with pebble inclusions. Only present to the south of the water main.



Image 40: Trench 3 Section 5 – South profile and berm.

Section 6

Trench 3 Section 6 extended from 84' E to 109' E, measuring 8'4" wide north-south, its south wall at 13'4" N (Map 17). The section overlaps the former locations of Trench 2 Sections 7 and 8 from 20'7" N to the north wall at 21'10" N. The trench was excavated to a depth of 13.17' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 16'7" N, which was excavated to a depth of 15.67' NAVD88 (2'6" bgs) (Image 41). The defunct 20" water main continued running east-west down the trench at a depth of 14.67' NAVD88 (3'6" bgs), its centerline at 18'1" N at 84' E, shifting northward to 18'7" N at 98'11" E. The section's stratigraphy was similar to that seen in Trench 3 Section 5 (Table 30).

Table 30: General soil stratigraphy – Trench 3 Section 6.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.17' – 17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 17.5' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	17' – 13.17' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Begins at 15.34' NAVD88 (2'10" bgs) (0.86m bgs) to the south of the water main, underlying strat III.
III	17.5' – 15.34' NAVD88 (8" – 2'10" bgs) (0.2m – 0.86m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with pebble inclusions. Only present to the south of the water main.



Image 41: Trench 3 Section 6 – South profile and berm

Section 7

Trench 3 Section 7 extended from 109' E to 134' E, measuring 8'4" wide north-south, its south wall at 13'4" N (Map 17). The section overlaps the former locations of Trench 2 Sections 8 and 9 from 20'7" N to the north wall at 21'10" N at 109' E, shifting to 20'6" N to the north wall at 21'6" N at 134' E. The trench was excavated to a depth of 13.23' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 16'4" N, which was excavated to a depth of 15.73' NAVD88 (2'6" bgs) (Image 42). The defunct 20" water main continued running east-west down the trench at a depth of 14.73' NAVD88 (3'6" bgs), its centerline at 18'7" N at 109' E to 117' E, where it began shifting south, ending at 18'N at 134' E. A cement-clad ECS duct bank emerged from the berm at 129'7" E, moving north-eastward across the trench at 2'4" bgs.

Other than MFM's backfill from Trench 2 Sections 8 and 9, the section's stratigraphy was composed of the redeposited historic fill noted across the block, and a layer of modern fill associated with the ECS duct bank (Image 42) (Table 31).

Table 31: General soil stratigraphy – Trench 3 Section 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.23' – 17.06' NAVD88 0 – 1'2" bgs (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 17.56' NAVD88 (8" bgs) (0.2m bgs) along the south wall.

II	17.56' – 13.23' NAVD88 (8" – 5' bgs) (0.2m – 1.52m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	17.06' – 14.23' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 7/3 very pale brown	Clean coarse sand, associated with the ECS duct bank.



Image 42: Trench 3 Section 7 – South profile and berm.

Section 8

Trench 3 Section 8 extended from 134' E to 156'6" E, measuring 8' wide north-south, its south wall at 13'4" N (Map 17). The section overlaps the former location of Trench 2 Section 9 from 20'6" N to the north wall at 21'6" N from 134'E to 142'6" E, where the section encountered the open south-extension of Trench 2 Section 9, which overlapped it entirely, up to 154' E. The trench was excavated to a depth of 13.44' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 16'4" N from 134'E to 145' E, which was excavated to a depth of 15.94' NAVD88 (2'6" bgs) (Image 43).

The cement-clad ECS duct bank continued across the trench north-eastward at a depth of 16.11' NAVD88 (2'4" bgs), turning due east at 144'11" E, its centerline at 21' N. The defunct 20" water main continued running east-west down the trench at a depth of 14.94' NAVD88 (3'6" bgs), its centerline shifting from 18' N at 134' E to 17'7" N at 156'6" E. The section's stratigraphy was similar to that seen in Section 7 (Image 46) (Table 32).

Feature 7, a brick-lined shaft, was encountered in the berm at 135'11" E to 138'8" E, its north-most point at 16'7" N, 137' E (Image 44). The top course of brick was encountered at a depth of 17.11' NAVD88 (1'4") bgs. The brick shaft walls were composed of two layers of brick, and the fill documented within the exposed portion of the shaft was a 10YR 4/2 dark grayish brown loamy sand (Image 45). Except for this small sliver visible in profile, the feature was located north of the project's excavation trench area and therefore not impacted by construction.

Based on historic map overlays, this shaft may have been a rear yard feature of 72 Cross Street, a lot impacted by Worth Street's extension and de-listed from the tax register in 1833 (HPI 2013: Appendix A) (see Map 28, VII. Conclusions). The rear portion of the former residential building lot would have been razed and covered by the southern side of Worth Street after its 1833 expansion east. Much of the surrounding area from this lot became the recognizable open, triangular zone formed by Worth Street, Little Water Street, and Cross Street within Five Points after the area's buildings were razed for Worth Street's extension.

Table 32: General soil stratigraphy – Trench 3 Section 8.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.44' – 17.27' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 17.77' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	17.77' – 13.44' NAVD88 (8" – 5' bgs) (0.2m – 1.52m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	17.27' – 14.44' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 7/3 very pale brown	Clean coarse sand, associated with the ECS duct bank.



Image 43: Trench 3 Section 8 – Excavation in progress.



Image 44: Trench 3 Section 8 – Feature 7 south profile.



Image 45: Trench 3 Section 8 – Feature 7 plan view.



Image 46: Trench 3 Section 8 – East profile.

TRENCH 4, SECTIONS 1-3

Trench 4 was opened on March 13, 2019. Much of the excavation was conducted by machine, but the high density of existing utility lines necessitated hand digging throughout a large portion of the trench. Trench 4 measured 632'6" east-west, with a north-south width varying from 4' to 25'. The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long. Trench 4 extended from west of Baxter Street to the intersection with Park Row. Sections 1 through 3 were located on the block from Centre Street to Baxter Street.

Section 1

Trench 4 Section 1 extended from 156'6" E to 181'6" E, its north wall at 20'8" N. The north-south width of the trench varied as the south wall changed: 5' wide from 156'6" E to 161'6" E and 169' E to 170'8" E, 7.4' wide from 161'6" E to 169' E and 170'8" E to 181'6" E where the south wall abutted the south curb at 13'4" N (Map 18). The trench was excavated to a depth of 13.7' NAVD88 (5' bgs), save for a berm along the south wall extending from 13'4" N to 14'10" N from 170'8" E to 181'6" E which was excavated to a depth of 17.7' NAVD88 (1' bgs) (0.3m bgs), with only the pavement and roadbase stripped (Image 47).

The defunct 20" water main continued running east-west down the trench at a depth of 15.2' NAVD88 (3'6" bgs), its centerline at 17'7" N. The ECS duct bank continued running east-west along the north wall at a depth of 13.37' NAVD88 (2'4" bgs), its south edge at 19' N. Trench 4 Section 1's stratigraphy was composed layers of clean fill associated with the utilities found in the trench (Image 47) (Table 33).

Table 33: General soil stratigraphy – Trench 4 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.7' – 17.37' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 18.03' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	18.03' – 13.7' NAVD88 (8" – 5' bgs) (0.2m – 1.52m bgs)	7.5YR 3/4 dark brown	Clean loamy sand, associated with the 20" water main.
III	17.37' – 16.2' NAVD88 (1'4" – 2'6" bgs) (0.41m – 0.76m bgs)	2.5Y 5/6 light olive brown	Clean coarse sand, associated with the ECS duct bank.



Image 47: Trench 4 Section 1 – Plan view.

Section 2

Trench 4 Section 2 extended from 181'6" E to 206'6" E, its north wall at 20'8" N. The north-south width of the trench varied as the south wall changed: 7'5" wide from 181'6" E to 198'6" E where the south wall abutted the south curb at 13.3' N, narrowing to 5' from 198'6" E to 206'6" E (Map 18). The trench was excavated to a depth of 5' bgs, save for a berm along the south wall extending from 13'4" N to 14'10" N from 170'8" E to 181'6" E which was excavated to a depth of 1' bgs, with only the pavement and roadbase stripped (Image 48).

The defunct 20" water main continued running east-west down the trench at a depth of 15.91' NAVD88 (3'6" bgs), its centerline at 17'7" N from 181'6" E to 199'6" E, where it turned southward, disappearing into the south wall of the trench at 201'6" E. The ECS duct bank continued running east-west along the north wall at a depth of 17.08' NAVD88 2'4" bgs, its south edge at 19' N. The section's stratigraphy was similar to that seen in Section 1 (Image 48) (Table 34).

Table 34: General soil stratigraphy – Trench 4 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.41' – 18.08' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase. The concrete roadbase reaches only 18.74' NAVD88 (8" bgs) (0.2m bgs) along the south wall.
II	18.74' – 14.41' NAVD88 (8" – 5' bgs) (0.2m – 1.52m bgs)	7.5YR 3/4 dark brown	Clean loamy sand, associated with the 20" water main.
III	18.08' – 16.91' NAVD88 (1'4" – 2'6" bgs) (0.41m – 0.76m bgs)	2.5Y 5/6 light olive brown	Clean coarse sand, associated with the ECS duct bank.



Image 48: Trench 4 Section 2 – Excavation in progress.

Section 3

Trench 4 Section 3 extended from 206'6" E to 231'6" E, its north wall at 20'8" N from 206'6" E to 226'6" E, where the wall moved to 29'4" N, as the trench expanded in width from 5' to 13'6" (Map 18). The trench was excavated to a depth of 14.65' NAVD88 (5' bgs), save for a berm in the north-east corner of the section extending from 24'6"N to the north wall at 29'4" N, 227'11" E to 231'6" E. This berm was excavated to a depth of 15.65' NAVD88 (4' bgs) (Image 49).

The defunct 20" water main re-emerged from the south wall of the trench at 222'6" E, crossing the trench north-eastward at a depth of 16.32' NAVD88 (3'4" bgs), ending at 23'4" N, 231'6" E. The ECS duct bank continued running east-west along the north wall at a depth of 17.15' NAVD88 (2'6" bgs), its centerline at 20'7" N. The section's stratigraphy was composed of layers of modern fill associated with the utilities found in the trench overlying the redeposited historic fill noted across much of the block (Table 35).

Table 35: South profile soil stratigraphy – Trench 4 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.65' – 18.65' NAVD88 (0 – 1' bgs) (0 – 0.3m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.57' – 18.32' NAVD88 (1" – 1'4" bgs) (0.03m – 0.41m bgs)	7.5YR 4/3 brown	Clean loamy sand.
III	18.32' – 15.98' NAVD88 (1'4" – 3'8" bgs) (0.41m – 1.12m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with approximately 50% RCA gravel inclusions.
IV	15.98' – 14.65' NAVD88 (3'8" – 5' bgs) (1.12m – 1.52m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and brick fragment inclusions.



Image 49: Trench 4 Section 3 – North extension west profile.

TRENCH 6

Trench 6 was opened on May 24, 2019. Much of the excavation was conducted by machine, but the high density of existing utility lines and cramped conditions necessitated hand digging throughout a large portion of the trench. Trench 6 measured 60' east-west, with a north-south width varying from 6'6" to 13'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 22' long.

Section 1

Trench 6 Section 1 extended from 153'6" W to 136'10" W. From 150'10" W to 139'4" W the section straddled the south curbline, its south wall at 1'10" N, its north-south width varying from 13'3" at 150'8" W to 13'6" at 139'4" W as the north wall paralleled the curb. From 153'6" W to 150'10" W and from 139'4" W to 136'10" W the trench lay within the street, its south wall abutting the curb, with a north-south width of 6'6" (Maps 14-15).

Section 1 overlapped the former location of Trench 1 Sections 4 and 5 from its north wall to 11'5" N at 153'6" W and to 12' N at 136'10" W, however, Trench 6 Section 1 reached a greater max depth. After the portion of Section 1 beneath the sidewalk was excavated to a depth of 12.9' NAVD88 (4' bgs), protective sheeting was installed along three sides: the south side at 2'10" N, the west side at 150'4" W, and the east side at 141'4" W; the east and west sheeting reaching to 9'10" N. The area within the sheeting was then excavated to a depth of 9.9' NAVD88 (7' bgs), where it encountered a concrete slab or floor.

Feature 11 was encountered abutting the south trench wall below the south curb, beginning at a depth of 13.9' NAVD88 (3' bgs), extending to the trench floor at 12.9' NAVD88 (4' bgs). The feature was a mortared stone wall (Image 50).

Feature 12 was encountered at 3'4" bgs underlying the clay lined ducts at 9'10" N, extending from 151' W to 139' W. Feature 12 was a second mortared stone wall, composed of two layers of stone. Feature 12 was 1'6" thick and extended down to the trench floor at 9.9' NAVD88 (7' bgs) (Image 51). Feature 12 ended in a finished, straight eastern terminus just before Feature 14 (see below).

Feature 11 and 12 formed roughly parallel stone walls running east-west in Worth Street's south sidewalk. Overlay on historic maps suggests these features may have been foundation or substructure walls at the rear of the historic 72/74 Centre Street lot, or possibly a north boundary and internal wall within the property at 138 or 140 Anthony/Worth Street (see Map 27, VII. Conclusions for historic overlay). These lots were laid out after about 1817, after the Collect Pond was filled and Anthony/Worth Street and Collect/Centre Street began to be constructed. Soils surrounding and filling the area between Features 11 and 12 appeared to be later fill, with no evidence of extant materials relating to the usage period of the structure(s) these walls formed.

The portion of Trench 6 located north of the curb from 153'6" W to 151' W was excavated to 12.9' NAVD88 (4' bgs), save for a berm extending to 4'10" N which reached only 15.23' NAVD88 (1'8" bgs), exposing a bank of clay-lined ducts. From 151' W to 141' W the trench was excavated to a depth of 9.4' NAVD88 (7'6" bgs), at which point Feature 12 was dismantled. From 141' W to 136'10" W the trench was excavated to a depth of 11.9' NAVD88 (5' bgs), save again for a berm extending to 4'10" N which was excavated to 15.23' NAVD88 (1'8" bgs), exposing the clay-lined ducts.

Feature 14, a third mortared stone wall in the Trench 6 area, was exposed at a depth of 15.23' NAVD88 (1'8" bgs) at 140'4" W, its north face at 12'11" N. The feature ran eastward into Trench 6 Section 3 and extended south into the berm and downward through the trench floor at 11.9' NAVD88 (5' bgs) (Image 52). The section's stratigraphy was composed of redeposited historic fill. No pavement or roadbase remained, as it had been stripped during the excavation of Trench 1 (Table 36) (Table 37).

Feature 14 extended east immediately north of Feature 12's terminus. Overlay on historic maps suggests Feature 14 was a northern foundation or substructure wall for the property at 140 Anthony/Worth Street, constructed after 1817 when the street began to be laid out (see Map 27, VII. Conclusions for historic overlay). No intact historic materials appeared associated with Feature 14 or soils surrounding it.

Table 36: Soil stratigraphy south of the curb – Trench 6 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.9' – 15.9' NAVD88 (0 – 1' bgs) (0 – 0.3m bgs)	N/A	Concrete sidewalk overlying RCA gravel.
II	15.9' – 9.9' NAVD88 (1' – 7' bgs) (0.3m – 2.13m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, loose brick, and concrete fragment inclusions.

Table 37: Soil stratigraphy north of the curb – Trench 6 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
II	16.6' – 9.4' NAVD88 (0' – 7'6" bgs) (0 – 2.29m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, loose brick, and concrete fragment inclusions.



Image 50: Trench 6 Section 1 – Feature 11 South profile.



Image 51: Trench 6 Section 1 – Feature 12 North profile.



Image 52: Trench 6 Section 1 – Features 12 & 14 east profile.

Section 2

Trench 6 Section 2 was excavated from 175'6" W to 153'6" W. The south wall abutted the curb, ranging from 7'10" N at 175'6" W to 8'5" N at 153'6" N. The section had a north-south width of 6'6", its north wall running parallel with the curb (Map 14). The section overlapped the former location of Trench 1 Sections 3 and 4, from its north wall to 11'4" N. Trench 6 Section 2 was excavated to a max depth of 13.13' NAVD88 (3'8" bgs) from 172' W to 153'6" W save for a berm, parallel with the curb, extending to 3' north of the south wall which reached only 15.13' NAVD88 (1'8" bgs), exposing a bank of clay-lined ducts. From 175'6" W to 172' W the trench sloped from the ground surface down to 13.13' NAVD88 (3'8" bgs).

Feature 13, an east-west oriented wall composed of mixed brick and stone, was encountered in the trench floor at 3.13' NAVD88 (3'8" bgs) from 172' W to 165'8" W (Images 53-54). The feature was 2'3" wide north-south, with its south face at 12' N. Feature 13 was left in place after documentation, as it lay below the project impact depths.

Feature 13 corresponds in historic overlays to the northern boundary of either 72/74 Centre Street or 138 Anthony/Worth Street (see Map 27, VII. Conclusions for historic overlay). These lots were constructed post-1817, when Centre and Anthony/Worth Street began to be laid out following filling the Collect Pond. Feature 13 lay in similar orientation to Feature 3, identified further west in Trench 1 and shown to have a mixed stone construction at its deeper depth. Similar dimensions, construction, and orientation suggest Features 3 and 13 formed the same northern boundary foundation wall for the 72/74 Centre Street or 138 Anthony/Worth Street lot.

Trench 6 Section 2' stratigraphy was similar to that seen in Section 1. No pavement or roadbase remained as it had been stripped during the excavation of Trench 1 (Table 38).

Table 38: General soil stratigraphy – Trench 6 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.8' – 13.13' NAVD88 (0' – 3'8" bgs) (0 – 1.12m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, loose brick, and concrete fragment inclusions.



Image 53: Trench 6 Section 2 – Feature 13 Plan view.



Image 54: Trench 6 Section 2 – North profile with Feature 13 in plan view.

Section 3

Trench 6 Section 3 extended from 136'10" W to 115'6" W. The south wall abutted the curb, ranging from 8'9" N at 136'10" W to 10'3" N at 115'6" W. The section had a north-south width which ranged from 6'6" at 136'10" W to 7'6" at 115'6" W, its north wall running parallel with the curb (Map 15). The section overlapped the former location of Trench 1 Section 5 from its north wall to 12' N at 136'10" W and to 16'3" N at 115'6" W. The section was excavated to a max depth of 12' NAVD88 (5' bgs) save for a berm extending to 3' north of the south wall, which reached only 15' NAVD88 (2' bgs), exposing a bank of clay-lined ducts.

Feature 14, the mortared stone wall exposed in Trench 6 Section 1, continued eastward down Section 3, all the way to the trench's east wall at 115'6" W, its north face at 13'1" N. It lay directly below utility ducts, likely previously impacted by their installation (Image 55). Feature 14 was dismantled down to the trench floor at 12' NAVD88 (5' bgs) after documentation to facilitate project utility installations but continued below the trench floor.

Trench 6 Section 3's stratigraphy was similar to that seen in Section 2, with an additional layer of modern fill associated with the clay-lined utility ducts. No pavement or roadbase remained as it had been stripped during the excavation of Trench 1 (Image 56) (Table 39).

Table 39: General soil stratigraphy – Trench 6 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17' – 12' NAVD88 (0' – 5' bgs) (0 – 1.52m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, loose brick, and concrete fragment inclusions.
II	16' – 13' NAVD88 (1' – 4' bgs) (0.3m – 1.22m bgs)	10YR 6/4 light yellowish brown	Coarse sand clean fill associated with clay-lined ducts.



Image 55: Trench 6 Section 3 – Feature 14 south profile.



Image 56: Trench 6 Section 3 – North profile.

TRENCH 16

Trench 16 was opened on October 1, 2019. Much of the excavation was conducted by machine, but the high density of existing utility lines and cramped conditions necessitated hand digging throughout a large portion of the first two sections, as well as limited areas throughout the rest of the trench. Trench 16 measured 475' east-west, with a north-south width varying from 19'6" to 26'4". The monitoring and documentation of the trench was broken up into arbitrary sections 25' long.

Section 1

Trench 16 Section 1 extended from 251'6" W to 226'6" W. The north wall abutted the north curb at 46'10" N from 251'6" W to 245' W. From 245' W to 235' W the trench widened northward by 5'4", putting the north wall at 52'2" N. At 235' W the north wall moved southwards by 4", reaching 51'10" N, where it remained up to 226'6" W (Map 14). The north-south width of the trench ranged from 21' at 251'6" W, to 26'4" at 245' W, to 26' at 235' W.

Trench 16 Section 1 was excavated to a max depth of 8.74' NAVD88 (8' bgs) in a 11'6" north-south by 10' east-west pit abutting the north wall from 245' W to 235' W. The western and southern portions of Section 16 were excavated to a max depth of 10.44' NAVD88 (6' bgs), while the north half of the trench reached 13.44' NAVD88 (3' bgs) from the north wall to 4' south of the curb at 42'10" N, and 1'10" bgs further south.

Trench 16 Section 1 was characterized by a dense network of utility lines, found south of the curb at depths ranging from 14.44' NAVD88 (2' bgs) to 10.44' NAVD88 (6' bgs) (Image 57). North of the curb at 46'10" N (14.27m N), a brick utility vault was encountered beneath the sidewalk. This vault was partly dismantled during excavation (Image 58). The stratigraphy of this section was composed of separate deposits of redeposited historic fill within the street and below the sidewalk (Image 59) (Table 40) (Table 41).

Table 40: General soil stratigraphy – Trench 16 Section 1 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.44' – 15.57' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.57' – 10.44' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with numerous utility lines.

Table 41: General soil stratigraphy – Trench 16 Section 1 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.74' – 16.24' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface
II	16.74' – 8.74' NAVD88 (6" – 8' bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and brick fragment inclusions.



Image 57: Trench 16 Section 1 – Utilities below surface.



Image 58: Trench 16 Section 1 – Vault below sidewalk.



Image 59: Trench 16 Section 1 – Excavation in progress.

Section 2

Trench 16 Section 2 extended from 226'6" W to 201'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb. The north-south width of the section was 26' from 226'6" W to 204'6" W, changing to 21' at 204'6" W as the south wall moved 5' north (Map 14). The section was excavated to a depth of 13.65' NAVD88 (3' bgs) from the north wall to 42'10" N, to 14.52' NAVD88 (1'10" bgs) further south, and to a max depth of 10.35' NAVD88 (6' bgs) in the southwest corner, ending at 210'6" W (Image 60).

As in Section 1, the deeper portion of the excavation encountered numerous utilities beginning at 14.35' NAVD88 (2' bgs) and reaching to the trench floor (Image 60). The stratigraphy of the section was composed of redeposited historic fill within the street and clean modern fill below the sidewalk (Table 42) (Table 43).

Table 42: General soil stratigraphy – Trench 16 Section 2 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.35' – 15.18' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	18.18' – 10.35' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with numerous utility lines.

Table 43: General soil stratigraphy – Trench 16 Section 2 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.65' – 16.15' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.15' – 13.65' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Clean coarse sand.



Image 60: Trench 16 Section 2 – Excavation in progress.

Section 3

Trench 16 Section 3 extended from 201'6" W to 176'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 14). The section was excavated to a depth of 13.71' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 14.58' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. The stratigraphy of the section was composed of redeposited historic fill beneath both the street and the sidewalk (Table 44) (Table 45).

Table 44: General soil stratigraphy – Trench 16 Section 3 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.41' – 15.24' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.24' – 14.58' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 45: General soil stratigraphy – Trench 16 Section 3 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.71' – 16.21' NAVD88 (0' – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.21' – 13.71' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 4

Trench 16 Section 4 extended from 176'6" W to 151'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 14). The section was excavated to a depth of 13.8' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 14.67' NAVD99 (1'10" bgs) from 42' N to the south wall at 30'10" N. The stratigraphy was unchanged from that of Section 3 (Table 44) (Table 45).

Table 46: General soil stratigraphy – Trench 16 Section 4 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.5' – 15.33' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.33' – 14.67' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 47: General soil stratigraphy – Trench 16 Section 4 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.8' – 16.3' NAVD88 (0' – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.3' – 13.8' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 5

Trench 16 Section 5 extended from 151'6" W to 126'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 15). The section was excavated to a depth of 13.93' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 14.8' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. A pit for a new utility box measuring 4' north-south by 4' east-west with its southwest corner at 47'5" N, 141'6" W was excavated to a depth of 12.93' NAVD88 (4' bgs) beneath the sidewalk (Image 61). A second pit measuring 6'6" north-south by 8' east-west with its southwest corner at 39'4" N, 131'6" W was excavated to a depth of 11.63' NAVD88 (5' bgs) within the street. This second pit extended eastward into Section 6 and was excavated to remove an existing utility box (Images 61-62).

Trench 16 Section 5's stratigraphy remained similar to that seen in Section 4 (Table 48) (Table 49).

Table 48: General soil stratigraphy – Trench 16 Section 5 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.63' – 15.46' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.46' – 11.63' NAVD88 (1'2" – 5' bgs) (0.36 – 1.52m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 49: General soil stratigraphy – Trench 16 Section 5 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.93' – 16.43' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.43' – 15.93' NAVD88	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

	(6" – 4' bgs) (0.15 – 1.22m bgs)		
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Image 61: Trench 16 Section 5 – Pit within sidewalk.



Image 62: Trench 16 Section 5 – Pit within street.

Section 6

Trench 16 Section 6 extended from 126'6" W to 101'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 15). The section was excavated to a depth of 14.19' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.06' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. The portion of the 5' deep pit from Section 5 which extended into Section 6 ended at 123'6" W. The stratigraphy remained unchanged from that seen in Section 5 (Table 50) (Table 51).

Table 50: General soil stratigraphy – Trench 16 Section 6 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.89' – 15.72' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.72' – 11.63' NAVD88 (1'2" – 5'3" bgs) (0.36m – 1.6m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 51: General soil stratigraphy – Trench 16 Section 6 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.19' – 16.69' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.19' – 14.19' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 7

Trench 16 Section 7 extended from 101'6" W to 76'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 15). The section was excavated to a depth of 14.26' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.13' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. The stratigraphy was unchanged from that of Section 6 (Table 52) (Table 53).

Table 52: General soil stratigraphy – Trench 16 Section 7 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.96' – 15.79' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.79' – 15.13' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 53: General soil stratigraphy – Trench 16 Section 7- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.26' – 16.76' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.76' – 14.26' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 8

Trench 16 Section 8 extended from 76'6" W to 51'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (6.4m) (Map 15). The section was excavated to a depth of 14.34' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.21' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. The stratigraphy was unchanged from that of Section 7 (Table 52) (Table 53).

Table 54: General soil stratigraphy – Trench 16 Section 8 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.04' – 15.87' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.87' – 15.21' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 55: General soil stratigraphy – Trench 16 Section 8- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.34' – 16.54' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.54' – 14.34' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 9

Trench 16 Section 9 extended from 51'6" W to 26'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 16). The section was excavated to a depth of 11.41' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.28' NAVD99 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. A pit measuring 4' north-south by 4' east-west with its southwest corner at 47'5" N, 31'6" W was excavated to a depth of 13.41' NAVD88 (4' bgs) beneath the sidewalk (Image 63).

The Trench 16 Section 9 stratigraphy was largely unchanged from Section 8, with modern clean coarse sand fill being intermixed with the redeposited historic fill found beneath the sidewalk (Table 56) (Table 57).

Table 56: General soil stratigraphy – Trench 16 Section 9 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.11' – 15.94' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	15.94' – 15.28' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 57: General soil stratigraphy – Trench 16 Section 9 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.41' – 16.91' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	16.91' – 13.41' NAVD88 (6" – 4' bgs) (0.15m – 1.22m bgs)	10YR / 7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	16.91' – 14.41' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.



Image 63: Trench 16 Section 9 – Pit within sidewalk east profile.

Section 10

Trench 16 Section 10 extended from 26'6" W to 1'6" W. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 16). The section was excavated to a depth of 14.73' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.6' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Section 10's stratigraphy was largely unchanged from that of Section 9 (Image 64) (Table 58) (Table 59).

Table 58: General soil stratigraphy – Trench 16 Section 10 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.43' – 16.26' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	16.26' – 15.6' NAVD88 (1'2" – 1'10" bgs) (0.36 – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 59: General soil stratigraphy – Trench 16 Section 10- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.73' – 17.23' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.23' – 14.73' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	17.23' – 14.73' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.



Image 64: Trench 16 Sections 10 to 14 – Excavation in progress.

Section 11

Trench 16 Section 11 extended from 1'6" W to 23'6" E. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb, and the north-south width remained 21' (Map 16). The section was excavated to a depth of 14.85' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 1'10" bgs from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 11's stratigraphy within the street was the same as that seen in Section 10, while under the sidewalk only the clean coarse sand fill was encountered (Table 60) (Table 61).

Table 60: General soil stratigraphy – Trench 16 Section 11 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.55' – 16.38' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	16.38' – 15.72' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 61: General soil stratigraphy – Trench 16 Section 11- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.85' – 17.35' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.35' – 14.85' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions.

Section 12

Trench 16 Section 12 extended from 23'6" E to 48'6" E. The north wall held steady at 51'10" N, 5' north of Worth Street's north curb up to 31'6" E, where it moved south by 1'6" to 50'4" N. At that point, the north-south width changed from 21' to 19'6" (Map 16). The section was excavated to a depth of 14.99' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 15.86' NAVD88 (1'10" bgs) from 42.8' N to the south wall at 30.8' N.

Trench 16 Section 12's stratigraphy remained unchanged from that seen in Section 11 (Image 64) (Table 62) (Table 63).

Table 62: General soil stratigraphy – Trench 16 Section 12 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.69' – 16.52' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	16.52' – 15.86' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 63: General soil stratigraphy – Trench 16 Section 12 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.99' – 17.49' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.49' – 14.99' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions.

Section 13

Trench 16 Section 13 extended from 48'6" E to 73'6" E. The north wall held steady at 50'4" N. The north-south width of the section remained 19'6" (Map 17). The section was excavated to a depth of 15.18' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 16.05' NAVD88 (1'10" bgs) from 42.8' N to the south wall at 30.8' N.

Trench 16 Section 13's stratigraphy remained unchanged from that seen in Section 12 (Table 64) (Table 65).

Table 64: General soil stratigraphy – Trench 16 Section 13 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	17.88' – 16.71' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	16.71' – 16.05' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 65: General soil stratigraphy – Trench 16 Section 13 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.18' – 17.68' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.68' – 15.18' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions.

Section 14

Trench 16 Section 14 extended from 73'6" E to 98'6" E. The north wall held steady at 50'4" N. The north-south width of the section remained 19'6" (Map 17). The section was excavated to a depth of 15.44' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 16.31' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 14's stratigraphy within the street remained unchanged from that seen in Section 13, while under the sidewalk the brown loamy sand layer returned, intermixed with the clean coarse sand (Table 66) (Table 67).

Table 66: General soil stratigraphy – Trench 16 Section 14 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.14' – 16.97' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	16.97' – 16.31' NAVD88 1.2' – 1.8' bgs (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 67: General soil stratigraphy – Trench 16 Section 14- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.44' – 17.94' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	17.94' – 15.44' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

III	17.94' – 15.44' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.
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Section 15

Trench 16 Section 15 extended from 98'6" E to 123'6" E. The north wall held steady at 50'4" N. The north-south width of the section remained 19'6" (Map 17). The section was excavated to a depth of 15.5' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 16.37' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 15's stratigraphy remained unchanged from that seen in Section 13 (Image 65) (Table 68) (Table 69).

Table 68: General soil stratigraphy – Trench 16 Section 15 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.2' – 17.03' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	17.03' – 16.37' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 69: General soil stratigraphy – Trench 16 Section 15 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.5' – 18' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	18' – 15.5' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions.
III	18' – 15.5' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 65: Trench 16 Section 15 – North profile

Section 16

Trench 16 Section 16 extended from 123'6"E to 148'6"E. The north wall held steady at 50'4" N. The north-south width of the section remained 19'6" (Map 17). The section was excavated to a depth of 15.64' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 16.51' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 16's stratigraphy slightly from that seen in previous sections, with a slightly darker redeposited historic fill predominating. This loamy sand was also encountered under the sidewalk, intermixed with the clean sand modern fill layer (Image 66) (Table 70) (Table 71).

Table 70: General soil stratigraphy – Trench 16 Section 16 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.34' – 17.17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	17.17' – 16.51' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 71: General soil stratigraphy – Trench 16 Section 16- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.64' – 18.14' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	18.14' – 15.64' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.14' – 15.64' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.



Image 66: Trench 16 Section 16 – Excavation in progress.

Section 17

Trench 16 Section 17 extended from 148'6"E to 173'6"E. The north wall held steady at 50'4" N. The north-south width of the section remained 19'6" (Map 18). The section was excavated to a depth of 15.91' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 16.78' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N. A concrete manhole measuring 5' north-south by 15'6" east-west with its southwest corner at 33'5" N, 156'5" E was encountered at a depth of 17.61' NAVD88 (1' bgs) within the street.

Trench 16 Section 17's stratigraphy was unchanged from that encountered in Section 16 (Table 72) (Table 73).

Table 72: General soil stratigraphy – Trench 16 Section 17 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.61' – 17.44' NAVD88 (0 – 1.2' bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	17.44' – 16.78' NAVD88 (1.2' – 1.8' bgs) (0.36m – 0.56m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 73: General soil stratigraphy – Trench 16 Section 17- under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	18.91' – 18.41' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	18.41' – 15.91' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.41' – 15.91' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.

Section 18

Trench 16 Section 18 extended from 173'6"E to 198'6" E. The north wall held steady at 50'4" N up to 197'6" E, at which point it moved north by 1'6", putting it at 51'10" N. At that point, the north-south width of the section changed from 19'6" to 21' (Map 18). The section partly overlapped the former location of Trench 2 Section 11. The section was excavated to a depth of 16.64' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 17.51' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 18's stratigraphy was similar to that seen in Section 17 (Table 74) (Table 75).

Table 74: General soil stratigraphy – Trench 16 Section 18 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.34' – 18.17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	18.17' – 17.51' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 75: General soil stratigraphy – Trench 16 Section 18 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.64' – 19.14' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	19.14' – 16.64' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	19.14' – 16.64' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.

Section 19

Trench 16 Section 19 extended from 198'6" E to 223'6" E. The north wall of the section was at 51'10" N up to 213'3" E, at which point it moved to 46'10" N, abutting Worth Street's north curbline. The section's north-south width was 21' up to 213'3" E, then 16' up to 215'6" E, and finally 4' up to 223'6" (Map 18). The section partly overlapped the former location of Trench 2 Section 11. The section was excavated to a depth of 17.5' NAVD88 (3' bgs) from the north wall to 42'10" N, and to 18.37' NAVD88 (1'10" bgs) from 42'10" N to the south wall at 30'10" N.

Trench 16 Section 19's stratigraphy was similar to that seen in Section 18 (Image 67) (Table 76) (Table 77).

Table 76: General soil stratigraphy – Trench 16 Section 19 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.2' – 19.03' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	19.03' – 18.37' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 77: General soil stratigraphy – Trench 16 Section 19 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.5' – 20' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	20' – 17.5' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	20' – 17.5' NAVD88 (6" – 3' bgs) (0.15m – 0.91m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions. Intermixed with Strat II.



Image 67: Trench 16 Section 19 – Excavation in progress.

TRENCH 21

Trench 21 was opened on November 13, 2019. As the street surface and roadbase had already been removed, all excavation was carried out by hand. Trench 21 was located entirely within the footprint of Trench 16 Sections 14 and 15. The trench was oriented north-south, perpendicular to Worth Street (Map 17), and measured 18'6" long by 6' wide, with its southwest corner at 31'4" N, 95'6" E. The trench was excavated to a max depth of 12.34' NAVD88 (4' bgs). Several utility lines were encountered crossing the trench east-west at depths ranging from 15.34' to 12.84' NAVD88 (1'bgs to 3.5' bgs) (Image 68). Trench 21 was small enough to not be divided into sections for documentation.

Trench 21's stratigraphy was composed of a 7.5YR 4/3 brown loamy sand within the street, and a 10YR 6/4 coarse sand at the north end of the trench, beneath Worth Street's north sidewalk (Table 78) (Table 79). FS 18 and 19 were found at the trench floor within the street (Table 78). FS 18 included one animal bone, one salt-glazed stoneware body sherd, and one embossed olive green glass bottle fragment. FS 19 included one blue transfer-printed pearlware sherd, one banded whiteware rim sherd, and one blue-painted slat-glazed stoneware body sherd.

Table 78: General soil stratigraphy – Trench 16 Section 19 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	16.34' – 12.34' NAVD88 (0 – 4' bgs) (0 – 0.36m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 18 and 19 found within this stratum.

Table 79: General soil stratigraphy – Trench 16 Section 19 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	15.47' – 12.34' NAVD88 (10" – 4' bgs) (0.25m – 1.22m bgs)	10YR 6/4 light yellowish brown	Coarse sand with some rounded pebble inclusions.



Image 68: Trench 21 – Excavation in progress.

BAXTER STREET FROM WORTH STREET TOWARD HOGAN PLACE

Excavation across the north side of Worth Street into Baxter Street running north toward Hogan Place included two trenches (Trenches 5 and 24) (Map 18). Excavation in this area did not reveal any features or intact deposits.

TRENCH 5

Trench 5 was opened on March 25, 2019. Following the removal of the asphalt pavement and concrete roadbase, the majority of the excavation was carried out by hand. Trench 5 was oriented northwest by southeast, parallel with Baxter Street, and measured 10' long by 4'6" wide, with its southwest corner at 63'4" N, 244'6" E (Map 18). The trench was excavated to a max depth of 14.5' NAVD88 (6' bgs). A 12" water main was encountered in the center of the trench at a depth of 15.5' NAVD88 (5' bgs).

Trench 5's stratigraphy was composed of a 10YR 4/3 brown loamy sand fill with pebble, cobble and loose brick inclusions (Image 69) (Table 80).

Table 80: Northeast profile soil stratigraphy – Trench 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.5' – 19.33' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	19.33' – 14.5' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with a 12" water main.



Image 69: Trench 5 – Plan view and north profile.

TRENCH 24

Trench 24 was opened on January 29, 2020. Much of the excavation was conducted by machine, but the high density of existing utility lines and cramped conditions necessitated hand digging throughout most of the trench. Trench 24 measured 54'6" long, with a width varying from 4'6" to 9'. The monitoring and documentation of the trench was broken up into arbitrary sections up to 20' long.

Section 1

Trench 24 Section 1 measured 19' long by 9' wide and was oriented north-south, with its southwest corner at 29°10" N, 239°6" E. The section overlapped the former location of Trench 2 Section 13 by 1' in the south (Map 18). The section was excavated to a max depth of 14.61' NAVD88 (6' bgs). Numerous utility lines were encountered crossing the section, at depths ranging from 19.11' NAVD88 (1'6" bgs) to 15.61' NAVD88 (5' bgs) (Image 70).

Trench 24 Section 1's stratigraphy was made up primarily of redeposited historic fill, alongside several distinct layers of modern fill. (Image 71) (Table 81). FS 21 and 22 were found in strat II, the redeposited fill, along with a modern, twentieth century aluminum soda can (Table 81). FS 21 included a blue transfer-printed whiteware sherd and a Rockingham ware spittoon base sherd. FS 22 included two animal bone fragments, two metal keys, a plain whiteware plate rim sherd, two stoneware sherds, and a colorless glass tumbler fragment.

Table 81: West profile soil stratigraphy – Trench 24 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.61' – 19.44' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	19.44' – 14.61' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with numerous utility lines. FS 21 and 22 found within this stratum, along with twentieth century trash.
III	19.44' – 17.61' NAVD88 (1'2"–3' bgs) (0.36m – 0.91m bgs)	10YR 5/4 yellowish brown	Clean coarse sand fill. Associated with various utility lines.
IV	20.19' – 14.61' NAVD88 (5"–6' bgs) (.13m – 1.83m bgs)	10YR 4/2 dark grayish brown	Loamy sand fill with over 30% RCA gravel inclusions.



Image 70: Trench 24 Section 1 – Utility lines.



Image 71: Trench 24 Section 1 – East profile.

Section 2

Trench 24 Section 2 measured 15'6" long by 5' wide and was oriented north-south, with its southwest corner at 48'10" N, 243'6" E (Map 18). The section was excavated to a max depth of 15.6' NAVD88 (5' bgs).

Trench 24 Section 2's stratigraphy was entirely composed of redeposited historic fill (Image 72) (Table 82). FS 23 was found within this context. This included two animal bones, a cattle horn, a kaolin pipe stem fragment, six whiteware sherds, four pearlware sherds, one yellow ware sherd, a salt-glazed stoneware sherd, a black amber glass bottle fragment, a citron glass bottle fragment, and a colorless glass bottle fragment.

Table 82: West profile soil stratigraphy – Trench 24 section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.6' – 19.43' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	19.43' – 15.6' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Associated with a 12" water main. FS 23 found within this stratum.



Image 72: Trench 24 Section 2 – Plan view.

Section 3

Trench 24 Section 3 measured 20' long by 4'6" wide and was oriented northwest by southeast, parallel with Baxter Street. Its southwest corner was at 61'4" N, 244'6" E. This section almost entirely overlapped the former location of Trench 5 (Map 18). The section was excavated to a max depth of 14.5' NAVD88 (6' bgs), exposing the same 12" water main seen previously in Trench 5 at 15.5' NAVD88 (5' bgs).

Trench 24 Section 3's stratigraphy was unchanged from that seen in Section 2 (Image 73) (Table 83). FS 24 was found within this context at a depth of 16' NAVD88 (4'6" bgs) (Table 83). This included 12 animal bones, two kaolin smoking pipe fragments, six pearlware sherds, one ironstone sherd, four porcelain sherds, three salt-glazed stoneware sherds, one Rockingham ware sherd, one lusterware sherd, and a charcoal pencil. An extension was excavated from the northeast wall of this section reaching beyond Baxter St's east curb. This extension measured 14'6" long by 3' wide, expanding to a width of 6' within the sidewalk and reaching a depth of 14' NAVD88 (6' bgs) below the sidewalk (Map 18). The soil stratigraphy of this extension was identical to that of the rest of section 3 (Image 74) (Table 84).

Table 83: Northeast profile soil stratigraphy – Trench 24 Section 3 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.5' – 20.33' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.33' – 14.5' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 24 found within this stratum.

Table 84: General soil stratigraphy – Trench 24 Section 3 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20' – 19.5' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface.
II	19.5' – 14' NAVD88 (6" – 6' bgs) (0.15m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



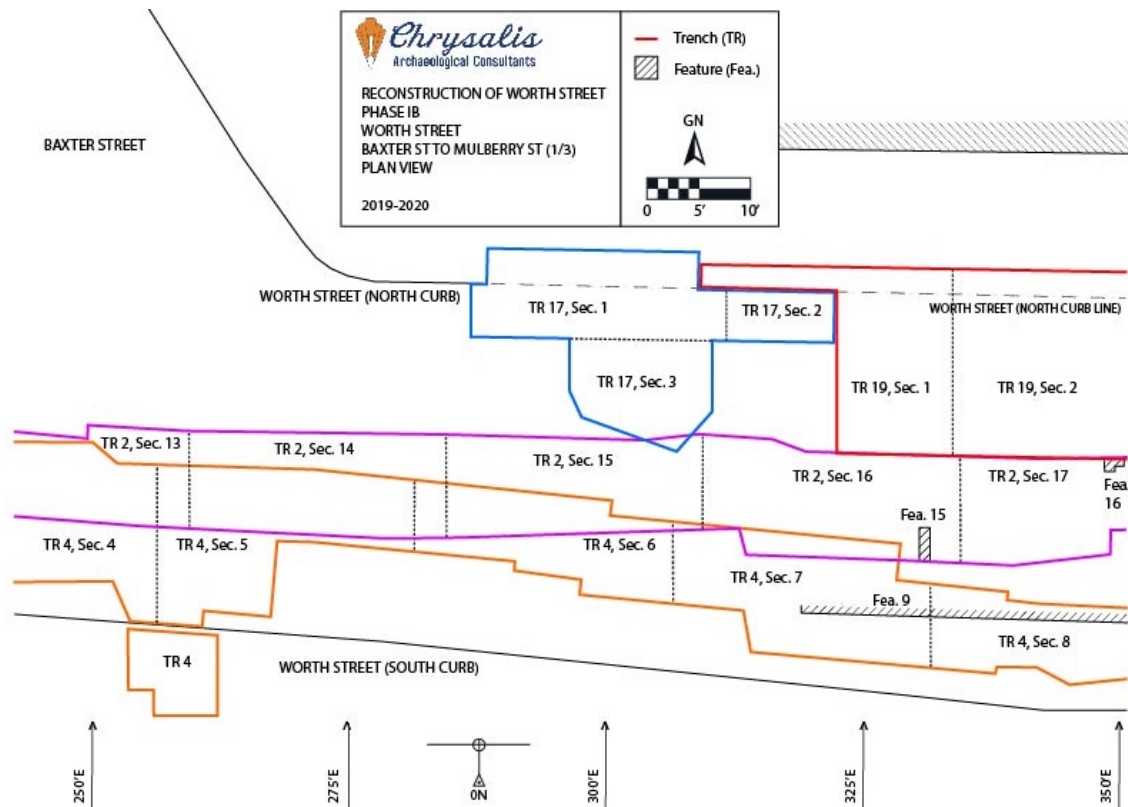
Image 73: Trench 24 Section 3 – Excavation within the street



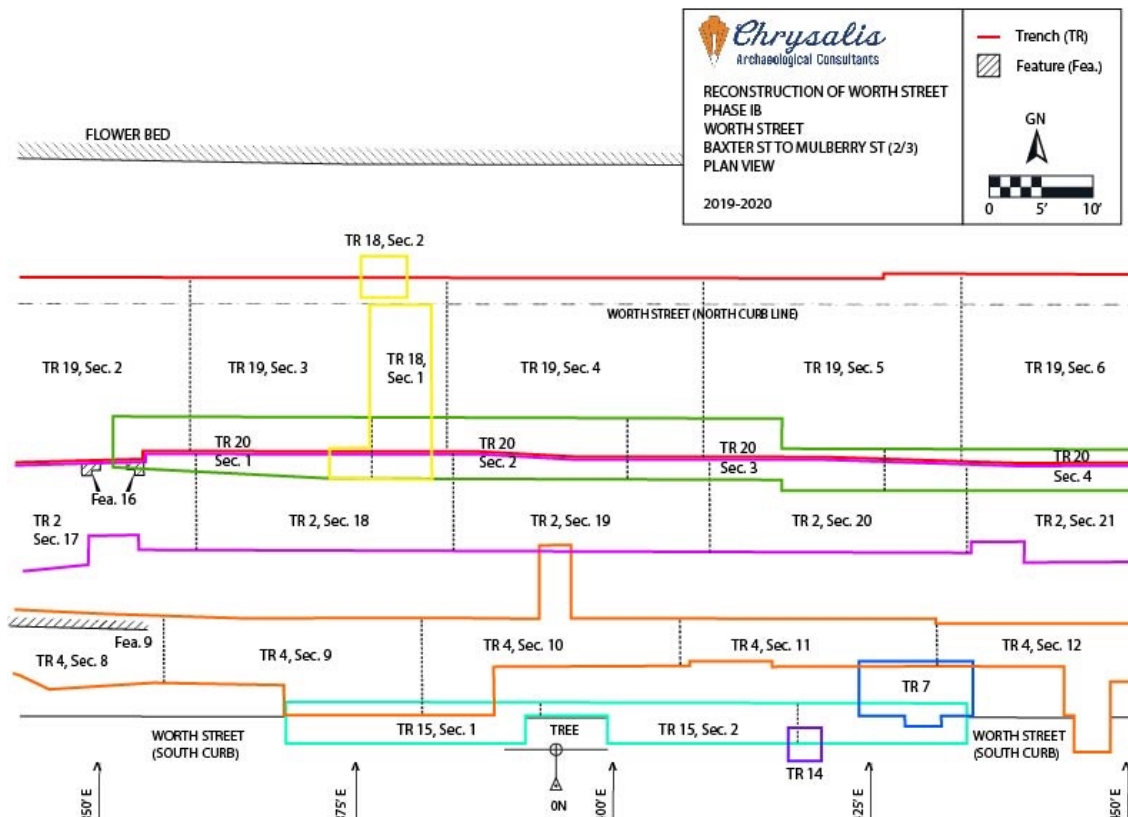
Image 74: Trench 24 Section 3 – Excavation under the sidewalk.

WORTH STREET FROM BAXTER STREET TO MULBERRY STREET

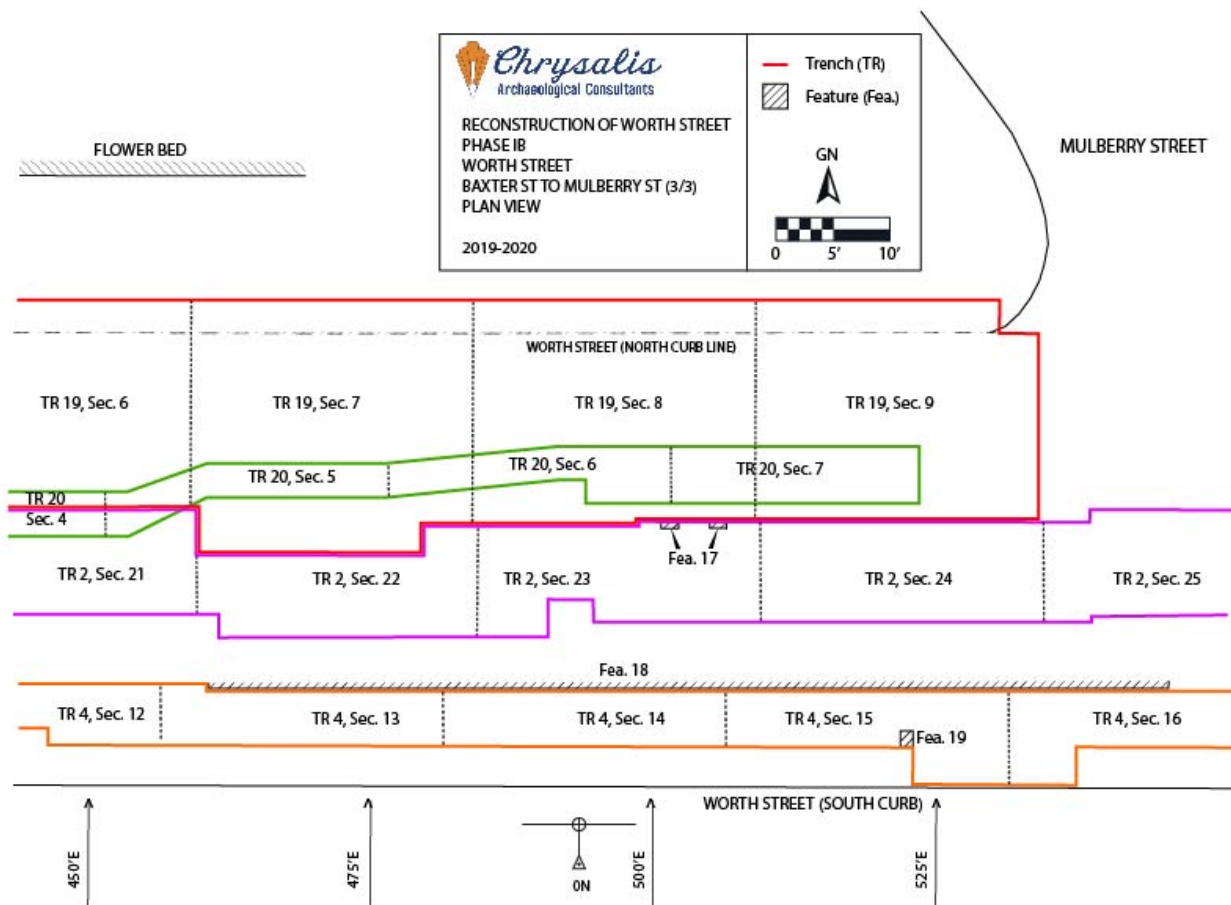
Excavation across Worth Street from Baxter Street to Mulberry Street included nine trenches (Trench 2 Sections 13-24, Trench 4 Sections 4-15, Trench 7, Trench 14, Trench 15, Trenches 17-20). Excavation of these trenches exposed Worth Street curb-to-curb, including excavation slightly north and south of the existing curb lines (Maps 19-21). Excavation in this area revealed seven features (Features 8 [on Map 18], 9, 15, 16, 17, 18, 19).



Map 19: Plan view of Worth Street excavation from Baxter Street to Mulberry Street, part 1 of 3.



Map 20: Plan view of Worth Street excavation from Baxter Street to Mulberry Street, part 2 of 3.



Map 21: Plan view of Worth Street excavation from Baxter Street to Mulberry Street, part 3 of 3.

TRENCH 2, SECTIONS 13-24

Trench 2, which began further west on Worth Street between Centre and Baxter Streets (Map 14), continued into the block from Baxter Street to Mulberry Street in Sections 13 through 24. Trench 2 measured 957' east-west, with a north-south width varying from 5'6" to 18'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 30' long.

Section 13

Trench 2 Section 13 extended from 234'6" E to 259'6" E. The north-south width of the section was 8'6" from 234'6" E to 250' E, at which point the trench widened northward by 1'6", for a new total width of 10'. The south wall of the section was at 22'4" N from 234'6" E to 236'6" E, at which point the trench began to angle southeastward following the line of the curb. At 259'6" E the south wall was at 20'11" N (Map 19). The oilostatic line continued running east-west down the trench at 15.23' NAVD88 (5'6" bgs), its centerline at 23'4" N. Section 13's floor was excavated to a depth of 10.73' NAVD88 (10' bgs). Other utilities encountered during excavation included a 4'6" wide concrete encased duct bank crossing the trench north-south at 244'6" E at a depth of 12.73' NAVD88 (8' bgs).

The trench largely overlapped the former location of Trench 4 Sections 4 and 5, which had previously been excavated and backfilled, however, Trench 2 Section 13 reached a greater maximum depth than the previous excavation, so previously untouched areas were encountered across the entire trench floor. Trench 2 Section 13's stratigraphy was mostly composed of redeposited historic fill and a clean modern fill layer associated with the oilstatic line (Image 75) (Table 85).

Table 85: General soil stratigraphy – Trench 2 Section 13.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.73' – 19.56' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.56' – 10.73' NAVD88 (1'2" – 10' bgs) (0.36 – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	19.56' – 13.73' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 75: Trench 2 Section 13 – Excavation in progress.

Section 14

Trench 2 Section 14 extended from 259'6" E to 284'6" E. The north-south width of the section remained 10'. The south wall of the section was at 20'11" N at 259'6" E, moving to 19'11" N at 278'6" E as the section moved southeastward, following the curbline (Map 19). The oilostatic line continued running east-west down the trench, rising to a depth of 16.5' NAVD88 (4'6" bgs), its centerline at 23'4" N up to 277'6" E, at which point it turned northeastward, ending with its centerline at 23'10" N at 284'6" E. The section's floor was excavated to a depth of 11' NAVD88 (10' bgs). Other utilities encountered during excavation included two concrete-encased duct banks at 19' NAVD88 (2' bgs) and steel ducts at 14.5' NAVD88 (6.5' bgs) to 13' NAVD88 (8' bgs).

The trench largely overlapped the former location of Trench 4 Sections 5 and 6, which had previously been excavated and backfilled, however, Trench 2 Section 14 reached a greater maximum depth than the previous excavation, so previously untouched areas were encountered across the entire trench floor. Trench 2 Section 14's stratigraphy was mostly unchanged from that encountered in Section 13 (Image 76) (Table 86).

Table 86: General soil stratigraphy – Trench 2 Section 14.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21' – 19.83' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.3' – 11' NAVD88 (1'2" – 10' bgs) (0.36m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18' – 14' NAVD88 (3' – 7' bgs) (0.91m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 76: Trench 2 Section 14 – Excavation in progress.

Section 15

Trench 2 Section 15 extended from 284'6" E to 309'6" E. The north-south width of the section varied due to the section's irregular shape, from 10' at 284'6" E to 9'3" at 309'6" E (Map 19). The south wall of the section moved from 19'11" N at 284'6" E to 20'10" N at 309'6" E. The oilstatic line continued running east-west down the trench at a depth of 16.77' NAVD88 (4'6" bgs), its centerline moving from 23'10" N at 284'6" E to 24'6" N at 309'6" E. The section's floor was excavated to a depth of 11.27' NAVD88 (10' bgs).

The trench overlapped the former location of Trench 4 Sections 5 and 6, which had previously been excavated and backfilled, however, Trench 2 Section 15 reached a greater maximum depth than the previous excavation, so previously untouched areas were encountered across the entire trench floor. Trench 2 Section 15's stratigraphy was mostly unchanged from that encountered in Section 14 (Image 77) (Table 87).

Table 87: General soil stratigraphy – Trench 2 Section 15.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.27' – 20.1' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.1' – 11.27' NAVD88 (1'2" – 10' bgs) (0.36m – 3.05m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.27' – 14.27' NAVD88 (3' – 7' bgs) (0.91m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 77: Trench 2 Section 15 – Excavation in progress.

Section 16

Trench 2 Section 16 extended from 309'6" E to 334'6" E. The north-south width of the section varied due to the section's irregular shape, from 9'3" at 334'6" E to 11'6" at 313'6" E to 10'6" at 319'6" E. The south wall of the section began at 20'10" N at 309'6" E, moving to 18'4" N at 313'6" E, ending at 17'4" N at 334'6" E (Map 19). The oilstatic line continued running east-west down the trench, diving to a depth of 16.34' NAVD88 (5' bgs), its centerline moving from 24'6" N at 309'6" E to 24'4" N at 334'6" E.

The section's floor was excavated to a depth of 11.34' NAVD88 (10' bgs). A brick-lined sewer manhole was encountered along the north wall at 313' E. The trench partly overlapped the former location of Trench 4 Sections 5 and 6, which had previously been excavated and backfilled (Map 19), however, Trench 2 Section 16 reached a greater maximum depth than the previous excavation, so previously untouched areas were encountered across the entire trench floor.

Feature 15, a mortared brick wall 1' in width, oriented north-south, intruded into the section by 3'6" from the south wall (Image 78). The feature was encountered at a depth of 19.34' NAVD88 (2' bgs) and extended down to 12.84' NAVD88 (8.5' bgs). Bricks from Feature 15 had maker's marks reading "N.BROS" and "P.A.N." (Image 79). "N.BROS" was the maker's mark of Nicholson Brothers of Dutchess Junction, NY, in operation circa 1840–1930. "P.A.N." was the maker's mark of Pierre A. Northrip of Dutchess Junction NY, in operation circa 1905 (Graves 2020). The late nineteenth and early twentieth century production dates for these bricks and orientation of Feature 15 in alignment with Worth Street's east-west axis suggests Feature 15 was a defunct brick utility box.

Trench 2 Section 16's stratigraphy was mostly unchanged from that encountered in Section 15 (Image 80) (Table 88).

Table 88: General soil stratigraphy – Trench 2 Section 16.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.34' – 20.17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.17' – 11.34' NAVD88 (1'2" – 10' bgs) (0.36m – 3.05m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.34' – 14.34' NAVD88 (3' – 7' bgs) (0.91m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 78: Trench 2 Section 16 – Feature 15 south profile.



Image 79: Trench 2 Section 16 – Feature 15 brick detail.



Image 80: Trench 2 Section 16 – South profile in progress.

Section 17

Trench 2 Section 17 extended from 334'6" E to 359'6" E. The north-south width of the section varied due to the section's irregular shape, from 10'6" at 334'6" E to 7' at 349' E, ending at 9'6" at 359'6" E. The south wall of the section began at 17'4" N at 334'6" E, then moved to 20'10" N at 349' E as the section diverted around a concrete Con Edison manhole (Maps 19-20). From 354' E to 359'6" E the south wall remained at 19'4" N.

The oilstatic line continued running east-west down the trench, at a depth of 16.55' NAVD88 (5' bgs), its centerline moving from 24'4" N at 334'6" E to 24'7" N at 359'6" E. The section's floor was excavated to a depth of 11.05' NAVD88 (10'6" bgs).

Feature 16 was encountered in the north wall from 348'6" E to 354'6" E (Image 81). The feature was composed of two mortared brick walls extending from the bottom of the concrete roadbase at 20.38' NAVD88 (1'2" bgs) down to 16.55' NAVD88 (5' bgs), where they rested on a concrete slab 6" thick. The walls were 1' thick, composed of three layers of brick, and separated by a 4' thick layer of 10YR 3/3 dark brown loamy sand fill with concrete fragment inclusions. The top of the brick structure formed a stepped arch or pair of buttresses, extending from 20.38' NAVD88 to 18.05' NAVD88 (1'2" bgs to 3'6" bgs). Feature 16 was likely a pier for the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century.

Trench 2 Section 17's stratigraphy remained unchanged from that encountered in Section 16 (Image 82) (Table 89).

Table 89: General soil stratigraphy – Trench 2 Section 17.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.55' – 20.38' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.38' – 11.05' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	18.55' – 14.55' NAVD88 (3' – 7' bgs) (0.91m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 81: Trench 2 Section 17 – Feature 16 north profile.



Image 82: Trench 2 Section 17 – South profile in progress.

Section 18

Trench 2 Section 18 extended from 359'6" E to 384'6" E. The north-south width of the section was 9'6", and the south wall remained at 19'4" N (Map 20). The oilostatic line continued running east-west down the trench, diving to a depth of 16.29' NAVD88 (5'6" bgs), its centerline at 24'7" N at 359'6" E, ending at 24'10" N at 384'6" E. The section's floor was excavated to a depth of 11.29' NAVD88 (10'6" bgs).

Modern fill deposits with significant RCA gravel inclusions from previous excavation episodes were encountered in both the north and south Trench 2 Section 18 profiles (Image 83). Otherwise the section's stratigraphy remained unchanged from that encountered in Section 16 (Image 83) (Table 90) (Table 91).

Table 90: North profile soil stratigraphy – Trench 2 Section 18.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.79' – 20.62' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.62' – 11.29' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	21.37' – 19.79' NAVD88 (5" – 2' bgs) (0.13m – 0.61m bgs)	10YR 4/2 dark grayish brown	Loamy sand with over 30% RCA gravel inclusions.
IV	19.79' – 14.79' NAVD88 (2' – 7' bgs) (0.61m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.

Table 91: South profile soil stratigraphy – Trench 2 Section 18.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.79' – 20.62' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.62' – 11.29' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	21.37' – 18.04' NAVD88 (5" – 3'4" bgs) (0.13m – 1.02m bgs)	10YR 4/2 dark grayish brown	Loamy sand with over 30% RCA gravel inclusions.



Image 83: Trench 2 Section 19 – North profile in progress.

Section 19

Trench 2 Section 19 extended from 384'6" E to 409'6" E. The north-south width of the section began at 9'6" at 384'6" E, narrowing to 9' at 396'6" E, and the south wall remained at 19'4" N (Map 20). The oilstatic line continued running east-west down the trench at a depth of 16.81' NAVD88 (5'6" bgs), its centerline at 24'10" N at 384'6" E, ending at 25' N at 409'6" E. The section's floor was excavated to a depth of 11.81' NAVD88 (10'6" bgs).

The modern fill with RCA gravel encountered in Section 18 was not found in Section 19 (Image 84) (Table 92).

Table 92: North profile soil stratigraphy – Trench 2 Section 19.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.31' – 21.14' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.14' – 11.81' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	19.31' – 15.31' NAVD88 (3' – 7' bgs) (0.91m – 2.13m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 84: Trench 2 Section 19 – North profile in progress.

Section 20

Trench 2 Section 20 extended from 409'6" E to 434'6" E. The north-south width of the section was 9' from 409'6" E to 420'6" E, narrowing to 8'9" at 434'6" E. The south wall remained at 19'4" N (Map 20). The oilostatic line continued running east-west down the trench at a depth of 16.98' NAVD88 (5'6" bgs), its centerline at 25' N at 409'6" E, moving to 24'8" at 434'6" E. The section's floor was excavated to a depth of 11.98' NAVD88 (10'6" bgs).

Trench 2 Section 20's stratigraphy remained largely unchanged from that encountered in Section 19 (Image 85) (Table 90).

Table 93: General soil stratigraphy – Trench 2 Section 20.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.48' – 21.31' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.31' – 11.98' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Underlies strat III in the north half of the trench.
III	21.31' – 15.48' NAVD88 (1'2" – 7' bgs)	10YR 6/3 pale brown	Clean sand associated with the oilostatic line.

	(0.36m – 2.13m bgs)		
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Image 85: Trench 2 Section 20 – North profile in progress.

Section 21

Trench 2 Section 21 extended from 434'6" E to 459'6" E. The north-south width of the section was 7'6" from 434'6" E to 440' E, widening to 9'6" from 440' E to 459'6" E. At 459'6" E the section narrowed by 4' from the north as the trench encountered a concrete manhole. The south wall of the section was at 20'4" N from 435' E to 440' E as the section diverted around another concrete manhole, then moved to 18'4" N from 440' E to 459'6" E (Maps 20-21). The oilstatic line continued running east-west down the trench at a depth of 17.28' NAVD88 (5'6" bgs), its centerline at 24'6" N when it disappeared into the northern manhole at 459'6" E. The section's floor was excavated to a depth of 12.28' NAVD88 (10'6" bgs).

Trench 2 Section 21's stratigraphy remained largely unchanged from that encountered in Section 20 (Image 86) (Table 94).

Table 94: General soil stratigraphy – Trench 2 Section 21.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.78' – 21.61' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.

II	21.61' – 12.28' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Underlies strat III in the north half of the trench.
III	21.61' – 15.78' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR 6/3 pale brown	Clean sand associated with various utilities.



Image 86: Trench 2 Section 21 – North profile in progress.

Section 22

Trench 2 Section 22 extended from 459'6" E to 484'6" E. The north-south width of the section was 7'6" from 459'6" E to 477'6" E, widening to 10' past the northern concrete manhole. The south wall was at 18'4" N from 459'6" E to 461'6" E, moving to 16'4" N throughout the rest of the section (Map 21). The oilostatic line emerged from the east side of the concrete manhole at 477'6" E at a depth of 18.11' NAVD88 (5' bgs), its centerline at 25'4" N. The section's floor was excavated to a depth of 12.61' NAVD88 (10'6" bgs). Other utilities encountered included steel ducts running along the south wall at a depth of 21.11' NAVD88 (2' bgs).

The section's stratigraphy remained largely unchanged from that encountered in Section 21 (Image 87) (Table 95).

Table 95: North profile soil stratigraphy – Trench 2 Section 22.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.11' – 21.94' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.94' – 12.61' NAVD99 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Underlies strat III in the north half of the trench.
III	21.94' – 18.11' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 87: Trench 2 Section 22 – South profile in progress.

Section 23

Trench 2 Section 23 extended from 484'6" E to 509'6" E. The north-south width of the section was 10' from 484'6" to 490'6" where a concrete manhole intruded into the trench from the south, then 9' from 498'6" E to 509'6" E. The south wall of the section was at 16'4" N from 484'6" E to 490'6" E, at 19'10" N from 490'6" E to 494'6" E as the trench diverted around the manhole, then at 17'10" N throughout the rest of the section (Map 21).

The oilostatic line continued running east-west down the trench at a depth of 18.86' NAVD88 (5' bgs), its centerline at 25'4" N. The section's floor was excavated to a depth of 13.36' NAVD88 (10'6" bgs). Other utilities encountered included steel ducts running along the south wall at a depth of 21.86' NAVD88 (2' bgs).

Feature 17 was encountered in the north wall from 500'6" E to 506'4" E (Image 88). The feature was composed of a pair of mortared brick walls, each 1'6" thick (0.46m), extending from the bottom of the concrete roadbase at 22.69' NAVD88 (1'2" bgs) (0.36m bgs) down to 17.86' NAVD88 (6' bgs) (1.83m bgs). These walls were separated by a layer of concrete with rounded pebble inclusions from 22.69' to 22.28' NAVD88 (1'2" bgs to 1'7" bgs) (0.36m bgs to 0.48m bgs) overlying a layer of 10YR 7/3 very pale brown clean coarse sand (Image 88). Feature 17 was likely a pier for the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to the early twentieth century.

Trench 2 Section 23's stratigraphy remained largely unchanged from that encountered in Section 22 (Image 89) (Table 96).

Table 96: North profile soil stratigraphy – Trench 2 Section 23.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.86' – 22.69' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.69' – 13.36' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Underlies strat III in the north half of the trench.
III	22.69' – 17.86' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 6/3 pale brown	Clean sand associated with the oilostatic line.



Image 88: Trench 2 Section 23 – Feature 17 north profile.



Image 89: Trench 2 Section 23 – South profile in progress.

Section 24

Trench 2 Section 24 extended from 509'6" E to 534'6" E. The section had a north-south width of 9'. The south wall remained at 17'10" N (Map 21). The oilostatic line continued running east-west down the trench, rising to a depth of 19.61' NAVD88 (4'6" bgs), its centerline at 25'4" N at 509'6" E, ending at 24'4" N at 534'6" E. The section's floor was excavated to a depth of 13.61' NAVD88 (10'6" bgs).

Trench 2 Section 24's stratigraphy remained largely unchanged from that encountered in Section 23 (Image 90) (Table 97).

Table 97: North profile soil stratigraphy – Trench 2 Section 24.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.11' – 22.94' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.94' – 13.61' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.94' – 18.61' NAVD88 (1'2" – 5'6" bgs) (0.36m – 1.68m bgs)	10YR 6/3 pale brown	Clean sand associated with the oilostatic line.



Image 90: Trench 2 Section 24 – North profile in progress.

TRENCH 4, SECTIONS 4-15

Trench 4 began just west of Worth Street's intersection with Baxter Street (Map 19) and continued into the block from Baxter Street to Mulberry Street in Sections 4 through 15. The monitoring and documentation of the trench was broken up into 25' long arbitrary sections.

Section 4

Trench 4 Section 4 extended from 231'6" E to 256'6" E. The north-south width of the section varied from 13'6" at 231'6" E to 12'6" at 252'6" E to 21'3" at 253'6" E to 24'10" at 256'6" E. The north wall of the trench was at 29'4" N from 231'6" E to 250' E, where it turned southeastward, turning due east again at 27' N at 252'6" E. The south wall of the trench was at 15'10" N from 231'6" E to 252' E, where it turned southeastward, crossing the curb into the sidewalk to 5'9" N from 253'6" to 256', falling back to 2'2" N from 256' E to 256'6" E (Map 19).

The trench was excavated to a depth of 14.97' NAVD88 (5' bgs) south of the ECS duct bank, not including the portion of the trench south of the curbline, which was excavated to 15.97' NAVD88 (4' bgs). North of the ECS duct bank the trench was excavated to 15.97' NAVD88 (4' bgs) save for a small area from 22'4" N, 231'6" E to 24' N, 234'6" E around the end of the defunct 20" water main, which reached 14.97' NAVD88 (5' bgs) and the portion of the trench from 242'6" E to 248'6" E, which reached 13.97' NAVD88 (6' bgs). The ECS duct bank continued eastward across the section at 17.97' NAVD88 (2' bgs) with its centerline at 20'7" N from 231'6" E to 253'6" E, where it began moving northward, ending at 21' N at 256'6" E (Image 91).

Numerous other utility lines crossed Trench 4 Section 4, including a 12" pipe which crossed the trench north-south with its centerline at 246' E and a concrete slab at 18.97' NAVD88 (1' bgs) in the south extension beneath the sidewalk (Image 92).

Feature 8, a mortared brick wall, was encountered at 18.89' NAVD88 (1'1" bgs), from 239' E to 246' E (Maps 19-20). The feature intruded into the trench from the south, its north face at 16'9" N. The wall was apparently composed of a single layer of brick and extended below the trench floor at 14.97' NAVD88 (5'bgs) (Image 93). According to nineteenth century tax maps and modern utility maps, the Feature 8 area did not correspond to previous known structures razed on Cross Street; it lays at the convergence of multiple utilities. Its location and single-course construction suggest this was a wall forming a utility box (see Map 28, VII. Conclusions for historic overlay).

Trench 4 Section 4's stratigraphy was composed of a layer of modern sand fill associated with the various utilities overlying redeposited historic fill (Image 94) (Table 98).

Table 98: South profile soil stratigraphy – Trench 4 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	19.97' – 18.34' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	18.34' – 17.47' NAVD88 (1'4" – 2'6" bgs) (0.41m – 0.76m bgs)	2.5Y 5/6 light olive brown	Clean sand.
III	17.47' – 14.97' NAVD88 (2'6" – 5' bgs) (0.76 – 1.52m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 91: Trench 4 Section 4 – Utilities.



Image 92: Trench 4 Section 4 – South extension within sidewalk.



Image 93: Trench 4 Section 4 – Feature 8 south profile.



Image 94: Trench 4 Section 4 – Excavation in progress.

Section 5

Trench 4 Section 5 extended from 256'6" E to 281'6" E. The north-south width of the section varied from 24'10" at 256'6" E to 14' at 287'6" E to 7' at 266'6" E. The south extension into the sidewalk ended at 262'6" E, while in the street the south wall of the trench moved to 13' N at 261' E. At 266'6" E the south wall moved from 12'6" N to 19'6" E, and finally to 18'6" N at 281'6" E. The north wall began at 27' N at 256'6" E, moving to 25'6" N at 281'6" E (Map 19). The trench was excavated to a max depth of 14.32' NAVD88 (6' bgs) north of the ECS duct bank, reaching only 14.82' NAVD88 (5'6" bgs) to the south of the duct bank.

The ECS duct bank continued eastward across the section at 18.32' NAVD88 (2' bgs) with its centerline at 21' N at 256'6" E, moving to 22'3" N at 272' E, then to 18'6" N at 281'6" E. Other utilities in the section included the 10" oilostatic line, a 12" watermain, and a concrete service box. The oilostatic line emerged from the trench floor at 15.32' NAVD88 (5' bgs) at 257' E, its centerline at 24' N, moving to 23'4" N at 281'6" E. The 12" main was encountered at 15.82' NAVD88 (4'6" bgs), its centerline at 19'6" N. The service box measured 5'6" by 5'6", its southwest corner at 14' N, 259'2" E (Image 95).

Trench 4 Section 5's stratigraphy was composed primarily of modern fill deposits associated with the various utility lines, with some redeposited historic fill appearing in the south half of the trench (Image 96) (Table 99) (Table 100). A mid twentieth century beer bottle was found in strat IV at 16.32' NAVD88 (4' bgs) at 271'6" E and was discarded.

Table 99: North profile soil stratigraphy – Trench 4 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.32' – 18.99' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	18.99' – 14.32' NAVD88 (1'4" – 6' bgs) (0.41m – 1.83m bgs)	10YR 5/4 yellowish brown	Clean coarse sand associated with the ECS duct bank and the oilostatic line.
III	18.99' – 16.82' NAVD88 (1'4" – 3'6" bgs) (0.41m – 1.07m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with some angular gravel and wood fragment inclusions. Appears in the north profile at 264'6" E (80.62m E)

Table 100: South profile soil stratigraphy – Trench 4 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.32' – 18.99' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	18.99' – 16.82' NAVD88 (1'4" – 3'6" bgs)	10YR 5/4 yellowish brown	Clean coarse sand associated with the ECS duct bank and the oilostatic line.

	(0.41m – 1.07m bgs)		
IV	16.82' – 14.82' NAVD88 (3'6" – 5'6" bgs) (0.41m – 1.68m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and brick fragment inclusions. Associated with the 12" water main.



Image 95: Trench 4 Section 5 – Service box.



Image 96: Trench 4 Section 5 – North profile in progress.

Section 6

Trench 4 Section 6 extended from 281'6" E to 306'6" E. The north-south width of the section began at 7' from 281'6" E to 291'6" E, widening to 8' at 291'6" E. The south wall was at 18'6" N at 281'6" E, moved from 17'4" N to 16'4" N at 292'6" E, then from 15'10" N to 14'5" N at 297.5' E ending at 13'6" N at 306'6" E. The north wall was at 25'6" N at 281'6" E, moved from 23'6" N to 22'6" N at 300'4" E, ending at 21'6" N at 306'6" E (Map 19).

Trench 4 Section 6 was excavated to a max depth of 14.71' NAVD88 (6' bgs) at 281'6" E, sloping up to 15.21' NAVD88 (5'6" bgs) at 295'6" E. An unexcavated berm at 19.21' NAVD88 (1'6" bgs) was left up to 1'4" north of the south wall from 297'6" E to 306'6" E).

The ECS duct bank continued eastward across the section at 18.71' NAVD88 (2' bgs), its centerline at 20'6" N at 281'6" E, moving to 16'3" N at 306'6" E. A second ECS duct bank crossed the section at 19.21' (1'6" bgs), emerging from the north wall at 284'10" E and disappearing into the south wall at 302'3" E. The oilostatic line disappeared into the north wall at 296'6" E (Image 97).

Trench 4 Section 6's stratigraphy was composed of a layer of modern coarse sand fill associated with the ECS duct banks and the oilostatic line and a layer of redeposited historic fill, which appeared in the north wall at 297'6" E (Image 98) (Table 101). fragment, was found in strat III at a depth of 17.71' to 15.71' NAVD88 (3' to 5' bgs) (Table 101).

Table 101: General soil stratigraphy – Trench 4 Section 6.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.71' – 19.54' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.54' – 14.71' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 5/4 yellowish brown	Clean coarse sand associated with the ECS duct bank and the oilostatic line.
III	19.54' – 15.21' NAVD88 (1'2" – 5'6" bgs) (0.36m – 1.68m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions. Appears beginning at 297'6" E (90.68m E).



Image 97: Trench 4 Sections 5 to 7 – Utilities.



Image 98: Trench 4 Section 6 – North profile in progress.

Section 7

Trench 4 Section 7 extended from 306'6" E to 331'6" E. The north-south width of the section varied from 8' at 306'6" E to 14'6" at 317' E. The south wall began at 13'6" N at 306'6" E, moving to 12'6" N at 314' E, then to 7'3" N. The south wall abutted the curb from 317' E to 321'6" E at 5'9" N to 5'3" N, moving to 1' north of the curb from 321'6" E to 331'6" E at 6'3" N to 5'2" N. The north wall began at 21'6" N at 306'6" E, moving to 19' N at 329'1" E, where it moved to 15'4" N, ending at 15'1" N at 331'6" E (Map 19).

Trench 4 Section 7 was excavated to a max depth of 15.31' NAVD88 (5'6" bgs), save for the portion of the trench north of the ECS duct bank from 319'6" E to 329'1" E where the pavement was stripped only to 19.81' NAVD88 (1' bgs), leaving the soil beneath undisturbed. The ECS duct bank continued eastward across the section, rising to 19.31' NAVD88 (1'6" bgs), its centerline at 16'3" N at 306'6" E, moving to 13' N at 331'6" E. Numerous other utilities were encountered, including a 20" water main at 16.81' NAVD88 (4' bgs), its centerline at 10'4" N, and the steam pipe at 17.81' NAVD88 (3' bgs), its centerline at 7'8" N (Image 99).

Feature 9, an east-west oriented mortared stone wall, was encountered at 18.64' NAVD88 (2'2" bgs) beginning at 319' E and extending eastward 35' 3" into Section 8 to end at 354' 9" E (Maps 16-17). Its south face was at 12'6" N at 319' E, running slightly southeast to 12'1" N at 331'6" E. The wall was located under the ECS duct bank, likely previously impacted by the utility installations, and only the south face was visible extending deeper below the trench floor at 15.31' NAVD88 (5'6" bgs) (Image 100). Historic maps do not indicate any structures in the area that correspond to Feature 9's location and orientation prior to Worth Street's post-1868 expansion east

through the former blocks between Baxter and Mulberry Streets (see Map 28, VII. Conclusions for historic overlay). Feature 9 likely represents a building substructure or utility support put in place near the south boundary of Worth Street after 1868.

Trench 4 Section 7's stratigraphy was composed of a modern fill deposit of coarse sand associated with the ECS duct bank in the north half of the trench and two separate layers of redeposited historic fill differentiated by color, the one in the south half of the section associated with the 20" water main and the steam pipe (Image 99) (Table 102).

Table 102: General soil stratigraphy – Trench 4 Section 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.81' – 19.64' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.64' – 17.31' NAVD88 (1'2" – 3'6" bgs) (0.36m – 1.07m bgs)	10YR 5/4 yellowish brown	Clean coarse sand associated with the ECS duct bank in the north half of the trench up to 319'6" E (97.38m E).
III	17.31' – 15.31' NAVD88 (3'6" – 5'6" bgs) (1.07m – 1.68m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with pebble, cobble, and loose brick inclusions bank in the north half of the trench up to 319'6" E (97.38m E).
IV	19.64' – 15.31' NAVD88 (1'2" – 5'6" bgs) (0.36m – 1.68m bgs)	7.5YR 3/3 dark brown	Medium sand with some cobble and loose brick inclusions, associated with the 20" water main and the steam pipe in the south half of the trench.



Image 99: Trench 4 Section 7 & 8 – Excavation in progress.



Image 100: Trench 4 Section 7 – Feature 9 north profile.

Section 8

Trench 4 Section 8 extended from 331'6" E to 356'6" E. The north-south width varied from 10' at 331'6" E to 6' at 338'10" E. The south wall began at 5'2" N at 331'6" E, moving to 7'6" N at 338'2" E, ending at 6'6" N at 356'6" E (Maps 19-20). The section was excavated to a max depth of 14.87' NAVD88 (6' bgs). The ECS duct bank continued eastward across the section at 19.37' NAVD88 (1'6" bgs), its centerline moving from 13' N at 331'6" E to 10'6" N at 356'6" E. The 20" water main continued eastward across the section at a depth of 16.87' NAVD88 (4' bgs), its centerline at 10'6" N, as did the steam pipe at 17.87' NAVD88 (3' bgs), its centerline at 8'3" N.

Feature 9, the mortared stone wall encountered in Trench 4 Section 7, continued eastward into Section 8 at 18.7' NAVD88 (2'2" bgs), ending at 354'9" E, its south face at 11'7" N. As in Section 7 the wall was located under the ECS duct bank, and only the south face was visible. (Image 101).

Trench 4 Section 8's stratigraphy was composed of the same modern fill seen in Section 7 and a slightly darker redeposited historic fill associated with the 20" water main and the steam pipe (Image 102) (Table 103).

Table 103: General soil stratigraphy – Trench 4 Section 8.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.87' – 19.7' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.7' – 17.37' NAVD88 (1'2" – 3'6" bgs) (0.36m – 1.07m bgs)	10YR 5/4 yellowish brown	Clean coarse sand associated with the ECS duct bank.
III	19.7' – 14.87' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions, associated with the 20" water main and the steam pipe.



Image 101: Trench 4 Section 8 – Feature 9 north profile.



Image 102: Trench 4 Section 8 – North profile.

Section 9

Trench 4 Section 9 extended from 356' 6"E to 381'6" E. The north-south width was 6'3" from 356'6" E to 368' E, widening to 9'6" from 368' E to 381'6" E when the south wall fell back from 6'6" N to abut the curb at 3'4" N (Map 20). The section was excavated to a max depth of 15.91' NAVD88 (5' bgs), save for a berm extending from the south wall to 5'4" N from 368' E to 381'6" E which reached only 19.74' NAVD88 (1'2" bgs).

The ECS duct bank continued eastward through the section, rising to 19.74' NAVD88 (1'2" bgs), its centerline at 9'7" N at 366' E, disappearing into the south wall at 372'6" E. The 20" water main continued eastward across the section at a depth of 16.91' NAVD88 (4' bgs), its centerline at 11'1" N, as did the steam pipe at 3' bgs, its centerline at 8'4" N.

Trench 4 Section 9's stratigraphy was composed of several layers of modern utility fill, with little of the redeposited historic fill remaining (Image 103) (Image 104) (Table 104) (Table 105).

Table 104: North profile soil stratigraphy – Trench 4 Section 9.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.91' – 19.74' (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	19.74' – 15.91' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/3 dark brown	Medium sand with some cobble inclusions. Associated with the 20" water main.
III	19.74' – 17.91' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 5/6 yellowish brown	Clean medium sand. Appears in the north profile starting at 379'6" E (115.67m E)

Table 105: South profile soil stratigraphy – Trench 4 Section 9.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.91' – 19.74' (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
IV	19.74' – 18.81' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and brick fragment inclusions.
V	18.91' – 17.91' NAVD88 (2' – 3' bgs) (0.61m – 0.91m bgs)	10YR 3/4 dark yellowish brown	Clean medium sand overlying steam pipe.

II	17.91' – 15.91' NAVD88 (3' – 5' bgs) (0.91m – 1.52m bgs)	7.5YR 3/3 dark brown	Medium sand with some cobble inclusions.
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Image 103: Trench 4 Sections 9 & 10 – North profile.



Image 104: Trench 4 Sections 9 & 10 – South profile.

Section 10

Trench 4 Section 10 extended from 381'6" E to 406'6" E. The north-south width was 9'6" from 381'6" E to 388'6" E, narrowing to 4'9" from 388'6" E to 406'6" E as the south wall moved from 3'4" N to 8'1" N (Map 20). An extension was excavated from the north side of the trench, 7' long north-south by 3' wide east-west, from 393' E to 396' E, reaching to 19'10" N (Image 105). The trench was excavated to a max depth of 17.04' NAVD88 (5' bgs), with the north extension reaching only 18.54' NAVD88 (3'6" bgs), and a berm from the south wall to 5'4" N from 381'6" E to 388'6" E which reached only 20.87' NAVD88 (1'2" bgs).

The 20" water main continued eastward across the section at a depth of 18.04' NAVD88 (4' bgs), its centerline at 11'1" N. The steam pipe continued across the trench at a depth of 19.04' NAVD88 (3' bgs), its centerline at 8'4" N, entering a concrete housing at 413'6" E. Numerous other ducts were uncovered in the north extension at depths ranging from 19.87' to 18.54' NAVD88 (2'2" bgs to 3'6" bgs) (Image 105).

Trench 4 Section 10's stratigraphy was primarily made up of layers of modern clean sand fill overlying a 7.5YR 3/3 dark brown sand fill with some cobble inclusions, along with several other pocket strata, including one artifact bearing layer (Image 106) (Table 106).

Table 106: North profile soil stratigraphy – Trench 4 Section 10.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.04' – 20.87' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.87' – 19.04' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 5/6 yellowish brown	Clean medium sand.
III	20.87' – 20.04' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with coal fragment and brick fragment inclusions.
IV	20.87' – 17.04' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/3 dark brown	Medium sand with some cobble inclusions.
V	20.87' – 20.04' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR ¾ dark yellowish brown	Clean medium sand. Present in the south wall from 382'6" E to 391'6" E (116.59m E to 119.33m E)
VI	20.87' – 20.04' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and brick fragment inclusions. Present from 381'6" E to 382'6" E (116.28m E to 116.59m E), then from 391'6" E to 393'6" E (119.33m E to 119.94m E)



Image 105: Trench 4 Section 10 – North extension, west profile.



Image 106: Trench 4 Section 10 – North profile, showing artifact-bearing layer.

Section 11

Trench 4 Section 11 extended from 406'6" to 431'6" E. The section had a north-south width of 5', its south wall at 8'4" N (Map 20). The trench was excavated to a max depth of 17.05' NAVD88 (5' bgs). The 20" watermain continued eastward down the section at a depth of 17.88' NAVD88 (4'2" bgs), its centerline moving to 10'9" N. An ECS duct bank emerged from the south wall at 426' E, crossing to the north wall and turning eastward at 21.05' NAVD88 (1' bgs).

Trench 4 Section 11's stratigraphy was primarily composed of redeposited historic fill (Image 107) (Table 107).

Table 107: North profile soil stratigraphy – Trench 4 Section 11.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.05' – 20.88' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	20.88' – 17.05' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/4 dark brown	Coarse sand with pebble, cobble, and loose brick inclusions.



Image 107: Trench 4 Section 11 – Excavation in progress.

Section 12

Trench 4 Section 12 extended from 431'6" E to 456'6" E. The north-south width of the trench varied from 4' to 5'6", as the south wall moved from 8'4" N from 431'6" E to 444' E, to 6'10" N from 448'6" E to 456'6" E (Maps 20-21). An extension was excavated from the south side of the trench, 8'6" long north-south by 4'6" wide east-west, its south wall reaching to 2" S, 3'6" south of the curb (Image 108). The section was excavated to a max depth of 17.4' NAVD88 (5' bgs). The 20" water main continued eastward down the section at 17.9' NAVD88 (4'6" bgs), its centerline at 10'5" N. The ECS duct bank which appeared in Section 11 also continued eastward along the north wall at a depth of 21.4' NAVD88 (1' bgs).

Trench 4 Section 12's stratigraphy was similar to that seen in Section 11 (Image 109) (Table 108).

Table 108: North profile soil stratigraphy – Trench 4 Section 12.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.4' – 21.23' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.23' – 17.4' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/4 dark brown	Coarse sand with pebble, cobble, and loose brick inclusions.



Image 108: Trench 4 Section 12 – South extension, east profile.

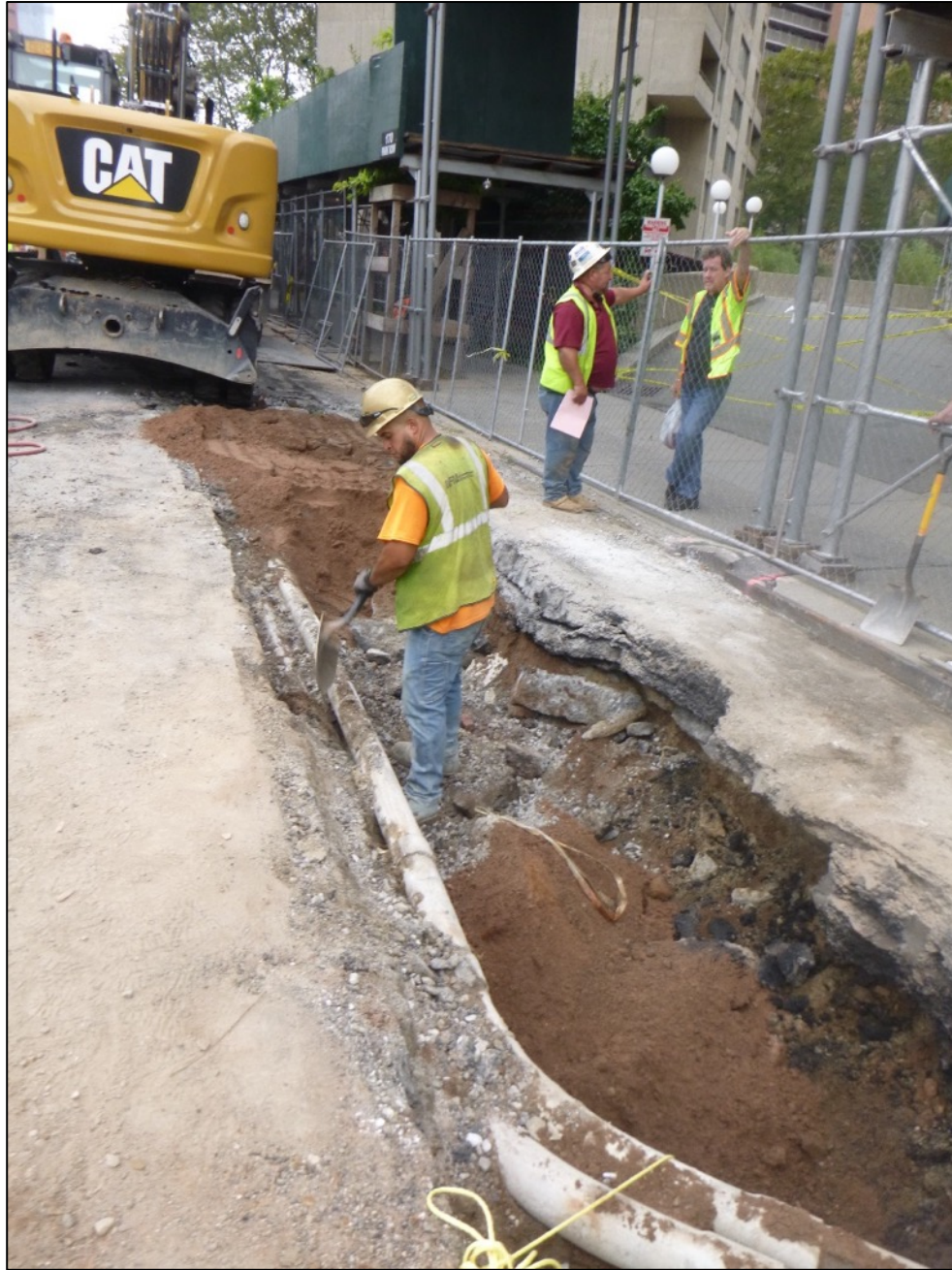


Image 109: Trench 4 Section 12 – Excavation in progress.

Section 13

Trench 4 Section 13 extended from 456'6" E to 481'6" E. The north-south width of the trench was 5'6" from 456'6" E to 460'6" E, narrowing to 5' from 460'6" E to 481'6" E. The south wall of the section remained at 6'10" N (Map 21). The section was excavated to a max depth of 17.77' NAVD88 (5' bgs). The 20" water main continued eastward down the section at 18.27' NAVD88 (4'6" bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 21.77' NAVD88 (1' bgs).

Feature 18, a mortared stone wall, appeared at 460'6" E (140.36m E), flush with the north wall at 11'10" N. The feature was present from a depth of 21.6' NAVD88 (1'2" bgs), just under the concrete roadbase, down into the trench floor at 17.77' NAVD88 (5' bgs). There was a brick-lined gap in the wall from 478'6" E to 482'6" E, after which the feature continued eastward (Image 110). Historic maps do not indicate any structures in the area that correspond to Feature 18's location and orientation prior to Worth Street's post-1868 expansion east through the former blocks between Baxter and Mulberry Streets (see Map 28, VII. Conclusions for historic overlay). The feature appeared to correspond to the position and orientation of Feature 9, found further west in Trench 4 Sections 7-8. Feature 18 likely represents a building substructure or utility support put in place near the south boundary of Worth Street after 1868.

Trench 4 Section 13's stratigraphy was similar to that seen in Section 12 (Image 110) (Table 109).

Table 109: North profile soil stratigraphy – Trench 4 Section 13.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.77' – 21.6' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.6' – 17.77' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/4 dark brown	Coarse sand with pebble, cobble, and loose brick inclusions.



Image 110: Trench 4 Sections 13 & 14 – Feature 18 north profile showing brick-lined gap.

Section 14

Trench 4 Section 14 extended from 481'6" E to 506'6" E. The north-south width of the trench was 5'. Its south wall remained at 6'10" N (Map 21). The section was excavated to a max depth of 18.34' NAVD88 (5' bgs). The 20" water main continued eastward down the section, diving down to 18.51' NAVD88 (4'10" bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 22.34' NAVD88 (1' bgs).

Feature 18, the mortared stone wall which appeared in Section 13, continued eastward across this section flush with the north wall at 11'10" N. Another brick-lined gap appeared in the wall from 498'6" E to 501'6" E, this one containing a 4" vertical pipe (Image 111). Following the gap, the Feature 18 stone wall continued eastward into the next section.

Trench 4 Section 14's stratigraphy was similar to that seen in Section 13 (Image 112) (Table 110).

Table 110: North profile soil stratigraphy – Trench 4 Section 14.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.34' – 22.17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.17' – 18.34' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/4 dark brown	Coarse sand with pebble, cobble, and loose brick inclusions.



Image 111: Trench 4 Section 14 – Feature 18 north profile showing second brick-lined gap.



Image 112: Trench 4 Section 14 – Trench floor. Feature 18 visible in north wall.

Section 15

Trench 4 Section 15 extended from 506'6" E to 531'6" E. The north-south width of the trench was 5'. Its south wall remained at 6'10" N, although the pavement was stripped from the south wall to the curb at 3'4" N beginning at 523' E (Map 21). The section was excavated to a max depth of 18.51' NAVD88 (5' bgs).

The 20" water main continued eastward down the section at a depth of 18.68' NAVD88 (4'10" bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 22.51' NAVD88 (1' bgs). Another utility line was uncovered crossing the section north-south at a depth of 21.51' NAVD88 (2' bgs) at 526'6" E.

Feature 18, the mortared stone wall that first appeared in Section 13, continued eastward across Section 15 flush with the north wall at 11'10" N (Image 113).

Feature 19, a 1' wide mortared brick wall oriented north-south, intruded into the section from the south at 522' E (Image 114). The feature was composed of three layers of brick, although it had been previously disturbed and partially dismantled. Its top was encountered at a depth of 22.34' NAVD88 (1'2" bgs), and it continued down past the level of the trench floor at 18.51' NAVD88 (5' bgs). The bricks had no maker's marks or other diagnostic features. Feature 19 was aligned north-south on an axis matching that of Worth Street, not in alignment with the nineteenth century Five Points blocks razed ca. 1868 for Worth Street's expansion (see Map 28, VII. Conclusions for historic overlay). Feature 19 likely represents a utility box, trolley support, or wall structure post-dating the 1868 Worth Street expansion. The limited extent visible and lack of surrounding intact historic soils or features precludes a more confident determination of the feature's function.

Trench 4 Section 15's stratigraphy was mostly similar to that seen in Section 14, with a layer of modern loamy sand and gravel fill appearing in the east half of the section (Image 114) (Table 111).

Table 111: North profile soil stratigraphy – Trench 4 Section 15.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.51' – 22.34' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.34' – 1.51' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 4/2 dark grayish brown	Loamy sand with significant RCA gravel inclusions. Only present in the east half of the section.
III	22.34' – 18.51' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/4 dark brown	Coarse sand with pebble, cobble, and loose brick inclusions.



Image 113: Trench 4 Sections 15 & 16 – Feature 18 north profile.



Image 114: Trench 4 Section 15 – Feature 19 south profile.

TRENCH 7

Trench 7 was opened on August 9, 2019. The pavement and concrete roadbase were removed by machine, otherwise all excavation was conducted by hand. Trench 7 measured 10' east-west, from 424' E to 434' E. It had a north-south width of 5'6", its south wall at 3'4" N, flush with Worth Street's south curb (Map 20). The trench floor was brought down to 19.18' NAVD88 (3' bgs). A small portion of the trench was excavated to a max depth of 15.68' NAVD88 (6'6" bgs). This deeper portion measured 3'6" by 3'6", from 428' E to 431'6" E, and its south wall extended 1' south of the curb to 2'4" N, exposing a concrete wall or vault beneath the sidewalk (Image 115). The steam pipe was encountered at 16.18' NAVD88 (6' bgs) (1.83m bgs). The trench stratigraphy was composed of redeposited historic fill (Image 116) (Table 112).

Table 112: South profile soil stratigraphy – Trench 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.18' – 21.01' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.01' – 16.18' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 3/3 brown	Loamy sand with pebble, cobble, loose brick, and architectural stone rubble inclusions.



Image 115: Trench 7 – Sidewalk vault.



Image 116: Trench 7 – North profile.

TRENCH 14

Trench 14 was opened on September 11, 2019. All excavation was conducted by hand. Trench 14 measured 3'4" by 3'4", from 417' E to 420'4" E, its south wall at 1'S. The entirety of the trench was located beneath the sidewalk, south of the curb (Map 20). The trench was brought down to a depth of 19.34' NAVD88 (3' bgs). The trench stratigraphy was composed of a layer of modern loamy sand fill overlying a layer of redeposited historic fill (Image 117) (Table 112).

Table 113: South profile soil stratigraphy – Trench 14.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.34' – 21.92' NAVD88 (0 – 5" bgs) (0 – 0.13m bgs)	N/A	Concrete sidewalk
II	21.92' – 21.51' NAVD88 (5" – 10" bgs) (0.13m – 0.25m bgs)	10YR 5/2 grayish brown	Loamy sand fill
III	21.51' – 19.34' NAVD88 (10" – 3' bgs) (0.25m – 0.91m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, brick fragment, and concrete fragment inclusions.



Image 117: Trench 14 – East profile.

TRENCH 15

Trench 15 was opened on September 12, 2019. The pavement and concrete roadbase were removed by machine, otherwise all excavation was conducted by hand. Trench 15 measured 4' north-south, with an east-west width of 66'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 15 Section 1 extended from 368'E to 393'E. The south wall was at 6" N, moving to 3'4" N at 391'6" E where the trench diverted around a tree. The trench straddled the curb, with the north wall 1'2" north of the curblineline. The section partly overlapped the former location of Trench 4 Sections 9 and 10 (Map 20). The section was excavated to a max depth of 19.02' NAVD88 (2' bgs). A concrete slab was encountered running along the south wall at 19.52' NAVD88 (1'6" bgs). The section's stratigraphy was composed of redeposited historic fill (Image 118) (Table 114).

Table 114: General soil stratigraphy – Trench 15 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.02' – 19.85' NAVD88 (0 – 1.2' bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.32' – 20.9' NAVD88 (+3" – 1" bgs) (+0.08m – 0.03m bgs)	N/A	Concrete sidewalk, only in the south half of the trench.
III	20.9' – 19.02' NAVD88 (1" – 2' bgs) (0.03m – 0.61m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 118: Trench 15 Section 1 – South profile.

Section 2

Trench 15 Section 2 extended from 393'E to 418'E. The south wall began at 3'4" N at 393'E, moving back to 6" N at 399'6" E completing the diversion around a tree. The section partially overlapped the former location of Trench 14 beginning at 417' E (Map 20). The section was excavated to a max depth of 19.63' NAVD88 (2' bgs). The section's stratigraphy was similar to that seen in Section 1 (Image 119) (Table 115).

Table 115: General soil stratigraphy – Trench 15 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.63' – 20.46' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	21.93' – 21.51' NAVD88 (+3" – 1" bgs) (+0.08m – 0.03m bgs)	N/A	Concrete sidewalk, only in the south half of the trench.
III	21.51' – 19.63' NAVD88 (1" – 2' bgs) (0.03m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 119: Trench 15 Section 2 – South profile.

Section 3

The third section of Trench 15 extended from 418' E to 434'6" E. The south wall remained at 6" N. The section overlapped the former location of Trench 14 from 418' E to 420'4" E, and of Trench 7 from 424' E to 434' E (Map 20). The trench was excavated to a max depth of 20.13' NAVD88 (2' bgs). The section's stratigraphy was similar to that seen in Section 2 (Image 120) (Table 116).

Table 116: General soil stratigraphy – Trench 15 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.13' – 20.96' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.43' – 22.01' NAVD88 (+3" – 1" bgs) (+0.08m – 0.03m bgs)	N/A	Concrete sidewalk, only in the south half of the trench.
III	22.01' – 20.13' NAVD88 (1" – 2' bgs) (0.03m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 120: Trench 15 Sections 2 & 3 – Plan view.

TRENCH 17

Trench 17 was opened on October 17, 2019. While some of the excavation was conducted by machine, the high density of existing utility lines necessitated hand digging throughout most of the trench. Trench 17 was oriented northwest by southeast, parallel with Worth Street's north curbline, and measured 39'6" east-west, with a north-south width varying from 5' to 19'2". The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 17 Section 1 extended from 287' E to 312' E. The north-south width of the trench was 5' from 287' E to 288'6" E, the north wall abutting Worth Street's north curb, changing to 8' from 288'6" E to 309' E as the trench expanded northward into the sidewalk, then returning to 5' from 309' E to 312' E. The southwest corner of the section was at 39'6" N and the southeast corner of the section was at 39'2" N (Map 19). The section floor was excavated to a max depth of 15.96' NAVD88 (5' bgs). Numerous utility lines were encountered crossing the trench at depths ranging from 18.96' to 17.96' NAVD88 (2' to 3' bgs) (Image 121). The section's stratigraphy was composed of redeposited historic fill, both in the street and below the sidewalk (Image 121) (Table 117) (Table 118). A modern Miller High Life glass bottle was noted at the trench floor but not retained.

Table 117: South profile soil stratigraphy – Trench 17 Section 1 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	20.96' – 19.96' NAVD88 (0 – 1' bgs) (0 – 0.3m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	19.96' – 15.96' NAD88 (1' – 5' bgs) (0.3m – 1.52m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Modern Miller High Life beer bottle at base.

Table 118: General soil stratigraphy – Trench 17 Section 1 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.26' – 20.68' NAVD88 (0 – 7" bgs) (0 – 0.18m bgs)	N/A	Concrete sidewalk surface.
II	20.68' – 16.26' NAVD88 (7" – 5' bgs) (0.18m – 1.52m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 121: Trench 17 Section 1 – South profile.

Section 2

Trench 17 Section 2 extended from 312' E to 326'6" E. The north-south width of the section was 5' as the north wall continued to abut Worth Street's north curb. The southwest corner of the section was at 39'2" N, and the southeast corner was at 39' N (Map 19). The section floor was excavated to a max depth of 16.25' NAVD88 (5' bgs). The same utility lines seen in Section 1 were encountered crossing the trench at depths ranging from 19.25' to 18.25' NAVD88 (2' to 3' bgs) (Image 122). The section's stratigraphy remained unchanged from that seen in Section 1 (Table 119).

Table 119: South profile soil stratigraphy – Trench 17 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.25' – 20.25' NAVD88 (0 – 1' bgs) (0 – 0.3m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.25' – 16.25' NAVD88 (1' – 5' bgs) (0.3m – 1.52m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 122: Trench 17 Section 2 – Excavation in progress.

Section 3

Trench 17 Section 3 was a southward extension from Section 1. Its west wall was at 296'6" E and its east wall was at 310'6" E. The maximum north-south width of Section 3 was 10'7", with its southmost point at 28'8" N (Map 19). The section floor was excavated to a max depth of 15.02' NAVD88 (6' bgs). Numerous utility lines were encountered crossing the trench at depths ranging from 19.02' – 18.02' NAVD88 (2' to 3' bgs). The section's stratigraphy remained unchanged from that seen in Sections 1 and 2 (Image 123) (Table 120).

Table 120: South profile soil stratigraphy – Trench 17 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.02' – 20.02' NAVD88 (0 – 1' bgs) (0 – 0.3m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.02' – 15.02' NAVD88 (1' – 6' bgs) (0.3m – 1.83m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 123: Trench 17 Section 3 – Excavation in progress.

TRENCH 18

Trench 18 was opened on October 24, 2019. While the majority of the excavation was conducted by machine, the high density of existing utility lines necessitated hand digging throughout significant portions of the trench. Trench 18 was oriented north-south, perpendicular to Worth Street, and measured 21'6" north-south, with an east-west width varying from 4'6" to 10'. The monitoring and documentation of the trench was broken up into arbitrary sections up to 17' long.

Section 1

Trench 18 Section 1 extended from 26'4" N to 43'4" N. From 26'4" N to 29'4" N it had an east-west width of 10', extending from 372'6" E to 382'6" E. From 29'4" N to 43'4" N, the east-west width shrank to 6', the section extending from 376'6" E to 382'6" E (Map 20). The section's floor was excavated to a maximum depth of 14.87' NAVD88 (7' bgs). Numerous utility lines were encountered crossing the trench from depths of 20.2' to 18.37' NAVD88 (1'8" bgs to 3'6" bgs). The section's stratigraphy was composed of redeposited historic fill (Image 124) (Table 121).

Table 121: South profile soil stratigraphy – Trench 18 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.87' – 20.7' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.7' – 14.87' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Twentieth century trash found in this strat.



Image 124: Trench 18 Section 1 – Excavation in progress.

Section 2

Trench 18 Section 2 was located within Worth St's north sidewalk, extending from 43'10" N to 48'2" N. The section had an east-west width of 4'6", extending from 375'6" E to 380' E (Map 20). The section's floor was excavated to a depth of 17.1' NAVD88 (5' bgs). An oilostatic line was visible in the north wall without intruding into the section proper. The section's stratigraphy was mostly similar to that encountered in Section 1, with the addition of a layer of modern clean sand fill associated with the oilostatic line (Image 125) (Table 122).

Table 122: West profile soil stratigraphy – Trench 18 Section 2 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.1' – 21.52' NAVD88 (0 – 7" bgs) (0 – 0.18m bgs)	N/A	Concrete sidewalk surface.
II	21.52' – 17.1' NAVD88 (7" – 5' bgs) (0.18m – 1.52m bgs)	10YR/7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	21.52' – 18.27' NAVD88 (7" – 3'10") (0.18m – 1.17m bgs)	10YR 5/4 yellowish brown	Clean coarse sand, associated with the oilostatic line.



Image 125: Trench 18 Section 2 – North profile.

TRENCH 19

Trench 19 was opened on October 31, 2019. The majority of the excavation was conducted by machine, as the excavation did not reach deep enough to uncover any utilities or other obstructions. Trench 19 was oriented east-west, parallel with and straddling Worth Street's north curbline. The trench measured 225' east-west, with a north-south width varying from 2'6" to 22'6" (Maps 19-20). The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 19 Section 1 extended from 309' E to 334' E. The north-south width of the section was 4' from 309' E to 326'6" E, expanding to 18'6" from 326.5' E to 334' E. The south wall was at 44'2" N at 309' E, moving to 28'4" N at 326'6" E, ending at 27'3" N at 334' E (Map 19). The section's floor was excavated to a depth of 19.29' NAVD88 (2' bgs). The section's stratigraphy was composed of redeposited historic fill, both under the sidewalk and within the street (Image 126) (Table 123) (Table 124).

Table 123: South profile soil stratigraphy – Trench 19 Section 1 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.29' – 20.12' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.12' – 19.29' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 124: North profile soil stratigraphy – Trench 19 Section 1 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.59' – 21.09' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	21.09' – 19.59' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 126: Trench 19 Section 1 – North profile.

Section 2

Trench 19 Section 2 extended from 334' E to 359' E. The section's north-south width increased to 20.66', the south wall moving to 25.16' N (Maps 19-20). The section's floor was excavated to a depth of 19.53' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 17, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy remained unchanged from that seen in Section 1 (Image 127) (Table 125) (Table 126).

Table 125: South profile soil stratigraphy – Trench 19 Section 2 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.53' – 20.36' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	(1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 126: North profile soil stratigraphy – Trench 19 Section 2 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.83' – 21.33' NAVD88 (0 – 6" bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.

	(0 – 0.15m bgs)		
II	21.33' – 19.83' NAVD88 (6''' – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 127: Trench 19 Section 2 – North profile.

Section 3

Trench 19 Section 3 extended from 359' E to 384' E. The north-south width of the section remained 20'8", the south wall at 25'2" N (Map 20). The section's floor was excavated to a depth of 19.75' NAVD88 (2' bgs). The section partly overlapped the former locations of Trench 2 Section 18 and Trench 18 Sections 1 and 2, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy remained unchanged from that seen in Section 2 (Image 128) (Table 127) (Table 128).

Table 127: South profile soil stratigraphy – Trench 19 Section 3 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.75' – 20.58' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.58' – 19.75' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 128: North profile soil stratigraphy – Trench 19 Section 3 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.05' – 21.55' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	21.55' – 20.05' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 128: Trench 19 Sections 3 & 4 – North profile.

Section 4

Trench 19 Section 4 extended from 384' E to 409' E. The north-south width of the section remained 20'8", the south wall at 25'2" N (Map 20). The section's floor was excavated to a depth of 19.99' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 19, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy remained unchanged from that seen in Section 3 (Table 129) (Table 130).

Table 129: South profile soil stratigraphy – Trench 19 Section 4 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.99' – 20.82' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.82' – 19.99' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 130: North profile soil stratigraphy – Trench 19 Section 4 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.29' – 21.79' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	21.79' – 20.29' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Section 5

Trench 19 Section 5 extended from 409' E to 434' E. The north-south width of the section was 20'8" from 409' E to 426'6" E, where the section expanded northward by 6" for a total width of 21'2". The south wall remained at 25'2" N (Map 20). The section's floor was excavated to a depth of 20.25' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 20, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy remained unchanged from that seen in Section 4 (Image 131) (Table 132) (Table 129).

Table 131: South profile soil stratigraphy – Trench 19 Section 5 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.25' – 21.08' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	21.08' – 20.25' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.

Table 132: North profile soil stratigraphy – Trench 19 Section 5 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.55' – 22.05' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	22.05' – 20.55' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 129: Trench 19 Sections 5 & 6 – North profile.

Section 6

Trench 19 Section 6 extended from 434' E to 459' E. The north-south width of the section remained 21'2". The south wall remained at 25'2" N (Maps 20-21). The section's floor was excavated to a depth of 20.59' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 21, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy was mostly the same as that seen in Section 5, with some modern clean sand fill intermixed with the redeposited historic fill (Table 133) (Table 134).

Table 133: South profile soil stratigraphy – Trench 19 Section 6 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.59' – 21.42' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	21.42' – 20.59' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	21.42' – 20.59' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Table 134: North profile soil stratigraphy – Trench 19 Section 6 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.89' – 22.39' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	22.39' – 20.89' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.39' – 20.89' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Section 7

Trench 19 Section 7 extended from 459' E to 484' E. The north-south width of the section began at 21'2", widening to 22'6" from 459'6" E to 479'6" E, where it narrowed to 20'. The south wall moved accordingly, from 25'2" N to 23'10" N, and finally ending at 26'4" N, in order to accommodate two concrete manholes (Map 21). The section's floor was excavated to a depth of 20.95' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 22, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy was unchanged from that seen in Section 6 (Image 130) (Table 135) (Table 136).

Table 135: South profile soil stratigraphy – Trench 19 Section 7 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.95' – 21.78' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	22.95' – 20.95' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.95' – 20.95' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Table 136: North profile soil stratigraphy – Trench 19 Section 7 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.25' – 22.75' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	22.75' – 21.25' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.75' – 21.25' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.



Image 130: Trench 19 Sections 7 & 8 – Excavation in progress.

Section 8

Trench 19 Section 8 extended from 484' E to 509' E. The north-south width of the section was 20', with the south wall remaining at 26'4" N (Map 21). The section's floor was excavated to a depth of 21.38' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 23, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy was unchanged from that seen in Section 7 (Table 137) (Table 138).

Table 137: South profile soil stratigraphy – Trench 19 Section 8 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.38' – 22.21' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	22.21' – 21.38' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.21' – 21.38' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Table 138: North profile soil stratigraphy – Trench 19 Section 8 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.68' – 23.18' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	23.18' – 21.68' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	23.18' – 21.68' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Section 9

Trench 19 Section 9 extended from 509' E to 534' E. The north-south width of the section was 20' up to 530'6" E, where it narrowed by 3' from the north for a total width of 17'. The south wall remained at 26'4" N (Map 21). The section's floor was excavated to a depth of 21.82' NAVD88 (2' bgs). The section partly overlapped the former location of Trench 2 Section 24, however it had a shallower max depth and so encountered only MFM's backfill in that area. The section's stratigraphy was unchanged from that seen in Section 8 (Image 131) (Table 139) (Table 140).

Table 139: South profile soil stratigraphy – Trench 19 Section 9 - within the street.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.82 – 22.65' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	22.65' – 21.82' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.65' – 21.82' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.

Table 140: North profile soil stratigraphy – Trench 19 Section 9 - under sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.12' – 23.62' NAVD88 (0 – 6" bgs) (0 – 0.15m bgs)	N/A	Concrete sidewalk surface overlying RCA gravel.
II	23.62' – 22.12' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	23.62' – 22.12' NAVD88 (6" – 2' bgs) (0.15m – 0.61m bgs)	10YR 5/4 yellowish brown	Clean coarse sand. Intermixed with strat II.



Image 131: Trench 19 Sections 8 & 9 – Excavation in progress.

TRENCH 20

Trench 20 was opened on November 12, 2019. The majority of the excavation was conducted by machine, with limited hand excavation. Trench 20 was oriented east-west, mostly parallel with Worth Street. The trench measured 172' east-west, with a north-south width varying from 4' to 6' (Maps 20-21). The monitoring and documentation of the trench was broken up into arbitrary sections up to 25' long.

Section 1

Trench 20 Section 1 extended from 351'6" E to 376'6" E. The section had a north-south width of 5' at 351'6" E, widening to 6' at 376'6" E. The southwest corner of the section was at 27'4" N, the southeast corner of the section was at 26'4" N (Map 20). The section floor was excavated to a depth of 17.71' NAVD88 (4' bgs). The west wall of the section abutted a concrete utility vault, and several utilities were encountered associated with that vault, at depths from 20.54' to 19.04' NAVD88 (1'2" bgs to 2'8" bgs) (Image 132). The section overlapped the previous locations of Trench 2 Sections 17 and 18, Trench 18 Section 1, and Trench 19 Sections 2 and 3. All of these older excavations save for Trench 19 exceeded Trench 20 in depth. The section's stratigraphy was composed of redeposited historic fill, as well as various modern clean sand fill deposits associated with previous excavation episodes (Image 133) (Table 141). FS 17 was recovered from this section (Table 141). This included a blue transfer-printed whiteware sherd and a blue transfer-printed pearlware sherd, as well as an intact late twentieth century Sprite bottle.

Table 141: North profile soil stratigraphy – Trench 20 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	21.71' – 20.54' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.54' – 19.79' NAVD88 (1'2" – 1'11" bgs) (0.36m – 0.58m bgs)	7.5YR 5/8 strong brown	Clean coarse sand fill associated with utilities in the west half of the section.
III	20.54' – 17.71' (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 17 found in this strat, along with twentieth century remains.



Image 132: Trench 20 Section 1 – West profile.



Image 133: Trench 20 Sections 1 & 2 – Excavation in progress.

Section 2

Trench 20 Section 2 extended from 376'6" E to 401'6" E. The north-south width remained 6', and the south wall remained at 26'4" N (Map 20). The section floor was excavated to a depth of 18' NAVD88 (4' bgs). A 1' thick concrete slab was encountered at a depth of 20.5' NAVD88 (1'6" bgs), possibly an old road base. The section overlapped the previous locations of Trench 2 Sections 18 and 19, Trench 18 Section 1, and Trench 19 Sections 3 and 4. All of these older excavations save for Trench 19 exceeded Trench 20 in depth. The section's stratigraphy was largely unchanged from that seen in Section 1 (Table 142).

Table 142: North profile soil stratigraphy – Trench 20 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22' – 20.83' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	20.83' – 18' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	20.5' – 19.5' NAVD88 (1'6" – 2'6" bgs) (0.46m – 0.76m bgs)	N/A	Concrete slab.

Section 3

Trench 20 Section 3 extended from 401.5' E to 426'6" E. The section had a north-south width of 6' from 401'6" E to 416'6" E, narrowing to 4' from 416'6" E to 426'6" E. The south wall of the section was at 26'4" N from 401'6" E to 416'6" E, where it moved to 25'4" N (Map 20). The section floor was excavated to a depth of 18.17' NAVD88 (4'2" bgs). The section overlapped the former locations of Trench 2 Sections 19 and 20 and Trench 19 Sections 4 and 5, however only Trench 2 exceeded Trench 20 in depth. The section's stratigraphy was similar to that seen in Sections 1-2, with the addition of some 7.5YR 4/4 brown coarse sand mottling (Image 134) (Table 143).

Table 143: North profile soil stratigraphy – Trench 20 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.34' – 21.17' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	21.17' – 18.17' NAVD88 (1'2" – 4'2" bgs) (0.36m – 1.27m bgs)	10YR 4/3 brown Lo Sa & 7.5YR 4/4 brown Co Sa	Loamy sand with pebble, cobble, and loose brick inclusions. Mottled with clean coarse sand.



Image 134: Trench 20 Section 3 – South profile.

Section 4

Trench 20 Section 4 extended from 426'6" E to 451'6" E. The section had a north-south width of 4', its south wall remaining at 25'4" N (Maps 20-21). The section floor was excavated to a depth of 18.51' NAVD88 (4'2" bgs). The section overlapped the former locations of Trench 2 Sections 20 and 21 and Trench 19 Sections 5 and 6, however only Trench 2 exceeded Trench 20 in depth. The section's stratigraphy was unchanged from that seen in Section 3 (Image 135) (Table 144).

Table 144: North profile soil stratigraphy – Trench 20 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	22.68' – 21.51' (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	21.51' – 18.51' NAVD88 (1'2" – 4'2" bgs) (0.36m – 1.27m bgs)	10YR 4/3 brown Lo Sa & 7.5YR 4/4 brown Co Sa	Loamy sand with pebble, cobble, and loose brick inclusions. Mottled with clean coarse sand.



Image 135: Trench 20 Section 4 – North profile.

Section 5

Trench 20 Section 5 extended from 451'6" E to 476'6" E. The north-south width of the section was 4' from 451'6" E to 453'6" E, narrowing to 3' at 460'6" E. The south wall of the section was at 25'4" N from 451'6" E to 453'6" E, moving to 28'10" N at 460'6" E as the trench diverted around a concrete manhole structure (Map 21). The section floor was excavated to a depth of 18.01' NAVD88 (5' bgs). A clay-encased utility duct was encountered in the north wall at 21.01' NAVD88 (2'bgs) from 460'6"E to 476'6" E. The section overlapped the former locations of Trench 2 Section 21 and Trench 19 Sections 6 and 7, however only Trench 2 exceeded Trench 20 in depth. The section's stratigraphy was unchanged from that seen in Section 4 (Image 136) (Table 145).

Table 145: North profile soil stratigraphy – Trench 20 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.01' – 21.84' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	21.84' – 18.01' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 4/3 brown Lo Sa & 7.5YR 4/4 brown Co Sa	Loamy sand with pebble, cobble, and loose brick inclusions. Mottled with clean coarse sand.



Image 136: Trench 20 Section 5 – North profile.

Section 6

Trench 20 Section 6 extended from 476'6" E to 501'6" E. The north-south width of the section was 3' from 476'6" E to 494' E, where it widened to 5'. The south wall of the section began at 28'10" N at 476'6" E, moving to 30'4" N at 491'6" E, then to 28'4" N at 494' E (Map 21). The section floor was excavated to a depth of 18.42' NAVD88 (5' bgs). The section overlapped the former location of Trench 19 Sections 7 and 8, however, Trench 20 exceeded Trench 19 in depth. The section's stratigraphy was unchanged from that seen in Sections 4 and 5 (Image 137) (Table 146).

Table 146: North profile soil stratigraphy – Trench 20 Section 5.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.42' – 22.25' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	22.25' – 18.12' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 4/3 brown Lo Sa & 7.5YR 4/4 brown Co Sa	Loamy sand with pebble, cobble, and loose brick inclusions. Mottled with clean coarse sand.



Image 137: Trench 20 Sections 5 & 6 – Excavation in progress.

Section 7

Trench 20 Section 7 extended from 501'6" E to 523'6" E. The north-south width of the section remained 5' and the south wall remained at 28'4" N (Map 21). The section floor was excavated to a depth of 18.88' NAVD88 (5' bgs). The section overlapped the former location of Trench 19 Sections 8 and 9, however, Trench 20 exceeded Trench 19 in depth. The coarse sand inclusions came to an end, but otherwise the section's stratigraphy was unchanged from that seen in Sections 4-6 (Image 138) (Table 147).

Table 147: North profile soil stratigraphy – Trench 20 Section 7.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.88' – 22.71' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	22.71' – 18.88' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 138: Trench 20 Sections 6 & 7 – South profile.

MULBERRY STREET FROM WORTH STREET TO MOSCO STREET

Excavation in Mulberry Street between Worth Street and Mosco Street included one trench (Trench 23) (Map 22, below). Excavation in this area revealed no archaeological features or intact contexts.

TRENCH 23

Trench 23 was opened on January 21, 2020. Much of the excavation was conducted by machine, however the dense network of utilities encountered required hand excavation throughout most of the trench. Trench 23 was mostly oriented northwest by southeast, parallel with Mulberry Street, although Sections 3 and 4 were oriented north-south. The total length of trench excavated was 84' with a width varying from 3' to 6'. The monitoring and documentation of the trench was broken up into arbitrary sections up to 29'6" long.

Section 1

Trench 23 Section 1 was oriented northwest by southeast on the east side of Mulberry Street, parallel with its curblineline. It measured 25' long by 6' wide, with its northwest corner at 64' N, 540' E and its southwest corner at 48'4" N, 555' E (Map 22). The section floor was excavated to a depth of 17.65' NAVD88 (6' bgs), reaching a max depth of 14.32' NAVD88 (9'4" bgs) along the east wall. Numerous utility lines were encountered crossing the section at depths ranging from 22.65' to 17.65' NAVD88 (1' bgs to 6' bgs) (Image 139). The section's stratigraphy was composed entirely of modern fill deposits associated with these utilities, primarily a 10YR 5/3 brown coarse sand (Image 140) (Table 148).

Table 148: West profile soil stratigraphy – Trench 23 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.65' – 23.32' NAVD88 (0 – 4" bgs) (0 – 0.1m bgs)	N/A	Asphalt pavement. Street surface.
II	23.32' – 22.65' NAVD88 (4" – 1' bgs) (0.1m – 0.3m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with approximately 30% RCA gravel inclusions.
III	22.65' – 14.32' NAVD88 (1' – 9'4" bgs) (0.3m – 2.84m bgs)	10YR 5/3 brown	Clean coarse sand fill.



Image 139: Trench 23 Section 1 – Plan view.



Image 140: Trench 23 Section 1 – Southwest profile.

Section 2

Trench 23 Section 2 was oriented northwest by southeast for 16'6", then turned due east for 13'. Overall, the section measured 29'6" long, with a width varying from 5' to 6'. The northwest corner of the section was at 48'4" N, 555' E and its southeast corner was at 27'4" N, 577'6" E (Map 22). The south wall of the section overlapped the former location of Trench 2 Section 26, and the east end of the section abutted the west wall of Trench 22 Section 1. The section floor was excavated to a max depth of 18.55' NAVD88 (6' bgs). Numerous utilities crossed the section at depths ranging from 23.8' to 19.88' NAVD88 (9" bgs to 4'8" bgs). A bank of clay-lined ducts 4' wide crossed the trench at 23.8' NAVD88 (9" bgs), its centerline at 35'4" N (Image 141). The section's stratigraphy was sharply differentiated north and south of the duct bank. North of the duct bank, the stratigraphy was similar to that seen in Section 1, while to the south redeposited historic fill predominated (Image 142) (Table 146) (Table 147).

Table 146: West profile soil stratigraphy – Trench 23 Section 2, north of duct bank at 35'4" N.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.55' – 23.38' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.

II	23.38' – 18.55' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 5/3 brown	Clean coarse sand fill.
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Table 147: West profile soil stratigraphy – Trench 23 Section 2, south of duct bank at 35'4" N.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.55' – 23.38' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	23.38' – 21.55' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 5/6 yellowish brown	Clean coarse sand fill associated with the duct bank.
III	21.55' – 18.55' NAVD88 (3' – 6' bgs) (0.91m – 1.83m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 141: Trench 23 Section 2 – Excavation in progress.



Image 142: Trench 23 Section 2 – North profile south of duct bank.

Section 3

Trench 23 Section 3 was oriented north-south, perpendicular to Worth Street. It was excavated as an extension south from Trench 23 Sections 1 and 2, extending from 49'10" N to 33'4" N, with a width of 6'6" at 41'1" N, narrowing to 3' from 41'1" N to 33'4" N. The west wall of the section was at 550'6" E (Map 22). The section floor was excavated to a depth of 18.3' NAVD88 (6' bgs). Various utilities were encountered crossing the section from depths of 22.8' to 18.8' NAVD88 (1'6" bgs to 5'6" bgs). The section's stratigraphy was largely similar to that seen in Section 1 and the north half of Section 2 (Image 143) (Table 149).

Table 149: West profile soil stratigraphy – Trench 23 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.3' – 23.13' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	23.13' – 18.3' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 5/4 yellowish brown	Coarse sand fill with some angular concrete fragments and pebble inclusions.



Image 143: Trench 23 Section 3 – West profile.

Section 4

Trench 23 Section 4 was oriented north-south, perpendicular to Worth Street. It was excavated as an extension south from Trench 23 Section 3. It extended from 33'4" N to 20'4" N, with a width of 5'. The west wall of the section was at 550'6" E (Map 22). The section largely overlapped the former location of Trench 2 Section 25, which exceeded it in depth. The section floor was excavated to a depth of 18.42' NAVD88 (6' bgs). One utility line was encountered running north south up the center of the section at a depth of 20.09' NAVD88 (4' bgs). Other than MFM's backfill from Trench 2, the section's stratigraphy was primarily composed of a 10YR 3/3 dark brown loamy sand mottled with 7.5YR 3/3 dark brown, with pebble, cobble, and loose brick inclusions (Image 144) (Table 150).

Table 150: West profile soil stratigraphy – Trench 23 Section 4.

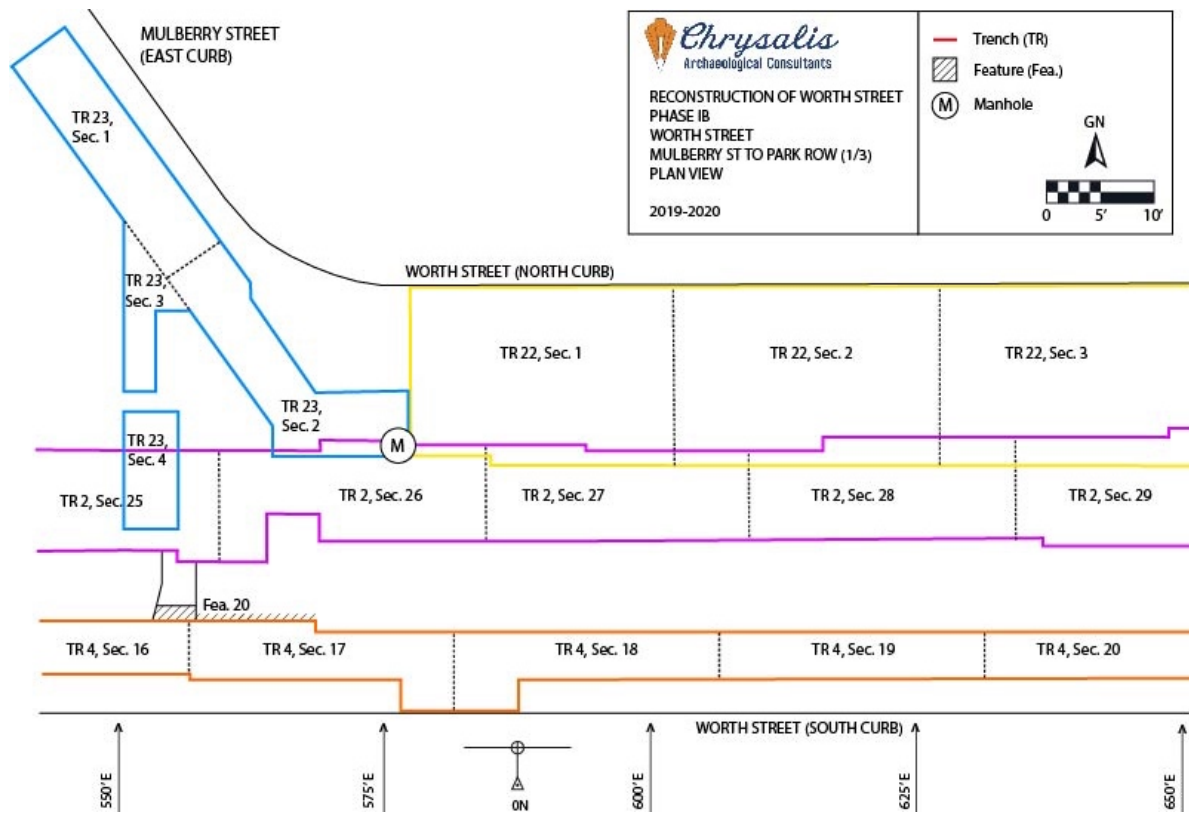
STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.42' – 23.25' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase. Street surface.
II	23.25' – 18.42' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 5/4 yellowish brown	Coarse sand fill with some angular concrete fragments and pebble inclusions.



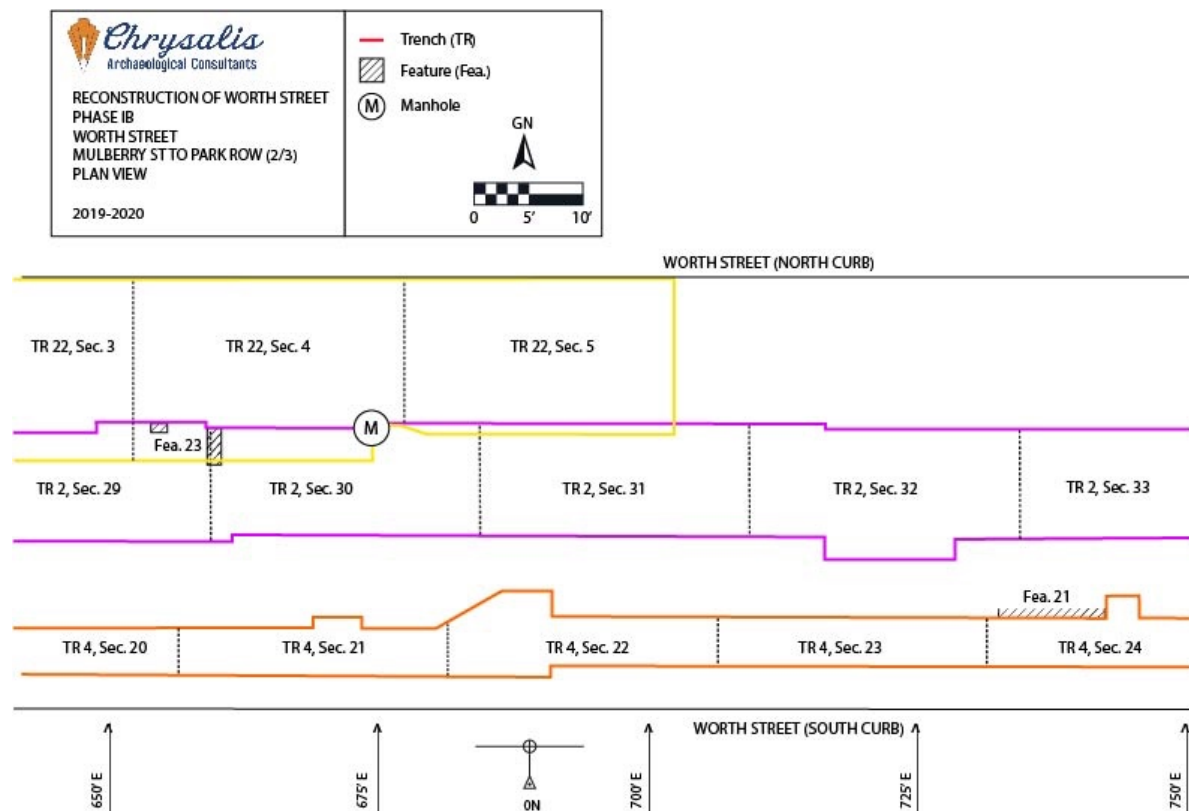
Image 144: Trench 23 Section 4 – West profile.

WORTH STREET FROM MULBERRY STREET TO PARK ROW

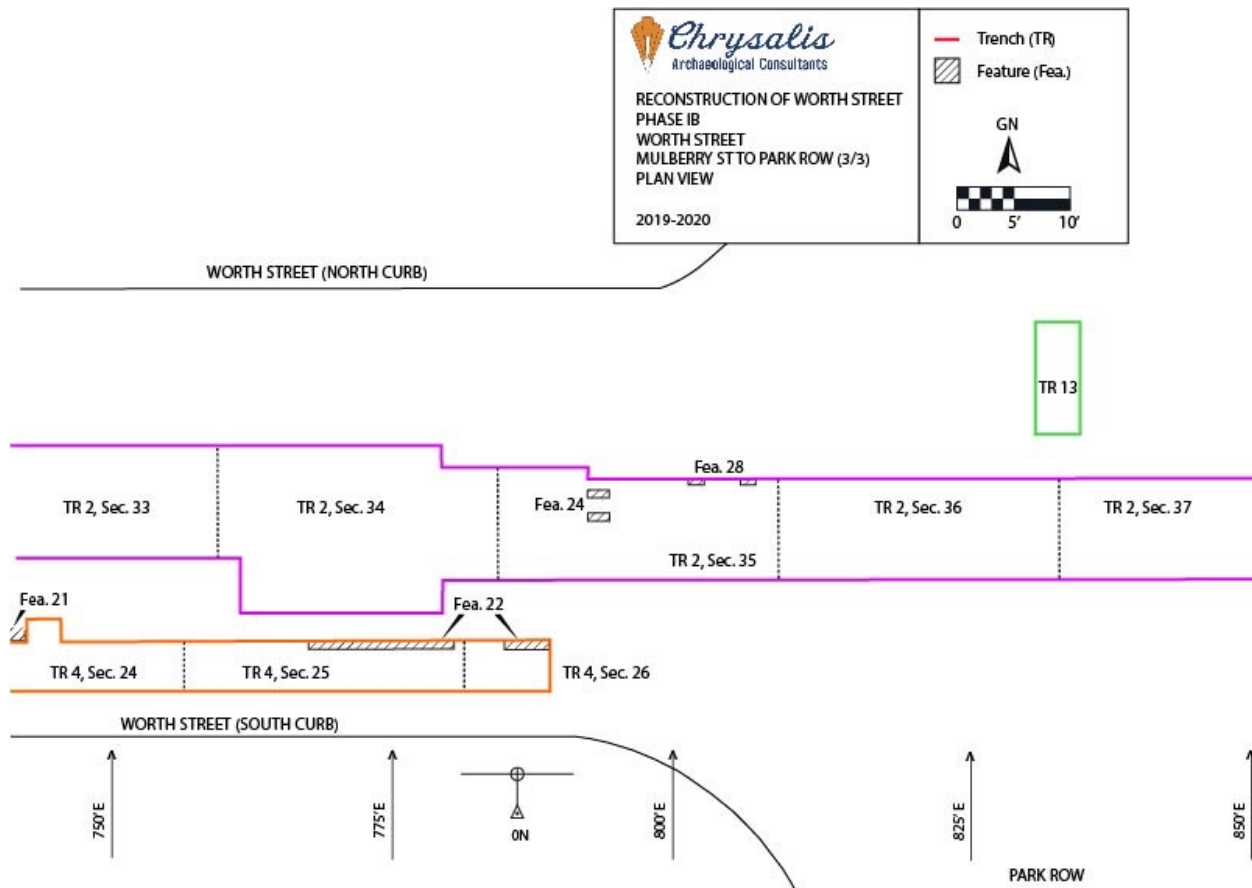
Excavation across Worth Street from Mulberry Street to Park Row included X trenches (Trench 2 Sections 13-24, Trench 4 Sections 4-15, Trench 7, Trench 14, Trench 15, Trenches 17-20). Excavation of these trenches exposed Worth Street curb-to-curb and revealed six features (Features 20, 21, 22, 23, 24, 28).



Map 22: Plan view of Worth Street excavation from Mulberry Street to Park Row, part 1 of 3.



Map 23: Plan view of Worth Street excavation from Mulberry Street to Park Row, part 2 of 3.



Map 24: Plan view of Worth Street excavation from Mulberry Street to Park Row, part 3 of 3.

TRENCH 2, SECTIONS 25-35

Trench 2 began near the westernmost area of the APE, with Sections 1-12 on Worth Street between Centre Street and Baxter Street. Trench 2 Sections 13-24 ran through Worth Street between Baxter Street and Mulberry Street. Trench 2 Sections 25-35 were located on the block from Mulberry Street to Park Row.

Section 25

Trench 2 Section 25 extended from 534'6" E to 559'6" E. The section had a north-south width of 9' from 534.5' E to 538.5' E, widening to 9'6" as the section expanded northward from 538'6" E to 556'6" E, then to 10.5' E as the section expanded southward from 556'6" E to 559'6" E. The south wall of the section was at 17'10" N from 534'6" E to 538'6" E, moved to 18'4" N from 538'6" E to 556'6" E, and finally to 17'4" N from 556'6" E to 559'6" E (Map 22). The oilostatic line noted further west continued running east-west down the trench, rising to a depth of 20.86' NAVD88 (3'6" bgs), its centerline at 24'4" N at 534'6" E, ending at 23'9" N at 559'6" E. The section's floor was excavated to a depth of 13.86' NAVD88 (10'6" bgs). The section's stratigraphy remained largely unchanged from that encountered in Section 24 (Image 145) (Table 151).

Table 151: North profile soil stratigraphy – Trench 2 Section 25.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.36' – 23.19' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.19' – 13.86' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	23.19' – 18.36' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 6/3 pale brown	Clean sand associated with the oilstatic line.



Image 145: Trench 2 Sections 25 & 26 – North profile in progress.

Section 26

Trench 2 Section 26 extended from 559'6" E to 584'6" E. The north-south width of the trench varied: 10'6" from 559'6" E to 564' E, then 6' from 564' E to 569' E, then 9'6" from 569' E to 578' E, then 9' from 578' E to 584'6" E. The south wall was at 17'4" N from 559'6" E to 564' E, then 21'10" N from 564' E to 569' E, then 19'4" N from 569' to 584'6" E as the trench deviated around a concrete manhole (Map 22). The oilstatic line continued running east-west down the trench at a depth of 21.11' NAVD88 (3'6" bgs), its centerline at 23'9" N at 559'6" E, ending at 22'8" N at 584'6" E. The section floor was excavated to a depth of 10'6" bgs. Other utilities encountered during excavation included a brick-lined sewer manhole along the north wall at

576'6" E. This manhole extended past the trench floor, leaving the sewer itself unexposed. The section's stratigraphy remained largely unchanged from that encountered in Section 25 (Image 146) (Table 152).

Table 152: North profile soil stratigraphy – Trench 2 Section 26.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.61' – 23.44' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.44' – 14.11' NAVD88 (1'2" – 10'6" bgs) (0.36m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	23.44' – 19.61' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/3 pale brown	Clean sand associated with the oilostatic line.



Image 146: Trench 2 Section 26 – North profile in progress.

Section 27

Trench 2 Section 27 extended from 584'6" E to 609'6" E. The north-south width of the trench was 9' from 584.5' E to 594' E, changing to 8'6" from 594' E to 609'6" E. The south wall of the section remained at 19'4" N (Map 22). The oilstatic line continued running east-west down the trench, diving to a depth of 20.83' NAVD88 (4' bgs), its centerline at 22'8" N at 584'6" E, ending at 23' N at 609' 6"E. The section floor was excavated to a depth of 14.83' NAVD88 (10' bgs). Section 27's stratigraphy was similar to that encountered in Section 26, with the addition of a distinct layer of modern fill with RCA gravel inclusions directly underlying the roadbase (Image 147) (Table 153).

Table 153: South profile soil stratigraphy – Trench 2 Section 27.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.83' – 23' NAVD88 (0 – 1'10" bgs) (0 – 0.56m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23' – 21.33' NAVD88 (1'10" – 3'6" bgs) (0.56m – 1.07m bgs)	10YR 4/3 brown	Loamy sand with RCA gravel inclusions.
III	21.33' – 14.83' NAVD88 (3'6" – 10' bgs) (1.07m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
IV	23' – 19.83' NAVD88 (1'10" – 5' bgs) (0.56m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 147: Trench 2 Section 27 – South profile in progress.

Section 28

Trench 2 Section 28 extended from 609'6" E to 634'6" E. The north-south width of the section was 8'6" from 609'6" E to 616'6" E, at which point the section widened by 1' to the north, giving a total width of 9'6". The south wall of the section remained at 19'4" N (Map 22). The oilostatic line continued running east-west down the trench at a depth of 21.04' NAVD88 (4' bgs), its centerline at 23' N at 609' 6"E, ending at 23'8" N at 634'6" E. The section floor was excavated to a depth of 15.04' NAVD88 (10' bgs). The stratigraphy of the section was similar to that encountered in Section 27, with the addition of a layer of concrete encountered in the north profile beneath the loamy sand layer underlying the roadbase (Image 148) (Table 154).

Table 154: North profile soil stratigraphy – Trench 2 Section 28.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.04' – 23.21' NAVD88 (0 – 1'10" bgs) (0 – 0.56m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.21' – 22.96' NAVD88 (1'10" – 2'1" bgs) (0.56m – 0.64m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	22.96' – 22.54' NAVD88 (2'1" – 2'6" bgs) (0.64m – 0.76m bgs)	N/A	Concrete layer, encountered in the north profile. Possibly old roadbase.
IV	22.54' – 15.04' NAVD88 (2'6" – 10' bgs) (0.76m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
V	23.21' – 20.04' NAVD88 (1'10" – 5' bgs) (0.56m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 148: Trench 2 Sections 28 & 29 – North profile in progress.

Section 29

Trench 2 Section 29 extended from 634'6" E to 659'6" E. The north-south width of the section was 9'6" up to 637' E, at which point it widened by 6" southward, for a width of 10' up to 649' E, where it widened by 1' to the north, for a final width of 11'. The south wall was at 19'4" N up to 637' E, where it moved to 18'10" N (Maps 22-23). The oilostatic line continued running east-west down the trench at a depth of 21.85' NAVD88 (3'6" bgs), its centerline at 23'8" N. The section floor was excavated to a depth of 15.35' NAVD88 (10' bgs). The stratigraphy of the section was similar to that encountered in Section 28 (Table 155). A modern Miller High Life bottle was found in strat IV and discarded.

Feature 23 was encountered in the north wall of the section from 654' E to 660'6" E in Section 28 (Image 149). The feature was composed of two mortared brick walls, each 1'3" thick, supporting a steel trolley rail at 24.35' NAVD88 (1' bgs). The brick walls were separated by 4' of 10YR 3/3 loamy sand with angular pebble and brick fragment inclusions. The walls extended from 23.85' to 20.35' NAVD88 (1'6" bgs to 5' bgs), where they rested on a concrete slab 6" thick. This feature was associated with the streetcar line which ran down Worth Street from the late nineteenth to early twentieth century.

Table 155: North profile soil stratigraphy – Trench 2 Section 29.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.35' – 24.18' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.18' – 23.77' NAVD88 (1'2" – 1'7" bgs) (0.36m – 0.48m bgs)	10YR 3/3 dark brown	Loamy sand with pebble, cobble, and loose brick inclusions.
III	23.77' – 23.18' NAVD88 (1'7" – 2'2" bgs) (0.48m – 0.66m bgs)	N/A	Concrete layer, encountered in the north profile. Possibly old roadbase.
IV	23.18' – 15.35' NAVD88 (2'2" – 10' bgs) (0.66m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Modern trash found within this stratum.
V	24.18' – 20.35' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 149: Trench 2 Sections 29 & 30 – Feature 23 north profile.

Section 30

Trench 2 Section 30 extended from 659'6" E to 684'6" E. The north-south width of the section was 10'6" up to 661'6" E, then 10' up to 678'6" E as the trench narrowed by 6" from the south, and finally 10'6" again as the trench widened by 6" to the north at 673'6" E to accommodate a brick-lined sewer manhole. The south wall of the section was at 18'10" N up to 661'6" E, where it then moved to 19'4" N (Map 23). The oilstatic line continued running east-west down the trench at a depth of 22.18' NAVD88 (3'6" bgs), its centerline at 23'8" N. The section floor was excavated to a depth of 16.18' NAVD88 (9'6" bgs).

The east wall of Feature 23 ended at 660'6" E as recorded in Section 29. This wall intruded 3'6" south into the section, its south face at 25'10" N (Image 150). The stratigraphy of the section was similar to that encountered in Section 29, without the concrete slab layer (Image 151) (Table 156).

Table 156: North profile soil stratigraphy – Trench 2 Section 30.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.68' – 24.51' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.51' – 22.68' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 3/2 very dark grayish brown	Loamy sand with RCA gravel inclusions.
III	22.68' – 16.18' NAVD88 (2' – 9'6" bgs) (0.61m – 2.9m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
IV	24.51' – 20.68' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 150: Trench 2 Section 30 – Feature 23 east wall.



Image 151: Trench 2 Section 31 – North profile in progress.

Section 31

Trench 2 Section 31 extended from 684.5' E to 709.5' E. The north-south width of the section was 10'6", and the south wall remained at 19'4" N (Map 23). The oilstatic line continued running east-west down the trench at a depth of 22.55' NAVD88 (3'6" bgs), its centerline at 23'8" N. Other utilities were encountered crossing the section at depths ranging from 25.05' to 22.55' NAVD88 (1' to 3'6" bgs). The section floor was excavated to a depth of 16.55' NAVD88 (9'6" bgs). The stratigraphy of the section was similar to that encountered in Section 30, with the addition of the reappearance of the derelict concrete seen in Sections 28 and 29 (Image 152) (Table 157).

Table 157: North profile soil stratigraphy – Trench 2 Section 31.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.05' – 24.72' NAVD88 (0 – 1'4" bgs) (0 – 0.41m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.72' – 24.05' NAVD88 (1'4" – 2' bgs) (0.41m – 0.61m bgs)	10YR 3/3 dark brown	Loamy sand with pebble and concrete fragment inclusions.
III	24.05' – 23.55' NAVD88 (2' – 2'6" bgs) (0.61m – 0.76m bgs)	N/A	Concrete layer, encountered in the north profile. Possibly old roadbase.

IV	23.55' – 16.55' NAVD88 (2'6" – 9'6" bgs) (0.76m – 2.9m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
V	24.72' – 21.05' NAVD88 (1'4" – 5' bgs) (0.41m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 152: Trench 2 Sections 30 & 31 – North profile in progress.

Section 32

Trench 2 Section 32 extended from 709'6" E to 734'6" E. The section had a north-south width of 10'6" up to 716'6" E, where it changed to 12' wide as the section narrowed by 6" from the north and widened by 2' to the south, finally changing to 10' wide at 728'6" E as the section narrowed by 2' from the south. The south wall of the section was at 19'4" N up to 716'6" E, then moved to 17'4" N up to 728'6" E where it finally returned to 19'4" N (Map 23).

The oilstatic line continued running east-west down the trench at a depth of 22.92' NAVD88 (3'6" bgs), its centerline at 23'8" N. Other utilities were encountered crossing the section at depths ranging from 25.42' to 23.42' NAVD88 (1' to 3' bgs). The section floor was excavated to a depth of 16.92' NAVD88 (9'6" bgs). The stratigraphy of the section was similar to that encountered in Section 31 (Image 153) (Table 158).

Table 158: North profile soil stratigraphy – Trench 2 Section 32.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.42' – 25.25' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.25' – 24.42' NAVD88 (1'2" – 2' bgs) (0.41m – 0.61m bgs)	10YR 3/3 dark brown	Loamy sand with RCA gravel inclusions.
III	24.42' – 23.92' NAVD88 (2' – 2'6" bgs) (0.61m – 0.76m bgs)	N/A	Concrete layer, encountered in the north profile. Possibly old roadbase.
IV	23.92' – 16.92' NAVD88 (2'6" – 9'6" bgs) (0.76m – 2.9m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
V	25.25' – 21.42' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilostatic line.



Image 153: Trench 2 Section 32 – North profile in progress.

Section 33

Trench 2 Section 33 extended from 734'6" E to 759'6" E. The north-south width of the section was 10' and the south wall remained at 19'4" N (Maps 23-24). The oilstatic line continued running east-west down the trench at a depth of 23.78' NAVD88 (3' bgs), turning southward it disappeared into the south wall at a depth of 24.28' NAVD88 (2'6" bgs) at 759'6" E.

A PVC pipe continued eastward across the section at a depth of 25.78' NAVD88 (1' bgs). The section floor was excavated to a depth of 17.28' NAVD88 (9'6" bgs). The stratigraphy of the section was similar to that encountered in Section 32 (Image 154) (Table 159).

Table 159: North profile soil stratigraphy – Trench 2 Section 33.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.78' – 25.61' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.61' – 24.58' NAVD88 (1'2" – 2' bgs) (0.41m – 0.61m bgs)	10YR 3/3 dark brown	Loamy sand with RCA gravel inclusions.
III	24.58' – 24.08' NAVD88 (2' – 2'6" bgs) (0.61m – 0.76m bgs)	N/A	Concrete layer, encountered in the north profile. Possibly old roadbase.
IV	24.08' – 17.28' NAVD88 (2'6" – 9'6" bgs) (0.76m – 2.9m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
V	25.61' – 21.78' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line.



Image 154: Trench 2 Section 33 – North profile in progress.

Section 34

Trench 2 Section 34 extended from 759'6" E to 784'6" E. The north-south width of the section was 10' up to 761'6" E, where the section widened by 5' to the south, for a total width of 15' up to 779'6" E. Here the section narrowed by 2' from the north and 3' from the south, for a final width of 10'. The south wall of the section was at 19'4" N up to 761'6" E, where it moved to 14'4" N, then finally moved to 17'4" N at 779'6" E (Map 24).

The PVC duct continued running eastward along the trench at a depth of 26.14' NAVD88 (1' bgs), and a clay-lined duct was visible in the north wall at a depth of 24.14' NAVD88 (3' bgs). The section floor was excavated to a depth of 17.64' NAVD88 (9'6" bgs). The layer of 10YR 3/3 dark brown loamy sand underlying the roadbase in Sections 27 through 33 was not present, and a new layer of clean sand fill was seen in association with the clay-lined duct. Otherwise the stratigraphy of the section was similar to that encountered in Section 33 (Image 155) (Table 160).

Table 160: North profile soil stratigraphy – Trench 2 Section 34.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	27.14' – 25.97' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.97' – 23.64' NAVD88 (1'2" – 3'6" bgs)	10YR 5/6 yellowish brown	Coarse sand associated with the clay-lined duct in the north wall.

	(0.41m – 1.07m bgs)		
III	25.97' – 17.64' NAVD88 (1'2" – 9'6" bgs) (0.41m – 2.9m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.
IV	25.97' – 22.64' NAVD88 (1'2" – 4'6" bgs) (0.36m – 1.37m bgs)	10YR 6/4 light yellowish brown	Clean sand associated with the oilstatic line in the south profile.



Image 155: Trench 2 Section 34 – North profile in progress.

Section 35

Trench 2 Section 35 extended from 784'6" E to 809'6" E. The north-south width of the section was 10' up to 792'6" E, where the section narrowed by 1' from the north, for a final width of 9'. The south wall of the section remained at 17'4" N (Map 24). Various utilities were encountered crossing the section at depths ranging from 26.62' to 25.71' NAVD88 (11" to 1'8" bgs). The section floor was excavated to a depth of 17.54' NAVD88 (10' bgs).

Feature 24 was encountered in Section 35 at 792'6" E (Image 156). The feature was a pair of mortared brick walls each oriented east-west, 8" thick and separated by 1'5" of 10YR 3/3 dark brown loamy sand with concrete fragment inclusions. The north face of the north wall was at 25'4" and the south face of the south wall was at 22'7" N. The walls extended from 26.37' to 25.04' NAVD88 (1'2" bgs to 2'6" bgs) where they rested upon a concrete slab 6" thick.

Feature 28 was encountered in the north wall of the section from 801'6" E to 807'6" (Image 157). This feature was a pair of mortared brick walls each oriented north-south, supporting a steel trolley rail at 25.87' NAVD88 (1'8" bgs). The walls were each 1'4" thick and separated by 3'5" of 10YR 3/3 dark brown loamy sand with concrete fragment inclusions. The walls extended down to 22.54' NAVD88 (5' bgs) where they rested upon a concrete slab 6" thick.

Features 24 and 28 were both associated with the trolley tracks from the streetcar line which ran down Worth Street from the 1870s to early twentieth century. The clean sand fill strata seen previously did not appear in Section 35, while a layer of loamy sand fill associated with Features 24 and 28 overlay the redeposited historic fill (Image 158) (Table 161).

Table 161: North profile soil stratigraphy – Trench 2 Section 35.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	27.54' – 26.37' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	26.37' – 24.54' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 3/3 dark brown	Loamy sand fill with concrete fragment inclusions.
III	24.54' – 17.54' NAVD88 (3' – 10' bgs) (0.91m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 156: Trench 2 Section 35 – Feature 24 east profile.



Image 157: Trench 2 Section 35 – Feature 28 north profile.



Image 158: Trench 2 Sections 34 and 35 – North profile in progress.

TRENCH 4, SECTIONS 16-26

Trench 4 began near the western side of the Worth Street and Baxter Street intersection, with Sections 1-3 on Worth Street between Centre Street and Baxter Street. Trench 4 Sections 4-15 ran through Worth Street between Baxter Street and Mulberry Street. Trench 4 Sections 16-26 were located on the block from Mulberry Street to Park Row.

Section 16

Trench 4 Section 16 extended from 531'6" E to 556'6" E. The north-south width of the trench was 5'. Its south wall remained at 6'10" N, although the pavement was stripped from the south wall to the curb at 3'4" N from 531'6" E to 537'6" E (Map 22). An extension was excavated northward from the north wall, 4' wide east-west by 6'6" long north-south, from 553' E to 557' E in Section 17. The extension connected Trench 4 with Trench 2 Section 25 (Map 22). The trench was excavated to a depth of 18.85' NAVD88 (5' bgs) from 531'6" E to 546'6" E and to 17.35' NAVD88 (6'6" bgs) from 546'6" E to 556'6" E, reaching 17.85' NAVD88 (6' bgs) in the north extension.

The 20" water main continued eastward down the section at a depth of 18.97' NAVD88 (4'10" bgs) up to 546'6" E, where it dove to 17.85' NAVD88 (6' bgs). Its centerline was at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 22.85' NAVD88 (1' bgs). Other utilities were encountered in the north extension at depths of 25.27' NAVD88 (3'7" bgs) and 19.85' NAVD88 (4' bgs).

Feature 18, the mortared stone wall that appeared in the Trench 4 north profile in Section 13, continued eastward across the section flush with the north wall at 11'10" N, ending at 545'6" E (Image 113).

Feature 20, a mortared brick wall 1'6" thick, with a cement facing, appeared at 552'6" E and continued eastward into Section 17, its south face flush with the trench's north wall at 11'10" N (Image 159). The wall appeared at a depth of 22.68' NAVD88 (1'2" bgs) and extended to the trench floor at 17.35' NAVD88 (6'6" bgs). Feature 20 was partially demolished during the excavation of Section 16's north extension. Bricks used in its construction further east in Section 17 (see below) bore the maker's mark "ZZZ", associated with the manufacturer "Ziegler Brothers" of Coeymans, NY, active from 1905 to 1914 (Graves 2020).

Feature 20's east-west alignment matched Worth Street's orientation along with Features 9, 18, and 19 identified further west, rather than the alignment of the nineteenth century Five Points blocks razed ca. 1868 for Worth Street's expansion (see Map 28, VII. Conclusions for historic overlay). Its constituent materials appear to date to as early as 1905, indicating this wall was associated with an early twentieth century structure or utility along the south side of Worth Street.

Trench 4 Section 16's stratigraphy was composed of redeposited historic fill (Image 160) (Table 162).

Table 162: General soil stratigraphy – Trench 4 Section 16.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	23.85' – 22.68' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	22.68' – 17.35' NAVD88 (1'2" – 6'6" bgs) (0.36m – 1.98m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 159: Trench 4 Section 16 – Feature 20 north profile.



Image 160: Trench 4 Section 16 – North extension west profile.

Section 17

Trench 4 Section 17 extended from 556'6" E to 581'6" E. The north-south width of the trench changed to 5'6" at 556.5' E as the south wall moved to 6'4" N, then to 4'6" at 568.5' E where the north wall moved to 10'10" N (Map 22). The section was excavated to a max depth of 17.27' NAVD88 (7' bgs) from 556'6" E to 568' E where the floor rose to 19.77' NAVD88 (4'6" bgs). The 20" water main continued eastward down the section at a depth of 18.27' NAVD88 (6' bgs), rising to 20.27' NAVD88 (4' bgs) at 568' E, its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 23.27' NAVD88 (1' bgs). Other utilities were encountered crossing the section north-south at a depth of 20.27' NAVD88 (4' bgs).

Feature 20, the mortared brick wall with a cement facing that began further west in Section 16, continued eastward across the section with its south face flush with the north wall at 1'10" N up to 568'6" E (Image 161). Bricks used in its construction bore the maker's mark "ZZZ" (Image 162), associated with the manufacturer "Ziegler Brothers" of Coeymans, NY, active from 1905 to 1914 (Graves 2020).

Section 17's stratigraphy was similar to that seen in Section 16, composed of redeposited historical fill (Image 163) (Table 163).

Table 163: General soil stratigraphy – Trench 4 Section 17.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.27' – 23.1' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.1' – 17.27' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 161: Trench 4 Section 17 – Feature 20 east profile.



Image 162: Trench 4 Section 17 – Feature 20 brick detail.



Image 163: Trench 4 Section 17 – North profile.

Section 18

Trench 4 Section 18 extended from 581'6" E to 606'6" E. The north-south width of the section was 4'6", its south wall remaining at 6'4" N (Map 22). The section was excavated to a max depth of 19.88' NAVD88 (5' bgs). The 20" water main continued eastward across the section at a depth of 20.88' NAVD88 (4' bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 23.88' NAVD88 (1' bgs). Other utilities were encountered in the section at depths from 23.38' to 20.88' NAVD88 (1'6" bgs to 4' bgs), including a concrete-clad ECS duct bank running along the south wall. The section's stratigraphy was similar to that seen in Section 17 (Image 164) (Table 164).

Table 164: General soil stratigraphy – Trench 4 Section 18.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.88' – 23.71' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.71' – 19.88' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 164: Trench 4 Sections 17 & 18 – South profile in progress.

Section 19

Trench 4 Section 19 extended from 606'6" E to 631'6" E. The north-south width of the section was 4'6", its south wall remaining at 6'4" N (Map 22). The section was excavated to a max depth of 19.06' NAVD88 (6' bgs). The 20" water main continued eastward across the section at a depth of 21.06' NAVD88 (4' bgs), its centerline at 10.08' N. The ECS duct bank continued eastward along the north wall at a depth of 24.06' NAVD88 (1' bgs). The concrete duct bank continued eastward along the south wall, rising to 22.06' NAVD88 (3' bgs). The section's stratigraphy was similar to that seen in Section 18 (Image 165) (Table 165).

Table 165: General soil stratigraphy – Trench 4 Section 19.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.06' – 23.89' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.89' – 19.06' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 165: Trench 4 Section 19 – South profile.

Section 20

Trench 4 Section 20 extended from 631'6" E to 656'6" E. The north-south width of the section was 4'6", its south wall remaining at 6'4" N (Maps 22-23). The section was excavated to a max depth of 19.37' (6' bgs). The 20" water main continued eastward across the section at a depth of 21.37' NAVD88 (4' bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 24.37' NAVD88 (1' bgs). The concrete duct bank continued eastward along the south wall, rising to 22.87' NAVD88 (2'6" bgs). Two other 4" ducts were encountered crossing the section north-south at a depth of 23.37' NAVD88 (2' bgs). The section's stratigraphy was similar to that seen in Section 19 (Image 166) (Table 166).

Table 166: General soil stratigraphy – Trench 4 Section 20.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.37' – 24.2' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.2' – 19.37' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 166: Trench 4 Section 20 – North profile.

Section 21

Trench 4 Section 21 extended from 656'6" E to 681'6" E. The north-south width of the section was 4'6", its south wall remaining at 6'4" N. From 668'6" E to 673'6" E the north wall was bumped out to 11'10" N, increasing the section's north-south width to 5'6". At 680.5' E the north wall began turning towards the northeast (Map 23). The section was excavated to a max depth of 19.75' NAVD88 (6' bgs). The 20" water main continued eastward across the section, descending to a depth of 20.75' NAVD88 (5' bgs), its centerline at 10'1" N. The ECS duct bank continued eastward along the north wall at a depth of 24.75' NAVD88 (1' bgs), turning northward and disappearing into the wall at 681'6" E. The concrete duct bank continued eastward along the south wall, rising to 23.75' NAVD88 (2' bgs). Another 4" pipe was encountered crossing the trench at

a depth of 23.75' NAVD88 (2' bgs). The section's stratigraphy was similar to that seen in Section 20 (Image 167) (Table 167).

Table 167: General soil stratigraphy – Trench 4 Section 21.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.75' – 24.58' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.58' – 19.75' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 167: Trench 4 Section 21 – North profile.

Section 22

Trench 4 Section 22 extended from 681'6" E to 706'6" E. The north-south width of the trench varied, expanding from 5' to 8' from 681'6" E to 686'6" E as the north wall moved from 11'4" N to 14'4" N, then shrinking to 4'6" north-south at 691' E as the south wall moved to 7'4" N and the north wall moved to 11'10" N (Map 23). The section was excavated to a max depth of 20.25' NAVD88 (6' bgs). The 20" water main continued eastward across the section at a depth of 21.25' NAVD88 (5' bgs), its centerline at 10'1" N. The concrete duct bank continued eastward along the south wall at a depth of 24.25' NAVD88 (2' bgs), up to 691' E. A 4" pipe crossed the section north-south at a depth of 25.08' NAVD88 (1'2" bgs) at 688' E.

Trench 4 Section 22's stratigraphy was primarily composed of redeposited historic fill, similar to that seen in previous sections. A layer of modern fill with a high concentration of RCA gravel inclusions appeared just beneath the pavement at 691'6" E. This layer took up the entire profile from 695' 6" E to 699' E, at which point the redeposited historic fill reappeared (Image 168) (Table 168).

Table 168: General soil stratigraphy – Trench 4 Section 22.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.25' – 25.08' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.08' – 20.25' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Underlies strat III from 699' E to 706'6" E (213.06m E to 215.34m E).
III	25.08' – 20.25' NAVD88 (1'2" – 6' bgs) (0.36m – 1.83m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions. Appears at 691'6" E (210.77m E)



Image 168: Trench 4 Section 22 – North profile.

Section 23

Trench 4 Section 23 extended from 706'6" E to 731'6" E. The section had a north-south width of 4'6", its south wall at 7'4" N (Map 23). The section was excavated to a max depth of 20.4' NAVD88 (6' bgs). The 20" water main continued eastward across the section at a depth of 21.4' NAVD88 (5' bgs), its centerline at 10'1" N.

Feature 21, a mortared stone wall, appeared flush with the north trench wall at 726'6" E, its south face at 11'10" N (Image 169). The feature was present from a depth of 25.23' NAVD88 (1'2" bgs) down into the trench floor at 20.4' NAVD88 (6' bgs). Feature 21 continued east to Section 24 to end at ending at 742'6" E. Feature 21's east-west alignment matched Worth Street's orientation along with Features 9, 18, 19, and 20 identified further west, rather than the alignment of the nineteenth century Five Points blocks razed ca. 1868 for Worth Street's expansion (see Map 29, VII. Conclusions for historic overlay). This suggests Feature 21 was a post-1868 portion of foundation wall or utility support at Worth Street's south side.

The section's stratigraphy was primarily composed of redeposited historic fill, overlain by a layer of modern fill with significant RCA gravel inclusions throughout the entire section. A layer of modern clean sand fill appeared in the north profile from 706'6" E to 711'6" E, overlying an asphalt fragment which extended from 23.4' to 22.9' NAVD88 (3' bgs to 3'6" bgs) (Image 170) (Table 169).

Table 169: General soil stratigraphy – Trench 4 Section 23.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.4' – 25.23' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.23' – 24.4' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	24.4' – 23.4' NAVD88 (2' – 3' bgs) (0.61m – 0.91m bgs)	10YR 5/4 yellowish brown	Clean coarse sand fill. Present from 706'6" E to 711'6" E (215.34m E to 216.87m E).
IV	23.4' – 22.9' NAVD88 (3' – 3'6" bgs) (0.91m – 1.07m bgs)	N/A	Asphalt fragment. Present from 706'6" E to 711'6" E (215.34m E to 216.87m E).
V	24.4' – 20.4' NAVD88 (2' – 6' bgs) (0.61m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 169: Trench 4 Sections 23 & 24 – Feature 21 north profile.



Image 170: Trench 4 Section 23 – North profile.

Section 24

Trench 4 Section 24 extended from 731'6" E to 756'6" E. The section had a north-south width of 4'6", its south wall remained at 7'4" N. An extension was excavated northwards from the trench from 742'6" E to 745'6" E, reaching to 13'10" N (Maps 23-24). The section was excavated to a max depth of 20.52' NAVD88 (6' bgs). The 20" water main continued eastward across the section at a depth of 21.52' NAVD88 (5' bgs), its centerline at 10'1" N. A 12" service valve extended northwards from the water main at 21.52' NAVD88 (5' bgs) into the north extension (Image 171). A slab of concrete 1' thick was present in the south wall at a depth of 23.52' NAVD88 (3' bgs) beginning at 750'6" E.

Feature 21, the mortared stone wall which was first encountered in Section 23, continued eastward into the section, its south face flush with the north wall at 11'10" N, ending at 742'6" E (Image 169).

The section's stratigraphy was primarily composed of a 7.5YR 4/4 brown loamy sand with pebble, cobble, and loose brick inclusions, overlain by a layer of 10YR 4/2 dark grayish brown loamy sand with significant RCA gravel inclusions (Image 172) (Table 170).

Table 170: General soil stratigraphy – Trench 4 Section 24.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.52' – 25.35' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.35' – 24.69' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	24.69' – 20.52' NAVD88 (1'10" – 6' bgs) (0.53m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 171: Trench 4 Section 24 – North extension north profile.



Image 172: Trench 4 Sections 23 & 24 – Plan view in progress.

Section 25

The twenty-fifth section of Trench 4 extended from 756'6" E to 781'6" E. The section had a north-south width of 4'6", its south wall remained at 7'4" N (Map 24). The section was excavated to a max depth of 20.64' NAVD88 (6' bgs). The 20" water main continued eastward across the section at a depth of 21.64' NAVD88 (5' bgs), its centerline at 10'1" N.

Feature 22, a mortared stone wall, was encountered running along the north wall, its south face at 11'2" N, from 767'6" E to 780'6" E where there was a gap in the feature due to a previous demolition episode, the wall reappearing in Section 26 (Image 173). The highest point of the wall was at 25.14' NAVD88 (1'6" bgs), and it extended past the trench floor.

Feature 22's east-west alignment matched Worth Street's orientation along with Features 9, 18, 19, 20, and 21 identified further west, rather than the alignment of the nineteenth century Five Points blocks razed ca. 1868 for Worth Street's expansion (see Map 29, VII. Conclusions for historic overlay). This suggests Feature 22 was a post-1868 portion of foundation wall or utility support at Worth Street's south side.

The section's stratigraphy was similar to that seen in Section 24 (Image 174) (Table 171). A pull-tab Pepsi can dating to the mid-twentieth century was found in strat III at a depth of approximately 21.64' NAVD88 (5' bgs).

Table 171: General soil stratigraphy – Trench 4 Section 25.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.64' – 25.47' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.47' – 24.81' NAVD88 (1'2" – 1'10" bgs) (0.36m – 0.56m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	24.81' – 20.64' NAVD88 (1'10" – 6' bgs) (0.53m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Twentieth century trash found in this stratum.



Image 173: Trench 4 Sections 25 & 26 – Feature 22 north profile showing gap.



Image 174: Trench 4 Sections 24 & 25 – North profile.

Section 26

Trench 4 Section 26 extended from 781'6" E to 789' E. The section had a north-south width of 4'6", its south wall remained at 7'4" N (Map 24). The section was excavated to a depth of 20.76' NAVD88 (6' bgs) up to 783'6" E, and to 19.76' bgs (7' bgs). The 20" water main continued eastward across the section at a depth of 21.76' NAVD88 (5' bgs), its centerline at 10'1" N.

Feature 22, the mortared stone wall seen in Sections 24-25, reappeared at 785' E, extending beyond the east wall of the section (Image 175). The new area had the same construction and materials, and the south face of the wall remained at 11'2" N. The top of the wall was at 23.26' NAVD88 (3'6" bgs).

The section's stratigraphy was similar to that seen in Section 25, with the exception that the redeposited historic fill ended at 783'6" E, with the modern fill with RCA gravel entirely taking its place (Image 176) (Table 172).

Table 172: General soil stratigraphy – Trench 4 Section 26.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	26.76' – 25.59' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	25.59' – 19.76' NAVD88 (1'2" – 7' bgs) (0.36m – 2.13m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions. Extended only to 20.76' NAVD88 (1'10" bgs) (0.53m bgs) from 781'6" E to 783'6" E (238.2m E to 238.81m E).
III	24.81' – 20.76' NAVD88 (1'10" – 6' bgs) (0.53m – 1.83m bgs)	7.5YR 4/4 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Only present from 781'6" E to 783'6" E (238.2m E to 238.81m E).



Image 175: Trench 4 Section 26 – Feature 22 north profile.



Image 176: Trench 4 Section 26 – East profile.

TRENCH 22

Trench 22 was opened on October 25, 2018. Much of the excavation was conducted by machine, but the high density of existing utility lines necessitated hand digging throughout a large portion of the trench. Trench 22 measured 125' east-west, with a north-south width varying from 13' to 17'. The monitoring and documentation of the trench was broken up into arbitrary sections 25' long.

Section 1

Trench 22 Section 1 extended from 577'6" E to 602'6" E. The section had a width of 16' up to 585' E, where it widened by 1' to the south for a total width of 17'. The south wall was at 27'4" N up to 585' E, where it moved to 26'4" N (Map 22).

The section overlapped the former location of Trench 2 Sections 26 and 27. The section floor was excavated to a depth of 19.77' NAVD88 (5' bgs) south of the duct banks running through the center of the trench, and to a depth of 20.52' NAVD88 (4'3" bgs) north of the duct banks. These duct banks, as well as other utilities running along the north side of the section, were encountered at depths from 24.02' to 21.1' NAVD88 (9" to 3'8" bgs). The stratigraphy of the section was composed of layers of modern fill associated with the utility lines, with potentially older fill in the south of the section (Image 177) (Image 178) (Table 173). A styrofoam fragment was found in strat III at the trench floor.

Table 173: General soil stratigraphy – Trench 22 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.77' – 23.6' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.6' – 20.52' NAVD88 (1'2" – 4'3" bgs) (0.36m – 1.3m bgs)	7.5YR 2.5/1 black	Loamy sand fill with pebble, cobble, and concrete fragment inclusions. Present from 38'10" N (11.84m N) to the north wall, from 577'6" E to 599'6" E (176.02m E to 182.73m E).
III	23.6' – 19.77' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 3/3 dark brown	Loamy sand fill with pebble, cobble, and loose brick inclusions. Present south of the duct banks running down the center of the trench. Styrofoam found in this stratum.
IV	23.6' – 20.52' NAVD88 (1'2" – 4'3" bgs) (0.36m – 1.3m bgs)	2.5Y 5/3 light olive brown	Coarse sand clean fill associated with the duct banks in the center of the trench.
V	22.94' – 19.77' NAVD88 (1'10" – 5' bgs) (0.56m – 1.52m bgs)	10YR 5/6 yellowish brown	Medium sand clean fill associated with the duct banks running down the center of the trench.



Image 177: Trench 22 Section 1 – West profile north of central duct banks.



Image 178: Trench 22 Section 1 – West profile in progress.

Section 2

Trench 22 Section 2 extended from 602'6" E to 627'6" E. The section had a north-south width of 17', and the south wall remained at 26'4" N (Map 22). The section overlapped the former location of Trench 2 Sections 27 and 28. The section floor was excavated to a depth of 19.96' NAVD88 (5' bgs) south of the duct banks running through the center of the trench, and to a depth of 20.96' NAVD88 (4'3" bgs) north of the duct banks. These duct banks, as well as other utilities running along the north side of the section, were encountered at depths from 23.96' to 21.46' NAVD88 (1' to 3'6" bgs).

A north extension, measuring 5' north-south by 3' east-west was excavated into the sidewalk from 623'6" E to 626'6" E (Map 22). This extension reached a depth of 26.78' NAVD88 (4' bgs), exposing a gas line (Image 179). The stratigraphy of the section was composed of layers of modern fill associated with the utility lines, with potentially older fill in the south of the section (Image 180) (Table 174) (Table 175).

Table 174: General soil stratigraphy – Trench 22 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	24.96' – 23.79' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	23.79' – 20.71' NAVD88 (1'2" – 4'3" bgs) (0.36m – 1.3m bgs)	10YR 3/3 dark brown	Loamy sand fill with pebble, cobble, and loose brick inclusions. Present north of the duct banks running down the center of the trench.
III	23.13' – 20.96' NAVD88 (1'10" – 4' bgs) (0.56m – 1.22m bgs)	10YR 5/6 yellowish brown	Medium sand clean fill associated with the duct banks in the center of the trench.
IV	23.79' – 19.96' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/3 dark brown	Coarse sand fill with some pebble and loose brick inclusions. Present south of the duct banks running down the center of the trench.

Table 175: West profile soil stratigraphy – Trench 22 Section 2 - North extension below sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.11' – 24.78' NAVD88 (0 – 4" bgs) (0 – 0.1m bgs)	N/A	Concrete/asphalt sidewalk surface.
II	24.78' – 21.11' NAVD88 (4" – 4' bgs) (0.1m – 1.22m bgs)	10YR 6/4 light yellowish brown	Coarse sand clean fill associated with the gas line.
III	24.78' – 26.78' NAVD88 (4" – 4' bgs)	10YR 5/6 yellowish brown	Coarse sand clean fill associated with the gas line.

	(0.1m – 1.22m bgs)		
IV	24.78' – 23.11' NAVD88 (4" – 2' bgs) (0.1m – 0.61m bgs)	10YR 4/3 brown	Loamy sand fill underlying the asphalt at the north end of the extension.



Image 179: Trench 22 Section 2 – North extension west profile.



Image 180: Trench 22 Section 1 & 2 – Excavation in progress.

Section 3

Trench 22 Section 3 extended from 627'6" E to 652'6" E. The section had a north-south width of 17', and the south wall remained at 26'4" N (Maps 22-23). The section overlapped the former location of Trench 2 Sections 28 and 29. The section floor was excavated to a depth of 20.26' NAVD88 (5' bgs) south of the duct banks running through the center of the trench, and to a depth of 21.26' NAVD88 (4' bgs) north of the duct banks. These duct banks, as well as other utilities running along the north side of the section, were encountered at depths of 24.09' to 23.76' NAVD88 (1'2" to 1'6" bgs). The stratigraphy of the section was similar to that seen in Section 2 (Image 181) (Table 176).

Table 176: General soil stratigraphy – Trench 22 Section 3.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.26' – 24.09' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.09' – 21.26' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 3/3 dark brown	Loamy sand fill with pebble, cobble, and loose brick inclusions. Present north of the duct banks running down the center of the trench.
III	23.43' – 21.26' NAVD88 (1'10" – 4' bgs)	10YR 5/6 yellowish brown	Medium sand clean fill associated with the duct banks in the center of the trench.

	(0.56m – 1.22m bgs)		
IV	24.09' – 20.26' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 3/3 dark brown	Coarse sand fill with some pebble and loose brick inclusions. Present south of the duct banks running down the center of the trench.



Image 181: Trench 22 Section 3 – South profile.

Section 4

Trench 22 Section 4 extended from 652'6" E to 677'6" E. The section had a north-south width of 17' up to 674'6" E where the section narrowed from the south by 4', ending to 14' wide at 677'6" E. The south wall was at 26'4" N up to 674'6" E, ending at 29'4" N at 677'6" E (Map 23).

The section overlapped the former location of Trench 2 Sections 29 and 30. The section floor was excavated to a depth of 20.59' NAVD88 (5' bgs) south of the duct banks running through the center of the trench, and to a depth of 21.59' NAVD88 (4' bgs) north of the duct banks. These duct banks, as well as other utilities running along the north side of the section, were encountered at depths from 24.42' to 24.09' NAVD88 (1'2" to 1'6" bgs).

A north extension, measuring 5' north-south by 3' east-west was excavated into the sidewalk from 667'6" E to 670'6" E (Image 182). This extension reached a depth of 21.69' NAVD88 (4' bgs). The stratigraphy of the section was composed of layers of modern fill associated with the utility lines, with redeposited historic fill in the south of the section (Image 183) (Table 177) (Table 178).

Table 177: General soil stratigraphy – Trench 22 Section 4.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.59' – 24.42' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.42' – 21.59' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 3/1 very dark gray	Loamy sand fill with pebble, cobble, and loose brick inclusions. Present north of the duct banks running down the center of the trench.
III	24.42' – 21.59' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 5/3 brown	Coarse sand clean fill associated with utilities along the north wall.
IV	24.42' – 21.59' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 5/6 yellowish brown	Coarse sand clean fill associated with the duct banks in the center of the trench.
V	24.42' – 20.59' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	10YR 3/3 dark brown	Coarse sand fill with some pebble and loose brick inclusions. Present south of the duct banks running down the center of the trench.

Table 178: West profile soil stratigraphy – Trench 22 Section 4 - North extension below sidewalk.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.69' – 25.36' NAVD88 (0 – 4" bgs) (0 – 0.1m bgs)	N/A	Concrete/asphalt sidewalk surface.
II	25.36' – 21.69' NAVD88 (4" – 4' bgs) (0.1m – 1.22m bgs)	10YR 3/3 dark brown	Loamy sand fill with some pebble, cobble, and brick fragment inclusions.



Image 182: Trench 22 Section 4 – North extension in progress.



Image 183: Trench 22 Section 4 – North profile.

Section 5

Trench 22 Section 5 extended from 677'6" E to 702'6" E. The section had a north-south width of 14'6", and the south wall was at 28'10" N (Map 23). The section overlapped the former location of Trench 2 Sections 30 and 31. The section floor was excavated to a depth of 20.94' NAVD88 (5' bgs) south of the duct banks running through the center of the trench, and to a depth of 21.94' NAVD88 (4' bgs) north of the duct banks. These duct banks, as well as other utilities running along the north side of the section, were encountered at depths from 24.77' to 24.44' NAVD88 (1'2" to 1'6" bgs). The stratigraphy of the section was similar to that seen in Section 4 (Image 184) (Table 179).

Table 179: General soil stratigraphy – Trench 22 Section 5.

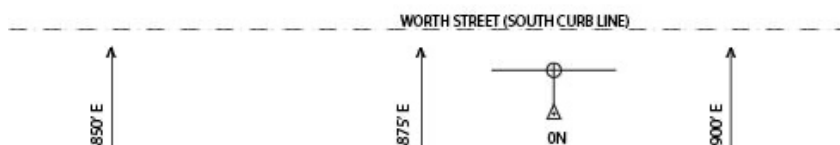
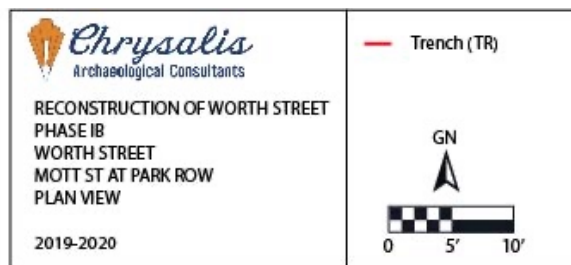
STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	25.94' – 24.77' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	24.77' – 21.94' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 3/1 very dark gray	Loamy sand fill with pebble, cobble, and loose brick inclusions. Present north of the duct banks running down the center of the trench.
III	24.77' – 21.94' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 5/3 brown	Coarse sand clean fill associated with utilities along the north wall.
IV	24.77' – 21.94' NAVD88 (1'2" – 4' bgs) (0.36m – 1.22m bgs)	10YR 5/6 yellowish brown	Coarse sand clean fill associated with the duct banks in the center of the trench.
V	24.77' – 20.94' NAVD88 (1'2" – 5' bgs) (0.36m – 1.52m bgs)	7.5YR 4/3 brown	Coarse sand fill with some pebble and loose brick inclusions. Present south of the duct banks running down the center of the trench.



Image 184: Trench 22 Section 5 – East profile in progress.

INTERSECTION OF WORTH STREET AND PARK ROW

Excavation at Worth Street's intersection with Park Row included two trenches (Trench 2 Sections 37-39 and Trench 13) (Maps 24-25). Excavation in this area revealed no archaeological features.



Map 25: Plan view of Worth Street at its intersection with Park Row.

TRENCH 2

Sections 36 through 39 of Trench 2 were located in the intersection of Worth Street and Park Row. Excavation in this area revealed no archaeological features or intact contexts.

Section 36

The thirty-sixth section of Trench 2 extended from 809'6" E to 834'6" E. The north-south width of the section was 9', with the south wall remaining at 17'4" N (Map 25). Several utility lines were encountered crossing the trench at depths ranging from 25.72' to 25.56' NAVD88 (1'5" to 1'7" bgs). The section floor was excavated to a depth of 17.96' NAVD88 (10' bgs). The stratigraphy of the section was similar to that encountered in Section 35 (Image 185) (Table 180). FS 27, including a porcelain sherd and an intact aqua glass bottle dated to 1902, was found in strat II between 22.96' and 18.96' NAVD88 (5' and 9' bgs) (Table 180).

Table 180: North profile soil stratigraphy – Trench 2 Section 36.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	27.96' – 26.79' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	26.79' – 17.96' NAVD88 (1'2" – 10' bgs) (0.41m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 27 found within this stratum.



Image 185: Trench 2 Section 36 – North profile in progress.

Section 37

Trench 2 Section 37 extended from 834'6" E to 859'6" E. The north-south width of the section was 9', with the south wall remaining at 17'4" N (Map 25). Numerous utility lines were encountered crossing the trench at depths from 25.83' to 20.33' NAVD88 (2'6" to 8' bgs). A brick-lined ConEdison utility vault intruded into the section at 23.33' NAVD88 (5' bgs) from the

south wall, reaching 21'4" N at 837' E, disappearing into the south wall at 844' E (Image 186). A duct bank leading away from the vault ran along the south wall at a depth of 21.16' NAVD88 (7'2" bgs). The section floor was excavated to a depth of 17.83' NAVD88 (10'6" bgs).

The stratigraphy of the section was similar to that encountered in Section 36 (Table 181). FS 28, which included two animal bones, was found in strat II between 24.33' and 21.33' NAVD88 (4' and 7' bgs) (Table 181).

Table 181: North profile soil stratigraphy – Trench 2 Section 37.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	28.33' – 27.16' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	27.16' – 17.83' NAVD88 (1'2" – 10'6" bgs) (0.41m – 3.2m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. FS 28 found within this stratum.



Image 186: Trench 2 Section 37 – East profile in progress with utility vault.

Section 38

Trench 2 Section 38 extended from 859'6" E to 884'6" E. The north-south width of the section was 9', with the south wall remaining at 17'4" N (Map 25). Utility lines were encountered crossing the trench at depths ranging from 26.82' to 21.65' NAVD88 (2' to 7' 2" bgs). The section floor was excavated to a depth of 18.82' NAVD88 (10' bgs) up to 871'6" E. From 871'6" E to 884'6" E the section was excavated to a depth of 24.07' NAVD88 (4'9" bgs).

The stratigraphy of the section was similar to that seen in Section 37 up to 871'6" E, at which point the redeposited historic fill ended, replaced by modern sand fill associated with some utilities, as well as a modern loamy sand fill along the south wall (Image 187) (Image 188) (Table 182).

Table 182: North profile soil stratigraphy – Trench 2 Section 38.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	28.82' – 27.65' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	27.65' – 18.82' NAVD88 (1'2" – 10' bgs) (0.41m – 3.05m bgs)	7.5YR 4/3 brown	Loamy sand with pebble, cobble, and loose brick inclusions. Present up to 871'6" E (265.63m E).
III	27.65' – 24.07' NAVD88 (1'2" – 4'9" bgs) (0.36m – 1.45m bgs)	10YR 5/6 yellowish brown	Medium sand with disarticulated brick demo inclusions. Present from 871'6" E to 884'6" E (265.63m E to 269.6m E).
IV	27.65' – 26.57' NAVD88 (1'2" – 2'3" bgs) (0.36m – 0.69m bgs)	10YR 4/2 dark grayish brown	Loamy sand with pebble, brick fragment, and concrete fragment inclusions. Present from the south wall to 19'8" N (5.99m N), 871'6" E to 884'6" E (265.63m E to 269.6m E).



Image 187: Trench 2 Section 38 – South profile at 18.82' NAVD88 (10' bgs).



Image 188: Trench 2 Sections 38 and 39 – North profile.

Section 39

Trench 2 Section 39 extended from 884'6" E to 891'6" E. The north-south width of the section was 9', with the south wall remaining at 17'4" N (Map 25). Utilities were encountered crossing the trench at the trench floor, and an oilostatic line was visible in the north wall at a depth of 26.03' NAVD88 (3' bgs). The section was excavated to a depth of 24.53' NAVD88 (4'6" bgs).

The stratigraphy of the section was similar to that seen in the east half of Section 38 (Image 189) (Table 183).

Table 183: North profile soil stratigraphy – Trench 2 Section 39.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	29.03' – 27.86' NAVD88 (0 – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	27.86' – 24.53' NAVD88 (1'2" – 4'6" bgs) (0.36m – 1.37m bgs)	10YR 5/6 yellowish brown	Medium sand with disarticulated brick demo inclusions.
III	27.86' – 26.78' NAVD88 (1'2" – 2'3" bgs) (0.36m – 0.69m bgs)	10YR 4/2 dark grayish brown	Loamy sand with pebble, brick fragment, and concrete fragment inclusions. Present from the south wall to 19'8" N (5.99m N).



Image 189: Trench 2 Sections 38 and 39 – Excavation in progress, facing northeast.

TRENCH 13

Trench 13 was opened on August 27, 2019. All excavation was carried out by hand. The trench was oriented north-south, perpendicular to Worth Street, and measured 10' long by 4' wide, with its southwest corner at 29°4" N, 832°6" E (Map 24). The trench was excavated to a depth of 22.02' NAVD88 (6' bgs). Various utilities were encountered crossing the trench at depths ranging from 25.17' to 22.02' NAVD88 (3' bgs to 6' bgs). The stratigraphy of the trench was composed of a layer of modern fill overlying the redeposited historic loamy sand fill (Image 190) (Table 184).

Table 184: East profile soil stratigraphy – Trench 9.

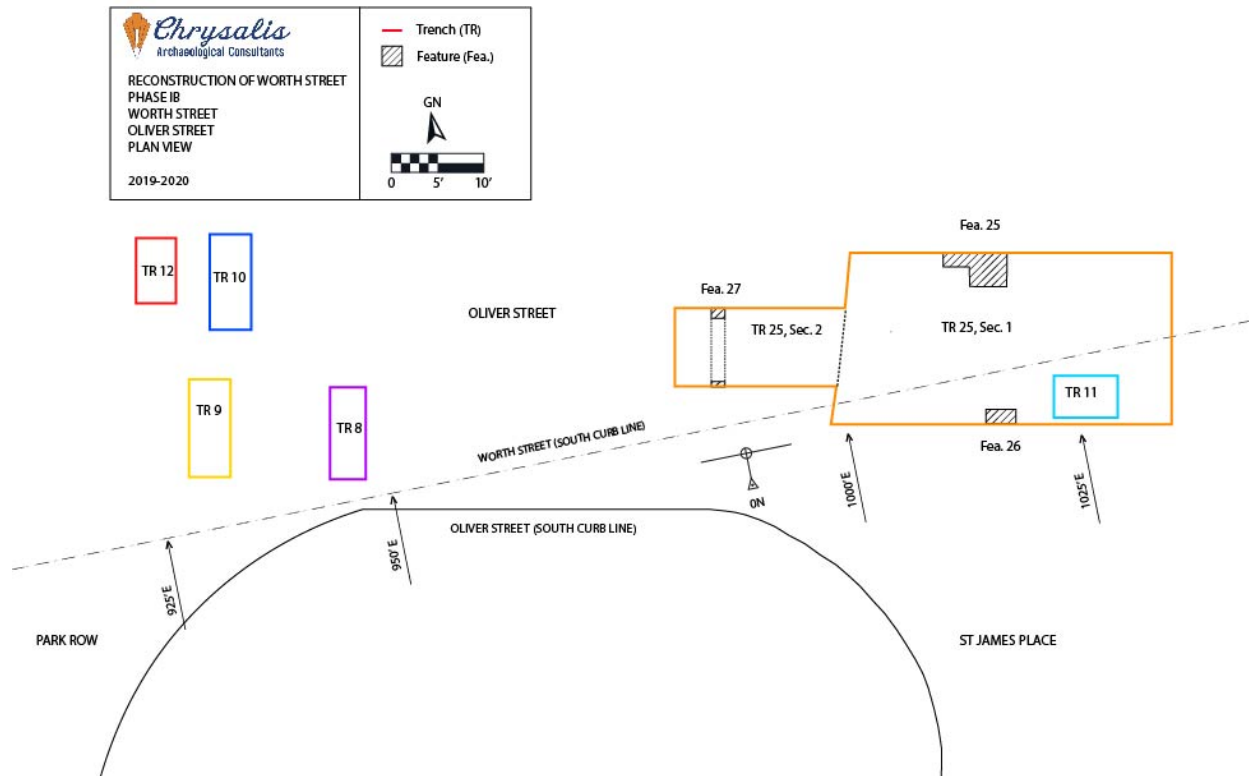
STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	28.17' – 27.17' NAVD88 (0' – 1' bgs) (0 – 0.3m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	27.17' – 25.84' NAVD88 (1' – 2'4" bgs) (0.3m – 0.71m bgs)	10YR 4/2 dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	25.84' – 22.02' NAVD88 (2'4" – 6' bgs) (0.71m – 1.83m bgs)	10YR 3/4 dark yellowish brown	Loamy sand fill with pebble, cobble, and loose brick inclusions.



Image 190: Trench 13 – Excavation in progress facing north.

OLIVER STREET FROM PARK ROW TO ST. JAMES PLACE

Excavation at Oliver Street's intersection with Park Row and St. James Place included six trenches (Map 26). Excavation in this area revealed three associated brick and concrete wall features (Features 25, 26, and 27).



Map 26: Plan view of Oliver Street at its intersection with Park Row and St. James Place.

TRENCH 8

Trench 8 was opened on August 20, 2019. All excavation was carried out by hand. The trench was oriented northeast by southwest, perpendicular to Oliver Street, and measured 10' long by 4' wide, with its southwest corner at 6'4" N, 943'4"E (Map 26). The trench was excavated to a depth of 26.6' NAVD88 (5' bgs). A concrete service box was encountered in the south half of the trench at a depth of 28.43' NAVD88 (1'2" bgs), along with other utility lines at depths ranging from 28.1' to 25.6' NAVD88 (1'6" to 4' bgs). The stratigraphy of the trench was composed of layers of modern fill (Image 191) (Table 185).

Table 185: West profile soil stratigraphy – Trench 8.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	29.6' – 28.43' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	28.43' – 26.6' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 4/2 dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	26.6' – 24.6' NAVD88 (3' – 5' bgs)	10YR 5/4 yellowish brown	Coarse sand.

	(0.53m – 1.83m bgs)		
IV	27.6' – 25.6' NAVD88 (2' – 4' bgs) (0.61m – 1.22m bgs)	10YR 2/2 very dark brown	Clay loam fill within concrete service box in the south half of the trench.



Image 191: Trench 8 – West profile.

TRENCH 9

Trench 9 was opened on August 20, 2019. All excavation was carried out by hand. The trench was oriented northeast by southwest, perpendicular to Oliver Street, and measured 10'6" long by 4'6" wide, with its southwest corner at 9'4" N, 928' E (Map 26). The trench was excavated to a depth of 22.02' NAVD88 (7'5" bgs). Utility lines were encountered throughout the trench at depths from 28.61' to 22.02' NAVD88 (10" to 7'5" bgs). The stratigraphy of the trench was composed of layers of modern fill (Image 192) (Table 186).

Table 186: East profile soil stratigraphy – Trench 9.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	29.44' – 28.27' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	28.27' – 25.94' NAVD88 (1'2" – 3'6" bgs) (0.36m – 1.07m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	25.94' – 22.02' NAVD88 (3'6" – 7'5" bgs) (1.07m – 2.26m bgs)	10YR 5/4 yellowish brown	Coarse sand fill.



Image 192: Trench 9 – East profile.

TRENCH 10

Trench 10 was opened on August 21, 2019. All excavation was carried out by hand. The trench was oriented northeast by southwest, perpendicular to Oliver Street, and measured 10'2" long by 4'6" wide, with its southwest corner at 24'7" N, 933' E (Map 26). The trench was excavated to a depth of 21.46' NAVD88 (8' bgs). A tunnel 3' in diameter was excavated 7' west from the northwest corner at the trench floor, locating a ConEdison gas utility in a deposit of 10YR 5/4 yellowish brown coarse sand fill. Other utilities were encountered crossing the trench proper at depths ranging from 27.96' to 25.96' NAVD88 (1'6" bgs to 3'6" bgs). The stratigraphy of the trench was composed of a layer of modern fill overlying redeposited historic fill loamy sand (Image 193) (Table 187).

Table 187: West profile soil stratigraphy – Trench 10.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	29.46' – 28.29' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	28.29' – 27.13' NAVD88 (1'2" – 2'4" bgs) (0.36m – 0.71m bgs)	10YR 4/2 dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	27.13' – 21.46' NAVD88 (2'4" – 8' bgs) (0.71m – 2.44m bgs)	10YR 3/4 dark yellowish brown	Loamy sand with pebble, cobble, and loose brick inclusions.



Image 193: Trench 10 – West profile showing tunnel.

TRENCH 11

Trench 11 was opened on August 23, 2019. All excavation was carried out by hand. The trench was oriented northwest by southeast, parallel to Oliver Street, and measured 7' long by 4'6" wide, with its southwest corner at 2'8" S, 1021'4" E (Map 26). The trench was excavated to a depth of 23.92' NAVD88 (6'6" bgs). A gas main crossed the trench at a depth of 26.17' NAVD88 (4'3" bgs). The stratigraphy of the trench was composed of layers of modern fill associated with the gas main (Image 194) (Table 188).

Table 188: North profile soil stratigraphy – Trench 11.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	30.42' – 29.25' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	29.25' – 27.42' NAVD88 (1'2" – 3' bgs) (0.36m – 0.91m bgs)	10YR 3/2 very dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.
III	27.42' – 23.92' NAVD88 (3' – 6'6" bgs)	10YR 6/4 light yellowish brown	Coarse sand fill.

	(0.91m – 1.98m bgs)		
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Image 194: Trench 11 – North profile.

TRENCH 12

Trench 12 was opened on August 26, 2019. All excavation was carried out by hand. The trench was oriented northeast by southwest, perpendicular to Oliver Street, and measured 7' long by 4'5" wide, with its southwest corner at 29'4" N, 928' E (Map 26). The trench was excavated to a depth of NAVD88 (8' bgs). A gas main was encountered at the trench floor. The stratigraphy of the trench was composed of layers of modern fill associated with the gas main (Image 195) (Table 189).

Table 189: North profile soil stratigraphy – Trench 12.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	29.33' – 28.16' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	28.16' – 27.33' NAVD88 (1'2" – 2' bgs) (0.36m – 0.61m bgs)	10YR 4/2 dark grayish brown	Loamy sand fill with approx. 30% RCA gravel inclusions.

III	27.33' – 21.33' NAVD88 (2' – 8' bgs) (0.61m – 2.44m bgs)	10YR 3/4 dark yellowish brown	Loamy sand fill with pebble, cobble, and loose brick inclusions.
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Image 195: Trench 12 – East profile.

TRENCH 25

Trench 25 was opened on February 17, 2020. Excavation was primarily conducted by machine, with some hand excavation. Trench 25 was oriented northwest by southeast, parallel with Oliver Street. The total length of trench excavated was 55' with a width varying from 8'6" to 18'6". The monitoring and documentation of the trench was broken up into arbitrary sections up to 37' long.

Section 1

Trench 25 Section 1 measured 37' long by 18'6" wide, with its southwest corner at 1'1" N, 998'6" E (Map 26). The section entirely overlapped the former location of Trench 11. The section was excavated to a maximum depth of 16.34' NAVD88 (14' bgs). Several utility lines were encountered crossing the trench at depths ranging from 25.84' to 25.59' NAVD88 (4'6" to 4'9" bgs).

Feature 25 was encountered in the north trench wall at 1021' E (Image 196). The feature was a mortared brick wall with concrete elements, oriented northwest by southeast, parallel with Oliver St. A cast iron or steel pipe extended upwards from the wall at its west end, to a height of 27.76' NAVD88 (2'7" bgs) (Image 196). The feature measured 7' long, extending 3'6" into the section and continuing north beyond the excavation an unknown extent. The top of the brick was

encountered at a depth of 25.51' NAVD88 (4'10" bgs), and it continued past the trench floor at 6.34' NAVD88 (14' bgs).

Feature 26 was encountered in the south wall of the trench at 1017'6" E (Image 197). The feature was a composite wall consisting of mortared stone, concrete top, and brick. It measured 3'2" long and extended 1'6" into the section. The top of the feature was at a depth of 28.34' NAVD88 (2' bgs), and it continued past the trench floor at 6.34' NAVD88 (14' bgs). The space between Features 25 and 26 was occupied by a loose brick-laden fill, suggesting additional brick elements spanned the area or connected the features (Image 198) (Table 190). Two mid-twentieth century Pepsi bottles were noted at 8' bgs within this brick-laden fill, indicating a mid-1900s usage or destruction date for the features.

Features 25 and 26 appeared to be in alignment with each other and with the orientation of St. James Place, which extends southwest from Chatham Square (now Kimlau Square). Overlaying these features atop the 1857 Perris fire insurance maps and the 1879 Bromley city atlas suggests this portion of the Chatham Square intersection was not developed in the nineteenth century (see Map 30, VII. Conclusions for historic overlay). Chatham Square, formed historically by an irregular meeting of Chatham Street, East Broadway, Division Street, Mott Street, Oliver Street, and Bowery, had New Bowery (now St. James Place) added cutting south sometime between 1852 and 1857 (Dripps 1852, Perris 1857). Features 25 and 26 do not appear to fall within the block partially razed for New Bowery/St. James Place. The deep extent of these features, continuing to at least 14' bgs, and their robust brick, mortar, and concrete construction may indicate they were part of the large elevated rail station or support tracks that was installed here by the late nineteenth century (Map 30). The alignment with St. James Place and position within the roadway suggests a post-1852 municipal or utility use rather than residential.

Trench 25 Section 1's stratigraphy was composed of the brick-laden fill between Features 25 and 26 as well as layers of modern fill associated with the modern utilities (Image 198) (Table 190).

Table 190: North profile soil stratigraphy – Trench 25 Section 1.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	30.34' – 29.17' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	29.17' – 25.34' NAVD88 (1'2" – 8' bgs) (0.36m – 2.44m bgs)	10YR 5/6 yellowish brown	Medium sand fill associated with modern utilities.
III	29.17' – 16.34' NAVD88 (2' – 14' bgs) (0.61m – 4.27m bgs)	7.5YR 3/4 dark brown	Loamy sand brick-laden fill with numerous brick inclusions. Two twentieth-century Pepsi bottles found in this stratum.
IV	29.17' – 16.34' NAVD88 (2' – 14' bgs) (0.61m – 4.27m bgs)	10YR 3/3 dark brown	Loamy sand fill with RCA gravel inclusions.



Image 196: Trench 25 Section 1 – Feature 25 north profile.



Image 197: Trench 25 Section 1 – Feature 26 south profile.



Image 198: Trench 25 Section 1 – South profile in progress.

Section 2

Trench 25 Section 2 measured 18' long by 8'6" wide, with its southwest corner at 8' N, 983' E (Map 26). The section was excavated to a depth of 21.08' NAVD88 (9' bgs).

Feature 27 was encountered in the north wall at 989'9" E (301.68m E) (Image 199). The feature was a mortared brick wall, oriented northeast by southwest, perpendicular to Oliver Street. The wall measured 1'6" wide, its top was encountered at 25.08' NAVD88 (5' bgs), and it continued down past the section floor at 9' bgs. The extant feature extended 1' into the section, however it appeared to have previously extended across the section, as shown by another wall remnant found in the same alignment in the south trench wall. The stratigraphy of this section was composed of the same deposit of brick-laden fill encountered in Section 1 associated with Features 25 and 26, intermixed with the clean sand modern fill (Image 200) (Table 191). A pocket calendar dating to 1956 was found within strat II (Table 191).

Feature 27 appeared oriented in alignment with Features 25 and 26 to the east, matching the orientation of New Bowery/St. James Place. The same brick-laden fill associated with Features 25 and 26 continued surrounding Feature 27, suggesting all three features were part of a previously razed structure. Their position near a mapped elevated rail station by 1857 may indicate the three features were part of this structure or a related support element (see Map 30, VII. Conclusions for historic overlay). Twentieth century Pepsi bottles and a 1956 pocket calendar found within the brick-laden fill suggests a mid-1900s usage or destruction date of this structure.

Table 191: North profile soil stratigraphy – Trench 25 Section 2.

STRATUM	DEPTH NAVD88 (BGS)	MUNSELL	DESCRIPTION
I	30.08' – 28.91' NAVD88 (0' – 1'2" bgs) (0 – 0.36m bgs)	N/A	Asphalt pavement overlying concrete roadbase.
II	28.91' – 21.08' NAVD88 (1'2" – 9' bgs) (0.31m – 2.74m bgs)	7.5YR 3/4 dark brown mottled with 10YR 5/6 yellowish brown	Loamy sand brick-laden demo fill, mottled with coarse sand. A 1956 pocket calendar was found in this stratum.



Image 199: Trench 25 Section 2 – Feature 27 in north profile.



Image 200: Trench 25 Section 2 – Excavation in progress.

VI. LABORATORY RESULTS

Archaeological materials were collected from 36 contexts during monitoring of excavation activities (Appendix A – Artifact Inventory). No materials collected represented finds from intact archaeological contexts. All materials collected were scattered finds from fill matrices or project backfill. These items were useful in general in assessing the nature of fill episodes and utility excavations, such as identifying modern fill by the presence of plastic or twentieth century glass. The artifacts encountered dated from the late eighteenth century through to the late twentieth century, with most dates falling in the middle of the nineteenth century. However, these artifacts were most frequently found in association with modern utilities, and their presence in the highly disturbed, redeposited loamy sand fill prevalent throughout the project area limits the degree to which they could be confidently attributed to local historic use at the site.

All cultural materials were bagged according to their unique provenience, recorded on field forms and in a project FS Log (Appendix A – FS Log). Artifacts were assessed for general identification and date characteristics (Appendix A – Artifact Inventory). Following this process, the artifacts were deemed to have originated from disturbed and redeposited fills and to lack significant cultural relevancy or utility in future study and were culled. No artifacts will be sent to the repository.

A total of 158 artifacts from the 36 contexts collected were transported to the laboratory. Of these, 117 artifacts were ceramic or glass Household goods, all highly fragmentary. Where production dates could be assigned, most commonly by ceramic ware type or identifying glass manufacturing characteristics, all dates were nineteenth or twentieth century except for a general production range of 1775-1840 for pearlware (Miller et al. 2000). A small whiteware chamber pot fragment and whiteware spittoon fragment were notable Sanitary items, and Personal items in the form of 3 pipe stem fragments and a plastic 1956 pocket calendar were also present. Also included were 21 animal bones mostly too fragmented to identify beyond mammal or avian. White tile fragments and clear window glass rounded out the materials collected.

VII. CONCLUSIONS

Between October 2018 and March 2020, a total of 25 trenches were excavated via backhoe and by hand on Worth Street and Mulberry Street between Centre Street and St. James Place. A total of 28 archaeological features were identified. Of these, 11 were previously impacted mortared brick piers from the ca. 1870 through early twentieth century trolley line on Worth Street. One was a brick-lined shaft, likely associated with the rear of a residential lot at 72 Cross Street prior to 1833.

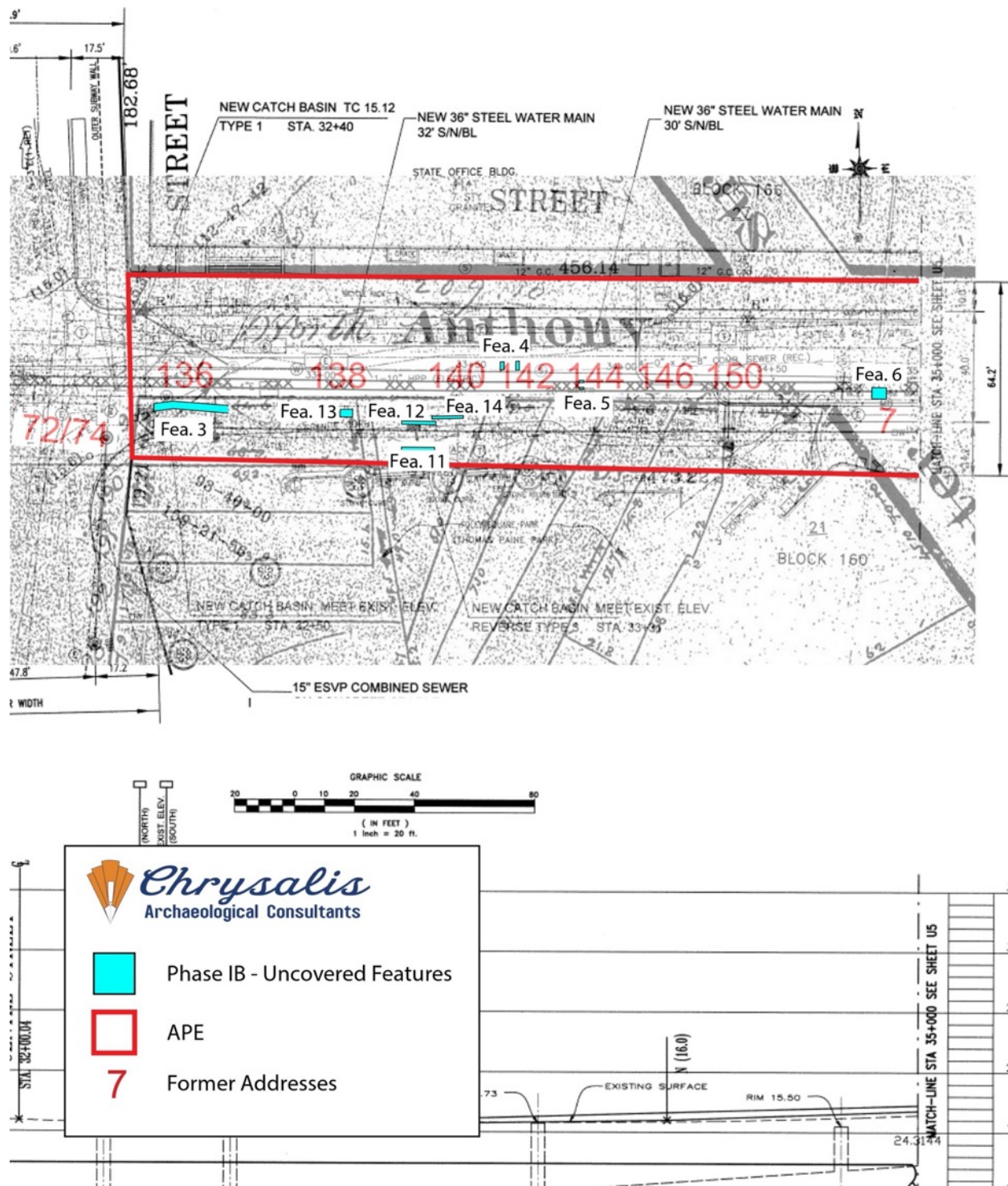
The additional 16 features represented previously razed and infilled stone and brick walls or utility boxes. Features 3, 11, 12, 13, and 14, walls found to the west of the former location of Little Water Street, were likely associated with the lot at 72/74 Centre Street or with 138 Anthony/Worth Street, created after 1817 as Anthony Street and Centre Street were formed and likely razed when Anthony Street was widened in 1833 (Map 27). Features 9, 18, and 19, found between historic Cross Street and Mulberry Street and aligned with Anthony/Worth Street, are walls likely associated with structures or utilities constructed post-1868, after Worth Street's extension through the area (Map 28). Features 20, 21, and 22 were walls built aligned with Anthony/Worth Street after its 1868 extension east to Mott Street (Map 29). Features 25, 26, and 27 were deep brick and

concrete walls likely associated with the elevated rail station and lines at Chatham Square (Map 29). Features 8 and 15 were portions of defunct brick utility boxes. Maps 27-29 overlay these feature locations atop 2012 utility maps, mid-nineteenth century tax maps, and 1857-1879 insurance maps and atlases.

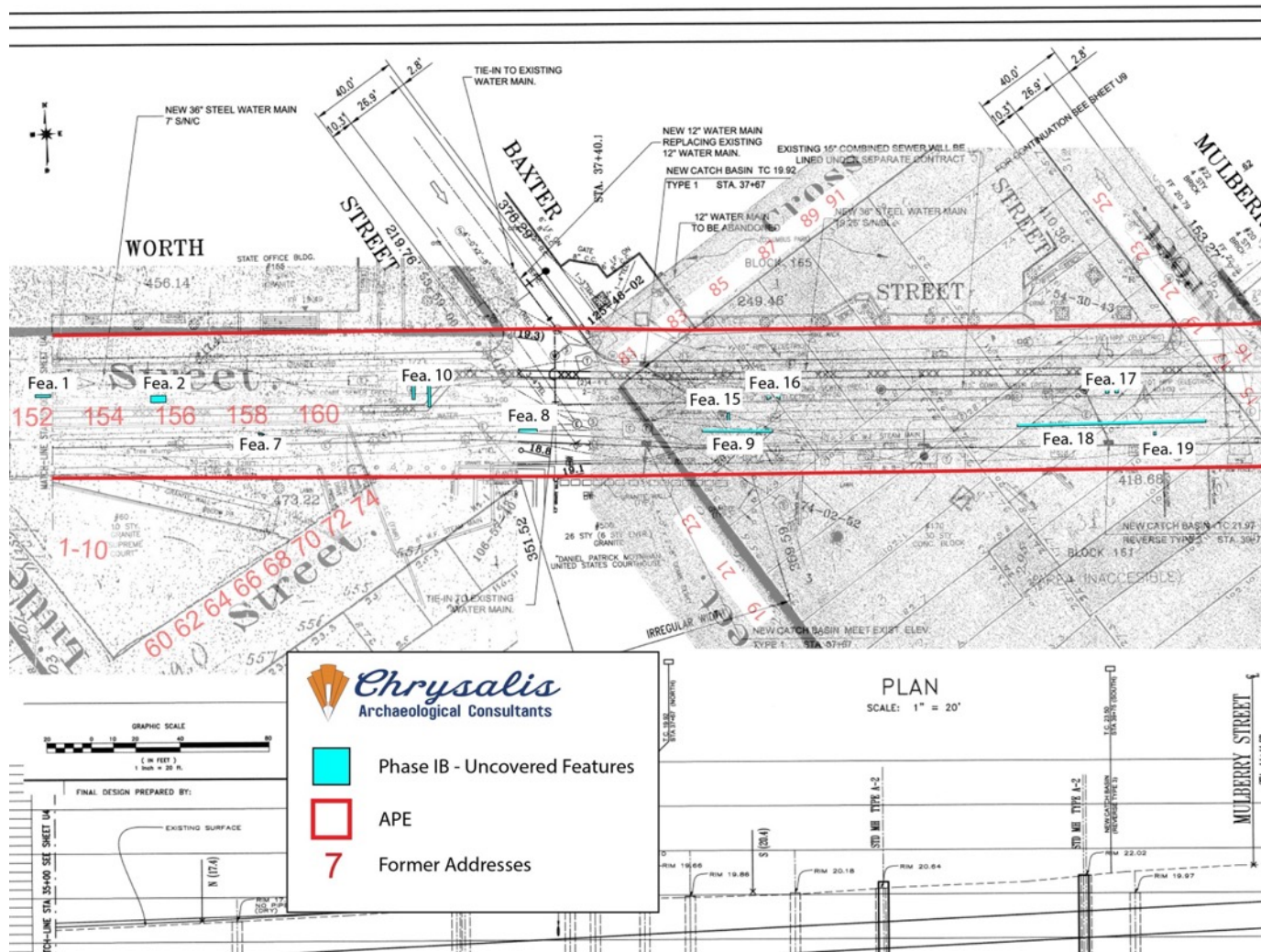
None of these features were associated with intact soil deposits or distinctive artifact assemblages. These features help confirm the mapped locations of nineteenth century structures razed in the path of Anthony/Worth Street, but the lack of undisturbed soils or intact assemblages associated with them limits the information to be gathered about the lifeways of people in the former Five Points neighborhood.

Existing water, gas, electric, sewer, and telecommunications utility lines were uncovered in nearly every project excavation from just below the modern concrete road base at around 1'2" bgs to at least 7'2" bgs. Manholes and utility boxes these lines fed into were present to depths from 5' to 10'6" bgs, depending on the amount and type of utilities running to them. The brick sewer encountered appeared at a depth of 12' bgs, the maximum depth reached by any of the project excavations.

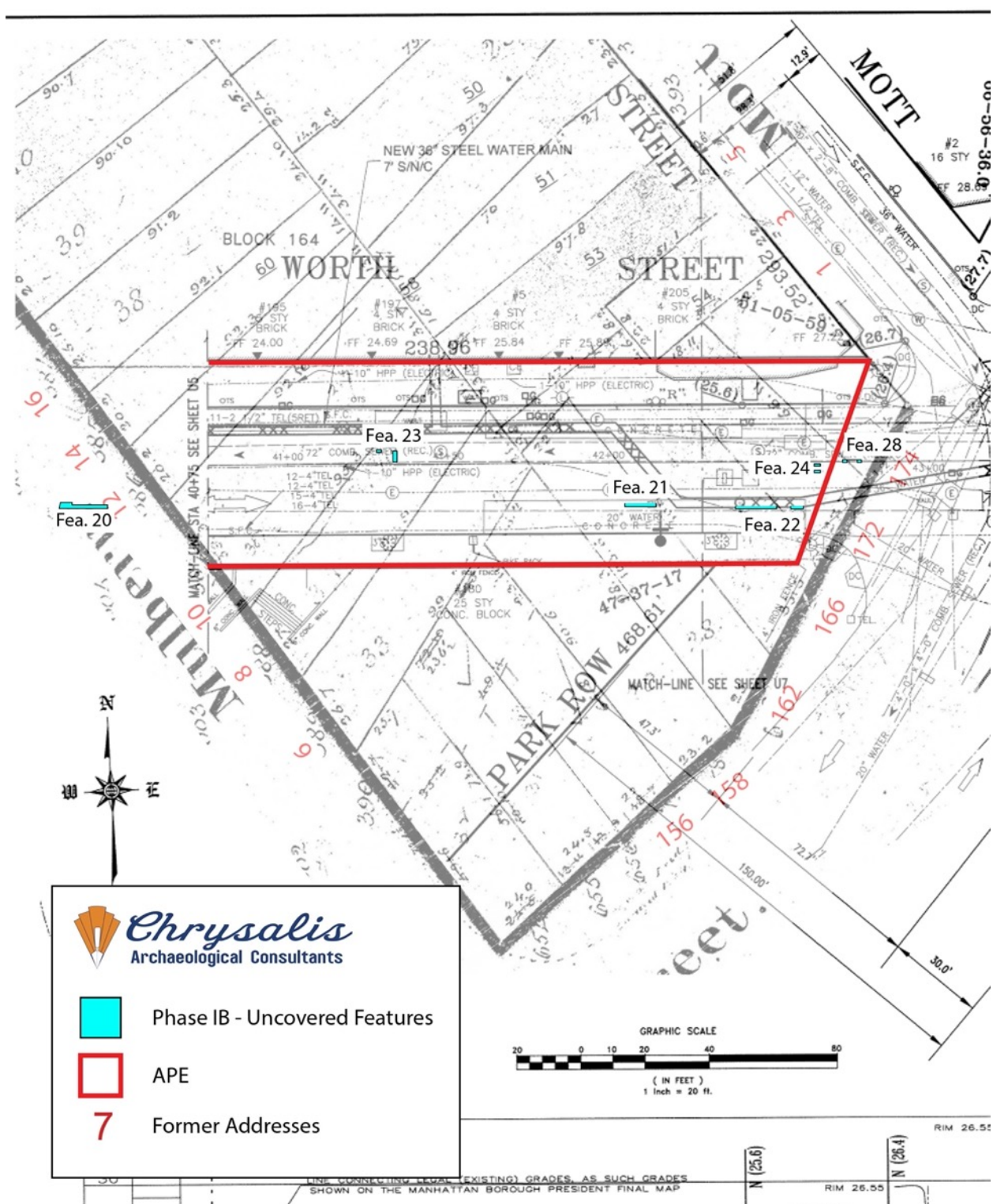
Soil matrices encountered were almost exclusively clean coarse sand or loamy sand fills. Large portions of each excavation were filled with 10YR 3/3 – 4/3 or 7.5YR 3/4 – 4/4 loamy sand fill with small brick and concrete fragments and pebble inclusions. These small inclusions suggest this soil was processed fill or repeatedly redeposited fill soil. This redeposited fill was present from depths ranging from just below the modern concrete road base at around 1'2" bgs down to the maximum extent of excavation at 12' bgs, and was found in association with every feature encountered during excavation. Shallower utilities tended to be backfilled with light color clean sands mostly devoid of inclusions, likely more modern clean fill soils added to more recent utility modifications. The narrow sewer trench anticipated in the IA report was not discernible, as this redeposited loamy sand fill was well-represented across the entire roadway throughout the project area. No intact historic soil deposits were uncovered, and no additional archaeological investigation is recommended for the project.



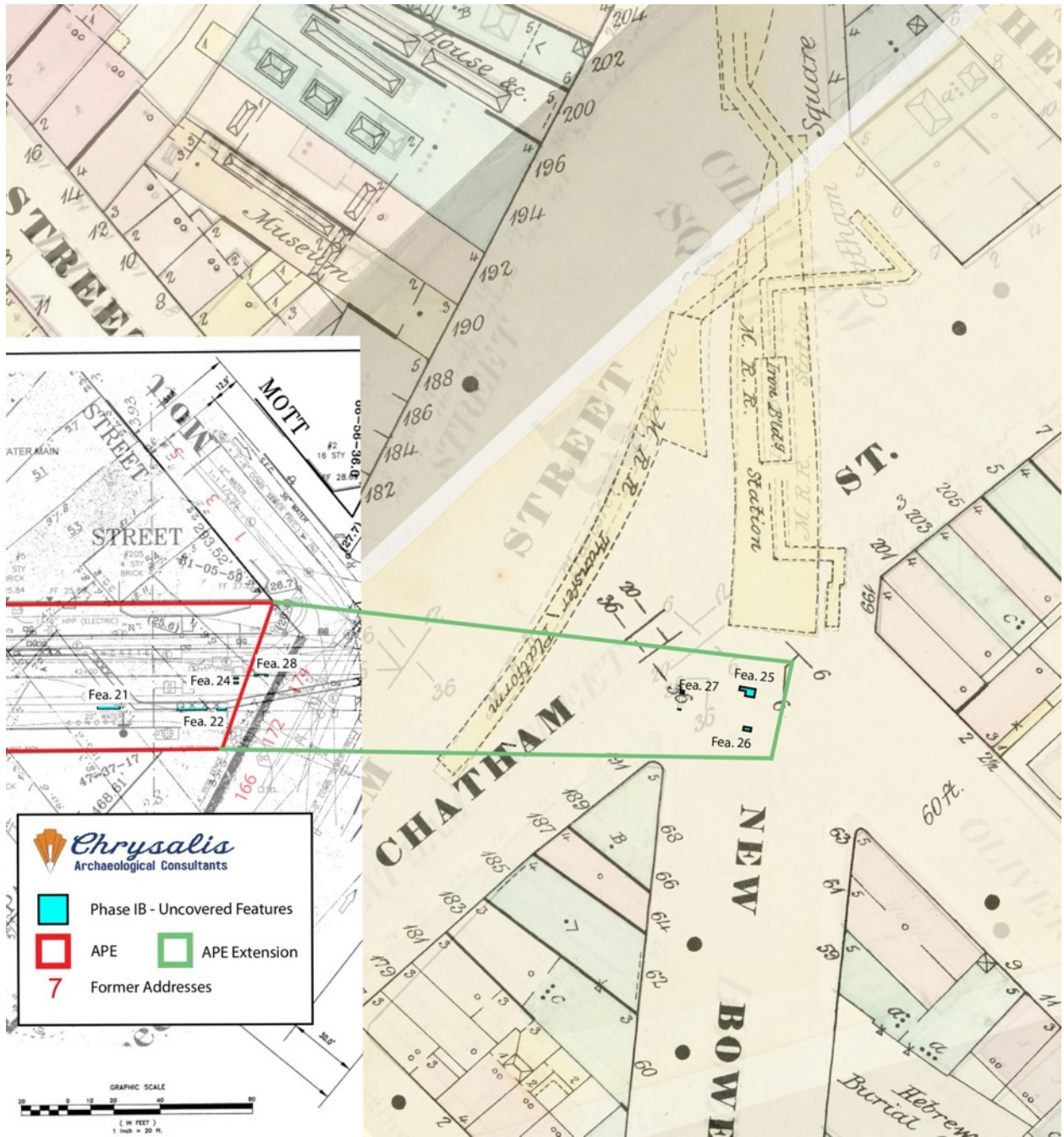
Map 27: Project Features, Worth Street east of Centre Street, 2012 utility map overlaying 1838-1871 tax map (modified from HPI 2013 Figure 22a).



Map 28: Project Features, Worth Street at Baxter and Mulberry Streets, 2012 utility map overlaying 1838-1871 tax map (modified from HPI 2013 Figure 22b).



Map 29: Project Features, Worth Street Mulberry to Mott Streets, 2012 utility map overlaying 1838-1871 tax map (modified from HPI 2013 Figure 22c).



Map 30: Project Features, Worth Street at Chatham Square, 2012 utility map overlaying 1838-1871 tax map (modified from HPI 2013 Figure 22c) and Perris 1857 and Bromley 1879.

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Appendix A:

FS Log and Artifact Database

Reconstruction of Worth Street from Hudson to Park Row - FS Log

[illegible]

Reconstruction of Worth Street from Hudson to Park Row - Artifact Inventory

FS	Cat No.	Quantity	Category	Object	Material	Ware Type	Decoration 1	Decoration 2	Color	Pattern	Form	Manufacture	Date Range	Dated by	Reference	Notes
1	1	1	household	bottle	stoneware	Bristol					rim/neck		1835-1900	ware	www.jefpat.maryland.gov	ginger beer bottle
1	2	1	household	tableware, general	refined earthenware	whiteware					body		1820-present	ware	Miller 2000	
1	3	1	household	bottle	common glass		molded		colorless	indeterminate/possibly ribbed	rim/neck					
2	1	3	architectural	window glass	common glass				colorless							
2	2	1	household	tableware, general	refined earthenware	pearlware	painted		blue	chinoiserie	base		1775-1810	ware and pattern	www.jefpat.maryland.gov	
3	1	1	household	tableware, general	porcelain	bone china	molded			floral/scroll	base		1794-present	ware	Miller 2000	
3	2	1	household	tableware, general	porcelain	unidentified porcelain					base					
3	3	1	architectural	tile	refined earthenware	"whiteware"										
4	1	1	household	bottle	stoneware	Bristol					rim/neck		1835-1900	ware	www.jefpat.maryland.gov	ginger beer bottle
4	1	1	household	tableware, general	refined earthenware	whiteware					body		1820-present	ware	Miller 2000	
4	2	1	household	tableware, general	refined earthenware	whiteware	molded			indeterminate	body		1820-present	ware	Miller 2000	
4	3	1	household	tableware, general	refined earthenware	whiteware	painted		polychrome	floral	rim		1830-1870	decoration	www.jefpat.maryland.gov	
5	1	1	faunal	bone	bone						butchered bone					large mammal
6	1	1	household	bottle	common glass		embossed	paper label	green		complete bottle		after 1940	product invention date	ico.com/mtnidew/article/when-was-mountain-dew-invented-how-did-it-get-its-name	
7	1	1	household	tableware, general	refined earthenware	whiteware					rim		1820-present		Miller 2000	
7	2	3	household	tableware, general	refined earthenware	creamware					body		1762-1820	ware	Miller 2000	
7	3	2	household	tableware, general	refined earthenware	pearlware					body		1775-1840	ware	Miller 2000	
7	4	1	architectural	tile	refined earthenware	"whiteware"										
7	5	1	household	tableware, general	refined earthenware	whiteware	transfer-print		blue	floral	rim		1815-1915	decoration	Azizi et al 1996	
7	6	3	household	general	refined earthenware	whiteware	transfer-print		blue	"Canadian"	body		1815-1915	decoration	Azizi et al 1996	pieces mend
7	7	1	household	general	refined earthenware	whiteware	transfer-print	molded	blue	neled	base		1815-1915	decoration	Azizi et al 1996	
7	8	1	household	holloware	refined earthenware	whiteware	transfer-print	molded	blue	paneled	rim		1815-1915	decoration	Azizi et al 1996	from an
7	9	1	household	general	porcelain	porcelain	painted		blue	chinoiserie	base		1815-1915	pattern	d.gov	
7	10	1	household	bottle	stoneware	stoneware	glazed		brown		neck					ginger beer
7	11	1	household	bottle	stoneware	Bristol	glazed				body		1835-1900	ware	d.gov	bottle
7	12	1	household	holloware	stoneware	stoneware	slip-decorated		grey		body					grey-bodied
7	13	1	household	holloware	stoneware	stoneware	slip-decorated		buff/white		body					
7	14	1	household	holloware	stoneware	stoneware	glazed	incised	brown, dark	banded	body					bodied
7	15	2	household	general	refined earthenware	pearlware	brush			floral	body and rim		1815-1830	decoration	d.gov	pieces mend
7	16	1	architectural	window glass	common glass				colorless							
8	1	1	household	bottle	stoneware	Bristol	glazed				body/sholder			ware	d.gov	
8	2	3	household	general	refined earthenware	whiteware					body		1820-present	ware	Miller 2000	not mend
8	3	1	household	general	refined earthenware	whiteware	molded			paneled	body		1820-present	ware	Miller 2000	
8	4	1	household	plate	refined earthenware	pearlware	molded	painted		unscallop,	rim		1841-1857	pattern	Miller 2000	
8	5	1	household	general	refined earthenware	pearlware	painted		warm+blue	floral	base		1815-1830	and color	d.gov	
8	6	1	indeterminate	indeterminate	indeterminate				white		indeterminate					
8	7	1	household	bottle	common glass				red		body		1840s-1960s	color	s	
8	8	1	household	bottle	common glass				olive amber		shoulder/neck/rim	mouth-blown				onion bottle

9	1	1	household	bottle	stoneware	Bristol	glaze				rim/neck		1835-1900	ware	d.gov	
9	2	1	household	bottle	stoneware	Bristol	glaze				rim/neck		1835-1900	ware	d.gov	
9	3	1	household	general	porcelain	porcelain					rim					
9	4	1	sanitary	chamber pot	refined earthenware	whiteware					rim		1820-present	ware	Miller 2000	
9	5	1	household	general	refined earthenware	whiteware	painted	blue	scalloped,				1874-1884	and pattern	Miller 2000	
9	6	1	household	general	refined earthenware	pearlware	painted	green	scalloped,				1784-1812	and pattern	Miller 2000	
9	7	1	household	general	coarse earthenware	redware	glazed	red and black			base					
9	8	1	household	holloware	stoneware	stoneware	salt-glazed	decorated	grey		body					
9	9	1	household	holloware	stoneware	stoneware	glazed	white			body					not mend
9	10	1	household	holloware	stoneware	stoneware	glazed	white			base					
9	11	1	household	general	refined earthenware	whiteware					body		1820-present	ware	Miller 2000	small sherd
9	12	1	household	general	refined earthenware	whiteware					rim		1820-present	ware	Miller 2000	
9	13	1	household	general	ironstone	granite	molded			paneled	rim		after 1840	material	d.gov	
9	14	1	household	bottle	common glass			olive amber			body		before 1890	color	www.sha.org	
9	15	1	household	bottle	common glass		molded	colorless	paneled		rim					food storage
10	1	1	household	bottle	stoneware	Bristol	glazed				base		1835-1900	ware	d.gov	bottle
11	1	1	household	bottle	stoneware	Bristol	glazed				base		1835-1900	ware	d.gov	bottle
11	2	1	household	holloware	stoneware	alkaline-glazed	salt-glazed	and grey			body					
11	3	1	household	general	refined earthenware	whiteware	transfer-print	blue	floral		rim		1815-1915	and color	Azizi et al 1996	
11	4	1	household	general	refined earthenware	pearlware	transfer-print	black	landscape		base		1825-1838	and color	d.gov	
12	1	1	architectural	tile	refined earthenware	"whiteware"					fragment					
13	1	1	household	general	refined earthenware	whiteware					base		1820-present		Miller 2000	
14	1	1	household	general	porcelain	porcelain	transfer-print	blue	willow		rim		1795-1830	pattern	Miller 2000	
15	1	1	household	general	refined earthenware	whiteware	painted	polychrome	floral		rim		1830-1870	decoration	d.gov	
16	1	1	household	holloware	stoneware	westwald	incised	blue	sprig		body		1700-1775	decoration	Miller 2000	
16	2	1	household	holloware	stoneware	stoneware	salt-glazed	painted	blue		body					remnants of
17	1	1	household	general	refined earthenware	whiteware	transfer-print	flow blue	blue	chinese motif	rim		1840-1900	and ware	d.gov	
17	2	1	household	general	refined earthenware	pearlware	transfer-print			willow	body		1795-1830	pattern	Miller 2000	
17	3	1	household	bottle	common glass		paper label	green			complete bottle		1961-1980s	manufacture	lutions.com/product	introduced
18	1	1	faunal	bone	bone						long bone					mammal
18	2	1	household	general	stoneware	stoneware	Albany	painted	blue	indeterminate	body		1805-1920	Albany slip		
18	3	1	household	bottle	common glass		embossed	olive green	text		base		1900	color	www.sha.org/bottle	mostly
19	1	1	household	general	refined earthenware	pearlware	transfer-print	blue	willow		body		1795-1830	pattern	Miller 2000	
19	2	1	household	general	stoneware	stoneware	scratch-blue	blue	indeterminate		body		1765-1795	and ware	Miller 2000	salt glaze
19	3	1	household	general	refined earthenware	whiteware	dipt	blue and green	banded		rim		1785-1840	and pattern	museum.ufl.edu/typ	
20	1	1	household	bottle	stoneware	Bristol	glazed				rim/neck		1835-1900	ware	aryland.gov/	Bristol ginger
21	1	1	household	general	refined earthenware	whiteware	transfer-print	blue	floral		body/base		1815-1915	decoration	Azizi et al 1996	body piece
21	2	1	Sanitary	spittoon	refined earthenware	Rockingham					base		1830-1900	ware	d.gov	
22	1	2	faunal	bone	bone						two long bones					unidentified mammal
22	2	2	hardware	key	metal											cataloging
22	3	1	household	plate	refined earthenware	whiteware					rim		1820-present	ware	Miller 2000	
22	4	1	household	general	stoneware	Bristol					base		1835-1900	ware	d.gov	bottle
22	5	1	household	general	stoneware	stoneware					handle					from jug
22	6	1	household	tumbler	common glass		molded			paneled	base		1830-present	pattern	m/archaeological-	
23	1	2	faunal	bone	bone						bone fragment					unidentified mammal
23	2	1	faunal	horn	bone						large horn fragment					unidentified mammal
23	3	1	personal	smoking pipe	clay	white ball clay					pipe stem frag	molded				
23	4	1	household	general	refined earthenware	pearlware					base		1775-1840	ware	Hume 1969	
23	5	1	household	general	refined earthenware	whiteware					base		1820-present	ware	Miller 2000	diameter
23	6	2	household	general	refined earthenware	whiteware					rim/pouring spout		1820-present	ware	Miller 2000	pieces mend
23	7	1	household	plate	refined earthenware	whiteware	molded			beaded	rim		1820-present	ware	Miller 2000	pattern
23	8	1	household	general	refined earthenware	whiteware	slip-decorated	blue	banded		base/body		1820-present	ware	Miller 2000	body piece,
23	9	1	household	plate/platter	refined earthenware	whiteware	printed	blue	floral		rim		1815-1915	and color	Azizi et al 1996	
23	10	1	household	general	refined earthenware	pearlware	printed	molded	red	floral	handle		1829-1880	and color	d.gov	
23	11	2	household	general	refined earthenware	pearlware	dipt	blue	banded		body		1785-1840	and pattern	museum.ufl.edu/typ	pieces mend
23	12	1	household	general	refined earthenware	yellowware	slip-decorated	blue, light	indeterminate		body		1830-1940	and ware	d.gov	
23	13	1	household	general	stoneware	Gray/Buf Buff Bodied	slip	salt-glazed	great		base		1805-1920	decoration	Miller 2000	

Appendix B:

Archaeological Work Plan and Project Information



To: New York State Office of Parks, Recreation and Historic Preservation
City of New York - Landmarks Preservation Commission
City of New York – Department of Design and Construction
ATANE Design and Construction Consultants

From: Alyssa Loorya, PhD, R.P.A., and Christopher Ricciardi, PhD, R.P.A.

Re: Phase IB Archaeological Monitoring Plan, Unanticipated Discoveries Plan and Human Remains Protocol for The Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York (Federal Project Number: X759.19.321, NYC Project Number: HWMWTCA7E, PIN Number: PIN: 8502015HW0028C and NY SHPO Project Number: 11PR04244)

Date: November 14, 2018 REVISED

I. INTRODUCTION

ATANE Design and Construction Consultants (ATANE), formerly HAKS Engineering, is undertaking construction management services for the Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York project (Federal Project Number: X759.19.321, NYC Project Number: HWMWTCA7E, PIN Number: PIN: 8502015HW0028C, and NY SHPO Project Number: 11PR04244) (Worth Street Project), on behalf of the City of New York – Department of Design and Construction (NYC DDC). Work is occurring curb to curb in certain areas throughout the project area (Map 01).

Chrysalis Archaeological Consultants, Inc. (Chrysalis) has been retained as the archaeological contractor for all the necessary Phase IB Cultural Resource Management/Archaeological tasks and undertakings as part of this project. Construction work for this project began in 2016 in areas identified as non-archaeologically sensitive. Only a portion of the project area was identified as sensitive for cultural resources (HPI 2013) (Map 02). Since that initial assessment the project area has expanded (area highlighted on Map 02 and discussed below).

This Archaeological Work Plan consists of three components: Archaeological Monitoring, Unanticipated Discoveries, and Human Remains Plan. The NYC DDC established the overall project area. The Area of Potential Effect (APE) for archaeological sensitivity was defined by the City of New York – Landmarks Preservation Commission (HPI 2013). The approved Phase IA assessment further defined the area of archaeological sensitivity (Map 03).

This plan is provided to the New York State Office of Parks, Recreation and Historic Preservation (NY SHPO), the City of New York – Landmarks Preservation Commission (NYC LPC) and the NYC DDC for review, approval and implementation. It describes the procedures and tasks to be performed as part of the Cultural Resources portion of the project; as well as what is to occur in the event that archaeological and/or human remains are exposed when the project archaeologist is not on site.

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Map 01: USGS – Jersey City, NJ-NY Quadrangle (United States Geological Survey 2016).



Map 02: Project area map, area of archaeological sensitivity (APE) highlighted blue, the expanded project area highlighted pink. New York City Tax Map (Department of Finance 2018).

The purpose of the overall cultural resources project guided by this Archaeological Work Plan (AWP) is to: 1) monitor construction activities in archaeologically sensitive areas of the project; 2) determine whether the project APE contains significant cultural resources (i.e. National Register Eligible, etc.) and/or human remains; 3) recover potentially significant buried cultural resources; 4) develop a historical and archaeological context(s) for the interpretation and evaluation of any potential cultural or archaeological resources that are, or may be, present within the APE; 5) outline the lines of communication and protocols that will be employed throughout the cultural resources process; 6) detail what steps will be taken in the event that significant unanticipated archaeological remains, including, but not limited to fragmentary or in situ human remains, are uncovered; 7) outline the laboratory process to be followed, if required; and 8) provide all necessary services related to the cultural resource process during the overall project.

The archaeological tasks required as part of the Phase IB project based upon the Scope of Work provided by ATANE include:

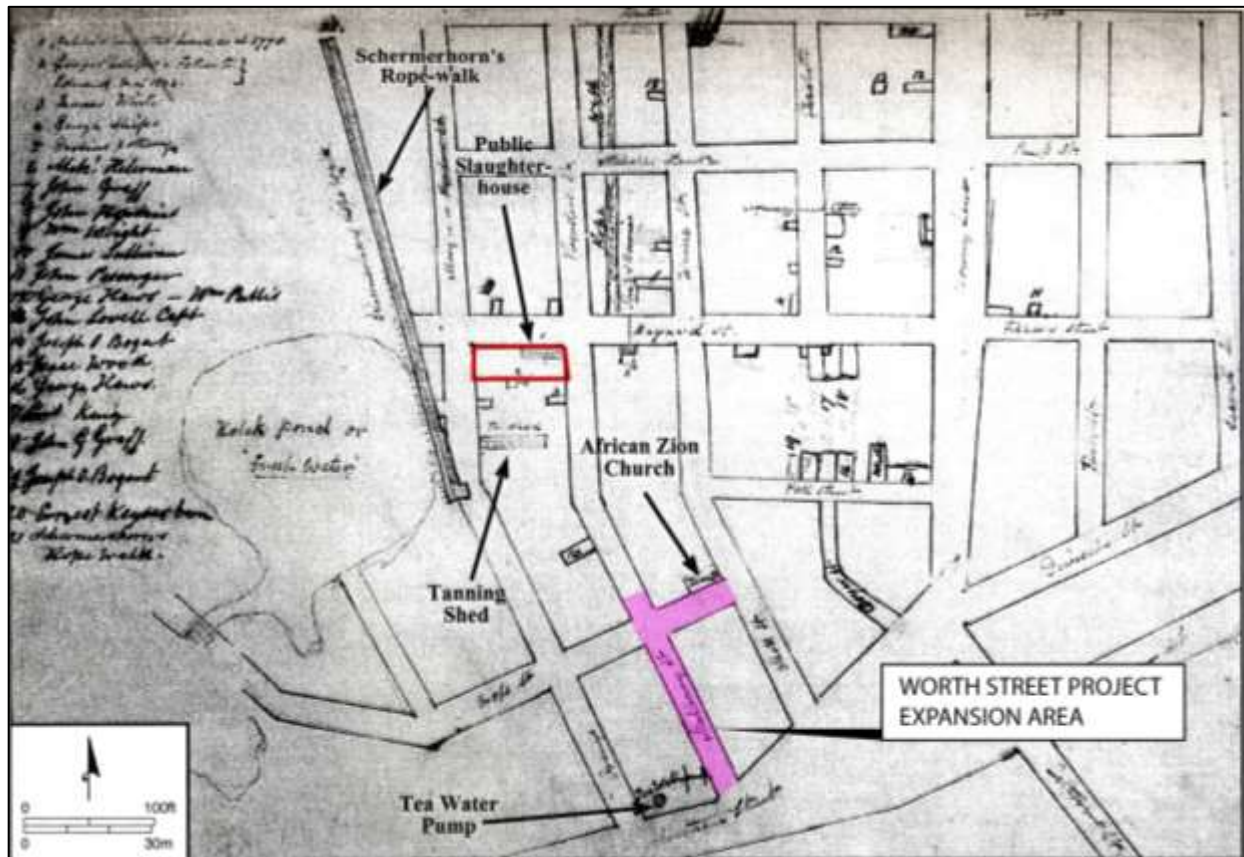
1. Preparation and development of an Archaeological Work Plan that includes Monitoring and Unanticipated Discoveries, and a Human Remains Plan and Protocol based on the Scope of Work provided by ATANE and NYC DDC.
2. Outline procedures and protocols to be followed by the project if significant cultural material or human remains are exposed during the course of the project, including in areas where archaeological monitoring is not required. (Note - the Human Remains Protocol Plan pertains to any and all areas where human remains may be exposed.)
3. Conduct Archaeological Monitoring and/or Testing within archaeologically sensitive areas as determined in the approved Phase IA.
4. Conduct laboratory analysis of any material remains recovered.
5. Produce a draft and final report of the results of field and laboratory work.
6. Based on the results of what is uncovered in the field, develop either Phase II or Phase III Mitigation Plans, if needed.
7. Provide all additional related cultural resource management services that may arise, including participation in project delivery team meetings and consultation with review agencies and interested parties.

PROJECT LOCATION

The overall Worth Street project area is curb to curb along Worth Street, between Hudson Street to the west, and St. James Place at the eastern extent of the project area (Map 02). The area of archaeological sensitivity, that is the focus of this plan, lies between Centre Street and Mott Street only. Project sponsors provided information to the NYC LPC in 2011, which resulted in a finding of “no further archaeological concerns” for the area between Hudson Street and Centre Street (Sutphin 2011 as cited in HPI 2013). NYC LPC requested a Phase IA Documentary Study and Assessment for the section of the project located between Centre Street and Mott Street (Sutphin 2011 as noted in HPI 2013).

The Phase IA assessment undertaken by Historical Perspectives Inc (2013) determined the area from Centre Street to Mott Street to possess archaeological sensitivity and recommended construction monitoring of the area.

Since the initial submittals the project area has expanded to cross the intersection of Mott Street, Park Row, and Chatham Square. It now also includes Mulberry Street from Worth Street to Mosco Street; and Mosco Street between Mulberry Street and Mott Street. These additional areas have not been subject to a Phase IA assessment. Based upon the proximity of these blocks to other archaeological projects¹ and the historic Collect District (Map 03) it is recommended that they be subject to archaeological monitoring and included in a re-defined APE (Map 04). Though Phase IA documentary research may potentially refine this area, based on the larger project schedule construction work may be required to start sooner than a thorough assessment could be completed.



Map 03: Kollect Map ca. 1800-1825 (modified from Chrysalis Archaeological Consultant's 2005, *Columbus Park; New York, (New York County) New York – Phase 1A and Partial Monitoring Report*).

¹ E.g. 62-64 Mulberry Street (Greenhouse Consultants 1994 and 1995) and Columbus Park (Chrysalis Archaeological Consultants 2005 and 2007).

PROJECT DESCRIPTION

Project Information²

Project Name	Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York (Federal Project Number: X759.19.321, NYC Project Number: HWMWTCA7E, PIN Number: PIN: 8502015HW0028C and NY SHPO Project Number: 11PR04244)
Street Address	N/A (see Project Area Map p.7)
Borough/Block/Lot	Manhattan (Block and Lot not applicable)
LPC PUID (If Yet Assigned)	
Applicant Name	ATANE Design and Construction Consultants and MFM Contracting
Lead Agency (Contact Person)	City of New York – Department of Design and Construction
Principal Investigator	Alyssa Loorya, Ph.D., R.P.A.
Proposed Project Schedule	See Section V

² Contact information for all agencies and individuals is presented in the Communication Plan section.



Map 04: Re-defined APE map (Department of Finance 2018).

CULTURAL RESOURCE REGULATIONS

For cultural resources and structures, the National Historic Preservation Act (NHPA) and the Advisory Council on Historic Preservation (ACHP) define, under ‘Section 106 Regulations’, that federal agencies (and other governmental agencies using federal funds) must consider the effects of their actions on any properties listed on, or determined eligible for listing on, the National Register for Historic Places (NR). Likewise, the State Historic Preservation Act (SHPA) and the (New York) City Environmental Quality Review Act (CEQRA) require that agencies must consider the effects of their actions on any properties listed on, or determined eligible for listing on, the State and City Register for Historic Places.

As this project is funded, in part, with Federal monies, the proposed work will be conducted in accordance with the National Historic Preservation Act of 1966, as amended, and the Advisory Council on Historic Preservation’s “Protection of Historic and Cultural Properties” (36 CFR 800). The investigation will also be conducted pursuant to NY SHPO’s and the New York Archaeological Council Guidelines (NYAC 1994; 2000 and 2002) and NYC LPC’s Guidelines for Archaeological Work in New York City³ (LPC 2018). The cultural resources specialists who will perform this work will satisfy the qualifications noted in the above-mentioned guidelines and specified in 36 CFR 61, Appendix A.

II. ENVIRONMENTAL AND HISTORIC CONTEXT

The Phase IA report does not address any potential for Native American or pre-contact resources. The focus of the IA report is potential historic resources from the eighteenth and nineteenth centuries, which are considerable. This section provides a brief summary of the historic sensitivity of the APE. For detail regarding both the history and previous archaeological discoveries adjacent to the APE please refer to the *Phase IA Archaeological Documentary Study Worth Street Reconstruction, Centre Street to Mott Street New York, New York* (HPI 2013).

The APE is in close proximity to the Five Points archaeological site and similar resources may be found in former nineteenth century property lots within the APE (Maps 04 and 05). The APE has a long occupational history dating post-1750s and it was fully utilized by a combination of farm buildings, tanneries, residential and commercial structures. According to research compiled during the Phase IA the majority of the properties and structures within the APE had a high turnover of occupants but there was a demonstrated consistency of “types of occupants or businesses within these structures” that “often endured over multiple years” lending to the potential significance of resources that may be exposed and recovered (HPI 2013:20).

Portions of the APE pass through several historic property lots, approximately 60 according to the Phase IA study (HPI 2013:10). Additionally, though the APE is presently all modern street bed, designated as Worth Street, Mulberry Street, and Mosco Street, historically the area consisted of several historic streets that no longer exist today. Additionally, portions of the APE were also part of the Collect Pond.

³ A copy of the NYC LPC Guidelines for Archaeological Work in New York City (NYC LPC 2018) will be provided to NYC DDC and ATANE for reference.

The Worth Street APE, formerly known as Anthony Street, was once part of several large tracts that had been granted during the seventeenth and early eighteenth centuries. It is presumed that either farms or tanneries occupied portions of these tracts. The 1813 Grim map depicts farm buildings in portions of the APE (HPI 2013:11). Streets began to be established in the general area of the APE in the 1750s. Structures appear of the Maerschalk map of 1755 along Chatham Street, which was a commercial corridor.

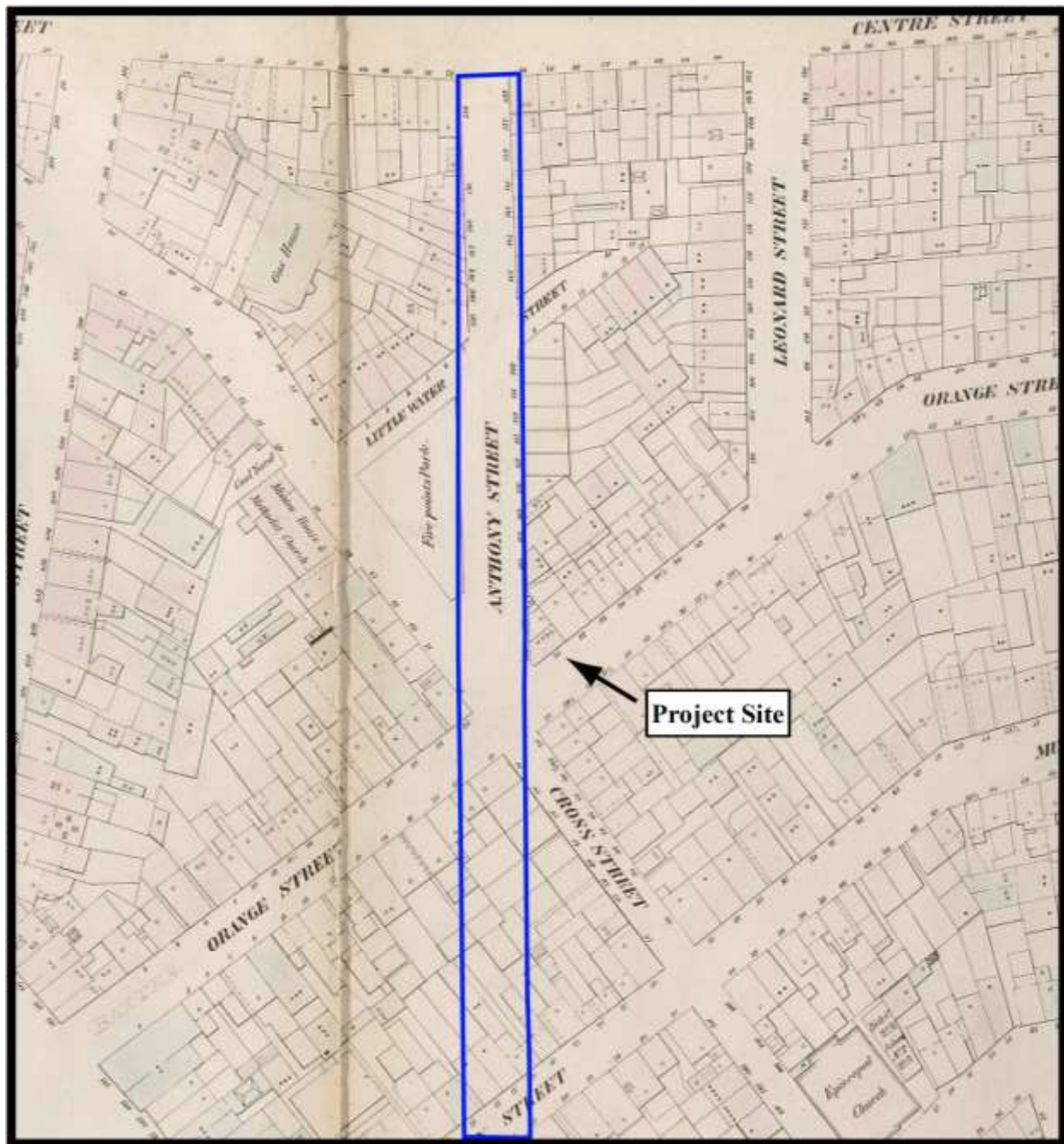
Nineteenth century tax assessment records show that almost the entire APE was developed by 1808 (HPI 2013:1). Documentary research was able to compile a general profile of the area which consisted of a mix of working-class residents and business owners who lived and work on a property alongside renters and boarders. The majority of the lots were typically configured with two houses, one at the front of the property and one in the back, to maximize occupancy and rental income.

By 1817, the Collect Pond was filled in and Anthony Street, present-day Worth Street was laid. This created the “Five Points”, the moniker by which the area would become known. “The creation of Anthony Street spurred two iconic landmarks: (1) the intersection of Anthony, Cross and Orange Street almost immediately became known as “Five Points;” and (2) the triangular shaped parcel bounded by the three streets on the west of the intersection, which with its now truncated lots became a hub for slum housing and prostitution.” (HPI 2013:13). By the 1830s the Five Points would become one of the most densely populated areas within the city; its reputation was one of slum-housing and brothels. Maps 04 and 05 depict the mid-nineteenth century configuration of the APE.

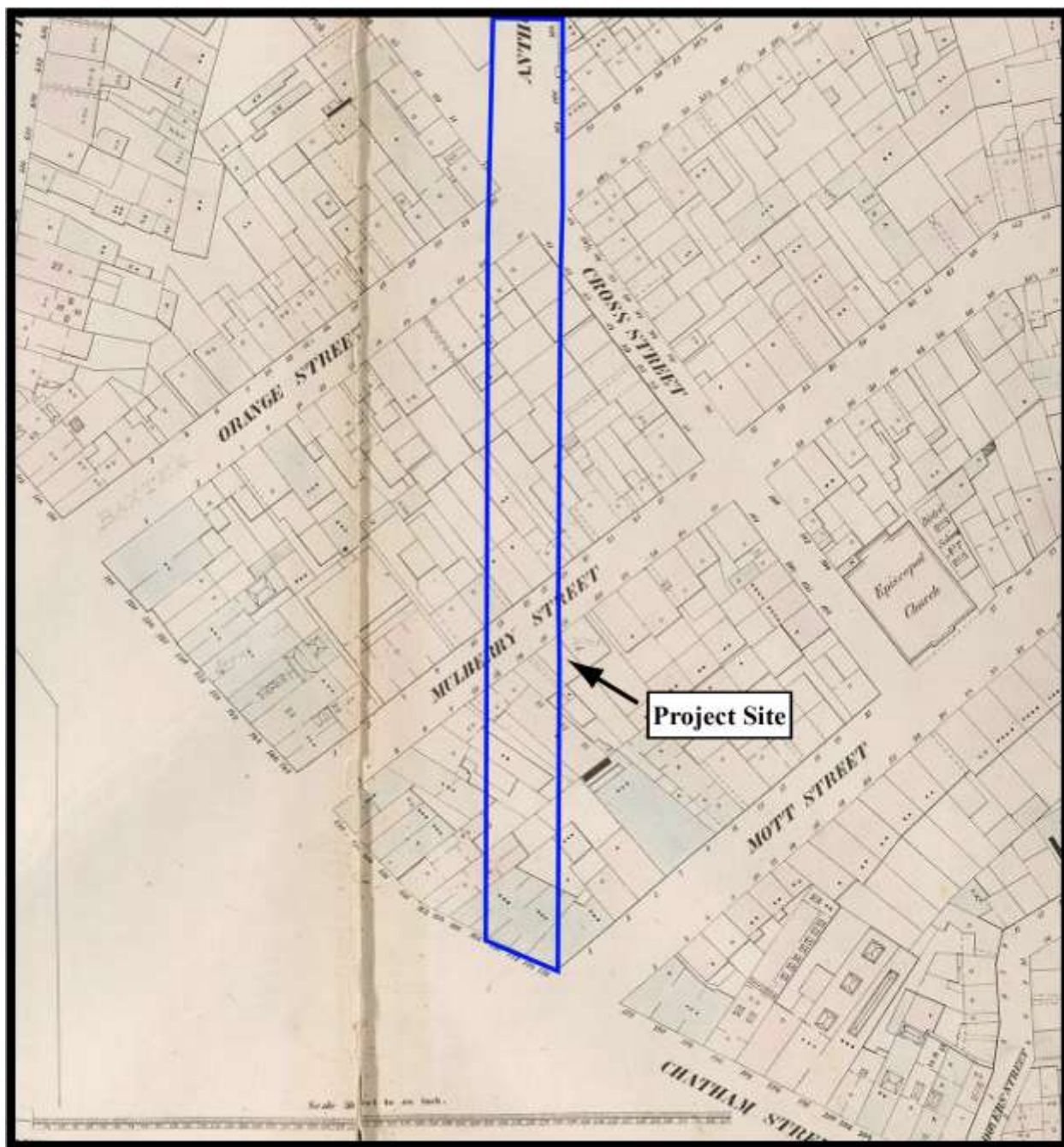
Expected historical resources within the APE could include:

1. Early farm buildings, associated refuse deposits, wells, privies or cisterns.
2. Tannery related resources such as organic soils or refuse pits related to the industry
3. Resources associated with the nineteenth century residential or commercial structures including trash deposits and back yard shaft features such as privies and cisterns that may contain artifact deposits⁴.

⁴ According to the Phase IA Assessment “few wells, which were more expensive to sink, have been discovered on historic lots in this working-class area, suggesting that they also are less likely to be found here” (HPI 2013:19).



Map 04: Western portion of project site on *Maps of the City of New York* (Perris 1853)
 Figure 14a from HPI 2013.



Map 05: Western portion of project site on *Maps of the City of New York* (Perris 1853)
Figure 14b from HPI 2013.

III. RESEARCH DESIGN

The Phase IA assessment considered two questions with regard to potential archaeological resources within the APE. The first question focused on the types of archaeological resources that once were located within the APE and the second question focused on whether these archaeological resources could have survived later disturbances to the APE.

It has been demonstrated that significant archaeological resources can, and have survived, in the City despite significant utility construction episodes. Archaeological monitoring will test whether historic resources remain in the APE as hypothesized by the Phase IA research.

Potential analysis of recovered features or artifact deposits, should they be present, has the potential to shed further light on the historic Five Points neighborhood, the nineteenth century working class residents and the development of New York City. It may also act as a complement to the earlier Five Points archaeological project. More specific research questions can be detailed if archaeological resources are identified.

IV. PROJECT METHODS

PHASE IB ARCHAEOLOGICAL PLAN PROTOCOLS

Phase IB fieldwork is designed to ascertain the presence/absence, type, and extent of archaeological resources within a site. Its ultimate goal is to determine whether significant (i.e., National Register [NR] eligible) resources that could be adversely affected by project construction are extant within the APE. The nature of the project, curb to curb utility replacement within a lower Manhattan street precludes pre-construction testing. Therefore, archaeological monitoring is the proposed methodology for Phase IB Archaeological fieldwork.

The following sets forth the plan for Phase IB archaeological monitoring and investigation for the Worth Street Project. It describes additional mitigation measures that will be undertaken should archaeological resources be encountered during the archaeological investigations, including artifact analysis such as laboratory work, written reports, and further documentary research, if necessary.

ARCHAEOLOGICAL MONITORING

Archaeological monitoring is defined as “the observation of construction excavation activities by an archaeologist in order to identify, recover, protect and/or document archaeological information or materials” (NYAC 2002:2). It is the “archaeological supervision of subsurface construction work to ensure that archaeological resources are not disturbed” LPC 2018:79).

All monitoring activities will follow NY SHPO and New York Archaeological Council’s Guidelines for the Use of Archaeological Monitoring (NYAC 2002), and NYC LPC’s Guidelines for Archaeological Work in New York City (LPC 2018). The archaeologist(s) will maintain drawings, photographs, and descriptions of all encountered resources as well as an up-to date log of all monitoring activities, including the date, time, and duration of all monitoring episodes,

accompanied with a description of the activity being monitored as appropriate.

Archaeological Monitoring will occur throughout the APE once asphalt roadbed and/or concrete surfaces or other paving materials are removed. Removal of the extant pavement surfaces, and other potentially non-sensitive soils do not require archaeological monitoring. Monitoring will occur until the final construction depths are reached in all archaeologically sensitive areas and/or if the archaeological monitor determines the excavation area to have reached sterile soil (with regard to potential for archaeological deposits and resources). Throughout the course of the project the archaeologist(s) will be permitted to temporarily halt construction excavation at regular intervals to examine the soil, photograph and draw stratigraphic profiles as per the NYC LPC Archaeological Guidelines (LPC 2018).

An archaeological monitor is required for each active excavation area within the APE. If excavations are occurring simultaneously in more than one archaeologically sensitive area at a time, additional archaeological monitors will be required to ensure that each excavation area is monitored in accordance with the protocols. The project will provide at least 48 hours' notice prior to the beginning of excavation work in any areas that require archaeological monitoring so that the adequate resources can be provided.

In the event that any archaeological resources are encountered, the archaeologist(s) will halt construction work and inform, NY SHPO and NYC LPC of the potential archaeological deposits or resources, via email. "If resources are encountered, the PI must stop the work and consult with LPC to determine whether further field testing and/or mitigation are necessary" (LPC 2018:44). Any communications with NY SHPO requiring a formal response, such as consultation over archaeological discoveries, must be through the Cultural Resource Information System (CRIS).

NY SHPO and NYC LPC may request the discovery be documented in a Memorandum for the Record (MFR) and may also wish to visit the site. No construction work will occur in the area of the potential discovery until NY SHPO and NYC LPC have responded in writing to acknowledge they have been informed of the discovery and concur that the archaeologist will move forward with the assessment of the potential resources.

The archaeologist will then be allowed time for photography, drawing of plan views and profiles, screening of removed soil for artifacts, removal of soil samples, hand excavation, and any other actions deemed necessary to determine the nature, extent, and potential significance of the discovery. The archaeologist will determine the level of documentation for each discovery. Additional documentary research may be also necessary in order to further understand the potential significance of deposits before a determination by NY SHPO and NYC LPC can be made.

If work stoppages occur, the construction contractor may relocate to an area or task where archaeological monitoring is not required. However, if excavation is to occur in another potentially sensitive area, the archaeological team will provide additional staff, within a minimum 48-hour notification period for staffing changes, to monitor this additional area while work documenting the cultural resource occurs.

If the resources encountered are deemed significant, it will be necessary to further consult with NY SHPO and NYC LPC. All consultation will be in writing. Submissions to NY SHPO must be made through the CRIS, submissions to NYC LPC will be made via email.

If the resources encountered do not appear potentially significant, the on-site professional archaeologist will notify NY SHPO and NYC LPC in writing. Both agencies must respond, in writing before construction may resume. Upon concurrence from NY SHPO and NYC LPC, the archaeologist will notify the ATANE RE and appropriate construction personnel.

GENERAL METHODOLOGY

During all excavation, the construction contractor will aid the archaeological team, as needed. This may include, but is not limited to, meeting all OSHA regulations, pumping water from excavation areas, providing additional shoring to trenches, and machine excavation of non-sensitive levels to further reveal resource(s). Construction personnel will allow the archaeologist access to the excavation area at a maximum of 60-minute intervals, as requested, to enter and observe soils and stratigraphy within the excavation area.

If excavation depths extend below 5 feet (1.5 meters), the archaeologist will observe the excavation from the street level and may request specific soil deposits be temporarily piled beside the excavation in order to closely examine them. It may be necessary to temporarily halt excavation to enter the construction excavation area in order to observe the deeper deposits.

In the event that any archaeological deposits are encountered NY SHPO and NYC LPC must be notified in writing (LPC 2018:C4). All work must halt in the area of the discovery until a response is received from NY SHPO and NYC LPC. Following confirmation from the NY SHPO and NYC LPC, professional standards for excavation, screening, recording of features and stratigraphy, labeling, mapping, photographing, and cataloging will be applied. If intact deposits are identified below 1.5 meters (5 feet), all health and safety concerns will be addressed prior to the archaeologists entering the confined space to examine the deposits.

It is noted that NY SHPO and/or NYC LPC may request a discovery specific work plan for each discovery. If required, the archaeologist will provide an estimate of the time needed to develop said discovery specific work plan. The discovery specific work plan will be submitted the NY SHPO and NYC LPC for approval prior to being implemented. Upon approval, in writing from NY SHPO and NYC LPC, the archaeologist will proceed. No work by the contractor may occur in the area until approval is received, in writing, from NY SHPO and NYC LPC.

Documentation of archaeological deposits may require soil sampling or the hand excavation of features, cultural layers or test units. Screening of soils (i.e. sample percentage) from the excavation will be based upon the judgment of the archaeologist based on the specific deposit. Soils will be screened through ¼ inch-mesh screen and excavated by natural strata or in pre-determined controlled levels. Soils from both the trenches and units will be described using the Munsell color system and standard texture classifications. All artifacts recovered during screening will be retained, with the exception of bulk materials such as concrete rubble, brick, large metal objects, ash coal, cinders, and slag. In the case of such materials, a sample will be described from

each provenience and the remainder will be quantified and discarded in the field. Recovered artifacts will be bagged according to their unique provenience and transported to the laboratory for processing and analysis. An artifact catalog, recording the depth and location of each recovered artifact, will be created. A permanent datum will be established to record depths of any archaeological deposits or features. Soil profiles, cultural features, etc. will be described, photographed in digital format and illustrated by measured drawings in Imperial and metric scale in plan and vertical perspective, as appropriate.

Permanent site datums will be utilized in recording archaeological deposits or features. Due to the size and heavily developed nature of the project area multiple datum points may be employed. Every effort will be made to use the North American Datum 1983-NAV83 with a vertical datum of NAVD-88. However, it is noted that construction circumstances may require in-field adjustments to recording methodologies (for example a deposit or feature located in an extremely constrained space that limits access). General excavation trench monitoring results or discussion of utilities, that do not directly refer to archaeological deposits or features may rely on below ground surface measurements so as not to impede the construction progress and schedule. Additionally, below surface measurements are commonly referenced by the construction contractor and utilized in general documentation of the excavation work.

SPECIFIC ARCHAEOLOGICAL RESOURCE TYPES

SHAFT FEATURES

If shaft features are encountered the archaeologist will halt construction and enter the area to examine the feature. The archaeologist will first clear the area to determine the extent of the feature within the construction boundaries. No excavation will occur within the feature interior. The exposed perimeter of the feature will be archaeologically documented as appropriate via photography and scaled drawings. The archaeologist will notify NY SHPO and NYC LPC of the discovery via email. This email will be followed up with a memorandum for the record and a request for consultation with NY SHPO and NYC LPC.

In consultation with NY SHPO and NYC LPC it may be determined that the feature must be further tested and/or excavated. NY SHPO and NYC LPC may require a discovery specific work plan be developed prior to testing of interior fill. The archaeologist will provide an estimate of the time needed to develop the discovery specific work plan. The discovery specific work plan will be submitted the NY SHPO and NYC LPC for approval prior to being implemented. Upon approval, in writing from NY SHPO and NYC LPC, the archaeologist will proceed.

No work by the contractor may occur in the area until consultation with NY SHPO and NYC LPC has been completed and approval is received, in writing, from both agencies.

BUILDING FOUNDATIONS OR OTHER ARCHITECTURAL FEATURES

If building foundations, or other architectural features are encountered the archaeologist will halt construction and enter the area to examine the feature. The archaeologist may request assistance from the contractor to clear soils from the structural feature. Once cleared the archaeologist will document the feature as appropriate via photography and scaled drawings. The archaeologist will notify NY SHPO and NYC LPC of the discovery via email. This email will be followed up with a memorandum for the record and a request for consultation with NY SHPO and NYC LPC.

In consultation with NY SHPO and NYC LPC a test unit may be excavated by the archaeologist alongside the structure to determine the depth of the feature. The archaeologist will note the materials of which the feature is constructed and may take a sample of the building materials and mortar. In consultation with NY SHPO and NYC LPC mortar samples may be sent for specialized analysis to aid in determining composition of the mortar and dating of the structure.

No construction work may occur in the vicinity of the discovery until consultation with NY SHPO and NYC LPC has been completed and approval is received, in writing, from both agencies.

The project will provide a protected area within the project site or field office to temporarily store equipment and/or material remains recovered from the excavation trenches. Materials remains may require temporary storage prior to transportation to Chrysalis' laboratory facility.

DETERMINATION OF SIGNIFICANCE

If upon further investigation the encountered archaeological resources are determined to be potentially significant, e.g. appearing to meet eligibility criteria for listing on the National Register of Historic Places (NR-eligible), the archaeologist will notify all project shareholders, including, but not limited to, ATANE, NYC DDC, NY SHPO and NYC LPC.

If any NRHP-eligible cultural resources are identified all work will cease in the area of the discovery pending consultation with NY SHPO and NYC LPC and until NR eligibility evaluation (Phase II) and, if necessary, mitigation through data recovery (Phase III) is completed. A scope of work for the potential Phase II and/or III work will be developed in consultation with NY SHPO, NYC LPC and NYC DDC and implemented prior to further construction to retrieve significant information before all or part of the site is impacted by construction. Preparation of a scope of work for potential Phase II and/or Phase III investigation may cause a delay in construction, given the requirement for agency review and approval prior to initiating those tasks.

The specific time required for the documentation effort will be coordinated with the project team. The construction contractor should plan, schedule, and execute their work in a manner such that work stoppages will not result in a total shutdown of any construction work.

Upon completion of the Phase II or Phase III work and receipt of concurrence and approval from NY SHPO and NYC LPC, the archaeologist will notify the construction contractor/manager that work may resume.

LARGE SCALE DISCOVERIES

In the event of a significant large-scale discovery, defined as a significant discovery containing a large volume of materials and/or features that will require additional archaeological excavation for data recovery, all project shareholders including ATANE, NYCS DDC, NY SHPO and NYC LPC, will be consulted to develop a path forward meeting the needs of the potential discovery. Following this consultation, it may be recommended that additional archaeological measures and resources be employed. This may include, but is not limited to, additional staffing, specialist consultants and expanded archaeological testing/excavation such as Phase II or Phase III data recovery.

The ability to bring in a larger or additional archaeological staff and additional resources would allow for a more expeditious approach toward the recovery and documentation of any large-scale discoveries.

In the event of a large-scale discovery:

1. Chrysalis will notify ATANE and NYC DDC. Chrysalis will also notify NY SHPO and NYC LPC.
2. A meeting will be held to discuss how to best address the discovery with. If NY SHPO and/or NYC LPC determines that extensive excavation and recovery are required (i.e. Phase II or Phase III Mitigation), Chrysalis will create a SOW for the specific discovery that includes necessary tasks, time and budget, within ten business days. The SOW will be provided to ATANE and NYC DDC for approval.
3. Upon written approval from ATANE, Chrysalis will bring in the additional resources required to complete the specific task(s).
4. Once the agreed upon tasks of the SOW are completed, any additional resources and services will no longer be required unless further along in the project additional large-scale discoveries are made.

HUMAN REMAINS

The project's APE runs adjacent to the African Burial Ground and the Commons Historic District/United States National Monument and Park. Although the likelihood of uncovering remains associated with this historic area is minimal, there remains a possibility that the project may encounter human remains.

Special consideration and care is required if human remains are uncovered. Any action related to the discovery of human remains is subject to the statute law as defined in the *Rules of the City of New York*, Title 24 - Department of Mental Health and Hygiene, specifically Title 24, Title V, Article 205. In addition, NY SHPO's (Appendix A), NYC LPC regulations regarding human remains and the New York Archaeological Council's (NYAC) policy on the discovery of human remains and items of cultural patrimony as defined by Section 3001 of the Native American Graves Protection and Repatriation Act (NAGPRA) will be taken into consideration – providing they do

not conflict with the City of New York statute regulations. The protocols to be implemented in the event that human remains are discovered are more fully detailed in the human remains section of this document.

ARTIFACT ANALYSIS AND CURATION

All artifacts will be cleaned, catalogued and stored in archival safe materials. Pre-contact and historic artifacts will be analyzed in terms of material type, form, function, and temporal attributes (e.g., Noël Hume 1969, South 1977, Miller 1991). Detailed analysis will include the identification of the Terminus Post Quem (TPQ) of artifacts for each context and generation of mean beginning and end dates for assemblages. This information will be used to establish context and to determine whether such assemblages represent primary or secondary deposits.

Depending of the materials recovered, and in consultation with NY SHPO and NYC LPC a detailed Laboratory Analysis Work Plan may be required. This document would detail the artifact analysis to be undertaken, including specialized analysis by material culture specialists, and recommended specialized conservation. This Laboratory Analysis Work Plan will be submitted to NY SHPO and NYC LPC for approval before work can begin. A separate cost estimate will be provided to ATANE and NYC DDC.

Any artifact collection removed from the project site will be the property of the project site owner, in accordance with current NYC LPC guidelines. It is the responsibility of NYC DDC to arrange for the long-term curation of the collection in an appropriate facility. The New York City Archaeological Repository (NYCAR) may accept significant and representative materials recovered from the site for curation. NYC LPC cannot make this determination until the analysis and report are completed.

Any significant deposits that will be curated at the NYCAR will be prepared in accordance with NYC LPC's curation guidelines (NYC LPC 2018). In accordance with NYC LPC Guidelines all artifacts must be catalogued in a database, to be included in the final report and labelled with a catalog number (see NYC LPC 2018 Section C8 for requirements regarding Archaeological Collections).

There may be archaeological materials and deposits recovered that the NYCAR will not accept for curation. These materials will be returned to NYC DDC. It is the responsibility of NYC DDC to arrange for their storage, curation with another facility or final disposition. The archaeological team will prepare any materials according to the standards of the receiving repository or according to current archaeological standards.

As noted, NYC LPC cannot make a determination if a collection will be accepted for curation at NYCAR until the analysis and report are complete. As a result, the artifact collection cannot be processed for final curation (storage) until a decision regarding the final receiving repository or disposition of the materials is known. NYC DDC and ATANE should note that this must be factored into the project close-out date.

ATANE and NYC DDC will arrange for the transportation of the collection from Chrysalis' laboratory facility to the repository.

REPORT RESULTS

A report documenting the results of the monitoring, analysis, any background and/or documentary research, and any other field efforts will be prepared according to NY SHPO and NYC LPC standards. This report will incorporate the artifact analysis and address research based on the analysis, this may require additional documentary research. In addition, the report will include recommendations regarding the potential National Register eligibility of any artifact deposits and/or features and recommendations for additional investigation or mitigation, as necessary.

As part of the final report process all potentially significant archaeological resources (artifact deposits or features) will be submitted via CRIS as an archaeological site so that it may be assigned a Unique Site Number (USN).

A work plan and outline, including research design and questions, and final report outline, will be developed at the end of fieldwork when the initial significance of the cultural resources can be assessed. This plan, including an estimated schedule, will be submitted to NY SHPO and NYC LPC for approval before work can commence. A separate cost estimate will be provided to ATANE and NYC DDC.

A digital, preliminary draft report will be submitted to ATANE and NYC DDC for initial review. Upon approval, the formal draft report will be submitted digitally to NY SHPO via CRIS and a printed copy to NYC LPC. Upon approval of NY SHPO and NYC LPC, the final version of the report will be uploaded to NY SHPO's CRIS system, and two printed copies and one digital copy will be provided to NYC LPC for their records. Digital copies will be provided to all other parties unless printed copies are requested.

ARCHAEOLOGICAL AWARENESS ORIENTATION

Due to the nature of the site and associated necessary methodology, construction personnel will be relied upon to work with the archaeological team in the identification of archaeological resources and deposits as well as human remains. There will also be areas that are not subject to archaeological monitoring but may still contain archaeological materials or human remains.

Chrysalis will provide an Archaeological Awareness Orientation for all project and construction personnel. This orientation will include historic and archaeological background of the area and the site as well as information regarding the types of resources that may be encountered during this project and how to recognize those resources. This orientation must occur prior to the commencement of any construction excavation activities to ensure the construction contractor understands the nature of the archaeological significance of the area and the procedures of this combined Archaeological Monitoring Plan, Unanticipated Discoveries Plan, and Human Remains Protocol.

UNANTICIPATED DISCOVERIES PLAN

The Unanticipated Discoveries Plan is to be used as a guide for construction personnel during portions of the project that do not require archaeological monitoring. Unanticipated Discoveries are defined as any cultural resources, including human remains, found during construction in any portion of the project site not monitored by the archaeologist. Cultural resource discoveries that require immediate reporting and notification to the archaeological team and the construction coordinator include, but are not limited to, human remains and recognizable, potentially significant concentrations of artifacts, features, or other evidence of human occupation. All project team members and construction foremen should be made aware of this plan.

The ATANE RE will coordinate with the professional archaeologist for implementation of the Unanticipated Discoveries Plan. The ATANE RE will obtain, review, and file on site this Unanticipated Discoveries Plan. The ATANE RE will initiate implementation of the Unanticipated Discoveries Plan by sponsoring an awareness session with the archaeologist, on-site construction management personnel, equipment operators, and laborers.

Cultural resource discoveries that require reporting and notification to the ATANE RE include (but are not limited to):

1. Any human remains including coffins, burial vaults or other evidence of burials.
2. Any recognizable, potential concentrations of artifacts, features, faunal material or other evidence of human occupation.
3. Building or other structural foundations. These may be constructed of wood, stone or brick. It is possible that artifact deposits exist within these features. Foundation walls may be intact, but often only sections of a wall are uncovered and/or remain.

In the event that previously unanticipated archaeological resources are found during construction in any portion of the project site, the following procedures will be followed:

1. If an unanticipated discovery of artifacts or historic structural remains, as defined above, occurs during construction, all work will immediately stop in the area of the find to protect the integrity of the find. Work may not resume in the area of the find until the archaeologist and the ATANE RE has granted clearance.
2. The construction foreman will immediately notify the designated on-site ATANE RE of the find. The ATANE RE will instruct the construction foreman to flag and fence off the area of the discovery to ensure safety and avoidance of impacts.
3. The ATANE RE will immediately notify NYC DDC and the archaeologist of the find. The notification will include the specific location of the discovery within the disturbed area of the project site and the nature of the discovery. The ATANE RE will identify the location and date of the discovery on the project plans.

4. The archaeologist will coordinate an on-site archaeological consultation to evaluate the find. A reasonable amount of time must be given to the archaeologist to not only arrange to return to site (generally within 24 hours) but to complete the assessment of the discovery (generally within 24 of arriving on site). These timeframes may vary based on the nature of the discovery (i.e. size, complexity, etc.).
5. The archaeologist will conduct an on-site assessment of the find. If necessary, the archaeologist will coordinate with the ATANE RE to direct the contractor to flag or fence off the archaeological discovery location and direct the contractor to continue work in another portion of the project area. The contractor will not restart work in the area of the identified archaeological resource until ATANE RE has granted clearance, after receiving word from the archaeologist that the archaeological resource has been fully examined.
6. The archaeologist will then promptly notify the ATANE RE and NYC DDC of the preliminary significance, if any, of the find.

If the discovery is determined to lack potential significance by the archaeologist, the ATANE RE will grant clearance to the contractor to resume work.

If the unanticipated find is determined to be potentially significant, the following procedures will be followed:

1. The archaeologist will promptly notify ATANE, NYC DDC, NY SHPO and NYC LPC of the find. This notification will explain why the archaeologist believes the resource to be significant and define a SOW for further evaluating the significance of the resource and project effects on it. All work to evaluate significance will be confined to the area of potential effect.
2. The archaeologist will conduct a more detailed assessment of the material remains significance and the potential effect of construction.
3. The archaeologist will document the find in accordance with the guidelines presented in the Archaeological Plan/Protocol.
4. ATANE will notify other parties, as directed by NY SHPO and NYC LPC, or as indicated by City/State law.
5. If the find is determined to be significant, and continuing construction may damage more of the resource, then the archaeologist, ATANE and NYC DDC will consult with NY SHPO and NYC LPC, and project shareholders regarding further mitigation and appropriate measures for recovery and/or appropriate measures for site treatment. These measures may include:

- Formal archaeological evaluation of the site
 - Visits to the site by NY SHPO and/or NYC LPC and other parties
 - Preparation of a mitigation plan for approval by NY SHPO and NYC LPC
 - Implementation of the mitigation plan
 - Approval to resume construction following completion of the fieldwork component of the mitigation plan
6. If the find is determined to be isolated or completely disturbed by previous construction activities, the archaeologist will consult with the ATANE RE, NYC DDC, NY SHPO and NYC LPC and will request approval to resume construction, subject to any further mitigation that may be required by NY SHPO and NYC LPC.
 7. The ATANE RE will notify the Construction Contractor of clearance to resume work.

HUMAN REMAINS PROTOCOL

The project's APE runs adjacent to the African Burial Ground and the Commons Historic District/United States National Monument and Park. Although the likelihood of uncovering remains associated with this historic area is minimal, there remains a possibility that the project may uncover human remains. This Protocol is applicable to all instances when potential human remains are exposed, both when the archaeological team is on site and when the archaeological team is not on site.

Special consideration and care is required if human remains are uncovered. Any action related to the discovery of human remains is subject to the statute law as defined in the *Rules of the City of New York*, Title 24 - Department of Mental Health and Hygiene, specifically Title 24, Title V, Article 205. In addition, NY SHPO's (Appendix A), NYC LPC regulations regarding human remains and the New York Archaeological Council's (NYAC) policy on the discovery of human remains and items of cultural patrimony as defined by Section 3001 of the Native American Graves Protection and Repatriation Act (NAGPRA) will be taken into consideration – providing they do not conflict with the City of New York statute regulations. The protocols to be implemented in the event that human remains are discovered are more fully detailed in the human remains section of this document.

As per New York City law (Title 24, Title V, Section 205.1 (a)) a burial is defined as a “means (of) interment of human remains in the ground or in a tomb, vault, crypt, cell or mausoleum, and includes any other usual means of final disposal of human remains other than cremation” (Rules of the City of New York 2015). For the purposes of this project and as per New York City law (Title 24, Title V, Section 205.1 (c)), human remains are defined as “any part of the dead body of a human being but does not include human ashes recovered after cremation” (Rules of the City of New York 2015). This includes any bone fragments, a single bone or tooth, partial skeleton, etc.

As per New York City law (Title 24, Title V, Section 205.7) a permit must be obtained for the disinterment of any human remains. A funeral director must obtain this permit. No human remains may be removed from the ground, from the area where they are first exposed, until this permit has been obtained. No construction work can occur in this area while the permit is being obtained and until the archaeologist, in consultation with LPC, gives clearance for work to proceed.

In any area that human remains are discovered, the ATANE RE and/or the on-site Construction Foreman or Supervisor will flag or fence off the area of the discovery, taking all practical measures to protect the discovery from damage and disturbance.

The Construction Contractor should plan to move to another location if human remains are exposed, as work will need to be temporarily halted in the area of the remains. If the contractor moves to an area that requires archaeological monitoring, additional archaeological personnel will be required on site.

INITIAL PROTOCOL

- If suspected human remains are exposed, the archaeologist in conjunction with the ATANE RE and/or the on-site Construction Foreman or Supervisor will immediately halt all work in the area of the discovery.
- If suspected human remains are exposed in an area that has not been previously identified for archaeological monitoring, i.e. if the archaeologist is not on site, the ATANE RE and/or the on-site Construction Foreman or Supervisor will immediately halt all work in the area of the discovery and notify the archaeologist. The archaeologist will return to site within 24 hours of notification. The ATANE RE and/or the on-site Construction Foreman or Supervisor will cover and protect the discovery from any further disturbance.
- The archaeologist (once on site) will enter the construction area to inspect the discovery. Chrysalis' Forensic Anthropologist may be called to site to make a determination if the skeletal remains are human or not.
- If the identified skeletal material is not human, the archaeologist will inform the ATANE RE and/or the on-site Construction Foreman or Supervisor that work may continue.
- If the skeletal material is human, the archaeologist will inform the ATANE RE and/or the on-site Construction Foreman or Supervisor that work must cease in the area, and the full remainder of the human remains protocol will be implemented.

HUMAN REMAINS PROTOCOL

At all times, human remains must be treated with the utmost dignity and respect. The following procedures will be followed once it is confirmed that human remains have been exposed:

1. The ATANE RE will notify the NYC DDC. Chrysalis will notify NY SHPO and NYC LPC.
2. The ATANE RE will immediately notify the New York City Police Department (NYPD) and the archaeologist will notify the Medical Examiner's office (OME) of the find. The project will cooperate with the OME and NYPD, providing access to the site if required.
3. Once the NYPD and OME have determined they have no concerns regarding the discovery⁵, the ATANE RE will direct the archaeological team to proceed with an initial assessment of the remains, including if the remains represent an intact burial, multiple burials, or partial skeleton or fragmentary skeletal remains, and the potential effect of construction.
4. Chrysalis will draft a Memorandum to LPC detailing the discovery, including recommendations as to how to proceed.

⁵ NYC Department of Health requires that this be obtained in writing.

5. It is the preference of NY SHPO and NYC LPC that human remains, remain in place and not be disturbed, if possible. Due to the nature and location of the project, it is assumed that removal of the human remains may be necessary. Permits from the City of New York Department of Health and Mental Hygiene (DOH) are necessary for the disinterment and disposition of any human remains. Permits are required for intact burials, partial burials, and fragmentary remains.
6. Only a funeral director can obtain the permits from DOH. Chrysalis will contact and coordinate with the Funeral Director to obtain all necessary permits.
7. The ATANE RE will notify any parties, including next of kin, if known, as directed by the NYC LPC or as indicated by City/State law.
8. Once the proper permits have been obtained, the archaeological team will proceed as appropriate depending on the context of the discovery and based on consultation with NY SHPO and NYC LPC.

PROTOCOL FOR FRAGMENTARY HUMAN REMAINS

If the exposed skeletal remains are determined to be fragmentary and do not represent a partial or intact skeleton, the following procedures will be implemented:

1. Chrysalis will begin a detailed archaeological assessment of the discovery. This may include photography, scaled drawings and eventual removal of the remains. Only the archaeologist or Forensic Anthropologist may excavate identified human remains.
2. Once this is completed and the fragmentary remains have been removed, the archaeologist will further investigate the area to assess if any additional remains are present.
3. If no further human remains are present, the archaeologist will notify the ATANE RE and/or the on-site Construction Foreman of Supervisor that work may continue.

PROTOCOL FOR PARTIAL BURIALS OR INTACT AND IN SITU HUMAN REMAINS

If it is determined that intact interments are present and may be disturbed by continuing construction, the archaeologist will consult with the NY SHPO and NYC LPC and the project regarding additional measures to avoid or mitigate further damage. The following protocol will be followed:

1. Chrysalis' Forensic Anthropologist will further assess the burial and begin documentation. Only the archaeologist or Forensic Anthropologist may excavate human remains that have been identified.
2. Chrysalis will consult with NY SHPO and NYC LPC and the project regarding potential additional mitigation measures;

3. Chrysalis will prepare and submit a mitigation plan for the disinterment, documentation and analysis of the human remains. This will be submitted to NY SHPO and NYC LPC for approval.
4. Any disinterment will be conducted by and/or under the supervision of the Forensic Anthropologist following the procedures detailed in the mitigation plan.
5. Depending on the scale of the discovery, additional archaeological personnel may be required to assist with archaeological tasks on site.
6. If any burials are to remain *in situ*, the project will assist as necessary in ensuring they are protected.

Once an area has been documented and cleared of human remains that are to be disinterred or any burials to remain *in situ* are appropriately protected, the archaeologist and the ATANE RE will inform the project that construction may resume.

All human remains will be brought to the Chrysalis' laboratory facility in Brooklyn, NY. Final disposition of the remains following conclusion of the project will be arranged with the project.

V. ARCHAEOLOGICAL SCHEDULE AND PROJECT MANAGEMENT

As this is a monitoring project, the time to complete field work is dependent upon the schedule of the construction contractor. Chrysalis has no input or control over the schedule of the contractor.

It is noted that:

1. Chrysalis needs a minimum of 72 hours' notice to schedule personnel to be available for fieldwork.
2. Chrysalis requires 24 hours' notice for cancellation of personnel to monitor excavation work.

Calendar dates cannot be provided for the completion of field work. Additionally, time and schedule estimates cannot be made for laboratory work or report writing as this is dependent upon whether or not the project encounters any archaeological deposits or other resources. A proposed schedule for laboratory work and final report production will be provided following completion of archaeological monitoring.

VI. COMMUNICATION PLAN

Parties to be notified and consulted are noted throughout the Archaeological Work Plan. Contact information for all parties is listed below. All formal communication will be in writing, via email, and follow-up with phone calls, if necessary and/or time constraint. Chrysalis will provide the team with a weekly email update regarding the monitoring project.

CONTACT INFORMATION

Chrysalis Archaeology

Alyssa Loorya, Ph.D., R.P.A., Principal Investigator
Chrysalis Archaeological Consultants, Inc.
4110 Quentin Road
Brooklyn, New York 11234-4322
Phone: (718) 645-3962
Cell: (347) 922-5581
Email: aloorya@chrysalisarchaeology.com

Christopher Ricciardi, Ph.D., R.P.A., Project Manager
Chrysalis Archaeological Consultants, Inc.
4110 Quentin Road
Brooklyn, New York 11234-4322
Phone: (718) 645-3962
Email: cricciardi@chrysalisarchaeology.com

ATANE Design and Construction Consultants

Hesham Kotby, Vice President
ATANE Engineers & Land Surveyors P.C.
40 Wall Street, 11th Floor
New York, New York 10005-1357
Phone: (212) 747-1997 ext. 573
Cell: (646) 739-7043
Email: hkotby@ATANE.net

Magdy Elkafafi, Resident Engineer
ATANE Engineers & Land Surveyors P.C.
40 Worth Street, Suite 821
New York, New York 10013
Phone: (646) 559-2264
Cell: (646) 772-8849
Email: melkafafi@ATANE.net or worthstreetfieldoffice@gmail.com

NYC – Department of Design and Construction:

Dushyant Rajput, P.E., Engineer-In-Charge
NYC DDC - Manhattan Construction
40 Worth St. – 8th Floor -Suite # 836
New York, New York 10013
Email: RajputDu@ddc.nyc.gov

MFM Contracting - Construction Company:

Michael Belling, P.E., Project Manager
Cell: (631) 514-9675
Email: mbelling@mfmcontracting.com

John Rinaldi, Site Foreman
jrinaldi@mfmcontracting.com

NYS – Historic Preservation Office:

Philip Perazio
New York State Office of Parks, Recreation and Historic Preservation
Historic Preservation Field Service Bureau
Peebles Island, P.O. Box 189
Waterford, New York 12188-0189
Phone: 518-268-2175
Email: philip.perazio@parks.ny.gov

NYC – Landmarks Preservation Commission:

Amanda Sutphin, Director of Archaeology
City of New York – Landmarks Preservation Commission
Municipal Building
One Center Street – 9th Floor
New York, New York 10007
Phone: (212) 669-7823
Email: asutphin@lpc.nyc.gov

NYC – Office of the Medical Examiner:

Bradley Adams
City of New York – Office of the Medical Examiner
520 1st Avenue
New York, New York 10016-6499
212.447.2760 or 646.879.7873
Email: badams@ocme.nyc.gov

NYC – Police Department:

New York City Police Department
5th Precinct
19 Elizabeth Street
New York, NY, 10014
(212) 334-0711

REFERENCES

Chrysalis Archaeological Consultants

- 2005 *Columbus Park; New York, (New York County) New York – Phase 1A and Partial Monitoring Report*

City of New York

- 2015 Rules of the City of New York.

City of New York - Department of Finance

- 2018 DOF – Digital Tax Map. <http://gis.nyc.gov/taxmap/map.htm>

City of New York – Landmarks Preservation Commission.

- 2018 Guidelines for Archaeological Work in New York City. Report on file with the City of New York – Landmarks Preservation Commission. New York, New York.

Historical Perspectives, Inc

- 2013 Phase IA Archaeological Documentary Study Worth Street Reconstruction, Centre Street to Mott Street New York, New York NYC Department of Design and Construction NYCLPC # DOT/HWMWTCA7E

New York Archaeological Council.

- 1994 Standards for Cultural Resource Investigations and the Curation of Archaeological Collections in New York State. Report on file with the New York State Office of Parks, Recreation and Historic Preservation. Albany, New York.
- 2000 Cultural Resource Standards Handbook: Guidance for Understanding and Applying the New York Standards for Cultural Resource Investigations. Report on file with the New York State Office of Parks, Recreation and Historic Preservation. Albany, New York.
- 2002 Guidelines for the Use of Archaeological Monitoring as an Alternative to Other Field Techniques. Report on file with the New York State Office of Parks, Recreation and Historic Preservation. Albany, New York.

New York State Office of Parks, Recreation and Historic Preservation.

- 2018 State Historic Preservation Office/New York State Office of Parks, Recreation and Historic Preservation Human Remains Discovery Protocol.

United States Geological Survey

- 2016 USGS US Topo 7.5 - minute map for Jersey City, NJ-NY.

Appendix A:
New York State Office of Parks, Recreation and Historic Preservation –
Human Remains Protocol

**State Historic Preservation Office/
New York State Office of Parks, Recreation and Historic Preservation
Human Remains Discovery Protocol
(August 2018)**

If human remains are encountered during construction or archaeological investigations, the New York State Historic Preservation Office (SHPO) recommends that the following protocol is implemented:

- Human remains must be treated with dignity and respect at all times. Should human remains or suspected human remains be encountered, work in the general area of the discovery will stop immediately and the location will be secured and protected from damage and disturbance.
- If skeletal remains are identified and the archaeologist is not able to conclusively determine whether they are human, the remains and any associated materials must be left in place. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if they are human.
- No skeletal remains or associated materials will be collected or removed until appropriate consultation has taken place and a plan of action has been developed.
- The SHPO, the appropriate Indian Nations, the involved state and federal agencies, the coroner, and local law enforcement will be notified immediately. Requirements of the coroner and local law enforcement will be adhered to. A qualified forensic anthropologist, bioarchaeologist or physical anthropologist will assess the remains in situ to help determine if the remains are Native American or non-Native American.
- If human remains are determined to be Native American, they will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO and the Indian Nations. The involved agency will consult SHPO and the appropriate Indian Nations to develop a plan of action that is consistent with the Native American Graves Protection and Repatriation Act (NAGPRA) guidance. Photographs of Native American human remains and associated funerary objects should not be taken without consulting with the involved Indian Nations.
- If human remains are determined to be non-Native American, the remains will be left in place and protected from further disturbance until a plan for their avoidance or removal can be generated. Please note that avoidance is the preferred option of the SHPO. Consultation with the SHPO and other appropriate parties will be required to determine a plan of action.
- To protect human remains from possible damage, the SHPO recommends that burial information not be released to the public.



Parks, Recreation, and Historic Preservation

ANDREW M. CUOMO
Governor

ROSE HARVEY
Commissioner

November 15, 2018

Mr. Dushyant Rajput
NYC Department of Design and Construction
40 Worth Street
Room 836
New York, NY 10013

Re: HUD
HWMWTCA7E - Worth Street Reconstruction
Borough of Manhattan, New York County, NY
11PR04244

Dear Mr. Rajput:

Thank you for requesting the comments of the New York State Historic Preservation Office (SHPO). We have reviewed the submitted materials in accordance with Section 106 of the National Historic Preservation Act of 1966. These comments are those of the SHPO and relate only to Historic/Cultural resources.

SHPO has reviewed *Phase IB Archaeological Monitoring Plan, Unanticipated Discoveries Plan and Human Remains Protocol for The Reconstruction of Worth Street from Hudson Street to Park Row, Borough of Manhattan, New York County, New York* (Chrysalis Archaeological Consultants, 14 November 2018).

Thank you for making the requested revisions. We concur with the revised plan. In addition, we agree with the Landmarks Preservation Commission (Sutphin, 15 November 2018) that a Phase IA assessment should be completed for the addendum area to the original project APE.

If you have any questions, please don't hesitate to contact me.

Sincerely,

Philip A. Perazio, Historic Preservation Program Analyst - Archaeology Unit
Phone: 518-268-2175
e-mail: philip.perazio@parks.ny.gov

via e-mail only

cc: Magdy Elkafafi, ATANE; Alyssa Loorya and Chris Ricciardi, Chrysalis
Mihir Shah, DDC; Amanda Sutphin, LPC

Division for Historic Preservation

P.O. Box 189, Waterford, New York 12188-0189 • (518) 237-8643 • www.nysparks.com

ARCHAEOLOGY

Project number: DEPARTMENT OF TRANSPORTATION / HWMWTCA7E
Project: Worth Street Reconstruction
Date received: 11/13/2018

Comments: as indicated below. Properties that are individually LPC designated or in LPC historic districts require permits from the LPC Preservation department. Properties that are S/NR listed or S/NR eligible require consultation with SHPO if there are State or Federal permits or funding required as part of the action.

This document only contains Archaeological review findings. If your request also requires Architecture review, the findings from that review will come in a separate document.

Comments:

The LPC is in receipt of the revised, "Phase IB Archaeological Monitoring Plan, Unanticipated Discoveries Plan and Human Remains Protocol for the Reconstruction of Worth Street, New York, New York," prepared by Chrysalis Archaeological Consultants and dated November 14, 2018.

The LPC notes that the requested changes have been made to the scope. However, we recommend that a Phase IA be completed for the new project area. Archaeological monitoring should occur within this area if construction will be underway in those areas before the research can be reviewed by NYSHPO and LPC.

Cc: NYSHPO



11/15/2018

SIGNATURE
Amanda Sutphin, Director of Archaeology

DATE

File Name: 27700_FSO_ALS_11142018.doc

Appendix C:

Phase IA Addendum Conveyances

Block 164(formerly Block 161), Lots 61, 62, 63, 64, 65, 66

Table C.1: Block 164, Lot 61 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Kingston, John and Rachel	Wells, Obadiah	11/17/1763	36	467	61,62,63	
Block 161	Dunlap, James and Rachel	Strang, John	09/15/1803	65	218	61	1/2 Interest
Block 161	Marsells, Theophilus, Catherine	Mahoney, Charles	09/02/1809	84	86	61	
Block 161	Mahoney, Charles, Margaret	Fleming, Walter	09/02/1809	84	89	61	
Block 161	Fleming, Walter, Bidy	Dinninger, Christopher	09/02/1809	84	92	61	
Block 161	Dinninger, Christopher, Mary	Gilmore, Charles	12/27/1813	104	146	61	
Block 161	Gilmore, Charles, Elizabeth	Johnston, Richard	10/13/1815	111	321	61	
Block 161	Strang, John, Sarah	Strang, Henry	01/17/1816	114	7	61	
Block 161	Hubbard, Ruggles (Sheriff), Strang, John (Interest of)	Ash, Thomas	10/02/1817	124	13	61	
Block 161	Strang, Henry, Ann Eliza	Holmes, Eldad, Irad	12/18/1817	123	575	61	
Block 161	Johnston, Martha	Brower, Abraham P, Trutsee for	11/20/1818	132	47	61	1/3 Interest

		Johnston, Richard W, Julia M					
Block 161	Waring, Henry	Platt, George W	09/24/1830	266	258	61	
Block 161	Southall, Julia M Richard W, Heirs & Devisees of Johnston, Richard, Southall, John W	Platt, George W	09/24/1830	266	260	61	
Block 161	Hawley, Irad, Sarah	Guinaud, Francis C	03/02/1846	474	130	61	
Block 161	Guinaud, Francis C, Matilda	Munch, George, Martin	04/16/1853	640	11	61	
Block 161	Platt, George W, Eliza	Phelps, William	12/29/1853	654	303	61	
Block 161	Munch, George, Maria, Martin, Catharine	Evers, Frederick	01/21/1857	726	97	61	
Block 161	Evera, Frederick, Ellen	Bischoff, Henry	03/06/1863	872	276	61	
Block 161	Bischoff, Henry, Amalia	Steinmetz, Michael	03/16/1866	961	250	61	
Block 161	Phelps, William, Mary S	Cassin, James	01/16/1871	1155	565	61	
Block 161	Steinmetz, John M	Weber, Andrew A	01/24/1872	1192	555	61	

Block 161	Weber, Andrew A, Genevefa	Mittnacht, George M	07/24/1872	1213	639	61	
Block 161	Paulding, Gouverneur, Kemble, Gouverneur Jr, Paulding, James N, Kemble, Peter, Firm of Paulding Kemble and Company, Kemble, Julia, Paulding, Emily, Kemble, Victorine	Mittnacht, George M	11/25/1873	1269	332	61	
Block 161	Conner, William C (Sheriff), Wikins, Henry (Interest of)	Jones, John C	03/14/1876	1343	463	61	
Block 161	Jones, John C	Brown, Stephen E	05/13/1876	1366	426	61	
Block 161	Shafer, Ebenezer B (Referee), John M Steinmetz et al Defendants	Corbett, Otis	11/30/1878	1473	259	61	
Block 161	Browne, Stephen E	Corbett, Otis	12/02/1878	1474	290	61	
Block 161	Corbett, Otis, Mary Amelia	Lehmann, Julius C	04/07/1879	1495	14	61	
Block 161	Ledwith, James P (Referee),	Corbett, Otis	04/07/1879	1495	16	61	

	James Cassin et al Defendants						
Block 161	Watson, William (Referee), Julius C Lehmann et al Defendants	Emmerich, Francis G	04/01/1880	1531	281	61	
Block 161	Lehmann, Julius C, Elizabeth	Phelps, William	04/01/1880	1531	284	61	
Block 161	Phelps, William, Mary S	Emmerich, Francis G	04/01/1880	531	286	61	
Block 161	Emmerich, Francis G, Emilie	Emmerich, Rudolph F	09/22/1886	1978	476	61	
Block 161	Emerich, Rudolph F, Louisa	Stewart & Potter Company	11/9/1900	57	391	61	
Block 161	The Stewart & Potter Company	The Worth Company	12/27/1903	90	24	61	
Block 161	Worth Company	Second Avenue Railroad Company	10/17/1910	129	431	61	Consent
Block 161	Worth Company	Trageser Realty Co Inc	3/3/1926	3526	239	59, 61	
Block 161	Trageser Realty Co Inc	Atlantic District of the Evangelical Lutheran Synod of Missouri	1/7/1947	4487	26	61	

		Ohio and Other States					
Block 161	City of New York		12/2/1969			Whole Block	
Block 164	Atlantic District of the Lutheran Church	True Light Lutheran Church	3/14/1975	337	1273	61	D

Table C.2: Block 164, Lot 62 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Kingston, John, Rachel	Wells, Obadiah	11/17/1763	36	467	61, 62, 63	
Block 161	Wells, Obadiah, Abigail	Jay, Frederick	12/01/1784	42	128	62	
Block 161	Lawler, William, Elizabeth	Lawler, Timothy	03/07/1799	56	251	62	
Block 161	McKenna, Timothy Lawler (or) McKenna, Mary	Lyon, Nicholas	04/09/1800	58	60	62	
Block 161	Lyon, Nicholas B, Rachel	Raymond, Francis	04/30/1818	128	27	62	
Block 161	Hallock, Elizabeth, Raymod, Francis, William A, Heirs of Raymond, Francis, Raymond Ann, Hallock	Gilmartin, John	05/10/1843	435	364	62	

	Horace, Raymond Ruth						
Block 161	Gilmartin, John, Ann	Gilmartin, Daniel	05/18/1843	435	366	62	
Block 161	Gilmartin, Daniel	Gilmartin, Thomas	08/09/1861	842	316	62	
Block 161	Gilmartin, Thomas	Gilmartin, Catharine, John T, Anna	11/26/1861	849	172	62	
Block 161	Gilmartin, John T	Caponigri, Pasquale	5/2/1900	58	191	62	Lease
Block 161	Gilmartin, John T	Caponigri, Pasquale	4/17/1905	93	180	62	Lease
Block 161	Gilmartin, John T	Micheli, Guiseppe C	5/31/1910	127	331	62	Lease
Block 161	Micheli, Giuseppe C	Micheli, Theresa	4/12/1911	133	221	62	Asst of Lease L 127 Cp 331
Block 161	Colgan, John B (Exr & Trus of) Bank of New York and Trust Company (Trustee)	Jafs Realty Corporation	1/15/1929	3696	432	62	
Block 161	Jafs Realty Corporation	Peirano, Stephen J	1/25/1954	4866	693	62	
Block 161	Peirano, Stephen J	Jafs Realty Corporation	1/25/1954	4866	699	62, 63	
Block 161	Peirano, Stephen J	Jafs Realty Company	6/5/1957	5005	76	62, 63	
Block 161	Jafs Realty Company	Jafs Realty Company	5/11/1966	55	31	62,63	D

Block 161	City of New York		12/2/1969			Whole Block	
Block 164	Jafs Realty Co, Peirano John, Peirano Catherine, Peirano Stephen, Peirano, Stephen J	Jamay Realty Corporation	6/17/1970	176	670	62	D
Block 164	Peirano, Stephen J (Deed)		7/6/1971	209	1434	62	NY State Release of Estate Tax
Block 164	Peirano, Stephen J (Deed)		7/6/1971	209	1436	62	NY State Release of Estate Tax
Block 164	Jamay Realty Corporation	Jamay Limited Partnership	8/6/1998			62	Deed
Block 164	Wong Kong	Ng Yip, Shuen	8/6/2008			62	Deed

Table C.3: Block 164, Lot 63 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Kingston, John, Rachel	Wells, Obadiah	11/17/1763	36	467	61,62,63	
Block 161	Adams, John	Beekman, John	08/12/1771	39	138	63	
Block 161	All, Adam, Anoshel	Dinninger, Christine, Mary	05/20/1809	83	81	63	
Block 161	Dinninger, Christopher, Mary	Warner, Jacob	05/20/1809	83	84	63	

Block 161	Warner, Jacob, Catharine	Greenebach, John, Nicholas	10/30/1815	111	389	63	
Block 161	Grenzebach, John N (Exrs of)	Beach, Lewis, Alvord, Alonza A, Grenzebach, Margaret	05/29/1839	397	201	63	
Block 161	Alvord, Alonzo A Susan, Beach, Lewis Sophia, Grenzeback, Margaret	Embury, Peter, Manley, James R, Trustee of Cutter, Maria	06/15/1840	408	146	63	
Block 161	Alvord, Alonzo A Susan, Beach, Lewis, Sophia, Grenzeback, Margaret	Gilmartin, John	04/29/1842	424	453	63	3/4 Interest
Block 161	Embury, Peter, Manley, James R, Trustee of Cutter, Maria, Cutter, Smith Maria	Gilmartin, John	04/29/1842	424	457	63	1/4 Interest
Block 161	Winter, Mary, Widow of Winter, Joseph	Gilmartin, John	11/15/1842	432	82	63, 64	1/5 Interest
Block 161	Gilmartin, Thomas	Gilmartin, William	12/14/1859	791	551	63, 64	Quit Claim
Block 161	Gilmartin, William	Gilmartin, Thomas	12/07/1860	823	467	63, 64	Quit Claim
Block 161	Gilmartin, Daniel	Brennan, Owen	07/30/1861	844	124	63, 64	1/5 Int.

Block 161	Brennan, Owen, Catharine	Gilmartin, Daniel	03/11/1864	899	125	63, 64	
Block 161	Gilmartin, Daniel, Catharine	Gilmartin, Anna C	03/11/1864	899	128	63, 64	1/5 Int.
Block 161	Robinson, Hamilton W, Referee Daniel Gilmartin et al Defendants	Bonardt, Louis	05/16/1865	936	346	63, 64	
Block 161	Bonard, Louis (Testator)	The American Society for the Prevention of Cruelty to Animals	12/05/1872	1241	11	63, 64	Will
Block 161	American Society for the Prevention of Cruelty to Animals in the City of New York	Marks, Flora	04/28/1892	9	431	63, 64	936 Cp 348
Block 161	Marks, Flora	Mezzadri, Evardo	10/19/1892	10	488	63, 64	Lease
Block 161	Marks, Flora	Mezzadri, Evardo	01/25/1895	27	323	63, 64	Lease
Block 161	Marks, Flora	Peirano, John B	04/10/1896	34	485	63, 64	
Block 161	Peirano, John B	Mezzadri, Evardo	11/6/1902	74	54	63, 64	Lease
Block 161	Peirano, Stephen J, Rose	Jafs Realty Company	3/1/1949	4612	343	63, 64	

Block 161	Jafs Realty Corporation	Peirano, Stephen J	1/25/1954	4866	695	63	
Block 161	Peirano, Stephen J	Jafs Realty Corporation	1/25/1954	4866	699	62, 63	
Block 161	Peirano, Stephen J	Jafs Realty Company	6/5/1957	5005	76	62, 63	
Block 161	Jafs Realty Company	Jafs Realty Company	5/11/1966	55	31	62,63	D
Block 161	City of New York		12/2/1969			Whole Block	
Block 164	270 Associates	270 West End Tenants Co	5/5/1971	Libre	Page	63	Deed

Table C.4: Block 164, Lot 64 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Kingston, John, Rachel R	Garrit, Magnus	10/04/1786	44	17	64	
Block 161	Winter, Joseph	Shaw, William, Winter, Gabriel, Bolton, Thomas	01/09/1812	96	44	64	
Block 161	Ferris, Benjamin (Sheriff) Winter, Joseph (Interest of)	Bogert Cornelius I, Ogden, Thomas L, Dey, Anthony	05/20/1812	98	403	64	
Block 161	Garritt, Magnus	O'Neal, John	10/06/1817	123	174	64	

Block 161	Bogert, Cornelius J, Ogden, Thomas L, Dey, Anthony	Shaw, William, Winter, Gabriel, Bolton, Thomas	08/04/1820	146	70	64	
Block 161	Garret, John	Jackson, Andrew	10/20/1820	147	254	64	
Block 161	Wilson, James Ann, Henry David Jennette	Craig, John	11/15/1842	432	76	64	1/5 Interest
Block 161	Garrit, Gilbert Mary, Hopps, Joseph Catherine, Bellamy, Elizabeth, Arnold, Moses Ann, Hyer, Gordon, Margaret A, Kling, George Margaret, Craig John	Gilmartin, John	11/15/1842	432	77	64	4/5 Interest
Block 161	Garrit, Estatia, Widow of Garrit, John	Gilmartin, John	11/15/1842	432	80	64	Release of Dower
Block 161	Shaw, William, Winter, Gabriel, Bolton, Thomas	Gilmartin, John	11/15/1842	432	81	64	1/5 Interest
Block 161	Winter, Mary, Widow of Winter, Joseph	Gilmartin, John	11/15/1842	432	82	63, 64	1/5 Interest

Block 161	Shaw, William, Winter, Gabriel, Bolton, Thomas	Gilmartin, John	11/15/1842	432	83	64	
Block 161	Jackson, Andrew, Deborah	Gilmartin, John	11/15/1842	432	85	64	
Block 161	Garret, John	Winter, Joseph	12/15/1842	431	322	64	
Block 161	Garrit, Gilbert Mary, Hopps Joseph Catherine, Bellamy, Elizabeth, Arnold Moses Ann, Hyer Gordon, Margaret A, Kling, George, Margaret, Craig, John	Gilmartin, John	05/18/1843	436	222	64	4/5 Interest
Block 161	Gilmartin, Thomas	Gilmartin, William	12/14/1859	791	551	63, 64	Quit Claim
Block 161	Gilmartin, William	Gilmartin, Thomas	12/07/1860	823	467	63, 64	Quit Claim
Block 161	Gilmartin, Daniel	Brennan, Owen	07/30/1861	844	124	63, 64	1/5 Int.
Block 161	Brennan, Owen, Catharine	Gilmartin, Daniel	03/11/1864	899	125	63, 64	
Block 161	Gilmartin, Daniel, Catharine	Gilmartin, Anna C	03/11/1864	899	128	63, 64	1/5 Int.

Block 161	Robinson, Hamilton W, Referee Daniel Gilmartin et al Defendants	Bonardt, Louis	05/16/1865	936	346	63, 64	
Block 161	Bonard, Louis (Testator)	The American Society for the Prevention of Cruelty to Animals	12/05/1872	1241	11	63, 64	Will
Block 161	American Society for the Prevention of Cruelty to Animals in the City of New York	Marks, Flora	04/28/1892	9	431	63, 64	936 Cp 348
Block 161	Marks, Flora	Mezzadri, Evardo	10/19/1892	10	488	63, 64	Lease
Block 161	Mezzadri, Evardo	Campagna (or) Campagria, Guiseppe	01/14/1895	27	224	64	Lease
Block 161	Marks, Flora	Mezzadri, Evardo	01/25/1895	27	323	63, 64	Lease
Block 161	Marks, Flora	Peirano, John B	04/10/1896	34	485	63, 64	
Block 161	Peirano, John B	Campagna, Joseph	05/04/1896	41	244	64	Lease
Block 161	Peirano, John B	Mezzadri, Evardo	11/6/1902	74	54	63, 64	Lease
Block 161	Peirano, John D (Estate of) by Stephen J	Mezzadri, John	12/13/1921	3238	465	64	L

Block 161	Mezzadri, John	Moneta, Cesare A	12/13/1921	3238	468	64	AL
Block 161	Peirano, Stephen J, Rose	Jafs Realty Company	3/1/1949	4612	343	63, 64	
Block 161	City of New York		12/2/1969	Libre	Page	Whole Block	Remarks

Table C.5: Block 164, Lot 65 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Fradenburgh, Cornelius, Mary	O'Neale, John	01/02/1804	66	99	43, 44, 65, 66	
Block 161	Wells, Obadiah, Abigail	Vredenburgh, Cornelius	12/11/1811	94	477	43, 44, 65, 66	See L 66 Cp 99
Block 161	Hubbard, Ruggles (Sheriff), O'Neale, John (Interest of)	O'Neale, Elizabeth	03/27/1818	126	300	43, 44, 65, 66	
Block 161	O'Neill, Elizabeth	Schenck, Cornelius	05/10/1819	135	474	43, 44, 65, 66	
Block 161	Holmes, Samuel A, Eleanor-Amanda	Schenck, Peter, Trustee for Holmes, Eleanor-Amanda	03/29/1866	967	205	43, 44, 65, 66	
Block 161	Schenck, John W, Cornelius, Peter, Holmes Eleanor A, Pirnie, Sarah M, Schenck, Henry V, William E, Franklin S,	Callanan, Laurence J	04/02/1866	978	33	65	

	Debevoise, Caroline A, Heirs of Schenck, Cornelius						
Block 161	Livingston, Peter-Von Bough (Exr & Trus of) Livingston Philip (Trustee)	Sartre, Louis Mary, Fradenburgh, Cornelius	04/03/1866	796	189	44, 45, 65, 66	
Block 161	Callanan, Lawrence J, Ellen, Agnes	Casey, Michaeol	07/22/1867	1013	494	65	
Block 161	Cacy, Michael, Mary	Driscoll, Daniel	09/18/1869	1128	85	65	
Block 161	Driscoll, James H	Driscoll, Ellen	05/09/1884	1803	163	65	
Block 161	Driscoll, James H, Ellen	Driscoll, Ellen	10/20/1887	2090	200	65	
Block 161	Ellen, Driscoll	Volta, Pius Clemente	03/09/1891	1	325	65	
Block 161	Driscoll, Ellen	Zito, Nichols	1/27/1900	59	6	65	Lease
Block 161	Driscoll, Ellen	Acritelli, Peter P	1/18/1903	80	332	65	
Block 161	Acritelli, Peter P, Lillie F	Acritelli, Francesco, Santa	1/21/1903	80	351	65	
Block 161	Acritelli, Francesco, Santa	Bacigalupo, Charles	5/16/1903	83	353	65	

Block 161	Poncoroni, Lucy, Cecgalipo, Eugene	Lecloah	5/17/1946	4434	77	65	
Block 161	City of New York		12/2/1969			Whole Block	
Block 164	Yick, Morris	Yick, Morris, Martha L	6/3/1969	Reel 141	747	65	D
Block 164	Yick, Morris, Martha L	Yick, Martha L	11/28/1969	Reel 157	1541	65	
Block 164	Yick, Martha L	Wah Wing Sang Funeral Corporation	11/7/1975	355	303	65	D
Block 164	Wah Wing Sang Funeral Corporation	Wong's Millennium Corp	2/11/2000			65	Deed
Block 164	Wong's Millennium Corp.	Ng Yip, S	2/2/2006			65	Deed
Block 164	Wong Kong's	Ng Yip, Shuen	9/4/2008			65	Deed

Table C.6: Block 164, Lot 66 Conveyance Records

AREA	GRANTORS	GRANTEES	DATE	LIBRE	PAGE	LOT #	REMARKS
Block 161	Fradenburgh, Cornelius, Mary	O'Neale, John	01/02/1804	66	99	43, 44, 65, 66	
Block 161	Wells, Obadiah, Abigail	Vredenburgh, Cornelius	12/11/1811	94	477	43, 44, 65, 66	See L 66 Cp 99
Block 161	Hubbard, Ruggles (Sheriff),	O'Neale, Elizabeth	03/27/1818	126	300	43, 44, 65, 66	

	O'Neale, John (Interest of)						
Block 161	O'Neill, Elizabeth	Schenck, Cornelius	05/10/1819	135	474	43, 44, 65, 66	
Block 161	Holmes, Samuel A, Eleanor- Amanda	Schenck, Peter, Trustee for Holmes, Eleanor- Amanda	03/29/1866	967	205	43, 44, 65, 66	
Block 161	Schenck, Peter, Trustee of Holmes, Eleanor A, Schenck, John W., Cornelius, C Peter, Holmes, Eleanor A, Pirnie, Sarah M, Schenck, Henry V William E Franklin S, Debevoise, Caroline A, Heirs of Schenck, Cornelius, Schenck, Sarah, Holmes, Samuel P, Schenck, Magdalen Anna Agnes, Debevoise Isaac C	Koster John F W	03/31/1866	959	488	66	
Block 161	Livingston, Peter-Von Bough (Exr & Trus of)	Sartre, Louis Mary	4/3/1866	796	189	44, 45, 65, 66	

	Livingston, Philip (Trustee)	Fradenburgh, Cornelius					
Block 161	Koster, Margaret E, Catharine M, Emma A (Gdn of)	Cuneo, Antonio	07/01/1886	1953	462	66	
Block 161	Puckhafer, Catharine (formerly) Coster, Widow of Koster, John F W	Cuneo, Antonio	07/01/1886	1953	465	66	
Block 161	Ghelardi, Eusebro, Pastene Charles A, Trustees of Launeo, Maddaleno	Bowery Ave East River Industrial Bank	1/11/1928	3638	335	66	Lease
Block 161	Bank of America National Association - Assigner, National City Bank of New York - Assumptive, Delafield Edward C, Rovensky John E, Liquidating Agent of Bank fo America National Association, Chelardi	National City Bank of New York	12/22/1931	3823	88	66	Asst of Lease 3638 cf 335

	Eugelio, Pastene Charles A, Trustees under LW & J of Cuneo Maddalena Decd Landlord- Consent & Acceptance						
Block 161	Lee, Wah	Yick, Morris, Howard	5/1/1953	4831	295	66	
Block 161	Cuneo, Maddalena (Trus of) Edna K. (as Trust)	28 Mulberry Street Corporation	7/29/1959	5086	458	66	
Block 161	City of New York		12/2/1969			Whole Block	
Block 164	28 Mulberry St Corporation	Yick, Martha	1/18/1982	600	1892	66	D
Block 164	Yick, Martha	Wong's Millennium Corp	3/2/2000			66	

Appendix D:

Resumes

Alyssa Loorya, Ph.D., R.P.A. | President, Principal Investigator



Ms. Loorya is founder and president of Chrysalis Archaeological Consultants. For more than twenty years she has worked in cultural resource management and public education devoted to preserving cultural resources and communicating their value to local communities. She has completed over sixty technical and academic reports and has delivered dozens of presentations concerning preservation compliance, New York City historical development, and educational curricula. Her extensive experience lends itself to her roles in developing and executing research and excavation plans, project management, regulatory compliance and report production.

SELECTED PROJECTS

New York City:

Brooklyn Navy Yard (Steiner Studio) – Phase IB (2017-2018)
Coney Island Utility Upgrade – Phase IB/Monitoring (2017-2018)
Downtown Brooklyn Reconstruction – Phase IB/Monitoring (2012)
Elias Hubbard House – Phase IB (2001)
Hendrick I. Lott House – Phase IB/Monitoring (2004, 2013)
Marine Park – Phase IB/Monitoring (1997, 2003)
79 Christopher Street Burial Vault Project – Phase II (2008)
Chambers Street – Phase IB (2005)
City Hall Reconstruction Project – Phase IB and II (2010-2015)
Myrtle Avenue - Ingersol Senior Housing—Phase I/II (2016-2020)
Fulton Street Reconstruction – Phase I and II (2009-2018)
High Bridge Park – Phase IB/Monitoring (2014-2015)
Peck Slip – Phase I and II (2011-2018)
South, South Street – Phase IB/Monitoring (2017-2018)
Stone Street – Phase IB/Monitoring (1998)
Wall Street Water Main Project – Phase I (2007-2008)
Washington Square Park – Phase IB/Monitoring (2015-2020)
Worth Street—Phase I/Monitoring (2018 to 2020)
Bartow-Pell Mansion – Phase IB/Monitoring (2008, 2012)
Newtown Playground – Phase IB/Monitoring (2018-2019)
John Bowne House – Phase IB/Monitoring (2016)

Greater New York Region:

Hofstra University – Historical Research Report (2015-2017)
Fire Island National Seashore – Phase IB/Monitoring (2014)
Sharswood, Philadelphia Housing Authority – Phase IA (2018)
Tappan Zee Bridge Replacement – Phase I (2014-2016)

Over 100 publications and conference papers in CRM and popular magazines published. For full listing see:
www.chrysalisarchaeology.com

AREAS OF EXPERTISE

National Historic Preservation Act
Section 106 Compliance

Material Collections Analysis

Archaeological Survey and Excavation

Public Outreach

EDUCATION

Ph.D., Anthropology and Archaeology:
2018, CUNY Graduate School

M.A., Anthropology and Archaeology:
1998, Hunter College

CERTIFICATIONS

Register of Professional Archaeologists

10-Hour OSHA Construction Safety

30-Hour OSHA Construction Safety

40-Hour OSHA HAZWOPER

SWAC - Secure Worker Access
Consortium

PROFESSIONAL EXPERIENCE

1995-2001: Brooklyn College
Archaeological Research Center

2001-Present: Chrysalis Archaeological
Consultants, President and Principal
Investigator

2006-2010: URS Corporation, Principal
Investigator

2007-2010: Gray & Pape, Supervisory
Consultant

CONTACT INFORMATION

aloora@chrysalisarchaeology.com

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One Richmond Square – Suite 121F
Providence, RI 02906-5139
Phone: 401.499.4354

Alexander Agran |

Field Director



Mr. Agran has twelve years of experience working in all phases of archaeological excavation and reporting. His specializations include both prehistoric and historic contexts in the Middle Atlantic, New England, and Midwest regions. He has extensive knowledge of laboratory analysis and archival preparation techniques for prehistoric and historic artifacts and has experience with in-field GPS devices.

SELECTED PROJECT EXPERIENCE

Worth Street Reconstruction – Phase IB (2018-2020) **New York City, NY**

Monitored excavation during the upgrading of water, gas, and other utilities along Worth St in lower Manhattan, in the vicinity of the 18th century African Burial Ground and 19th century Five Points.

Washington Square Park Water Mains – Phase IB (2015-2018) **Manhattan, NY**

Oversaw excavations and conducted excavation of human remains around Washington Square Park and its surrounding area in order to replace and upgrade water main, sewer, and additional utility services.

The High Bridge Rehabilitation – Phase IB (2012-2014) **New York City, NY and Bronx, NY**

Under hazmat conditions, conducted monitoring of excavation for new footings as well as the removal of toxic lead dust from within the bridge, mapping and architectural investigation of the 19th century bridge spanning the East River.

I-95 /Girard Interchange Project – Phase II, Phase III (2009-2011) **Philadelphia, PA**

Performed extensive excavation across three miles of 18th and 19th century residential and commercial areas in one of Philadelphia's first communities. Conducted artifact analysis of historic and prehistoric materials as well as floatation analysis.

Rockies Express Pipeline – Phase III (2008) **Pittsfield, IL**

Excavated Phase III prehistoric upland occupation site, including structural, hearth, storage, and tool production areas. Analysis included tool microanalysis and storage vessel lipid testing to assess local faunal resources utilized for food and hides.

AREAS OF EXPERTISE

Archaeological Survey and Excavation

Construction Monitoring

Prehistoric Artifact Analysis

Laboratory Preparation

EDUCATION

B.A., Anthropology: 2008, Temple University

CERTIFICATIONS

30-Hour OSHA Construction Safety Training (2020)

8-Hour Annual HAZWOPER Refresher Course (2012)

10-Hour OSHA Construction Safety Training (2010)

40-Hour HAZWOPER Safety Training (2009)

PROFESSIONAL EXPERIENCE

2014: Commonwealth Cultural Resources Group

2011-Present: Chrysalis Archaeological Consultants

2008-2011: URS Corporation

CONTACT INFORMATION

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www.chrysalisarchaeology.com

Lisa Geiger, MA, MS, RPA |

Field Director

Ms. Geiger has ten years of experience working in all phases of archaeological excavation and reporting. Her specializations include both prehistoric and historic contexts in the Middle Atlantic, New England, and Midwest regions. Her professional focus centers on historic urban infrastructure and consumer culture. She has extensive knowledge of laboratory analysis and archival preparation techniques for prehistoric and historic artifacts.

SELECTED PROJECT EXPERIENCE

Washington Square Park Water Mains Improvements – Phase IB (2020)

New York City, NY

Conducted monitoring of street bed excavation surrounding three-quarters of Washington Square Park and surrounding roadways for water main upgrades and replacements. Excavation uncovered historic interments and potter's field burials.

Peck Slip Rehabilitation – Phase IA, Phase II (2011-2014)

New York City, NY

Conducted Phase II monitoring, mapping, and feature-specific excavations during road reconstruction and utility replacements at Peck Slip, an 18th and 19th century shipping area and Historic District in downtown Manhattan.

Lenape Farms Wetland Restoration Project – Phase IA/IB (2015)

Atlantic County, NJ

Conducted site assessment research and shovel test pit excavation in a WWI munitions plant historic district and prehistorically sensitive surrounding area in advance of wetland enhancement activities.

Archaeological Investigations, City Hall Park – Phase II-III (2010-2011)

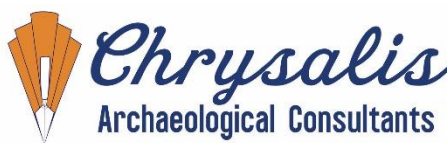
New York City, NY

Performed Phase II and III excavations at City Hall pinpointing historic architecture and features. Highlighted discoveries include a pre-revolution British jail, early water management features, and large scale refuse deposits. Performed in conjunction with URS.

I-95/Girard Interchange Project – Phase II-III (2008-2011)

Philadelphia, PA

Performed extensive excavation across three miles of 18th and 19th century residential and commercial areas in one of Philadelphia's first communities. Conducted for PA Dept. of Transportation (PADOT).



AREAS OF EXPERTISE

Archaeological Survey and Excavation

Public Outreach and Education

Laboratory Preparation and Data curation

EDUCATION

M.S., Library and Information Science: 2018, University of Illinois at Urbana-Champaign

M.A., Anthropology: 2015, Hunter College (CUNY)

B.A., Archaeology, Classical Studies: 2008, Dickinson College

CERTIFICATIONS

30-Hour OSHA Construction Industry Training (2020)

40-Hour OSHA HAZWOPER Safety Training (2009)

10-Hour OSHA Construction Safety Training (2010)

SWAC - Secure Worker Access Consortium (2014)

PROFESSIONAL EXPERIENCE

2019-2020: Chrysalis Archaeological Consultants

2017-2019: Field Museum of Natural History

2011-2016: Chrysalis Archaeological Consultants

2013: AIA/Carr Plantation Outreach

2008-2011: URS Corporation

New York Headquarters

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2119 East 34th Street
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www.chrysalisarchaeology.com

Christopher Ricciardi, Ph.D., RPA |

Principal Investigator

With over 30 years of experience in the field, Dr. Ricciardi is an expert on Section 106 and Federal, State, and Local regulatory criteria for compliance. His research has focused on 17th through 9th century rural communities, highlighting the development of New York City's outer boroughs and its surrounding area. Dr. Ricciardi served as an archeologist for the U.S. Army Corps of Engineers New York District from 2001 - 2009. He has been President of the Professional Archaeologists of New York and the Metropolitan Chapter of the New York State Archaeological Association and is committed to local historic preservation.

SELECTED PROJECT EXPERIENCE

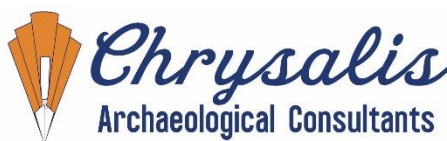
New York:

63/65 Columbia Street – Phase IA (2004)
147 Hicks Street – Phase IB (1998)
Brooklyn Navy Yard (Steiner Studio) – Phase IB (2017-2018)
Downtown Brooklyn Reconstruction – Phase IB/Monitoring (2012)
Gravesend Cemetery – Phase IB (2001)
Gowanus Canal Study – Phase IA (2012)
Hendrick I. Lott House – Phase IB/Monitoring (2004, 2013)
Marine Park – Phase IB/Monitoring (1997, 2003)
156 Rivington Street – Phase IA (2012)
79 Christopher Street Burial Vault Project – Phase II (2008)
City Hall Reconstruction Project – Phase IB and II (2010-2015)
Columbus Park – Phase I (2007)
Dyckman Farmhouse Project – Phase IB/Monitoring (2007)
Fulton Street Reconstruction – Phase I and II (2009-2018)
High Bridge Park – Phase IB/Monitoring (2014-2015)
Liberty Island – Phase IB/Monitoring (2001)
Peck Slip – Phase I and II (2011-2018)
Roger Morris Park – Phase IB/Monitoring (2005)
Stone Street – Phase IB/Monitoring (1998)
Wall Street Water Main Project – Phase I (2007-2008)
West Village Housing – Phase IA (2007)
Worth Street—Phase I/Monitoring (2018 to 2020)
Bartow-Pell Mansion – Phase IB/Monitoring (Barn) (1993)
Bartow-Pell Mansion – Phase IB/Monitoring (Cemetery) (2004)
Bronx River Greenway – Phase IB/Monitoring (2015-2016)
Elmhurst Cemetery – Phase IA (1997)
Wayanda Park – Phase IB/Monitoring (2003)

Greater New York Region:

NYC DEP Water Tunnel – Catskill and Delaware (2013)
The Edwards Homestead; Sayville – Phase IB (2001)
Timothy Knapp House; Rye – Phase IB (1997)

Over 150 professional and public lectures/presentations. See www.chrysalisarchaeology.com for full listing.



AREAS OF EXPERTISE

Archaeological Survey and Excavation
Public Outreach
Laboratory Preparation
Section 106-National Historic Preservation Act

EDUCATION

B.A., 1987, Brooklyn College, CUNY (History and Anthropology and Archaeology).
M.A., 1997, Syracuse University (Anthropology and Archaeology)
Ph.D., 2004, Syracuse University (Anthropology and Archaeology)

CERTIFICATIONS

Register of Professional Archaeologists
10-Hour OSHA Construction Safety Training
30-Hour OSHA Construction Safety Training
SWAC -Secure Worker Access Consortium

PROFESSIONAL EXPERIENCE

2001-Present: Chrysalis Archaeological Consultants
2001-Present: U.S. Army Corps of Engineers
1990-2001: Field and Laboratory Director – Brooklyn College Archaeological Research Center, Brooklyn College, CUNY

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