PHASE 1A LITERATURE REVIEW AND ARCHEOLOGICAL SENSITIVITY ASSESSMENT

Old Stone House Accessibility Upgrades & Addition Construction
Hartgen 6175

336 3rd Street, Brooklyn
Kings County, NY 11215

Hartgen 6175

Submitted to:
Historic House Trust of NYC Inc.
The Olmstead Center
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December 2024

MANAGEMENT SUMMARY

Involved Agencies:	New York City Landmarks Preservation Commission (LPC)
Phase of survey:	Phase 1A Literature Review and Archeological Sensitivity Assessment

LOCATION INFORMATION

Municipality:	Brooklyn
County:	Kings

RECOMMENDATIONS

Hartgen Archeological Associates have identified a moderate archeological sensitivity within the area of this Project due to several factors, including proximity to water, historic travel corridors, and historic fill capping earlier deposits. However, based upon the geotechnical report, the depth of fill soils is between 23.5 and 28 feet below ground surface (Mudalel, 2024). The depth of proposed excavation is 11 feet. Therefore, the potential for encountering intact archeological resources during construction is low.

Original deposits are likely far beneath the levels of historic fill, which extends far deeper than planned ground disturbing activities. Further, historic artifacts might possibly be encountered during construction, but due to their presence in identified fill soils, any artifacts recovered lack context and cannot be definitively linked to the Old Stone House.

Hartgen Archeological Associates recommend no further archeological investigation or surveying of the Old Stone House project APE.

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Date of Report:	December 2024

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1 Introduction

Hartgen Archeological Associates, Inc. (Hartgen) completed this Phase 1A literature review and archeological sensitivity assessment for the proposed Old Stone House Accessibility Upgrades & Addition Construction (Project) in the Borough of Brooklyn, Kings County, New York. In accordance with applicable historic preservation law, archeological investigations in New York State proceed in phases. Phase 1A surveys use existing sources and an initial field visit to assess the likelihood of archeological deposits in the area where the proposed action may affect historic properties, an area known as the APE, or area of potential effects. The study's findings shape future archeological testing and provide the context needed to interpret any identified historic properties. The investigation will be conducted according to the Landmarks Preservation Commission (LPC) *Guidelines for Archaeological Work in New York City* (Sutphin 2018) and will be reviewed by LPC.

2 Project Information

The Project is considered an undertaking for the purposes of historic preservation law and regulatory review. As such, this study is concerned with the effects the Project may have on resources determined eligible for the State and National (or local) Registers of Historical Places or that may be determined eligible by the SHPO or the involved federal agency. The assessment of potential effects is largely focused on proposed ground disturbing activities but may include other actions that may alter or destroy archeological resources.

Historically, the Old Stone House has been referred to by a number of names, mostly based upon ownership. For instance, it has been called the Vechte House, the Vechte-Cortelyou House, and the Gowanus House. Any of these names may be used in the following report to refer to the Old Stone House.

2.1 Project Location

The Project is located in the neighborhood of Park Slope in Brooklyn, east of 4th Avenue, west of 5th Avenue, North of 4th Street, and south of 3rd Street located between Washington Park and the J.J. Byrne Playground (Map 1).

2.2 Description of the Project

The Project entails the construction of a two-story addition with a basement to the Old Stone House. The proposed construction of the additional footprint measures approximately 800 square feet. The depth of the new basement will be nine feet below surface level, with additional structural support up to 11 feet below ground level.

2.3 Description of the Area of Potential Effects (APE)

The APE includes all portions of the property that will be directly altered by the proposed Project. The APE encompasses .25 acres (Map 1).

Legend

Area of Potential Effects (APE)

1,000 0 1,000 2,000 Feet

300 0 300 600 Meters

Project Location

GIS Services Accessed 10/30/2024: Environmental Systems Research Institute, Inc., World Street Map; USGS The National Map

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Map 1

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3 Sources

Hartgen consults a variety of scientific and historical resources to help determine the APE's archeological sensitivity, including the following:

- Geologic maps: Geologic maps illustrate the distribution of different types of bedrock and surficial deposits. Data from the *Geologic Map of New York* (1970) and the *Surficial Geologic Map of New York* (1986) is particularly useful for New York archeology.
- Topography: Maps published by the United States Geological Survey (USGS) beginning in the late 19th century and digital elevation models derived from lidar survey contain detailed representations of topography.
- Hydrography: Definitions of waterways, water bodies, and wetlands are obtained from the United States Geologic Survey (USGS) National Hydrography Dataset (NHD), the United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI), and when available, project-specific wetland surveys.
- United States Department of Agriculture's Soil Survey Geographic Database (SSURGO): Detailed soil data contain the results of the National Cooperative Soil Survey, an ongoing effort that began in 1899 to describe soil characteristics nationwide.
- New York State Cultural Resource Information System (CRIS): CRIS is an online database maintained by the New York SHPO and the Division for Historic Preservation (DHP) within OPRHP. CRIS contains a comprehensive inventory of known archeological sites, properties listed on the State and National Register (NR), properties determined eligible for the National Register but not listed (NRE), and previous cultural resource surveys.
- Landmarks Preservation Commission (LPC): LPC has an online database which contains an inventory of Individual NYC Landmarks as well as Historic Districts. LPC also contains an inventory of archeology reports.
- Historical maps and imagery: Numerous online repositories hold collections of published and manuscript maps, historical photographs, postcards, artwork, illustrations, and aerial and satellite imagery.

4 Environmental Background

The APE's environmental features give us hints about the likelihood of past human presence and therefore the area's potential for archeological deposits. As a rule, people have chosen to live in level, well-drained areas near wetlands and waterways, particularly when such areas also gave them access to important resources such as stone suitable for toolmaking. This survey therefore considers topography, hydrography, and surficial and bedrock geology to determine how likely the APE is to have been lived in and therefore to contain archeological resources.

4.1 Bedrock Geology

Bedrock formations may contain chert or other resources that have attracted people to the APE and influenced how they lived on and utilized the landscape. The bedrock mapped within the APE is Glacial and Alluvial deposits that were formed during the Quaternary geologic age and is made up primarily of alluvium and glacial drift and is not chert bearing. There are no known bedrock outcrops within the APE.

4.2 Topography and Hydrography

The APE is located in a flat urban setting located within the Atlantic Coastal Plain physiographic province in the Park Slope neighborhood of Brooklyn located between the green spaces J.J. Byrne Playground and Washington Park. The surrounding area is urban land of grid roads and city blocks. The closest permanent source of water according to modern topographic maps, is the 4th Street Basin of the Gowanus Canal located approximately 370 meters northwest of the APE. Prior to the construction of the Gowanus Canal, a tributary of the Gowanus Bay water was located less than .1 mile northwest of the Vecht-Cortelyou House.

4.3 Soils

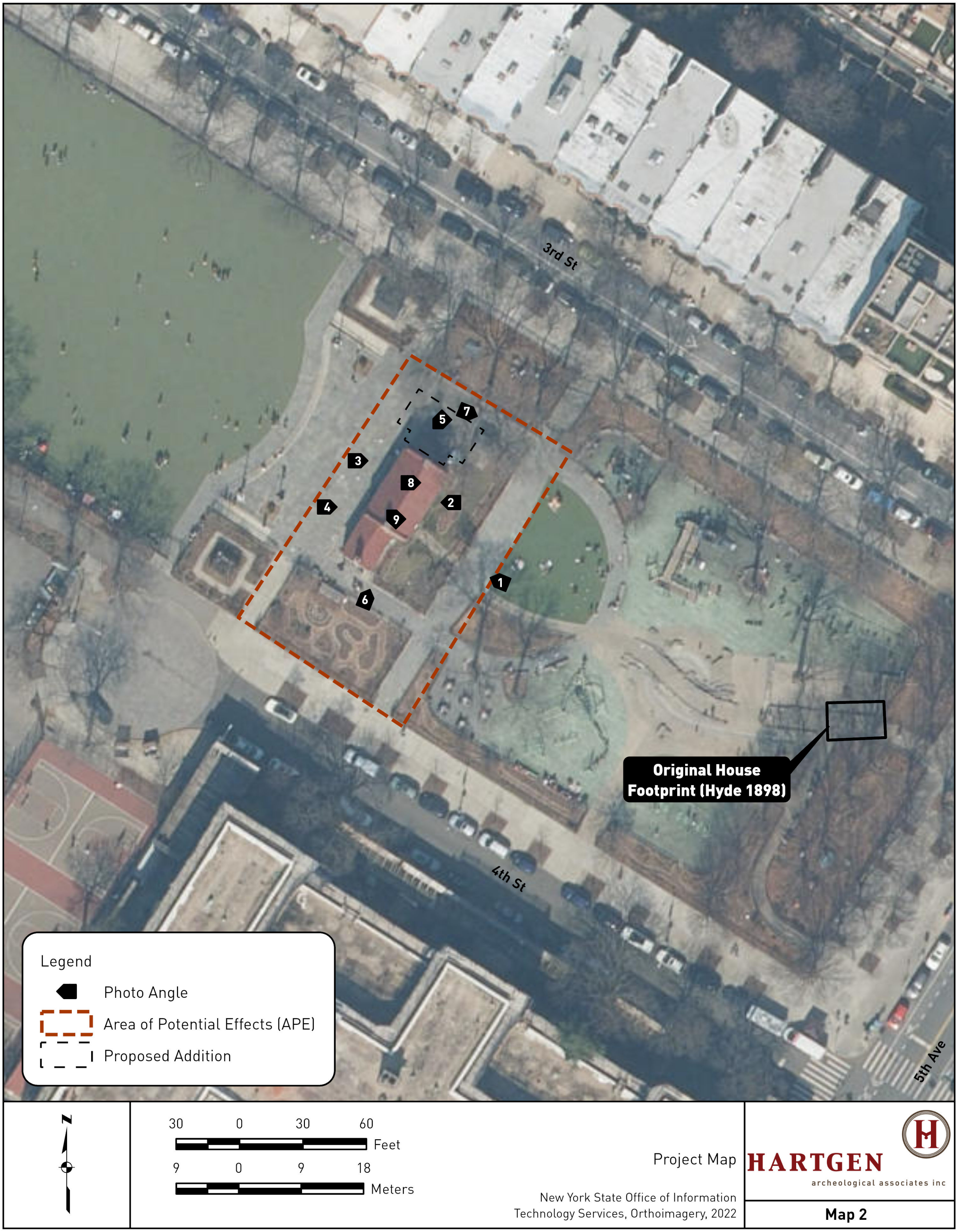
Good soil data is key for archeological surveys. Previous surveys have classified the types and depth of soil in the area, an important factor in deciding the appropriate methodology for a field study. Soil conditions can also shed light on past climatic conditions and changes in local hydrography and are therefore important in determining archeological sensitivity. Historical sources and the geotechnical survey of the APE conducted for the purpose of this Project indicate a significant amount of fill soil in the APE, measuring between 23.5 and 28 feet below ground surface. Below the fill deposits is a layer of silty sand (Mudalel, 2024).

This Project is located within the Harbor Hill Moraine of Brooklyn, and the "moraine generally consists of irregular deposits of unconsolidated sand, compact till, and stratified drift, with scattered large boulders from local and upstream sources" (Mudalel, 2024).

Distribution of soil types within the APE is presented on Map 3.

Table 1. Soils in the APE

Symbol	Name	Horizon	Depth	Textures	Slope	Drainage	Landform
UGB	Urban land-Greenbelt Complex	Urban Land M 2^C	 0-15 in. 15-79 in.	 Cemented material Gravelly sandy loam	3-8%	Variable	Urban settings
		Greenbelt Complex A B C	 0-5 in. 5-30 in. 30-79 in.	 Loam Loam Sandy loam		Well drained	Summit, shoulder, backslope, footslope, toeslope



Project Map

New York State Office of Information Technology Services, Orthoimagery, 2022

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Map 2

5 Human Activity in the APE

Humans have occupied the area of present-day New York State for nearly 14,000 years, over which time they have left behind a great deal of archeological and historical evidence. Examination of that evidence for the surrounding region forms the basis for assessing the APE's archeological sensitivity.

5.1 Indigenous Peopling to Transatlantic Exchange

Prior to Europeans populating Brooklyn, the Delaware Nation occupied the lands that now compromise Kings and part of Queens counties. Euro-Americans began purchasing tracks within present day King's County around 1636, and the initial push of European settlement into Indigenous territory that later provoked conflict. Hundreds were killed from 1640 to 1676 when outbreaks of conflicts between Europeans and Indigenous Americans (Grumet 1995). The first major conflict, known as Governor Kieft's War, occurred between 1640 and 1645 and initially centered on New Amsterdam and Raritan. However, conflict spread out in all directions to include western Long Island. In 1655, the Peach War, followed by the Esopus Wars (1658-1664), were centered in the Hudson Valley, which helped keep small Dutch settlements near to New Amsterdam (presently Manhattan) (Grumet 1995).

There are three reported precontact Indigenous archeological sites within one mile of the APE (Table 2). Of the three sites, two are burial sites while one is a village site. The Native American Burial Site (04701.01732) was discovered in a basement with a layer of clam and oyster shells located approximately 4,600 feet northwest of the APE and is eligible for inclusion on the National Register, while the Indian Burial Ground (04701.025658) is a burial ground of multiple individuals located 4,000 feet northwest of the APE. The Indian Village Site (04701.025657) is located 4,300 northwest of the APE and little other additional information was available. Both the Indian Village Site and Indian Burial Ground have undetermined eligibility for inclusion on the National Register.

Table 2. Precontact Indigenous archeological sites within 1 mile of the APE.

Site No.	Site Identifier	Description	NR Status	Proximity to APE (mi)
04701.017322	Native American Burial, Case #K-04-5451	Precontact site with human remains; precontact burial in basement in layer of clam and oyster shells.	Eligible	4,600 feet northwest
04701.025657	Indian Village Site	Precontact site; major planting area.	Undetermined	4,300 feet northwest
04701.025658	Indian Burial Ground	Precontact site with human remains; burial ground.	Undetermined	4,000 feet northwest

The APE is located within the area of interest to the Delaware Nation, the Delaware Tribe, the Stockbridge-Munsee Community, and the Shinnecock Nation, federally recognized tribal nations, and the Unkechaug Nation, a New York State recognized tribal nation. At the time of European contact, the APE was within the territory inhabited by the Delaware Nation.

5.2 Colonial Period to the 20th Century

The first settlement in Breuckelen (Brooklyn) was established in the 1640s near the head of the Gowanus Bay. A series of five towns were later established by Dutch settlers in the county over the next 30 years. These include Brooklyn, New Amersfoort (Flatlands), Midwout or Vlacke Bosche (Flat Bush), New Utrecht, and Boswick (Bushwick). Once relative peace had been assured, around 1683, the five towns, along with Gravesend founded by the English in 1643, were united to form Kings County.

By the end of 17th century, the population of Kings County was just over 2,000 people, approximately 15 percent of whom were enslaved Africans or of African descent. Kings County was primarily a farming district which benefitted from close proximity to New York City. The profitability of farming dissuaded owners from selling, which led to agricultural pursuits dominating Kings County into the early 19th century (Manbeck 1998). As a result, a significant number of New York Dutch farmhouses remained until the early 20th century.

The Old Stone House was built in 1699 by Vechte family, either Hendrick Claessen or his father, Nicholas, who had purchased the land in the years following his family's arrival in New Amsterdam from the Netherlands in 1660. Land between the Gowanus and the Wallabout Bays to the north (today's Brooklyn Navy Yard) was particularly sought after, and each farm between the bays "had its waterway, its meadow, its garden at the wood's edge, and its timber" (Fraser 1909). The Old Stone House was also situated along the Gowanus Road, which hugged the Gowanus Bay before joining with the Road to the Narrows (Shore Road) southwest of the Old Stone House (Ratzer 1767).

The land was farmed by enslaved peoples owned by the Vechtes, and "[w]hen the Continental Congress declared independence from Great Britain in 1776, more enslaved people lived at the Old Stone House than free" and they most likely were the primary workforce on the Vechte's farm (1619 Brooklyn; Yeats). It was also the only stone house in Gowanus at the time of its construction, further speaking to the wealth and influence of the Vechte family (Fraser 1909).

Various sources document the Old Stone House's presence and role in the Battle of Brooklyn (also called the Battle of Long Island). On August 27, 1776, some 22,000 British and 10,000 Americans amassed upon the agrarian communities of Brooklyn which at the time was only occupied by 4,000 people (Parry 2019). General William Alexander (more commonly Lord Stirling) assumed the Vechte house as his headquarters. Lord Stirling was later routed and forced to retreat from the Vechte house, which was then possessed by General Cornwallis' British troops and used as a redoubt, where supposedly guns were placed both inside and outside of the structure (Fraser 1909). The Americans eventually rallied and dislodged the British from the Old Stone House, though at the heavy loss of Colonel William Smallwood's Marylanders regiment. Commanded by Major Mordecai Gist, this group of about 800 "made a suicidal attack against advancing British forces in the vicinity of the Old Stone House…sacrificing themselves to save the rest of the [American] army (Parry 2019). The heroic sacrifice of the "Maryland 400" and the "Missing 256"—popular but inaccurate statistics referring to those Marylanders missing or killed in action—allowed the Continental Army to escape north.

While the Americans were routed in the Battle of Brooklyn, the Continental Army survived to fight another day, and ultimately win the war, the British soundly controlled New York until their final surrender and the signing of the Treaty of Paris in September, 1783 (National Park Service).

Jacques Cortelyou purchased the house and farm from the Vechte family in 1790 (Fraser 1909) and operated it until 1852, when it was sold to developer Edwin Litchfield in the Park Slope neighborhood of Brooklyn (Yeats). It seems that, at this time, the house fell into some degree of disuse and disrepair as Washington Park and the surrounding neighborhood developed around it. After the sale to Litchfield, the modern neighborhood and street plan began to take shape. "Fifth Avenue and Third Street were raised about 16 feet above the original ground level, leaving the Old Stone House surrounded by earthen embankments. Around the same time, the Gowanus Canal was excavated, draining the millpond" (Parry 2021). The Old Stone House would only stand for another 50 years once it was sold to Litchfield.

For some time after 1852, the house was in the care of an African American man, with the lot around it, known as the Fifth Avenue Grounds--being used by local baseball and ice skating groups (sometimes both—baseball on ice was popular in the early 1860s (Ross and Dyte) (Figure 1). By 1883, the Brooklyn Base Ball Club (later the Brooklyn Dodgers) had scouted the lot and chosen it as their location for their new field, Washington Park, named for General George Washington's presence near the site during the Battle of Brooklyn. The new park "included a field measuring 500 by 900 feet, a grandstand to seat 2,500 people, and a free stand for 2,000…, and a thirteen foot high fence around the whole block" (Ross and Dyte). Located within the park, the Old Stone House was used as the home team's clubhouse.

At that time the house was said to be partially buried as a result of the modern streets being raised, and the players "gained entrance by jumping down through doors or windows…To have made it necessary to "jump down" through door or windows in order to gain entrance, the house must have been buried to a point above the…original doorsill, thus reducing the visible portion of the house [from two and a half stories] to a story and a half" (Fraser 1909) (Figure 2). Likely, the house was being buried as part of efforts to level out the knoll it sat on to the modern street level. The origin of this fill is unknown.

Table 3. List of Old Stone House owners from 1699 to present.

Owner	Dates Owned/Inhabited	Original Structure Extant?	Map/Source Reference	Notes
Vechte Family	1699-1790	Yes	(Fraser 1909)	
Cortelyou Family	1790-1852	Yes	(Fraser 1909)	
Edwin Litchfield	1852-?	Yes, but buried by end of 19th century		In the care of African American man
NYC Parks Department	1926 (or earlier)-present	No; excavated then reconstructed	(NYC Parks)	Excavated from original location 1933-1934; reconstructed in 1934

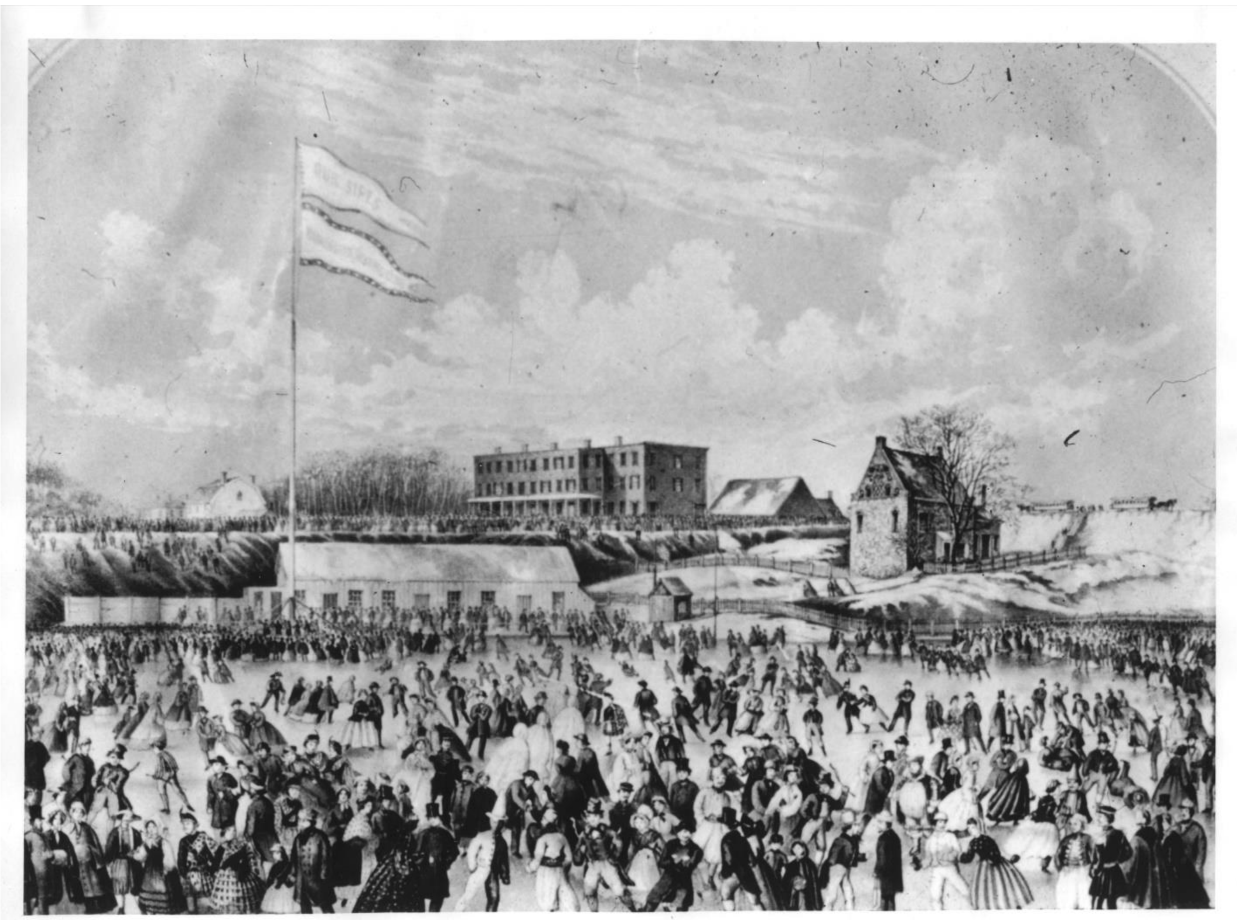


Figure 1. Etching ca. 1862 of ice skaters in Washington Park in the basin below the Old Stone House. Note the elevated street with carriages above the house, which corresponds to modern-day 5th Avenue. This scene predates the burial of the Old Stone House. The basin has been filled so that the park is level with the street. Image courtesy of Old Stone House.

Figure 2. A partially buried Old Stone House. Date unknown, but the photo certainly post-dates the purchase of the lot by Edwin Litchfield in 1852, as the buildings in the background would have been constructed following his control of the neighborhood's development. The buildings in the background may be the ones that appear on 1888 Sanborn map and 1898 Hyde map of Ward 22, and which align with the modern grid plan. These same maps show a truncated footprint of what is likely the Old Stone House, set at an angle to the modern street, just west of these buildings at the corner of 5th Avenue and 3rd Street.

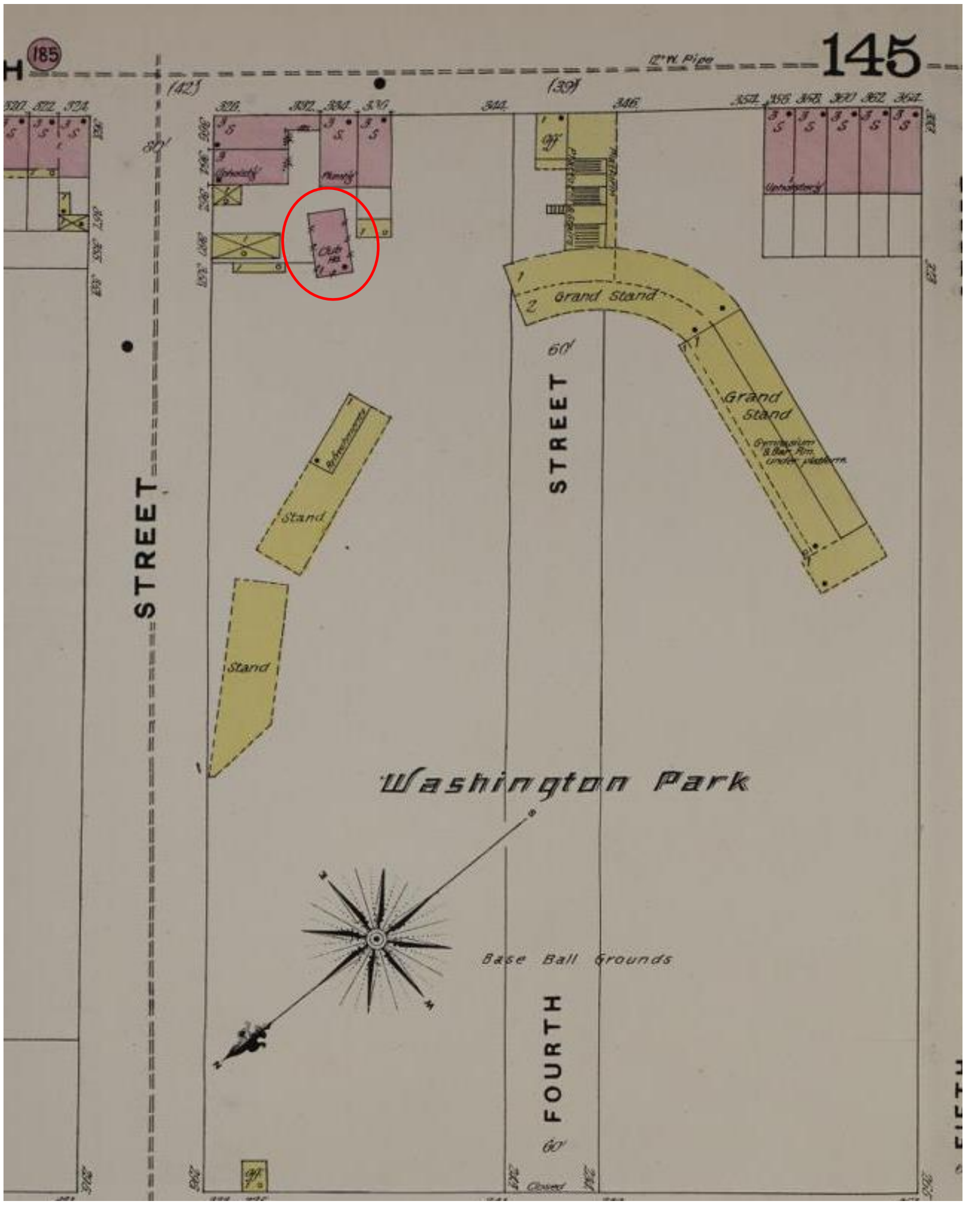
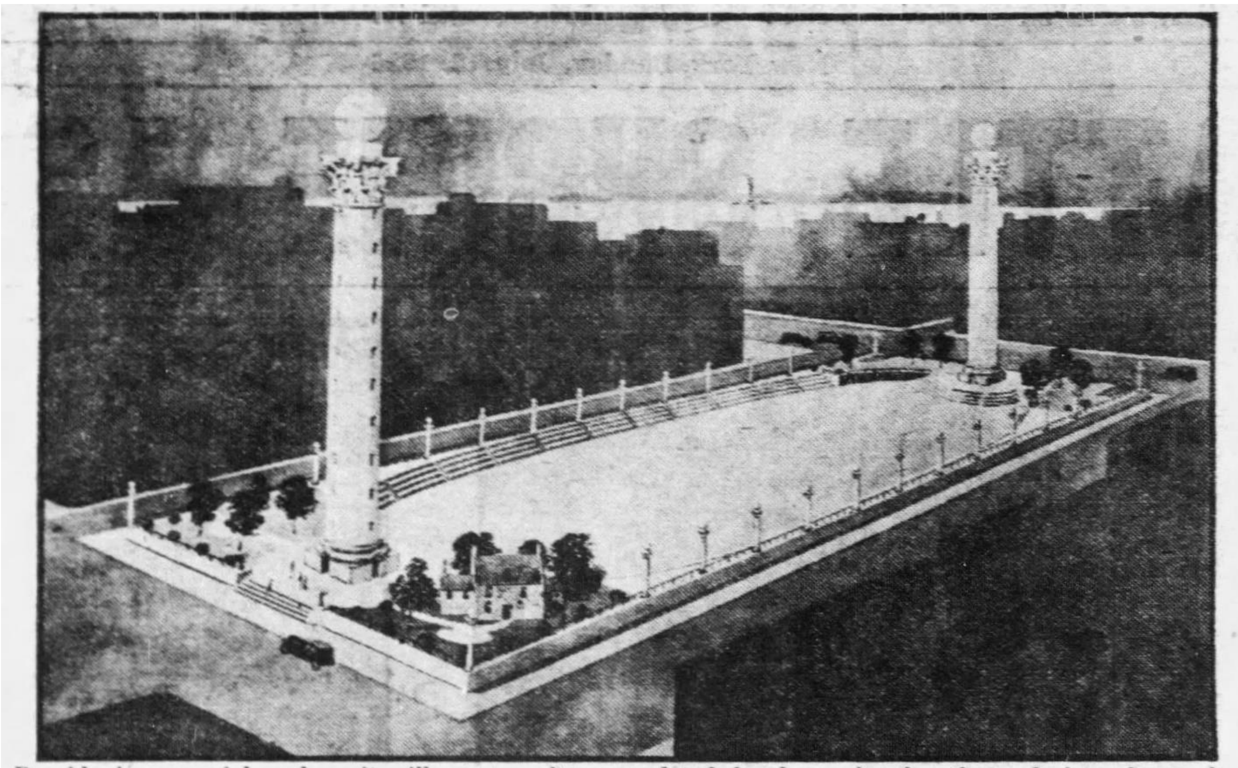


Figure 3. Sanborn map of 1888 (Sanborn Map and Publishing Company 1888) showing the Washington Park baseball field and bandstands. The Old Stone House, circled, appears on this map in the upper left, labelled as "Club Ho." (Club House), set at an angle to the modern street plan.

The Old Stone House continued to be used as a clubhouse until baseball games moved to a newer and larger facility nearby in 1891. The Washington Park space continued to be used recreationally, but "city grading work to even out the slope of the area buried much of the site, including the Old Stone House, in 16 feet of dirt" (Ross and Dyte). Thus, by the end of the 19th century, what remained of the Old Stone House would be buried until its rediscovery some 30 years later.

Activist groups, including the Public Forum of Brooklyn Heights, who wished to memorialize the Battle of Brooklyn and the historic Old Stone House had, for some years, lobbied for a memorial (Figure 4). As reported in the *Brooklyn Daily Eagle* in May of 1930, a man named Mr. Charles Higgins:

took a keen interest in the history of the Old Stone House and for years tried to have it restored and the property surrounding it made into a park. The project made a good deal of progress, but at present seems unlikely to be carried out. The property was purchased by the city some years ago, with the idea in view of carrying out the Higgins plan…The friends of the memorial project are still staunchly fighting to have the Old Stone House restored and made a national shrine (Brooklyn Daily Eagle 1930).



Brooklyn's memorial park as it will appear when completed is shown in the above design, drawn by William J. Dilthey, an architect, and chairman of the Public Forum of Brooklyn Heights. In the foreground is the old Gowanus house where Lord Stirling held back the British army at the Battle of Long Island, 150 years ago. The house, now buried fifteen feet below the street, will be resurrected.

Figure 4. A model shrine design, memorializing the Battle of Brooklyn (Battle of Long Island), with a conjectured resurrection of the Old Stone House (Daily News 1926).

The New York City Parks Department bought the property in 1926 with intent to create a memorial commemorating the 150th anniversary of the Battle of Brooklyn. The Old Stone House was included in design plans, though needed to be found and excavated first (NYC Parks) (Figure 4). Plans were inevitably slowed by the Great Depression, and rediscovery and excavation would not take place until 1933-1934. Amid the Great Depression, the department allocated $750,000 in WPA/Emergency Relief funds for the construction of a new park and playground at 5th Avenue and 3rd Street. Efforts to locate the Old Stone House began in March 1926, and on the morning of May 4, 1933, after six weeks of digging, remains of the Old Stone House was uncovered (Brooklyn Daily Eagle 1933a) (Figure 5, Figure 6).

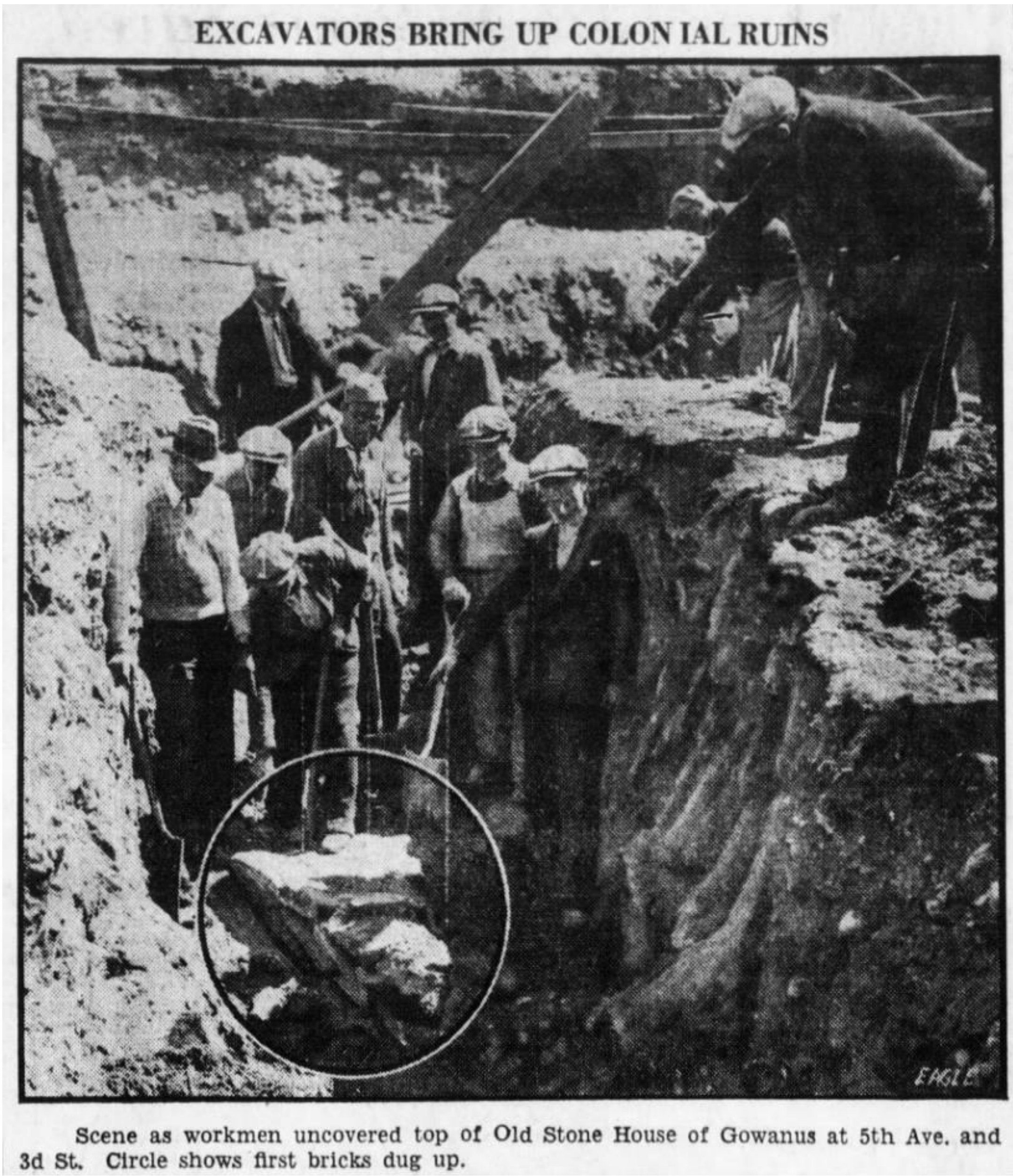


Figure 5. After weeks of digging, workers encountered the original Old Stone House, buried beneath layers of fill, printed May 4, 1933 (Brooklyn Daily Eagle 1933b).

Figure 6. Excavation of the Old Stone House after its rediscovery in 1933. Image courtesy of the Old Stone House.

OLD LANDMARK COMES TO VIEW

Workmen are shown exhuming the Old Stone House at Gowanus, 3d St. and 5th Ave., which, from this view, appears like the ruins of the Inca empire.

Figure 7. The remains of the Old Stone House found by workers in the Brooklyn Daily Eagle, published Sunday, June 11, 1933 (Brooklyn Daily Eagle 1933b).

Brooklyn Borough President, J. J. Byrne, ordered then-Parks Commissioner Robert Moses to oversee the reconstruction of the house using what original materials could be salvaged (NYC Parks). Reconstruction was completed by 1934, though the house had been moved from its original footprint and rotated almost 90 degrees clockwise to centrally situated it in the park and to orient it with the modern street plan. A new pavilion (Figure 8) was attached to the north façade, which is no longer extant and has been replaced by a fire escape (Photo 5). The J. J. Byrne playground was officially opened on August 11, 1934, and the press release from the Parks described it as a:

> MODEL PLAYGROUND at 3d and 4th STREETS at FOURTH AVENUE (GOWANUS HOUSE). 695 ft. x 230 ft. Facilities: the recreation building is an adaptation of the old Cortelyou house which formerly stood on this site. It is being built in part from the stone salvaged from the old house at Gowanus, the foundations of which were uncovered by Park Department Emergency Relief workers

last summer. The play room is designed in a manner to represent typical Early Dutch Colonial Interior Architecture (NYC Parks 1934).

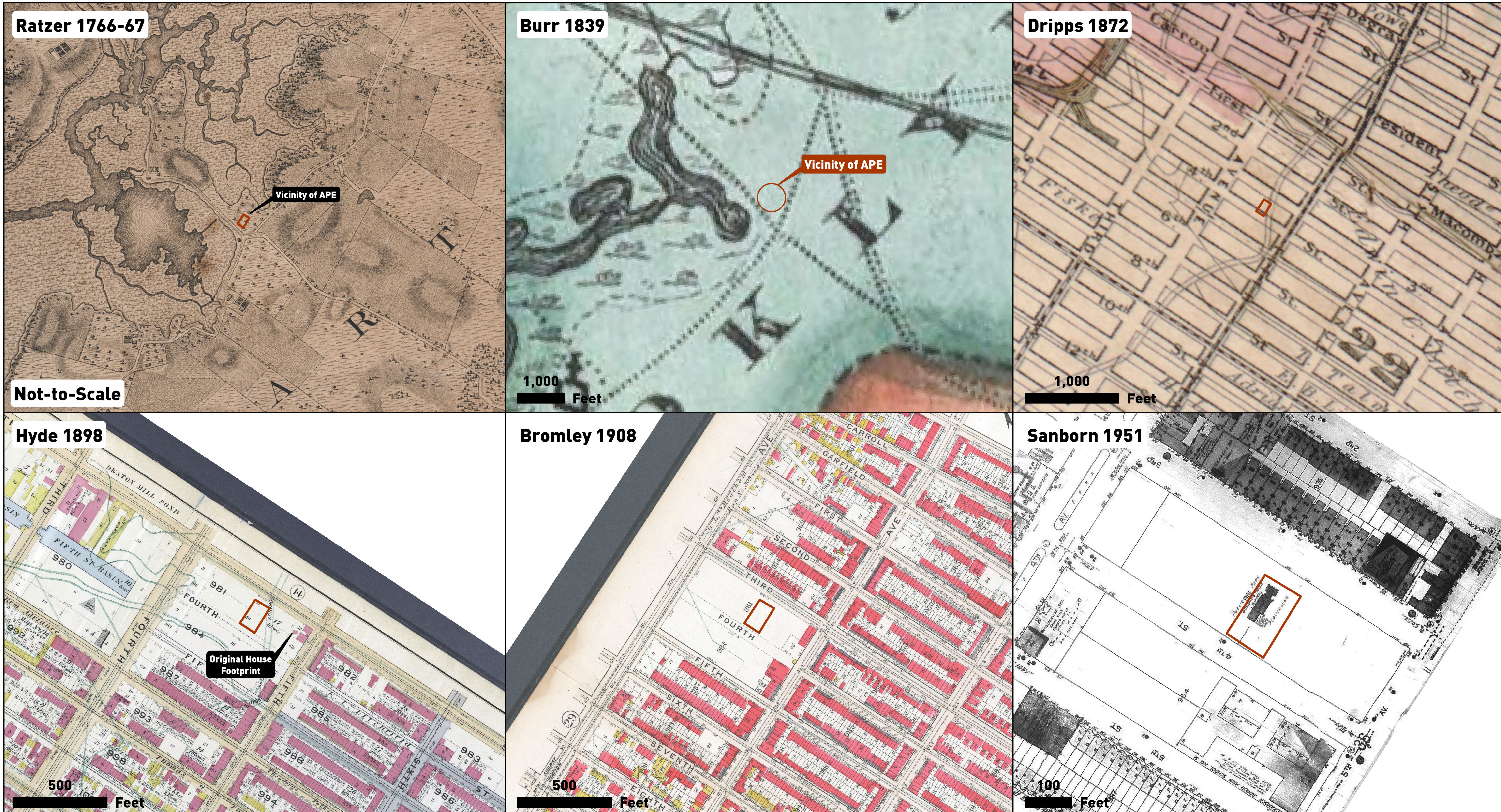
Figure 8. Elevated shot of the Old Stone House's west elevation in 1934 after its reconstruction with the new pavilion attached to the north façade. Image courtesy of Old Stone House.

Since the 1930s, the Old Stone House has been a park facility and recreation center. Additional renovations and modernizations were made in the 1990s thanks to the efforts of John Gallagher and Herb Yellin, who created the First Battle Revival Alliance to support the House's renovation efforts, which included new windows, new roofing, and updated plumbing and electric (Lewine 1997).

Several archeological sites are within 1 mile of the Old Stone House and are listed in Table 4.

Table 4. Relevant historic archeological sites within or adjacent to the APE.

Site No.	Site Identifier	Description	NR Status	Proximity to APE (mi)
04701.014947	Vechte-Cowenhoven Family Cemetery	Historic cemetery with human remains; defunct and obliterated in 19th century	Undetermined	.06 miles north
04701.014947	Revolutionary War Mass Grave	Historic burial site with human remains; exact location unknown	Undetermined	.24 miles west
04701.020238	Rear Yard of 197 9th Street/ Gowanus Pre-K Archaeological Site	Historic site including stone privy, stone well, and brick cistern	Undetermined	.32 miles southwest



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Legend

Area of Potential Effects (APE)

Historical Maps

1766-1951

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Map 3

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5.2.1 Cemeteries

Two potential burial sites are located within close proximity of the Project.

The Vechte-Cowenhoven Family Cemetery, burial site of the Vechtes who built the Old Stone House thought long defunct and destroyed, was located .06 miles north of the Project. According to Dr. Elizabeth Meade in her 2020 dissertation:

> Stones date 1792–1841 (Brooklyn Daily Eagle 1911); as of 1879, 7 stones still stood, two in Dutch (NYGB 1967); Remains of James Pearsall and six other family members (members of Baisley, Betts, and Hubbard families, graves dated 1822–1841) removed to Green-Wood on January 14, 1851 (Section 101, Lot 4488); Possible that 8 additional graves from the Cowenhoven (including Major John Cowenhoven) and Jackson families were removed to Section 75, Lot 4011 at Green-Wood on May 5, 1852 (Meade 2020).

While some individuals were reinterred in Green Wood Cemetery, possibly others were not. The cemetery was obliterated around 1873 (Meade 2020).

SHPO's Cultural Resource Information System (CRIS) shows an additional site .25 miles west of the Old Stone House, labelled as a Revolutionary War mass grave site, referring to an unevidenced burial site of Smallwood's Marylanders who sacrificed themselves during the Battle of Brooklyn in 1776. Though the exact location of this site is unknown, if it even exists, SHPO's general location near 3rd Avenue and 6th Street is aligned with historical claims of the "Maryland 400" and the "Missing 256," popular claims of the number of Marylanders that were missing or killed in action during the Battle of Brooklyn. A "plaque placed in the sidewalk at 431 Third Avenue in 1897 stated that it was the 'Burial Place of ye 250 Maryland soldiers…'" (Parry 2019). The address of 431 3rd Avenue is only .1 mile southwest of CRIS's suggested location of the Marylander burials. However, as Parry ultimately concludes in his research dedicated to this issue:

> 256 Marylanders were *not* killed on the battlefield—more likely only a tenth of that number. Those that were killed, were not all killed in one location, nor were they buried in mass graves (or trenches) at one spot. It is highly likely that those who were killed were interred in widely scattered shallow graves close to the spots where they fell (or left unburied) …possibly they were added to a preexisting family burial ground. In that last case, most likely the bones were either moved to Green-Wood Cemetery in 1846, or destroyed by subsequent street grading and development (Parry 2019).

5.3 Present Land Use and Current Conditions

Hartgen archeologist Hannah Kate Simon visited on September 15, 2024, to observe and photograph existing conditions within the APE (Photo 1, Photo 2, Photo 3, Photo 4, Photo 5, Photo 6, Photo 7, Photo 8, and Photo 9). Conditions were fair, partly cloudy with temperatures in the mid-to-high 70s. On site, Hannah met with Kim Maier, Director of the Old Stone House. Kim provided a tour and historical context of the house in both its original historical context and its current function as a public museum. Public programs were in progress during the tour, and the Old Stone House was busy with visitors both inside and in the surrounding park. The downstairs of the building is divided into exhibition and offices spaces, while the upstairs is sectioned into a large event space and kitchens.

The addition attached to the south façade has served as restroom facilities for park visitors since the house's reconstruction in 1934. In 1934, this addition had clapboard siding, but it has since been lost/removed, leaving the cement beneath exposed. The basement is accessed from this side of the house through a bulkhead door.

The house's east lawn, directly outside the current entrance, is a flower garden. Beyond the front yard is a bluestone walkway, an artificial turf field, and the J.J. Byrne playground. To the south is a small farm garden used for teaching. To the west, at the rear façade, is a bluestone court which faces onto the field of Washington Park. To the north are additional bluestone walkways, and a separate brick oven and enclosed green space. The oven is modern, approximately 6 years old, and might be based upon Brittany/French examples. An Old Stone House board member with interest in the Brittany region suggested building an outdoor oven at the Old Stone House based upon historical examples for use during public programs. This oven will be moved to the southern end of the Old Stone House once the Project is completed.

Photo 1. The Old Stone House viewed from the east with the public entrance door propped open. This façade was originally north-facing. The front garden was added during renovations in the 1990s. Note that the addition on the left has lost its clapboard siding since the 1930s reconstruction.

Photo 2. The Maryland flag is flown at the Old Stone House in honor of the so-called "Maryland 400," heroes of the Battle of Brooklyn. View northwest.

Photo 3. West façade, which was originally south-facing. This would have been the original house's primary entrance. View northeast.


Photo 4. Metal-clad shutters on the ground floor of the original south (now west) façade. View northeast.

Photo 5. Present-day north façade, which was originally the west façade. The 1930s pavilion was attached to this façade. The fire escape is a later addition. This façade will be impacted by the upcoming addition and renovations and will be the site of the new accessible entrance. View south.

Photo 6. Bulkhead door which gives access to the basement. The bare concrete of the southern addition is visible on the left. View north.

Photo 7. Side profile of the recently built woodfired outdoor oven. The oven is not based on Dutch colonial examples, but more likely French/Brittany examples. View east.


Photo 8. Reconstructed upstairs interior, based upon colonial examples. View northeast.

Photo 9. The inset windowsills of the upstairs interior are lined with reproduction 17th century Delft tiles showing windmills and children at play. View west.

6 Previous Archeological Surveys

No previous archeological surveys have been completed in the APE.

Several archeological surveys have been performed within .5 miles of the APE. All were conducted on or west of 4th Avenue, west of the Project. Select relative surveys are included in Table 5, below. Most pertinent to this Project is the Phases 1 and 2 investigations at 168 8th Street, correlating to SHPO site 04701.020238 described in Table 4 above, during which a stone well, stone privy, and brick cistern were discovered. This site was once a portion of the 120-acre Van Brunt family farm built in the 1840s (Meade 2018).

Table 5. Relevant previous surveys within or adjacent to the APE

Project/Phase	Summary	Citation/Survey Number
Phase 1 Archeological Investigation and Phase 2 Evaluation	Proposed Pre-Kindergarten Center, 168 8th Street (Block 1003, Lot 11); Brooklyn, Kings County, New York; Final Archaeological Technical Report: Phase 1B Investigation and Phase 2 Evaluation	18SR56192
NR Report (Draft) of Gowanus Canal	National Register of Historic Places Eligibility Evaluation and Cultural Resources Assessment for the Gowanus Canal, Borough of Brooklyn, Kings County, New York in Connection with the Proposed Ecosystem Restoration Study	04SR54640
Phase 1A	Gowanus Neighborhood Rezoning, Phase 1A Archaeological Documentary Study	24SR00033

7 Archeological Sensitivity Assessment

The New York Archaeological Council provides the following description of archeological sensitivity:

> Archaeologically sensitive areas contain one or more variables that make them likely locations for evidence of past human activities. Sensitive areas can include places near known prehistoric sites that share the same valley or that occupy a similar landform (e.g., terrace above a river), areas where historic maps or photographs show that a building once stood but is now gone as well as the areas within the former yards around such structures, an environmental setting similar to settings that tend to contain cultural resources, and locations where Native Americans and published sources note sacred places, such as cemeteries or spots of spiritual importance (NYAC 1994:9).

Table 6. Factors influencing archeological sensitivity of the APE.

Factor		Comment
The following factors indicate an increased probability of past habitation in the APE:		
☒	Water sources (e.g., wetlands, ponds, streams, lakes, bays, and ocean	Gowanus Bay/4th Street Canal Basin
☐	Favorable landform (e.g., level, solar exposure, leeward facing)	
☐	Well-drained soil	
☐	Stone tool ore sources (e.g., chert outcrop)	
☐	Natural resources (e.g., iron, limestone, building stone)	
☒	Known archeological sites in the vicinity	
☒	Standing or historic map-documented structures	Original Old Stone House, former 5th Ave. houses
☒	Transportation corridors (e.g., road, canals, rivers, railroads)	Gowanus Road (defunct)
☐	Other documented resources	
The following factors indicate an increased probability of archeological evidence of past habitation in the APE:		
☐	Undisturbed soils	
☐	No evidence of erosion or soil removal (e.g., sand or gravel mining)	
☐	Alluvium present, which may cap and preserve deposits	
☒	Historic fill present, which may cap and preserve earlier deposits	
☐	Deep soil column (A and B horizons) enabling formation and preservation of archeological features	
Overall assessment: Moderate archeological sensitivity		

Overall, the area has a moderate sensitivity for archeological resources due to a number of factors. First among them is the proximity to a water source, that is the former Gowanus Bay, near which the original Old Stone House was built. However, the Gowanus Canal, constructed in the 19th century, permanently altered the original coastline, drainage routes, and neighborhood layout, and presently the Gowanus 4th Street Basin. Map documented structures include the original Old Stone House located closer to present-day 5th Avenue and 3rd Street, as well as 19th century buildings lining 5th Avenue between 3rd and 4th Streets, which are no longer extant.

The Gowanus Road was a primary route of transportation through Brooklyn, prior to the construction of the 19th century modern street plan. The road is long defunct.

A geotechnical survey was performed in advance of this Project, and included 2 soil borings at the north portion of the Old Stone House where the new basement will be excavated (Mudalel, 2024). These two soil borings show fill between 23.5 and 28 feet below ground surface. While the number of fill episodes is unknown, all fill episodes would have taken place prior to the construction of modern Washington Park/J. J. Byrne Playground (opened 1934) and the reconstruction of the Old Stone House, making the fill historic with the potential of capping earlier deposits possibly dating to the 17th century and earlier. However, ground disturbance during construction of the new basement will not exceed the depth of the historic fill, and therefore earlier, buried deposits will not be encountered. Further, the historic fills are of unknown origin, and any artifacts that may be encountered during ground disturbing activities lack context.

8 Recommendations

As discussed above, there is archeological sensitivity within the area of this Project due to several factors, including proximity to water, travel corridors, and historic fill capping earlier deposits. However, based upon the geotechnical report, the depth of fill soils is between 23.5 and 28 feet below ground surface (Mudalel, 2024). The depth of proposed excavation is 11 feet. Therefore, the potential for encountering intact archeological resources during construction is low.

Original deposits are likely far beneath the levels of historic fill, which extends far deeper than planned ground disturbing activities. Further, historic artifacts might possibly be encountered during construction, but due to their presence in identified fill soils, any artifacts recovered lack context and cannot be definitively linked to the Old Stone House.

Hartgen Archeological Associates recommend no further archeological investigation or surveying of the Old Stone House project APE.

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Appendix 1: Project Site Plans

CITY OF NEW YORK PARKS & RECREATION

NEW ACCESSIBLE ADDITION & UPGRADES TO OLD STONE HOUSE

IN WASHINGTON PARK 336 3RD ST BROOKLYN NY 11215

BOROUGH OF BROOKLYN
CONTRACT#: **B111-123M**

50% CDs - 06.5.24

CAPITAL PROJECTS
OLMSTED CENTER
FLUSHING MEADOWS CORONA PARK
FLUSHING, NEW YORK, NY 11368

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SUE DONOGHUE

DEPUTY COMMISSIONER, CAPITAL PROJECTS
THÉRÈSE BRADDICK

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DENISE MATTES, PLA

TEAM LEADER, MANHATTAN
DESMOND SPILLANE

DESIGN DIRECTOR, MANHATTAN
LESLIE PEOPLES, PLA

TEAM LEADER, QUEENS
ERIC MATTES, PLA

DESIGN DIRECTOR, QUEENS
JAMES MITUZAS, PLA

TEAM LEADER, STATEN ISLAND
ADRIAN SMITH, PLA

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MARLISA WISE, RA

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ALLAIRE O'CONNOR, PE

CONSTRUCTION

CHIEF OF CONSTRUCTION
PHILIP GRANITTO

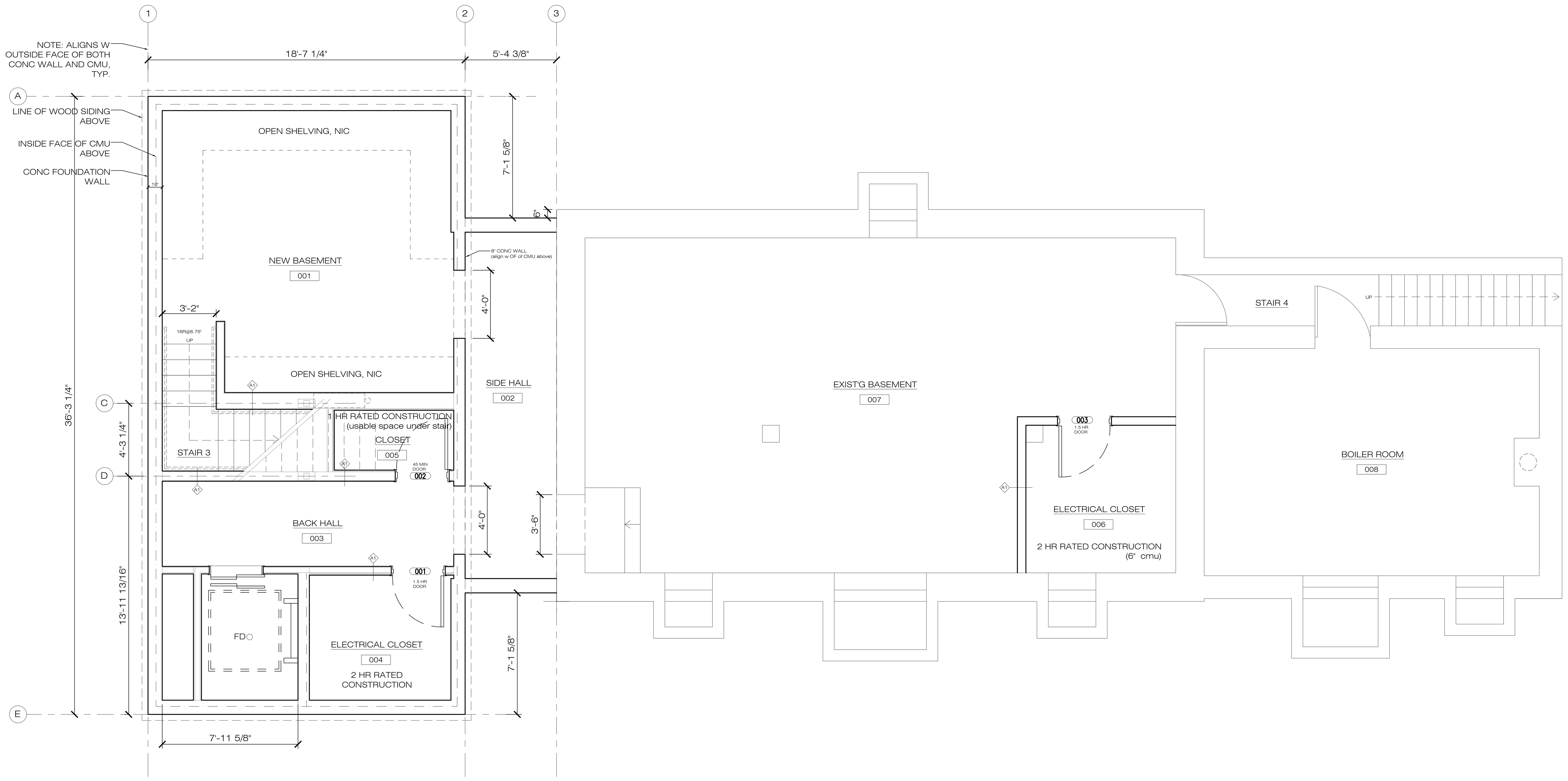
LOCATION PLAN
NOT TO SCALE
NORTH

AERIAL PHOTO/ EX. SITE/ STRUCTURE
NOT TO SCALE
NORTH

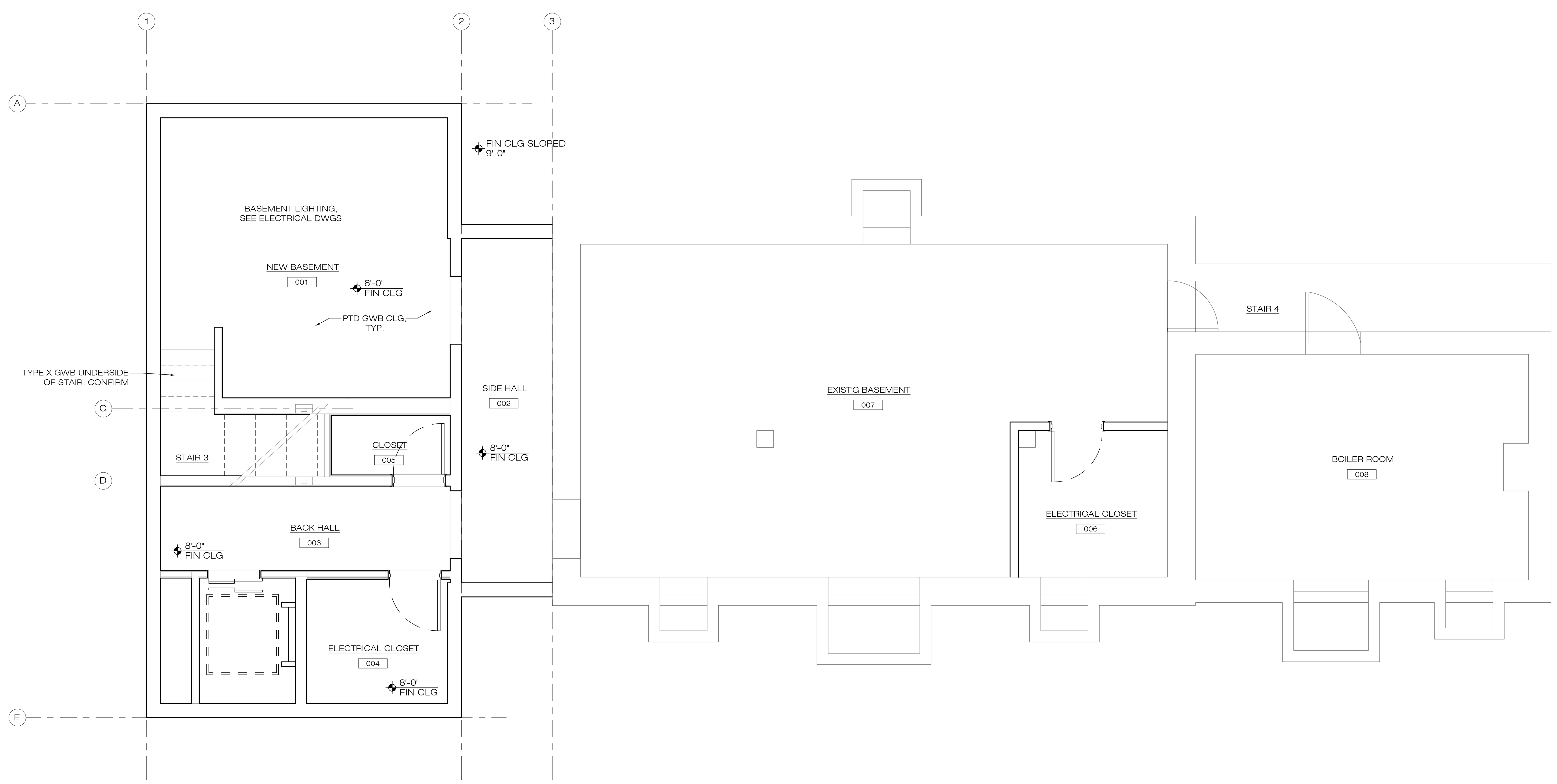
Parks

50% CDs - 06.5.24 - NOT FOR CONSTRUCTION

B111-123M



1 BASEMENT PLAN
SCALE: 1/4" = 1'-0"



2 BASEMENT RCP
SCALE: 1/4" = 1'-0"

NORTH

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CONSULTANTS:

N/A

NO.	DATE	REVISION

NYC PARKS PROJECT MANAGER:
DISCIPLINE LEAD:
DESIGNER:
DRAFTED BY:
CHECKED BY:

CONTRACT NO.: X111-123M
DATE:

PROJECT TITLE:
OLD STONE HOUSE ACCESSIBLE ADDITION, WITH UPGRADES TO PUBLIC RESTROOM & EXISTING HOUSE, AT WASHINGTON PARK
ADDRESS: BLOCK: 981 LOT: 1
336 3RD ST, BROOKLYN,11215

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DRAWING TITLE:
BASEMENT PLANS

DRAWING NO.:
A101.00

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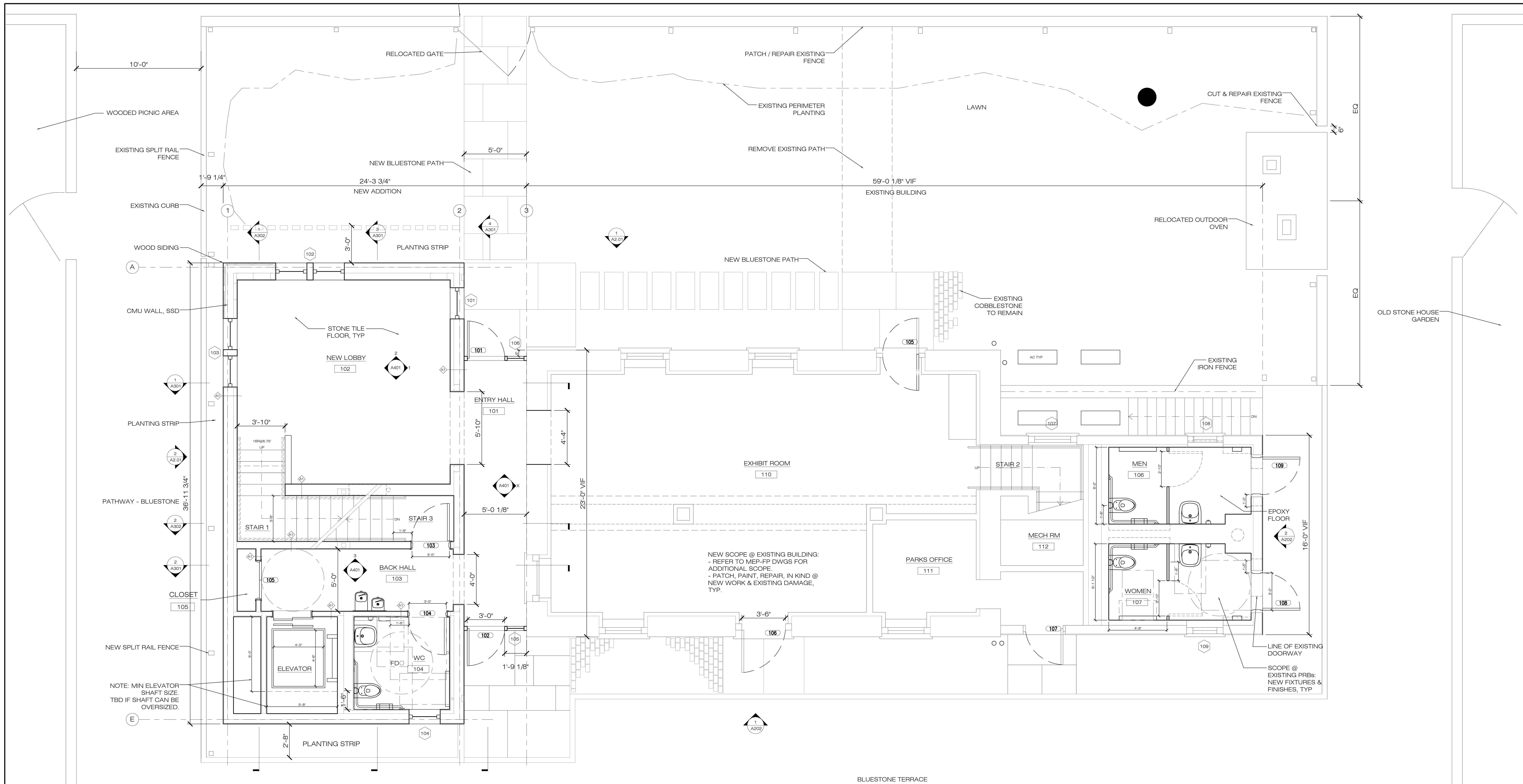

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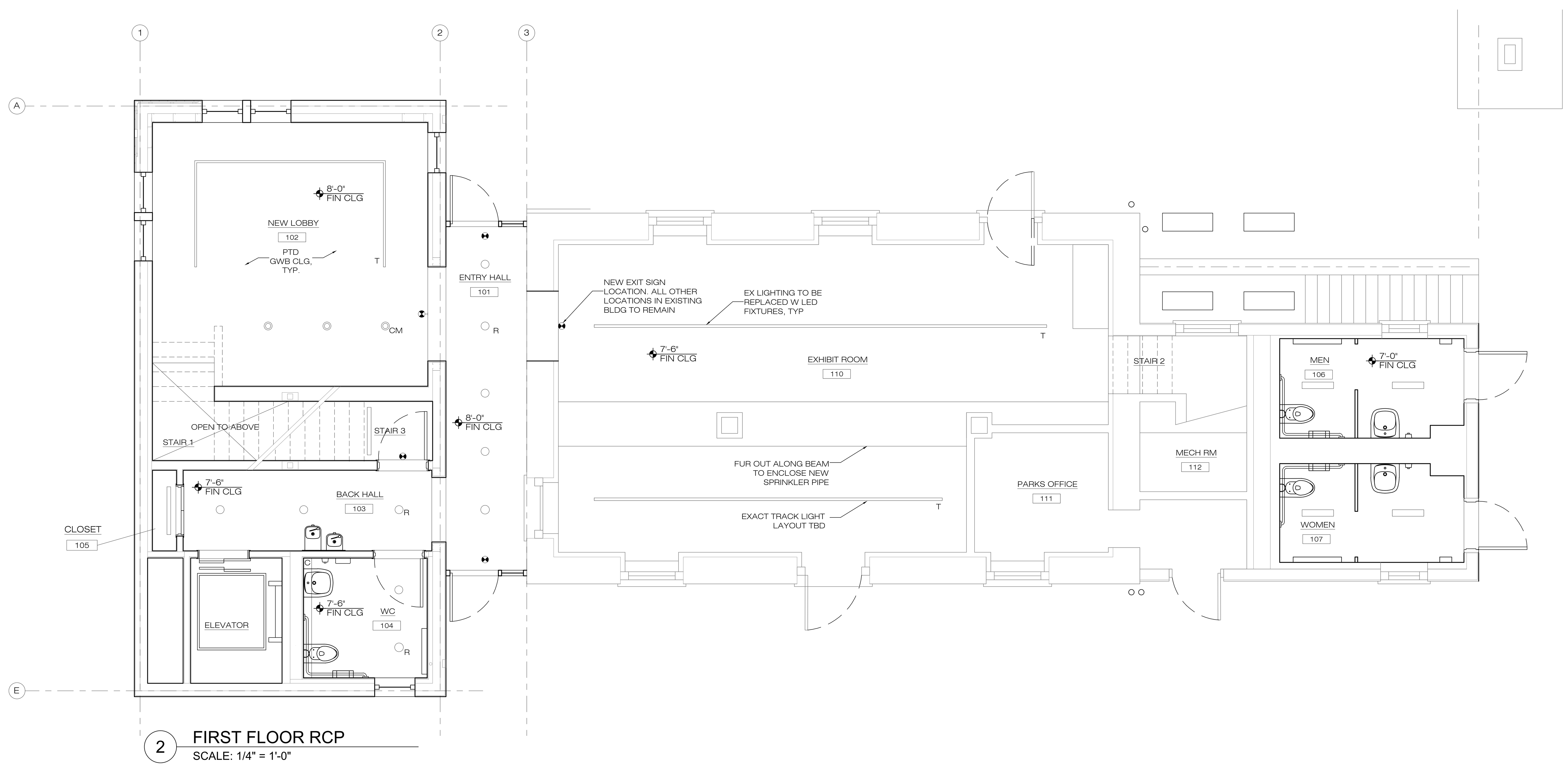

2 FIRST FLOOR RCP
SCALE: 1/4" = 1'-0"

NORTH

0 2' 4' 8'
Scale: 1/4" = 1'-0"

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OLD STONE HOUSE ACCESSIBLE ADDITION, WITH UPGRADES TO PUBLIC RESTROOM & EXISTING HOUSE, AT WASHINGTON PARK
ADDRESS: BLOCK: 981 LOT: 1
336 3RD ST, BROOKLYN,11215

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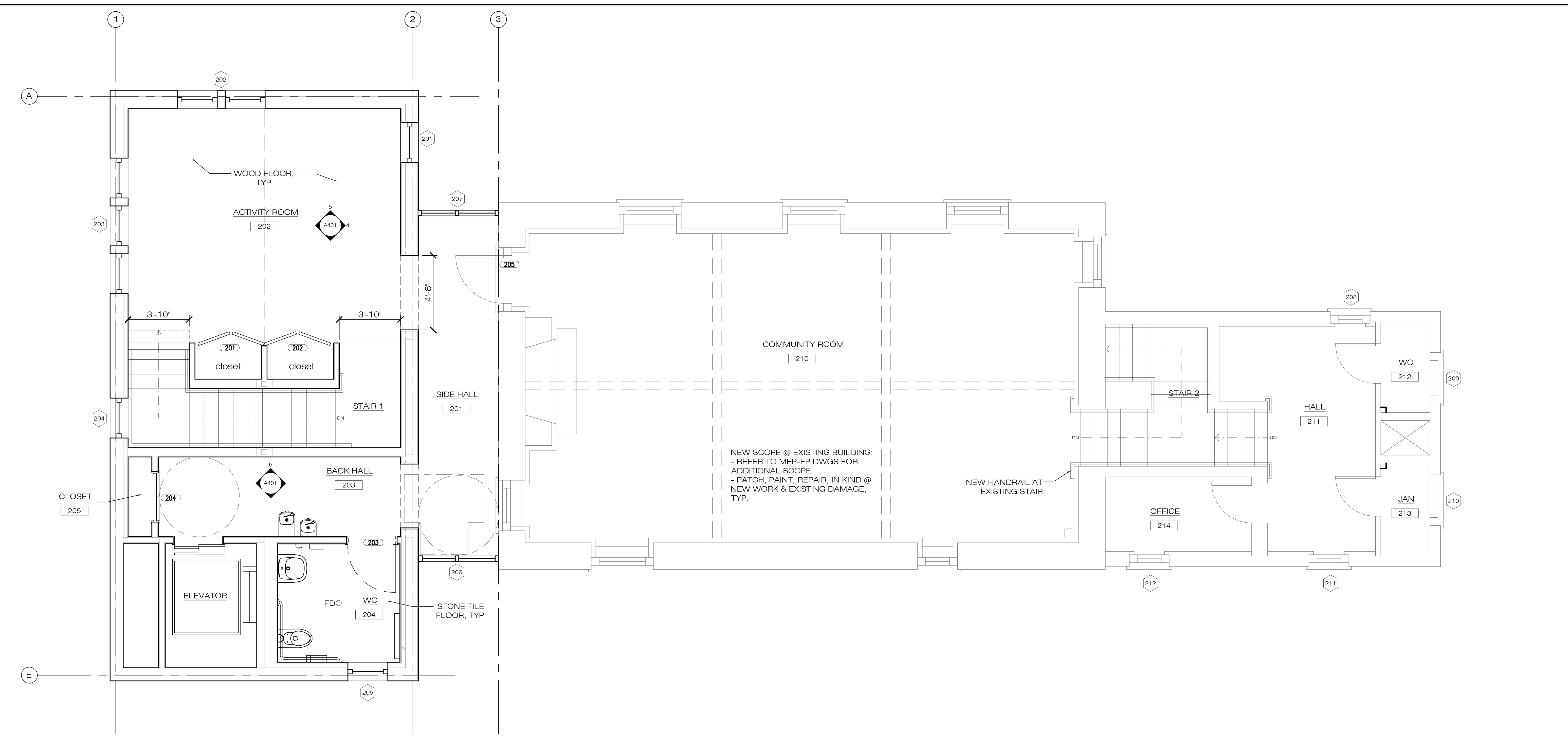

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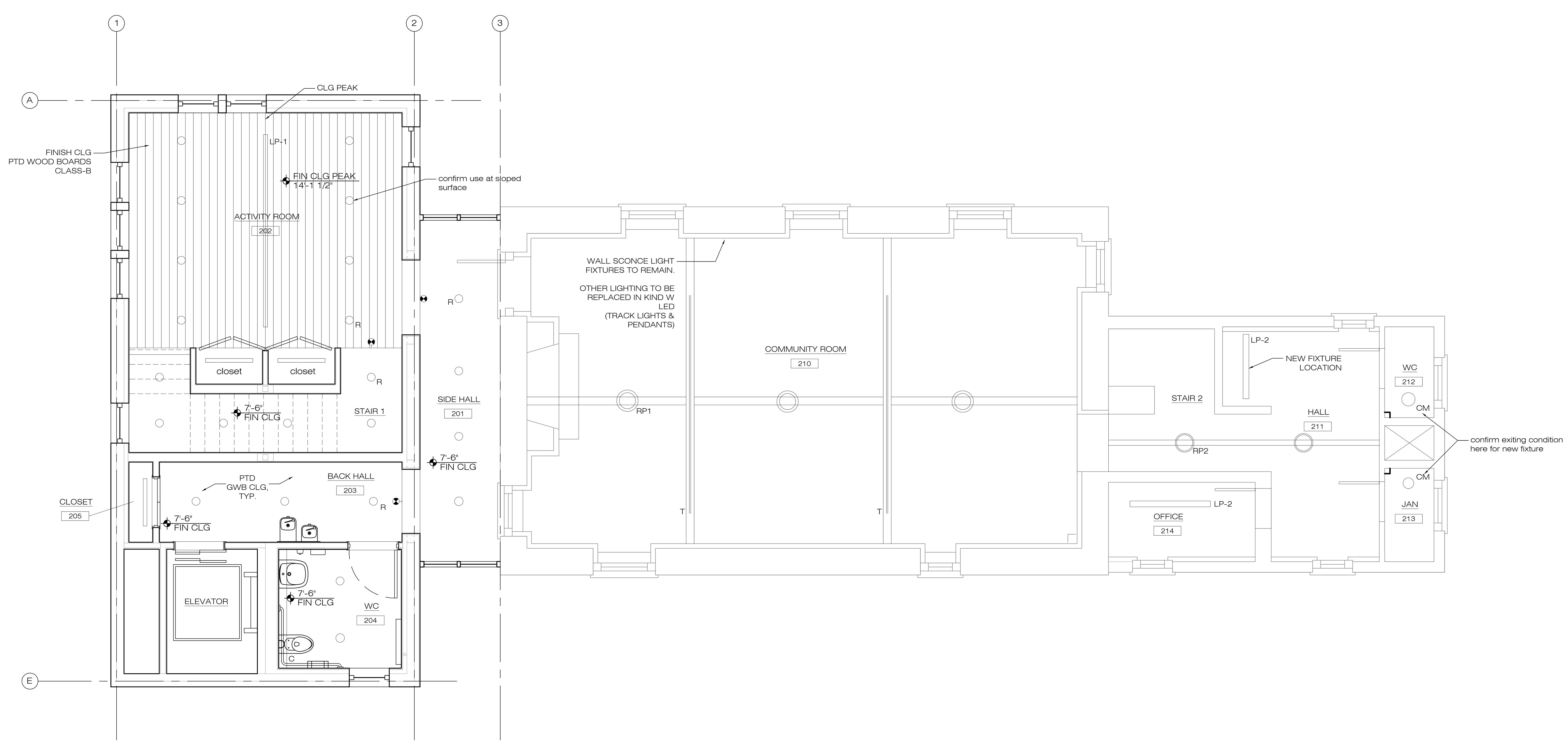

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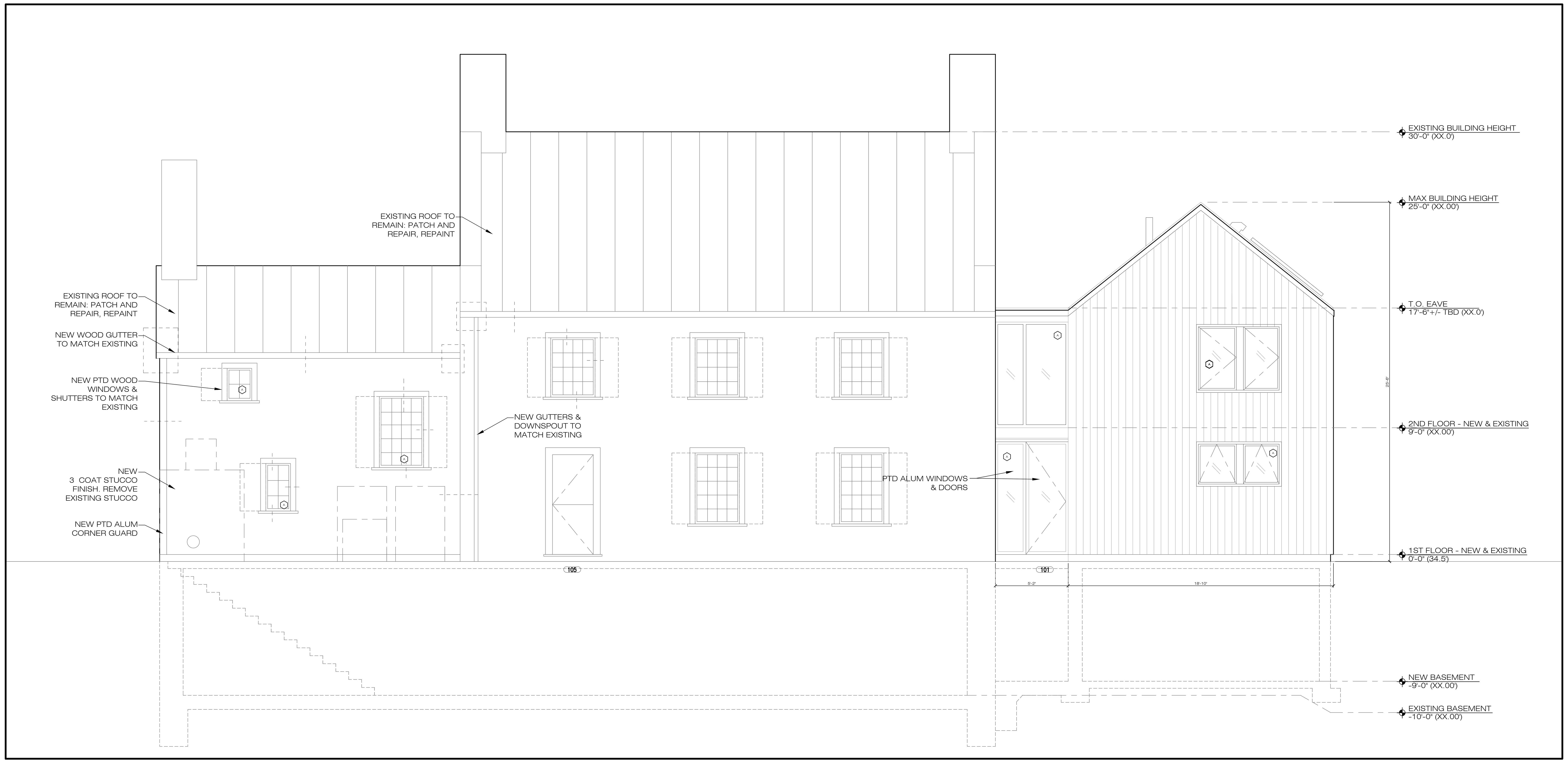

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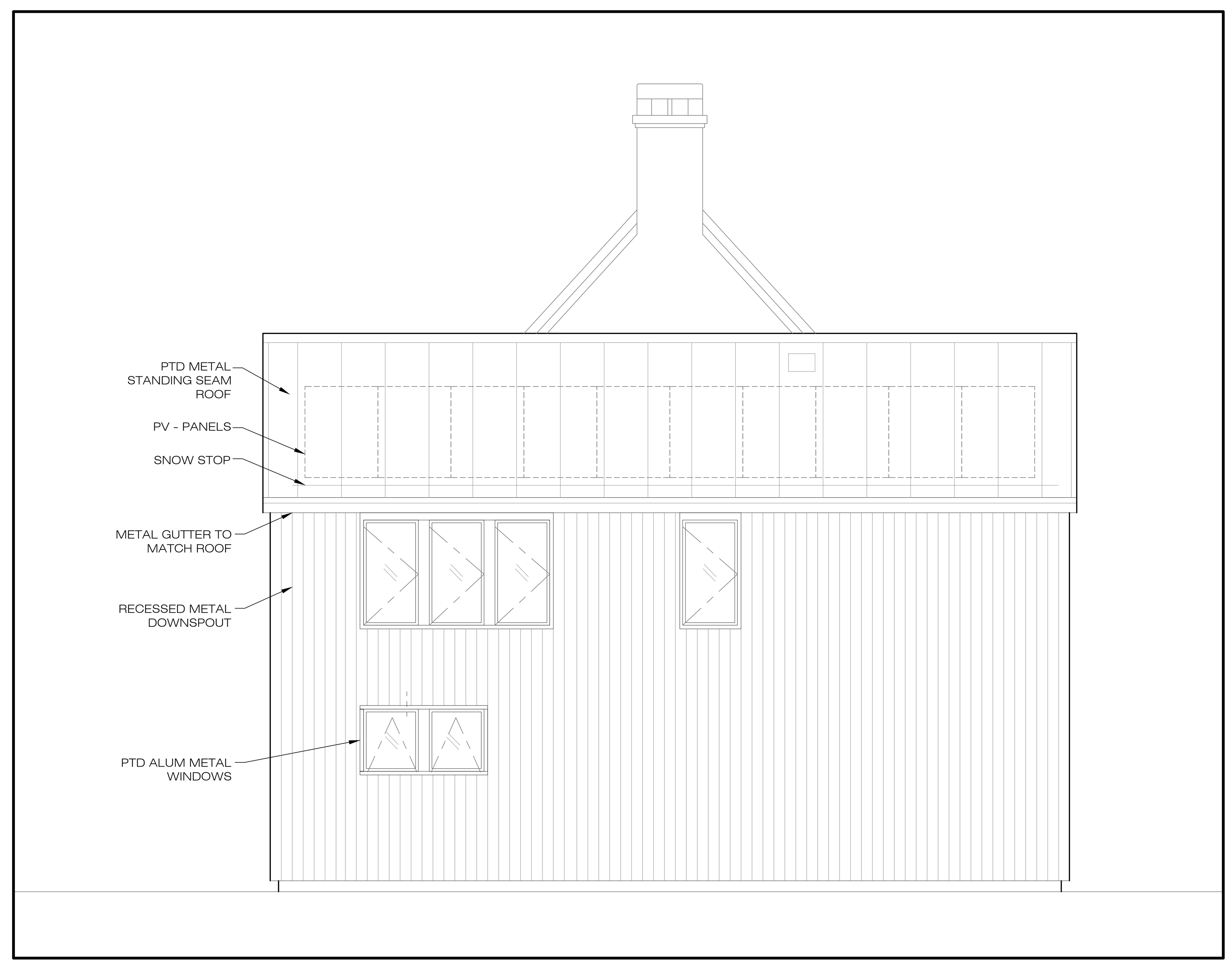

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PROJECT TITLE:
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EXTERIOR ELEVATIONS

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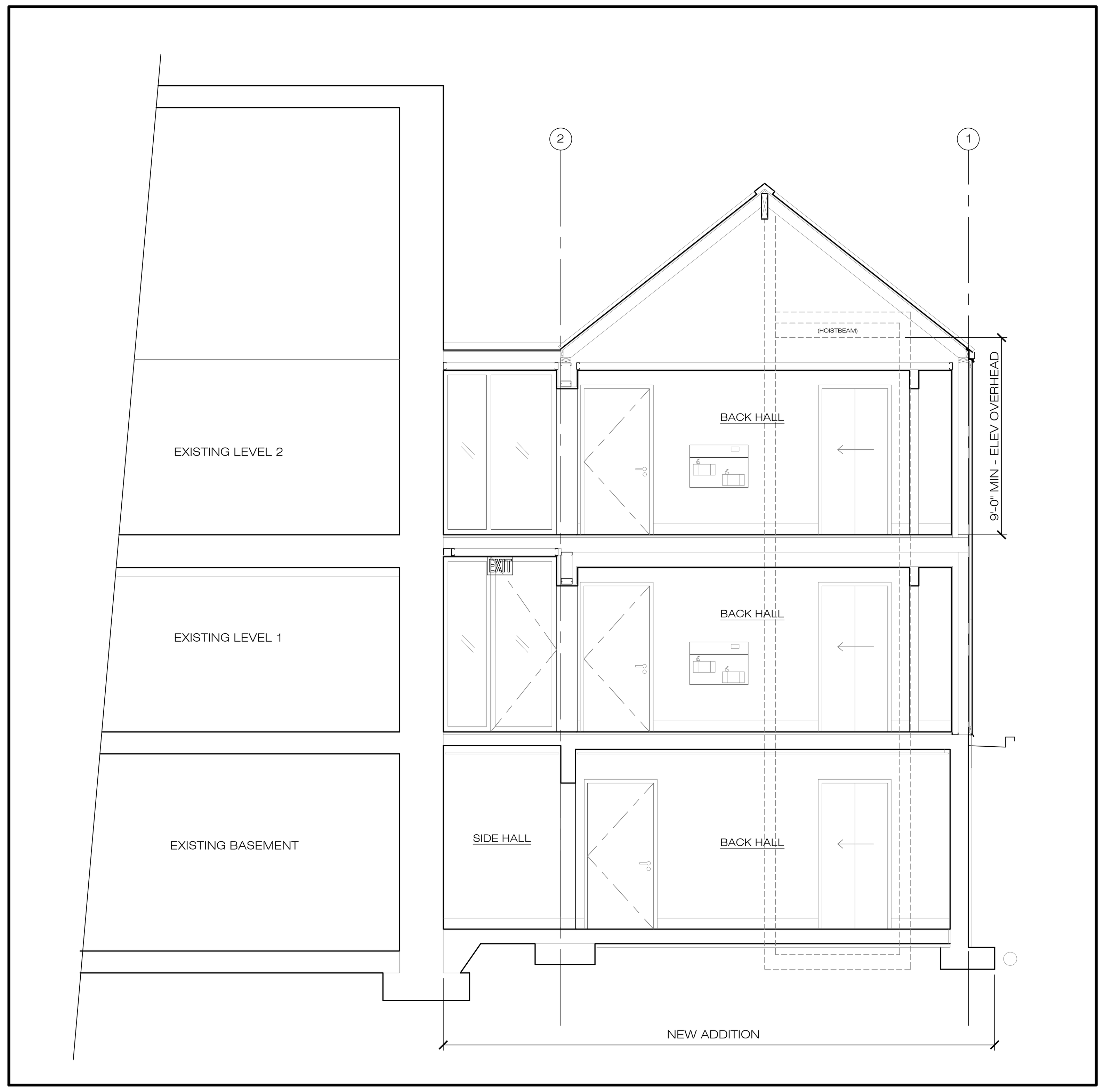

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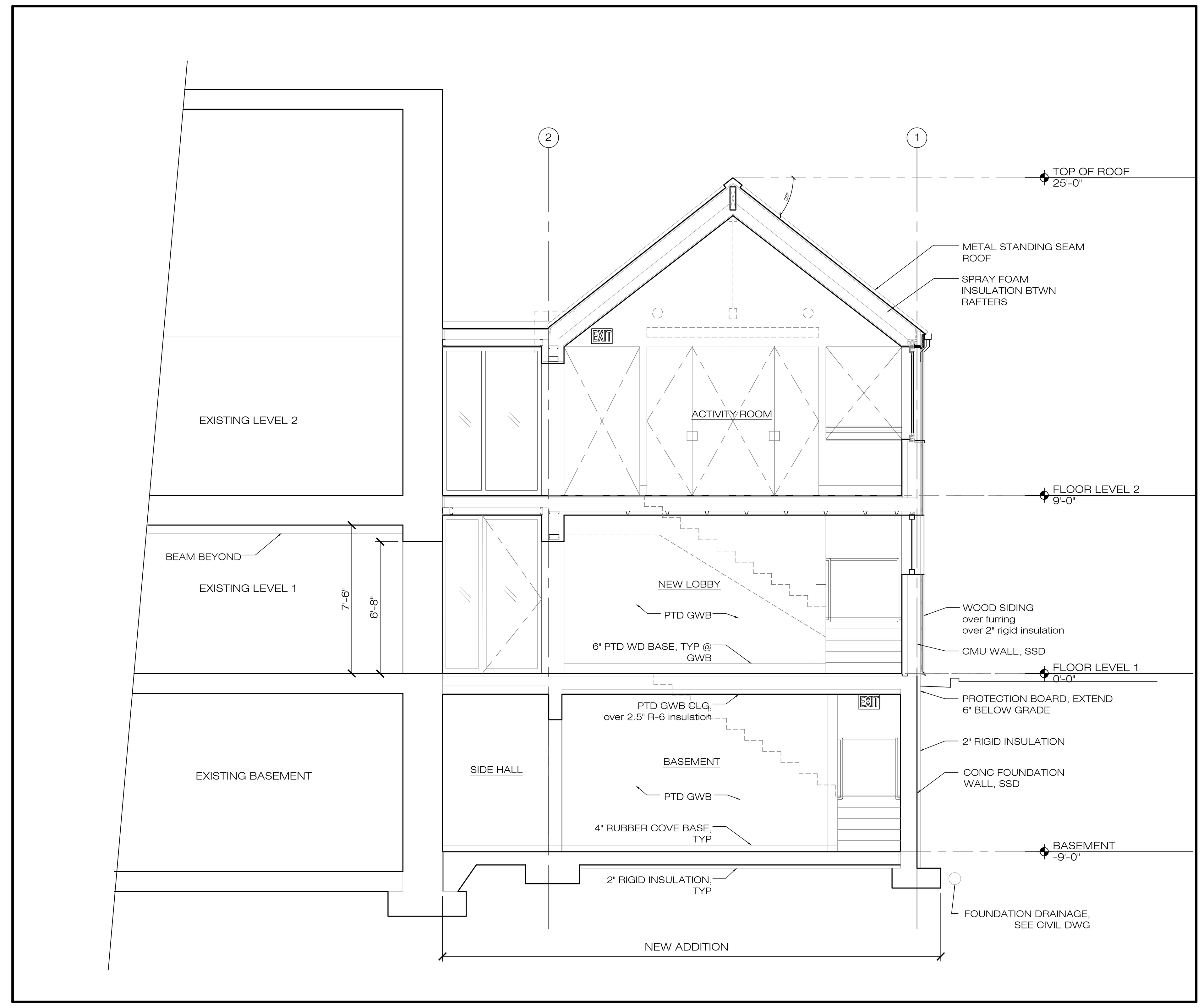

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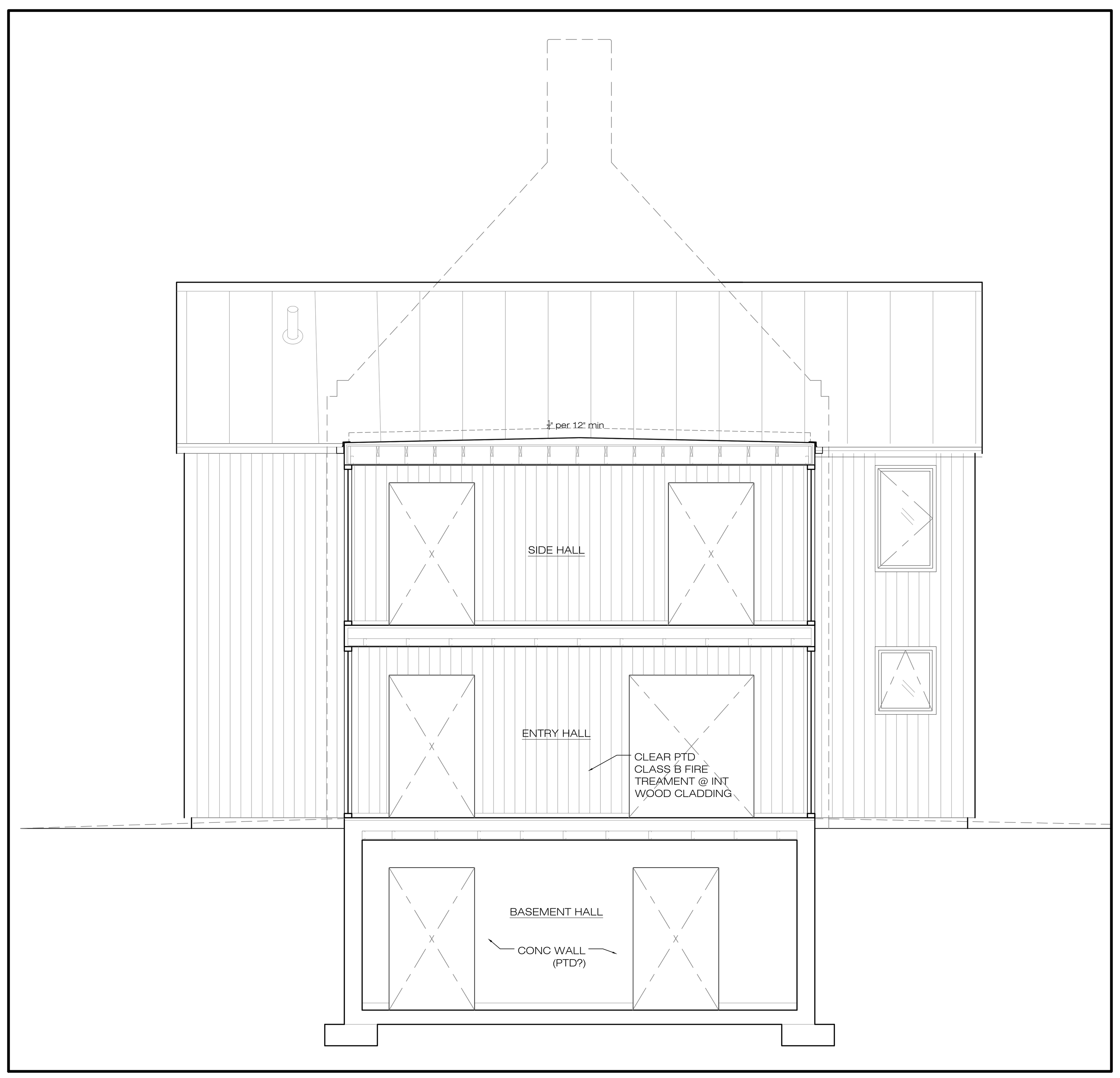

4 SECTION @ ENTRY HALL - LOOKING NORTH
SCALE: 1/4" = 1'-0"

3 SECTION @ LOBBY - LOOKING NORTH
SCALE: 1/4" = 1'-0"

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CONSULTANTS:

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NYC PARKS PROJECT MANAGER:
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CONTRACT NO.: X111-123M
DATE:

PROJECT TITLE:
OLD STONE HOUSE ACCESSIBLE ADDITION, WITH UPGRADES TO PUBLIC RESTROOM & EXISTING HOUSE, AT WASHINGTON PARK
ADDRESS: BLOCK: 981 LOT: 1
336 3RD ST, BROOKLYN,11215

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DRAWING TITLE:
BUILDING SECTIONS

DRAWING NO.:
A301.00

SHEETS IN CONTRACT SET:
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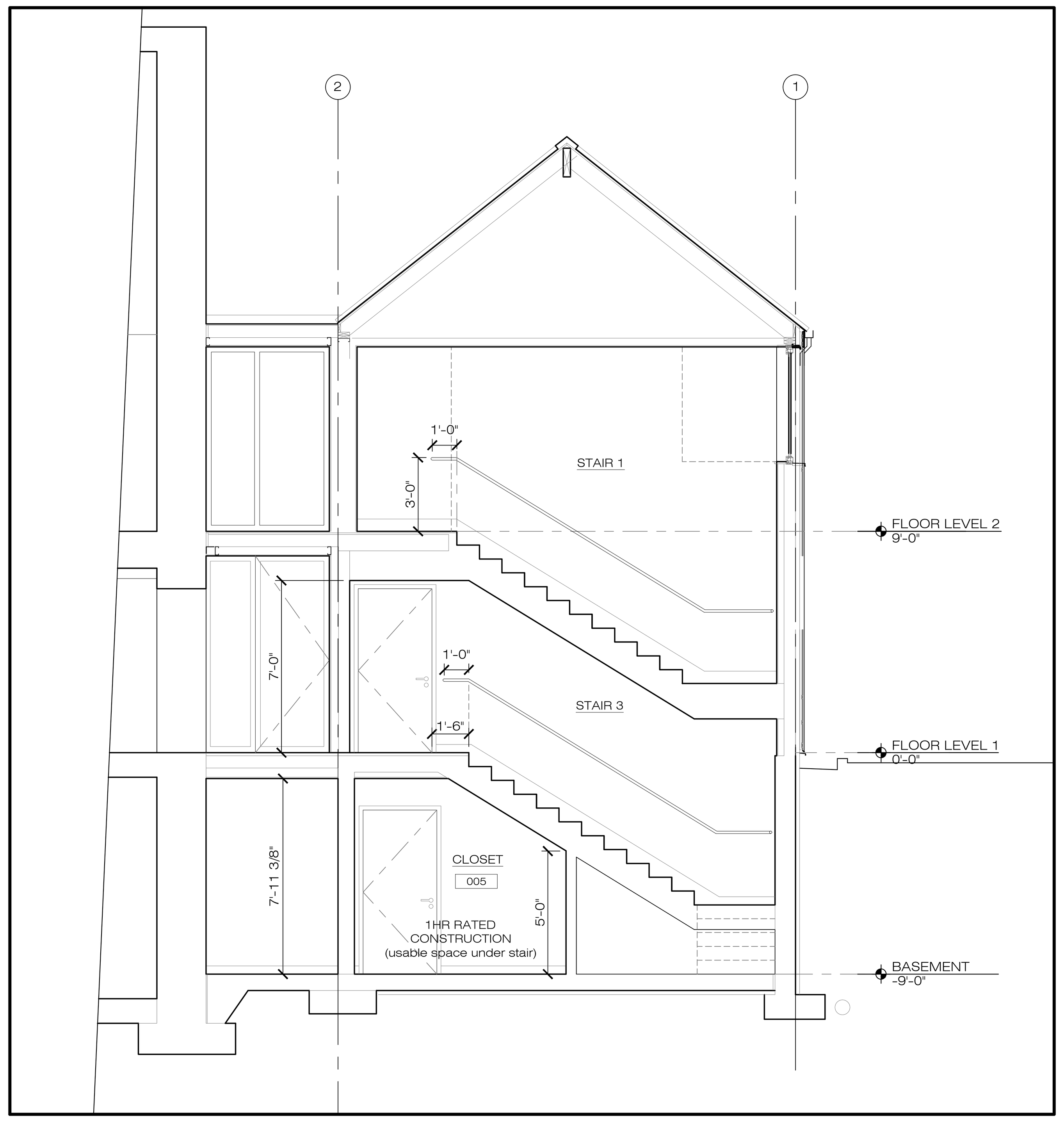

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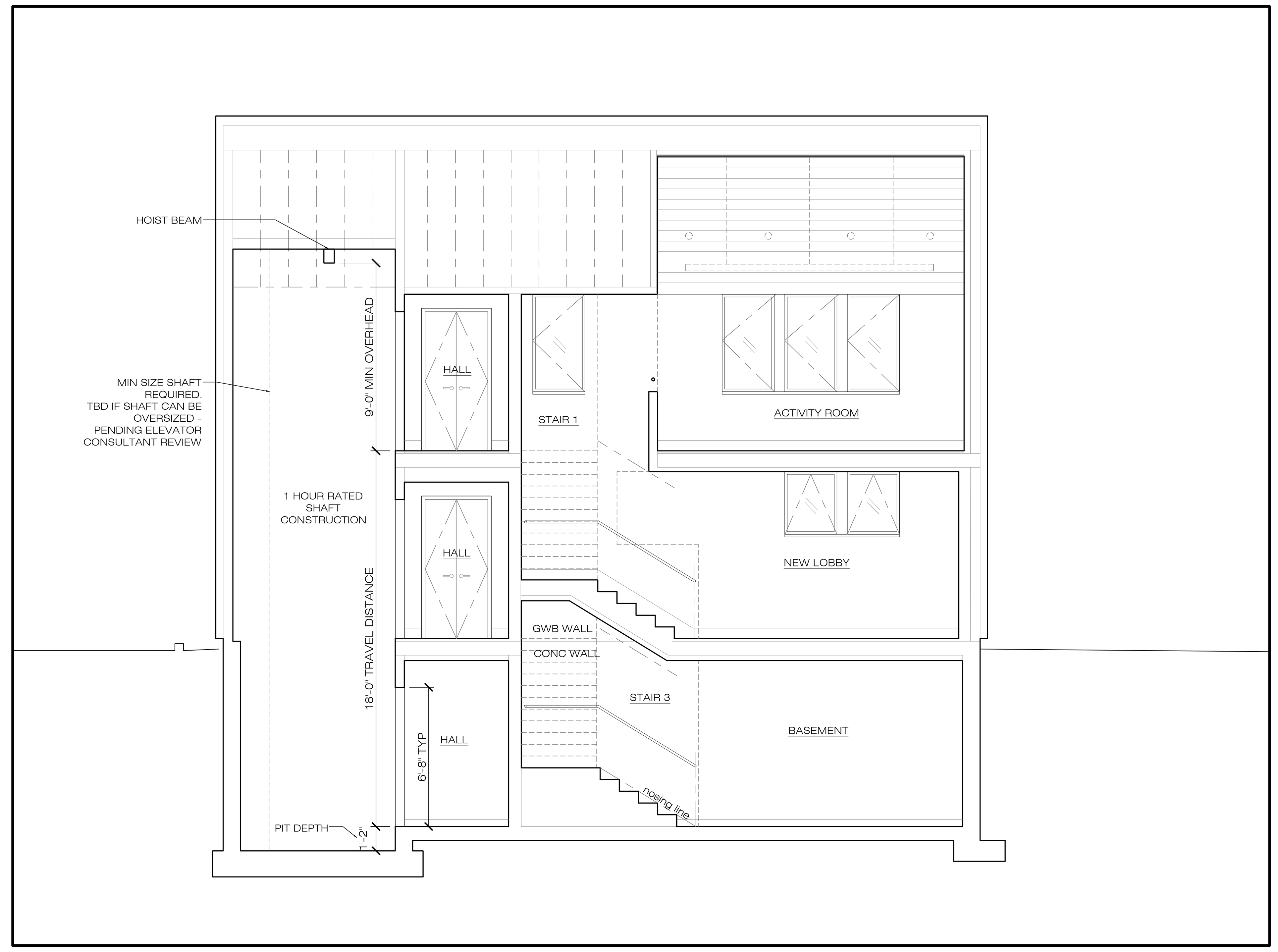

1 SECTION @ STAIR - LOOKING NORTH
SCALE: 1/4" = 1'-0"

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CONSULTANTS:

N/A

NO.	DATE	REVISION

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DISCIPLINE LEAD:
DESIGNER:
DRAFTED BY:
CHECKED BY:

CONTRACT NO.: X111-123M
DATE:

PROJECT TITLE:
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ADDRESS: BLOCK: 981 LOT: 1
336 3RD ST, BROOKLYN,11215

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DRAWING TITLE:
BUILDING SECTIONS

DRAWING NO.:
A302.00

SHEETS IN CONTRACT SET:
SHEET OF ##

Appendix 2: Geotechnical Report

Geotechnical Engineering Report

NYC Parks - Old Stone House Addition Construction

336 3rd Street
Brooklyn, New York

PREPARED FOR:

Anthony Weber, PE, LEED AP
LiRo Engineers, Inc.
235 E Jericho Turnpike
Mineola, New York 11501

PREPARED BY:

MFS Consulting Engineers and Surveyor, DPC
320 Fifth Avenue, Suite 1200
New York, New York 10001

T: (908) 922-4622

F: (866) 517-7413

29 April 2024
MFS Project No. 1124009

Geotechnical Engineering Report

NYC Parks - Old Stone House Addition Construction

336 3rd Street
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INTRODUCTION

This report presents the results of the MFS Consulting Engineers & Surveyor, DPC (MFS) geotechnical engineering study for the New York City Department of Parks and Recreation (NYC Parks) Old Stone House Addition Construction project located in the borough of Brooklyn, New York. The purpose of this study is to investigate the subsurface conditions at the project site and develop recommendations for the design and construction of the proposed building addition. Our study includes a review of available information, a subsurface investigation, an engineering evaluation, and geotechnical engineering recommendations for the proposed building addition design and construction. A summary of our findings and recommendations are presented herein.

Work included in this study was performed in general accordance with the Subconsultant Agreement for the subject project between LiRo Engineers, Inc. (LiRo) and MFS dated 15 January 2024.

All elevations referenced herein are in units of U.S. survey feet and reference the North American Vertical Datum of 1988 (NAVD88). The grade elevation at each boring and test pit location was approximated using the Topographic Survey prepared by MFS dated 12 April 2024 and based on field measurements of the boring and test pit locations from existing fixed objects at the project site at the time that the subsurface investigation was performed. The as-drilled boring and as-dug test pit locations were not surveyed and so the plan locations shown and elevations noted on each respective log/sketch are not exact.

PROPOSED DEVELOPMENT

The project site is located within the J. J. Bryne Playground at Washington Park and has a street address of 336 3rd Street in the borough of Brooklyn, New York. The project site is identified on the New York City tax maps as Block 981, Lot 1 and is presented on the "USGS Topographic Site Location Map" in Figure 1.

The Old Stone House is a loosely styled reconstruction of the Dutch styled Vechte-Cotelyou house built in 1699. The current structure was designed and built by NYC Parks from 1933 to 1934 to capture the basic appearance and spirit of the 1699 house. The house is a Historic House Trust of New York City site and serves as a historic house museum featuring local history exhibits and programming.

It is our understanding that the project scope includes the design and construction of a new 1-1/2 story, approximately 2,600 gross square foot addition with a full basement along the north façade of the existing building. The addition is proposed to house an ADA compliant 3-stop elevator, egress stairs, toilets, and passageways to assist with building circulation. This report has been prepared specifically for the proposed building addition and its foundations and below grade walls.

SUBSURFACE INVESTIGATION

GEOTECHNICAL BORINGS

MFS completed a subsurface investigation consisting of two (2) geotechnical borings, denoted as B-1 and B-2. Each boring was conducted in the vicinity of the proposed building addition. The as-drilled boring locations were measured at the time of drilling from existing fixed site features and are shown on the "As-Drilled and As-Dug Subsurface Investigation Plan" in Figure 2.

Each boring was drilled by MFS Construction, LLC (MFS Construction) from 5 March 2024 to 13 March 2024 under the full-time special inspection of MFS. Each of the borings were completed to a depth of 42 feet below existing site grade. A track mounted Geoprobe 7822DT drill rig was used to advance each of the borings at the project site. The two (2) borings were advanced using a 4-inch inner diameter steel casing and the mud rotary drilling technique with a 2-15/16-inch, 3-7/8-inch, and/or 5-7/8-inch tri-cone button bit and drilling fluid to maintain a stable borehole during boring advancement.

In each boring, soil samples were generally taken via Standard Penetration Testing (SPT)[1] continuously in the uppermost 11 feet to 12 feet below grade and at 5-foot intervals thereafter to the respective boring termination depths. As no soft, cohesive soils were identified during the field subsurface investigation, Shelby tube (undisturbed) samples were not obtained. In addition, rock was not encountered and therefore rock core samples were not obtained during the field subsurface investigation. Upon completion of each boring, the respective borehole was backfilled with soil cuttings and the existing pavers/flagstone were reinstalled to match existing site grade.

Recovered soil samples were visually examined and classified in the field in accordance with the Unified Soil Classification System (USCS) and the New York City Building Code (NYCBC). Soil classifications, standard penetration resistances, drill rig actions, and other observations during boring operations were recorded on the field boring logs. The boring logs were compiled using gINT geotechnical engineering software and are provided in Appendix A.

TEST PIT

MFS completed one (1) test pit, denoted as TP-1 at the project site. Test pit TP-1 was conducted at the location of a former gazebo extension of the building that has since been demolished. The purpose of the test was to identify if any existing foundations for the gazebo remain at the project site. The test pit location is shown on the "As-Drilled and As-Dug Subsurface Investigation Location Plan" presented in Figure 2. The test pit was excavated using handheld equipment by MFS Construction, LLC on 6 March 2024. The pavers and flagstones present at grade were removed prior to excavation and reinstalled upon completion of the test pit operations.

Throughout the duration of the field test pit operations, the MFS engineer visually examined and classified the soil encountered in accordance with the USCS and the NYCBC. During the test pit operations, the remnant gazebo foundation wall was identified, however the depth and extents of the wall were not determined. The subsurface conditions, existing foundation wall extents, test pit plan and sections, and other observations during the test pit operations are shown in the "Test Pit Plan and Sections" presented in Figure 3. Photographs taken during the test pit operations and upon completion/site restoration are provided in Appendix C.

[1]The Standard Penetration Test is a measure of the soil density and consistency. The SPT N-value is defined as the number of blows required to drive a 2-inch outside diameter split-barrel sampler 12 inches, after an initial penetration of 6 inches, using a 140-pound hammer free falling from a height of 30 inches in general accordance with ASTM D1586.

GEOTECHNICAL LABORATORY TESTING

Upon completion of the field subsurface investigation, all soil samples were transported to our office for further evaluation and selection of samples for geotechnical laboratory testing. Soil classifications were verified by a senior level geotechnical engineer and select soil samples were sent to an accredited geotechnical testing laboratory (RSA Geolab, LLC) for further testing.

The laboratory testing of soil samples from the subsurface investigation included water content (ASTM D2216), sieve analyses (ASTM D6913), specific gravity (ASTM D854), and organic content (ASTM D2974). The geotechnical laboratory testing results, including plots and graphs as appropriate, are provided in Appendix B.

SUBSURFACE CONDITIONS

PHYSIOGRAPHY AND LOCAL GEOLOGY

The project site is located within the Atlantic Coastal Plain physiographic province. In the greater New York City region, the Atlantic Coastal Plain Province consists of the three (3) major terminal moraines (Ronkonkoma, Harbor Hill, and Roanoke Point) and the associated outwash deposits beyond the terminus of a large ice sheet that covered a majority of the northern United States approximately 18,000 years ago. The project site is located within the Harbor Hill Moraine in Brooklyn, New York. The entire province has very low relief, with the highest elevations being approximately 400 feet. The northern section of the moraines is low undulating terrain of glacial drift usually under 75 feet elevation. The moraine generally consists of irregular deposits of unconsolidated sand, compact till, and stratified drift, with scattered large boulders from local and upstream sources and the outwash is generally a broad low sandy plain extending south from the moraine.

The project site is located within the Hartland Formation geological rock unit. The Hartland Formation is of Middle Ordovician to Lower Cambrian age consisting of metamorphic and igneous bedrock. The bedrock generally may be described within one or more of the following five (5) rock types; 1) grey thinly laminated muscovite-biotite-quartz schist with minor garnet, 2) medium-grey fine-grained biotite-muscovite-quartz schist, 3) white to pinkish-white fine to medium grained gneissic quartz-microcline-muscovite-biotite-plagioclase granite with minor garnet, 4) dark greenish-black quartz-biotite-hornblende amphibolite, and 5) grey unevenly foliated sillimanite-plagioclase-muscovite-biotite-microcline-quartz gneissic schist with minor garnet. In addition, these rocks can be interlayered with coarse-grained pegmatite, hornblende amphibolite, and amphibolite gneiss.

SOIL CONDITIONS

The following is a description of each strata in the order that it was encountered below grade within the borings conducted at the project site.

Surface Course

In boring B-1, the surface course was comprised of 2 inches of flagstone, 2 inches of sand/mortar, and 2 inches of concrete. In boring B-2, the surface course was comprised of 1.5 inches of paver, 6 inches of sand/mortar, and 4 inches of concrete.

Fill (Class 7)

Fill comprised of sand and gravel with varying amounts of silt was encountered directly below the surface course in each boring conducted at the project site. In addition, miscellaneous debris including brick and asphalt fragments were identified within the fill layer. A petroleum odor was noted all fill samples beginning at a depth of 20 feet below grade. The fill layer extended to a depth of approximately 23.5 feet below grade (EL. +10.4±) in boring B-1 and 28.5 feet below grade (EL. +5.7±) in boring B-2. The relative density for the fill layer was very loose to very dense based on SPT N-values ranging between 2 and 68 blows per foot and an average value of approximately 19 blows per foot.

Silty Sand (SM) (Class 6 and Class 3)

Brown and brown/grey fine to coarse sand with varying amounts of silt and gravel was encountered directly beneath the fill layer in each of the borings. The sand layer was first encountered in boring B-1 at elevation EL. +10.4± and extended to the respective boring termination depth. In boring B-2, the sand layer had a thickness of approximately 5 feet and ranged in elevation from EL. +5.7± to EL. +0.7±. The relative density for the sand layer was very loose to dense based on SPT N-values ranging between 2 blows per foot and 46 blows per foot and an average value of approximately 20 blows per foot.

Peat (Pt) (Class 6)

Dark brown peat was encountered below the sand layer in boring B-2. The peat layer had a thickness of approximately 5 feet and ranged in elevation from EL. +0.7± to EL. -4.3±. The moisture content in the single peat sample recovered was 130.7% and the sample was approximately 37.1% organic.

Gravel (GM) (Class 2)

Brown coarse to fine gravel with trace fine to coarse sand and silt was encountered directly below the peat layer in boring B-2 and extended to the respective boring termination depth. The gravel was identified beginning at elevation EL. -4.3± and extended to the termination depth of boring B-2 at EL. -7.8±. The relative density of the gravel layer was dense based on a SPT N-value of 47 blows per foot for the one (1) sample obtained at the project site.

Groundwater Table

During the field subsurface investigation, groundwater was identified within each of the borings conducted at the project site. Groundwater was identified at depths ranging from 25 feet below grade in boring B-1 to 30 feet below grade in boring B-2, corresponding to EL. +8.9± to EL. +4.2± at the time of drilling. The groundwater observations at the time of drilling are based upon increased moisture in soil samples collected during the subsurface investigation. Due to the mud rotary drilling technique and bentonite used to advance the borings, MFS does not believe that the water levels observed at the completion of the boring operations are an accurate representation of the groundwater levels on site and shall be ignored.

Based on our review of available groundwater data at the project site published by the United Stated Geological Survey (USGS) in 2013, the static groundwater table is expected to be on the order of 24 to 26 feet below grade, which is generally consistent with the groundwater observations at the time of drilling during the field boring operations.

Soil moisture and groundwater conditions should be expected to fluctuate with seasons, precipitation amounts, tides, and other on-site and off-site factors including site utilization.

TEST PIT

Test pit TP-1 was excavated at the location of the foundation wall that previously supported a gazebo structure that has since been demolished to the north of the existing Old Stone House building.

The top of the existing foundation wall was identified approximately 10.5 inches below existing grade, corresponding to EL. +33.2±. The concrete foundation wall was approximately 16 inches wide. The depth to the bottom of the foundation wall was not identified within the test pit extents, which terminated at a depth of approximately 19.5 to 20 inches below existing site grade. At the northern portion of the test pit, Belgian block pavers were encountered at grade and were underlain by 3.5 inches of sand/mortar and a 3-inch concrete slab with welded wire reinforcement approximately 6 inches on center in each direction. At the southern portion of the test pit, flagstone was encountered at grade and was underlain by 9 inches of sand and a 4-inch concrete slab with welded wire reinforcement approximately 6 inches on center in each direction. Beneath the concrete, fill soil comprised of moist brown fine to medium sand with some silt and little fine to course gravel was identified and extended to the termination depth of the test pit.

EVALUATION AND FOUNDATION DESIGN RECOMMENDATIONS

DESIGN GROUNDWATER ELEVATION

As indicated above, groundwater was encountered in the borings conducted at depths ranging from 25 feet to 30 feet below grade and corresponding to elevations EL. +8.9± to +4.2±. Furthermore, the anticipated depth to groundwater based on USGS published data is approximately 24 to 26 feet below grade. Based on our observations during the field subsurface investigation and our review of available USGS data, it is recommended that a design groundwater table elevation of EL. +11.0 be used for the proposed building addition design and construction.

SEISMIC EVALUATION

This section presents the results of our seismic evaluation for the site according to the provisions outlined in the 2022 NYCBC and provides recommended parameters for use in seismic design of the proposed building addition.

<u>Soil Liquefaction</u>

The NYCBC requires that non-cohesive soils below the groundwater table and less than 50 feet below the ground surface be considered for liquefaction. In addition, cohesive soils with plasticity indices less than 20 shall also be considered for liquefaction. The subsurface profile at the project site consists predominantly of medium dense to dense granular fill, sand, peat, and gravel deposits below the design groundwater elevation. As no significant loose granular soil deposits or low plasticity cohesive soils were identified, liquefaction does not need to be considered by the design Engineer of Record. Note that our liquefaction evaluation is limited to the boring termination depths of 42 feet below existing site grade.

Mapped Spectral Accelerations

The site is assigned as Site Class D in accordance with Table 1613.3.4.1 of the NYCBC and based on average soil properties (i.e. N-values). The mapped maximum considered earthquake spectral response acceleration for the short period (S_s) is 0.296g, the one-second period (S_1) is 0.061g, and the maximum considered earthquake geometric mean peak ground acceleration adjusted for site class effects (PGA_M) is 0.26g for Site Class D in New York City in accordance with the NYCBC.

Site Classification

The corresponding seismic factors and the design spectral response accelerations at short period (S_{DS}) and at one-second period (S_{D1}) are calculated based on site class and the mapped spectral response accelerations. The maximum design spectral acceleration at short periods (S_{DS}) is 0.310g and one-second period (S_{D1}) is 0.098g. The site is classified as Seismic Design Category B under Risk Categories I, II, and III and Seismic Design Category C under Rick Category IV in accordance with NYCBC Table 1613.3.5.

FROST DEPTH

As required by the NYCBC, the frost depth at the project site is four (4) feet below grade. As such, it is recommended that the base of all shallow foundations proposed on site extend a minimum of four (4) feet below the lowest proposed adjacent permanent exposed site grade in the vicinity of the proposed building addition. Alternatively, the foundations may be constructed in accordance with ASCE-32 (Design and Construction of Frost Protected Shallow Foundations).

BUILDING ADDITION FOUNDATION SYSTEM

Based upon the results of the field subsurface investigation, it is recommended that the new foundations required to support the proposed building addition be designed and constructed utilizing a shallow foundation system with a slab-on-grade at the lowest level.

Shallow Foundations

We recommend that the proposed building addition be supported on a shallow foundation system that may consist of strip and/or spread footings founded on the Class 7 fill material encountered a minimum of four (4) feet below grade for frost depth with a slab-on-grade at the lowest level.

Shallow foundations bearing on the Class 7 fill material a minimum of four (4) feet below grade for frost depth shall be designed using a gross allowable bearing pressure of 1.5 tons per square foot (tsf). If used, strip footings shall have a minimum width of 18 inches and spread footings shall have minimum plan dimensions of two (2) feet by two (2) feet or be a minimum of two (2) feet in diameter, even if smaller dimensions can be justified using the allowable bearing pressures provided herein.

In order to design the foundations using the allowable bearing capacity indicated herein, MFS recommends that the Contractor be required to over excavate any loose soils that may be identified at the proposed bearing elevation and replace the soil with clean crushed stone or controlled fill to the proposed subgrade elevation. If over excavating is conducted, controlled backfill shall be placed and properly compacted as outlined in the *Fill Material, Placement, and*

Compaction Criteria section of this report prior to constructing the foundations. The extents of the over excavation required should be determined by the geotechnical engineer responsible for special inspections. During construction, the geotechnical engineer responsible for special inspections shall verify the subgrade quality to determine if the allowable bearing capacity of the exposed subgrade is in conformance with the design. For foundation subgrade preparation, refer to the *Subgrade Preparation* section of this report.

Slab-On-Grade

MFS recommends that the proposed building addition be designed with a slab-on-grade at the lowest floor level. It is recommended that the slab-on-grade be designed using a modulus of subgrade reaction of 90 psi/inch (based on a 12-inch square plate). Furthermore, we recommend that a minimum 12-inch-thick layer of free draining clean crushed stone be placed atop the properly compacted subgrade as described in the *Subgrade Preparation* section of this report prior to slab-on-grade construction.

SITE LAYOUT CONSIDERATIONS

The Engineer of Record shall consider the site layout so as to minimize any additional incurred loads on any surrounding existing foundation elements and/or existing below grade walls and prevent the undermining of any existing structures in the vicinity of the proposed construction.

It is our understanding that the proposed building addition will be constructed directly adjacent to the existing Old Stone House structure. At the time that this report was prepared, MFS was only provided with a partial historic drawing that indicates that the existing Old Stone House structure foundations are approximately 11.25 feet below existing site grade. MFS has not been provided any additional information on the sizes, locations, and extents of the existing structure foundations and/or below grade levels. As such, MFS recommends that the bearing elevations and extents of the existing footings be verified before or during construction via test pits.

If possible, any new foundations proposed to support the building addition shall be designed and constructed to bear at the same elevation as the existing adjacent foundations. Under no circumstance shall the proposed foundations be designed and constructed at elevations above the existing adjacent foundations. By designing and constructing the proposed foundations to bear at the same elevation as the existing structure foundations, the new foundations will not induce loads on the existing foundation walls and/or foundations nor will the existing structure be undermined or require underpinning during construction. If the proposed addition is to extend to a depth greater than the foundations of the existing structure, the existing foundations shall be underpinned or otherwise supported during construction. If the new structure is not designed to be constructed directly adjacent to the existing structure, MFS recommends that an influence line having a slope of 1.5H:1V be used to determine if the proposed foundation construction will influence the existing foundations and require underpinning. Any underpinning or stabilization of existing foundations shall be designed by a professional engineer licensed in the state of New York.

If any of the existing foundations are to be used to support the proposed building addition, MFS recommends that the structural engineer analyze the existing foundations using the soil design parameters and bearing capacity outlined herein to determine if they are adequate to support the additional loads incurred due to the construction of the proposed building addition. If the existing foundations are not suitable and/or not deep enough for a full basement, the existing foundations shall be altered and/or reinforced to support the additional loads and/or deepened to allow for the construction of a full basement.

Based on the anticipated location of the proposed building addition, the new foundations and walls will abut the existing foundation walls and footings of the existing Old Stone House structure at the project site. As such, MFS recommends that a Styrofoam or similar bond breaker be placed between the existing and proposed foundation walls and footings. In addition, the design Engineer of Record may consider placing an expansion joint between the existing structure and proposed addition to allow for differential settlement.

PERMANENT BELOW GRADE WALLS

The permanent below grade walls shall be designed to resist static and dynamic earth pressures, hydrostatic pressures, and appropriate surcharge loads. MFS recommends that the design soil parameters provided in the *Design Parameters* section of this report be used for the design of the below grade walls based upon the subsurface conditions encountered in the respective borings performed at the project site.

Backfill should not be placed against the below grade walls until the wall concrete has reached its 28-day compressive design strength as indicated by laboratory testing and all slabs have been constructed to site grade to provide bracing, or temporary lateral bracing has been provided to prevent rotation or other damage to the walls.

Static Earth Pressures

The rigid below grade concrete walls should be designed using an at-rest triangular earth pressure distribution having a pressure of zero at the proposed site grade and increasing to a maximum of $\boldsymbol{Ko} * \boldsymbol{\gamma'} * \boldsymbol{H}$ (lb/ft^2) at the base of the wall, where $\boldsymbol{Ko}$ is the at-rest pressure coefficient, $\boldsymbol{\gamma'}$ is the effective soil unit weight (lb/ft^3), and $\boldsymbol{H}$ is the depth from grade to the bottom of the below grade structure (ft). The lateral earth pressure coefficients shall consider any sloped backfill that is within the influence of the below grade walls.

Dynamic Earth Pressures

The dynamic lateral earth pressure distribution is an inverted triangle having a maximum pressure at the ground surface of $\mathbf{10} * \boldsymbol{H}$ (lb/ft^2), where $\boldsymbol{H}$ is the wall height in feet. The pressure reduces to zero at the bottom of the wall. Lateral earth pressures resulting from the surcharge loads need not be considered for the dynamic loading condition.

Hydrostatic Pressures

In addition to the soil loads, if any below grade structures are to be constructed to extend below the design groundwater table outlined herein, the Engineer of Record shall consider hydrostatic lateral and uplift (buoyancy) forces on the below grade structures. At the time that this report was prepared, we understand that the building addition will be constructed above the design groundwater elevation and so hydrostatic pressures need not be considered. To help alleviate hydrostatic pressure build up on below grade walls during precipitation events, proper drainage shall be installed as outlined in the *Drainage Considerations* section of this report.

VERY IMPORTANT INFO FOR DETAILING AND WP

<u>Surcharge Loads</u>

In addition to earth and water pressures, appropriate surface surcharge pressures should be considered such as potential construction loads, live loads, adjacent structure loads, and vehicular loads adjacent to the proposed below grade structures. It is recommended that all surcharge loads be applied to the structures using the appropriate pressure distribution based on the surcharge load type (line load surcharge, point load surcharge, etc.).

PERMANENT GROUNDWATER CONTROL

It is recommended that all below-grade structures that are intended to remain dry after construction be fully waterproofed to the highest adjacent exposed grade and connect to the façade system. This includes all below grade walls, slabs, and pits and will help prevent groundwater or surface runoff infiltration into the below-grade structures in the event of heavy rainfall, flooding, or a utility break. We recommend that a membrane type waterproofing be used, such as the Preprufe and Bithuthene products by GCP Applied Technologies. Furthermore, it is recommended that water-stops be installed at all concrete joints in addition to the waterproofing membrane. The use of bentonite waterproofing or negative side crystalline waterproofing is not recommended.

It is recommended that new horizontally applied waterproofing membranes be installed on a minimum 2-inch-thick lean concrete mud mat placed over a compacted and approved subgrade to provide a smooth, uniform application surface. All substrate preparation should be performed as recommended by the manufacturer.

The vertical waterproofing should be protected with a rigid barrier to prevent damage during backfilling. Outboard of the waterproofing membrane, we recommend the installation of an appropriate drainage media extending from grade to the bottom of the foundation system to prevent localized build-up of hydrostatic pressures. A prefabricated drainage panel or drainage fill is considered appropriate drainage media. The panel can be used against the waterproofing to provide protection during backfilling. Appropriate drainage fill shall be placed on the outboard side of the drainage panel consisting of clean crushed stone wrapped in filter fabric a minimum of 12 inches wide to reduce the migration of fine soils and prevent the build-up of hydrostatic pressures from accumulation of perched water behind the walls. Refer to the *Drainage Considerations* section below for drainage recommendations and materials.

The waterproofing installation should be inspected routinely during construction by a manufacturer certified waterproofing inspector. Any holes or tears should be repaired in accordance with the manufacturer's recommendations and all utility penetrations should be carefully sealed in accordance with the manufacturer's recommendations. All seams, including separations between wall and slab membranes should be checked for tightness. We recommend that the waterproofing manufacturer inspect the waterproofing operations during construction and approve all work prior to placement of concrete. We also suggest discussing waterproofing detailing with the selected manufacturer during design. Careful installation, diligent protection, and close oversight are critical in producing a final product that limits the potential for seepage.

DOES THIS INFO GET INTO WP SPEC?

DESIGN PARAMETERS

MFS recommends that the soil properties tabulated below be used for the design of the proposed addition foundations and below grade walls as well as any temporary excavation support systems (if required).

Table 1: Soil Design Parameters

Soil Material	Density (pcf)	Friction Angle (°)	Cohesion (ksf)
Existing Fill (Class 7)	120	29	---
Sand (N < 10) (Class 6)	110	28	---
Sand (10 < N < 30) (Class 3b)	115	30	---
Sand (N > 30) (Class 3a)	125	32	---
Peat (Class 6)	90	26	---
Gravel (Class 2a)	125	33	---

The ultimate coefficient of friction between the concrete foundations and the fill soils shall be 0.35.

Controlled fill meeting the gradation, placement, and compaction requirements outlined in this report may be analyzed using a density of 120 pcf, a friction angle of 30°, and a cohesion of 0 ksf.

FOUNDATION SETTLEMENT

The settlements of the proposed shallow foundations will be a function of the structural loads and are dependent on the size, layout, and stiffness of the foundation systems. In addition, settlement will depend on variations in the subsurface profile, thickness of compacted imported fill, and the quality of the earth work operations. Shallow foundations bearing on the Class 7 fill material at a depth of 10 feet below grade should be expected to experience settlement on the order of 1-inch based on the gross allowable bearing capacity of 1.5 tsf outlined herein. As the soils on site are predominantly granular, it is anticipated that much of the settlement will be elastic and occur during or shortly after construction.

Note that a layer of highly organic peat was identified in boring B-2 at a depth of approximately 33.5 feet below existing site grade. As we understand that a gazebo structure was previously constructed in the area of the proposed addition, and as the proposed foundations will be constructed a minimum of approximately 20 feet above this layer, it is assumed that any vertical stress increases in the peat layer will be relatively small and no significant settlement will occur due to stress increases in the peat layer.

It should be noted that at the time this report was prepared, no design loads, foundation sizes, or bearing depths were provided to be used in a more representative analysis of the anticipated settlement. MFS recommends that a foundation design and settlement analysis be performed to ensure that the settlements are within allowable project tolerances once design load, foundation sizes, and bearing depths are known.

FOUNDATION CONSTRUCTION CONSIDERATIONS

EXCAVATION AND TEMPORARY EXCAVATION SUPPORT

Based upon the results of the field subsurface investigation, it is anticipated that miscellaneous debris may be encountered in the upper fill strata identified on site while excavating for the proposed construction. Furthermore, as identified in test pit TP-1, abandoned foundations are known to be in the vicinity of the proposed addition. It is recommended that if they cannot be repurposed all existing foundations in the vicinity of the proposed addition be demolished and removed during construction. It is anticipated that traditional excavators and demolition/excavating equipment will be capable of removing any miscellaneous debris and foundation remnants encountered. No large boulders or other significant obstructions were identified during the field subsurface investigation, however, as the existing fill contains miscellaneous debris and remnant foundations are expected, the Contractor should be prepared to excavate and remove any obstructions if they are identified. All excavations shall be conducted in accordance with OSHA requirements.

In order to construct the proposed foundations on site, temporary excavation support may be required. If the site conditions permit, lateral support of the soil overburden may consist of benching. For temporary excavations, a benched slope out at 1.5H:1V can be performed if site clearance and adjacent structures and/or utilities are not interfering with the excavation. If there are obstructions on site that do not allow for the soil overburden to be benched or the site disturbance is to be minimized, an alternate support of excavation system may be required to excavate to the required depths to construct the proposed foundations on site. Alternate support of excavation systems may consist of, but shall not be limited to, pre-engineered trench boxes, steel sheeting, and/or steel/timber shoring depending on the required excavation sizes and depths. The Contractor shall determine the most appropriate temporary excavation support system to fulfill their means and methods of construction. The design of all temporary support of excavation systems shall be performed by a professional engineer licensed in the state of New York. In addition to earth pressures, appropriate surface surcharge pressures such as potential construction and structure loads should be considered when evaluating the temporary excavation support.

The Contractor shall be responsible for ensuring the installation of the excavation support does not adversely impact any existing utilities or other structures in the area. It is recommended that the specifications require that the Contractor be responsible for all damage and repairs (or replacements, as necessary) to existing utilities and structures resulting from their excavation and foundation work. If existing utilities fall within the limits of excavation for the proposed construction, the Contractor shall take all necessary precautions to locate, monitor, and prevent the movement and/or undermining of the existing utility or provide appropriate support of the utility during excavation in accordance with the owner’s requirements.

TEMPORARY GROUNDWATER CONTROL

Based on the anticipated depths of the proposed foundations and the anticipated depth of groundwater on site, it is not anticipated that the construction will require dewatering within the extents of the excavations. In the event that water is encountered during excavation or accumulates in the excavations after precipitation events, the water should be lowered and maintained at least two (2) feet below the final excavation and subgrade depth. The Contractor shall be responsible for determining their means and methods of dewatering, if required, and should be prepared to perform dewatering activities in advance of excavating to maintain stable excavation subgrades and slopes. Any required dewatering on site shall not result in any softening or loss of soil at the proposed foundation subgrade elevations and shall ensure that any drawdown does not adversely affect any adjacent utilities and structures. If the groundwater table is encountered during excavation activities on site, it shall be brought to the attention of MFS for re-evaluation of the design groundwater table depth outlined herein.

If needed, discharge of dewatering effluent may not be placed into sewers without a permit from the New York City Department of Environmental Protection (NYCDEP). Contaminated water, if present, will need to be treated prior to discharging into the storm or sanitary sewers or disposed of in accordance with local laws, environmental regulations, and codes.

Furthermore, the site should be graded during construction to facilitate proper drainage and minimize ponding during precipitation events. All areas of disturbed soil shall be compacted and sealed at the end of each workday to reduce the risk of subgrade softening.

SUBGRADE PREPARATION

Excavation within the last foot from the final foundation and/or slab-on-grade subgrade elevations should be performed with care to minimize soil disturbance at the bearing elevation. The exposed subgrade surface should be level and free of loose soil, debris, organics, standing water, or other unsatisfactory material. Over excavation may be required to remove large debris in the fill material, if encountered, or if loose soils are identified at the subgrade bearing elevations and shall be replaced with clean crushed stone or compacted controlled fill. The exposed subgrade condition and bearing capacity should be verified and approved by the geotechnical engineer responsible for special inspections before any foundation or slab-on-grade construction takes place.

Prior to construction, the foundation and slab-on-grade subgrades should be compacted with at least five (5) passes of a 2-ton smooth-drum vibratory roller. Any areas exhibiting excessive weaving, rutting, or pumping should be removed and replaced with clean crushed stone or compacted controlled fill, as described below.

It is recommended that the subgrades be protected from the effects of frost, precipitation, surface run-off, and construction equipment until the concrete is placed. As such, it is recommended that the shallow foundations and slab-on-grade be constructed on a minimum of 12 inches of clean crushed stone. This layer of crushed stone will serve to protect against subgrade deterioration during construction. Prior to pouring concrete for the foundations and slab-on-grade, all water, organics, and debris will need to be removed from the subgrade. Any unprotected subgrade exposed to rain or snow events should be re-compacted and re-inspected by the geotechnical engineer responsible for special inspections prior to concrete placement.

FILL MATERIAL, PLACEMENT, AND COMPACTION CRITERIA

If needed, all imported fill used to establish the finish subgrade beneath new foundations and slabs-on-grade should be controlled fill as defined by the NYCBC consisting of well-graded sand and gravel having not more than 10% by dry weight passing the No. 200 sieve. The maximum particle size should be three (3) inches. The fill should be free of organics, clay, and other deleterious or compressible materials and shall be approved by the geotechnical engineer prior to placement. Clean crushed stone, where recommended herein, shall conform to the requirements of AASHTO No. 57 stone.

Controlled fill material should be placed in uniform 12-inch-thick loose lifts and compacted using a smooth drum vibratory roller to at least 95% of its maximum dry unit weight as determined by ASTM D1557. In restricted areas where only hand-operated compactors can be used, the maximum lift thickness should be limited to six (6) inches. The appropriate water content at the time of compaction should be plus or minus two (2) percentage points of optimum as determined by the laboratory compaction tests of proposed fill material. No fill should be placed until all unsuitable material is removed and the underlying material has been compacted and approved by the geotechnical engineer responsible for special inspections. No backfill material should be placed on areas where free water is standing or on frozen subsoil areas.

It is recommended that before filling operations begin, representative samples of proposed fill materials be obtained and sent to a laboratory for testing. The samples should be tested for gradation, maximum dry density, and optimum moisture contents. These tests will be required for quality control testing during construction as well as to determine whether or not the proposed materials meet the fill requirements stated herein.

During fill placement, all surfaces should be sloped adequately during construction to promote surface runoff and to prevent the accumulation of ponded water on the fill. It is good practice to roll the surface with a smooth roller to promote water runoff if rainfall is imminent and at the end of each workday. Frozen soils should be removed before placing new fill. It is recommended that the geotechnical engineer responsible for special inspections observe and document the placement of all fill materials. Areas that do not meet the specified compaction should be re-compacted and re-tested.

SOIL REUSE

Any potential soil reuse shall first be subjected to the results and recommendations of environmental testing (by others) and any compliance as may be required by NYC Parks or other authorities having jurisdiction.

In general, the uppermost fill soils at the project site consisted of sands with miscellaneous debris material and relatively high fines content (greater than 10%). As such, MFS recommends that the existing fill material not be re-used as controlled fill on site. The existing fill may be used as uncontrolled fill on site and not for the support of structures, behind walls, etc. In order for any existing fill material to be re-used as uncontrolled fill, it is recommended that the Contractor be required to complete gradation and compaction testing on representative soils samples and submit the results to the Engineer of Record for approval. Prior to reuse as uncontrolled fill, any organic materials, debris, and particles larger than 3-inches shall be removed.

DRAINAGE CONSIDERATIONS

MFS recommends that the Engineer of Record consider the drainage of water in the backfill material behind all permanent below grade walls and beneath all foundations and slabs-on-grade. Providing adequate drainage will prevent the build-up of hydrostatic pressures on the walls and slabs as well as potential frost heave damage. MFS recommends that a minimum 12-inch-thick layer of free draining material wrapped with filter fabric be provided beneath all foundations and slabs as outlined herein.

MONITORING OF ADJACENT STRUCTURES

Due to the proximity of the proposed construction to existing structures and utilities at a historical project site, MFS recommends that a monitoring plan be prepared and implemented on site to evaluate the performance of the existing structures during construction. The monitoring plan should be developed based upon the anticipated support of excavation method and foundation types as some methods will cause more disturbance as compared to others. Monitoring should include means to measure structure and ground movement, as well as vibrations due to construction activities. The type and locations of specific monitoring equipment, threshold values (maximum movement, peak particle velocity, etc.), and durations should be developed based on review of the anticipated construction means and methods in conjunction with the proximity and type of existing structures and utilities with relation to the site. The purpose of performing monitoring is to provide reasonable feedback to the Engineer of Record as to the performance of the Contractor with respect to protecting existing structures and utilities, and to assess any necessary changes to means and methods of construction.

We recommend that a monitoring plan and project specifications be completed prior to temporary support of excavation construction, excavation, and foundation construction. The monitoring plan shall be developed by a professional engineer licensed in the state of New York. The monitoring plan should detail the methods, locations, and equipment required for monitoring vibration and movement, and would provide limits along with requirements for frequency of readings and reporting. The monitoring plan should also provide project procedures in the event of a movement or vibration exceedance to limit damage to existing utilities and structures in the vicinity of the project. It is anticipated that the monitoring program will likely include a pre- and post-construction survey, crack gauges, optical surveying, and seismographs (vibration monitoring).

It is recommended that all monitoring be performed by a third-party consultant independent of the Contractor; however, the Contractor shall reserve the right to perform additional monitoring at their discretion. Monitoring should be performed for the duration outlined in the monitoring plan, but shall not be shorter than the demolition, support of excavation system construction, excavation, foundation construction, and below grade wall construction until the at grade floor slab is installed and backfilled to proposed finished site grade.

CONSTRUCTION DOCUMENTS AND QUALITY CONTROL

Technical specifications and design drawings should incorporate our recommendations to ensure that the subsurface conditions and any geotechnical issues at the site are adequately addressed in the construction documents. MFS should assist the design team in preparing specification sections related to geotechnical issues such as earthwork, excavation, subgrade preparation, and foundation construction. MFS should also review foundation drawings and details, and all Contractor submittals and construction procedures related to geotechnical work.

All foundations and earthwork for this project shall be subject to engineering special inspections as required by Chapter 17 of the NYCBC. We recommend that MFS provide engineering special inspections during construction to verify that the foundation design is implemented and to provide timely responses to field questions and changes. At this time, the following special inspections and progress inspections may be required for the earthwork and foundation construction for the envisioned project:

- BC 1705.3 (Concrete Construction)
- BC 1705.6 (During Fill Placement, Evaluation of In-Place Density, Subgrade Inspection)
- BC 1705.25.3 (Excavations, New Foundations)

LIMITATIONS

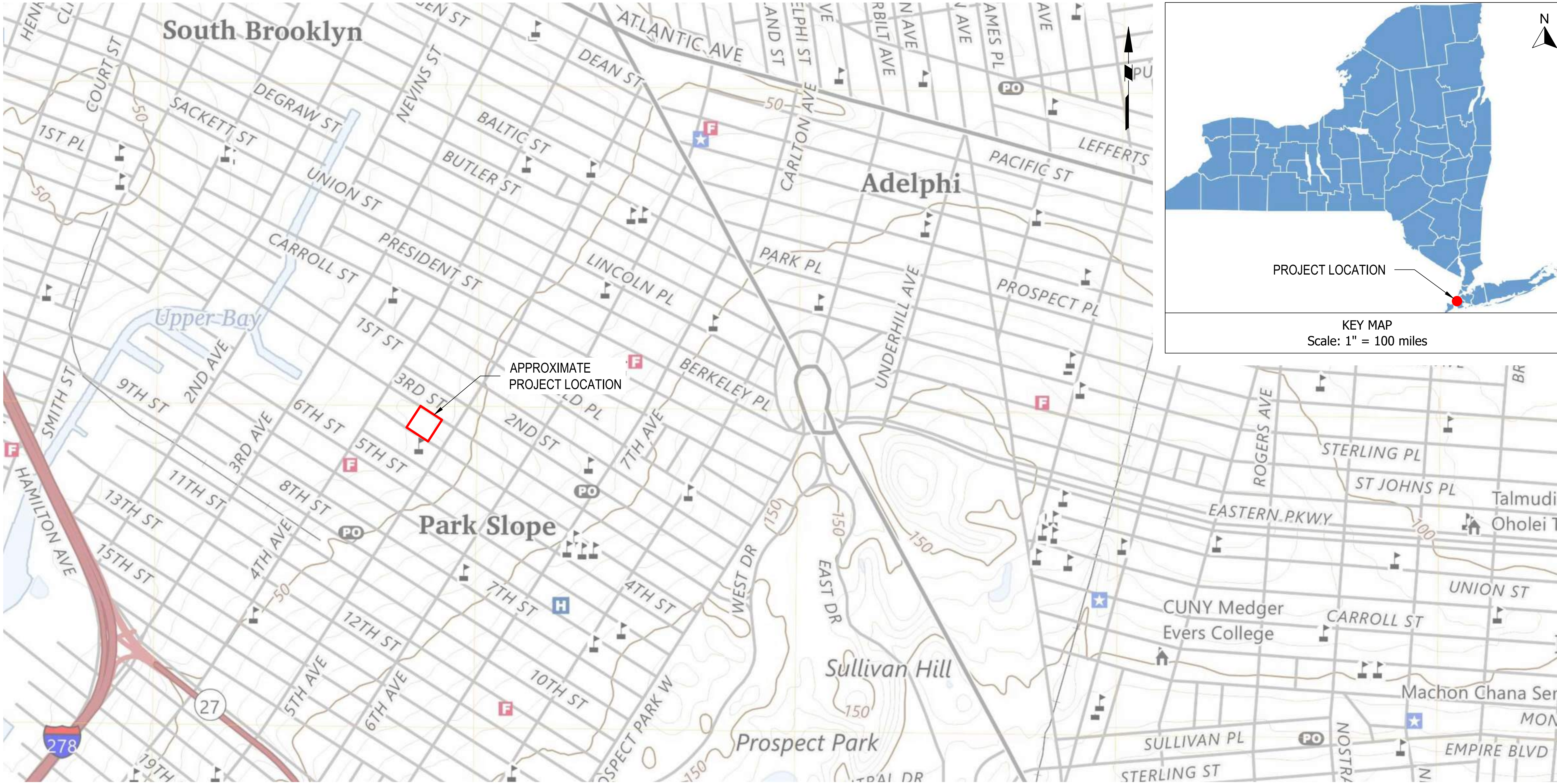
The conclusions and recommendations provided in this report are based on the results of the field subsurface investigation consisting of two (2) geotechnical borings and one (1) test pit. Recommendations provided are contingent upon one another and no recommendation should be followed independent of the others.

This report has been prepared to assist the Owner, Architect, and Engineer in the design process and is only applicable to the envisioned project discussed herein. Any changes in the proposed development should be brought to our attention so that we can determine whether such changes affect our recommendations. MFS cannot assume responsibility for use of this report for any areas beyond the limits of this study or for any projects not specifically discussed herein. This report must not be used for the design of temporary works including scaffolding, construction hoists, and crane pads.

Information on the subsurface strata and groundwater levels shown on the logs represent conditions encountered only at the locations indicated and at the time of investigation. If different conditions are encountered during construction, they should immediately be brought to our attention for evaluation as they may affect our recommendations.

Environmental issues (such as potentially contaminated soil) are outside the scope of this study and should be addressed in a separate study.

FIGURES



KEY MAP
Scale: 1" = 100 miles

1 USGS TOPOGRAPHIC SITE LOCATION MAP

Scale: 1" = 1000'

0 1000' 2000'

LEGEND
APPROXIMATE PROJECT LOCATION

NOTE:

1. THE BACKGROUND FOR THIS SHEET WAS OBTAINED FROM THE USGS TOPOGRAPHIC 7.5-MINUTE MAP FOR BROOKLYN, NY 2023 - NATIONAL GEOSPATIAL TECHNICAL OPERATIONS CENTER (NGTOC).

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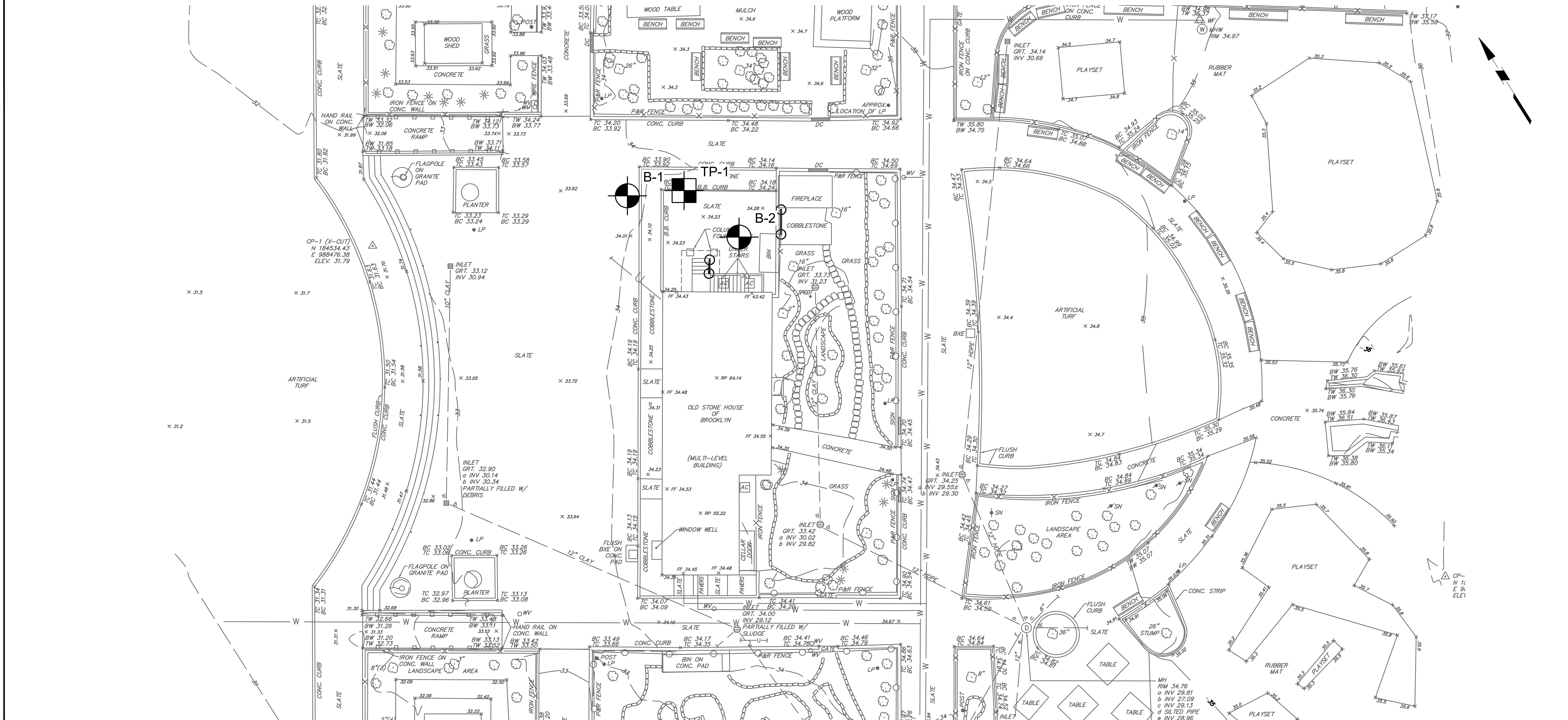
N.Y. CERTIFICATE OF AUTHORIZATION: 0020175

PROJECT NAME
OLD STONE HOUSE ADDITION CONSTRUCTION
336 3RD STREET
(BLOCK 981, LOT 1)
BROOKLYN KINGS COUNTY NEW YORK

DRAWING TITLE
USGS TOPOGRAPHIC SITE LOCATION MAP

PROJECT NO.	1124009	SHEET NO.
DATE	03/11/2024	FIG. 1
SCALE	AS_NOTED	
DRAWN BY	WFB	
CHECKED BY	JMF	1 OF 1



NOTES:

1. THE AS-DRILLED BORING AND AS-DUG TEST PIT LOCATIONS REFERENCE THE FIELD SUBSURFACE INVESTIGATION COMPLETED BY MFS CONSTRUCTION, LLC. UNDER THE FULL-TIME SPECIAL INSPECTION OF MFS CONSULTING ENGINEERS AND SURVEYOR, DPC (MFS) FROM 5 MARCH 2024 TO 13 MARCH 2024.
2. THE BACKGROUND SURVEY REFERENCES THE PARTIAL TOPOGRAPHIC SURVEY COMPLETED BY MFS DATED 12 APRIL 2024 IN AUTOCAD FORMAT.
3. ALL AS-DRILLED BORING AND AS-DUG TEST PIT LOCATIONS WERE MEASURED IN THE FIELD AT THE TIME OF THE FIELD SUBSURFACE INVESTIGATION FROM EXISTING FIXED SITE FEATURES AND THE RESPECTIVE LOCATIONS SHALL BE CONSIDERED APPROXIMATE. DIMENSIONS ARE NOT SHOWN FOR CLARITY.
4. ALL ELEVATIONS SHOWN HEREIN REFERENCE THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88).

1 AS-DRILLED/AS-DUG SUBSURFACE INVESTIGATION PLAN

Scale: 1"=20'

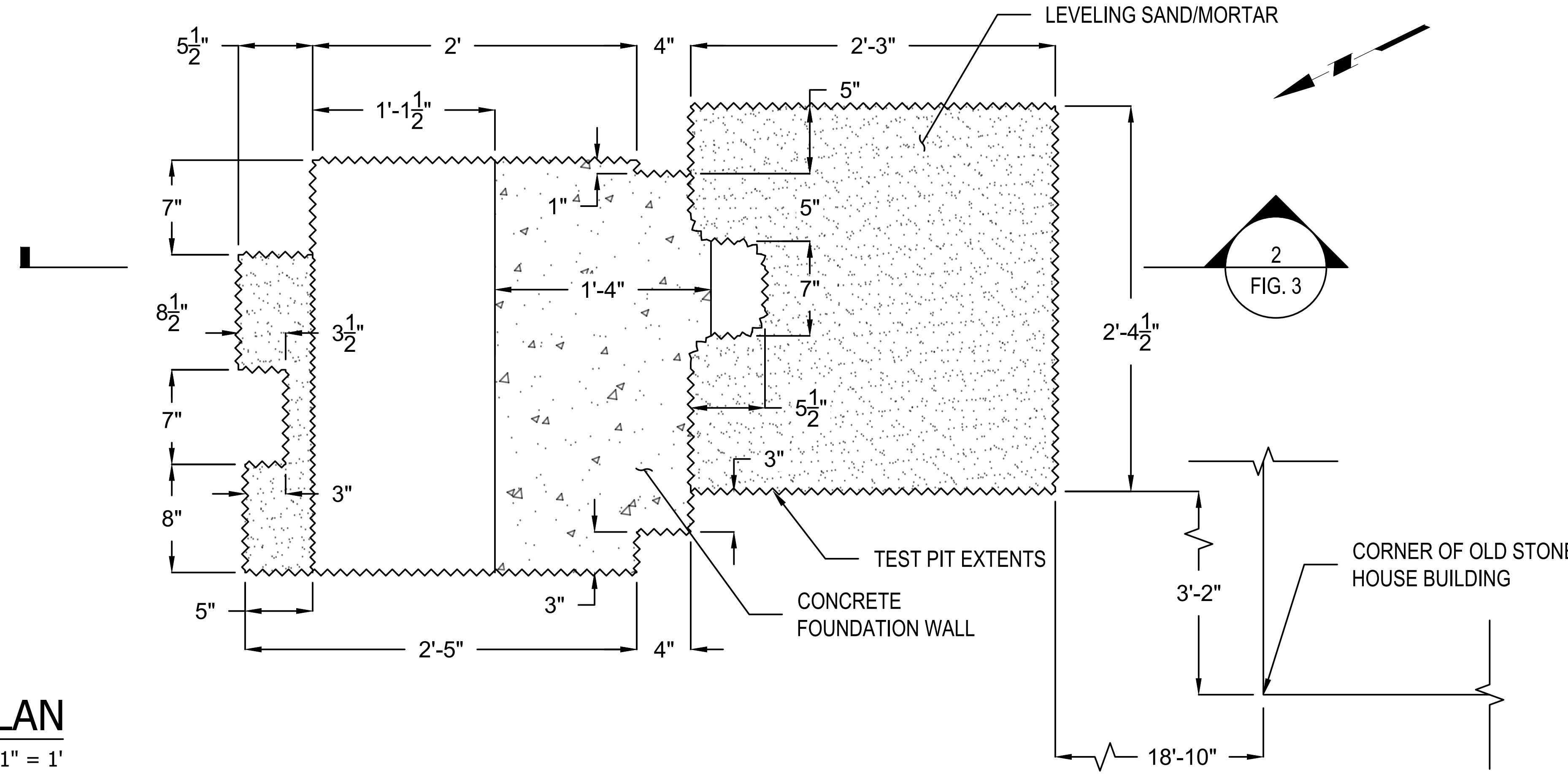
0 20' 40'

LEGEND

B-# AS-DRILLED BORING LOCATION

TP-# AS-DUG TEST PIT LOCATION

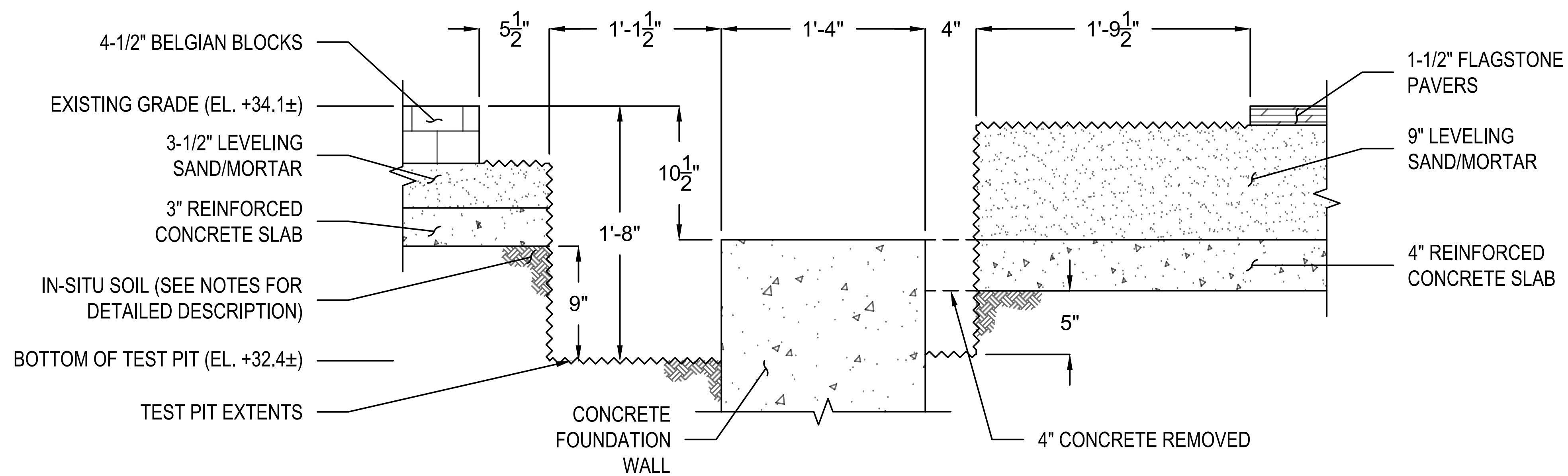
MFS ENGINEERS & SURVEYORS MFS CONSULTING ENGINEERS & SURVEYOR, DPC 320 FIFTH AVE., FLOOR 12-SUITE #1200, NEW YORK, NY 10001 T: 212.943.6576 www.MFSengineers.com F: 866.517.7413 N.Y. CERTIFICATE OF AUTHORIZATION: 0020175	PROJECT NAME OLD STONE HOUSE ADDITION CONSTRUCTION 336 3RD STREET (BLOCK 981, LOT 1) KINGS COUNTY BROOKLYN NEW YORK	DRAWING TITLE AS-DRILLED AND AS-DUG SUBSURFACE INVESTIGATION PALN	PROJECT NO. 1124009 DATE 03/11/2024 SCALE AS_NOTED DRAWN BY WFB CHECKED BY JMF	SHEET NO. FIG. 2 1 OF 1



1 TP-1 PLAN

Scale: 1" = 1'

0 4' 8'



3 TP-1 SECTION

Scale: 1" = 1'

0 4' 8'

NOTE:

1. SEE FIGURE 2 FOR ALL GENERAL NOTES.
2. THE CONCRETE SLABS IDENTIFIED WERE REINFORCED WITH WELDED WIRE REINFORCEMENT CONSISTING OF APPROXIMATELY 8-GAUGE WIRE WELDED 6"X6" ON CENTER.
3. IN-SITU SOIL CONSISTED OF MOIST, BROWN F.-M. SAND, SM. SILT, LT. F.-C. GRAVEL, TR. COBBLES (FILL) (CLASS 7).

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PROJECT NAME
OLD STONE HOUSE ADDITION CONSTRUCTION
336 3RD STREET
(BLOCK 981, LOT 1)
BROOKLYN KINGS COUNTY NEW YORK

DRAWING TITLE
TEST PIT PLAN AND SECTIONS

PROJECT NO.	1124009
DATE	03/11/2024
SCALE	AS_NOTED
DRAWN BY	WFB
CHECKED BY	JMF

SHEET NO.
FIG. 3
1 OF 1

APPENDIX A

Boring Logs

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISION						GRAPHIC SYMBOL	GROUP SYMBOL (ASTM D2487)	TYPICAL DESCRIPTION
COARSE-GRAINED SOIL	MORE THAN 50% BY WEIGHT RETAINED ON NO. 200 SIEVE*	GRAVEL	50% OR MORE OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	LESS THAN 5% FINES**		GW	WELL GRADED GRAVEL, GRAVEL-SAND MIXTURES $Cu \geq 4$ & $1 < Cc \leq 3$
							GP	POORLY GRADED GRAVEL, GRAVEL- SAND MIXTURES
				GRAVEL WITH FINES	MORE THAN 12% FINES**		GM	GRAVEL-SAND-SILT MIXTURES
							GC	GRAVEL-SAND-CLAY MIXTURES
		SAND	MORE THAN 50% OF COURSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	LESS THAN 5% FINES**		SW	WELL GRADED SAND, SAND-GRAVEL MIXTURES $Cu \geq 6$ & $1 < Cc \leq 3$
							SP	POORLY GRADED SAND, SAND-GRAVEL MIXTURES
				SAND WITH FINES	MORE THAN 12% FINES**		SM	SAND-SILT MIXTURES
							SC	SAND-CLAY MIXTURES
FINE-GRAINED SOIL	MORE THAN 50% BY WEIGHT PASSES NO. 200 SIEVE*	SILT & CLAY	LIQUID LIMIT LESS THAN 50				ML	INORGANIC SILT, CLAYEY SILT, LOW PLASTICITY
							CL	INORGANIC CLAY OF LOW TO MEDIUM PLASTICITY, SILTY CLAY
							OL***	ORGANIC, LOW PLASTICITY, SILT-CLAY MIXTURES, LESS THAN 30% ORGANICS
		SILT & CLAY	LIQUID LIMIT GREATER THAN 50				MH	INORGANIC SILT OF HIGH PLASTICITY,
							CH	INORGANIC CLAY OF HIGH PLASTICITY
							OH***	ORGANIC, MEDIUM TO HIGH PLASTICITY, SILT-CLAY MIXTURES, LESS THAN 30% ORGANICS
HIGHLY ORGANIC SOIL 30% OR MORE ORGANICS							PT	PEAT, MUCK, OTHER HIGHLY ORGANIC SOIL

* BASED ON MATERIAL PASSING THE 3” (75MM) SIEVE; COBBLES 3” TO 12”; BOULDERS > 12”
** MATERIALS WITH 5% TO 12% FINES ARE BORDERLINE CASES, DESIGNATED: GW-GM, SW-SC, ETC.
***ORGANIC SOILS (OH/OL) ARE DEFINED BY HAVING A LIQUID LIMIT VALUE AFTER OVEN DRYING THAT IS LESS THAN 75% OF ITS LIQUID LIMIT VALUE BEFORE OVEN DRYING

GRADATION

TERM	% BY DRY WEIGHT
TRACE	< 10
LITTLE	10 to 20
SOME	20 to 35
AND	35 to 50

TERM	% BY VOLUME
OCCASIONAL	< 1
FREQUENT	1 to 10
NUMEROUS	> 10

RELATIVE DENSITY (COARSE-GRAINED SOIL)

TERM	SPT N-VALUE (BLOWS/FT.)
VERY LOOSE	0 to 4
LOOSE	5 to 10
MEDIUM DENSE	11 to 30
DENSE	31 to 50
VERY DENSE	> 50

TERM	PLASTICITY
SILT	NON-PLASTIC
CLAYEY SILT	LOW PLASTICITY
SILTY CLAY	MEDIUM PLASTICITY
CLAY	HIGH PLASTICITY

CONSISTENCY (FINE-GRAINED SOIL)

TERM	SPT N-VALUE (BLOWS/FT.)
VERY SOFT	0 to 2
SOFT	3 to 4
MEDIUM STIFF	5 to 8
STIFF	9 to 15
VERY STIFF	16 to 30
HARD	31 to 50
VERY HARD	> 50

VALUES OF PERCENT CONTENT ARE FROM LABORATORY OR FIELD TEST DATA, WHERE APPLICABLE.
WHEN NO TESTING WAS PERFORMED, VALUES OF PERCENT CONTENT ARE ESTIMATED BASED ON VISUAL OBSERVATION.

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BORING NUMBER B-1

CLIENT	LiRo Engineers, Inc.	**PROJECT NAME**	NYC Parks - Old Stone House Addition
MFS PROJECT NUMBER	1124009	**PROJECT LOCATION**	Brooklyn, New York

DRILLING AGENCY	MFS Construction, LLC	**SURFACE ELEVATION**	33.90 feet+/-	**DATUM**	NAVD88
DRILLING EQUIPMENT	Geoprobe 7822DT	**DATE STARTED**	3/5/24	**COMPLETED**	3/12/24
SIZE AND TYPE OF BIT	2-15/16", 3-7/8", & 5-7/8" TCBB	**COMPLETION DEPTH**	42 feet	**ROCK DEPTH**	----
CASING	4" I.D. Steel	**NO. SAMPLES** 12	**DIST.** 12	**UNDIST.** 0	**CORE** 0
CASING HAMMER	Automatic	**GROUND WATER LEVELS (ft. BG):**		▽ **AT TIME OF DRILLING**	25
WEIGHT 140 pounds	**DROP** 30 inches	▼ **AT END OF DRILLING**	10.2	**AFTER DRILLING**	----
SAMPLER	2" O.D. Split Spoon	**FOREMAN**	Barry Elliott		
SAMPLER HAMMER	Automatic	**INSPECTOR**	William Butler		
WEIGHT 140 pounds	**DROP** 30 inches	**CHECKED BY**	Michael Mudalel, PE		

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in) (RQD%)	BLOW COUNTS / 6 INCHES (N VALUE)	GRAPHIC LOG	NYC BUILDING CODE	DEPTH BELOW SURFACE (ft)	MATERIAL DESCRIPTION	ELEVATION
0						0.50	2" Flagstone, 2" Sand/Mortar, 2" Concrete	33.40
	SS S-1	6	3-3-3 (6)				Moist, brown f.-c. SAND, sm. Silt, lt. f. Gravel (Class 7) (FILL)	
	SS S-2	8	4-8-6-6 (14)				Moist, brown f.-m. SAND, sm. Silt, tr. f. Gravel (Class 7) (FILL)	
5	SS S-3	1	2-2-6-4 (8)				Moist, grey f. GRAVEL, sm. f.-c. Sand, tr. Silt (Class 7) (FILL)	
	SS S-4	4	2-3-5-4 (8)				Moist, brown/grey f.-c. SAND, sm. Silt, lt. f. Gravel (brick fragments) (Class 7) (FILL)	
10	SS S-5	7	18-20-12-8 (32)				Moist, brown f.-c. SAND, sm. c.-f. Gravel, lt. Silt (brick fragments) (Class 7) (FILL)	
	SS S-6	13	8-10-13-12 (23)		Class 7	▼	Moist, brown/dark brown f.-c. SAND, sm. Silt, sm. f.-c. Gravel (brick fragments) (Class 7) (FILL)	
15	SS S-7	1	3-4-4-5 (8)				Moist, brown f.-c. SAND, sm. Silt, tr. f. Gravel (Class 7) (FILL)	
20	SS S-8	7	8-9-6-3 (15)				Moist, dark grey f.-c. SAND, sm. Silt, lt. f. Gravel (asphalt fragment) (petroleum odor) (Class 7) (FILL)	
						23.50		10.40
25					Class 6	▽		

REMARKS

3/5/24
Mobilize to boring location at 7:40 AM
Start boring at 8:00 AM
Remove flagstone at grade and drill to 0.5' below grade using 3-7/8" Tri-Cone Button Bit (TCBB)
Take S-1
Take S-2
Take S-3

Attempt to take S-4
Auto hammer not functioning
Backfill borehole with soil cuttings and Benseal
End of day at 12:00 PM
3/7/24
Resume boring operations at 8:00 AM
Drill to 3.5' below grade using 5-7/8" TCBB
Advance 4" casing to 5' below grade
Drill to 6' below grade using 3-7/8" TCBB
Mix Quick-Gel drilling fluid
Pump not working - unable to drill
End of day at 11:00 AM
3/12/24
Resume boring operations at 7:45 AM
Advance 4" casing to 5' below grade
Drill to 6' below grade using 2-15/16" TCBB
Take S-4
Take S-5
Take S-6
Advance 4" casing to 9.5' below grade
Drill to 10' below grade using 3-7/8" TCBB - casing spinning/rods stuck
Remove rods and advance 4" casing to 14.5' below grade
Drill to 15' below grade using 3-7/8" TCBB
Take S-7
Drill to 20' below grade using 3-7/8" TCBB

(Continued Next Page)

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BORING NUMBER B-1

CLIENT LiRo Engineers, Inc. **PROJECT NAME** NYC Parks - Old Stone House Addition

MFS PROJECT NUMBER 1124009 **PROJECT LOCATION** Brooklyn, New York

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in) (RQD%)	BLOW COUNTS / 6 INCHES (N VALUE)	GRAPHIC LOG	NYC BUILDING CODE	DEPTH BELOW SURFACE (ft)	MATERIAL DESCRIPTION	ELEVATION	REMARKS
25	SS S-9	7	4-1-1-1 (2)		Class 6	28.50	Wet, brown f.-c. SAND, sm. Silt, lt. f.-c. Gravel (Class 6) (SM)	5.40	Take S-8 Drill to 25' below grade using 3-7/8" TCBB Take S-9 Drill to 30' below grade using 3-7/8" TCBB Issues with clogging during advancement
30	SS S-10	9	4-13-11-8 (24)		Class 3		Wet, brown f.-c. SAND, sm. Silt (Class 3b) (SM)		Take S-10 Drill to 35' below grade using 3-7/8" TCBB
35	SS S-11	0	9-9-10-12 (19)				No Recovery		Take S-11 Coarse gravel in split spoon shoe Drill to 40' below grade using 3-7/8" TCBB Issues with clogging during advancement Rig chatter from 39' to 40' below grade
40	SS S-12	12	12-20-26-35 (46)			42.00	Wet, brown/grey f.-c. SAND, sm. f.-c. Gravel, sm. Silt (Class 3a) (SM)	-8.10	Take S-12 End of boring at 1:40 PM to 42' below grade Backfill borehole with soil cuttings and restore flagstone to match existing site grade

Bottom of borehole at 42.0 feet.

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BORING NUMBER B-2

CLIENT LiRo Engineers, Inc.
PROJECT NAME NYC Parks - Old Stone House Addition
MFS PROJECT NUMBER 1124009
PROJECT LOCATION Brooklyn, New York

DRILLING AGENCY MFS Construction, LLC
SURFACE ELEVATION 34.20 feet+/- **DATUM** NAVD88
DRILLING EQUIPMENT Geoprobe 7822DT
DATE STARTED 3/13/24 **COMPLETED** 3/13/24
SIZE AND TYPE OF BIT 3-7/8" & 5-7/8" TCBB
COMPLETION DEPTH 42 feet **ROCK DEPTH** ----
CASING 4" I.D. Steel
NO. SAMPLES 11 **DIST.** 11 **UNDIST.** 0 **CORE** 0
CASING HAMMER Automatic
GROUND WATER LEVELS (ft. BG): ▽ **AT TIME OF DRILLING** 30
WEIGHT 140 pounds **DROP** 30 inches
▼ **AT END OF DRILLING** 18.2 **AFTER DRILLING** ----
SAMPLER 2" O.D. Split Spoon
FOREMAN Barry Elliott
SAMPLER HAMMER Automatic
INSPECTOR William Butler
WEIGHT 140 pounds **DROP** 30 inches
CHECKED BY Michael Mudalel, PE

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in) (RQD%)	BLOW COUNTS / 6 INCHES (N VALUE)	GRAPHIC LOG	NYC BUILDING CODE	DEPTH BELOW SURFACE (ft)	MATERIAL DESCRIPTION	ELEVATION	REMARKS
0						1.00	1.5" Paver, 6" Sand/Mortar, 4" Concrete	33.20	Mobilize to boring location at 7:10 AM Start boring at 7:30 AM Remove paver at grade and drill to 1' below grade using 5-7/8" Tri-Cone Button Bit (TCBB)
	SS S-1	12	5-8-11-15 (19)				Moist, brown f.-c. SAND and Silt, lt. f. Gravel (brick fragments) (Class 7) (FILL)		Take S-1
	SS S-2	2	6-44-24-10 (68)				Moist, brown f.-c. SAND, sm. Silt, tr. f. Gravel (brick fragments) (Class 7) (FILL)		Take S-2
5	SS S-3	0	7-7-7-10 (14)				No Recovery		Take S-3
	SS S-4	20	8-20-12-11 (32)				Moist, brown f.-c. SAND, sm. Silt, lt. f.-c. Gravel (brick fragments) (Class 7) (FILL)		Take S-4
10	SS S-5	18	11-11-6-5 (17)				Moist, brown f.-m. SAND, sm. Silt, tr. f. Gravel (Class 7) (FILL)		Take S-5 Advance 4" casing to 9.5' below grade Drill to 15' below grade using 3-7/8" TCBB
					Class 7				
15	SS S-6	4	3-2-2-3 (4)				Moist, brown f.-m. SAND, sm. Silt, tr. f. Gravel (Class 7) (FILL)		Take S-6 Drill to 20' below grade using 3-7/8" TCBB
						▼			
20	SS S-7	1	3-9-5-3 (14)				Moist, dark brown f.-m. SAND, sm. Silt (petroleum odor) (Class 7) (FILL)		Take S-7 Attempt to drill to 25' below grade using 3-7/8" TCBB Loss of drilling returns and rig chatter at 22.5' below grade Stop drilling at 22.5' below grade and advance 4" casing to 19.5 below grade Drill to 25' below grade using 3-7/8" TCBB
25									

(Continued Next Page)

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Telephone: (908) 922-4622
Fax: (866) 517-7413

BORING NUMBER B-2

CLIENT LiRo Engineers, Inc. **PROJECT NAME** NYC Parks - Old Stone House Addition

MFS PROJECT NUMBER 1124009 **PROJECT LOCATION** Brooklyn, New York

DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY (in) (RQD%)	BLOW COUNTS / 6 INCHES (N VALUE)	GRAPHIC LOG	NYC BUILDING CODE	DEPTH BELOW SURFACE (ft)	MATERIAL DESCRIPTION	ELEVATION	REMARKS
25	SS S-8	2	3-10-9-9 (19)		Class 7	28.50	Moist, dark brown f.-m. SAND, sm. Silt (petroleum odor) (Class 7) (FILL)	5.70	Loss of drilling returns at 20' below grade Advance 4" casing to 24.5' below grade Drill to 25' below grade using 3-7/8" TCBB Take S-8 Attempt to drill to 30' below grade using 3-7/8" TCBB No drilling returns at 25.5' below grade Stop drilling at 25.5' below grade and advance 4" casing to 29.5 below grade
30	SS S-9	5	3-4-6-10 (10)		Class 3	33.50	Wet, brown f.-m. SAND, sm. Silt, lt. c.-f. Gravel (Class 3b) (SM)	0.70	Drill to 30' below grade using 3-7/8" TCBB Take S-9 Drill to 35' below grade using 3-7/8" TCBB
35	SS S-10	19	3-6-10-14 (16)		Class 6	38.50	Wet, dark brown PEAT (Class 6) (PT)	-4.30	Take S-10 Drill to 40' below grade using 3-7/8" TCBB
40	SS S-11	1	9-24-23-26 (47)		Class 2	42.00	Wet, brown c.-f. GRAVEL, tr. f.-c. Sand, tr. Silt (Class 2a) (GP)	-7.80	Take S-11 Coarse gravel in split spoon shoe End of boring at 3:00 PM to 42' below grade Backfill borehole with soil cuttings and restore pavers to match existing site grade

Bottom of borehole at 42.0 feet.

APPENDIX B
Geotechnical Laboratory Testing Results

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

Letter of Transmittal

Date: 3-22-24 Job No.: 909 Lab Log: 24-3273

Attention: Mr. Jacob Fradkin
MFS Consulting Engineers and Surveyor, DPC
2780 Hamilton Boulevard
South Plainfield, NJ 07080

CC:

Re: NYC Parks – Old House Addition
Project Number: 1124009

Sample(s) ID: **B-1 S-2 thru B-2 S-10** (8 samples)

Dear Mr. Fradkin,

Please find attached results for the samples referenced above. The following lab testing was performed:

- ASTM D2216 Moisture Content (8 tests)
- ASTM D6913 Sieve Analysis (7 tests)
- ASTM D854 Specific Gravity (1 test)
- ASTM D2974 Organic Content (1 test)

Regards,
RSA Geolab, LLC

Remarks: If you have any questions, please call 908-964-0786.

Signed: ______________

Dr. Raza S. Ahmed
President RSA Geolab, LLC

RSA GEOLAB

1017 Greeley Ave N
Union, NJ 07083
908-964-0786
www.RSAGeolab.com

MOISTURE CONTENT (ASTM D2216)

Project:	NYC Parks - Old Stone House Addition Reinforcement	Project #:	909
Client:	MFS Consulting Engineers and Surveyor, DPC Project Number: 1124009	Date:	3-22-24

HOLE #/ SAMPLE #	B-1 S-2	B-1 S-6	B-1 S-9	B-1 S-12	B-2 S-1	B-2 S-4
DEPTH	2-4'	10-12'	25-27'	40-42'	1-3'	7-9'
WET WGT. + TARE (gms.)	217.7	361.4	407.7	434.2	299.4	365.3
DRY WGT. + TARE (gms.)	191.7	317.3	332.4	373.6	269.1	323.6
WGT. WATER (gms.)	26.0	44.1	75.3	60.6	30.3	41.7
TARE (gms.)	7.1	7.2	7.2	7.0	7.1	7.0
DRY WGT. (gms.)	184.6	310.1	325.2	366.6	262.0	316.6
MOISTURE CONTENT (%)	**14.1**	**14.2**	**23.2**	**16.5**	**11.6**	**13.2**

HOLE #/ SAMPLE #	B-2 S-9					
DEPTH	30-32'					
WET WGT. + TARE (gms.)	303.1					
DRY WGT. + TARE (gms.)	266.4					
WGT. WATER (gms.)	36.7					
TARE (gms.)	7.1					
DRY WGT. (gms.)	259.3					
MOISTURE CONTENT (%)	**14.2**					

Performed by: VS   Entered by: KH   Checked by: KP

RSA GEOLAB
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Union, NJ 07083
908-964-0786
www.RSAGeolab.com

MOISTURE CONTENT (ASTM D2216)/
LOSS ON IGNITION (ASTM D2974)

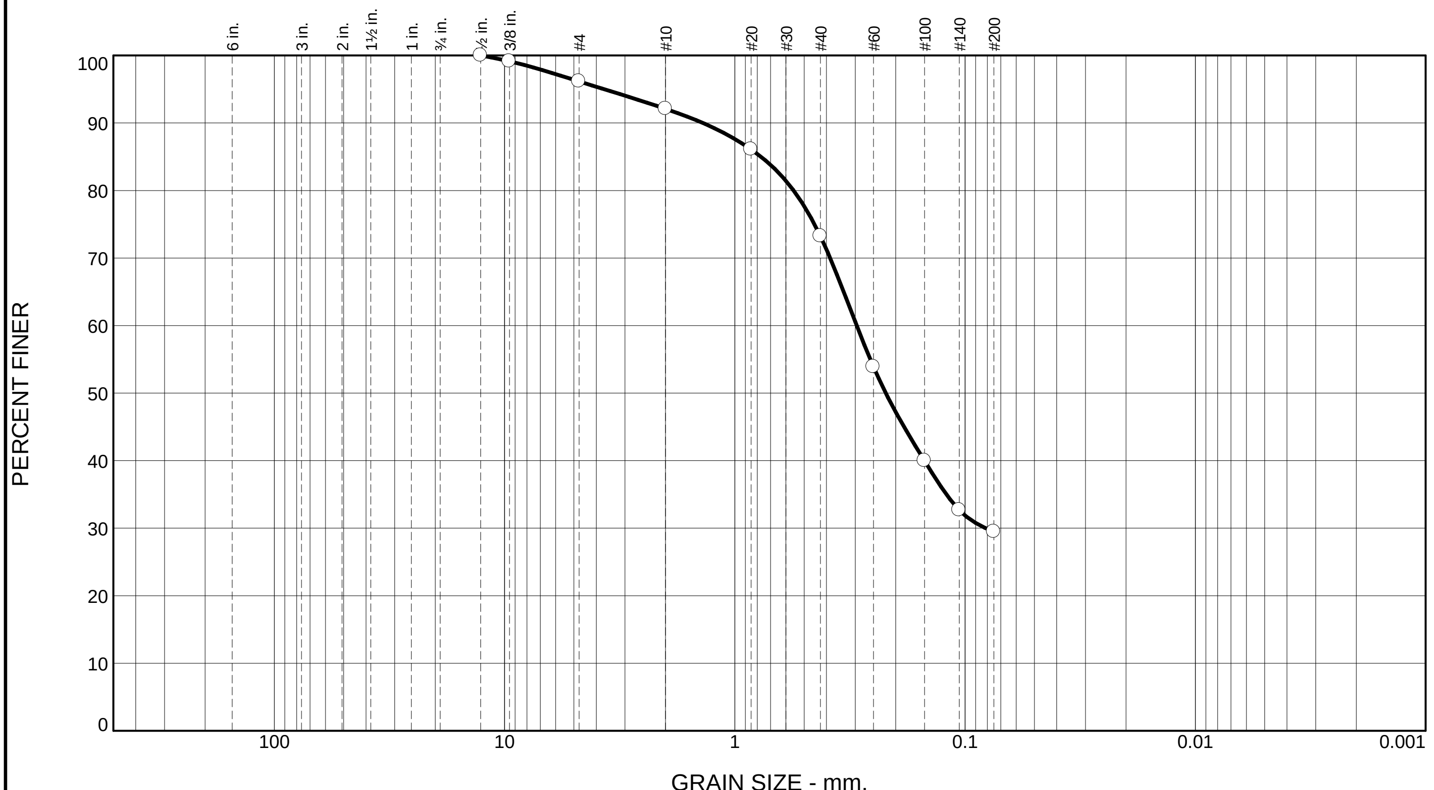
Project: NYC Parks - Old Stone House Addition   Project #: 909

Client: MFS Consulting Engineers and Surveyor, DPC   Date: 3-22-24
Client Number: 1124009

HOLE #/ SAMPLE #	B-2 S-10					
DEPTH	35-37'					
WET WGT. + TARE (gms.)	198.0					
DRY WGT. + TARE (gms.)	89.9					
WGT. WATER (gms.)	108.1					
TARE (gms.)	7.2					
DRY WGT. (gms.)	82.7					
MOISTURE CONTENT (%)	**130.7**					
OVEN DRIED SAMPLE + TARE (gms.)	161.16					
AFTER IGNITION SAMPLE + TARE (gms.)	143.51					
LOSS ON IGNITION (gms.)	17.65					
TARE (gms.)	113.60					
INITIAL WGT. OF OVEN DRIED SAMPLE (gms.)	47.56					
ORGANIC CONTENT (%)	**37.11**					

Performed by: AO   Entered by: KH   Checked by: KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.8	4.1	18.9	43.7	29.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.5	100.0		
.375	99.1		
#4	96.2		
#10	92.1		
#20	86.1		
#40	73.2		
#60	53.9		
#100	40.0		
#140	32.7		
#200	29.5		

* (no specification provided)

Material Description

Dark Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 1.3760 D_{85}= 0.7703 D_{60}= 0.2956
D_{50}= 0.2210 D_{30}= 0.0814 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-1 S-2 2-4'

Date: 3-22-24

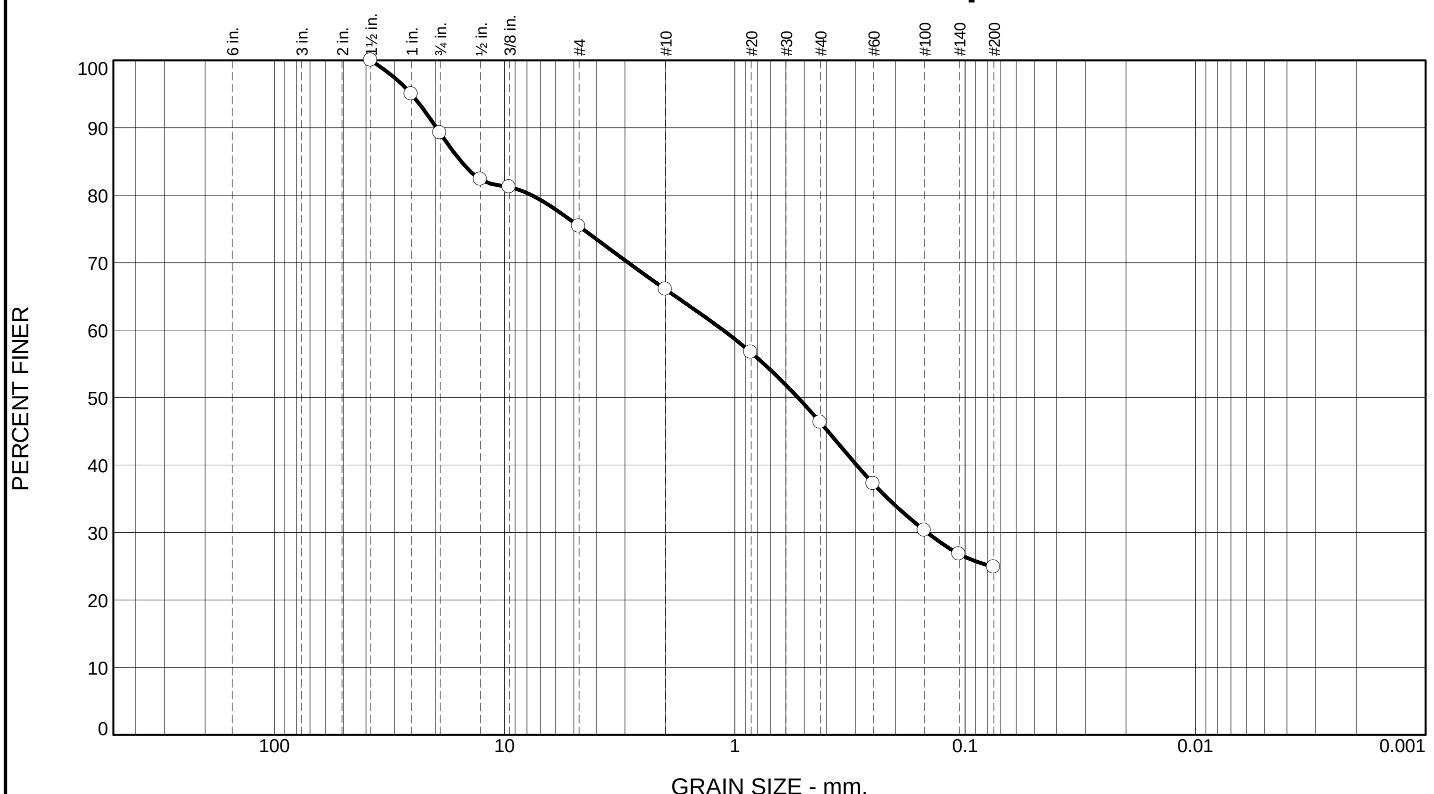
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.8	13.8	9.4	19.7	21.4	24.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	95.0		
.75	89.2		
.5	82.3		
.375	81.2		
#4	75.4		
#10	66.0		
#20	56.7		
#40	46.3		
#60	37.2		
#100	30.3		
#140	26.8		
#200	24.9		

* (no specification provided)

Material Description

Olive Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.7462 D_{85}= 15.4411 D_{60}= 1.1236
D_{50}= 0.5320 D_{30}= 0.1460 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-1 S-6 10-12'

Date: 3-22-24

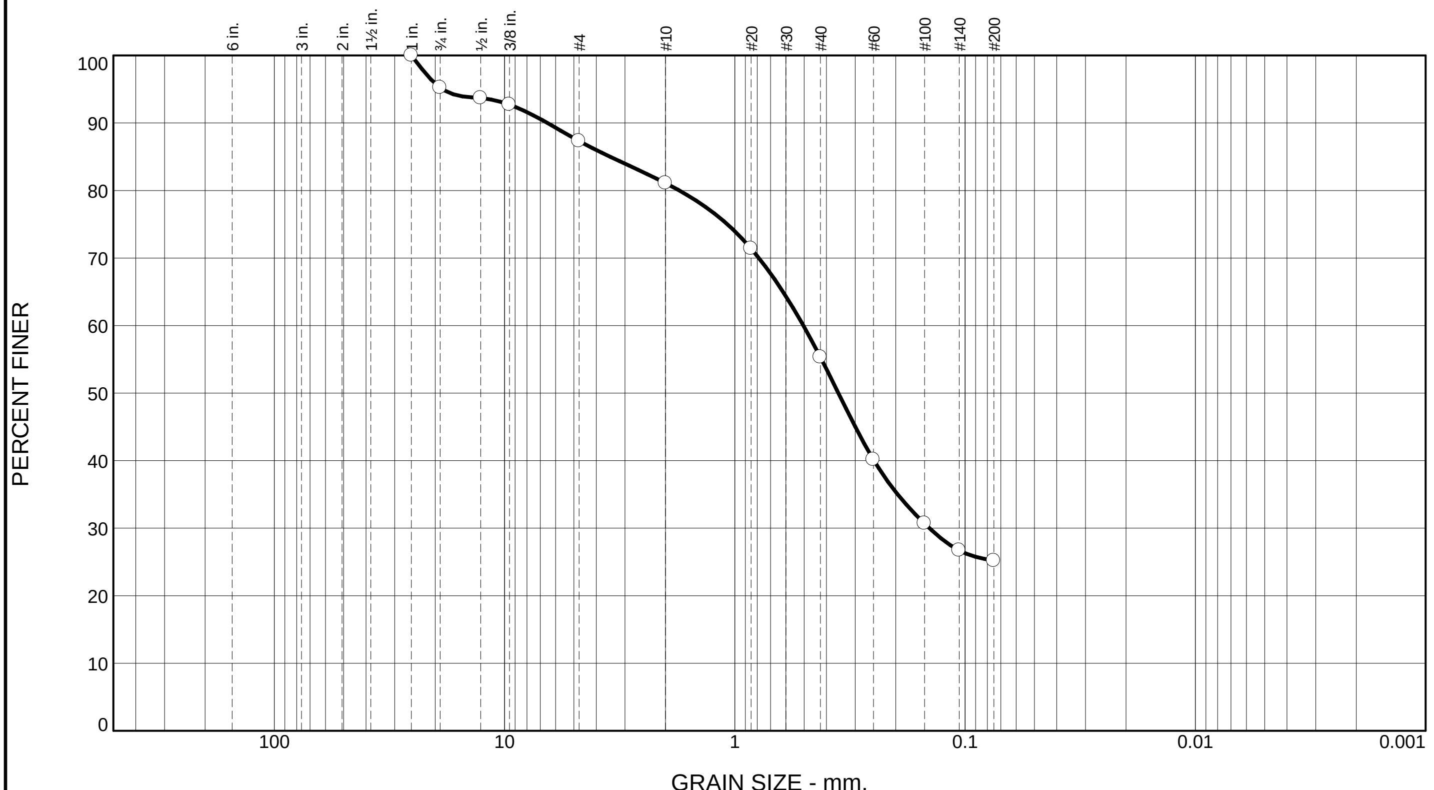
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.8	7.9	6.2	25.8	30.1	25.2	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
.75	95.2		
.5	93.7		
.375	92.7		
#4	87.3		
#10	81.1		
#20	71.4		
#40	55.3		
#60	40.1		
#100	30.7		
#140	26.7		
#200	25.2		

* (no specification provided)

Material Description

Very Dark Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.5147 D_{85}= 3.4802 D_{60}= 0.5039
D_{50}= 0.3551 D_{30}= 0.1428 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-1 S-9 25-27'

Date: 3-22-24

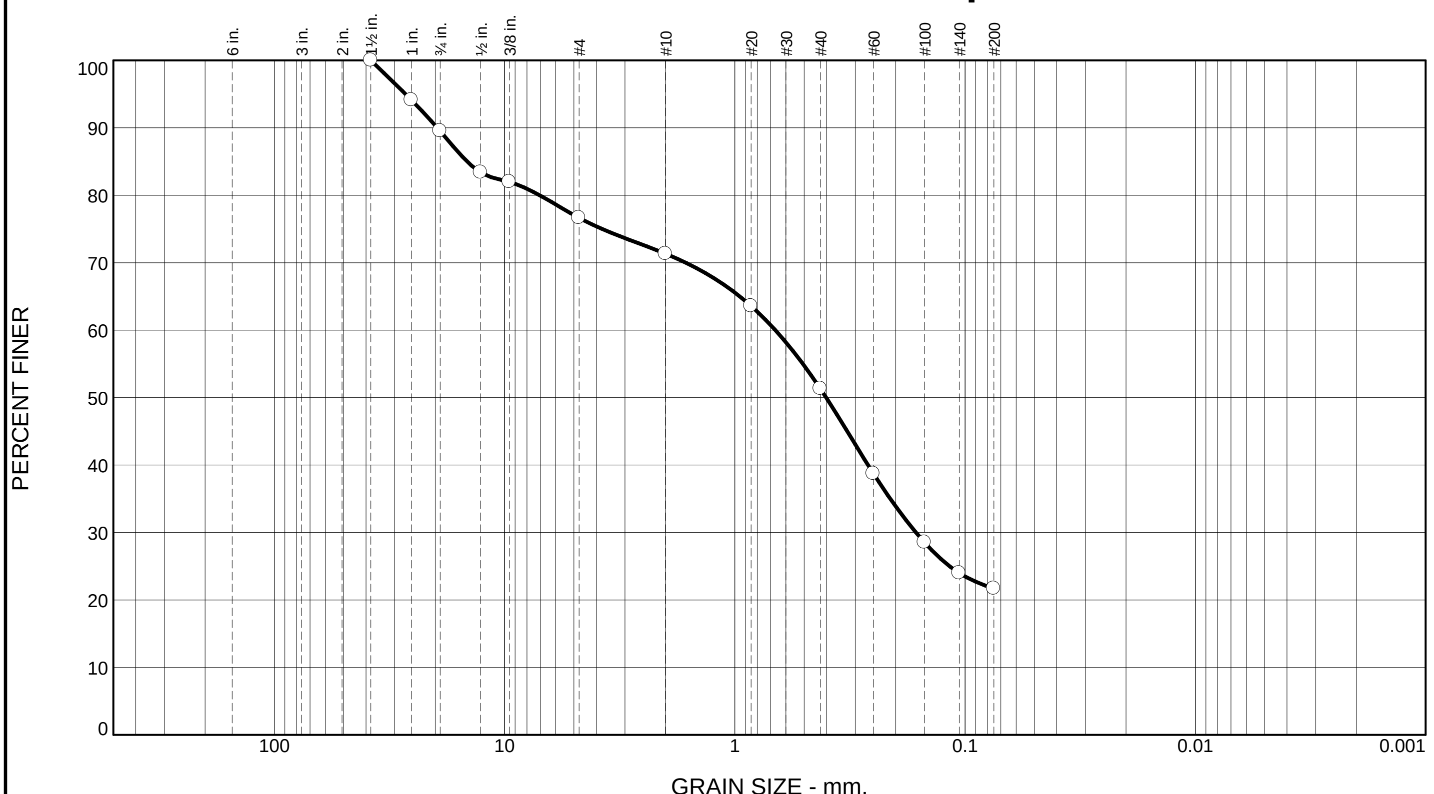
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	10.5	12.8	5.4	20.0	29.6	21.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	94.1		
.75	89.5		
.5	83.4		
.375	82.0		
#4	76.7		
#10	71.3		
#20	63.6		
#40	51.3		
#60	38.7		
#100	28.5		
#140	24.0		
#200	21.7		

* (no specification provided)

Material Description

Dark Grayish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 19.5895 D_{85}= 14.5363 D_{60}= 0.6670
D_{50}= 0.4011 D_{30}= 0.1635 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-1 S-12 40-42'

Date: 3-22-24

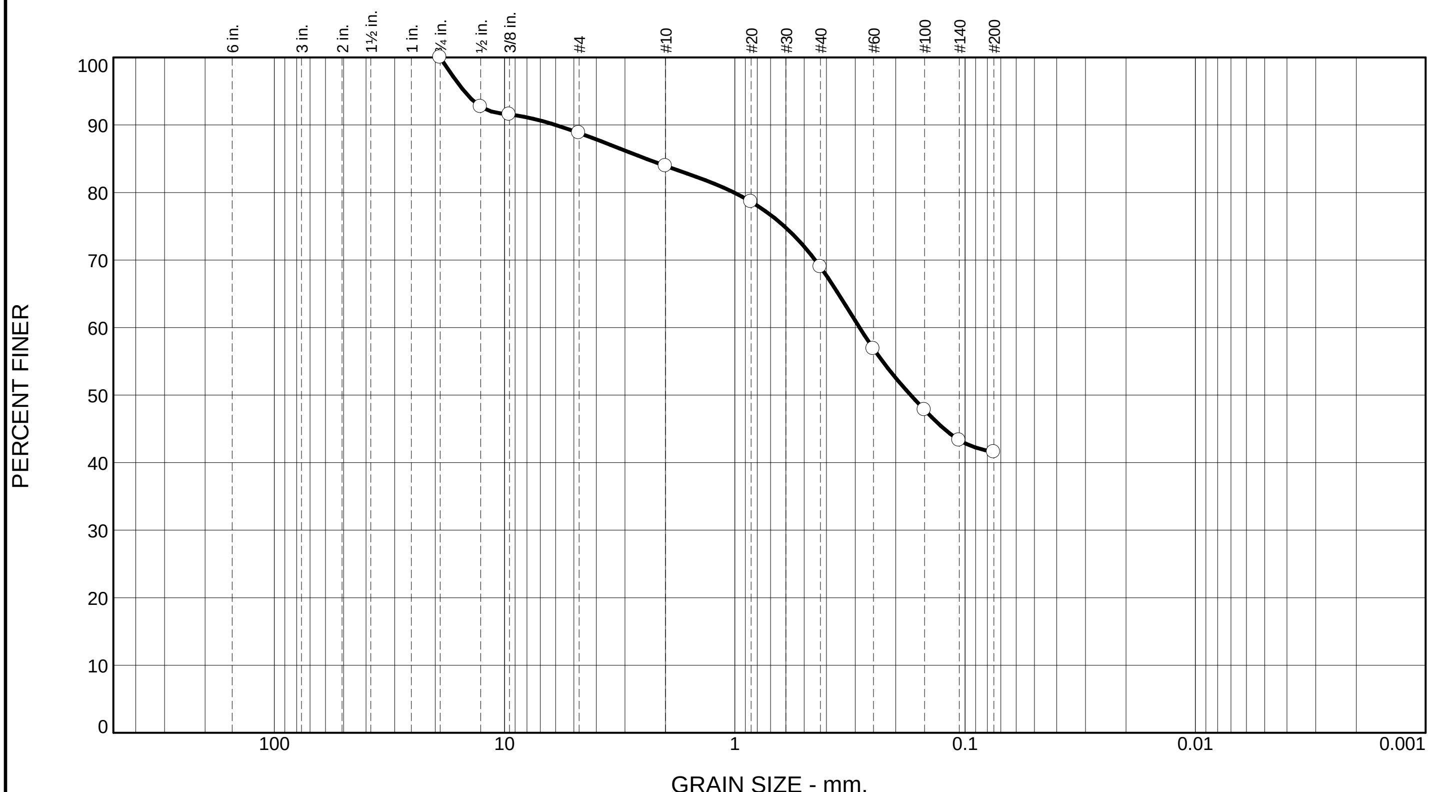
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	11.2	4.9	14.9	27.4	41.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
.75	100.0		
.5	92.7		
.375	91.6		
#4	88.8		
#10	83.9		
#20	78.6		
#40	69.0		
#60	56.9		
#100	47.8		
#140	43.3		
#200	41.6		

* (no specification provided)

Material Description

Dark Yellowish Brown

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 6.0010 D_{85}= 2.4290 D_{60}= 0.2873
D_{50}= 0.1722 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-2 S-1 1-3'

Date: 3-22-24

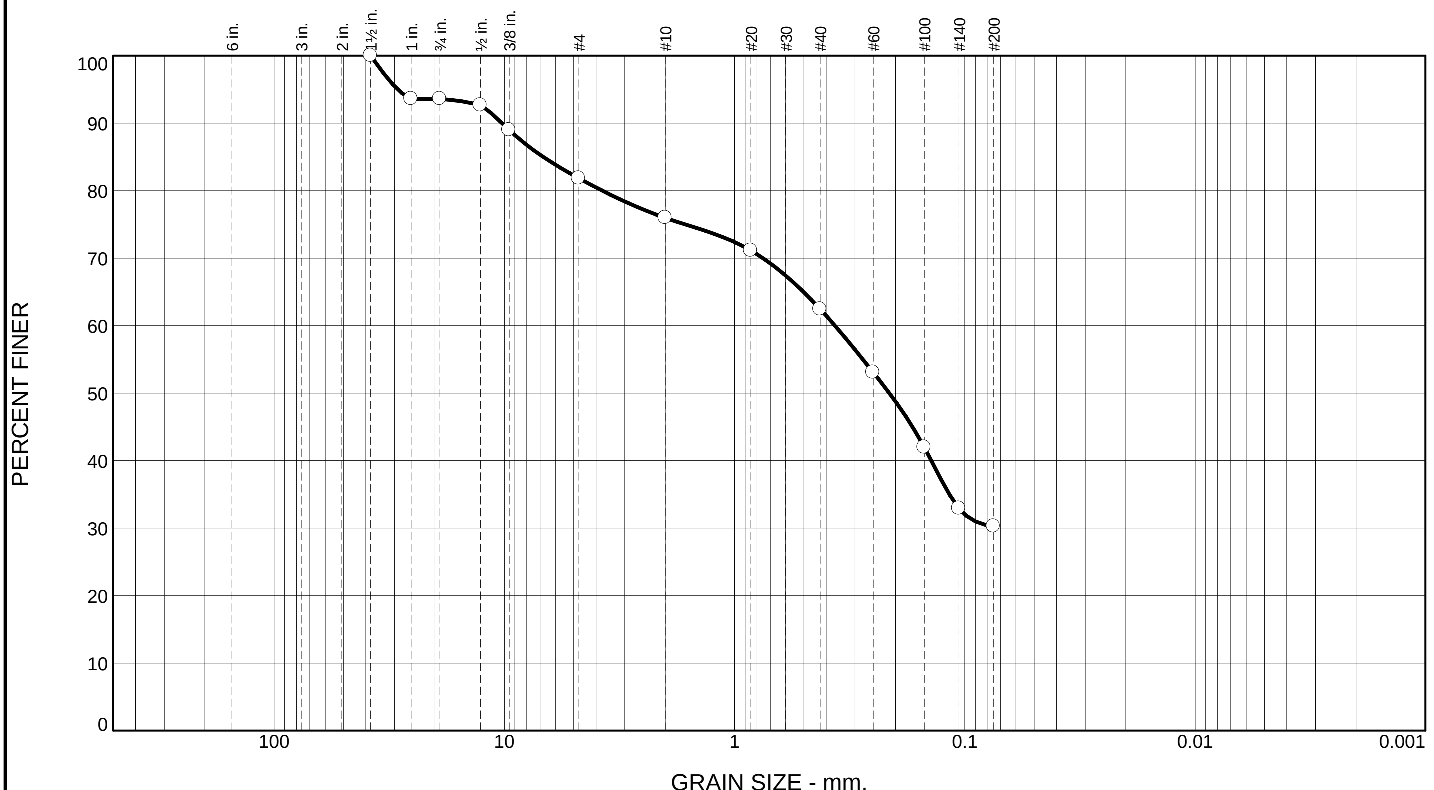
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	6.4	11.8	5.8	13.6	32.1	30.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	93.6		
.75	93.6		
.5	92.7		
.375	89.0		
#4	81.8		
#10	76.0		
#20	71.1		
#40	62.4		
#60	53.1		
#100	42.0		
#140	32.9		
#200	30.3		

* (no specification provided)

Material Description

Dusky Red

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 10.2459 D_{85}= 6.7793 D_{60}= 0.3668
D_{50}= 0.2129 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-2 S-4 7-9'

Date: 3-22-24

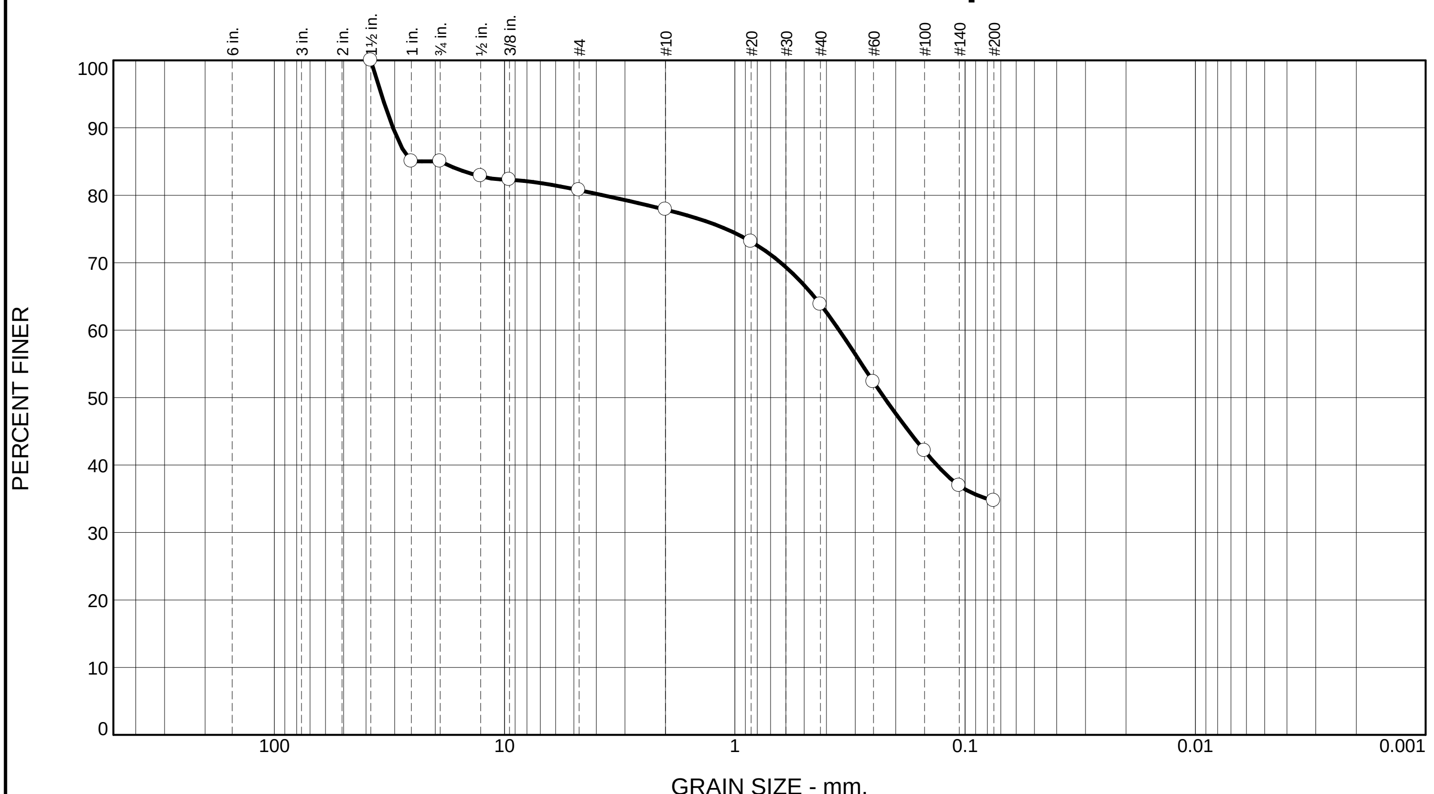
RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	15.0	4.2	2.9	14.1	29.1	34.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5	100.0		
1	85.0		
.75	85.0		
.5	82.8		
.375	82.3		
#4	80.8		
#10	77.9		
#20	73.1		
#40	63.8		
#60	52.3		
#100	42.1		
#140	36.9		
#200	34.7		

* (no specification provided)

Material Description

Yellowish Red

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 30.5344 D_{85}= 18.9568 D_{60}= 0.3525
D_{50}= 0.2244 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= AASHTO=

Remarks

Sample Number: B-2 S-9 30-32'

Date: 3-22-24

RSA Geolab

Union, New Jersey

Client: MFS Consulting Engineers and Surveyor, DPC
Project: NYC Parks - Old Stone House Addition
Project#1124009
Project No: 909 **Figure**

Tested By: ER **Checked By:** KP

RSA GEOLAB
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www.RSAGeolab.com

SPECIFIC GRAVITY TESTS
ASTM D854

Project: NYC Parks - Old Stone House Addition   **Project #:** 909

Client: MFS Consulting Engineers and Surveyor, DPC   **Date:** 3-22-24
Client Number: 1124009

SAMPLE	B-2 S-10				
DEPTH	35-37'				
PYCNOMETER NO.	7				
1. TARE AND DRY SOIL	127.37				
2. TARE WEIGHT	92.34				
3. WT. DRY SOIL	35.03	0.00	0.00	0.00	0.00
4. TEMP	23.9				
5. WT. PYC SOIL	359.88				
6. WT. PYC. AT TEMP	341.64				
7. AW (5-6)	18.24	0.00	0.00	0.00	0.00
8. SP. GR. = 3/(6-(5-3))	2.0864	0	0	0	0
9. TEMP. CORRECTION	0.99912				
10. SPEC. GRAVITY	2.0845	0.0000	0.0000	0.0000	0.0000

PERFORMED BY: AO   CHECKED BY: KP
COMPUTED BY: KH

APPENDIX C

Test Pit Photographs

Photo 1: Overview of test pit TP-1 upon commencement of excavation (facing west).

Photo 2: Overview of TP-1 (facing north).

Photo 3: Overview of TP-1 (facing west).

Photo 4: Detail of TP-1 (facing down).

Photo 5: Detail of TP-1 (facing southwest).

Photo 6: Detail of TP-1 (facing northeast).

Photo 7: Detail of TP-1 (facing southeast).

Photo 8: Test Pit TP-1 upon completion and site restoration (facing east).