

# The Smithsonian Institution

## National Museum of African American History and Culture

Constitution Avenue and Madison Drive between 14th and 15th  
Streets, NW

Washington, DC

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Submitted by the Smithsonian Institution

Final Foundation and Building Core Plan

March 13, 2012

**Commission meeting date:** April 5 2012

**NCPC review authority:** PL 108-184

**Applicant request:** Final Approval Foundation Plan

**Delegated / consent / open / executive session:** Consent

**NCPC Review Officer:** Ken Walton

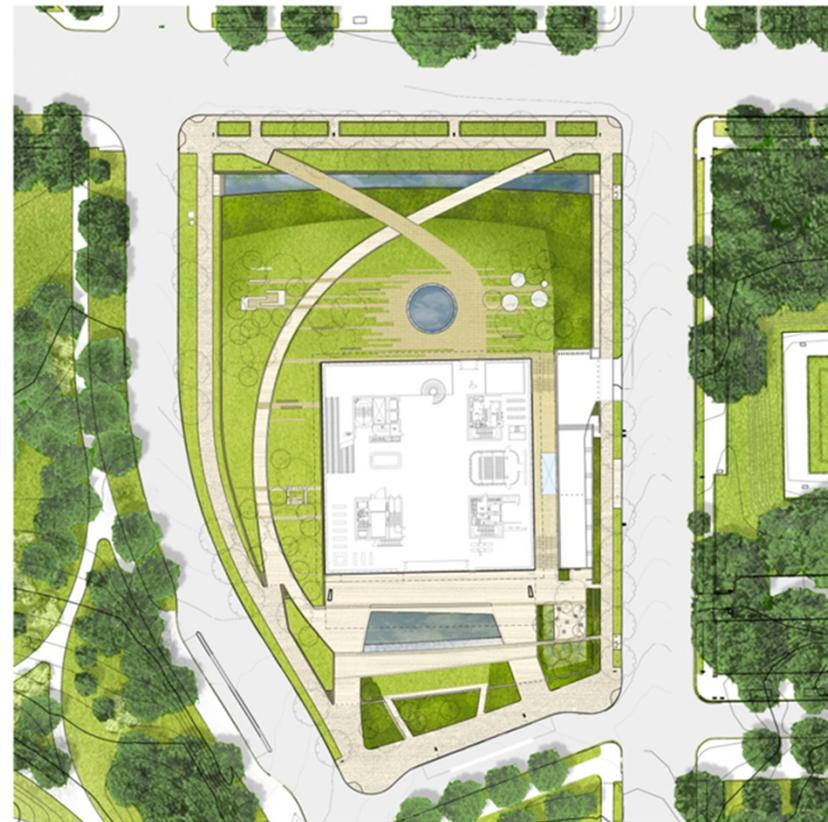
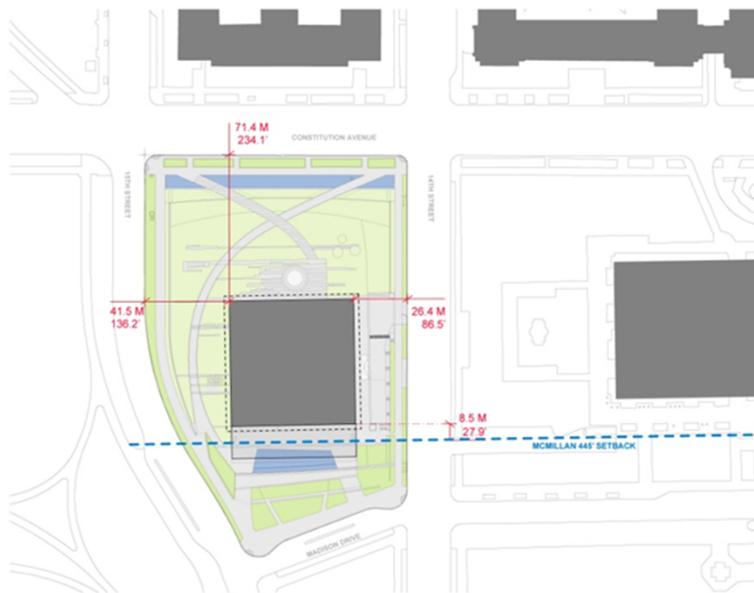
**NCPC File number:** 1.42(38.00)42538

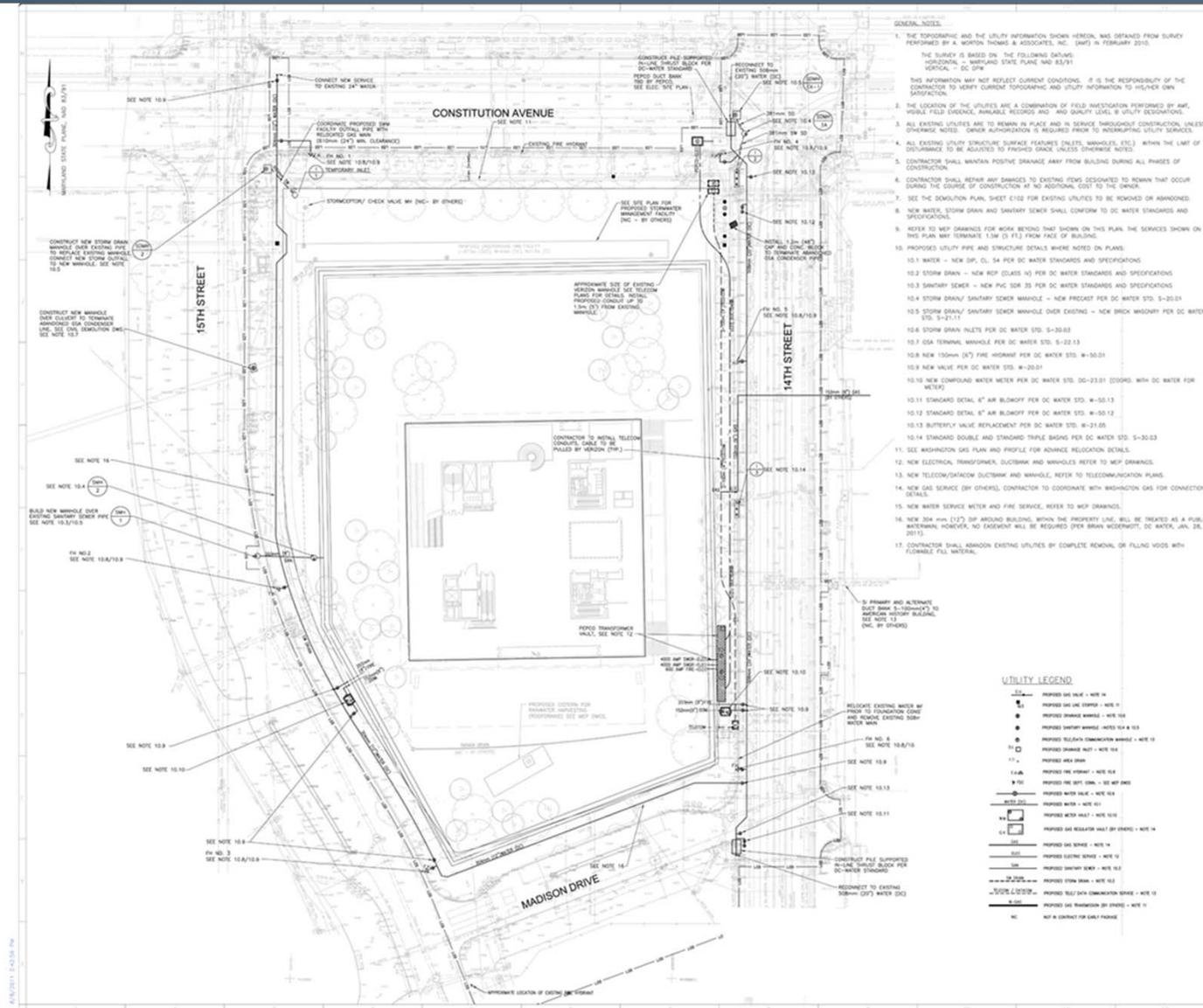
## **Project summary:**

Smithsonian has submitted a final foundation plans for a new museum building to house the National Museum of African American History and Culture on the former grounds of the Washington Monument between Constitution Avenue and Madison Drive, NW and 14th and 15th Streets, NW. The 373,798 SF museum will contain state-of-the-art galleries, offices for program and administrative staff, and an education center. The Smithsonian has begun construction on site utilities, and the support of excavation.

The current submission is for Deep Foundations, this includes the final design for below grade foundations for the building consisting of drilled piles as well as the mat foundation. Concrete, and vertical transportation includes concrete construction (excluding site walls and paving) including floor slabs and the walls of the four internal cores, elevators and escalators. Approval of the foundation plan in advance of the overall project approval which will be submitted next fall is required to implement the first phase of the construction project.







- GENERAL NOTES**
1. THE TOPOGRAPHIC AND THE UTILITY INFORMATION SHOWN HEREON WAS OBTAINED FROM SURVEY PERFORMED BY A. HORTON THOMAS & ASSOCIATES, INC. (DWT) IN FEBRUARY 2010.
  2. THE SURVEY IS BASED ON THE FOLLOWING DATUMS:  
HORIZONTAL - NAD 83  
VERTICAL - MARYLAND STATE PLANE 48 83/91  
NAD 83 - DC UTM
  3. THIS INFORMATION MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS/HER OWN SATISFACTION.
  4. THE LOCATION OF THE UTILITIES ARE A COMBINATION OF FIELD INVESTIGATION PERFORMED BY AWT, VISUAL FIELD EVIDENCE, AVAILABLE RECORDS AND - AND SURVEY DATA. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS/HER OWN SATISFACTION.
  5. ALL EXISTING UTILITIES ARE TO REMAIN IN PLACE AND IN SERVICE THROUGHOUT CONSTRUCTION UNLESS OTHERWISE NOTED. OWNER AUTHORIZATION IS REQUIRED PRIOR TO INTERRUPTING UTILITY SERVICES.
  6. CONTRACTOR SHALL MAINTAIN POSITIVE DRAINAGE AWAY FROM BUILDING DURING ALL PHASES OF CONSTRUCTION.
  7. CONTRACTOR SHALL REPAIR ANY DAMAGES TO EXISTING FEWS DESIGNATED TO REMAIN THAT OCCUR DURING THE COURSE OF CONSTRUCTION AT NO ADDITIONAL COST TO THE OWNER.
  8. SEE THE SCHEDULE PLAN, SHEET 11112 FOR EXISTING UTILITIES TO BE REMOVED OR ABANDONED.
  9. NEW WATER, STORM DRAIN AND SANITARY SEWER SHALL CONFORM TO DC WATER STANDARDS AND SPECIFICATIONS.
  10. REFER TO MEP DRAWINGS FOR WORK BEYOND THAT SHOWN ON THIS PLAN. THE SERVICES SHOWN ON THIS PLAN MAY VARY FROM THE 1.5M (5.0') FROM FACE OF BUILDING.
  11. PROPOSED UTILITY PIPE AND STRUCTURE DETAILS WHERE NOTED ON PLANS:  
10.1 WATER - NEW DPN, CL. 54 PER DC WATER STANDARDS AND SPECIFICATIONS  
10.2 STORM DRAIN - NEW RCP (CLASS 1) PER DC WATER STANDARDS AND SPECIFICATIONS  
10.3 SANITARY SEWER - NEW PVC SDR 35 PER DC WATER STANDARDS AND SPECIFICATIONS  
10.4 STORM DRAIN/SANITARY SEWER MANHOLE - NEW PRECAST PER DC WATER STD. 5-20.1  
10.5 STORM DRAIN/SANITARY SEWER MANHOLE COVER EXISTING - NEW BRICK MANSUET PER DC WATER STD. 5-21.1  
10.6 STORM DRAIN INLETS PER DC WATER STD. 5-20.03  
10.7 65A TERNAL MANHOLE PER DC WATER STD. 5-22.13  
10.8 NEW 150mm (6") FIRE HYDRANT PER DC WATER STD. W-50.1  
10.9 NEW VALVE PER DC WATER STD. W-20.1  
10.10 NEW COMPOUND WATER METER PER DC WATER STD. 00-23.01 (EODS), WITH DC WATER FOR METER.  
10.11 STANDARD DETAIL 6" AIR BLDGROFF PER DC WATER STD. W-50.13  
10.12 STANDARD DETAIL 6" AIR BLDGROFF PER DC WATER STD. W-50.12  
10.13 BUTTERFLY VALVE REPLACEMENT PER DC WATER STD. W-21.05  
10.14 STANDARD DOUBLE AND STANDARD TRIPLE SHANGS PER DC WATER STD. 5-30.03  
11. SEE SCHEDULE PLAN AND PROFILE FOR ADVANCE RELOCATION DETAILS.  
12. NEW ELECTRICAL TRANSDUCER, DUCTWORK AND MANHOLES REFER TO MEP DRAWINGS.  
13. NEW TELECOM/DATACOM DUCTWORK AND MANHOLE, REFER TO TELECOMMUNICATION PLANS.  
14. NEW GAS SERVICE (BY OTHERS), CONTRACTOR TO COORDINATE WITH WASHINGTON GAS FOR CONNECTION DETAILS.  
15. NEW WATER SERVICE METER AND FIRE SERVICE, REFER TO MEP DRAWINGS.  
16. NEW 304-SS (1") SIP ABOVE BUILDING WITHIN THE PROPERTY LINE SHALL BE TREATED AS A PUBLIC WATERMAIN. HOWEVER, NO EASEMENT WILL BE REQUIRED (PER BRANN ADOPTION, DC WATER, JAN. 28, 2017).  
17. CONTRACTOR SHALL ABANDON EXISTING UTILITIES BY COMPLETE REMOVAL OR FILLING VOID WITH FILLABLE SILL MATERIAL.

**UTILITY LEGEND**

Symbol	Description
Symbol	PROPOSED GAS MAIN - NOTE 14
Symbol	PROPOSED GAS LINE SERVICE - NOTE 14
Symbol	PROPOSED DRAINAGE MANHOLE - NOTE 10.1
Symbol	PROPOSED SANITARY MANHOLE - NOTE 10.1 & 10.2
Symbol	PROPOSED TELECOM/DATACOM MANHOLE - NOTE 13
Symbol	PROPOSED DRAINAGE INLET - NOTE 10.6
Symbol	PROPOSED AREA DRAIN
Symbol	PROPOSED FIRE HYDRANT - NOTE 10.8
Symbol	PROPOSED NEW 6" SIP - SEE MEP DRAWINGS
Symbol	PROPOSED WATER MAIN - NOTE 10.1
Symbol	PROPOSED WATER MAIN - NOTE 10.1
Symbol	PROPOSED GAS REGULATOR VALVE BY OTHERS - NOTE 14
Symbol	PROPOSED GAS SERVICE - NOTE 14
Symbol	PROPOSED EXISTING SERVICE - NOTE 10.1
Symbol	PROPOSED STORM DRAIN - NOTE 10.1
Symbol	PROPOSED NEW 6" SIP CONSTRUCTION LINE - NOTE 10
Symbol	PROPOSED GAS PROTECTION BY OTHERS - NOTE 14
Symbol	NOT A CONTRACT FOR GASEY PERMITS

**NMAAHC**  
National Museum of African American History and Culture  
Not For Construction

PROJECT OF RECORD  
ARCHITECT ASSOCIATES  
3000 MICHIGAN AVENUE, N.W.  
WASHINGTON, DC 20007  
ARCHITECTURAL DESIGN TEAM

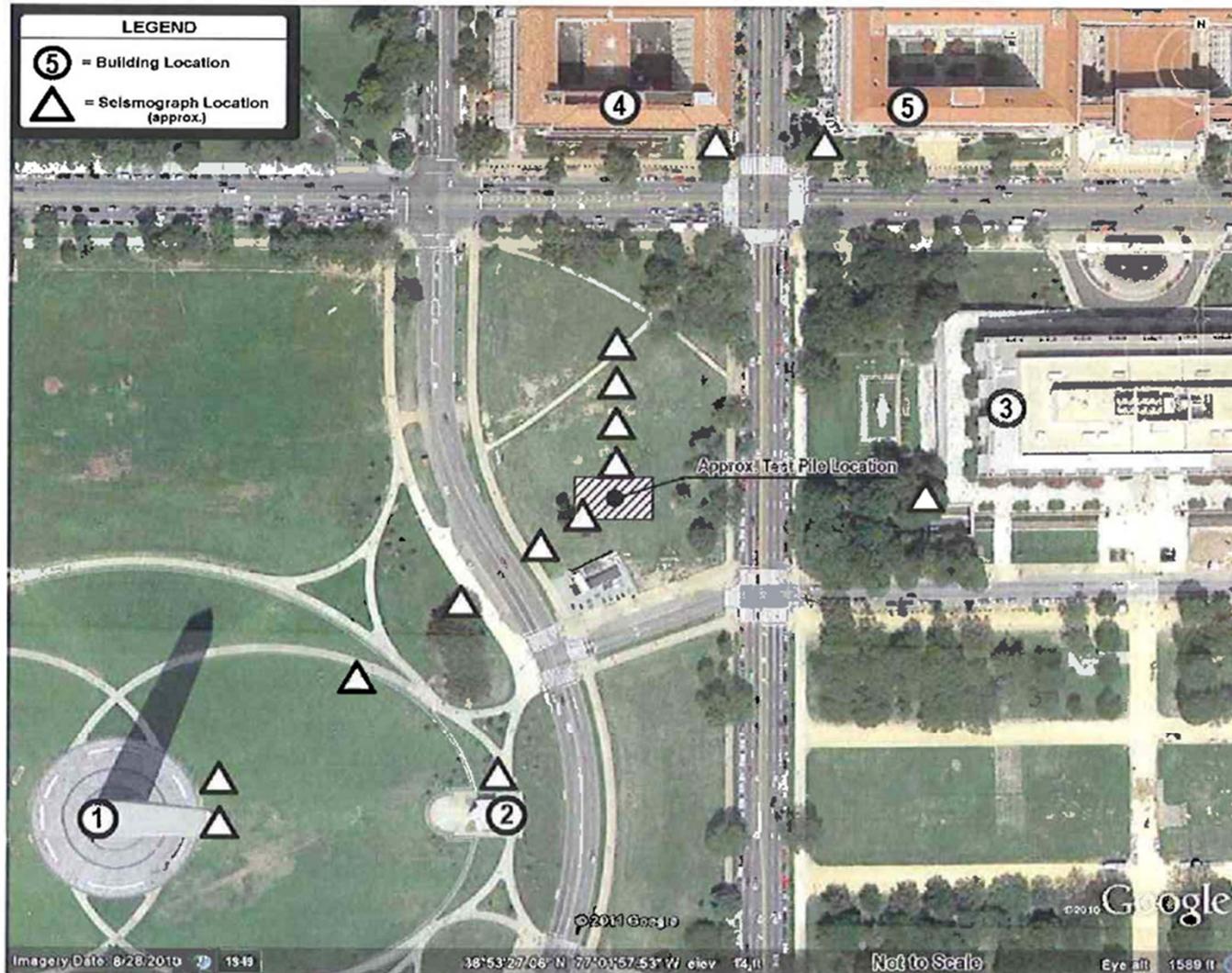
PROJECT MANAGER ASSOCIATES  
3000 MICHIGAN AVENUE, N.W.  
WASHINGTON, DC 20007  
ARCHITECTURAL DESIGN TEAM

DATE: 01/11/2017  
SCALE: 1/8" = 1'-0"  
SHEET: 11112 OF 11112

1:500  
GRAPHIC SCALE 1/8" = 1'-0"

**Smithsonian Institution**  
Office of Public Engagement and Operations  
400 Maryland Avenue, N.W., Suite 500  
Washington, DC 20001-2000

DATE: 01/11/2017  
SCALE: 1/8" = 1'-0"  
SHEET: 11112 OF 11112



Seismic Monitoring Info of The Initial Pile Test :

489' from Monument base, 283' from Driving Operation - .075

American History Museum - .03

Lodge/Monument Bookstore/Ticket Office/Restroom - .012

Interior Base of Monument - .004

Interior Top of Monument - .024

Agency Agreed cut off was 0.10 and 0.25 at the top of the Monument



# Slurry Wall and Foundation Wall Details

**NMAAHC**  
NATIONAL MUSEUM OF  
AFRICAN AMERICAN  
HISTORY AND CULTURE

**FREELON**  
ARCHITECT OF RECORD  
**ADJAYE ASSOCIATES**  
DESIGN ARCHITECT  
**DAVIS BRODY BOND**  
ARCHITECTURAL DESIGN TEAM  
**SMITHGROUP**  
ARCHITECTURAL DESIGN TEAM  
**ROBERT SILMAN ASSOCIATES**  
STRUCTURAL ENGINEER OF RECORD  
**GUY NORDENSON & ASSOCIATES**  
STRUCTURAL ENGINEER OF RECORD  
**GUSTAFSON GUTHRIE NICHOL**  
LANDSCAPE ARCHITECT  
**RUMMEL KLEPPER & KAHL**  
CIVIL ENGINEER  
**WSP FLACK & KURTZ**  
MSP / P ENGINEER

KEY PLAN

GRAPHIC SCALE(S)

PROJECT NO.	100717
DATE	08/11/17
SCALE	AS SHOWN
DATE	
SCALE	
DATE	
SCALE	
DATE	
SCALE	



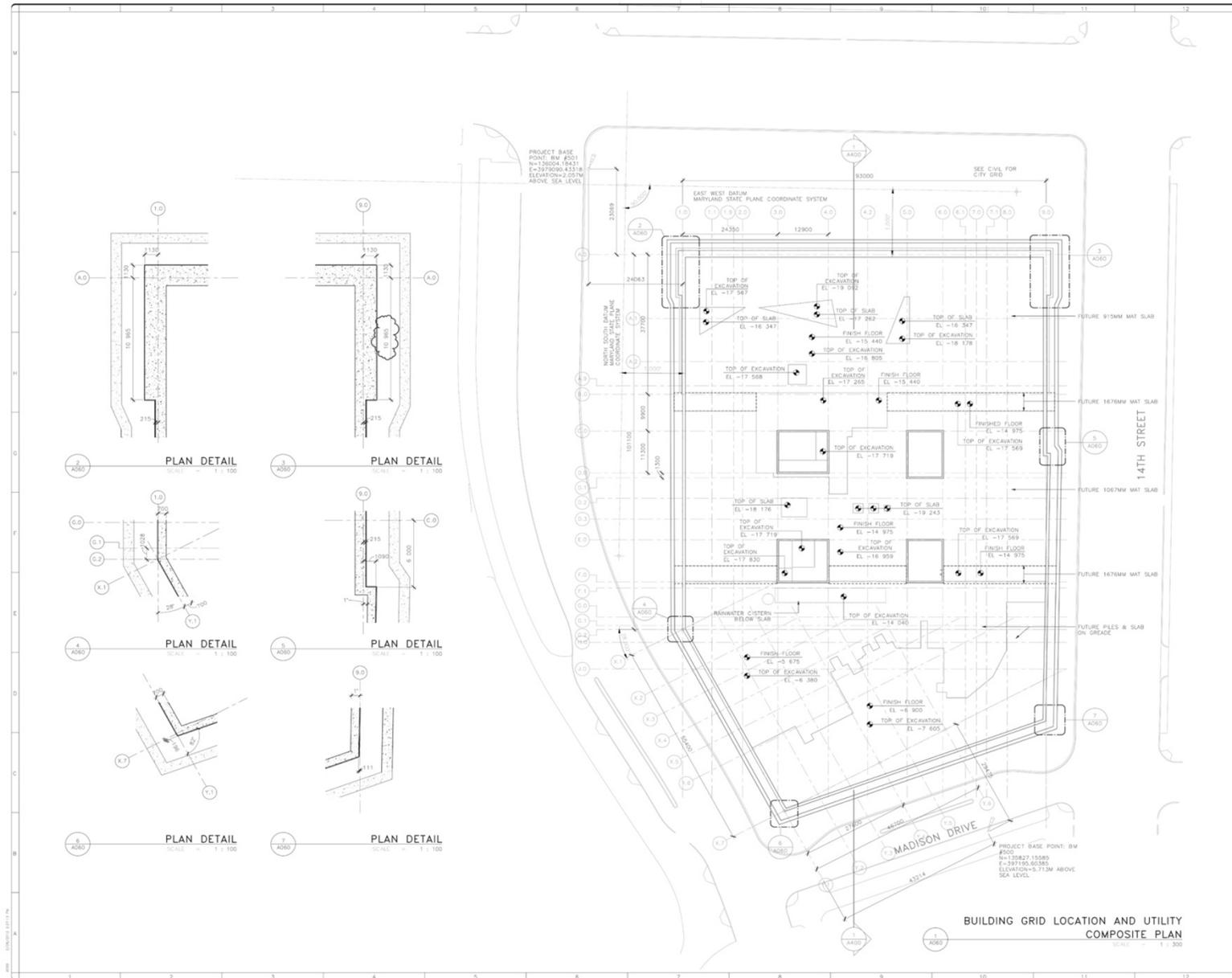
Office of Facilities Engineering and Operations  
400 Michigan Avenue, NE, Suite 3000  
Washington, DC 20002

NATIONAL MUSEUM OF AFRICAN  
AMERICAN HISTORY AND CULTURE  
3007102A / 08/11/2017  
317 200004 00

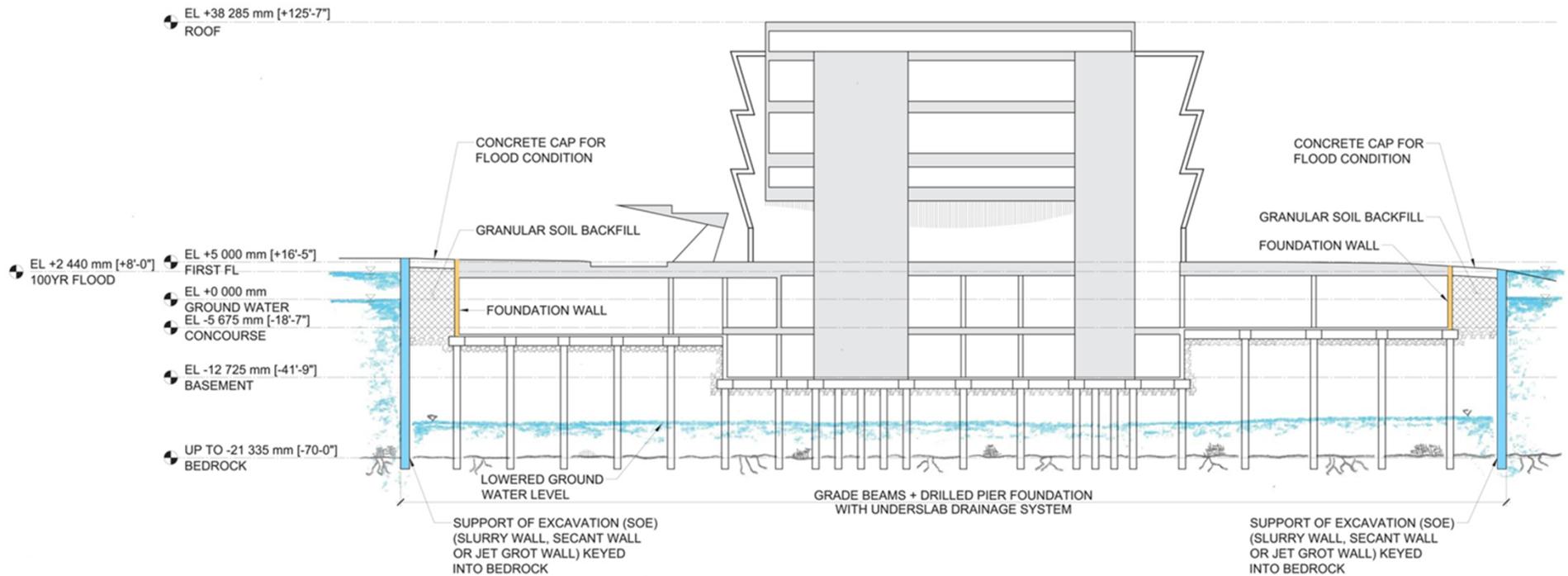
BUILDING LOCATION PLAN

DATE	08/11/17
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DATE	
SCALE	
DATE	
SCALE	
DATE	
SCALE	

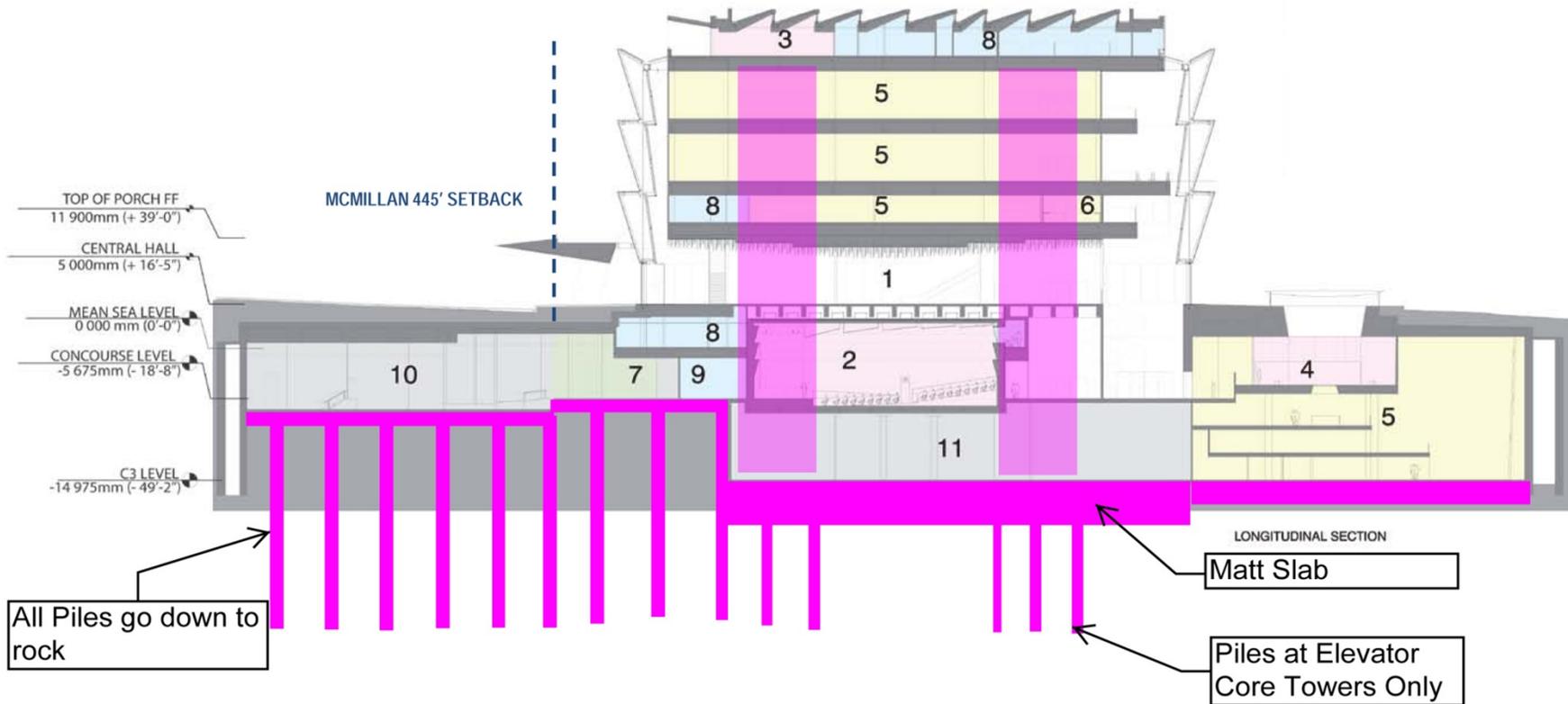
SCALE: 1" = 60'

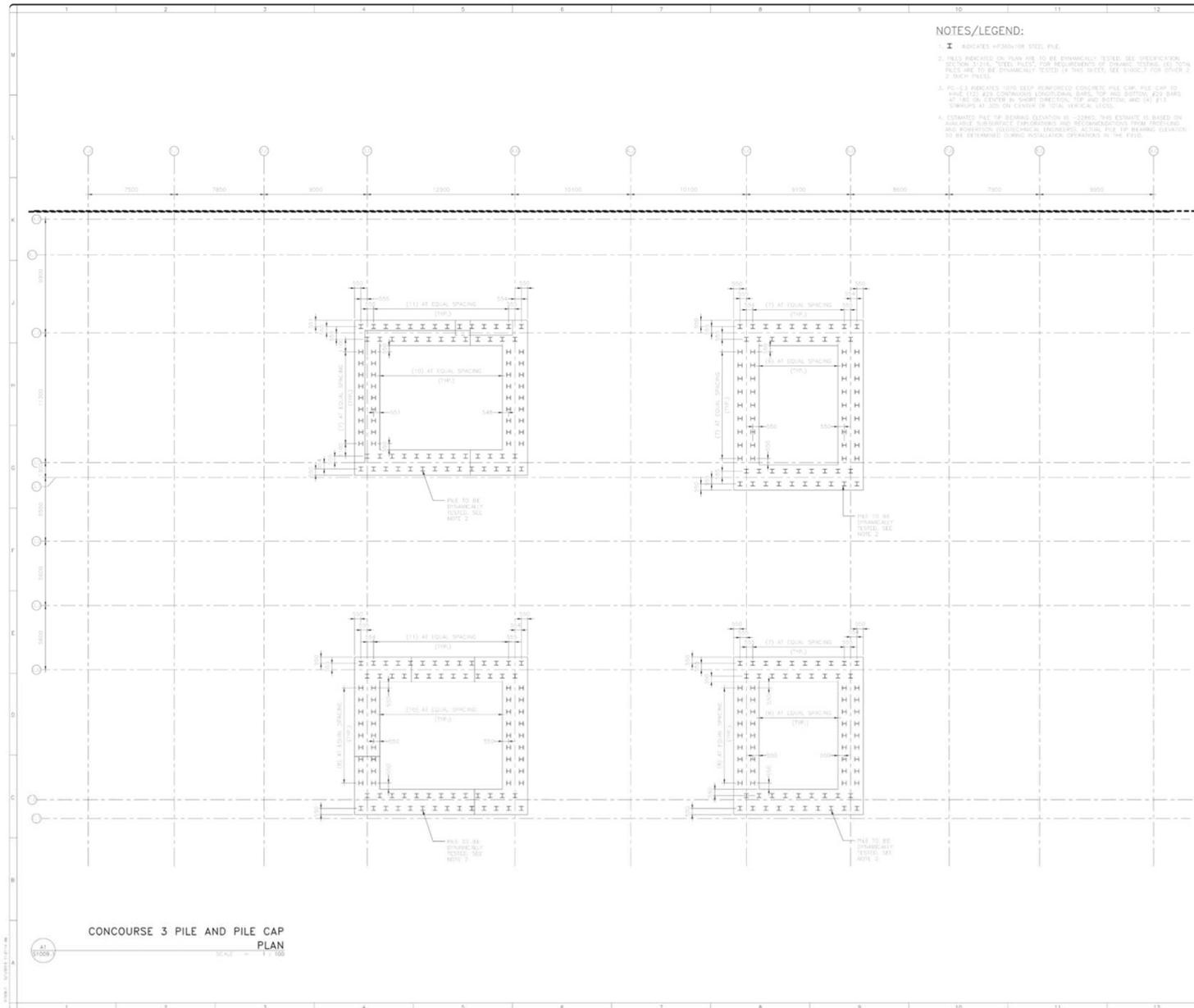


**BUILDING GRID LOCATION AND UTILITY  
COMPOSITE PLAN**  
SCALE: 1" = 300'



# Slurry Wall and Foundation Wall Section



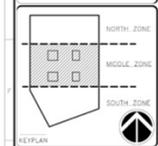


**NOTES/LEGEND:**

- 1. INDICATES POSITION FOR STEEL PILE.
- 2. PILES INDICATED ON PLAN ARE TO BE DYNAMICALLY TESTED. SEE SPECIFICATION SECTION 32.116 "STEEL PILES" FOR REQUIREMENTS OF DYNAMIC TESTING. (3) TOTAL PILES ARE TO BE DYNAMICALLY TESTED (4 THIS SHEET; SEE SHEET 2 FOR OTHER 2 2 SHEET PAGES).
- 3. PG-13 INDICATES 1000 DEEP REINFORCED CONCRETE PILE CAP. PILE CAP IS 1000 (12) #22 COMPRESSIVE LONGITUDINAL BARS, TOP AND BOTTOM, #22 BARS AT 180 ON CENTER IN SHORT DIRECTION, TOP AND BOTTOM, AND (4) #13 STIRRUPS AT 200 ON CENTER IN LONG DIRECTION.
- 4. ESTIMATED PILE TIP BEARING ELEVATION IS -2000. THIS ESTIMATE IS BASED ON AVAILABLE SUBSURFACE INFORMATION AND RECOMMENDATIONS FROM PRELIMINARY AND WORKSHOP GEOLOGICAL ENGINEERS. ACTUAL PILE TIP BEARING ELEVATION TO BE DETERMINED DURING INSTALLATION OPERATIONS IN THE FIELD.

**NMAAHC**  
NATIONAL MUSEUM OF  
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HISTORY AND CULTURE

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DESIGN ARCHITECT
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ARCHITECTURE DESIGN TEAM
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LANDSCAPE ARCHITECT
- RUMMEL, KLEPPER & KAHL  
CIVIL ENGINEER
- WSP FLACK & KURTZ  
WSP / TP ENGINEER



GRAPHIC SCALE(S)

DATE	DATE
SCALE	SCALE
BY	BY
CHECKED	CHECKED
APPROVED	APPROVED



Office of Facilities Engineering and Operations  
600 Maryland Avenue, N.W., Suite 5000  
Washington, DC 20062-0200

PROJECT	1400 CONSTITUTION AVE. RENOVATION, DC 20060
CLIENT	NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE
PROJECT NO.	00277028 / 00277028
DATE	3/13

DATE	DATE
SCALE	SCALE
BY	BY
CHECKED	CHECKED
APPROVED	APPROVED

CONCOURSE 3 PILE AND PILE CAP PLAN  
SCALE: 1/4"=1'-0"

## Previous Commission action

Approved the preliminary design, final utility plans and slurry wall foundation plans

Adopted the Record of Decision (ROD) for the National Museum of African American History and Culture (NMAAHC); signed by the Smithsonian Institution on October 19, 2011.

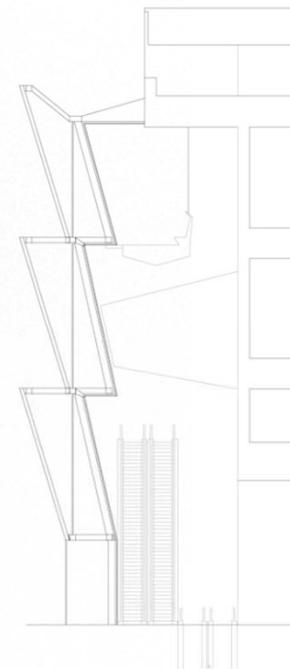
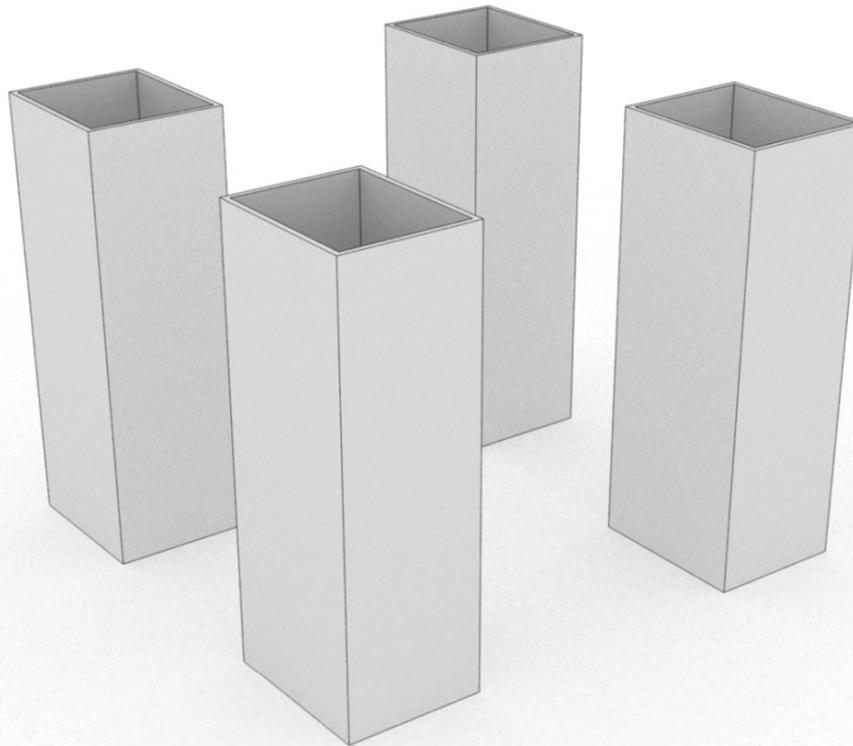
## Analysis summary:

### FOUNDATIONS

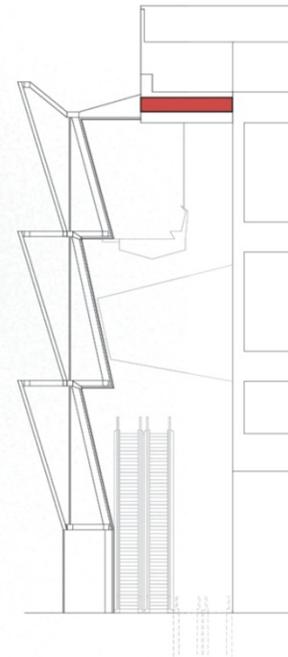
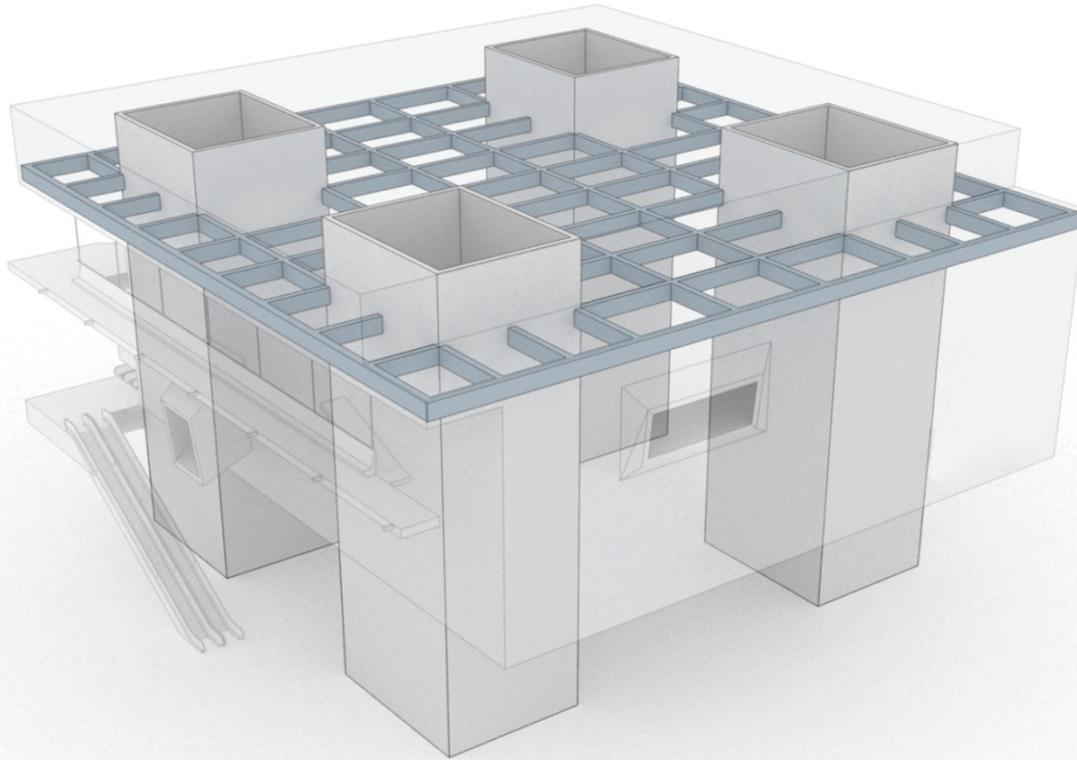
These are comprised of a combination of steel bearing piles driven into bedrock to support the largest loads, including those of the four internal cores, and supporting columns and slab at the loading dock, and a mat slab foundation system consisting of an approximately 3-5 feet thick mat reinforced concrete slab below other areas of the building.

During the design of the project's foundation system, the Smithsonian and its Construction Manager, Clark Smoot Russell, undertook a Vibration and Noise Study in September and October 2011 that included the installation of test piles at the site. In addition to providing technical feedback on load capacities to the engineering team designing the project, the study was also designed to test the impact of the test pile installation on nearby buildings and monuments including the Washington Monument and its Lodge; the Department of Commerce and EPA Buildings of the Federal Triangle; and the Smithsonian National Museum of American History. Representatives of the agencies responsible for the above monuments and buildings, including the structural engineering consultants assessing earthquake damage to the Washington Monument, were engaged in planning the test-pile exercise, setting the maximum acceptable vibration limits and assisting in the placement of the seismographs at their sites. Additional crack-monitoring devices were also installed at the Washington Monument as part of this study. The final report of that study entitled Vibration and Noise Study, Test-Pile Program, National Museum of African American History and Culture, Constitution Avenue NW, Washington, DC been made available to the commission. The study's conclusions included the finding that the vibrations transmitted to the surrounding buildings and the Washington Monument were well below the thresholds agreed to with the Monument's engineers and accepted industry standards for limits to avoid damage to adjacent buildings. Measured noise levels at the adjacent buildings and monument from the test piles were comparable to the measured background noise.

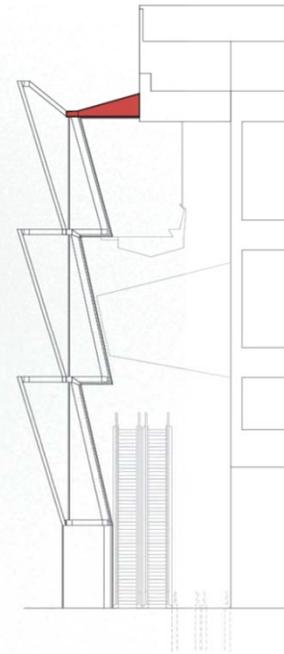
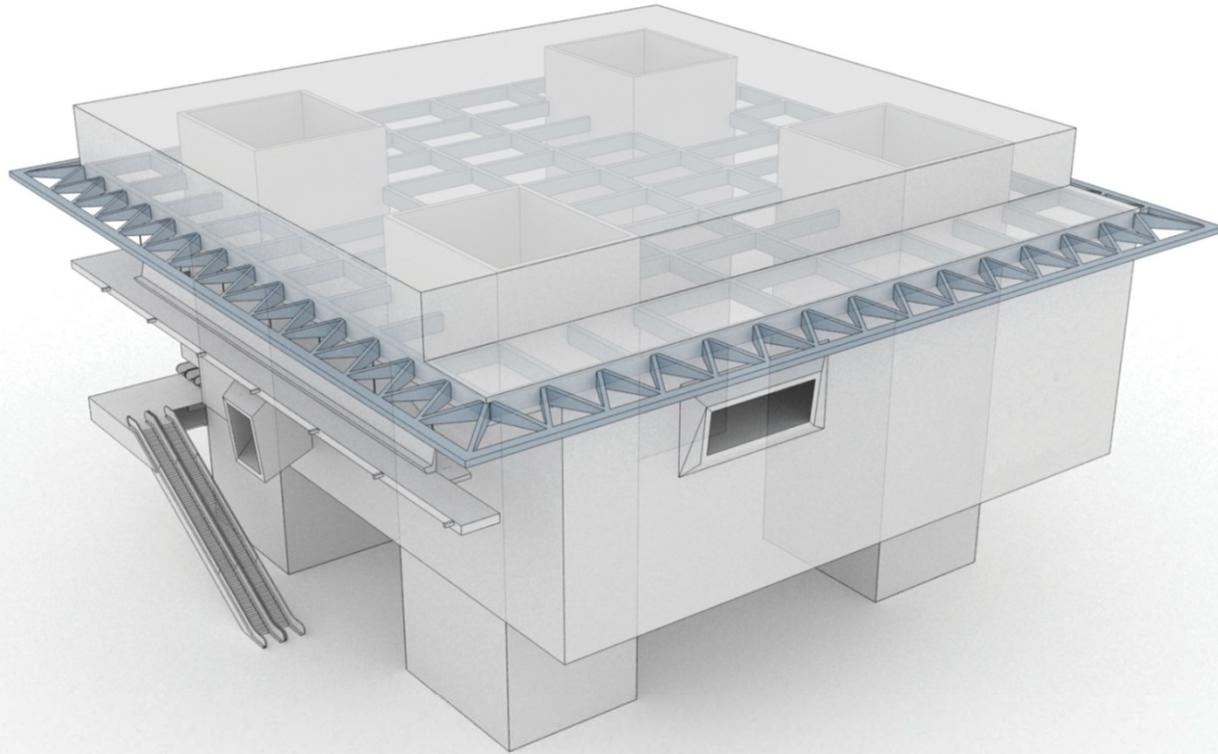




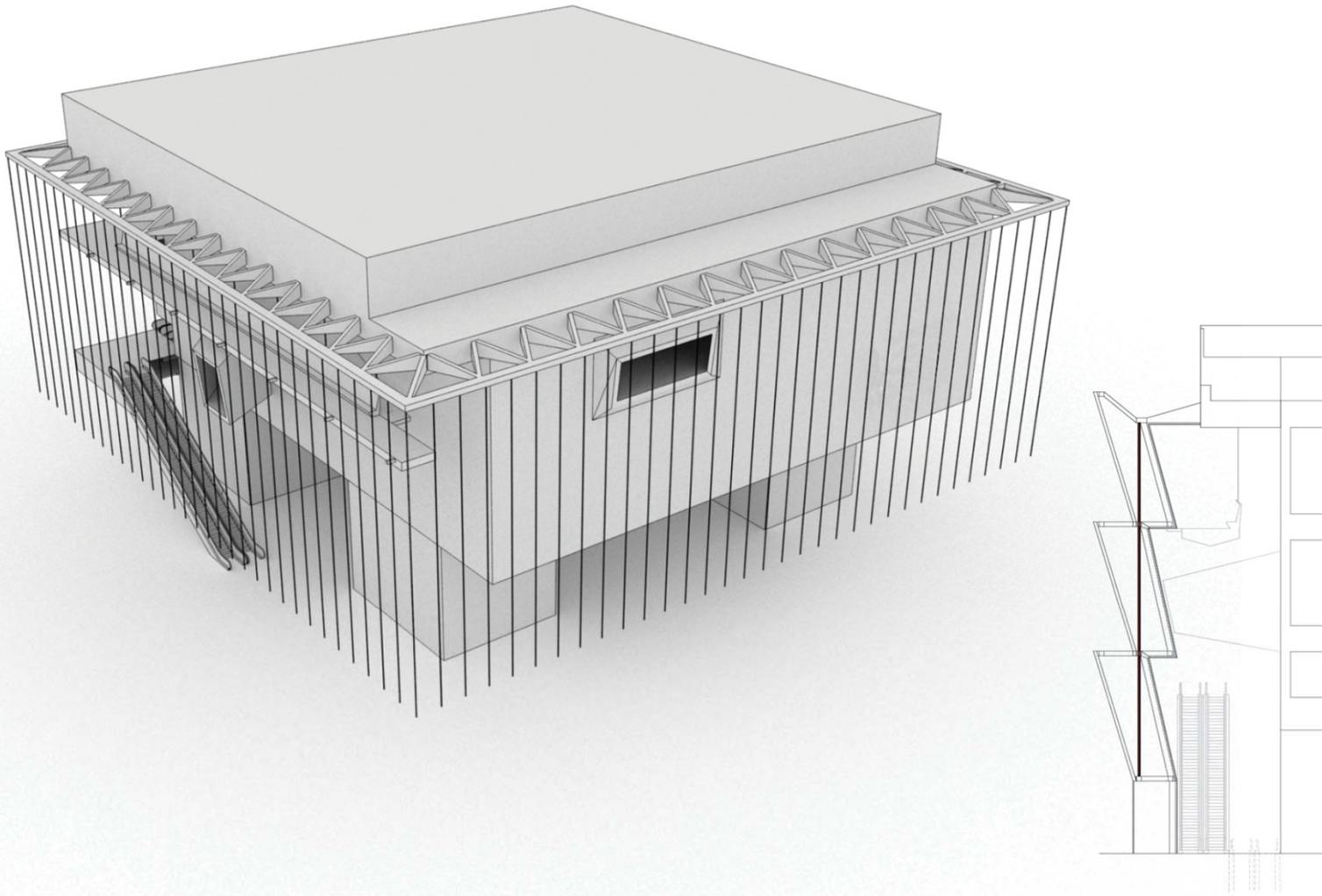
Axonometric Diagram - Cores



Axonometric Diagram – Office Level Structure



Axonometric Diagram – Outrigger Support



Axonometric Diagram – Tension Cables