Project: South Battery Park City Resiliency Project: Wagner Park Pavilion Construction Services Request for Proposals ("RFP")

Date: April 20, 2022

RE: Addendum #9
# of Pages: 142

A) REVISIONS TO RFP:

1) a) The following revised/updated Pavilion Project drawings and specifications are hereby formally incorporated into the RFP's Exhibit B-1 – Construction Documents: Pavilion Project Drawings & Specifications. These revised/updated drawings and specifications replace and supersede all prior versions issued with the RFP:
   - Landscape Drawing L262: Enlargement – Pavilion Parapet Soils Plan (Attachment #1)
   - Architectural Drawing A701: Finish Schedule (Attachment #2)
   - Architectural Drawing A125: Second Level RCP (Attachment #3)
   - Specification 062000: Carpentry (Attachment #4)
   - Specification 033300: Architectural Cast in Place Concrete (Attachment #5)

   b) The following new specification is hereby formally incorporated into the RFP's Exhibit B-1 – Construction Documents: Pavilion Project Drawings & Specifications:
   - Specification 316333: Micropiles (Attachment #6)

2) Revised/corrected versions of the RFP's Exhibit D – *Technical Submittal Requirements* and Exhibit E – *Qualification Forms* are hereby re-issued, and are both attached hereto as Attachment #7. The revised sections of Exhibit D are shown in yellow-highlight, and the corrected technical form references therein are reflective of the correct incorporation and sequencing of such forms found in the revised version of Exhibit E.

B) BPCA'S RESPONSE TO SUBSTANTIVE QUESTIONS:

The following responses (the "Responses") are provided to substantive questions ("Questions") received by Battery Park City Authority ("BPCA") by 5:00 p.m. Eastern Standard Time on April 11, 2022, in connection with its RFP for the South Battery Park City Resiliency Wagner Park Pavilion Construction Services Project (the "Pavilion Project"). A forthcoming addendum will be issued to address additional substantive questions received after April 11, 2022. The Responses are provided in bold, italicized print immediately following the Questions. All capitalized terms shall have the same definitions as provided in the RFP.

1) Please confirm if a 4" Mud Slab is required under all concrete pile caps. Some details call for it and other details do not.
   No, a mud slab is not required below pile caps.

2) Drawing A-004.00 Building Code Notes; Item 03 Required Special Inspections states by Onwer *[sic]*, CM or GC. Please advise who shall be responsible for all 3rd party testing listed on A-004.
   BPCA will be separately procuring a third-party special inspections firm for performance of this work.

[NO FURTHER TEXT ON THIS PAGE]

3) Detail 1 on Sheet L-262 shows bulb planting in the Pavilion Overlook Parapet planter. There are three plant codes that don't correspond to a plant species on any of the plant schedules. What plants are represented by AC, AME, and AA? There are 70 of each of these called out on L-262.
Due to the micro climate, soils, and irrigation anticipated and designed for the green roof and in the accessory parapet planters, bulbs in the Pavilion overlook parapet planter are no longer required as part of the scope. No changes are required to the plant schedule as these bulb plants were not originally included in the plant schedule.

The call-out to bulb planting has been removed on the revised version of Drawing L262 (which, as mentioned in Section A – REVISIONS TO RFP above, is attached hereto as Attachment #1), including the plants as represented by AA, AME, and AC (allium atropurpureum, allium "mount Everest", and allium cernuum respectively). Instead, the proposed perennials and grasses will provide seasonal interest and color.

4) Sheet L-200A states that the Landscape Scope in Package 3 only includes soil, planting, and irrigation. Can you confirm that this means the parapet planter materials (insulation, drainage mat, root barrier, planter liner) in Detail 3 on Sheet L-916 are not included in the landscape scope?
The parapet planting according to Drawing L200A, L200B, and the new Detail 2 on Drawing L916 (the updated version of L916 will be provided via a forthcoming addendum, as part of a revised set of select Package 3 landscape drawings), are included in the landscape component of the Pavilion Project scope found in these drawings.

5) Please provide detailed drawing(s) indicating locations and structures that are required to be monitored in conformance with notes indicated on G-007. In addition please advise of the parameters for the type of monitoring equipment required and the duration that monitoring is to be required for. Are remote readings acceptable or do readings need to be conducted in situ.
Monitoring locations/structures are detailed in the new Specification 316333 - Micropiles which, as noted in Section A – REVISIONS TO RFP above, is attached hereto as Attachment #6.

Monitoring must be performed for the critical structures within 50 feet of pile installation activities. Monitoring must also be performed for the duration of pile installation operations. Vibration monitoring must be performed using seismograph that continuously monitor vibrations and trigger alarms when a vibration level that exceeds threshold values stipulated is detected. Vibration recordings must be conducted continuously in histogram mode and real-time display and printing capability is required.

6) Exhibit E Qualification Forms do not line up with the Technical Proposal Qualification Form requirements in Exhibit D. For example, Form B-2 is listed in Exhibit D Section 1-3 as "State Finance Law Certifications." However, there is no Form B-2 in Exhibit E, and the "State Finance Law Certifications" Form is Form B-4 in Exhibit E. Additionally, Form B-3 is listed in Exhibit D, Section 1-4 as "Disclosure of Prior Non-Responsibility Determinations," however, in Exhibit E, form B-3 is a Statement of Non-Collusion Form. In Exhibit D, Section 1-5, Financial Statements, if the proposer has provided a guarantor, include qualification Form B-4. Again, Qualification Form B-4 is currently the State Finance Law Certifications form in Exhibit E. Please provide an updated Exhibit E to reflect the correct form numbers as required in Exhibit D, Technical Proposal.

As noted in Section A – REVISIONS TO RFP (above), revised versions of <u>Exhibit D</u> – Technical Proposal Submittal Requirements and <u>Exhibit E</u> – Qualification Forms are attached hereto as Attachment #7.

7) Drawing A701 Finish Schedule does not call for any wood base trim in any rooms. In rooms 105, 101, and 121 the room details call for note 168 (wood painted hardwood base) (drawing details 2/A607, detail 3/A605, and detail 3/A606). Note 168 indicates specification section 062000 and this specification section does not call out for any wood trim. Please clarify.
As noted in Section A – REVISIONS TO RFP (above), revised versions of Drawing A701 and Specification 062000 are provided, respectively, as Attachments #2 and #4. The bubbled revisions to Drawing A701, and the revised Specification 062000, indicate wood base trim extents and requirements. Refer to Drawing A772, Detail 6 for typical wood baseboard detail.

8) Drawings A611 and A612 are called out on drawing A111 (enlarged plan ground) for elevations in parks storage room. These drawings are not in the bid set and I have not seen them in any addendums. Please clarity.
The detail elevation references to Drawings A611 and A612 on Drawing A111, are incorrect. The correct detail elevation references are A608 and A609, respectively. These reference errors will be corrected and bubbled in a revised/updated version of Drawing A111 which will issued via a forthcoming addendum.

9) Drawing A701 Finish schedule. The finish key indicates an R-1 (resin flooring) but there in *[sic]* no specification section for this type of flooring. There is a Terrazzo flooring specification but not resin. Rooms 020, 021, 022, 023, 026 and 124 all call for Resin. Please clarify.
Please refer to the finish schedule in the revised version of Drawing A701; R-1 resin floors have been changed to CO-4 sealed concrete floors. As stated in Section A – REVISIONS TO RFP (above), the revised version of Drawing A701 is attached hereto as Attachment #2.

10) Spec Section 107119.16 Removable Flood Barriers. The contract documents call for Removeable *[sic]* barriers, Flip-Up gates and Flip-up deployables. We have however been unable to conclude which barriers are required where and their dimensions. Can you please provide matrix and or schedule identifying the locations, types and dimensions of the flood barrier protection.
Deployable stop logs will be part of the Pavilion building. Stop logs are required at the service door entry and the adjacent restaurant entry. These are the only applicable flood protection measures associated with Package 3. Refer to Drawings A-111, A-442, and FO-203 for further information. The flood barrier will be deferred and covered by shop drawings as required in Specification 107119.16, Section 1.03C.

11) Reference Spec Section 033300:
    a) Paragraph 1.6.7.5 refers to "increased" and "decreased" volume of Color Admixture per 2.1.6.5. That Paragraph does not appear to be included in the spec. ***This is an error; the correct reference is to Paragraph 2.1.6.4, not Paragraph 2.1.6.5. As stated in Section A – REVISIONS TO RFP (above), the revised version of Specification Section 033300 is attached hereto as Attachment #5.***

    b) Paragraph 1.6.7.5 says the Architect "may request up to 20 24" x 24" color samples. Paragraph 1.6.7.5.3 says "The Contractor shall assume no less than 20 samples" This implies that there could

be more than 20 samples. ***The selected Proposer should perform the related work based upon the assumption that twenty (20) 24" x 24" color samples will be required.***

c) Paragraph 1.6.7.6 says the Architect "may request up to 8 12'-0" long x 12: deep x 8'-0" high mockups". Paragraph 1.6.7.6.2 says "The Contractor should assume no less than 8 mockups". This implies that there could be more than 8 mockups. Please advise.
The selected Proposer should perform the related work based upon the assumption that eight (8) 12'-0" long x 12: deep x 8'-0" high mockups will be required. This requirement is addressed in the revised version of Specification 033300, attached hereto as Attachment #5.

12) Architectural Precast Ceiling Panel. When counting the pieces as identified on the plans, some pieces shall be extremely small in length which will ultimately require more joints. Is the intent to follow the pieces and jointing as identified on the ceiling plans or can some of the smaller pieces be combined to minimize the number or prices and joints. Please advise.
The selected Proposer must maintain joint locations, as indicated in the revised version of Drawing A125. As stated in Section A – REVISIONS TO RFP (above), the revised version of Drawing A125 is attached hereto as Attachment #3.

13) Can you please provide the aggregate composition and sample pictures of terrazzo flooring specified. Also please confirm there is no terrazzo wall base required and the thickness of terrazzo floor is to be 3/8" thick.
Mix design is indicated in the Specification 096623, Section 2.4. Terrazzo floor thickness is 3/8" thick, as per Specification 06623, Section 3.3 B. There is no terrazzo baseboard; please refer to Drawing A772 for typical terrazzo edge termination details.

14) On page A-111 for the park storage areas the interior elevations for them are labeled A-611 and A-612. Please advise these drawings as *[sic]* are missing.
See response to Question #8, above.

By signing the line below, I am acknowledging that all pages of this Addendum #9 have been received, reviewed and understood, and will be incorporated into the Proposal submitted. This document must be attached to the Proposal for consideration.

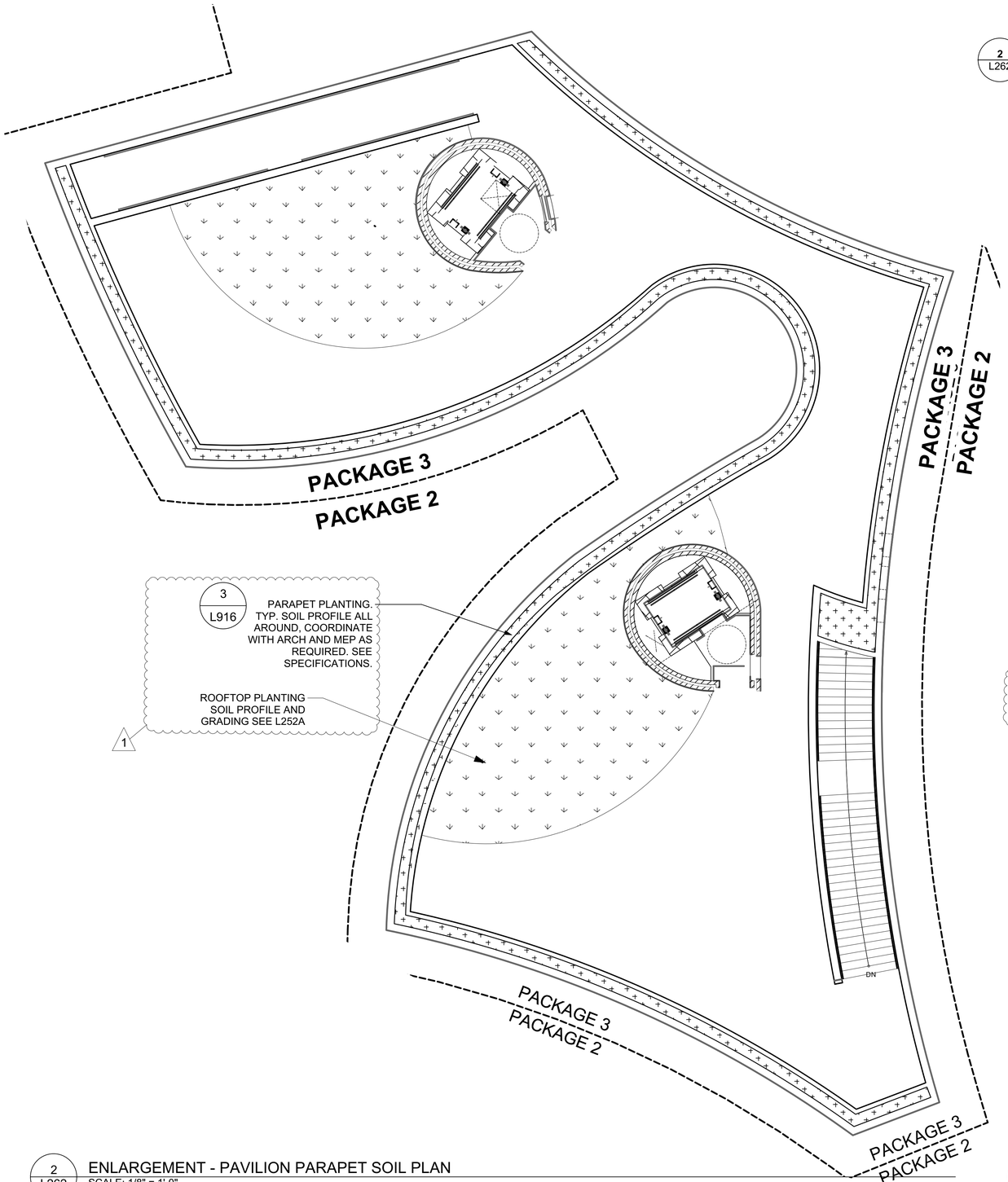
_____	_____	_____
Print Name (Above)	Signature (Above)	Date (Above)

Number of pages received: <fill in>

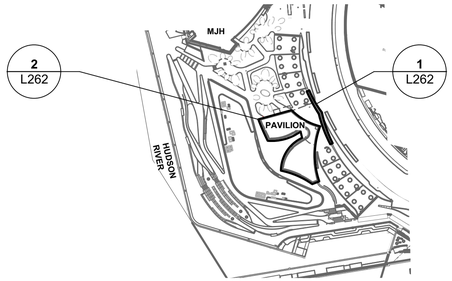
Distributed to: All prospective Proposers

ATTACHMENT #1
REVISED LANDSCAPE DRAWING L262:
ENLARGMENT – PAVILION PARAPET SOILS PLAN

(ATTACHED)

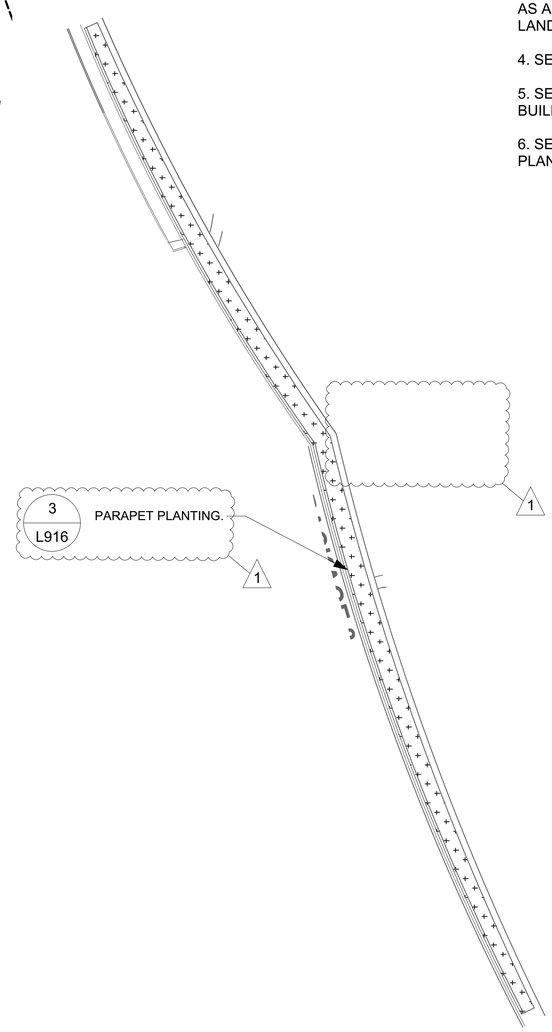


2 L262 ENLARGEMENT - PAVILION PARAPET SOIL PLAN
SCALE: 1/8" = 1'-0"



2 L262 — 1 L262

KEY PLAN
NO SCALE



1 L262 PAVILION OVERLOOK PARAPET PLANTING - PERENNIALS
SCALE: 1/8" = 1'-0"

PLANTING LEGEND

SOIL PROFILE - PARAPET PLANTER — 3 L916

SOIL PROFILE - GREEN ROOF — 2 L916

N

NOTES:

1. FOR UNDERDRAIN SYSTEM SEE CIVIL DRAWINGS.

2.COORDINATE AND LAYOUT MEP AND IRRIGATION SYSTEM AS REQUIRED PRIOR TO SOIL INFILL.

3. SEE L-916 FOR DRAINAGE DETAILS. PLACE DRAINAGE AS APPROPRIATE, TO BE VERIFIED IN THE FIELD BY LANDSCAPE ARCHITECT.

4. SEE SPECIFICATIONS.

5. SEE STRUCT. AND ARCH DRAWINGS FOR PAVILION BUILDING.

6. SEE L252A FOR GREEN ROOF SOIL AND GRADING PLAN

GRAPHIC SCALE: 1/8" = 1'-0"
5' 0' 5' 10' 15' 20' 25'

AECOM

PROJECT

SOUTH BATTERY PARK CITY RESILIENCY DESIGN SERVICES

CLIENT

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BATTERY PARK CITY AUTHORITY

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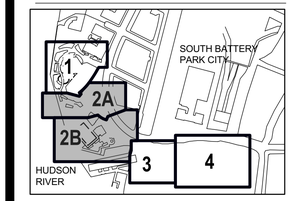
KEY PLAN



REGISTRATION



ISSUE/REVISION

1	APR 2022	ADDENDUM REVISION 1
I	JAN 2022	BID SET
I/R	DATE	DESCRIPTION

Designed By:	**H. EDELBURG**
Drawn By:	**M. MINCHIN**
Checked By:	**A. WILKUS**
Approved By:	**A. LAVALLEE**

PROJECT/TERM CONTRACT NUMBER

Contract No. 18-2586

SHEET TITLE

ENLARGEMENT - PAVILION PARAPET SOILS PLAN

SHEET NUMBER

L262

ANSI D 22" x 34"

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IT IS A VIOLATION OF TITLE VIII ARTICLE 145, SECTION 7209.2 OF THE NEW YORK STATE EDUCATION LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER IN ANY WAY, PLANS, SPECIFICATIONS, PLATS OR REPORTS TO WHICH THE SEAL OF A PROFESSIONAL ENGINEER HAS BEEN APPLIED. IF AN ITEM BEARING THE SEAL OF A PROFESSIONAL ENGINEER IS ALTERED, THE ALTERING ENGINEER SHALL AFFIX TO THE ITEM HIS SEAL AND THE NOTATION "ALTERED BY" FOLLOWED BY HIS/HER SIGNATURE, THE DATE, AND A SPECIFIC DESCRIPTION OF THE ALTERATION.

ATTACHMENT #2
REVISED ARCHITECTURAL DRAWING A701:
FINISH SCHEDULE

(ATTACHED)

ANSI D 22" x 34"

01 Finish Schedule

Room	Floor	North Wall	East Wall	South Wall	West Wall	Ceiling	Notes
Ground Level							
002 Parks Garage	CO-5	CO-3	CO-3	CMU-1	CMU-1	-	
003 Parks Storage (Program)	CO-4	CMU-1	CO-3, CMU-1	CO-3, CMU-1	CO-3, CMU-1	-	
004 Parks Corridor	CO-4	CO-3, CMU-1	CMU-1	CO-3, CMU-1	CMU-1	-	
005 Stair 3	CO-4	CO-3	CMU-1	CMU-1	CMU-1	-	
006 Geothermal	CO-4	CO-3	CMU-1	CMU-1	CO-3	-	
007 Water Reuse/ Fountain/ Utilities	CO-4	CO-3	CO-3	CO-3	CO-3	-	
009 Parks Storage (Maintenance)	CO-4	CMU-1	CMU-1	CMU-1	CO-3, CMU-1	-	
010 Mechanical	CO-4	CMU-1	CMU-1	CO-3	CMU-1	-	
011 Elevator 1 Machine Room	CO-4	CO-3, CMU-1	CMU-1	CMU-1	CMU-1	-	
020 Restaurant Entry	CO-4	CMU-1	CO-3	CMU-1	CMU-1	-	
021 Trash Room	CO-4	CMU-1	CMU-1	CMU-1	CMU-1	-	
022 Restaurant Vestibule	CO-4	CMU-1	CO-3	-	CMU-1	-	
023 Ramp/ Corridor	CO-4	-	CO-3	-	CMU-1	-	Ceiling by Food Service Vendor
024 Unisex Restroom 1	CO-4	T-1	T-1	T-1	T-1	-	Ceiling by Food Service Vendor
025 Office	CO-4	CO-3, CMU-1	CMU-1	CMU-1	CMU-1	-	Ceiling by Food Service Vendor
026 Kitchen	CO-4	CO-3, CMU-1	CO-3	CO-3	CO-3	-	Ceiling by Food Service Vendor
027 Telecom Closet	CO-4	CMU-1	CMU-1	CMU-1	CMU-1	-	
028 Stair 4	CO-4	CMU-1	GW-1	-	CO-3, CMU-1	-	
First Level							
North							
100 Community Room	ET-1	CO-1	CO-1	CO-1, GL-1	CO-1, GL-1	CO-2	
101 Vestibule	ET-1	GW-1	GW-1	CO-1	CO-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
102 Unisex Toilet 2	ET-1	T-1	T-1	T-1	T-1	GW-2	
103 Unisex Toilet 3	ET-1	T-1	T-1	CO-1	T-1	GW-2	
104 Storage	ET-1	GW-1	GW-1	GW-1, CO-1	GW-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
105 Parks Service Access	CO-4	GW-1, CO-1	GW-1	GW-1	CO-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
106 Storage	CO-4	GW-1	GW-1	CO-1	GW-1	-	
107 Vestibule	ET-1, M-2	T-1	CO-1	T-1	T-1	GW-2	
108 Janitor's Closet	CO-4	GW-1	GW-1	GW-1	GW-1	-	
109 Men's Toilet	ET-1	T-1	T-1	T-1	T-1	GW-2	
110 Vestibule	ET-1	T-1, CO-1	T-1, CO-1	T-1	T-1	GW-2	
South							
120 Restaurant	ET-1	-	CO-1	CO-1, GL-1	CO-1, GL-1	CO-2	
121 Vestibule	ET-1	GW-1	GW-1	GW-1	CO-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
122 Unisex Toilet 4	ET-1	T-1	T-1	T-1	T-1	GW-2	
123 Unisex Toilet 5	ET-1	T-1	T-1	T-1	T-1	GW-2	
124 Restaurant Prep	CO-4	GW-1	GW-1, CO-1	CO-1	CO-1	-	Ceiling by Food Service Vendor
125 Public Corridor	ET-1	T-1	CO-1	T-1	T-1	GW-2	
126 Janitor's Closet	CO-4	GW-1	CO-1	GW-1	GW-1	-	
127 Women's Toilet	ET-1	T-1	T-1	T-1	T-1	GW-2	
128 Vestibule	ET-1, M-2	CO-1	CO-1	GW-1	GW-1	GW-2	
129 Public Elevator Lobby	ET-1, M-2	CO-1	CO-1	GW-1	GW-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
130 Restaurant Service	CO-4	CO-1	GW-1	GW-1	CO-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
Second Level							
201 North Mechanical	CO-4	CO-1	CO-1	CO-1, GW-1	GW-1		
204 Electrical Room	CO-4	CO-1, GW-1	CO-1	CO-1	GW-1		
205 IT Room	CO-4	CO-1, PW-1	PW-1	CO-1, PW-1	PW-1		
211 South Mechanical	CO-4	CO-1	CO-1	CO-1	CO-1, GW-1		
212 Elevator 2 Machine Room	CO-4	GW-1	GW-1	GW-1	CO-1, GW-1	GW-2	Provide 2-Hour Rated Ceiling Assembly
213 Exhaust Fan	CO-4	GW-1	GW-1	GW-1	CO-1, GW-1	GW-2	Provide 2-Hour Rated Ceiling Assembly
Roof Level							
301 North Elevator Vestibule	ET-1	GW-1	CO-1	CO-1, GW-1	CO-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772
302 South Elevator Vestibule	ET-1	GW-1	CO-1	CO-1, GW-1	GW-1	GW-2	Include Painted Wood Baseboard on GW-1 walls, Ref. 06/A772

02 Finishes and Materials Key

Designation	Material	Supplier	Typ. Dimension	Color	Finish	Spec No.	Notes
S-1	Solid Surface Material	Corian	12 mm x 600 mm x 600 mm Slab	Glacier White	Matte	066600	
ET-1	Thin-Set Epoxy Terrazzo Floor	Terroxy	-	Custom	50 Grit with Sealer	096623	
GW-1	Gypsum Wall Board- Painted	-	-	RAL 9003 (White)		092900, 099000	
GW-2	GWB- Suspended, Painted	-	-	RAL 9003 (White)		092900, 099000	
CMU-1	Concrete Masonry Unit- Painted	-	-	RAL 9003 (White)		042000, 099000	
CO-1	Cast-in-Place Architectural Concrete	-	-	Custom		033300	
CO-2	Precast Arch. Conc. Acoustical Ceiling System	-	-	Custom		034500, 072100	See 02 and 03/A-745 for more info
CO-3	Cast-in-Place Concrete- Painted	-	-	RAL 9003 (White)		033000, 099000	
CO-4	Cast-in-Place Concrete- Sealed	-	-	Custom	Matte	033000, 099000	Sealant: Dex-O-Tex Posi-Tred, or Approved Equal
CO-5	Cast-in-Place Concrete- Traffic Coating	-	-	Custom	Matte	033000, 099000	Traffic Coating: Dex-O-Tex Auto Dex 500, or Approved Equal
M-1	Painted Metal	-	-	RAL 030 40 30 (Red)		057000, 099000	
M-2	Stainless Steel Walk Off Mat	-	-	-		057000	
T-1	Wall Tile	Dal-Tile	2" x 2"	Arctic White 0790	Matte	093100	
GL-1	Exterior Glass Façade	-	-	RAL 030 40 30 (Red)		057000, 084413, 099000	
PW-1	Ply Wood, Painted	-	-	RAL 9003 (White)		099000	Fire Rated

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AECOM

PROJECT

20 BATTERY PLACE
NEW YORK, NEW YORK 10280

OWNER

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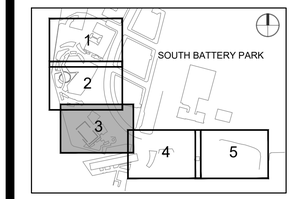
KEY PLAN



REGISTRATION



NYC DOB JOB NUMBER

M00613188-I1

ISSUE/REVISION

1	2022-04-14	Addendum Revision 1
	2021-12-23	Issued for DOB Approval
I/R	DATE	DESCRIPTION

PROJECT/TERM CONTRACT NUMBER

Contract No. 18-2586

SHEET TITLE

FINISH SCHEDULE

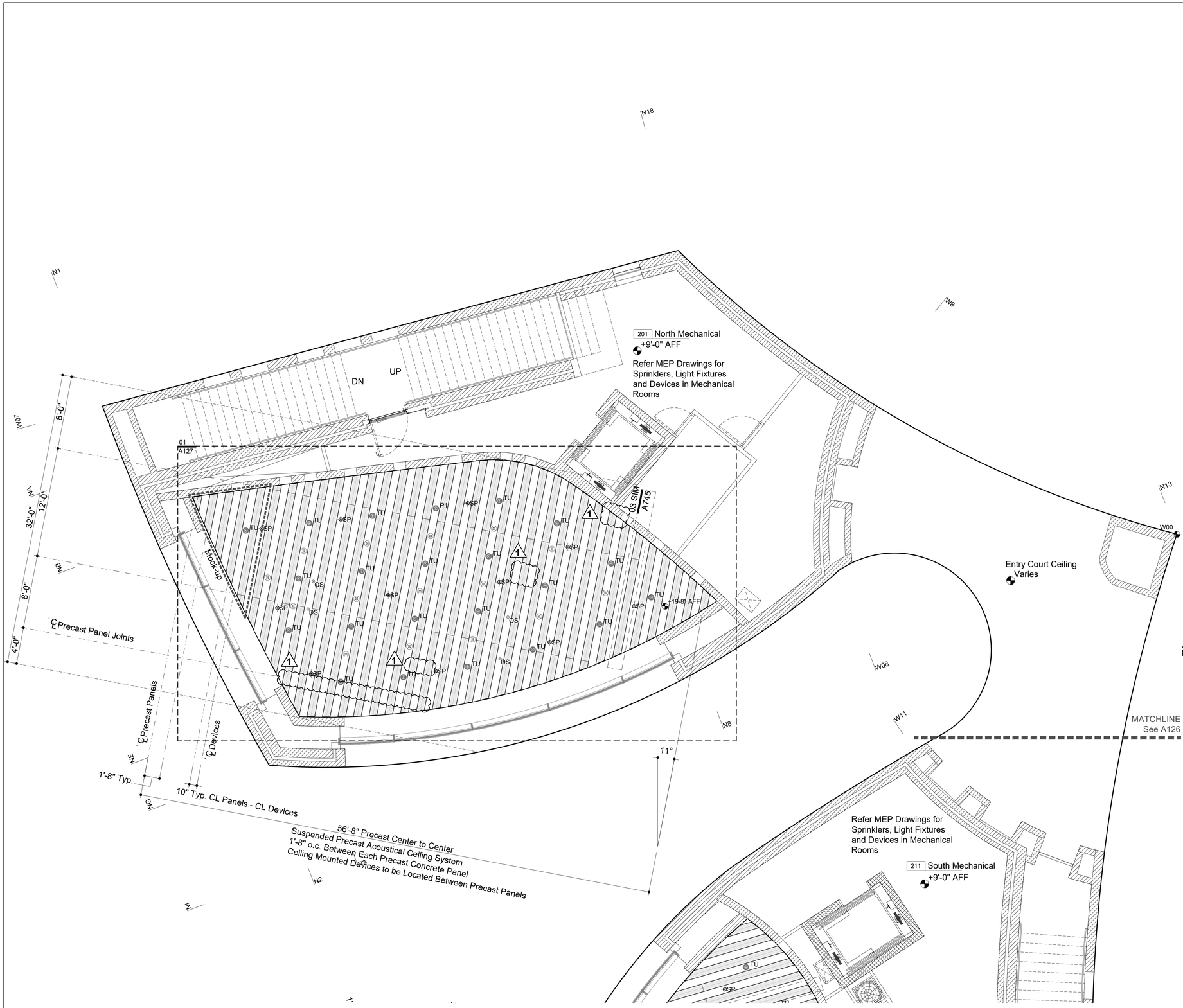
SHEET NUMBER

A-701.00

ATTACHMENT #3
REVISED ARCHITECTURAL DRAWING A125:
SECOND LEVEL RCP

(ATTACHED)

ANSI D 22" x 34"



Legend Notes

Notes For This Sheet Only

Refer Lighting Dwgs. for FixtureType & Description

Lighting Fixtures

Exterior
- TK Exterior Uplight, Recessed
- TT Exterior Wall Mounted

Interior
- TS Recessed Downlight
- TU Pendant Fixture, Ceiling Mounted
- Pendant Fixture, Mounting Point
- TQ Recessed Perimeter LED Fixture
- L1 Linear LED
- Occupancy (OS) or Daylight Sensor (DS)
- Vacancy Switch

Refer MEP Dwgs. for Device Type & Description

Refer A751 For Typical Device Elevations

Devices

Fire Alarm
- Pull Station
- Strobe
- Horn / Strobe
- Smoke Detector
- Heat Detector
- SP Sprinkler - Pendant
- SP Sprinkler - Sidewall
- EX Exit Sign - Ceiling Mounted
- CP Control Panel Remote Annunciator

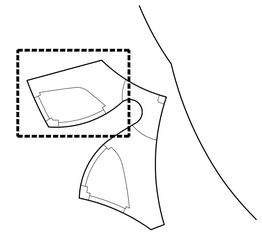
Electrical
- Junction Box
- Potential AV/Security Conduit Location
- EFO Exterior Rated Floor Outlet
- WP Wet Rated Wall Outlet
- Wall Outlet

Plumbing
- H Floor Hydrant

Notes

01 Architectural CIP Concrete. See Struc. Dwg.
08 Painted Metal and Glass Window System
32 Sprinkler, See Fire Protection Drawings
43 Suspended GWB Ceiling. Ref. Finish Sched.
114 Electrical Conduit, See E Documents
115 Junction Box, See E Documents
164 Sprinkler Piping, See FP Drawings
165 Future A/V and IT Conduit
166 Toilet Partition Steel Framing Member

Key Plan (N.T.S.)



GRAPHIC SCALE: 3/16" = 1'-0"

5' 0 5' 10'

DOB APPROVAL STAMP

N

AECOM

PROJECT

20 BATTERY PLACE
NEW YORK, NEW YORK 10280

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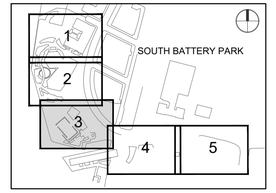
KEY PLAN



REGISTRATION

REGISTERED ARCHITECT
THOMAS McGEHEE PHIFER
19370
STATE OF NEW YORK

NYC DOB JOB NUMBER

M00613188-I1

ISSUE/REVISION

1	2022-04-14	Addendum Revision 1
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I/R	DATE	DESCRIPTION

PROJECT/TERM CONTRACT NUMBER

Contract No. 18-2586

SHEET TITLE

SECOND LEVEL RCP

SHEET NUMBER

A-125.00

PAGE NUMBER 051 OF 212

Printed on ___% Post-Consumer Recycled Content Paper

ATTACHMENT #4
REVISED SPECIFICATION 062000:
CARPENTRY

(ATTACHED)

SECTION 062000 - CARPENTRY

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

B. Sustainable Design Requirements: The owner requires the contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving ILFI Zero Carbon and WEDG certification. Refer to section 018113 - Sustainable Design Requirements for the project's targets and specific requirements. The contractor shall ensure that the requirements related to the project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the contractor or their subcontractors, shall not be allowed if such changes compromise the project's sustainability goals and ILFI Zero Carbon or WEDG certification.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the carpentry work as shown on the drawings and/or specified herein, including but not limited to, the following:

1. Blocking and miscellaneous wood, including plywood backer panels at walls and ceilings.
2. Rough hardware.
3. Installation only of finish hardware.
4. Installation only of doors and hollow metal frames.
5. Temporary controls furnished by Carpentry trades.
6. Rough carpentry associated with roof work.
7. Hard Wood Baseboard

1.3 RELATED SECTIONS

A. Construction and Demolition Waste Management and Disposal - Section 017419

B. Sustainable Design Requirements - Section 018113

C. Construction Indoor Air Quality Requirements - Section 018119

D. Plastic Laminate Cabinetry and Millwork - Section 062023.

E. Steel doors and frames - Section 081113.

F. Finish hardware - Section 087100.

G. Painting and Finishing – Section 099000

1.4 QUALITY ASSURANCE

A. Lumber Standard: Comply with PS 20.

B. Plywood Standard: Comply with PS 1 and American Plywood Assoc. (APA).

C. Shop fabricate carpentry work to the extent feasible and where shop fabrication will result in better workmanship than feasible for on-site fabrication.

D. Grade Marks: Identify lumber and plywood by official grade mark.

1. Lumber: Grade stamp to contain symbol of grading agency certified by Board of Review, American Lumber Standards Committee, mill number or name, grade of lumber, species grouping or combination designation, rules under which graded where applicable, and condition of seasoning at time of manufacture.

a. S-Dry: Maximum nineteen (19) percent moisture content as per ASTM D 2016.

E. Installation of doors, frames and hardware shall conform to the minimum standards of "Installation Guides for Doors and Hardware" of the Door and Hardware Institute.

F. Hard Wood Baseboard workmanship shall conform to the quality standards of the Architectural Woodwork Institute, "Architectural Woodwork Standards," including materials and installation, and for architectural woodwork. All work shall conform to "Premium" grade requirements of the AWS "Architectural Woodwork Standards," unless otherwise modified herein.

1.5 SUBMITTALS

A. Sustainability Submittals: For all permanently installed products and materials related to the work of this Section, submit product and material documentation to comply with and contribute to the Project's sustainability requirements, as outlined in the Submittals article of Section 018113 – Sustainable Design Requirements.

B. Environmental Product Declarations: To quantify the embodied carbon of the building's materials, ILFI ZC requires that Environmental Product Declarations (EPDs) with Life Cycle Analyses (LCAs) be provided. Include product-specific non-expired EPDs for applicable products. When product-specific EPDs are not available, provide industry-wide EPDs or product LCAs.

C. Product Data Sheets: Provide product data sheets that describe the material make up of products (e.g. material ingredient lists, CAS RN#s, description of product's material sourcing).

D. Pressure Treatment: Include certification by treating plant stating chemicals and process used, net amount of salts retained and conformance with applicable standards.

E. Fire-retardant treatment: include certification by treating plant that treatment material complies with governing ordinances and that treatment will not bleed through finished surfaces.

F. Shop drawings

1. Submit shop drawings of each type and finish of each type of trim, base, molding, etc. specified and indicated on the drawings. Shop drawings shall indicate room plans and elevations at 3/4" equals 1'-0" scale and typical construction details at 3" equals 1'-0" scale. Shop drawings shall indicate all materials, thicknesses and finishes.

2. Shop drawings shall show all anchors, fastenings and accessories.

3. Shop drawings shall show all jointing, joint treatment and butt jointing.

4. Where architectural woodwork deviates from AWI standards noted herein, shop drawings must identify these deviations.

G. Samples: submit samples of each of the following items:

1. Each type and finish of each type of trim, base, molding, etc., eight (8) inches long, finish as specified.

1.6 PRODUCT HANDLING

A. Deliver carpentry materials to the site ready to use with each piece of lumber clearly marked as to grade, type and mill, and place in an area protected from the elements.

B. Deliver rough hardware in sealed kegs and/or other containers which shall bear labels as to type and kind.

C. Pile lumber for rough usage, when delivered to the site in stacks to insure drainage and with a minimum clearance of six (6) inches above grade. Cover stacks with tarpaulins or other watertight coverings. Store grounds and similar small sized lumber inside the building as soon as possible after delivery.

D. Do not store seasoned lumber in wet or damp portions of the building.

E. Protect fire retardant treated materials against high humidity and moisture during storage and erection.

F. Remove delivered materials which do not conform to specified grading rules or are otherwise not suitable for installation from the job site and replace with acceptable materials.

G. All items specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

H. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

I. Keep all finish carpentry, millwork, and cabinet work under cover both in transit and at the premises. Do not deliver any finish carpentry, millwork or cabinet work before it is required for installation. Protect such work to avoid damage in transit, during erection and after erection until acceptance of the building; use all such methods to provide the proper protection. Remove such protection when directed by the Architect.

J. Deliver finish carpentry, millwork, and cabinet work in a dry stable condition; protect same against injury and dampness. Do not store or install finish carpentry, millwork or cabinet work until after the concrete, masonry and plaster work are thoroughly dry.

K. Damaged or defective items of work of this Section are subject to rejection and replacement with new by Contractor, at no cost to Owner.

L. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas.

1.7 JOB CONDITIONS

A. Installer must examine the substrates and supporting structure and the conditions under which the carpentry work is to be installed, and notify the Contractor in writing of conditions detrimental to the work. Do not proceed with the installation until unsatisfactory conditions have been corrected in a manner acceptable to the Installer and the Architect.

B. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.

C. Finish Carpentry

1. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

2. Humidity Controls: The ambient relative humidity at the site, including both the storage and the installation areas, shall be maintained between 25% and 55% prior to delivery and through the life of the installation.

3. Determine equilibrium moisture content and maintain required temperature and relative humidity as required for a tolerance of plus or minus one (1) percent of the specified optimum moisture content until woodwork receives specified finishes. Refer to "Guide to Wood Species Selection," AWS, for method of determining equilibrium moisture content values.

4. Examination of Substrate and Conditions: The installer must examine the substrate and the conditions under which the work of this Section is to be performed, and notify the Contractor in writing of unsatisfactory conditions. Do not proceed with work under this Section until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

5. Areas to receive architectural woodwork must be fully enclosed with windows and/or curtain wall installed and glazed, exterior door in place, HVAC systems operational and temporary openings closed. Any plaster, wet grinding and concrete work shall be fully dry.

6. Architectural woodwork shall be allowed to come to equilibrium on site for 7 days prior to installation.

PART 2 PRODUCTS

2.1 SUSTAINABILITY PERFORMANCE REQUIREMENTS

A. For all permanently installed products and materials related to the work of this Section, provide products and materials that meet the Project's sustainability performance criteria as outlined in PART 2–PRODUCTS of Section 018113 – Sustainable Design Requirements.

B. For interior, wet-applied, field-installed adhesives, sealants, paints, and coatings, provide products that meet Volatile Organic Compound (VOC) content limits -and- meet either VOC emissions testing requirements (VOC Emissions Evaluation) -or- have an

acceptable third party certification, as outlined in Section 018113 - Sustainable Design Requirements.

C. Provide composite wood products that meet Formaldehyde Emissions Evaluation requirements or demonstrate exemption from such requirements, as outlined in Section 018113 – Sustainable Design Requirements.

D. Provide wood products that are certified by the Forest Stewardship Council (FSC), as outlined in Section 018113 – Sustainable Design Requirements.

E. Provide products with product-specific or industry-wide Environmental Product Declarations (or alternative environmental declaration accepted by LEED), as outlined in Section 018113 – Sustainable Design Requirements.

F. Provide Products with manufacturer's product-specific Health Product Declaration (HPD), Declare label, or Cradle to Cradle certificate (or alternative health-related declaration accepted by LEED), as outlined in Section 018113 – Sustainable Design Requirements.

2.2 WOOD MATERIAL

A. General

1. All wood shall be sound, flat, straight, well seasoned, thoroughly dry and free from all defects. Warped or twisted wood shall not be used.

2. For miscellaneous wood blocking, grounds, furring as required, use Utility Grade Coastal Douglas Fir or Southern Pine, free from knots, shakes, rot or other defects, straight, square edges and straight grain, air seasoned with maximum moisture content of nineteen (19) percent. Wood shall be S4S, S-Dry, complying with PS-20.

3. Plywood for plenums, rough carpentry, backer boards and for telephone and electric closets, provide 3/4" thick C-D EXT-APA plywood, fire retardant treated as specified herein.

B. Wood Treatment

1. All interior wood material specified herein shall be fire retardant treated to comply with the AWPA standards (C20 for lumber, C27 for plywood) for pressure impregnation with fire retardant chemical to achieve a flame spread rating of not more than 25 (UL Class "FR-S") when tested in accordance with UL Test 723 or ASTM E 84. The fire retardant chemicals used to treat the lumber must comply with FR-1 of AWPA Standard P17 and be free of halogens, sulfates and ammonium phosphate.

a. After treatment, kiln dry to a moisture content of fifteen (15) percent; if wood is to be painted or finished, kiln dry to a moisture content of twelve (12) percent. Treatment shall be equal to "Dricon" made by Arch Wood Protection Inc. or

approved equal. Provide UL approved identification on treated materials. All plywood shall have smoke development less than 25 per ASTM E84.

b. Plywood: Pyro-Guard by Hoover Treated Wood Products, Inc. 706.595.7355, ¾" thickness unless otherwise specified on the drawings or approved equal meeting the same flame spread and smoke development in the Pyro-Guard. Plywood stamp must face in a direction that can be viewed by a building official.

c. Plywood at art walls and wood planks walls, floors and ceilings shall meet conditioning and moisture content for requirements indicated in specification section 096400.

2. For exterior blocking, roofing and sheet metal, pressure treat wood with copper azole, Type A (CBA-A); ammoniacal copper quat (ACQ) or similar preservative product that contains no arsenic or chromium. Preservative shall comply with AWPA Standard C-2 for lumber and C-9 for plywood, (.25 lbs./cubic foot of chemical in wood).

a. After treatment, kiln dry to a maximum moisture content of fifteen (15) percent. Treatment shall be equal to "Wolmanized Natural Select" made by Arch Wood Protection Inc. or approved equal.

3. Treated wood which is cut or otherwise damaged shall be further treated in accordance with the AWPA Standard M-4.

C. WOOD FOR CAPS, TRIM, BASES, MOLDINGS AND FRAMES

1. Quality Standard: For the following types of interior architectural woodwork, comply with indicated standards as applicable.

2. Standing and Running Trim: AWI Section 6.

3. Miscellaneous Millwork: AWI Section 6.

4. Wood Work with Painted Finish: Except as otherwise indicated, comply with the following:

a. Grade: Premium.

b. Species of Solid Wood: Poplar or other hardwood as accepted by the Architect

c. Finish: Painted, comply with requirements of Section 099000

2.3 HARDWARE

A. Rough Hardware for Treated Woods and Exterior Use: Hot-dipped galvanized or Type 304 stainless steel.

B. Nails: Common steel wire, untreated for interior work as per ASTM F 1667.

C. Bolts: Standard mild steel, square head machine bolts with square nuts and malleable iron or steel plate washers or carriage bolts with square nuts and cut washers conforming to the following:

1. Bolts: ASTM A 307, Grade A.

2. Nuts: ASTM A 563.

3. Lag Screws and Bolts: ASME B 18.2.1.

D. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.

2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2; use stainless steel for treated woods and exterior use.

E. Wood Screws: ASME B 18.6.1.

F. Concrete and Masonry Anchors: Standard expansion-shield self-drilling type concrete anchors where so shown or noted on the drawings, or where approved by the Architect.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where carpentry is to be installed and correct any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

3.2 INSTALLATION OF FINISH HARDWARE

A. All finishing hardware specified in Section 087100 of this specification entitled "Finish Hardware" shall be received, accounted for, stored and applied under this Section.

B. Hardware shall be sorted and stored in space assigned by Contractor and shall be kept at all times under lock and key. The safety and preservation of all items delivered will be the responsibility of the Contractor.

C. Hardware shall be carefully fitted and securely attached, in accordance with these specifications and the instructions of the various manufacturers.

D. Unless otherwise noted, mount hardware units at heights established in Section 081113.

E. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Wherever cutting and fitting is required to install hardware onto or into surfaces which are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, re-install each item. Do not install surface-mounted items until finishes have been completed on the substrate.

F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

G. Drill and countersink units which are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.

H. Cut and fit threshold and floor covers to profile of door frames, with mitered corners and hair-line joints. Join units with concealed welds or concealed mechanical joints. Cut smooth openings for spindles, bolts and similar items, if any.

I. All keys used shall be construction keys which are to be tagged with fiber discs as approved, clearly labeled with identifying inscriptions and then neatly arranged in a temporary cabinet. All construction keys shall be returned to the Owner.

J. Adjusting and Cleaning

1. Adjust and check each operating item of hardware and each door, to ensure proper operation and function of every unit. Lubricate moving parts with type lubrication recommended by manufacturer (graphite type if no other recommended). Replace units which cannot be adjusted and lubricated to operate freely and smoothly as intended for the application made.

2. Final Adjustment: Wherever hardware installation is made more than one month prior to acceptance or occupancy of a space or area, return to the work during the week prior to acceptance or occupancy, and make a final check and adjustment of all hardware items in such space or area. Clean and re-lubricate operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

3.3 INSTALLATION OF DOORS AND FRAMES

A. Preparation

1. Remove welded-in shipping spreaders installed at factory.

2. Prior to installation and with installation spreaders in place, adjust and securely brace standard steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch, measured at jambs on a perpendicular line from head to floor.

3. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

B. Installation

1. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

2. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

    a. Install frames in accordance with ANSI 250.11-20001, Recommended Erection Instructions for Steel Frames, unless more stringent requirements are specified herein.
    b. At fire-protection-rated openings, install frames according to NFPA 80.
    c. Where frames are fabricated in sections due to shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
    d. Install frames with removable glazing stops located on secure side of opening.
    e. Frames set in masonry walls shall have door silencers installed in frames before grouting.
    f. Remove temporary braces necessary for installation only after frames have been properly set and secured.
    g. Check plumb, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.

3. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with post-installed expansion anchors.

    a. Floor anchors may be set with powder-actuated fasteners instead of post-installed expansion anchors if so indicated and approved on Shop Drawings.

4. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames conforming to the requirements of Section 072100 – "Thermal Insulation."

5. In-Place Concrete Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.

6. Ceiling Struts: Extend struts vertically from top of frame at each jamb to supporting construction above, unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction above. Provide adjustable wedged or bolted anchorage to frame jamb members.

7. Installation Tolerances: Adjust steel door frames for squareness, alignment, twist, and plumb to the tolerance given in HMMA 841 of ANSI/NAAMM, current edition.

8. Steel Doors: Fit hollow metal doors accurately in frames to the tolerances given in HMMA 841 of ANSI/NAAMM, current edition.

    a. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

9. Glazing: Comply with installation requirements in Division 8 Section "Glass and Glazing" and with standard steel door and frame manufacturer's written instructions.

    a. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

C. Wood Doors

1. Condition doors to average prevailing humidity in installation area prior to hanging.

2. Install doors in accordance with manufacturer’s instructions.

3. Fit door to frames and machine for hardware to whatever extent not previously worked at factory as required for proper fit and uniform clearance at each edge.

4. Clearances: Install doors to meet clearance requirements specified in Section 081113

5. Fire-Rated Doors: Install in corresponding fire-rated frames in accordance with the requirements of NFPA No. 80. Provide clearances complying with the limitations of the authority having jurisdiction.

D. Adjustments: Check and readjust operating finish hardware items just prior to final inspection. Leave work in complete and proper operating condition. Remove and

replace defective work, including doors or frames which are warped, bowed or otherwise unacceptable.

3.4 BLOCKING AND MISCELLANEOUS WOOD

A. General

1. Erect rough carpentry true to line, levels and dimensions required; squared, aligned, plumbed, and securely fastened in place.

2. Shim where required to true up furring, blocking and the like. Use wood or metal shims only.

3. Do all cutting, fitting, drilling and tapping of other work as required to secure work in place and to perform the work included herein. Do all the cutting and fitting of carpentry work, for the work of other trades as required.

B. Blocking and Miscellaneous Wood

1. Furnish and install all wood grounds, furring, blocking, curbs, bucks, nailers, etc., that may be necessary and required in connection with the carpentry and with the work described for any other trades and including required carpentry for electrical fixtures. All blocking and nailers shall be continuous wherever required, whether or not so indicated.

2. Blocking shall be as required for the proper installation of the finished work and for items in mechanical sections as required. Blocking, edgings, stops, nailing strips, etc., shall be continuous, unless distinctly noted otherwise. Provide blocking as required to install all equipment. Provide blocking and nailers where shown or required to fasten interior sheet metal work.

3. Fastening for wood grounds, furring and blocking shall be of metal and of type and spacing as best suited to conditions. Hardened steel nails, expansion screws, toggle bolts, self-clinching nails, metal plugs, inserts or similar fastenings shall be used, of suitable type and size to draw the members into place and securely hold same.

C. Rough Lumber for Roofing and Sheet Metal

1. Furnish and install all wood nailing strips and wood blocking required in connection with respective types of roofing, fans, flashings, and sheet metal work, using preservative treated wood as herein before specified.

2. Wood blocking shall be of sizes and shapes as indicated on the drawings and/or designed for the reception of curb flashings for roof ventilators and similar items.

3. All nailing strips and blocking shall be carried out in accordance with the printed installation instructions, and/or recommendations of the accepted manufacturer of

the roofing materials, and in coordination and cooperation with the sheet metal work trades.

4. All blocking and nailing strips shall be firmly secured in place using counter bored bolt and nut fastenings, or secured by any other proposed flush surfaced fastenings.

5. Wood nailing strips or blocking required to be embedded in concrete work shall be furnished in time due for placing, prior to start of concrete operations. Locations and spacings of nailing strips or blocking shall be performed in coordination with the concrete trades, as required for respective installations.

3.5 PLYWOOD BACKER BOARDS

A. Furnish and install 3/4" thick plywood panels to the stud walls where noted on drawings as described in Section 092900.

3.6 ROUGH HARDWARE

A. Securely fasten rough carpentry together. Nail, spike, lag screw or bolt as required by conditions encountered in the field and the Contract Documents.

B. Provide rough or framing hardware, such as nails, screws, bolts, anchors, hangers, clips, inserts, miscellaneous fastenings, and similar items of the best quality and of the proper size and kind to adequately secure the work together and in place, in a rigid and substantial manner.

C. Secure rough carpentry to masonry with countersunk bolts in expansion sleeves or other acceptable manner, with fastenings not more than sixteen (16) inches apart. Secure woodwork to hollow masonry with toggle bolts spaced not more than sixteen (16) inches apart.

D. Countersink bolts in nailers and other rough woodwork and include washers and nuts. Cut bolts off flush with surfaces and peen as may be required to receive finished work.

E. Inserts to secure wood nailers to concrete shall be malleable iron threaded inserts with 3/8" diameter bolts of length to allow for countersinking. Locate at end of each nailer and at intervals not exceeding thirty (30) inches o.c.

F. Furnish to the mason for building into the work, or attaching the work which is to be built in, anchors, bolts, wall plates bolted to masonry, corrugated wall plugs, nailing blocks, etc., which are required for the proper fastening and installation for the work or other items as called for in this Section.

G. Detailed instructions with sketches of necessary requirements, shall be given to the masonry trade showing the location and other details of such nailing devices.

3.7 HARD WOOD BASEBOARD

A. Install with minimum number of joints possible, using full-length pieces for each run. Stagger joints in adjacent and related members. Cope at returns, miter corner.

B. Joints of all trim and/or moldings shall be set tight, miter exterior angles and cope interior angles. Joints, except end joints less than twelve (12) feet apart, will not be permitted in straight runs of trim and/or moldings and rails.

C. Secure all trim and/or moldings with glue and blind nail with finishing nails. Set exposed nail heads in finished work and putty. Sand all work to remove any tool marks and irregularities.

D. Painting and Finishing

1. General: All finishing work of this Section shall be shop applied. All finishing shall match approved samples.

2. Back-Painting: All work of this Section in contact with concrete or masonry or other moisture areas and all concealed surfaces of cabinet and millwork, shall be back-painted with one (1) coat of oil based paint prior to installation, shop applied where practicable.

3. Field Touch-Up: Field touch-up shall be the responsibility of the installing Subcontractor, and shall include the filling and touch-up of exposed job made nail or screw holes, refinishing of raw surfaces resulting from job fitting, repair of job inflicted scratches and mars, and final cleaning up of the finished surfaces.

3.8 TEMPORARY PROTECTION BY CARPENTER

A. General: Provide temporary protection as follows:

1. Temporary wood doors at exterior entrances and at interior door openings, as required.

2. Temporary protection and enclosures at elevators, stairs, and other shafts, at openings in floor and roof.

3. Temporary elevator cabin and temporary hatchway doors for each floor of elevators used for temporary service.

4. Temporary sills at door thresholds and other openings.

5. Temporary stair handrails continuously from top to bottom of each stair.

B. Stair Protection: Provide wood protection for stairs: cover finished treads. Protect platforms, treads and risers with dressed planking full stair width; hold in place with continuous edge strips. Erect required handrails and railings for closing in open wells and open sides of stairs. Protect railing from damage. Protect door sills and saddles.

C. Openings in Floors and Roofs: Protect openings in floors and roof slabs with adequate wood railings, substantially framed, braced and nailed. Cover openings not required to be kept open with not less than two (2) inches thick planking, cleat together, brace; make sufficiently strong and secure. Protect openings in floors and roofs immediately after forms are removed.

D. Exterior Openings: Provide temporary enclosures for exterior openings where required, properly secured and maintained until finished work is in place. Provide a sufficient number of temporary doors to give access to the building, all provided with hardware, locks and keys.

E. Maintenance: Maintain all temporary protection in good repair during the construction period. Remove when no longer required.

F. Temporary Locks: Provide temporary locks, including keys, for temporary doors. Use of permanent building hardware in connection with temporary doors is prohibited.

3.9 CLEANING UP

A. General: Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the work, free from accumulation of sawdust, cut-ends and debris.

B. Sweeping

1. At the end of each working day, or more often if necessary, thoroughly sweep all surfaces where refuse from this portion of the work has settled.

2. Remove the refuse to the area of the job site set aside for its storage.

3. Upon completion of this portion of the work, thoroughly broom clean all surfaces.

END OF SECTION

ATTACHMENT #5
REVISED SPECIFICATION 033300:
ARCHITECTURAL CAST IN PLACE CONCRETE

(ATTACHED)

SECTION 033300 - ARCHITECTURAL CAST IN PLACE CONCRETE

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

1.1.1 Drawings and general provisions of the Contract, including general conditions and Division 1 Specification Sections, including Section 018113- Sustainable Design Requirements, apply to this Section.

1.1.2 Sustainable Design Requirements: The Owner requires the Contractor to implement practices and procedures to meet the project's environmental performance goals, which include achieving ILFI Zero Carbon and WEDG certification. Refer to Section 018113 - Sustainable Design Requirements for the project's targets and specific requirements. The contractor shall ensure that the requirements related to the project's sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the contractor or their subcontractors, shall not be allowed if such changes compromise the project's sustainability goals and ILFI Zero Carbon or WEDG certification.

1.1.3 Bid Submission Subcontractor Qualification

1.1.3.1 At bid submission, the General Contractor must submit the Concrete Subcontractor's qualifications for review and approval to demonstrate compliance with the Contract Documents.

1.1.3.2 Concrete Subcontractor Qualifications shall include the following:

1.1.3.2.1 Qualifications indicating proven achievement and experience in custom-designed specialty architectural concrete installation for at least fifteen (15) years, including project lists and resumes of staff designated to work on the project.

1.1.3.2.2 Documentation of three (3) projects completed in the last fifteen (15) years to demonstrate the Subcontractor's ability to deliver work of a similar scale and complexity as that specified in the Contract Documents. Documentation shall include photographs, complete sets of shop drawings, and the name and contact information of references who can speak to the experience of working with the Concrete Subcontractor.

1.1.3.2.3 Information on Proposed Formwork System demonstrating the Concrete Subcontractor's ability to achieve the design intent as described in the Contract Documents, including poured-in-place architectural concrete domes, vaults, and arches.

1.1.3.3 Prequalified Concrete Subcontractors are:

1.1.3.3.1 Rogers and Sons

1.1.3.3.2 Villa Construction

1.1.3.3.3 Long Island Concrete

1.1.3.3.4 Approved Equal Accepted by the Owner and Architect

1.1.4 Bid Submittals: As part of the bid submission, the Contractor shall submit the following:

1.1.4.1 Environmental Product Declarations (EPDs) for the proposed concrete mix design and rebar as outlined in 1.6.8 in this section and Section 018113-Sustainable Design Requirements. Contractors are encouraged to exceed the Global Warming Potential (GWP) reduction minimums listed in 2.1.4 Sustainability Performance Requirements and propose the maximum possible reduction, while achieving the other performance requirements.

The percentage of GWP reduction proposed for the concrete and rebar will be part of the evaluative criteria used by the Owner to determine the Contract award.

1.1.4.2 Qualifications and Test Reports: As part of their bid, the Contractor must submit qualifications as per 1.6.5.12 Concrete Mix Supplier Certification, 1.6.5.13 Qualifications for Concrete Contractor, 1.6.5.14 Qualifications for Formwork Carpenter, Formwork Labor Foreman, Reinforcing Steel Foremen, and designated Concrete Quality Control Technician, and 1.6.5.15 Mix Test Reports for evaluation and approval by the Owner and Architect.

The selection of Contractors, Sub-Contractors, Manufacturers, Fabricators, and Suppliers is subject to the final approval by the Owner and Architect as outlined in this Section.

1.2 SECTION INCLUDES

1.2.1 Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.

1.2.2 Work of this Section includes all labor, materials, equipment, and services necessary to complete the architectural cast-in-place concrete as shown on the drawings and/or as specified herein. Architectural concrete work will include:

1.2.2.1 Ceilings

1.2.2.2 Walls including Structurally Composite walls incorporating board insulation and wythe connectors. Board insulation (Section 072100) located within exterior concrete sandwich façade walls, fasciae, and ceilings is included.

Accessories including non-conductive wythe tie connectors inside concrete façade sandwich panel walls.

1.2.2.3 Columns

1.2.2.4 Selected surfaces, including domes, vaults, arches, parapets, and bulkheads.

1.2.3 This section specifies requirements for Architectural Cast-in-Place Concrete work, including concrete materials, mix design, formwork, reinforcement, placement and finishing procedures and other items required in producing of the work. For Cast-in-Place Concrete not included in this section, the requirements of Section 03 30 00 shall also apply.

As described below, the Architectural Cast-in-Place Concrete is a red pigmented concrete. Until the acceptance of the final Phase 3 mockup, the Architect reserves the right to modify the color selection or selection of elements in the concrete that effect the final appearance and color.

1.3 RELATED SECTIONS

1.3.1 This Section includes additional requirements for and relating to the following sections:

1.3.1.2 Section 03 10 00 “Concrete Formwork”

1.3.1.3 Section 03 30 00 “Cast-In-Place Concrete”

1.4 REFERENCES

1.4.1 STANDARDS
Comply with the requirements of the structural requirements of Section 03 30 00 and the standards specified below. Unless otherwise noted, the latest edition of the following codes and standards will govern this work. If any conflicts exist between these codes and standards the more restrictive requirements will govern.

NYC Construction Code (2014) Chapter 19 Concrete

National Ready Mixed Concrete Association (NRMCA) – A Cradle-to-Gate Life Cycle Assessment of Ready-Mixed Concrete Manufactured by NRMCA Members – Version 3, Updated February 20, 2020

ASTM A767 Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement
ASTM C33 Specification for Concrete Aggregates
ASTM C94 Standard Specification for Ready-Mixed Concrete
ASTM C150 Specification for Portland Cement

ASTM C157/C157M Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete
ASTM C231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C457 Standard Test Method for Microscopical Determination of Parameters of the Air-Void System in Hardened Concrete
ASTM C469/C469M Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
ASTM C494 Specification for Chemical Admixtures for Concrete
ASTM C496/C496M-17 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
ASTM C618 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C979/ C979M-16 Standard Specification for Pigments for Integrally Colored Concrete
ASTM C989 Standard Specification for Slag Cement for Use in Concrete and Mortars
ASTM C1012 Standard test method for Length Change of Hydraulic-Cement Mortars Exposed to Sulfate Solution
ASTM C1017 Specification for Chemical Admixtures for Use in Producing Flowing Concrete
ASTM E1155 Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers
ASTM C1202 Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration
ASTM C1218 Standard Test Method for Water-Soluble Chloride in Mortar and Concrete
ASTM C1240-20 Standard Specification for Silica Fume Used in Cementitious Mixtures
ASTM C1260 Potential Alkali Reactivity of Aggregate (Mortar-Bar Method)
ASTM C1293 Standard Test Method for Determination of Length Change of Concrete Due to Alkali Silica Reaction
ASTM C1567 Standard Test Method for Determining the Potential Alkali Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
ASTM C1602 Standard Specification for Mixing Water Used in Production of Hydraulic Cement Concrete
ASTM C1611 Test Method for Slump Flow of Self-Consolidating Concrete

ACI 117 Standard Specification for Tolerances for Concrete Construction and Materials
ACI 201-2R Guide to Durable Concrete
ACI 224R Control of Cracking in Concrete Structures
ACI 226.R1 Standard Practice Ground Granulated Blast-Furnace Slag as a Cementitious Constituent in Concrete
ACI 301 Specifications for Structural Concrete for Buildings
ACI 308.1M Specification for Curing Concrete

Testing

ASTM C31 Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C39 Test Method for Compressive Strength of Cylindrical Concrete Specimens
ASTM C142/C143M Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C1077 Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
ASTM C1202 Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration

Formwork
ACI 347 Guide to Formwork for Concrete
ACI SP-4 Formwork for Concrete - 8th Edition
APA V345 Concrete Forming Design/Construction Guide
APA B360P HDO/MDO Plywood Product Guide
APA L870A PS 1-09 Structural Plywood

ASTM C295 Standard Guide for Petrographic Examination for Aggregates for Concrete
ASTM C1778 Reducing the Risk of Deleterious Alkali-Aggregate Reaction in Concrete
ACI 237 Self-Consolidating Concrete
ACI 303R Guide to Cast-In-Place Architectural Concrete Practice
NRMCA Quality Management System for Ready Mixed Concrete Companies

1.5 QUALITY ASSURANCE

1.5.1 Architectural Concrete Consultant: The Contractor shall retain consultation services for architectural concrete prior to and during the construction period for architectural concrete. Consultant shall specialize in cast-in-place architectural concrete work and be approved by the Architect. The consultant shall have demonstrated experience in the means, methods, materials, and delivery of high-quality visible cast-in-place architectural concrete. The consultant shall furnish the following CA services:

1.5.1.1 Review Contractor’s proposed construction methods and materials.

1.5.1.2 Evaluate proposed materials based on tests conducted by the Contractor’s testing laboratory and assist in design of architectural concrete mixes.

1.5.1.3 Assist and offer guidance to the Contractor in developing construction methods during mock-up construction, including architectural concrete construction techniques.

1.5.1.4 Provide an architectural concrete representative during certain periods of architectural concrete construction (including preconstruction, mockup process, shop drawing creation and review, formwork installation, and concrete pouring) to assist the Contractor’s personnel with architectural concrete construction techniques and the Architect with the inspection of the work.

1.5.1.5 Review shop drawings and submittals associated with architectural concrete.

1.5.1.6 Provide meeting minutes and site observation reports for distribution to Contractor, Architect, and Owner for all architectural concrete work.

1.5.1.7 Consultant shall be:

1.5.1.7.1 EllisDon
Mississauga, Ontario
905-896-8900

1.5.1.7.2 Reg Hough Associates, LLC
Allenwood, New Jersey
732-600-8977

1.5.1.7.3 Approved equal accepted by Architect and Owner.

1.5.2 Pre-Construction Meeting: After approval of products and color samples and as early as possible, but not less than 30 days prior to the fabrication of the formwork, the Contractor shall schedule a meeting at a mutually agreed time. The meeting shall include the Architect, Structural Engineer, Construction Manager, Contractor, Concrete Subcontractor, contractor's designated Concrete Quality Control Technician (see 1.5.3 below), Formwork Fabricator, Formwork Labor Foreman, Concrete Ready-Mix Supplier and Designer, and Third Party Testing Lab. Meeting agenda will be: materials, methods of forming and placing, coordinating and quality control procedures involved in the Architectural Cast-in-Place Concrete work and the interface with the non- architectural concrete and related work.

1.5.3 Concrete Quality Control Technician: Contractor is to assign a quality control person to oversee the architectural concrete work. The quality control technician is to have a formalized degree or diploma in civil engineering or materials sciences and is to be familiar with and implement the ISO 9001 system or equivalent of quality management. The qualified person should be versant in the production methods and concrete mix design strategies needed to produce high quality colored architectural concrete. The person shall also be versant in concrete formwork systems and methods of construction. The person shall also be familiar with concrete placing, finishing and patching methods. The primary duty is to be responsible for ensuring the required tasks in the work plan are accomplished. The Concrete Quality Control Technician shall develop a checklist for execution of the work as per 1.6.5.14 to be submitted to the Architect for approval prior to the fabrication of the formwork.

Provide quality assurance instruction, equipment and detailing for fabricated concrete wall insulation system and equipment for evaluation of connector installation.

1.5.4 Mockups

1.5.4.1 Three phases of architectural mockups will be produced by the Contractor for review by the Architect as specified in 1.6.7. The final concrete work shall not proceed until all samples, product data, and shop drawings are

approved by the Architect and the final architectural concrete mockup is accepted by the Owner and Architect.

1.5.4.2 Field mockups shall be constructed by the same subcontractors, using the same procedures, equipment, and materials that will be used for production of the final architectural concrete installation. The same submittal and shop drawing process shall apply to mockups and the final installation.

1.5.4.3 Mockups shall not be “in-situ”. On-site locations will be determined in coordination with the Construction Manager and Owner.

1.5.5 Quality Assurance by Testing Agency

1.5.5.1 Coordination
To work in close contact with the suppliers, fabricators and installers of formwork and reinforcing and to report to General Contractor, and the owner’s representatives the status of the work and compliance with the specifications.

1.5.5.2 Duties to be described in detail with the project quality control plan described in 1.6.2.1

1.5.5.3 Ensure concrete has the specified characteristics in the fresh mix state at delivery

1.5.5.4 Maintain records verifying that materials used are the specified and accepted types and sizes and are in conformance with this specification.

1.5.5.5 Slump adjustment: If concrete slump test results are below required slump, slump may be adjusted by adding chemical admixtures, or adding water up to amount allowed in accepted mixture proportions. Addition of water shall be in accordance with ASTM C94/C94M. Do not exceed specified maximum w/cm (water/ cementitious materials) or w/cm used in proportioning the concrete or required slump. Do not add water to concrete delivered in equipment not acceptable for mixing. Measure slump after slump adjustment to verify compliance with specified requirements. Note that when strength test samples are taken, both air and slump shall be checked to verify compliance and to register if non-intentional air entraining has occurred.

1.5.5.6 To comply with the quality control plan as outlined in 1.6.2.1 to ensure the construction of architectural concrete is in keeping with the requirements and high-quality aesthetic vision of the owner and architect. Items included for example are: placing considerations and controls; ready-mix procurement, production, delivery; protection and cleaning of formwork and reinforcing prior to placements; review of and storage of all records pertaining to the hardened and plastic properties of the concrete showing compliance with the specifications.

Refer to 3.2.8 Field Quality Assurance for additional requirements

1.6 SUBMITTALS

1.6.1 General:

1.6.1.1 Do not proceed with the construction of the cast-in-place architectural concrete in the project, including fabrication of the formwork, until all samples, product data, mock-up and shop drawings have been reviewed by the Architect with no exceptions taken.

1.6.2 Construction Procedure Documents:

1.6.2.1 Contractor shall develop a Quality Control Plan for the architectural concrete work for the entire project. The plan shall include a series of checklists and a work method statement to be used by the Concrete Quality Control Technician (see 1.5.2 above) in performing the technician's inspection work. Refer to Part 3: Execution for requirements.

1.6.2.2 Pursuant to Section 013200 Construction Schedule and 013300 Submittals, Contractor shall submit a schedule for all concrete submittals, shop drawings, samples, and mockups.

Failure of the Contractor to schedule and submit shop drawings and samples or produce mockups in ample time for checking, correction, and rechecking will not justify any delay in the Contract Schedule. Allow ample time for items to be tested and mockups and samples to be reviewed, including time for retesting or reiteration if the tests or mock-ups fail or are not accepted by the Architect.

1.6.3 Concrete Sandwich Wall and Formwork Shop Drawings:

1.6.3.1 Submit drawings showing the layout and details of formwork, including the mock-ups. Include details and layouts of the sandwich panel insulation (refer to Section 072100), nonconductive wythe tie connectors (refer to Section 072100) and other thermal isolation accessories.

1.6.3.2 Drawings shall include plans, elevations and sections to show layout of all exposed-to-view concrete work and interfacing adjacent concrete work and shall include all walls, columns, soffits, stairs, cast-in items, depressions, openings, recesses, reveals, control joints, construction joints, water-stopped joints, and formwork panel layouts. All light fixtures, conduits, junction boxes, plumbing fixtures, and MEP equipment that interfaces with or penetrates concrete shall be located in shop drawings. Drawings indicating concrete pour sequencing shall be included (as per 1.6.4). The shop drawings shall be stamped and engineered by a registered professional engineer in the state of New York.

1.6.3.3 Shop drawings shall include the following details:

1.6.3.3.1 Details of shop assembly of formwork and field assembly of construction and control joints, reveals, recesses, embedments, back-up, clean out panels, form ties, lost formwork (e.g. formwork left in final installation, formwork waste, etc.).

1.6.3.3.2 The means to be used to maintain alignment, including back-up bracing, seal all joints, dry ties, and brackets.

1.6.3.3.3 Cover of all concrete over reinforcing steel.

1.6.3.3.4 Location of clear placing passages through the steel reinforcing for placing trunks and hoses.

1.6.3.3.5 Crack mitigation at cast in place sandwich panel façade: Provide details that indicate how panel wall bowing and concrete cracking will be mitigated if the concrete sandwich wall panels do not include full-thickness concrete sections or metallic connectors between the concrete wythes (surfaces).

1.6.3.3.6 Shop drawing for final installation and for Phase 3 mockup must include arc, curve, and vault radii and lengths, geometric workpoints (as indicated in the contract documents), a digital 3d model indicating final concrete geometry and formwork, and any other information the Architect deems necessary to demonstrate compliance with the contract documents

1.6.4 Placing, Curing, Form Removal, and Protection: Demonstrate compliance with requirements of 3.7 Placing Concrete and 3.8 Curing and Form Removal. Submit layout or description of each placement showing sequence and projected time between deposits. Submit description and schedule of curing times, formwork removal, and concrete protection process.

1.6.5 Product Data / Qualifications: Submit manufacturer's name and technical information for each of the following products and qualifications as listed below:

1.6.5.1 Cement.

1.6.5.2 Aggregates, each type.

1.6.5.3 Admixtures, each type.

1.6.5.4 Form surface material, each type.

1.6.5.5 Foam gaskets/ sealants; thickness, width, foam compressibility, curing time.

1.6.5.6 Form release coating.

1.6.5.7 Reinforcing accessories including non conductive wythe ties inside concrete sandwich panels.

1.6.5.8 Curing compound; base material type.

1.6.5.9 Methods and equipment for surface finish, each type.

1.6.5.10 Water repellent sealer, if any.

1.6.5.11 Inserts and embedments, each type. Note when used in architectural concrete these materials are to be non-staining and not subject to corrosion.

1.6.5.12 Concrete mix supplier certification- to be in compliance with ASTM C94-16 and to show quality control procedures generally in compliance with NRMCA Quality Management System for Ready Mixed Concrete Companies. Producer to submit references from projects completed showing experience in architectural and colored concrete and mix designs using ternary blend cementing materials totaling 50% cement replacement for evaluation by the Owner and Architect prior to approval. Prequalified concrete suppliers are:

1.6.5.12.1 US Concrete

1.6.5.12.2 Approved Equal Accepted by the Owner and Architect

1.6.5.13 Qualifications for Concrete Contractor. Concrete Contractor is subject to 1.1.3 Pre-Bid Subcontractor Qualification. As part of bid submission, Contractor shall include documentation prepared for Pre-Bid Qualification, including references and project examples of experience in similar high-end colored architectural concrete installations.

The Contractor of the Work of this section shall have proven achievement and experience in custom-designed specialty architectural concrete installation for at least fifteen (15) years and are subject to final approval by the Owner and Architect.

1.6.5.14 Qualifications for Formwork Carpenter, Formwork Labor Foreman, Reinforcing Steel Foremen, and designated Concrete Quality Control Technician (see 1.5.3 above). All the aforementioned shall submit references and project examples of experience in similar high end colored architectural concrete installations for evaluation by the Owner and Architect prior to approval. All shall have proven achievement and experience in custom-designed specialty architectural concrete installation for at least fifteen (15) years and are subject to final approval by the Owner and Architect.

1.6.5.15 Test reports of mix design showing compliance with requirements as described in section 1.8.6 Concrete Performance Criteria. These results are to be presented as part of the concrete tender documents. Mix constituents and exposure class to be in compliance with section 2.06 B in section 0 30 00.

1.6.5.16 Checklist for use by the Concrete Quality Control Technician.

1.6.6 Samples: Submit physical samples to the Architect for approval of the following products, corresponding to the data and qualifications submitted in 1.6.5

1.6.6.1 Formwork surface materials, each type, 12 inches square.

1.6.6.2 Foam gaskets, 12 inches long.

1.6.6.3 Reinforcing supports, one each type. (Reference Dayton Superior Bar Support Handbook or similar). Note bar supports shall be pedestal type with small footprint onto the formwork surface. Material color shall be to match the concrete color. Support structure shall be non-corroding material only.

1.6.7 Mockups: Three phases of architectural mockups will be produced by the Contractor for review by the Architect. The Contractor may not advance to the next mockup phase until mockup of preceding phase is accepted by the Architect.

The mockups will be reviewed in an iteritive process. The Contractor should allow ample time for production, review, and reproduction of mockups up to the maximum quanitity listed in each phase below. Mockups failing or not being accepted by the Architect shall not justify any delay in the Contract Schedule.

The purpose of the mockup program is to establish a Reference Installation as described in 1.8.3 to guide the approvals and acceptance of architectural concrete work throughout the scope of the project.

See A800 series for Mockup drawings.

1.6.7.1 Mockups shall be detailed in this section. Coordinate dimensions and specific details with the architectural mockup drawings. Contactor is responsible for all engineering required for mockup. Engineer and reinforce in a similar detail as to that in the Contract Documents.

1.6.7.2 If mockups are not accepted by the Architect, remove, and replace with others at no additional cost to the Owner.

1.6.7.3 Additional mockups or partial mockups shall be required if the mockups below are deficient in producing the quality required for the project at no additional cost to the Owner.

1.6.7.4 Mockups shall be located so they will remain throughout construction. Protect mockup from damage during construction. Remove mockup when directed by the Architect.

1.6.7.5 Phase 1 Mockup: Architectural Samples
Submit concrete samples for color for each type of concrete. These samples are to show the range of possible colors and mixtures within a selected color range prescribed by the Architect. After Contract award, the Architect will provide a color sample (comparable to Color 417 Brick Red (SRI 40) by

Solomon Colors), then the Contractor will produce a range of samples equal or equivalent to as follows:

1. The best possible match to the provided color sample utilizing the highest quality materials.
2. Two additional samples with an increase of 25% and 50% chroma (e.g. through increased volume of Color Admixture per 2.1.6.4 or other changes to mix design).
3. Two additional samples with a decrease of 25% and 50% chroma (e.g. through decreased volume of Color Admixture per 2.1.6.4 or other changes to mix design).

The Architect reserves the right to modify the color selection throughout the mockup process and may request up to 20 24" x 24" color samples.

The mix samples shall satisfy the same requirements described in this specification for the formed vertical and horizontal architectural concrete, including cement replacement materials, admixtures, and strength requirements. The same aggregates and products intended for use in the architectural concrete shall be used in the samples.

The Architect will identify the selected sample as the 'architect's sample' that will determine the basis to evaluate color in Phase 2 and Phase 3 Mockups.

1.6.7.5.1 Cast concrete samples in a flat form box supplied by the Contractor with tightly sealed edges.

1.6.7.5.2 Concrete samples shall be minimum 24" x 24" x 2".

1.6.7.5.3 The Contractor should assume 20 samples (in several iterations) will be produced to satisfy the requirements of 1.6.7.5 Phase 1 Mockup.

1.6.7.5.4 Surfaces shall be out of form and clean.

1.6.7.5.5 At a meeting scheduled by the Contractor at a mutually agreed time, but not until the concrete samples are fully cured, the determined concrete color will be chosen from the group of submitted samples by the Owner and the Architect. Color will be viewed and compared by digital CIE L*a*b*C*h (International Commission on Illumination *lightness, green-red, blue-yellow, chroma,* and *hue*) readings as measured utilizing a digital Colorimeter (PCE-CSM 1 model or equal available from PCE Americas, Jupiter, FL, 561-320-9162, to be provided at the expense of the Contractor for exclusive use of this project and to be kept on site for the duration of project construction).

Readings taken using digital Colorimeter will aid in evaluation of color and uniformity in Phase 2 and Phase 3 Mockups.

1.6.7.6 Phase 2 Mockup: Large Sample

Using concrete mix design selected in Phase 1 Mockup trial, use three different formwork facing materials (as specified in 2.2.1.1.2) to cast concrete wall sample and then finish as described below, at on-site location approved by the Owner and Architect. After submitting to the Architect for review and approval, the Contractor shall also demonstrate the use of various form release agents (as per 2.2.5), their proposed concrete placing procedure, and various vibration methodologies, for evaluation by the Owner and Architect.

Contactor is responsible for all engineering required for mockup. Engineer and reinforce in a similar detail as to that in the Contract Documents.

The Architect will identify a formwork facing material, finish treatment, form release agent, placing procedure, and vibration regimen for use in the Phase 3 Mockup.

The Architect reserves the right to modify the color selection throughout the mockup process and may request up to 8 12’-0” long x 12” deep x 8’-0” high mockups.

1.6.7.6.1 Wall Sample: 12’-0” long x 12” deep x 8’-0” high. Comes with slab base to provide for setting and display. This sample is to be comprised of 3 different formwork facing materials so as to allow for comparison and evaluation of the quality of the surfacing materials. The formwork contact surface for each side of the wall shall consist of one 4’-0” x 8’-0” sheet of each selected facing material. The formwork contact surfaces on one side of the wall shall be divided in half vertically to demonstrate the quality of field cut panel joints.

1.6.7.6.2 The Contractor should assume 8 mockups (in several iterations) will be produced to satisfy the requirements of 1.6.7.6 Phase 2 Mockup.

1.6.7.6.3 Wall Finishing: One side of wall sample shall be blasted with crushed angular glass abrasives (Black Beauty Glass Abrasives “Fine” and “Medium” only, available from Harsco Minerals International 1-888-733-3646), to three levels of intensity:

"light" (approximately 2 mm surface profile), "medium" (3 mm), and "heavy" (4 mm).

Prior to blasting application, Contractor shall convene meeting with Architect and subcontractor responsible for applying finish treatment to review proposed blasting regime and define the three levels of intensity to be demonstrated in mockup.

If selected by Architect, Wall Finishing technique will be used for final installation on all exposed architectural concrete surfaces.

1.6.7.6.4 At a meeting scheduled by the Contractor at a mutually agreed time, but not less than 28 days after the concrete samples were poured, the Owner and Architect will identify a formwork facing material and finish treatment for use in the Phase 3 Mockup.

Color will be viewed and compared by digital CIE L*a*b*C*h readings as measured utilizing a digital Colorimeter to verify the Phase 2 Mockup corresponds to color accepted by Architect in Phase 1 Mockup trial. Unacceptable variations will result in rejection of the Phase 2 Mockup.

1.6.7.7 Phase 3 Mockup: Formed Concrete Work

Using the concrete mix identified in the Phase 1 Mockup and formwork surface material and finish treatment identified in the Phase 2 Mockup, construct a sample of full size, formed concrete elements as depicted in the Phase 3 Mockup drawings (see A800 series drawings), at on-site location approved by the Owner and Architect. The mockup is to be located on site that it may remain in place for the duration of construction.

Contactor is responsible for all engineering required for mockup. Engineer and reinforce in a similar detail as to that in the Contract Documents.

Mockup should be complete and prepared for review by the Owner and Architect at least 8 weeks prior to the first scheduled pour of architectural concrete, but not less than 28 days after the concrete samples were poured. The mockup will be reviewed according to 1.8.4 General Acceptance Criteria. When accepted by the Architect, selected areas of the mockup shall be used as a representative standard for the project as per 1.8.3 Reference Installation.

If not accepted by the Architect, the Contractor must produce additional mockups until all of the criteria listed in 1.8.4 General Acceptance Criteria are satisfied and reference installations are selected by the Architect.

The Architect reserves the right to modify the color selection throughout the mockup process and may request up to 3 mockups of the size and character of the Phase 3 Mockup.

1.6.7.7.1 Scope of mockup:

1.6.7.7.1.1 Mockup as shown in the drawings in A800 series, representing several of the typical conditions present in the final installation.

1.6.7.7.1.2 This mockup is to test the tightness of joints between formwork panels, plywood panel orientation and tie-pattern, cone insert profile and general placing of the slabs, arches, vaults, and walls.

1.6.7.7.1.3 Submit samples and product data for all items to be used in construction of mockup, as specified in 1.6.5 and 1.6.6, and shop drawings, as specified in 1.6.3, to the Architect for approval prior to commencing construction of the Phase 3 Mockup.

1.6.7.7.1.4 Construct field mockups using same procedures, equipment, and materials that will be used for production of formed vertical and horizontal architectural concrete. Demonstrate color and texture. Cure the mock-up as intended with the structure. Clean surface of concrete and demonstrate means to remove rust stains, wood resin stains, and other blemishes. Apply Sealers and coatings to only a portion of the mock-up. Accepted field mockup will be compared for periodic and final acceptance. Provide a simulated repair area to demonstrate an acceptable repair procedure.

1.6.7.7.1.5 Foundations will need to be designed to an adequate size, with reinforcement, and cast to support the mockups.

1.6.7.7.1.6 Reinforce the structure in a similar manner to the final installation and add necessary reinforcing and/or supports to maintain stability.

1.6.7.7.1.7 Use approved form face materials, reinforcement and accessories and assemble formwork as intended for the building construction.

1.6.7.7.1.8 Place concrete in the forms with methods to be used for typical placements in building, including columns, vault, arch, and wall placements. Include for anticipated time delays between deposit lifts.

1.6.7.7.1.9 Finish exposed hardened surfaces of the walls with specified finish treatments identified in the Phase 2 mockup process when directed by the Architect and with the Architect present. Finish wall with minimum 2 ft wide areas as directed by the Architect and/or in locations as directed by the Architect.

1.6.7.7.1.10 Repair procedure will provide an acceptable color and texture match. Contractor to demonstrate a minimum of five different repair techniques/ mixes in areas a minimum of 2 sq. ft. for evaluation by the Architect. All additional repairs or remediation depicted in the mockup drawings or intended by the Contractor for use in the final installation must be demonstrated in the Phase 3 Mockup for approval by the Architect.

Any repairs done should be as soon as possible after formwork stripping so that the repair and parent substrate can be curing and aging in a manner that is most conducive to uniform appearance. Remedial work will be evaluated a minimum of 28 days after installation to allow enough time for full curing.

1.6.7.7.2 Review and Acceptance of Mockup

1.6.7.7.2.1 Aesthetic Performance Criteria:

Areas that satisfy the performance criteria described in 1.8.5 will be identified as the Reference Installation as per 1.8.3.

Specific areas to be identified as Reference Installations include but are not limited to: vertical surfaces, horizontal surfaces, finishes, gaskets, corners, formwork joints, pour joints, openings, arched surfaces, vaulted surfaces, penetrations, and embeds.

1.6.7.7.2.2 Concrete Color:

Color will be viewed and compared by digital CIE L*a*b*C*h readings as measured utilizing a digital Colorimeter to verify the Phase 3 Mockup corresponds in color and uniformity accepted by the Architect in the Phase 2 Mockup trial.

As per 1.8.6.3.1, acceptable color range from previously accepted CIE L*a*b*C*h numbers is 2% +/- for any criterion.

Specific areas of color and uniformity in the Phase 3 Mockup will be identified as the Reference Installation as per 1.8.3.

1.6.7.7.2.3 Coatings

All coatings or sealants submitted as part of 1.6.5 Product Data shall be tested in areas of minimum 2’ x 2’ square as part of the Phase 3 Mockup.

Acceptable installations will be identified as the Reference Installation as per 1.8.3.

1.6.7.7.2.4 Finishes

Surface finishes selected in the Phase 2 Mockup as per 1.6.7.6 shall be applied to the Phase 3 Mockup in a manner similar to the final installation.

Specific areas of finish will be identified as the Reference Installation as per 1.8.3.

1.6.7.7.2.5 Repairs and Patching:

Review of repaired and patched areas as described in 1.6.7.7.1.10. Review of patched form tie holes as per 2.2.3.1. All repairs and patched areas will be viewed and compared by visual impressions according to 1.8.4 General Acceptance Criteria and by digital CIE L*a*b*C*h readings as measured utilizing a digital Colorimeter.

Acceptable color range for repaired and patched areas is 2% +/- from previously accepted CIE L*a*b*C*h numbers for architectural concrete.

Acceptable installations will be identified as the Reference Installation as per 1.8.3.

1.6.8 Environmental Product Declaration (EPD): Submit in accordance with the following requirements:

1.6.8.1 Submit a product-specific non-expired EPD for at least 90% by volume for all concrete mixes used in the project.

1.6.8.2 The EPD should include values for the following impact categories:

1.6.8.2.1 Global Warming Potential (GWP): All GWP information submitted shall be in the form of kgCO2eq/kg per functional unit.

1.6.8.2.2 Non-Renewable Energy Consumption (NREC): All NREC information submitted shall be in the form of MJ per functional unit.

1.6.8.3 Concrete: Plant-specific GWP information will be one of the decision criteria when awarding this scope. However, information for each impact category noted above will be reviewed. The impact category information will be evaluated against both industry average impact category datasets, as defined by National Ready Mix Concrete Association (NRMCA), regional mix EPD datasets, as well as the impact category information reported within mill-specific EPDs from competing bidders. If mill-specific impact category information is not provided, industry average EPDs will be used.

1.6.8.4 Rebar – Mill-specific GWP information will be one of the decision criteria when awarding this scope. However, information for each impact category noted above will be reviewed. The impact category information will be evaluated against both industry average impact category datasets, as defined by the Concrete Reinforcing Steel Institute (CRSI) EPD datasets, as well as the impact category information reported within mill-specific EPDs from competing bidders. If mill-specific impact category information is not provided, industry average EPDs will be used.

1.6.8.5 For the bid submission, a preliminary concrete EPD from Climate Earth, or another NRMCA certified, third-party verified EPD program may be used.

A full EPD that satisfies the requirments of this section must be submitted within six months of Contract award.

1.6.9 Recycled content documentation from materials suppliers: submit in accordance with the submittals article of Section 018113 Sustainable Design Requirements.

1.6.10 Bill of materials: material supplier(s) shall provide a report to the general contractor, at the completion of 100% construction documents, or as soon thereafter when the material sources are known, and at the completion of the primary structural frame, summarizing all concrete quantities, steel reinforcement quantities, and the location where each material was obtained. Each unique mix design used on the project shall be itemized.

1.6.10.1 In addition to the requirements above, report the following in cubic yards for concrete and itemize as required for each unique mix design:

1.6.10.1.1 Total Concrete Volume

1.6.10.1.2 Concrete Volume used in Foundations

1.6.10.1.3 Concrete Volume used in Horizontal Applications, e.g. Slabs/Beams

1.6.10.1.4 Concrete Volume used in Vertical Applications, e.g. Walls/Columns

1.7 WARRANTY

1.7.1 Comply with Contract requirements.

1.8 PERFORMANCE REQUIREMENTS

1.8.1 Responsibility for the design and installation of cast-in-place architectural concrete in conformance with the requirements of the drawings and specifications and performed using the highest standards of quality for visual and durable concrete rests with the contractor.

1.8.2 Design of the mix and formwork shall be performed by contractor’s registered licensed engineer, registered in the state of New York.

1.8.3 Reference Installation:

The reference installation for color and uniformity shall be determined by the Architect in the Phase 3 Mockup review as per 1.6.7.7. The selected reference installations will indicate the acceptance ranges that can be used as a reference for color, degree of finish and patching. The reference installation will be reviewed according to the criteria below in sections 1.8.4, 1.8.5, and 1.8.6.

1.8.4 General Acceptance Criteria:

Architecturally acceptable concrete surfaces should be aesthetically compatible with minimal color and texture variations and surface defects. Color uniformity will be visually assessed and using a colorimeter as described in 1.8.6.3.1. Variations and defects beyond the range defined in the Reference Installation, or the presence of any unacceptable criteria as defined in sections 1.8.5 and 1.8.6 will be cause for rejection by the Architect.

If any deficiencies occur, the Architect may order the affected concrete replaced or repaired with acceptable concrete. Repair only when directed by the Architect. Corrected deficiencies must meet with the Architect's approval.

1.8.5 Aesthetic Performance Criteria:

1.8.5.1 All concrete shall be installed so that no evidence of the following shall exist:

1.8.5.1.1 Damage of any kind.

1.8.5.1.2 Out of alignment or incorrect profiles, including but not limited to work that exceeds the parameters in section 3.4 "Formwork Tolerances".

1.8.5.1.3 Surface voids not completely covered by a circle ¼" in diameter or more than 25 surface voids larger than 1/8", in longest dimension, in any area 2 ft. square.

1.8.5.1.4 Bulging: Concrete surfaces that bulge due to insufficiently secured formwork, undersized ties, or flat bar clamps. Shall be compliant with ACI 117-10 clause 4.8.3 class A surface.

1.8.5.1.5 Wavy Concrete: Concrete surfaces that exhibit waves along plywood joints due to moisture migration into unsealed cuts of plywood sheets causing swelling.

1.8.5.1.6 Spalling: Concrete spalling due to shale, alkali reactivity, rusting steel too close to surface, carbonation, improper removal of formwork, expansion of cast-in steel during the welding process or other reasons.

1.8.5.1.7 Cracking and Crazing: Concrete cracking and crazing (a series of shallow closely spaced fine cracks alligator pattern) due to high water/cement ratio above 0.50 or water applied to surface during finishing

1.8.5.1.8 Air Holes: Air holes resulting from improper vibration and excessive heights of individual layers of pours between vibration. Air holes due to spreading of concrete with vibrators rather than moving buckets or hoses.

1.8.5.1.9 Honeycombing: Concrete honeycombing including loss of fines from leaking formwork or other causes.

1.8.5.1.10 Discoloration: Concrete discoloration caused by any reason, including inconsistent concrete mix, different sources of cement and aggregates, temperature variation between individual pour and curing phases, improper and inconsistent use of vibrators, variation of time span of concrete in formwork, form oils, and migration of plasticizer into concrete from exposed sealant beads on formwork and around cast-in items such as electrical outlet boxes.

1.8.5.1.11 Visible Pour Joints: Visible pour joints in concrete resulting from leaking formwork due to lack of gaskets and insufficient overlap with old concrete preventing proper tightening of formwork.
Placement of concrete layers in excessive heights and spreading concrete with vibrator.

1.8.5.1.12 Debris in Concrete: Concrete that includes debris, whether caused by insufficient cleaning of formwork or lack of cleanout and access doors at the base of formwork.

1.8.6 Concrete Performance Criteria

1.8.6.1 Low Permeability

1.8.6.1.1 For concrete that will be exposed to water, provide a mix that will meet the permeability requirements of RCPT <1500 coulombs within 56 days tested in compliance with ASTM C1202 (See note 7 in ASTM C1202 regarding potential duration of three months). Submit documentation verifying compliance with the specified requirements.

1.8.6.2 Low Shrinkage

1.8.6.2.1 Proportion all concrete for a maximum allowable length change of 0.04% measured at 28 days after curing accordance with ASTM C 157 (using air storage thereafter). Note concrete to be cured for 7 days after casting, taken out of the curing tank and the first initial measurements are made at that time. Samples to then be placed in a 50% humidity-controlled room with the measurements for compliance to be 28 days thereafter.

1.8.6.3 ASR Reactivity

1.8.6.3.1 Concrete mixes to be tested and accepted as resistant to deterioration due to ASR reactivity. Verification is to be based on historical field performance and / or compliance with testing done by ASTM C1293 meeting requirements of ASTM C33

appendix X1. Note mix constituents may be accepted based on results from ASTM C1260 pending a review of results.

1.8.6.4 Cracking

1.8.6.4.1 Conform to requirements of ACI 224R table 4.1 exposure class Seawater and salt spray, wetting and drying maximum 0.006 in.

1.8.6.5 Air Voids

1.8.6.5.1 When measured according to ASTM C457, the air void spacing factor is to be < 0.008 in and the specific surface is to be a minimum of 600 in^2 / in^3.

1.8.6.6 Plastic Air

1.8.6.6.1 Plastic concrete air content to be according to ACI 201.2R table 4.1 exposure class F3.

1.8.6.7 Sulfate Resistance

1.8.6.7.1 Type 2 cement or C3A content less than 10% with water/cement ratio less than 0.40 and combination of cement and supplementary materials such that for exposure class S1 expansion to be maximum 0.10% at 6 months when tested according to ASTM C1012.

1.8.6.8 Architectural Concrete

1.8.6.8.1 Concrete color shall meet the standards, consistency, and chroma as identified in mockup program as described in 1.6.7. As per 1.8.3, Reference Installation color to be designated and verified by colorimeter using CIE L*a*b*C*h numbers.

CIE L*a*b*C*h (International Commission on Illumination *lightness, green-red, blue-yellow, chroma,* and *hue*) readings are to be measured utilizing a digital Colorimeter (PCE-CSM 1 model or equal available from PCE Americas, Jupiter, FL, 561-320-9162, to be provided at the expense of the Contractor for exclusive use of this project and to be kept on site for the duration of construction). Readings taken using digital Colorimeter will aid in evaluation of color and uniformity for architectural concrete.

Acceptable readings must be taken from cured, cleaned concrete surfaces, a minimum of 28 days after pouring.

Acceptable color range for architectural concrete, patching, and repairs from Reference Installation CIE L*a*b*C*h numbers is 2% +/- for any criterion.

1.8.6.8.2 All materials and sources shall be disclosed to the project with award of the supply contract for ready-mix.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

2.1.1 All materials shall be new or in like new condition, free from defects which will impair achieving the specified durability or appearance of the architectural cast-in-place concrete. All materials shall comply with the requirements of Section 01 81 13 Sustainable Design Requirements.

2.1.2 Each concrete material shall be the product of a single plant and raw material source throughout project. All concrete materials shall be purchased at once and from a single production run.

2.1.3 Cement: ASTM C-150, Type I/II (see sulphate resistance above)

2.1.3.1 Acceptable Products / Manufacturers:

2.1.3.1.1 Lehigh-Hanson

2.1.3.1.2 Cemex

2.1.3.1.3 LafargeHolcim

2.1.3.1.4 Approved Equal

2.1.4 Sustainability Performance Requirements
Provide concrete and steel reinforcement products with third-party certified Type III product-specific or industry-wide Environmental Product Declarations (or alternative environmental declaration accepted by LEED), as outlined in Section 018113 Sustainable Design Requirements.

2.1.4.1 Steel reinforcement shall contain a minimum 97% recycled material or maximum A1-A3 GWP 0.36 kg CO2e / lb.

2.1.4.2 Concrete mixes must demonstrate, in aggregate, a minimum GWP reduction of 34% relative to the industry average GWP as determined by the National Ready Mixed Concrete Association (NRMCA) February 2020 regional benchmarking study. For reference, the NRMCA industry average GWP, in kilograms of carbon dioxide equivalent per cubic yard (kg CO_2e/yd^3), is detailed in the table below by compressive strength for the Eastern region.

Compressive Strength	NRMCA Baseline GWP ($kg\ CO_2e/yd^3$)
2500 psi	203
3000 psi	223
4000 psi	267

5000 psi	321
6000 psi	340
8000 psi	401
3000 psi Lightweight	417
4000 psi Lightweight	464
5000 psi Lightweight	511

2.1.4.3 Cement replacement shall not compromise structural requirements indicated elsewhere and shall comply with the requirements of NYC Building Code (2014) 1904.4.2, limiting the maximum percent of total cementitious materials by weight as follows:

2.1.4.3.1	Fly ash or other pozzolans conforming to ASTM C 618:	25%
2.1.4.3.2	Slag conforming to ASTM C 989:	50%
2.1.4.3.3	Silica fume conforming to ASTM C 1240:	10%
2.1.4.3.4	Total of fly ash or other pozzolans, slag and silica fume:	50%
2.1.4.3.5	Total of fly ash or other pozzolans and silica fume:	35%

2.1.5 Aggregates:

2.1.5.1 Fine Aggregate: ASTM C-33. Hard, natural sand. Particles finer than a 50 screen shall be less than 2% by weight and shall be white or light gray in color. All aggregates shall be free from discoloring minerals (e.g. Iron ferrite) and residue materials (clay).

2.1.5.2 Coarse Aggregate: ASTM C-33.

2.1.5.2.1 Aggregate shall be stone where designated in 3.1 and as specified herein and in Section 033000.

2.1.5.2.2 Stone Aggregate: Washed, hard, natural stone or near cubical shape crushed stone, maximum size ¾”.

2.1.5.2.3 Nominal maximum size of coarse aggregate shall not exceed three-fourths of the minimum clear spacing between reinforcement, one-fifth of the narrowest dimension between sides of forms, or one-third of the thickness of the slabs or toppings.

2.1.5.3 Aggregate Selection:

2.1.5.3.1 Types: Aggregates selected should be white quartz, limestone, marble, or other similar materials. Manufactured materials that are devoid of trace materials such as iron oxides, organics, clay, or other similar materials that can affect the color or staining are to be preferred.

2.1.5.3.2 Gradation: Aggregate gradation to be optimized in order to ensure a smooth as-cast surface.

2.1.5.3.3 Resistance to Alkali Silica Reaction: Use one of the two options below for qualifying concrete mixtures to reduce the potential of alkali-silica reaction.

2.1.5.3.3.1 For each aggregate used in concrete, the expansion result determined in accordance with ASTM C1293 shall not exceed 0.04 percent at 1 year.

2.1.5.3.3.2 For each aggregate used in concrete, the expansion result of the aggregate and cementitious materials combination determined in accordance with ASTM C1260 shall not exceed 0.10 percent at an age of 16 days.

2.1.6 Admixtures:

2.1.6.1 Admixtures must be certified to be compatible with the cement, aggregates, and other constituent materials in the mix. The admixtures shall be as approved at mockup Phase 1 per 1.6.7.5 such that the color of the admixtures needs to be of the same color that was approved in the Phase 1 mockup sample. A designation number or labelling needs to be such that the admixture can be ordered for the project without any changes to the color.

2.1.6.2 Water Reducing Admixture: ASTM C494, Type F or G

2.1.6.2.1 High Range Water Reducing Admixture (HRWR): “Glenium” by BASF/Master Builders (or approved equal).

2.1.6.2.2 Medium Range Water Reducing Admixture shall all be “Polyheed” by BASF/Master Builders (or approved equal).

2.1.6.2.3 Self-Consolidating Concrete: Shall include polycarboxylic ether based superplasticizer materials, High Range Water Reducing Admixtures: HRWR shall be “Glenium” by BCSF-Master Builders; Plastol Series by Euclid Chemical Co.; Plastiment by Sika Corp or equal

2.1.6.2.4 Acceptable Products / Manufacturers:

2.1.6.2.4.1 BASF-Master Builders, Cleveland, OH

2.1.6.2.4.2 Euclid Chemical Co., Cleveland, OH

2.1.6.2.4.3 Sika Corp., Lindhurst, NJ

2.1.6.3 Workability-Retaining Admixture ASTM C494/ C494 M Type S, Specific Performance Admixtures

2.1.6.3.1 MasterSure Z 60 (BASF) or equal

2.1.6.4 Color Admixture: Color Admixtures shall be granular (G), powder (P) or Liquid (L). Powder admixture shall be manufactured specifically for this project, prepackaged in units for treatment of one cubic yard per unit and have integral dispersal agents and plasticizers. The full amount of admixture shall be manufactured in one production run.

2.1.6.4.1 Acceptable Products / Manufacturers:

2.1.6.4.1.1 L.M. Scofield Co., Douglasville, GA

2.1.6.4.1.2 Euclid Chemical Co., Cleveland, OH

2.1.6.4.1.3 Davis Colors, Los Angeles, CA

2.1.6.4.1.4 Solomon Colors, Springfield, Illinois

2.1.6.5 Shrinkage Reducing Admixture: Shrinkage reducing admixture shall produce a low shrinkage rate of 0.04% at 28 days as determined with shrinkage test ASTM C 157-17. Note: For the initial curing extend to a total of 7 days in lime saturated water then take comparator initial readings. After the initial reading. Store the samples in air storage as per section 11.1.2 and report comparator readings according to Clause 11.2.2 at 4,7,14 and 28 days. Water storage is not to be used as a procedure during the comparator length change readings. Manufacturer shall provide test data showing product has met that requirement in mixes comparable to the mix used in this project for the architectural concrete work.

2.1.6.5.1 Acceptable Products / Manufacturers:

2.1.6.5.1.1 BASF-Master Builders, Cleveland, OH

2.1.6.5.1.2 Euclid Chemical Co., Cleveland, OH

2.1.6.5.1.3 W R Grace, Columbia, MD

2.1.6.6 Fiber Reinforcement Admixture: Integral fiber reinforcement shall be synthetic macro fibers. Acceptable Product / Manufacturer: “STRUX 90/40” by W R Grace, Columbia, MD or UltraFiber 500 cellulose fiber by Solomon Colors or approved equal exhibiting hydrophilic self-curing properties.

2.1.6.7 Hydration Controlling Admixture ASTM C 494/ C494M Type B, retarding and Type D, water reducing and retarding admixtures. Acceptable Product / Manufacturer: MasterSet DELVO.

2.1.6.8 Admixtures for retardation and acceleration may be used if shown there is no adverse effect on architectural requirements and are reviewed for use

2.1.6.9 Air-Detraining Admixture for Concrete. Acceptable Product / Manufacturer: MasterSure 1390 (ASTM C 494/C 494M Type S, Specific Performance, admixtures).

2.1.7 Water: Potable.

2.2 FORMWORK MATERIALS

2.2.1 Smooth Surface Formwork Material:

2.2.1.1 Flat form surfaces shall be plastic coated material as follows: Phenolic Surface Film (PSF) as per ACI SP-4 – 14 (containing 64 – 68% resin) or equivalent.

2.2.1.1.1 Panels shall be manufactured as form material and shall be ¾" thick panels in sizes to cover surface areas between joint lines shown on the drawings. Shall conform to APA PS 1 – 09 Class 1 Concrete form panels

2.2.1.1.2 Formwork materials shall comply with the requirements of Section 01 81 13 Sustainable Design Requirements.

2.2.1.1.3 Acceptable Products / Manufacturers:

2.2.1.1.3.1 WISA-Form Pro by WISA Plywood, Lahti, Finland.

2.2.1.1.3.2 Pourform-pH by Savona Specialty Plywood, Savona, British Columbia.

2.2.1.1.3.3 "FinnForm" (red) birch plywood core panels, minimum 14 plys per inch. As manufactured by Plywood & Door Corp., Union NJ.

2.2.2 Material Tolerances:

2.2.2.1 All formwork panels shall have square, straight, sealed edges (utilizing a good quality water-based 100% acrylic paint designed for exterior exposure). Panels shall be square within 1/16" when measured diagonally corner to corner. Butted edges of panels, when multiple panels are assembled together, shall not vary more than 1/16", each way, in 8'-0" in any butted joint. Modular formwork panels that have edges exposed to the concrete are not acceptable. Vertical and Inclined Formwork shall be designed for full hydrostatic pressures and deflections shall be limited to L/500 including mechanical movements. Horizontal Formwork shall be designed with limited

deflections not exceeding L/400 including mechanical settlements. Plywood facing materials shall include a high grade (phenolic or equivalent) and a second back layer of plywood that is an outdoor grade. Joints in the plywood panels shall be staggered between face material and the backing panels. The face materials shall be fixed in place by screws set in place from the backing panel. The ends of screws shall not penetrate through to the front face of the interior concrete side panel. The maximum variation in plane between any two plywood sheets shall be less than 1/16".

2.2.3 Form Ties: All wall formwork panel tie patterns shall be approved by the Architect. Form tie pattern and spacing is as per approved drawing included in the project documents. All form ties to be stainless steel. Tie samples and specifications to be submitted to architect for approval.

2.2.3.1 All form tie holes to be patched to match adjacent concrete. Any form tie patch that is not visually consistent and in plane with adjacent concrete will be rejected by the Architect.

2.2.4 Joint Sealing Material:

2.2.4.1 Gaskets for sealing field erected corner form joints shall be:

2.2.4.1.1 Highly compressible foam rubber or neoprene tape, paper backed, with pressure sensitive adhesive on one side, and shall be of sufficient width and thickness for specific use. Tape gaskets shall be as manufactured by Frost King, Patterson, NJ; or as manufactured by BM, St Paul, MN.

2.2.4.1.2 Tube applied liquid gaskets shall be "D-Guard" thin joint filler – as manufactured by ProSoCo, Lawrence, KS or preferably silicone sealant as described in 2.3.3.2.

2.2.4.2 Sealant for sealing permanent shop or bench fabricated unrevealed joints shall be non-staining, silicone caulking. Sealant shall be "Silpruf" as manufactured by General Electric; "Silicone caulk" by DCP Corp.

2.2.4.3 Joints in gang forms shall be set and secured by a routed slot into the edge piece of the face form extending 1" beyond the edge of the backup panel.

2.2.5 Form Release Coating for all formwork surfaces: Colorless, non-staining and having no deleterious effects on the concrete, manufactured specifically for non-absorbent surfaces and for reducing surface voids. Release Coating shall be "Cretelese 88A" by Cresset Chemical Co., Weston, OH; or Nox-Crete PCE, BioNox by Nox-Crete Products Group, Omaha, Nebraska or similar. Nox-Crete PCE shall be the preferable.

2.3 DELIVERY, STORAGE AND HANDLING

2.3.1 Comply with General Conditions requirements.

2.3.1.1 Store all materials as recommended by the manufacturer. Protect forms, liners, and other forming materials from weather and other environmental detriments. Protect form facing material panels and all material vulnerable to moisture in a dry storage area. Clean forms after each use and discard or repair damaged forms as required to assure conformance of work with accepted field mock-up.

2.4 REINFORCING AND ACCESSORIES

2.4.1 Support accessories in contact with exposed-to-view concrete surfaces are not permitted. See 3.4 for support requirements.

2.4.2 To secure reinforcing steel adjacent to architectural form surfaces:

2.4.2.1 Use plastic-coated tie wire for epoxy reinforcement.

2.4.2.2 Use stainless steel or plastic-coated tie wire for securing other reinforcement.

2.4.2.3 Use non-corrosive stainless steel, plastic, or plastic-coated wire-reinforcement supports and spacers. The contractor shall submit samples and technical data sheets showing the types of spacers being considered for approval by the architect prior to any concrete operations.

2.4.2.4 Nonconductive wythe ties: Fiber composite supports within exterior façade connect board insulation to cast in place concrete sandwich panels.
Acceptable Manufacturers Thermomass or equal as approved by the Architect
Provide fiber composite connectors having the following physical properties and attributes:

Non-conductive, non-corrosive, fiber-composite connectors having a minimum tensile strength of 120,000 psi, minimum glass fiber content of 76% (by weight), in a thermoset vinyl-ester resin matrix.

The vinyl-ester resin matrix impregnates the fiber strands, creating a composite material that has been tested and shown to be resistant to chemical attack.

Upon request, connector supplier shall provide documentation of alkali resistance of connector and long-term shear capacity of connector.

Coefficient of thermal expansion: 3.9x10-6 in/in/°F, nominal.

Central body of connector shall be provided with a flange to limit insertion depth into insulation.

Central body of connector shall have serrated profile to provide interference fit with pre-formed holes in the insulation so as to prevent connector from backing out of insulation after installation.

Thermal Conductivity: 6.9 Btu/ (°F•ft2•h) per inch of length.

The fiber-composite connectors are the only elements penetrating or crossing the insulation in the panels. They perform as insulators. The low conductivity of the connectors is vital to retaining over 90% of the insulation's R-value. Thermal testing has been performed at Construction Technology Laboratories and at the Oak Ridge National Laboratory, United States Department of Energy, to determine the effectiveness of the fiber-composite connectors in the elimination of loss of R-value in a sandwich wall construction. Contact Thermomass for more information on these test programs.

The wythe ties comprise of a fiber-composite connector with a polymer wing that controls the position of the connector within the twist-lock retainer and provides leverage during connector installation The pre-installed twist-lock retainers provide a friction fit with the pre-formed holes in the insulation eliminating concrete flow-through while the buttons structurally support the insulation at the designed location in the forms.

Proven accelerated aging testing. Provide reports showing compliance with ASTM C 581

Proven fire resistance testing as required by Code.

2.5 MISCELLANEOUS MATERIALS

2.5.1 Curing Material / Evaporation Retarders: VOC compliant, colorless, diffusive, and able to retain water in concrete with minimal loss during high temperatures and without rapid loss of moisture. Shall not contain wax, resin, or acid.

2.5.1.1 "SealTight Med-Cure" by, W.D. Meadows, Inc., Hampshire, IL.

2.5.1.2 "Bro-Cure" by Noxcrete, Omaha NE

2.5.2 Concrete Cleaning Solution and Stain Removers: Shall be a commercial concrete cleaner containing solvents, chloride acids and stain removers, with no more than 1.5% acid content. Solutions shall be as follows:

2.5.2.1 "Light Duty Concrete Cleaner" by Sure Klean, ProSoCo, Lawrence, KS (or approved equal).

2.5.2.2 Cleaning applications may or may not be required. Determination will be made by the Architect on review of surfaces. Cleaning materials shall be tested on mock-ups as directed by the Architect.

2.5.3 Water Repellent sealer shall be a low molecular, minimum 95% solid, clear, silane sealer.

Water Repellant sealer shall be uniformly applied to all interior and exterior architectural surfaces not receiving other finish or waterproofing treatment.

2.5.3.1 "SL-100" by ProSoCo, Lawrence, KC

2.5.3.2 "STIFEL 40" by Nox-crete, Omaha, NE

2.5.3.3 Horizontal Application Only: "STIFEL SC" by Nox-crete, Omaha, NE

2.5.3.4 Vertical Application Only: "STIFEL" by Nox-crete, Omaha, NE

2.5.4 Patching Additive: Shall be a liquid, acrylic-polymer bonding agent specifically made to be integrally mixed with mortar. Patching shall be demonstrated for Architect's approval in Mockup Phase 3 as described in 1.6.7.7.

2.5.5 Gasket adhesive remover shall completely remove any adhesive residue and shall not discolor concrete surface. Remover shall be "Asphalt and tar remover – 509" by ProSoCo, Lawrence, KS.

2.5.6 Use only water-based or bio-based concrete form release agent.

2.5.7 FSC (Forest Stewardship Council) Wood: All new wood-based materials, other than those which contain 100% recycled content, will be FSC-certified by an independent third party in accordance with FSC Forest Stewardship Council "Principles and Criteria" and will have received Chain-of-Custody (CoC) Certification as certified by an accredited certification group such as Smartwood or Scientific Certification Systems (SCS).

2.5.7.1 Contractor is required to specify the type of FSC Certification: FSC Pure (100% FSC Certified); FSC Mixed Credit (100% FSC Certified); or FSC Mixed Percentage (valued at % FSC content). Contractor is required to provide the CoC Certificate and invoice with CoC number verifying that the wood is FSC-certified.

2.5.7.2 Wood-based materials include but are not limited to the following materials, engineered wood products, or wood-based panel products:

2.5.7.2.1 Wood formwork and bracing members

2.5.7.3 Composite Wood and Agrifiber Products: All composite wood and agrifiber products shall contain no added urea-formaldehyde in resins, binders, and adhesives. *(Formaldehyde has been classified as a human carcinogen. Of available formaldehyde-based binders, urea-formaldehyde outgassing at highest levels.)*

2.5.8 VOC Limits: All field-applied adhesives, sealants, primers, paints and coatings used on the interior of the building shall meet the volatile organic compound (VOC) and chemical component limitations as defined in Section A1 81 15 “Volatile Organic Compound Limits”, VOC contents shall be identified and documented.

2.5.9 Substitutions:

2.5.9.1 Products not listed shall be submitted for review with data which shows they are equal to or better than the listed products to produce the specified purpose of the product. After review by the architect and noted as “no exceptions taken”, the submitted product may be used in samples and mock-ups. Products may be required to be used in a test condition at the contractor’s expense to show they do not have any adverse effects on architectural concrete surface presentation.

PART 3 EXECUTION

3.1 CONCRETE MIXTURES

3.1.1 Comply with the requirements of Section 03 30 00 and as specified herein. Comply with the requirements of Section 01 81 13 Sustainable Design Requirements.

3.1.2 Concrete Strength in 28 Days (Architectural Concrete)

5000 psi	Architectural Concrete	Refer to Structural Specifications 03 30 00 Cast-In-Place Concrete

3.1.3 Air Content All concrete shall have a measured air content of less than 3% measured according to ASTM C231.

3.1.4 Mixes shall be designed for a minimum water/cement ratio of 0.40 or less. Slump flow and T50 test shall be measured and used for acceptance of SCC (self-consolidating concrete) concrete on site. Method of measurement shall be as described in ASTM C 1611-18. Slump flow shall be 650 +/- 50 mm (25” +/- 2”) and T50 shall be 3 +/1 1 second. Temperature of concrete shall be targeted at 71.6 °F. Maximum temperature for placing shall be 77 °F.

3.1.5 Mix design shall designate the optimum duration of fluid stability for the mix for the maximum discharge time planned. Note that in many cases, it is required to provide a concrete with a slump retention time of minimum 4 hours from batching time to discharge. This may require the use of Hydration Stabilizers and workability-retaining admixtures. MasterSet Delvo by BASF (ASTM C494M Type B retarding and Type D, water reducing admixtures) and MasterSure Z60 (ASTM C494/C494M Type S, Specific Performance Admixtures) or similar other products.

3.2 CONCRETE PRODUCTION

3.2.1 The contractor is responsible for ensuring the ready-mix supplier complies with the below requirements:

3.2.2 Trucks

Dedicated trucks are to be used for the supply of architectural concrete. Each truck used must conform to the ASTM C94 requirements and the drum and mixing fins shall be completely free of any remnants of grey concrete.

3.2.3 Aggregate Storage

Aggregates shall be stored in bins that separate the aggregate stockpile from cross-contamination with other product storage. Bin aprons shall be sloped away from the stockpile such that excess rainwater and drainage does not collect at the toe of the stockpile. The aggregates shall be protected from contamination by wind driven dust or leaves or other such materials that will lead to color contamination or staining

3.2.4 Cement Storage

Silos shall be clearly marked for the name of materials being stockpiled. At the same time spigots or interfaces for discharge from pneumatic truck deliveries into the silos are also clearly marked and controlled by quality control to ensure that the correct material is being discharged into the silos. Prior to filling the silos, all conveying slides and pipes/hoses shall be inspected and cleaned of any residue that will contaminate the white cement and its color.

3.2.5 Admixture Storage

Admixtures shall be stored in sealed containers that are in a temperature controlled environment that is separated from hot sun or ultraviolet rays. Storage tanks shall be agitated by pumps or impellers to prevent segregation of the solids from the liquid carriers. Checks shall be made on a periodic basis by means of specific gravity to ensure that the quality of the admixtures has not varied from the initial specification requirements of the producer.

3.2.6 Weigh Hoppers and Batching Bins

There shall be individual weigh hoppers for each aggregate and cementing material. Cumulative weighing is not preferable Each batching bin shall be kept clean of any residual other material. Cleaning or clearing shall be done by application of a vibrational load to the bins prior to the next discharge of materials from the main plant stockpiles. There shall be a visual means of inspection by the plant batch operator prior to discharge into the weigh hoppers.

3.2.7 Sequence of Deliveries

Two weeks prior to any start of architectural concrete production, a meeting shall be held with the operations head of the ready-mix supplier, the contactor's Concrete Quality Control Technician (see 1.5.2), and the Architect to review the ready-mix supplier's strategy for serving the daily operations of the project. The results of the meeting and the agreements shall be documented by the contractor.

3.2.8 Field Quality Assurance

3.2.8.1 Testing agency shall provide qualified personnel at site to monitor concreting operations as follows:

3.2.8.1.1 Verify use of required mix

3.2.8.1.2 Record location of point of concrete discharge of each batch truck tested

3.2.8.1.3 Record temperature of concrete at time of placement. The temperature of the concrete as delivered shall not exceed 77 °F.

3.2.8.1.4 Record weather conditions at the time of placement; temperature, wind speed, relative humidity, and precipitation

3.2.8.1.5 Monitor consistency and uniformity of concrete

3.2.8.1.6 Monitor preparation for concreting operations, placement of concrete, and subsequent curing period.

3.2.6.2 Testing Agency shall conduct tests of concrete as follows and in accordance with ASTM C1077:

3.2.6.2.1 Testing frequency: each concrete design mix placed each day shall be taken not less than once a day nor less than once for each 98 cubic yards (75 cubic meters) (In addition, sample each truckload used for columns regardless of other frequencies listed above).

3.2.6.2.2 Determine air content of normal weight concrete in accordance with either ASTMC 231 or ASTMC 138

3.2.6.2.3 Test water content of freshly mixed concrete on a random basis, a minimum of once per 98 cubic yards (75 cubic meters), during placement in accordance with AASHTO T 318 for; hard troweled slabs exposed to view, slab to receive a bonded finish floor material, slabs with specified concrete strength exceeding 6000psi

3.2.6.2.4 For conventional concrete selected target slump shall not exceed 8 ¾" (225 mm). Determine the slump by ASTM C 143/C143M. Slump tolerances shall meet the requirements of ACI 117.
For SCC selected target slump flow shall not exceed 29 ½" (750mm). Determine the slump flow by ASTM C1611/C1611M. Slump flow tolerances shall meet the requirements of ASTM C94/C94M. Concrete will show no visible sign of segregation.

3.2.6.2.5 Slump indicated in mix designs shall be achieved at point of placement. Correlation between slump at point of initial discharge from truck and point of placement must be established to determine the amount of slump loss.

3.2.6.2.6 Conduct strength tests as follows:

A. Sample sets in accordance with ASTMC172
B. Mold cylinders in accordance with ASTMC31 and cure under standard moisture and temperature conditions in accordance with section 7 (a). Quantity of cylinders below is based on a cylinder size of 4" (100mm) diameter by 8" (200mm) long.
C. Test cylinders in accordance with ASTMC39. END PREPARATION
D. For 28 day mixes mold 6 cylinders. Test 2 at 7 days, and 3 at 28 days. The 28 day strength shall be the average of the 3 28 day cylinders. 1 cylinder shall be retained in reserve for later testing if required.
E. For 56 day mixes mold 7 cylinders. Test 1 at 7 days, 2 at 28 days and 3 at 56 days. The 56 day strength shall be the average

of the 3 56 day cylinders. 1 cylinder shall be retained in reserve for later testing if required.

F. For 90 day mixes if needed.
G. When high early strength is required by Contractor, additional cylinders shall be made and tested as required at the Contractors expense.
H. If one cylinder in a test exhibits evidence of improper sampling, molding or other damage, discard cylinder and base test results on that of remaining cylinder.

3.2.6.2.7 Testing Agency shall evaluate concrete for conformance with Specifications as follows:

A. Slump:
    i. Maintain a slump moving average comprised of the average of all batches or most recent 5 batches (whichever is fewer).
B. Strength:
    i. Maintain a compressive strength moving average, comprised of 3 consecutive strength test results, for each mix design used in work.
    ii. Strength level of concrete will be considered satisfactory provided averages of all sets of 3 consecutive strength test results equal or exceed specified 28 day strength, and no individual result falls below specified 28 day strength by more than 500psi
C. Conduct core tests on questionable concrete in accordance with CSA A23.4 and ASTMC42
    i. Concrete in area represented by core tests will be considered adequate if average strength of cores is equal to at least 85% of, and if no single core is less than 75% of specified strength
    ii. Fill core holes with low slump concrete or mortar with a strength

equal to or greater than that specified for area cored.

3.3 FORMWORK

3.3.1 Supply

3.3.1.1 Formwork systems are to provide for wall curvature of varying radii according to architectural drawings in the A050 series and other contract documents.

3.3.1.2 Systems are to allow for second layer of plywood sheets at face to render formwork facing material patterns according to architectural drawings in the A210 series.

3.3.1.3 Acceptable Products / Manufacturers:

3.3.1.3.1 Peri Vario GT

3.3.1.3.2 Doka Systems Circular Formwork H2O

3.3.1.3.3 Meva Circular Formwork Radius

3.3.1.4 Systems are to accommodate full liquid head from SCC concrete.

3.3.1.5 All systems are to be inspected and deemed to be in as new condition prior to delivery to the project site.

3.3.2 Fabrication

3.3.2.1 Comply with the requirements of the Section – 03 10 00 and as specified herein.

3.3.2.2 Design formwork to permit easy removal. Prying against the concrete with metal bars, pry bars and other sharp objects will not be permitted. Wooden wedges or simple 2 x 4's are recommended. Care shall be taken so as not to mar the concrete surface in cutting or removal of the forms.

3.3.2.3 The forms shall be completely rigid and strong enough to withstand without deflection, movement or fluid loss at the high hydraulic pressures that result from the rapid filling and vibration required for architectural concrete placing. Hydraulic pressures: Design formwork to limit deflections of plywood sheathing to L/400.

3.3.2.3.1 Formwork for concrete, 10’ high or less shall be designed for a minimum placement rate of 8’ /hour. In forms higher than 10’ formwork shall be designed for a higher rating if the concrete set rate is determined by the mix analysis to be fluid longer than the time of placement. Formwork pressure shall be calculated assuming a minimum of 85% of the hydrostatic potential. Confirmation of the pressure with concrete mixture shall be done by measurements taken during the Phase 3 mockup program (see 1.6.7.7).

3.3.2.4 Forms shall be fabricated so the concrete can be adequately placed, vibrated (if necessary) and finished to achieve the specified finishes for the profiles required. External vibration may be used to minimize the number of blemishes or bugholes in the exposed surface. Relationship between frequency of the vibrations, duration, orientation and spacing of the vibrators shall be determined during the Phase 3 mockup program (see 1.6.7.7). No internal vibration without the authorization of the Architect.

3.3.2.5 Layout form joints, exposed embedments as shown on the architectural drawings. Contractor shall take measures to implement drainage strategies to prevent the accumulation of water in formwork or cast concrete during rainstorms.

3.3.2.6 Smooth surfaces:

3.3.2.6.1 Edges of plastic overlay form panels shall be square, flat, and sealed. Seal all cut edges (end grain) with liquid polyurethane or 100% acrylic paint for outdoor use.

3.3.2.6.2 Install sealant in all fabricated butt joints of plastic overlay form panels to prevent fluid loss. At butting plywood panel edges place a bead of sealant (1/8” max) at back edge (away from contact face) of one panel prior to butting interface edge surfaces. Take care not to allow sealant to come in contact with form surface. Contact form surface shall be free of sealant prior to casting concrete.

3.3.2.6.3 Vertical surfaces:

3.3.2.6.3.1 Install a full backing sheet fastened securely to the back-up members. Install with tight seams with adjacent panels flush across the joint. Layout joints on the first layer so they are offset at least 12 inches from the facing layer. First layer may be ½” plywood

3.3.2.6.3.2 Back fasten plastic face panels with screws. Penetrations through the plastic faced panels in exposed-to-view areas is not permitted.

3.3.2.6.3.3 Pre-drill Holes in backer panel to eliminate any drill residue between layers that prevent a tight mating between panels.

3.3.2.6.3.4 Facing panel seams shall be sealed as in 3.3.1.6.2 above.

3.3.2.6.4 Transitions between adjacent planes of Architectural Cast-in-Place Concrete surfaces shall be without use of chamfers or radiused forms, unless otherwise specifically shown on the Architectural Drawings. All corners and edges of vertical concrete elements are to be sharp 90 degree configuration.

3.3.2.6.5 Horizontal surfaces:

As the concrete formed surface will be of high architectural quality and exposed to view, it is important to ensure that any potential contamination or staining resulting from the construction process is prevented by precautionary measures. Ensure that all horizontal surfaces (top of parapets, interfaces between horizontal and vertical etc.) exposed to weather are to have a minimum slope of 2% away from the critical architectural vertically prominent adjacent face or surface This includes the potential for tracking mud from the construction site via tradesman's footwear. Protective covers or 'booties' shall be provided for the workers prior to entering the horizontal formwork installation areas.

3.3.2.6.5.1 Install a first panel layer fastened securely to the supports. Install with tight seams with adjacent panels flush across the joint. Layout joints on the first layer so they are offset at least ½ panel width and length from the facing layer. First layer may be ½" plywood.

3.3.2.6.5.2 Fasten facing panels with screws at corners of panels and at edges, ½" from edge from the underside of the backing panel. Do not allow screws to penetrate through the facing panel. Use minimum screws that will assure adjacent panel surfaces are flush across the joint.

3.3.2.6.5.3 Facing panel seams shall be sealed as in 3.3.1.6.2 above.

3.3.3 Form Erection

3.3.3.1 General

The installation and erection of the formwork is to be supervised by a qualified professional who is fully competent in the design intentions and the requirements for performance of the system to ensure compliance with the formwork drawings and the re-shoring support system. The qualified professional is to certify that the formwork is installed according to the requirements of the design and is ready for concrete placement.

3.3.3.1.1 Use screw type fastening devices outside form cavity to maintain alignment, and to tightly close joints at corners, end forms, square columns and at bulkheads. Apply pressure at joint to resist concrete placing pressure as close to the joint as possible.

3.3.3.1.2 Vertical construction joints shall be at locations approved by the Architect before the erection of formwork begins.

3.3.3.1.3 Construction joints shall be formed so the joint is straight, in plane and flush with the adjacent surfaces, with no reveal, and shall be a straight line presentation across the concrete surface.

3.3.3.1.4 Gaskets shall be installed in all corner joints and bulkheads assembled and disassembled in field. Install a gasket in the form joint interface. Install gasket away from contact edge 1/16” to 1/8”.

3.3.3.2 Smooth Panels:

3.3.3.2.1 Use only form units that are in like new condition. The formwork installing contractor is to submit a quality plan that addresses the cleaning of the form surfaces and clearing any residue from previous placements. All panels shall be inspected and cleared by the quality representative prior to application of release agent and erection in place.
Replace panels with defects with new panels using fabrication procedures in 3.3.2.6.5

3.3.3.2.1.1 Where individual form panel within a gang or group damaged, replace with panel matching adjacent acceptable panels – in number of uses and presentation – so that the entire concrete placement is of uniform color, texture, shade, and presentation. If suitable replacement panels not available, replace all the panels in the gang or group to the nearest change in plane or finish as directed by Architect.

3.3.4 Coating of Forms: Prior to use, all forms shall be coated with the specified form release coating in accordance with the manufacturer’s written instructions.

3.3.4.1 Coat evenly and remove excess material from form surface by polishing with a damp absorbent cloth. Note that application of the release agent is to be applied with a sprayer that minimizes the deposits onto the formwork surface at a rate of 250 square yard/ gallon. Excess material is to be removed using a clean and lightly sprayed microfiber cloth. The surface of the form should feel slippery but there should be no obvious buildup of material evident on the surface.

3.3.4.2 Surface applied with specified release agent shall not be oily to the touch.

3.3.4.3 Do not allow coating to come in contact with previously placed concrete or with reinforcing steel.

3.3.5 It is the intent of this specification that the formwork will be erected in conjunction with the sandwich wall board and wythe ties. Before installation of the insulation sheets in the forms, tape the individual sheets together per the drawings supplied by Thermomass. Install the tape on both sides of the insulation. Apply the tape only to clean, dry surfaces.

Install the insulation assembly in the form.

Install the connectors.

Insert the connector in the rectangular hole in the twist-lock assembly.

Push the connector through the thickness of the insulation until the wing comes to rest against the face of the twist-lock assembly.

Using the wing for leverage, use the thumb and index finger to twist the connector in the directions indicated by the arrows on the face of the twist-lock assembly. Note that the connectors will rotate 90 degrees until internal detent in the retainer stops the rotation.

Continue this process for all of the connectors for a panel.

Using the notches on the fiber composite connectors, the sufficient connectors to the structural reinforcing bars to hold the insulation in place. Alternately, the connectors can be pre-installed and the insulation system can be pre-wired to the reinforcing cage before installation in the form.

Place the reinforcing for the remaining concrete layer and the ties to the connectors as needed. Verify that the insulation is properly located in the form and close the form.

During concrete placement, use accepted practice for concrete mix design and placement procedures for thin wall sections. If multiple walls intersect, start the concrete placement at the insulated walls. Ensure that the concrete is placed on both sides of the insulation with a maximum differential head of approximately one foot.

In installations with form-liners, maintain a positive differential head on the liner side to push the insulation and the connectors away from the liner.

3.4 FORMWORK TOLERANCES

Formwork tolerances and concrete finishes shall comply with ACI 117-10 Specification for Tolerances for Concrete Construction and Materials. The edge joinery between formwork facing materials is very important for the architectural prominence of the facility. It is recommended that tradespersons performing the cutting and fitting of the panels are experienced in cabinet making procedures. Equipment needed to obtain a clean cut true edge will most likely include table or panel type saws for cutting the panels to size. Once edges are cut, it is important to seal the fresh cut edges with a high solids type paint (NoxCrete Edgeflex 645 or similar).

3.4.1 Finish Lines: Fabricate and position formwork for surfaces to maintain hardened concrete finish lines within the following allowable variations:

3.4.1.1 From designed edge elevation in 10 ft.: +1/4 inch, -0 inches

3.4.1.2 From designed vertical plane in 10 ft.: +1/4 inch, -0 inches

3.4.1.3 Cross-Sectional Dimensions: +1/4 inch, -0 inches

3.4.1.4 Smooth form surface to surface at butt joint: Maximum variation of panel thickness-fabricate panel edges tight to back-up member.

3.4.1.5 Abrupt irregularities or changes in plane from panel to panel shall conform with ACI 117-10 and in no cases be more than 1/8”.

3.4.1.6 It is the intent of this specification that the formwork will be erected in such a manner that lines and surfaces are visually presentable without obvious defects.

3.5 REINFORCEMENT

3.5.1 Comply with the requirements of SECTION- 03 30 00 and as specified herein below.

3.5.2 Vertical Surfaces: Reinforcing for walls with exposed surfaces shall be held in position without use of supports in contact with the exposed facing material. Bars layers shall be fastened together securely and the cage unit supported on the back form surface and tied back to the back form surface to achieve the required cover on the front surface.

3.5.3 Horizontal Surfaces: Reinforcing bars for horizontal surfaces shall be hung from a support structure above the slab. Supports in contact with the deck facing form where permitted are to pedestal type and submitted to the architect for approval prior to placing the first concrete.

3.5.4 Layout reinforcement to assure a clear passage from top to bottom of walls and spandrels at least 10 feet apart where placing concrete. Clear passage shall be free of bands, ties, conduit, and other obstructions to allow easy insertion of the pump hose or placing trunks to the bottom of the form.

3.5.5 Tie wire for reinforcing steel shall be tied in a manner so that wire ends will point away from the architectural formwork surface and not project into the clear cover area between the bars and the form surface. Note tie wire used for reinforcing with architectural concrete is to be epoxy coated or stainless steel. Black steel tie-wire is not permitted.

3.5.6 All reinforcing steel, including bands, shall be secured with concrete cover from the contact surface of the formwork prior to placing concrete as follows:

3.5.6.1 Interior surfaces: Minimum 1", or as shown on the Structural Drawings. Note: Reinforcing bar shadowing may occur with some mixes with minimum ACI 318 cover. Assessment to be made in Phase 3 mockup evaluation per 1.6.7.7.

3.6 MIXING AND TRANSPORTING CONCRETE

3.6.1 All concrete for each placement (or a minimum of two truckloads) shall be on the site prior to starting concrete placement. The concrete shall be completely discharged into the forms within the time determined by the design mixes to be the optimum duration of fluid stability provided by the mix design. In no case will the concrete be placed after excessive stiffening of the concrete has occurred. Discharge two trucks at one time in a manner that will enable one truck to be half full and discharging while the other is finished and being replaced with another truck.
The readymix producer is to submit a quality plan that addresses the uniqueness of placing and batching colored concrete. The plan needs to address measures taken to ensure that contamination from previously batched (grey) concrete is not present in the truck mixer.

3.7 PLACING CONCRETE

3.7.1 Before placing concrete in the forms:

3.7.1.1 For all formwork surfaces: Verify that all forms have met all requirements specified; that reinforcing steel, embedded materials are in place and securely anchored; that forms are absolutely clean and verify that entire preparation has been approved by the Concrete Quality Control Technician and has been reviewed by the Architect.

3.7.1.2 Truck/Pump preparation:

3.7.1.2.1 The pumping contractor is to present a quality plan to address precautions necessary to prevent contamination from previously placed grey concrete to the colored concrete. This includes hoppers, pump lines and connections. Prior to discharging concrete into pump hopper perform following:

3.7.1.2.1.1 Prime the pump lines, utilizing cement, color and sand grout that match approved mix design. Pump hopper, pump lines and accessories are to be clean and free of non-architectural concrete prior to starting.

3.7.1.2.1.2 Mix concrete in drum for 1 minute per yard.

3.7.1.2.1.3 Allow to set for 30 seconds after mixing and discharge for testing or into pump hopper.

3.7.1.2.1.4 Assure pump hopper mixing paddles are completely submerged into the wet concrete at all times during placement.

3.7.2 Cleaning and Protecting Forms: Immediately prior to placing concrete, clean all form interiors free of foreign material and debris. All standing water shall be blown out of the formwork areas so that the surfaces are dry. Concrete for exposed surfaces shall not be placed if there is a possibility of rainfall or unless protection from rain is provided prior to placing.

3.7.2.1 Force debris out of forms prior to closing the last section with a jet stream of compressed air and/or water. Where form openings are not available, collect debris with vacuum cleaners and heavy duty magnets. Remove all wire clippings, sawdust, and other debris from all surfaces. Pay special attention to formwork of exposed surfaces to make sure all are free of debris and adhered material.

3.7.2.2 Protect cleaned forms if placing does not commence immediately, covering openings with tarpaulins.

3.7.2.3 Do not allow direct sunlight to heat forms before casting.

3.7.2.4 Do not let release agent get contaminated with windblown debris. The applied surfaces are to be protected from contamination or rain after application.

3.7.2.5 Protect the top 2 feet of the formwork from getting splatter from placing operations onto the formwork sheathing. Ensure that there are pour channels or gaps in the reinforcement to allow a 6” tremie pipe be inserted at 10 – 15’ o.c. along the length of the form. The tremie pipe shall be lowered within 2’ of the bottom prior to placement of any concrete. Care and attention shall be made to minimizing the free drop of concrete (especially) when first placed on top of hardened concrete from the floor below. The intention here is to eliminate or minimize the splatter of plastic concrete onto the sidewalls of column or wall forms. The hardened concrete surfaces shall be as smooth and planar as possible (finishing and attention) from the previous floor placement. Joints and seats (sill plates) in column or wall forms shall be mortar tight to prevent leakage from freshly placed concrete between the sill

plate and the previous floor. Gaskets or spacers shall be used to fill the gaps as described in the previous sentence.

3.7.3 Depositing Concrete

3.7.3.1 General: Placing pump line shall be equipped with a shut off valve at the top of the injection needle and be activated by the pump operator. All concrete that is placed in vertical elements (walls, core, and columns) is to be placed with a tremie procedure. The equipment for the tremie will include: Hopper for depositing from the concrete bucket or pump, A tremie pipe or elephant trunk (maximum 6" in diameter) with 3" x 4" ports in the pipe or trunk. Ports are to be at 3' o.c. from the bottom of the tremie and on the uphill side of the pipe (especially if the vertical elements are slanted).

3.7.3.2 Limits on discharge shall comply with ASTM C94/C94M. If discharge is acceptable after more than 90 minutes have elapsed since batching, verify that air content of air-entrained concrete, slump, and temperature of concrete are as specified.

3.7.3.3 Regular Concrete Surfaces:

3.7.3.3.1 Concrete for walls and vaults shall be placed with pumps or tremied with bucket and tremie system. In walls insert pump hose onto the form cavity. Maximum spacing between tremie pipe locations shall be 10'. In vaults, concrete placed directly onto the finished facing surface shall be placed with low pressure.

3.7.3.3.2 Deposit concrete as nearly as practical to its final position.

3.7.3.3.3 Do not drop concrete. Keep placing hose or pipe in wet concrete.

3.7.3.3.4 Pump shall be equipped with a shut off valve above form insertion "needle". Place concrete by inserting pump hose into form and into face of fresh concrete. Shut off line flow prior to removing and injecting the placing "needle" to/from form cavity.

3.7.3.3.5 Deposit layers in walls or deep spandrels shall not exceed 24 inches in height without vibration. Top deposit lift of placement shall not exceed 16 inches in height. Note internal vibration not required for SCC concrete.

3.7.3.3.6 Deposits of concrete in walls or slab placements shall have a subsequent deposit placed on top and/or adjacent to the fresh face and consolidated within 30 minutes. Plan construction joints and placements so that the placing sequence will follow this requirement.

3.7.4 Consolidating Concrete:

The preferred method for consolidating concrete shall be self-consolidating concrete (SCC). If there is an application where conventionally vibrated concrete is considered, the locations and methods shall be submitted to the Architect for approval prior to any concrete operations. See section 3.7.4.2

3.7.4.1 Concrete for all formed non-SCC surfaces: Conventionally vibrated concrete

3.7.4.1.1 All non-SCC concrete shall be consolidated by internal vibration using two vibrators at each placement. One vibrator shall follow deposit location and consolidate concrete after deposit is leveled. Optimum diameter of vibrator head at shall be 1" to 1½". Vibrators shall be placed into the concrete vertically at a consistent spacing that will thoroughly blend the deposits, remove entrapped air, and consolidate the concrete. Vibrator head shall be inserted rapidly and withdrawn slowly and evenly to remove maximum amount of entrapped air (optimum withdrawal speed approximately 2" to 4" per second). Do not jiggle vibrator up and down during consolidation, use continuous and even insertion and withdrawal of vibrator.

3.7.4.1.2 After top out leveling in walls and spandrels, the concrete shall be allowed to set 10 to 15 minutes and then shall be given a final vibration of the top 20 inches. Immediately thereafter the top surface shall be finished as required.

3.7.4.1.3 Caution must be exercised in using vibrators to prevent injury to the form surface material or displacement of embedded items.

3.7.4.1.4 Keep one spare working vibrator on site at all times.

3.7.4.1.5 Vigorously tap form facing panels just below deposit area during consolidation with rubber mallets. Strike in an even and consistent pattern to break up large entrapped air bubbles at the contact form face.

3.7.4.2 Concrete for Vertical Elements (Self Consolidating Concrete (SCC))

3.7.4.2.1 SCC concrete shall not be vibrated using internal vibrators

3.7.4.2.2 In the event that the surface condition of the mockup concrete samples is unacceptable using tremie and pour methods, consideration shall be given to utilizing external vibrators.

3.7.4.2.2.1 Wacker Neuson AR26 with frequency inverter system or approved equal.

3.7.4.2.2.2 The external vibrator system is to be set up and operated such that the minimum duration of vibration duration and intensity is used. The intentions are that the external vibrator will close air bubble voids at the surface of the concrete form face.

3.7.4.2.2.3 A written procedure is to be developed during the mockup stage such that the means of securing the vibrator to the formwork, the frequency and intensity of the vibration and the pattern of spacing between locations of the vibrators has been proven out to most efficiently benefit the surface quality of the concrete.

3.8 CURING AND FORM REMOVAL

3.8.1 Cure all concrete for a minimum of seven days and for the time to achieve 4000 psi. Curing shall be required to keep a high amount of mix water in the concrete and to curtail uneven and rapid moisture loss due to differential ambient temperatures or dryness on all surfaces equally. Curing shall conform to the requirements of ACI 308.1M and the information as follows. The most stringent shall govern.

3.8.2 Cure formed vertical concrete surfaces exposed to weather by the following method:

3.8.2.1 Keep formwork in place for the duration of 7 days in a wet cure condition and for the time necessary to achieve 4000 psi strength according to ACI 201.2R. Note: the consistent timing for formwork removal is important to achieve uniform color affects on the exposed concrete surfaces. A consistent duration between placing and formwork removal is critical. Verification of the durations are to be demonstrated during the mockup 2 and mockup 3 phases.

3.8.2.2 If formwork is to be removed prior to 7 days then immediately after stripping vertical surfaces, fog the surface (fine mist nozzle on hose – not a sprinkler head) and apply the approved curing compound material to all surfaces including top surfaces

3.8.3 Cure and protect horizontal concrete with exposed ceilings exposed to weather as follows:

3.8.3.1 Immediately after placement of soffit/ceilings treat all open faced concrete to protect from water. Note: water on top of the slab should be considered as an element that will stain the surface below. Protection from staining is required.

3.8.4 Form Removal:

3.8.4.1 Comply with the stripping requirements of Section- 033000 Cast-in-Place Concrete Section or notes on the approved engineering drawings, and as specified herein.

3.8.4.2 Care shall be taken so as not to mar the concrete surfaces and edges in removing the forms.

3.8.4.3 Clean formwork surfaces after stripping to remove haze or buildup from previous casting. Formwork cleaning methodology to be approved by Concrete Consultant.

3.9 CONCRETE FINISHES

3.9.1 All exposed work shall be finished with the approved finishes determined from sample tests executed in Part 1 on the mock-up. Finishes shall be as specified herein where indicated on the drawings. Minor defects may require fins to be removed (i.e. top edges) or minor patching performed, however, it is the intent of this specification that the work will be performed in such a manner that only the specified cleaning treatment (if required by architect), water repellent application will be required after stripping.

3.9.2 Floor Finish

3.9.2.1	Exposed Concrete Surfaces	Trowel finish—Float concrete surface, then trowel the surface. Unless otherwise specified, tolerances for concrete floors shall be for a flat surface in accordance with ACI 117. Addition of water to surface to facilitate finishing is prohibited. Do not apply hard-troweled finish to concrete with total air content greater than 3 percent. The acceptable finish is to be demonstrated and approved in the mockup phase. Attention to slip resistance in areas where water can set (outdoors and indoors) needs to be considered in the mockup.
3.9.2.2	Non-Exposed Surfaces	Float finish—Place, consolidate, strike off, and level concrete; cut high spots; and fill low spots. Do not perform further finishing operations until concrete is ready for floating. Begin floating with hand float, bladed power float equipped with float shoes, or powered disk float when bleed water sheen has disappeared and surface has stiffened sufficiently to permit operation of the specific float apparatus. Unless otherwise specified, produce a finish that will meet tolerance requirements of ACI 117 for a conventional surface.
3.9.2.3	Flatness Tolerances	All finishes that are exposed to view shall comply with the requirements of ACI 117-10 table 4.8.6.1 “Flat” designation. Those not exposed shall comply with the Conventional designation.
3.9.2.3.1		All cast in place concrete floor slabs in the First Level shall have overall flatness (SOFF) values of 35 and levelness (SOFL) values of 25 as per ACI 117-10 table 4.8.5.1 “Flat” designation.

3.9.3 General: Prior to treating, all surfaces shall receive the following preparation and cleanup.

3.9.3.1 All surfaces to receive treatment shall be a minimum of 21 days old. All surfaces can be treated at end of project.

3.9.3.2 Remove all stains using an appropriate non-abrasive stain remover for each type.

3.9.3.3 During operations, protect all adjacent work. At completion of day's work, leave area clean. At completion of work, remove all equipment, waste and excess material and leave area clean.

3.9.3.4 All treatments shall be applied to the mock-up surfaces as directed by the Architect. Finish treatments shall be applied to the building concrete surfaces only when and as directed by the Architect.

3.9.4 Treat the formed concrete surfaces with the following cleaning applications as determined from tests on the mock-up in Part-1:

3.9.4.1 Etch/Clean Treatment for concrete surfaces:

3.9.4.1.1 After stripping the surface shall be treated for stain removal and cleaning when directed by the architect.

3.9.4.1.2 Cleaning treatment shall be a full strength or a diluted "Heavy Duty Concrete Cleaner" as determined from tests on the mock-up.

3.9.4.2 "Non-acid" Treatment for concrete surfaces:

3.9.4.2.1 After stripping the surface shall be treated for stain removal and cleaning when directed by the architect.

3.9.4.2.2 Cleaning treatment shall be Prosoco "2010" or Prosoco "Enviro Klean" (or approved equal) as determined from tests on mockup Phase 3 as per 1.6.7.7.

3.9.4.3 Architect shall determine the extent of cleaning treatment required after a significant amount of concrete has been performed. If surfaces are acceptable as out-of-form with no cleaning treatment only specific areas may be determined to be treated.

3.9.5 Water Repellent Treatment (Waterproofing):

3.9.5.1 Waterproofing treatment to be used on all exterior horizontal architectural concrete surfaces to be a cementitious crystalline waterproofing.

3.9.5.1.1 Concrete waterproofing protection system shall be of the crystalline type that is a blend of Portland cement, fine treated silica sand and active proprietary chemicals. When mixed with water and applied as a cementitious coating, the active chemicals diffuse into the concrete and cause a catalytic reaction which generates a non-soluble crystalline structure

within the pores and capillary tracts of concrete. This crystalline system causes the concrete to become sealed against the penetration of liquids from any direction and protects the concrete from deterioration due to harsh environmental conditions.

3.9.5.2 Approved manufacturers:
- Xypex Chemical Corporation, Canada
-Gemite Group of companies, Canada
-Euclid Group, USA
-Sika

3.9.5.3 Application of materials to follow manufacturer's instructions

3.9.6 Efflorescence Treatment:

3.9.6.1 Required only if the specific mix ingredients emit white salts after stripping and prior to application of final sealer.

3.9.6.2 Apply a very light spray coating of Prosoco "SL100" sealer (or approved equal) to surfaces immediately after stripping.

3.9.6.3 If a white surface appears the contractor shall notify the architect immediately. Application requirement shall be determined by architect as the project progresses.

3.9.7 Formed Square Corner Edge Treatment: After concrete is hard use a fine masons stone or fine grit sanding block on the edge to achieve an eased edge with a 1/16 inch radius. Take care not to scar the adjacent surface. This applies to two adjacent vertically formed corner surfaces and to a formed surface adjacent to a trowel finished top surface.

3.9.8 Patching: Only areas designated by the architect shall be patched. Where minor patching is required as approved by the architect as a means of rendering the surface acceptable, it shall consist of patching with a texture matching technique and color matching mortar mix. Test patches shall be placed on the mock-up or other approved surface and approved by the architect prior to commencing any patching of the work. Final patching mortar shall be one part cement and two fine parts sand (maximum 00) mixed with a liquid acrylic-polymer bonding additive.

3.9.9 Core Drilling: The aesthetic acceptance criteria listed in the specification above apply to architectural core drilled openings as indicated in the Contract Documents. Core drilled openings must be tested in the Phase 3 mockup for approval of the Architect. Core Drilling Subcontractor must have demonstrated ten (10) years of experience in large diameter core drilling. Core Drilled Opening locations must be indicated in architectural concrete shop drawings and coordinated with requirements of the structural documentation and placement of reinforcement and non-conductive wythe ties.

3.9.10 Water Repellant Sealer: Water repellant sealer shall be uniformly applied to all interior and exterior architectural surfaces not receiving other finish or waterproofing treatment. Apply at direction of Architect.

3.10 PROTECTION

3.10.1 Protect all architectural cast-in-place concrete surfaces from damage of any kind. Pay special attention to surfaces near work of other trades. All architectural concrete surfaces shall be free of damage at the time of acceptance. All architectural concrete surfaces once accepted shall protected to assure protection from paint, oils, rust, stains, impact, or any other kind of damage. Special attention should be paid to any installation work in the vicinity of architectural concrete surfaces.

3.10.2 All corners or edges of vertical concrete elements (columns / core walls) are to be protected using a non-staining and impact resistant material. (e.g. 2 x 4 milled lumber separated from the concrete by non-staining plastic or similar bubble type spacer pads. The contractor is to submit samples and technical literature prior to construction start.

3.11 MOCKUP DRAWINGS

3.11.1 Mockup scope is as required by the Architect and Owner. See A800 series drawings.

END OF SECTION

ATTACHMENT #6
NEW SPECIFICATION 316333:
MICROPILES

(ATTACHED)

SECTION 316333 – MICROPILES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. This work consists of furnishing all materials, products, accessories, tools, equipment, services, transportation, labor, supervision, and manufacturing techniques required for testing and installation of micropiles described herein and as shown on the Contract Drawings.

C. The CONTRACTOR must employ a licensed surveyor to lay out the piles at the locations shown on the design drawings. The CONTRACTOR is responsible for the accuracy of the installed piles' locations.

1.02 REFERENCES

A. Unless otherwise noted, the latest edition of the following codes and standards must govern this work. If any conflicts exist between these codes and standards the more restrictive requirements must govern.

B. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

C. American Welding Society

1. AWS D1.1: Structural Welding Code – Steel
2. AWS D1.4: Structural Welding Code – Reinforcing Steel

D. American Society for Testing and Materials (ASTM)

1. ASTM D471 Rubber Property—Effect of Liquids

E. American Concrete Institute (ACI)

1. ACI 318 Building Code Requirements for Structural Concrete

F. International Building Code (IBC)

1.03 RELATED SECTIONS

A. Section 017829 – "*Survey and Layout Controls*"

B. Section 033000 – "*Cast-in-Place Concrete*"

C. Section 033101 – "*Marine Concrete*"

1.04 PRICE AND PAYMENT PROCEDURES

A. Payment: There are no separate pay items for the work of this section, which is considered incidental to applicable bid items. The CONTRACTOR must isolate the work of this Section by submitting a Schedule of Values to support payment requests.

1.05 SUBMITTALS

A. Submit the following qualifications in accordance with Section 013300.

B. Shop Drawings

1. Prepare and submit to the Engineer, for review and approval, working drawings and relevant calculations for micropile installation at least 21 days prior to planned start of construction.

C. Submit a detailed description of the construction procedures proposed for use. This shall include a schedule of major equipment resources. Indicate methods and equipment that will be used to containerize waste, including but not limited to soil cuttings, spoils, and drilling fluid, generated as part of the micropiles installation. The construction procedures shall be submitted for Engineer review and approval prior to the start of any work.

D. The working drawings shall include micropile installation details giving the following:

1. Micropile number, location and installation sequence.

2. Micropile design load.

3. Type and size of reinforcing steel.

4. Minimum total bond length.

5. Grout volumes and maximum pressures.

6. Micropile cut-off elevation.

E. For reinforcing steel, submit certified mill test reports, properly marked, for reinforcing steel, as the materials are delivered. The ultimate strength, yield strength, elongation, and composition shall be included. For steel pipe used as permanent casing, or core steel, and anchor plates, submit a minimum of two representative coupon tests or mill certifications (if available) on each steel heat delivered to the project site.

F. Submit the grout mix designs, including details of all materials to be incorporated, and the procedure for mixing and placing the grout to Engineer for review and approval prior to ordering any materials. This submittal shall include certified test results verifying the acceptability of the proposed mix designs.

G. Installation Records: The following records shall be prepared for each micropile installed, within 24 hours after each pile installation is completed. The records shall include the following minimum information:

1. Pile drilling date, time, duration and observations (e.g., flush return, relevant site observations).

2. Pile measured dimensions

3. Length of rock socket (if any)

4. Details of used equipment

5. Weather conditions

6. Information on soil and rock encountered, including description of strata, water, etc.

7. Final location of pile (northing and easting coordinates) surveyed by a New York State Licensed surveyor (this information may be furnished within a week of installation completion)

8. Final elevation of micropile including top and bottom of bond length.

9. Cut-off elevation.

10. Design loads.

11. Description of unusual installation behavior, or conditions.

12. Any deviation from the intended parameters.

13. Grout pressure attained, where applicable.

14. Calculated expected grout volume (estimated prior to piles' installation)

15. Measured grout quantities pumped.

16. Pile materials and dimensions.

17. Micropile test records, analysis, and details.

H. Pile Load Test Procedure and Set-Up

1. Submit the proposed set-up plan and procedure for performing the required static compression pile load tests, static lateral load tests, and static uplift pile load tests, for review and approval by the Engineer prior to starting any tests. The proposed location of the test piles is as indicated on the Contract Drawings.

I. Test Reports

1. Provide pile load test results for both compression and tension load tests as required in this section of the Specifications.

2. As-built drawings showing the location of the piles, their depth and inclination, and details of their composition shall be submitted within 15 days after installation of all production piles.

1.06 QUALITY ASSURANCE

A. Perform work in accordance with issued permits, New York City, Battery Park City Authority, and the State of New York, ordinances, and regulations, in accordance with Section 014100.

C. The micropile CONTRACTOR shall be experienced in the construction and field load testing of Micropiles and must have successfully completed at least 5 projects involving installation and axial and lateral testing micropiles, with a total of no less than 100 micropiles of comparable capacity to those required in the current project plans and drawings. This must include micropiles installed in rock and in soil.

D. The CONTRACTOR shall assign a licensed engineer in the city of New York to supervise the construction work. The engineer must have a relevant experience of no less than 3 years.

E. Survey Work: Engage a New York State licensed professional surveyor, to perform surveys, layout, and measurements. Conduct layout work for each micropile to lines and levels required before installation. Record actual measurements of installation of micropile foundation support systems. Refer to Section 017829 for additional survey requirements.

1. Record and maintain information pertinent to each micropile, and cooperate with the Owner’s Geotechnical ENGINEER and Owner’s Testing Agency to provide data required for reports.

2. Pre-construction Conference: A minimum two weeks prior to scheduled commencement of micropile installation and associated work, meet at project site with installer of micropiles, installers of related work, the Owner's Structural ENGINEER, Owner's Representative, Owner's Testing Agency, Owner's Geotechnical ENGINEER, and other representatives directly concerned with

performance of the work. Review foreseeable methods and procedures related to micropile work. Record discussion of conference and decisions reached, and furnish copy of record to each party attending.

1.07 PROJECT CONDITIONS

A. Subsurface Conditions: The CONTRACTOR must make themselves comfortable with the soil and groundwater subsurface condition on site prior to the start of any construction work at no additional cost to the owner.

B. Existing Utility Lines and Foundations: Any existing underground utility lines and foundations shown on the Drawings are shown from the best possible information available and shall be verified prior to any excavation or grading work.

1. Known utilities and foundations have been shown only where their existence has been determined by survey, investigation, or record drawings. The precise location of these lines, as well as careful reconnaissance of all areas for both above- and below-ground utilities as well as protection of same, shall be the sole responsibility of the CONTRACTOR.

2. Existing utility lines to be retained and shown on the Contract Drawings, or the location of which are made known to the CONTRACTOR prior to excavation operations, shall be protected from damage during excavation drilling, filling, and backfilling, and if damaged, shall be repaired by the CONTRACTOR, at his expense, and in a manner as directed by the ENGINEER.

3. New Utility Lines: New utility lines shown on the Civil Drawings, or the location of which are made known to the CONTRACTOR prior to concrete pier construction, shall be protected from damage during excavation, drilling, filling, and backfilling, and if damaged, shall be repaired by the CONTRACTOR, at his expense, and in a manner as directed by the ENGINEER.

1.08 SUSTAINABLE DESIGN REQUIREMENTS

A. Sustainable Design Requirements: The Owner requires the CONTRACTOR to implement practices and procedures to meet the Project’s environmental performance goals, which include achieving ILFI Zero Carbon and WEDG Certification. Refer to Section 018113 - Sustainable Design Requirements for the Project’s targets and specific requirements. The CONTRACTOR shall ensure that the requirements related to the Project’s sustainability design goals are implemented to the fullest extent. Substitutions, or other changes to the work proposed by the CONTRACTOR or their Subcontractors, shall not be allowed if such changes compromise the Project’s sustainability goals and ILFI Zero Carbon or WEDG certification.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Permanent Casing. Provide casing consisting of flush joint type steel pipe of appropriate thickness to withstand the stresses associated with advancing it into the ground, in addition to the stresses due to hydrostatic and earth pressures. The diameter of the cutting shoe of the casing shall not exceed the outer diameter of the casing by more than 0.25 Inch.

B. Casing/Pipe used as Reinforcement. Provide steel casing/pipe used as reinforcement conforming to API SCT N80 steel with 80 ksi yield strength. Mill secondaries cannot be used for reinforcement.

C. Bar Reinforcement. Provide bar reinforcement meeting the requirements of ASTM A615, Grade 75, or continuously threaded "uncoated high-strength steel bars for prestressing concrete" - ASTM A722.

D. Casing shall be flush joint and the pipe joint shall be completely shouldered and with no stripped threads.

E. Grout. Provide a pumpable grout consisting of, as a minimum, Portland Cement – Type II and water that provides a stable, homogenous neat cement grout with a minimum 28-day unconfined compressive strength of 5,000 psi.

F. Centralizers and Spacers. Provide centralizers and spacers fabricated from schedule 40 PVC pipe, tube, steel, or material non-detrimental to the reinforcing steel. Wood shall not be used.

PART 3 - EXECUTION

3.01 METHODS.

A. Construction Sequence

1. The CONTRACTOR must submit for the ENGINEER’s approval, the installation sequence of the piles.

B. Drilling and Excavation

1. Protect existing structures, including overhead and buried utility lines. CONTRACTOR shall perform exploratory test pits in the area of the proposed micropile installation as required to first expose any buried utilities prior to any drilling at no additional cost to the City.

2. The CONTRACTOR shall follow the requirements in Con Ed Specification CE-SI-1080 Guidelines for Protecting Existing Underground Transmission Electric Facilities from Nearby Construction Activities for any micropiles being installed adjacent to Con Ed electric facilities.

3. Advance the hole using a duplex drilling method. Do not drill or flush ahead of the drill casing by more than 1 foot. When cleaning the inside casing 2 diameters or two feet must be maintained behind the tip of the outer casing. Perform drilling and excavation in such a manner to prevent collapse of the hole. Use of bentonite slurry is not permitted. Use of polymer slurry to remove cuttings from the cased hole shall be approved by the ENGINEER.

4. If obstructions are encountered during installation for a pile, progress through them by means of coring or a tri-cone roller bit. Use of drop-type impact hammers and blasting are not permitted.

5. Use of a down-the-hole hammer must be approved by the ENGINEER.

6. Control the procedures and operations so as to prevent mining, damage, or settlement/deformation to adjacent structures, tunnels, utilities, or adjacent ground. If any damage or settlement occurs halt operations. Provide a written plan to the ENGINEER for review with procedures to avoid reoccurrence. Resume work only after the ENGINEER has approved the plan in writing. Repair all damage and settlement/deformation at no additional cost to the City.

7. Control the procedures and operations so as to prevent the soil at the bottom of the hole from flowing into the hole at all times during installation and cleaning out. Monitor the rate of fluid flow used to progress the holes.

8. Control drilling fluid and dispose of spoil in accordance with the approved procedure.

9. The CONTRACTOR must follow the installation procedure outlined in the Contract Drawings. Any deviation from the latter must be approved by the ENGINEER.

10. Do not progress a hole or pressure-grout within a radius of 5 pile diameters or 5 feet, whichever is greater, of a micropile until the grout for that micropile has set for 24 hours or longer if a retarder is used.

11. Obstructions, including but not limited to rock fragments, cobbles, boulders, and rubble fill are expected during installation of micropiles. It is CONTRACTOR's responsibility to assess the impact of obstructions on micropile installation and take measures to overcome the obstructions without causing additional cost to the City.

12. If, during installation of a pile, an obstruction is encountered that prevents the practical advancement of the hole, the hole shall be abandoned and filled with grout. A new pile shall be drilled at a location to be determined by the ENGINEER, although it must be acknowledged that in certain structures, relocation options may be severely limited, and further attempts at the original location with different methods may be required.

13. Location of existing utilities shall be field verified prior to drilling. The CONTRACTOR shall expose all existing utilities prior to installation of micropiles. It is the CONTRACTOR's responsibility to avoid damaging existing underground utilities during micropile installation.

14. The micropiles shall be constructed according to the size, depth, and methodology shown on the Contract Drawings.

C. Reinforcement and Grout Tube Placement

1. Provide centralizers sized to position the reinforcement within 3/8 inch of plan location from the center of the pile; sized to allow grout pipe insertion to the bottom of the drillhole; and sized to allow grout to freely flow up the drill hole and casing and between adjacent reinforcing bars. Centralizers, spaced not to exceed 10 feet, must be used to center the reinforcement for its entire length. Securely attach the centralizers to withstand installation stresses. Do not drop but lower the steel reinforcement to its specified location in the hole.

D. Grouting

1. The CONTRACTOR shall provide systems and equipment to measure the grout quality, quantity, and pumping pressure during the grouting operations. This information is to be measured and recorded by the CONTRACTOR. The grouting shall be performed immediately after the finish of drilling and flushing of the hole. No drilling of one micropile shall be performed if grouting is not expected to be finished for the same micropile immediately after drilling.

2. After drilling, the hole shall be flushed with water to remove drill cuttings and/or other loose debris. All drilling fluid along with cuttings and debris shall be collected in containers for future disposal. Prior to placement of grout, the CONTRACTOR shall verify that the bottom of the pile is clean and has reached the required tip elevation and that the bond length in soil or rock as shown in the Drawings has been achieved. The grout shall not contain lumps or any other evidence of poor or incomplete mixing. Admixtures, if used, shall be mixed in accordance with manufacturer's recommendations.

3. The CONTRACTOR shall perform grouting in a way to minimize grout loss to joints in cavities. The CONTRACTOR shall be responsible for any overrun of grout beyond the theoretical micropile volume and take it into consideration in their bid.

In case the grout does not return to the top of casing (during the initial grouting phases – prior to the pressure grouting stage) after 120 percent of theoretical grout volume for this pile has been consumed, the CONTRACTOR may let the grout set and redrill and regrout the micropile. In such case, the pile has to be field tested in compression up to 1.6 times the design load (not to exceed 80% of the structural pile capacity) and following the Quick test loading procedure outlined in the latest ASTM D 1143 standard. It shall be the CONTRACTOR's responsibility to deal with the potential grout loss issue.

4. Grout within the micropiles shall be allowed to attain the minimum design strength prior to being loaded. No load test shall be performed before the specified grout strength has been reached.

5. All relevant details including grouting pressure, volume, location and mix design, shall be submitted for ENGINEER approval.

6. The CONTRACTOR must adhere to the outlined pile installation process and grouting methodology in the Contract Drawings.

E. Pile Splices

1. Casing sections shall be joined by manufactured thread joints constructed to develop at least the required compressive and tensile, and/or bending structural strength used in the micropile design. Threaded pipe casing joints shall be located at least two casing diameters (OD) from a splice in any reinforcing bar.

2. Reinforcing steel shall be spliced using approved couplers from the reinforcing steel manufacturer and shall develop the ultimate tensile strength of the bars without evidence of any failure.

3. Lengths of casing and reinforcing steel to be spliced shall be secured in proper alignments and in such a manner that no eccentricity between the axes of the two lengths spliced or angle between them results.

F. Grout Placement

1. Provide quality control of the mix by monitoring grout quality. Measure grout consistency by determining grout density per API Recommended Practice (RP) 13B-1 by the Baroid Mud Balance Test at a frequency, of at least one test per micropile, and provide the information to the inspector.

2. The grout shall be injected using 0.75 Inch diameter PVC grout tube to within 2 feet of the bottom of the casing. Grouting of the pile must proceed from the bottom of the pile to displace the drilling fluid until grout flows out the top of the pile. All grouting operations associated with activities including, but not limited to, partial pulling of casing and pressure grouting, must ensure complete continuity of the

grout column. The use of compressed air to directly pressurize the fluid grout is not permissible. The grout pressures and grout takes shall be controlled to prevent excessive heave in cohesive soils or fracturing of soil or rock formations. The entire pile shall be grouted to the design cut-off level.

3. Following the grouting of the pile, the reinforcing thread bars and spacers must be introduced and pushed to the bottom of the pile. This is to be followed by pulling the casing on 5 feet increments while pumping grout and maintaining 75 psi grout pressure (pressure not to exceed 100psi at any point). The final (permanent) casing length and bond zone length are outlined in the Contract Drawings. Grouting of bond zone to cease if over 150% of the theoretical column in pumped in. Theoretical grout volume to be determined by the CONTRACTOR. Detailed installation procedure shown on Contract Drawings must be followed.

4. The pump shall be equipped with a pressure gauge to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used by the CONTRACTOR, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The grout must be kept in constant agitation prior to pumping.

5. The City will perform quality assurance of the mix design.

6. Testing a set of six 2 Inch by 2 Inch cubed of grout to be tested every day during which micropiles are grouted. Cubes to be tested at independent accredited laboratories CONTRACTOR to record the initial volume of grout required to fill the hole. CONTRACTOR to record grouting pressure and volume of grout being pumped into the pile during pressure grouting. Upon completion, maintain the grout level at or above the pile cut off elevation until the grout has set.

7. Locate the grout pressure and volume measuring gages at the pile installation site so that they are accessible and legible to the inspector.

8. Grouting of bond zone to cease should no more than 150% of the theoretically calculated volume is pumped in. The theoretical grout volume to be determined by the CONTRACTOR.

G. Construction Tolerances

1. Install the piles so that the center of each micropile does not vary from the tolerances indicated on the Contract Drawings. Should piles be installed outside these tolerances, the CONTRACTOR must suggest corrective actions (at the cost of the CONTRACTOR) for the ENGINEER’s approval.

2. Cut off the top of the pile casing at the elevation indicated on the Contract Drawings.

3. During production pile installation, prepare and test a minimum of one set of samples from each batch of grout used during production pile installation, but no less than one set per day. Perform one 7-day and one 28-day unconfined compressive strength tests per ASTM C780 Annex A6. The remaining sample shall be tested at 56-days if 28-day strength does not meet specifications.

4. Test results shall be submitted to the ENGINEER within 3 days from the finish the grout strength test. If the grout strength of a particular micropile is less than the specified strength, the ENGINEER may require the CONTRACTOR to prove the design capacity of the specific micropile by performing additional proof load test or to install additional micropile to replace the specific micropile with inadequate grout strength at no additional cost to the City.

5. The CONTRACTOR must adhere to all tolerances outlined on the Contract Drawings.

H. Welding

1. All welded connections of casing shall be performed by in accordance with AWS D1.1 and D1.5. These requirements do not apply to minor welding that does not carry structural load, such as cutting teeth and tacking on bearing plates.

I. Pile Load Testing

1. Follow the pile load testing requirements specified on the Contract Drawings. The proposed locations of the test piles are indicated on the Contract Drawings.

2. Static compression pile load tests shall be performed on those test piles in accordance with ASTM D1143 following New York City Building Code, and as indicated on the Contract Drawings. Piles shall be tested to a load 200% of the allowable compression pile capacity provided on the Contract Drawings, using the Standard Procedure.

3. Static tension pile load tests shall be performed on those test piles in accordance with ASTM D3689 following New York City Building Code, and as indicated on the Contract Drawings. Piles shall be tested to a load 200% of the allowable compression pile capacity provided on the Contract Drawings, using the Standard Procedure.

4. Lateral pile load tests shall be performed on those fixed head test piles per ASTM 3966 Standard Test Methods for Deep Foundations Under Lateral Load requirements and in accordance with the notes on the Contract Drawings.

5. The CONTRACTOR shall retain the services of a New York State Licensed Professional ENGINEER to perform load tests on the micropiles at the locations shown in the Contract Documents.

6. CONTRACTOR must notify the City of the pile loading test schedule at least one week prior to the start of testing.

7. A test report, in accordance with ASTM D1143, shall be submitted for each compression pile load test. A test report, in accordance with ASTM D3689, shall be submitted for each tension pile load test. A test report in accordance with ASTM 3966 shall be submitted for each lateral pile load test.

J. Vibration Monitoring

1. Follow the vibration monitoring requirements specified on the Contract Drawings and specified herein.

2. Where installing micropiles adjacent to critical structures, generated vibrations shall be monitored at the critical structures. Detected vibration levels at the monitored structures shall not exceed a peek particle velocity level greater than 0.5 in./sec. Critical structures include the following:

   a. 50 Battery Place building

   b. The Museum of Jewish Heritage building

   c. 54” MS4 Outfall (NYCDEP) in First Place

   d. Pier A Harbor House building

   e. 83” CSO (NYCDEP) in Pier A Plaza

   f. Battery Park Underpass (NYCDOT)

   g. Brooklyn-Battery Tunnel (TBTA)

   h. NYCT Subway 1 Train Tubes

   i. NYCT Subway Bowling Green Station

   j. Any other structures deemed critical by the CONSTRUCTION MANAGER.

3. During micropile construction, the CONTRACTOR must observe the conditions in the vicinity of the construction site for signs of ground heave or subsidence. Should the CONTRACTOR observe any signs of ground deformation and/or damage/deformation of adjacent structures to the construction site, the CONTRACTOR must immediately notify the ENGINEER and suspend drilling or grouting operations until further notice from the ENGINEER. The CONTRACTOR must follow the suggested corrective actions by the ENGINEER.

K. Unsatisfactory Piles

1. In case of unsatisfactory piles results not complying to the outlined requirements in this specification and/or the Contract Drawings, the CONTRACTOR ay suggest mitigation measures and submit for the ENGINEER's approval. Unsatisfactory results include, but are not limited to piles with grout not reaching required strength, piles installed out of the outlined acceptable tolerances in this document and on the Contract Drawings, piles with measured (from field test) capacity lower than required capacity outlined on the Contract Drawings.

END OF SECTION 316333

NO TEXT ON THIS PAGE

ATTACHMENT #7
REVISED EXHIBIT D – *TECHNICAL SUBMITTAL REQUIREMENTS*
AND REVISED EXHIBIT E – *QUALIFICATION FORMS*

(ATTACHED)

EXHIBIT D
TECHNICAL PROPOSAL
SUBMITTAL REQUIREMENTS

Formatting

Proposals shall be formatted as follows:

(a) Language – All information shall be in English.

(b) Type Font and Size – All narrative text shall be single-spaced in a regular style font at a minimum of 12 points. The type, style, and size of headings and figures are not prescribed. The minimum font size for charts, exhibits, and other illustrative and graphical information shall be 9-point font.

(c) Page Size – With the exception of a team organizational chart, all information shall be, when printed, on 8.5-inch by 11-inch paper. The team organizational chart may be, when printed, on 11-inch by 17-inch paper.

(d) Page Margins – No text, tables, figures, photos, or other substantive content shall be printed within 0.75 inches of any page edge.

(e) Page Limit – There is no page limit, except as otherwise indicated in this Exhibit D – *Technical Submittal Requirements*. To the extent that this Exhibit D indicates a page limit, unless expressly noted otherwise, a "page" is defined as, when printed, a single side of an 8.5-inch by 11-inch sheet of paper. The Proposal shall include only information required by this RFP.

(f) Table of Contents – Provide a table of contents that includes major headings for the Proposal and associated page numbers as well as a list of appropriate tables, graphics, figures, photos, appendices, etc.

(g) Dividers – Section dividers shall contain, at a minimum, one of the following:

1. Section number
2. Section title

(h) No other text is permitted on the dividers. The dividers will not be counted toward any allowable page total.

(i) Front Page – The front page of each Proposal shall be labeled with the name of the Proposer, along with the following:

"Technical Proposal – South BPC Resiliency Project, Wagner Park Pavilion Construction Services"

Content

Proposal information must be provided in a response format in accordance with this Exhibit D, in tabbed sections using the section numbers and titles provided in the table below. Submittals should be simple and provide a concise description of the qualifications of the Key Proposer Team Members. To the extent any section of the Proposal would repeat the same information provided in another section, the Proposer may choose to include such information only once and refer the reader to the specific location of the Proposal where the duplicative information may be found.

Section 1 – Responsiveness Forms

Each of the following forms shall be included in Section 1, where they will be evaluated only as part of the responsiveness review described in Section 6.3 (Responsiveness Review).

Section No.	Title	Contents
1-1	Transmittal Letter (Qualification Form A)	Submit a fully executed Qualification Form A (Transmittal Letter) of Exhibit E (Qualification Forms). The transmittal letter and all attachments thereto shall be signed by a representative of the Proposer who is empowered to sign it and to commit the Proposer to the obligations contained in the RFP. Proposers shall also submit the Certificate of Authorization, included as an attachment to the transmittal letter, with the proposal. If the Proposer is a partnership, the Proposal shall be signed by one or more of the general partners. If the Proposer is a corporation, an authorized officer shall sign his or her name and indicate his or her title beneath the full corporate name. If Proposer is a joint venture, the Proposal shall be signed by the joint venture. Anyone signing the Proposal as an agent shall file with the transmittal letter legal evidence of his or her authority to execute.
1-2	Vendor Responsibility Questionnaire/Certificate of No Change (Qualification Form B-1)	Complete and provide all information required by *Qualification Form B-1 – Vendor Responsibility Questionnaire/Certificate of No Change* of Exhibit E – *Qualification Forms*. The instructions included in Qualification Form B-1 indicate the circumstances under which a Certificate of No Change may be provided in lieu of the entire Vendor Responsibility Questionnaire.
1-3	State Finance Law Certifications (Qualification Form B-2)	Complete and provide all certifications required under Qualification Form B-2 (State Finance Law Certifications) of Exhibit E – *Qualification Forms*.
1-4	Statement of Non-Collusion (Qualification Form B-3)	Complete and provide all information required by Qualification Form B-3 (Statement of Non-Collusion) of Exhibit E – *Qualification Forms*.
1-5	Disclosure of Prior Non-Responsibility Determinations (Qualification Form B-4)	Complete and provide all information required by Qualification Form B-4 (Disclosure of Prior Non-Responsibility Determinations) of Exhibit E – *Qualification Forms*.

Section No.	Title	Contents
1-6	Financial Information (Qualification Form B-5)	Financial Statements. Provide financial statements for the three (3) most recent fiscal years (FY) and interim financial statements since the last fiscal year for which audited statements are provided. To the extent Proposer intends to rely on a guarantor to meet its obligations under the Contract, only the financial statements of the guarantor are required to be submitted. The following are the required financial statements: • Opinion letter (auditor's report); • Balance sheet; • Income statement; • Statement of changes in cash flow; and • Footnotes. In addition, the financial statements must meet the following requirements: • For US entities, prepared in accordance with US Generally Accepted Accounting Principles (GAAP) and audited by a Certified Public Accountant (CPA). For non-US entities, prepared in accordance with International Financial Reporting Standards (IFRS) and audited by a CPA equivalent. • If any entity provides financial statements prepared in accordance with principles other than US GAAP or IFRS, a letter must be provided from a certified public accountant, or equivalent, discussing the areas of the financial statements that would be affected by a conversion to US GAAP or IFRS. • If audited financials are not available for a Key Entity for which financial information is required to be submitted, the Proposal must include unaudited financials for such member, certified as true, correct, and accurate by the Chief Financial Officer (CFO) or treasurer of the entity. If any entity required to submit financial statements is a newly formed entity and does not have independent financial statements, such entity shall expressly state that it is a newly formed entity and does not have independent financial statements meeting the

Section No.	Title	Contents
		requirements above and shall provide financial statements otherwise consistent with those required hereby for each of its shareholders/equity members. • If Proposer files reports with the Securities and Exchange Commission (SEC), then such entity must provide electronic links to the most recently filed Forms 10-K, 10-Q and 8-K for all such reporting entities in lieu of hard copies. • Financial statement information must be prepared in English. If audited financial statements are prepared in a language other than English, translations of all financial statement information must accompany the original financial statement information. • If financial statements are not available in US dollars, Proposer must include summaries of the income statement, balance sheet and cash flow statement for the applicable time periods converted to US dollars. If financial statements are converted from a foreign currency into US dollars, the conversion method(s) must be explained in an attachment and must be reasonable. Translation at the average period rate for income statements and cash flow statements, and period end rate for balance sheet statements, shall be appropriate. Financial Information Summary. Proposer shall complete *Qualification Form B-6 – Financial Information Summary* of Exhibit E – *Qualification Forms*. If Proposer has provided a guarantor, include Qualification Form B-4 only for the Guarantor. As a general matter, in order to be considered for award of the Contract issued pursuant to this RFP, Proposers must demonstrate that it has sufficient financial strength to assure BPCA that it is capable of performing the Services; i.e., a financial capability at least commensurate with the Project. To this end, Proposers may propose to supplement its financial strength by proposing a parent or affiliate company to serve as a guarantor of Proposer and guarantee, through a guaranty agreement, all of Proposer's obligations under or in connection with the Contract. If a Proposer chooses to submit financial information of a parent company or affiliate, the parent company or affiliate will be required to serve as a guarantor pursuant to a guaranty agreement. The Proposer shall indicate clearly in response to this Section 1-5 whether it is proposing such a guarantor and, if so, provide a letter of acknowledgement from such proposed guarantor.

Section No.	Title	Contents
1-7	Insurance Requirements	Provide evidence of ability to obtain the insurance coverage anticipated to be required of the Proposer, as set forth in Exhibit G – *Insurance Requirements*.
1-8	Bonding Capacity	The Proposer shall provide a letter from a surety or insurance company stating whether or not the Proposer is capable of obtaining performance and payment bonds in amounts sufficient to address the needs of the Project. The Contract requires the Proposer to furnish a performance bond to guarantee performance of the Services, and a payment bond to guarantee payments to laborers, mechanics, subcontractors, and materials suppliers in connection with the Services. Each such bond must be in the amount of the total value of the Services. Letters indicating "unlimited" bonding capability are not acceptable. The surety or insurance company providing the letter must be authorized to do business in New York State with an A.M. Best Co. "Best's Rating" of A- or better.
1-9	Material Changes in Financial Condition	Proposer must provide information regarding any material changes in its financial condition for the past five (5) years or anticipated in the future. If no material change has occurred and none is pending, Proposer shall provide a letter from its CFO or treasurer so certifying. In instances where a material change has occurred, or is anticipated, Proposer shall provide a statement describing each material change in detail, the likelihood that the developments will continue during the period of performance, and the projected full extent of changes likely to be experienced in the periods ahead. Estimates of the impact on revenues, expenses and the change in equity will be provided separately for each material change as certified by the CFO or treasurer. References to the notes in the financial statements are not sufficient to address the requirement to discuss the impact of material changes. Where a material change will have a negative financial impact, Proposer shall also provide a discussion of measures that would be undertaken to insulate the Project from any recent material changes, and those currently in progress or reasonably anticipated in the future. If the financial statements indicate that expenses and losses exceed income in each of the three (3) completed fiscal years (even if there has not been a material change), Proposer shall provide a discussion of

Section No.	Title	Contents
		measures that will be undertaken to make the entity profitable in the future and an estimate of when the entity will be profitable. Representative material changes include the following: (1) An event of default or bankruptcy involving the Proposer, a related business unit within the same corporation, or the parent corporation of the Proposer; (2) A change in tangible net worth of ten percent (10%) of net assets; (3) A sale, merger or acquisition exceeding ten percent (10%) of the value of net assets prior to the sale, merger or acquisition which in any way involves the Proposer, a related business unit, or parent corporation of the Proposer; (4) A change in credit rating for the Proposer, a related business unit, or parent corporation of the Proposer; (5) Inability to meet conditions of loan or debt covenants by the Proposer, a related business unit or parent corporation of the Proposer which has required or will require a waiver or modification of agreed financial ratios, coverage factors or other loan stipulations, or additional credit support from shareholders or other third parties; (6) In the current and three (3) most recent completed fiscal years, the Proposer, a related business unit in the same corporation, or the parent corporation of the Proposer either: (i) incurs a net operating loss; (ii) sustains charges exceeding five percent (5%) of the then net assets due to claims, changes in accounting, write-offs or business restructuring; or, (iii) implements a restructuring/reduction in labor force exceeding two hundred (200) positions or involves the disposition of assets exceeding ten percent (10%) of the then shareholder equity; (7) Any material litigation or other material adverse proceedings that are still outstanding and may affect Proposer's ability to perform its obligations in relation to the Project; and (8) Other events known to the Proposer, a related business unit or parent corporation of the Proposer which represents a material change in financial condition over the past three (3) years or may be pending for the next reporting period.

Section 2 – Experience of Contractor and Sub-Contractors

Proposers must meet the minimum requirements set forth in *Section 2.4 – RFP Minimum Experience Requirements* to be eligible to participate in this RFP. BPCA will evaluate the Proposers based on the demonstrated experience of the members of each Proposer's team, including the Proposers' and Key Subcontractors' individual and collective performance history, and experience on previous or current Projects of Similar Scope and Complexity.

Demonstrated experience with "**Projects of Similar Scope and Complexity**" shall mean the successful completion of at least three (3) projects within the past consecutive ten (10) years involving the following work items:

1) Completion of new building construction in New York City as a general contractor;
2) Achieving project-specific sustainability goals and certifications;
3) Installing deep foundation systems;
4) Architectural concrete building facades including the construction of architectural concrete domes and arches;
5) Structural concrete work;
6) Architectural window walls;
7) Architectural ornamental metals;
8) New public and private utility construction including relocation work; and,
9) Landscape construction, including:
   a.) Plantings; and,

b.) Horticultural soils.

Among its overall Project experience and Project approach elements, Proposer shall specifically describe Contractor and Sub-Contractor Experience, Technical Approach, and Key Personnel for the following work items:

1) Architectural Concrete Building Façade (Specification 033300), including:
    a. Information on proposed formwork system
    b. Environmental Product Declarations (EPD), Qualifications, and Test Reports for proposed mix designs
2) Architectural Window Wall (Specification 084413), including:
    a. Information on proposed window system

3) Architectural Ornamental Metals (Specification 057000)

   a. Information on custom metal door fabrication

BPCA reserves the right to award points under the RFP's experience criterion to Proposers commensurately with their experience on projects having characteristics set forth in the definition of Projects of Similar Scope and Complexity.

SECTION NUMBER	TITLE	CONTENTS
2-1	**Project Profiles**	Provide project profiles to demonstrate that the Proposer's team (including, as applicable, Key Subcontractors) has completed, or has the capability to complete, Projects of Similar Scope and Complexity. Project profile criteria are as follows: (a) Project profiles shall include the project name, project location, client name, project manager name, project description (including identifying relevance to the Project), delivery method, services provided, baseline and actual completion date, baseline and actual contract amounts, and reasons for any variations from baseline. (b) Project profiles must identify Key Personnel from the profiled project, who are proposed for this Project, and a description of the scope of services and length of involvement provided by each such Key Personnel. (c) Photographs or other graphic materials may be included. (d) The Proposer may submit up to eight (8) project profiles. (e) Project profiles shall not exceed two (2) pages in length for each project. (f) BPCA projects shall not be included among the project profiles. (g) Project profiles should demonstrate experience with Projects of Similar Scope and Complexity. (h) Additional evaluation points are possible for Proposers that demonstrate previous working experience among the Key Proposer Team Members on Projects of Similar Scope and Complexity. This section is limited to sixteen (16) pages.

SECTION NUMBER	TITLE	CONTENTS
2-2	**Project References (Qualification Form C)**	Proposer shall provide a project reference for each project profile submitted above using Qualification Form C – *Reference Information for Key Entities* included in Exhibit E – *Qualification Forms*. The reference should be for the project's owner or the project owner's representative. BPCA may contact those individuals and firms that are listed as references by the Proposer and award points based upon the reference's verification that the Proposer's characterization of its involvement in the project is accurate, as well as their overall assessment of the quality of those services provided, including project management, partnership and collaboration, cost and schedule control, quality, and commissioning and function of installed work. It is the Proposer's responsibility to verify that all references listed can be reached by telephone and email. If a reference cannot be located based upon the information provided by the Proposer, BPCA may disregard the listed project. BPCA reserves the right to maintain the confidentiality of the past performance information provided by the references listed by the Proposer, as well as references obtained by other means, and is under no obligation to share such information with the Proposer. By submitting a Proposal for consideration under this RFP the Proposer agrees that it shall not seek to discover from any source the contents of such communication.
2-3	**Safety Questionnaire (Qualification Form D)**	Complete and provide all information required by Qualification Form D (Safety Questionnaire) of Exhibit E – *Qualification Forms*.
2-4	**Current Work vs. Capacity**	Provide graphics that highlight Proposer's ability to effectively staff and complete the Services and the Project. No specific format is required however, at a minimum, the following information is to be provided: • Average number of projects (with construction value equal to or greater than thirty million dollars ($30,000,000) in progress for each of the last five (5) years and the cumulative aggregate value of all in-progress projects for each such year. • For each current in-progress project with construction value in excess of thirty million dollars ($30,000,000), identify project value, start and forecast completion dates and number of staff currently assigned to the project.

SECTION NUMBER	TITLE	CONTENTS
		• Based in part on the above data, for the period from 2019 to 2025, present the aggregate staffing level currently assigned to all existing or pending projects plus the total staffing level available for assignment to prospective or upcoming projects.

Section 3 – Technical Approach

BPCA will evaluate the Project approach based on the Proposer's ability to demonstrate understanding of the objectives, elements, and challenges associated with the Project and the potential/likely approaches to successfully plan and execute the Project. The Project approach shall describe the use of Proposer's proven systems, processes and tools, referencing real-world examples of project success.

SECTION NUMBER	TITLE	CONTENTS
3-1	**Construction Approach**	The Proposer should submit initial plans relating to management aspects of the Project. Each initial plan should outline the key features of that particular aspect and how it will be addressed during the Contract. The Proposer should include in the Technical Approach the following components: 1. Initial Construction Management Plan 2. Initial Quality Plan 3. Initial Overall Safety Management Approach *[NO FURTHER TEXT ON THIS PAGE]* <u>Initial Construction Management Plan</u> Provide the Proposer's approach to addressing the construction of the Pavilion Project. Provide a narrative describing the overall construction sequence of the Services, including all staging areas, as well as the final permanent footprint of construction. The narrative should discuss the logistics and challenges of constructing the project elements, while meeting all contractual requirements. It should discuss why the sequence was chosen, how the sequence benefits BPCA, and why it is the best solution for constructing the Project elements. Discuss the elements of the Project that the Proposer may elect to self-perform as well as the work anticipated to be performed by subcontractors.

SECTION NUMBER	TITLE	CONTENTS
		The Proposer shall discuss the major components, issues and challenges the Proposer has identified on this complex, urban resiliency project and how it intends to address them. Provide a log that identifies the top ten (10) potential risks to the Pavilion Project with suggested mitigation strategies. The Construction Approach should also describe how the Proposer will manage construction, construction quality control and assurance and the tools that will be implemented to provide coordinated interaction with the Construction Manager, Owner, Design Team, adjacent contractors, public and private utility owners and other Pavilion Project stakeholders. The Proposer should describe how the progress of the construction work is reported to BPCA, how the work is controlled, how the Schedule will be updated, and how the work will be progressed in coordination with stakeholders. Describe the proposed methods of protecting existing facilities and implementing environmental controls including a description of the specific means and methods the Proposer intends to use to minimize impacts to existing utilities, private residences, structures and properties adjacent to or within the Project Site. For example, identify how the Proposer intends to mitigate impacts due to vibration, noise, dust, staging of construction materials and equipment, and construction vehicles of the Proposer's construction operations. <u>Initial Quality Plan</u> The Proposer should include a Quality Plan that details the Contractor's own quality control and quality assurance measures that will be in place for the duration of construction. The Quality Plan shall address how construction activities performed by different entities will be coordinated to ensure consistency of quality. The plan shall detail how non-conformance issues will be documented, communicated, and resolved. The narrative shall include a write up on how quality will be maintained for items fabricated and tested off-site and how mock-ups will be managed, implemented, and presented to the Authority for acceptance. <u>Initial Overall Safety Management Approach</u> The initial overall safety management plan should describe the Proposer's overall approach to ensuring safety of workers, other personnel, and the public over the duration of the Pavilion Project. Major safety

SECTION NUMBER	TITLE	CONTENTS
		issues and areas of concern should be identified and the proposed method of mitigating or eliminating the safety issue should be outlined. The Proposer shall include a narrative describing the organizational arrangements it intend to implement to manage project safety successfully. The organizational arrangements described should clearly identify responsibilities and reporting lines of staff, particularly relating to Key Personnel and should include subcontractors. Provide a narrative that addresses how the Proposer corrected or prevented any safety challenges or major safety issues that occurred on projects they performed in the last five (5) years, including projects where their OSHA Lost Time Frequency Rates were two (2) times the national average and the assigned EMR is greater than one-point-two (1.2). The initial safety management plan shall be considered an initial document for the purpose of conveying the overall approach of the Proposer regarding safety, and in is not intended to replace the Project-specific Safety and Health Program to be implemented in accordance with the Project Specifications. This Section 3-1 shall not exceed twenty (20) pages.

Section 4 –Key Personnel / Organizational Structure

BPCA will evaluate the Proposers based on each Proposer's team structure, including its legal structure and organization, team roles and responsibilities, clarity in team members' functional relationships, and their capability to perform assigned work responsibilities.

BPCA will evaluate the Proposers based on the qualifications, demonstrated experience, and past performance of the Key Personnel, with the evaluation considering among other things, his/her experience working in similar roles to those proposed for the Pavilion Project based on Projects of Similar Scope and Complexity and their overall suitability to fulfill their described role individually and as an integrated team. The entirety of this section will receive a combined score, and the Proposer's Key Personnel will not be scored individually. The Proposer shall present the Key Personnel and explain how their qualifications, experiences, and past performance on Projects of Similar Scope and Complexity make them uniquely qualified to lead in their role on this Project.

BPCA reserves the right to award points under the RFP's Key Personnel criterion to Proposers commensurately with their Key Personnel's direct experience on projects having characteristics set forth in the definition of Projects of Similar Scope and Complexity.

SECTION NUMBER	TITLE	CONTENTS
4-1	**Legal Structure**	The Proposer shall provide a description of the legal entity proposed. If the Proposer legal entity has already been formed, the Proposer shall provide complete copies of the organizational documents, along with evidence that the Proposer is authorized to conduct business in New York State or will be authorized to conduct business in the State prior to the award of the Contract. If the Proposer's legal entity has not yet been formed, then the Proposer shall provide a description of the proposed legal structure, with sufficient information to enable BPCA to determine whether the future organization will be capable of entering into the Contract and to meet all applicable legal requirements once it is formed. Once the entity is legally formed, the Proposer shall supplement its Proposal with copies of the final organizational documents. If the Proposer is a joint venture, the Proposer shall provide a copy of the executed joint venture agreement or a copy of the executed letter of intent to joint venture.
4-2	**Team Organization**	Provide an organization chart demonstrating the proposed make-up of the participants on the Proposer's team. It shall include the Proposer, all Key Subcontractor, Key Personnel (indicating their firm affiliation), and other proposed subcontractors and staff necessary for the performance of the Contract Services. Describe the Proposer team's past performance working together on any Projects of Similar Scope and Complexity. This section (not including the organization charts) is limited to two (2) pages.
4-3	**List of Key Personnel**	Provide a succinct list of all Key Personnel, supplying only the following information: • Individual name • Company/firm and title of individual • Key Personnel role • Intended commitment of key staff during Project phases in percentage of full-time employment The following Key Personnel shall be identified at a minimum:

		4-3.1 Project Executive The "Project Executive" is the Proposer's executive with authority to make the highest-level decisions. Their duties include, without limitation, settling the most difficult disputes and fostering a culture of partnering, integrity, and good faith among the leadership of all entities teamed with the Proposer. The Project Executive will be the person BPCA's executive team turns to effect positive change on the Project, when needed. The Project Executive should possess, at a minimum, ten (10) years of experience in the role of Project Executive involving multiple phases of larger scale building/infrastructure programs. In addition, the Project Executive must have a proficient level of knowledge relative to all aspects of construction management. **4-3.2 Project Manager** The "Project Manager" is the primary liaison for the Proposer and will act as the first point of contact between the Proposer and BPCA. This individual will have authority to make staffing decisions and shall be responsible for the overall design, construction, schedule, budget, quality management, and Contract administration for the Pavilion Project. It is the Project Manager's responsibility to ensure the Project is managed and delivered in accordance with the requirements of the Contract. BPCA expects the Project Manager to have experience managing and delivering a minimum of at least three (3) Projects of Similar Scope and Complexity. Additional consideration may be given if the Project Manager is also a certified project management professional. **4-3.3 Project Superintendent** The Project Superintendent should possess, at a minimum, fifteen (15) years of construction experience involving multiple phases of large-scale projects, including Projects of Similar Scope and Complexity. This individual must be able to develop/communicate a project work plan, monitor manpower and performance against the work plan and be able to perform a detailed comparison of the design drawings against each other to ensure coordination between each of the various project trades. This position requires experience to supervise a project's field activities including quality assurance (e.g. project completed in compliance with drawings and specifications), safety program implementation and monitoring, schedule compliance, site logistics, coordination of special/controlled inspections and resource tracking.

		4-3.4 Project Scheduler The "Project Scheduler" shall be a professional with experience in the production of large-scale complex schedules and project tracking documents, including overall schedules, detailed construction schedules, delay analysis, and four-week look ahead schedules. The Project Scheduler shall have experience using Primavera P6. This position shall determine a protocol and schedule for schedule submissions, which incorporates revisions and updates such that schedules remain current and represent the most accurate information available for the status of the Pavilion Project. The Project Scheduler should possess, at a minimum, ten (10) years of experience in providing scheduling services for similar large-scale, complex projects. **4-3.5 Project Estimator** The "Project Estimator" shall be a professional with experience in the preparation of cost estimates based on the tracking of historical costs, along with knowledge and analytical capabilities associated with construction market conditions and dynamics. The Project Estimator should possess a minimum of five (5) years of comparable experience on similar large-scale complex projects. The Project Estimator shall participate in the cost estimate reconciliation meetings with BPCA and its Advisory Team and prepare accurate minutes, draft correspondence for review, create simple calculations based spreadsheets and print out reports as required. **4-3.6 Quality Manager** The "Quality Manager" shall prepare and implement the quality control plan and quality assurance protocol/applications and make recommendations pertaining to constructability, sequencing, impact analysis, and other related tasks. This individual shall assure compliance with goals outlined in the BPC Sustainability Plan and Green Guidelines adopted by BPCA. The Quality Manger should have experience on providing cost-effective quality control consistent with the complexity, criticality and safety aspects of the Project and possess a minimum of ten (10) years of comparable experience. **4-3.7 Sustainability Representative** The "Sustainability Representative" shall oversee all on-site activities related to compliance with sustainability criteria. This individual will take primary responsibility for managing the processes of implementing and maintaining construction related sustainability documentation for which the contractor will be responsible; including (but not limited to) erosion and sedimentation control;

		construction and demolition waste management; indoor air quality; collecting, organizing, and uploading documentation required for the Project's ILFI Zero Carbon or WEDG submission. **4-3.8 Safety Manager** The "Safety Manager" shall develop and implement the safety program and assure the selected Proposer's compliance with the Occupational Safety and Health Act (OSHA) and amendments thereto, and other City, State and federal ordinances, rules, regulations, statutes or laws that may be applicable. This individual shall work closely with the Project Manager and Construction Manager and coordinate with BPCA and the Advisory Team regarding any and all necessary health and safety plans, spill response requirements and related environmental regulations and procedures as required by any agency having such jurisdiction over the Project. This individual shall assure that toolbox safety meetings are conducted on a frequent, recurring basis and shall lead the investigation and preparation of reports of any accident for BPCA review and follow-on action that minimizes the potential for re-occurrence. **4-3.9 Additional Personnel** The Pavilion Project will require substantially more personnel than those identified as Key Personnel in this Section. Proposers may include qualifications, technical competence, and experience of additional personnel and their proposed involvement that Proposer wishes to identify as Key Personnel.
4-4	**Resumes**	Provide resumes for each Key Personnel identified above in *Section 4.3: List of Key Personnel*. Such resumes shall demonstrate how each Key Personnel is uniquely qualified to lead in their role on the Project. Each resume must include the name, qualifications and relevant experience in Projects of Similar Scope and Complexity. The relevant experience must also include contracting method, dates spent on the project, and duties performed. Each Key Personnel resume submittal shall be no more than two (2) pages in length and the entirety of this Section shall be limited to thirty (30) pages.
4-5	**References**	Proposer shall provide three (3) references for each Key Personnel from different projects that are included in each resume described in Item 4-2 of this Section. The reference should be for the project's owner or the project owner's representative. BPCA personnel shall not be identified as a reference. BPCA reserves the right to contact those individuals that are listed as references and points may be assigned based upon the reference's verification that the Proposer's characterization of the individual's

		involvement in the project is accurate, as well as their overall assessment of those services provided in their identified role. Each reference should include the referral's name, title, email address, and phone number. Two of the three references for each Key Person should be from projects that are at least seventy-five percent (75%) complete. BPCA reserves the right to contact references other than those identified by the Proposer to evaluate past performance. BPCA reserves the right to maintain the confidentiality of the past performance information provided by the references listed by the Proposer, as well as references obtained by other means, and is under no obligation to share such information with the Proposer. By submitting a proposal for consideration under this RFP, the Proposer agrees that it shall not seek to discover from any source the contents of any such communication.

Section 5 – Pavilion Project Schedule

BPCA will evaluate the initial Pavilion Project schedule based on the Proposer's ability to demonstrate the overall construction sequence of the work, risk identification and achievability to meet BPCA schedule milestones as specified in the RFP. The proposed schedule (as modified during negotiations) shall become the basis for the agreed Project duration.

SECTION NUMBER	TITLE	CONTENTS
5-1	**Initial Schedule**	Proposer shall provide an initial schedule that at a minimum includes the following information: • Start of Work at the Pavilion Project Site • Start/End Dates for all Major Construction Activities o Permits o Procurement of Long Lead Time Items • Identification of Project Critical Path • Intermediate Milestone Dates, including the Architectural Concrete Completion Milestone • Substantial Completion Date • Final Completion Date
5-2	**Schedule Format**	The initial schedule described above in *Section 5-1: Initial Schedule* shall be provided in a hard-copy form printed on eleven-inch (11") x seventeen-inch (17") sheets with all as-printed fonts at least eight (8) points.

SECTION NUMBER	TITLE	CONTENTS
5-3	**Schedule Assumptions**	The Proposer shall provide a narrative that lists and describes the assumptions used in preparing the schedule, highlights any inherent advantage of the schedule approach, as well as inherent risks to meeting the proposed schedule. The Proposer shall also include in this section an initial monthly manpower evaluation designed to demonstrate level of manpower that are anticipated to be on-site throughout the duration of the Pavilion Project. This manpower evaluation shall be broken down to highlight specific trade manpower as well as manpower related to general contractor supervision. If Proposer seeks to describe means and methods to achieve earlier completion than the milestones set forth in the RFP, Proposer should describe such means and methods in this section. Proposer should highlight their overall approach to schedule float, and how they would tackle a recovery schedule if presented with the need for one. This section shall be limited to two (2) pages.

Section 6 – Diversity

BPCA will evaluate Proposers based upon the demonstrated experience in the successful utilization of MBE/WBE/SDVOB firms and to meet established MBE/WBE/SDVOB goals and EEO requirements.

SECTION NUMBER	TITLE	CONTENTS
6-1	Completion of all Requirements set forth in Exhibit F-1 Contractor Requirements and Procedures for Participation by NYS-Certified MBEs/WBEs/SDVOBs, and EEOs for Minority Group Members and Women	Proposer shall provide all information required by Exhibit F to this RFP, relating to the participation by New York State-certified minority- and women-owned business enterprise ("M/WBEs") and Service-Disabled Veteran Owned Business-Enterprises ("SDVOBs").

SECTION NUMBER	TITLE	CONTENTS
6-2	M/WBE & EEO Policy Statement (Exhibit F-1)	Complete and provide all information required by Exhibit F (Diversity Requirements, Equal Employment Opportunity (EEO) Policy Statement, and Diversity Practices Questionnaire)
6-3	Diversity Practices Questionnaire (Exhibit F-1)	Complete and provide all information required by Exhibit F (Diversity Requirements, Equal Employment Opportunity (EEO) Policy Statement, and Diversity Practices Questionnaire). This questionnaire will form the basis for BPCA's evaluation of a Proposer's Diversity score.

Section 7 – Comments on Contract

Submissions as part of **Section** 7 are voluntary and will not be part of the Proposals evaluation.

Section No.	Title	Contents
7-1	Comments on Contract	Provide comments, if any, on the expected terms and conditions of BPCA's Standard Form of Contract (addressed in Exhibit H).

[NO FURTHER TEXT ON THIS PAGE]

EXHIBIT E

QUALIFICATION FORMS

QUALIFICATION FORM A

TRANSMITTAL LETTER
REQUEST FOR PROPOSALS:

SOUTH BATTERY PARK CITY RESILIENCY PROJECT:

WAGNER PARK PAVILION CONSTRUCTION SERVICES

Transmittal Letter

(To be typed on Proposer's Letterhead)

Date:_____

Battery Park City Authority

Re: Request for Proposals- South Battery Park City Resiliency Project: Wagner Park Pavilion Construction Services

_____ (the "**Proposer**") hereby submits its proposal ("**Proposal**") in response to the Request for Proposals for South Battery Park City Resiliency Project: Wagner Park Pavilion Construction Services ("**RFP**"), issued on February 7, 2022, as amended. Capitalized terms used but not defined herein have the meanings set forth in the RFP.

As a duly authorized representative of the Proposer, I hereby certify, represent, and warrant, on behalf of the Proposer, as follows in connection with the RFP:

1. The Proposer acknowledges receipt of the RFP and the following Addenda:

No.	Date
_____	_____
_____	_____
_____	_____

2. The submittal of the Proposal has been duly authorized by, and in all respects is binding upon, the Proposer. The Certificate of Authorization, accompanying this Transmittal Letter, evidences my authority to submit the Proposal and bind the Proposer.

3. The Proposer has completely reviewed and understands and agrees to be bound by the requirements of the RFP, including all Addenda thereto.

4. All information and statements contained in the Proposal are current, correct and complete, and are made with full knowledge that BPCA will rely on such information and statements in determining whether to pre-qualify the Proposer in accordance with the RFP.

5. The Proposal has been prepared and is submitted without collusion, fraud or any other action taken in restraint of free and open competition for the services contemplated by the RFP. No attempt has been made or will be made by Proposer or any Key Proposer Team Member to induce any other person, partnership, firm or corporation to submit or not to submit a Proposal for the purpose of restricting competition.

6. No Key Proposer Team Member in the Proposal is currently suspended or debarred from doing business with any governmental entity.

7. The Key Proposer Team Members have reviewed all of the engagements and pending engagements of the Key Proposer Team Members, and no potential exists for any conflict of interest or unfair advantage.

8. No person or selling agency has been employed or retained to solicit the award of the Contract under an arrangement for a commission, percentage, brokerage or contingency

9. The principal contact person who will serve as the interface between BPCA and the Proposer for all communications is:

NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____

PHONE _____
E-MAIL: _____

10. The key technical and legal representatives available to provide timely response to written inquiries submitted, and to attend meetings requested by BPCA are:

Technical Representative

NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____

PHONE: _____
E-MAIL: _____

Legal Representative

NAME: _____
TITLE: _____
COMPANY: _____
ADDRESS: _____

PHONE: _____
E-MAIL: _____

_____
Name of Proposer

_____
Name of Designated Signatory

_____
Signature

_____
Title

(Notary Public)

State of _____

County of _____

On this _____ day of _____, 2021, before me appeared _____, personally known to me to be the person described in and who executed this Transmittal Letter and acknowledged that (she/he) signed the same freely and voluntarily for the uses and purposes therein described.

In witness thereof, I have hereunto set my hand and affixed by official seal the day and year last written above.

_____
Notary Public in and for the state of _____

(SEAL)

_____
(Name printed)

Residing at _____

My commission expires _____

CERTIFICATE OF AUTHORIZATION*

I, _____, a resident of _____ in the State of _____, DO HEREBY CERTIFY that I am the Clerk/Secretary of _____, a [corporation] duly organized and existing under and by virtue of the laws of _____; that I have custody of the records of the [corporation]; and that as of the date of this certification, _____ holds the title of _____ of the [corporation], and is authorized to execute and deliver in the name and on behalf of the [corporation] the Request for Proposals ("RFP") submitted by the [corporation] in response to the Request for Proposals for South Battery Park City Resiliency Project: Wagner Park Pavilion Construction Services issued on February 7, 2022, as amended; and all documents, letters, certificates and other instruments which have been executed by such officer on behalf of the [corporation] in connection therewith.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the corporate seal of the [corporation] this _____day of _____ 2022.

(Affix Seal Here)

_____
Clerk/Secretary

* ***Note***: *Separate certifications shall be submitted if more than one corporate officer has executed documents as part of the Proposal. Proposers shall make appropriate conforming modifications to this Certificate in the event that the signatory's address is outside of the United States.*

[NO FURTHER TEXT ON THIS PAGE]

LICENSES AND CERTIFICATES

Provide copies of the licenses and certificates of registration for Key Proposer Team Members leading the construction efforts. Include business licenses, contractor licenses and any certificates of authorization to perform the required services.

[NO FURTHER TEXT ON THIS PAGE]



QUALIFICATION FORM B-1

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE / NO CHANGE FORMS

Instructions

In the packet provided, there are two (2) required forms:

- The Standard Vendor Responsibility Questionnaire (Consisting of six (6) pages and a Certification page); and,
- The Certificate of No Change (1 page)

The Standard Vendor Responsibility Form should be filled out by someone in your firm who knows about tax filings, prior findings of non-responsibility by a governmental authority, etc., and can certify the accuracy of all information requested in the form (such as legal status, tax status, and debarment status).

You must answer every question on the questionnaire.

NOTE: You may fill out the "Certificate of No Change" form instead ONLY if your firm has submitted the Vendor Responsibility form to Battery Park City Authority already during this calendar year. If this is the first time your firm is proposing to do work for Battery Park City Authority this year, then you must fill out the entire Vendor Responsibility Questionnaire.

[NO FURTHER TEXT ON THIS PAGE]

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE

1. LEGAL BUSINESS NAME: _____

2. FEDERAL EMPLOYER ID NO. (FEIN): _____

3. D/B/A — Doing Business As (if applicable): _____
   COUNTY FILED: _____

4. WEBSITE ADDRESS (if applicable): _____

5. PRINCIPAL PLACE OF BUSINESS ADDRESS: _____

6. TELEPHONE: _____ ext. _____ 7. FAX: _____

8. AUTHORIZED CONTACT FOR THIS QUESTIONNAIRE:
   Name: _____
   Title: _____
   Telephone Number: _____
   Fax Number: _____
   E-mail: _____

9. TYPE OF BUSINESS: (please check appropriate box and provide additional information):

a)	☐ Corporation	State of Incorporation: _____
b)	☐ Sole Proprietor	State/County filed in: _____
c)	☐ General Partnership	State/County filed in: _____
d)	☐ Not-for-Profit Corporation	Charities Registration Number: _____
e)	☐ Limited Liability Company (LLC)	Jurisdiction filed: _____
f)	☐ Limited Partnership	State/County filed in: _____
g)	☐ Other — Specify:	Jurisdiction filed (if applicable): _____

10. IF NOT INCORPORATED OR FORMED IN NEW YORK STATE, PLEASE PROVIDE A CURRENT CERTIFICATE OF GOOD STANDING FROM YOUR STATE OR APPLICABLE LOCAL JURISDICTION.

11. LIST NAME AND TITLE OF EACH PRINCIPAL, OWNER, OFFICER, MAJOR STOCKHOLDER (10% OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, 25% OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), DIRECTOR AND MEMBER, as applicable:

a) _____
b) _____

[NO FURTHER TEXT ON THIS PAGE]

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN: _____

c) _____
d) _____
e) _____
f) _____
g) _____
h) _____

12. AUTHORIZED CONTACT FOR THE PROPOSED CONTRACT:
Name: _____
Title: _____
Telephone Number: _____ Fax Number: _____
E-mail: _____

13. DOES THE VENDOR USE, OR HAS IT USED IN THE PAST FIVE (5) YEARS, ANY OTHER BUSINESS NAME, FEIN, OR D/B/A OTHER THAN WHAT IS LISTED IN QUESTIONS 1-3 ABOVE?

☐Yes ☐No

If yes, provide the name(s), FEIN(s) and d/b/a(s) and the address for each such company and d/b/a on a separate piece of paper and attach to this response.

14. WITHIN THE PAST FIVE (5) YEARS, HAS THE VENDOR, ANY PRINCIPAL, OWNER, OFFICER, MAJOR STOCKHOLDER (ten percent (10%) OR MORE OF THE VOTING SHARES FOR PUBLICLY TRADED COMPANIES, twenty-five (25%) OR MORE OF THE SHARES FOR ALL OTHER COMPANIES), AFFILIATE[1] OR ANY PERSON INVOLVED IN THE BIDDING, CONTRACTING OR LEASING PROCESS BEEN THE SUBJECT OF ANY OF THE FOLLOWING:

a) a judgment or conviction for any business related conduct constituting a crime under federal, state or local government law including, but not limited to, fraud, extortion, bribery, racketeering, price-fixing or bid collusion or any crime related to truthfulness and/or business conduct?

☐Yes ☐No

[1]*"Affiliate" meaning: (a) any entity in which the vendor owns more than fifty percent (50%) of the voting stock; (b) any individual, entity or group of principal owners or officers who own more than fifty percent (50%) of the voting stock of the vendor; or (c) any entity whose voting stock is more than fifty percent (50%) owned by the same individual, entity or group described in clause (b). In addition, if a vendor owns less than fifty percent (50%) of the voting stock of another entity, but directs or has the right to direct such entity's daily operations, that entity will be an "affiliate" for purposes of this questionnaire.*

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN: _____

b) a criminal investigation or indictment for any business related conduct constituting a crime under federal, state or local government law including, but not limited to, fraud, extortion, bribery, racketeering, price-fixing or bid collusion or any crime related to truthfulness and/or business conduct?

☐Yes ☐No

c) an unsatisfied judgment, injunction or lien for any business related conduct obtained by any federal, state or local government agency including, but not limited to, judgments based on taxes owed and fines and penalties assessed by any federal, state or local government agency?

☐Yes ☐No

d) an investigation for a civil or criminal violation for any business related conduct by any federal, state or local agency?

☐Yes ☐No

e) a grant of immunity for any business-related conduct constituting a crime under federal, state or local governmental law including, but not limited to, fraud, extortion, bribery, racketeering, price-fixing, bid collusion or any crime related to truthfulness and/or business conduct?

☐Yes ☐No

f) a federal, state or local government suspension or debarment from the contracting process?

☐Yes ☐No

g) a federal, state or local government contract suspension or termination for cause prior to the completion of the term of a contract?

☐Yes ☐No

h) a federal, state or local government denial of a lease or contract award for non-responsibility?

☐Yes ☐No

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN: _____

i) an administrative proceeding or civil action seeking specific performance or restitution in connection with any federal, state or local contract or lease? ☐Yes ☐No

j) a federal, state or local determination of a willful violation of any public works or labor law or regulation? ☐Yes ☐No

k) a sanction imposed as a result of judicial or administrative proceedings relative to any business or professional license? ☐Yes ☐No

l) a consent order with the New York State Department of Environmental Conservation, or a federal, state or local government enforcement determination involving a violation of federal, state or local environmental laws? ☐Yes ☐No

m) an Occupational Safety and Health Act citation and Notification of Penalty containing a violation classified as serious or willful? ☐Yes ☐No

n) a rejection of a bid on a New York State contract or a lease with the State for failure to comply with the MacBride Fair Employment Principles? ☐Yes ☐No

o) a citation, violation order, pending administrative hearing or proceeding or determination issued by a federal, state or local government for violations of:

- health laws, rules or regulations ☐Yes ☐No
- unemployment insurance or workers' compensation coverage or claim requirements ☐Yes ☐No
- ERISA (Employee Retirement Income Security Act) ☐Yes ☐No
- human rights laws ☐Yes ☐No
- federal U.S. Citizenship and Immigration Services laws ☐Yes ☐No
- Sherman Act or other federal anti-trust laws ☐Yes ☐No

p) entered into an agreement to a voluntary exclusion from contracting with a federal, state or local governmental entity? ☐Yes ☐No

[NO FURTHER TEXT ON THIS PAGE]

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN: _____

q) a denial, decertification, revocation or forfeiture of Women's Business Enterprise, Minority Business Enterprise or Disadvantaged Business Enterprise status? ☐Yes ☐No

r) a rejection of a low bid on a federal, state or local contract for failure to meet statutory affirmative action or Minority or Women's Business Enterprise or Disadvantaged Business Enterprise status requirements on a previously held contract? ☐Yes ☐No

s) a finding of non-responsibility by an agency or authority due to a violation of State Finance Law §139-j? ☐Yes ☐No

FOR EACH 'YES' ANSWER TO QUESTIONS 14, items a-s, PROVIDE DETAILS ON ADDITIONAL SHEETS REGARDING THE FINDING, INCLUDING BUT NOT LIMITED TO CAUSE, CURRENT STATUS, RESOLUTION, ETC.

15. DURING THE PAST THREE YEARS, HAS THE VENDOR FAILED TO:

a) FILE RETURNS OR PAY ANY APPLICABLE FEDERAL, STATE OR LOCAL GOVERNMENT TAXES? ☐Yes ☐No

If yes, identify the taxing jurisdiction, type of tax, liability year(s) and tax liability amount the company failed to file/pay and the current status of the liability:

b) FILE RETURNS OR PAY NEW YORK STATE UNEMPLOYMENT INSURANCE? ☐Yes ☐No

If yes, indicate the years the company failed to file/pay the insurance and the current status of the liability:

16. HAVE ANY BANKRUPTCY PROCEEDINGS BEEN INITIATED BY OR AGAINST THE VENDOR OR ITS' AFFILIATES WITHIN THE PAST SEVEN YEARS (WHETHER OR NOT CLOSED) OR IS ANY BANKRUPTCY PROCEEDING PENDING BY OR AGAINST THE VENDOR OR ITS AFFILIATES, REGARDLESS OF THE DATE OF FILING? ☐Yes ☐No

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN: _____

If yes, indicate if this is applicable to the submitting vendor or one of its affiliates:

If it is an affiliate, include the affiliate's name and FEIN:

Provide the court name, address and docket number:

Indicate if the proceedings have been initiated, remain pending or have been closed:

If closed, provide the date closed:

17. DOES VENDOR HAVE THE FINANCIAL RESOURCES NECESSARY TO FULFILL THE REQUIREMENTS OF THE PROPOSED CONTRACT? ☐Yes ☐No

[NO FURTHER TEXT ON THIS PAGE]

STANDARD VENDOR RESPONSIBILITY QUESTIONNAIRE (CONTINUED)

VENDOR FEIN:

State of)
) ss:
County of)

CERTIFICATION:

The undersigned, personally and on behalf of the vendor identified in questions 1-3 above, does hereby state and certify to Battery Park City Authority – State of New York that the information given above is true, accurate and complete. It is further acknowledged that Battery Park City Authority – State of New York will rely upon the information contained herein and in any attached pages for purposes of evaluating our company for vendor's responsibility for contract award and Battery Park City Authority – State of New York may, in its discretion, by means which it may choose, verify the truth and accuracy of all statements made herein. It is further acknowledged that intentional submission of false or misleading information may constitute a felony under Penal Law Section 175.35 or may constitute a misdemeanor under Penal Law Sections 175.30, 210.35 or 210.45, and may also be punishable by a fine and/or imprisonment of up to five years under 18 USC Section 1001 and may result in a denial of contract award or contract termination.

_____	_____
Name of Business	Signature of Officer
_____	_____
Address	Typed Copy of Signature
_____	_____
City, State, Zip	Title

Sworn to before me this _____
day of _____20__ .

_____
Notary Public:
Registration No:
State:

CERTIFICATE OF NO CHANGE

STATE OF ( )

COUNTY OF) ss.:

The undersigned, being duly sworn, deposes and says:

1. I am _____, the _____ (title) of _____ (hereinafter the "Contractor"), which is currently submitting an amendment to a State Contract.

2. Contractor previously submitted the completed Battery Park City Authority Standard Vendor Responsibility Questionnaire, dated _____ in connection with another State Contract.

3. Attached is an accurate and true copy of such previously submitted Standard Vendor Responsibility Questionnaire.

4. I hereby certify that with the exception of the information specified in Question 12, and as changed herein, there has been no material change in the information pertaining to the Contractor specified on such attached Questionnaire.

AUTHORIZED CONTACT FOR THE PROPOSED CONTRACT:

Name & Title: _____
Telephone Number: _____
Email: _____

_____
SIGNATURE

_____
PRINT NAME

_____
TITLE

Sworn before me this
_____ day of_____, _____

_____
Notary Public



QUALIFICATION FORM B-2

STATE FINANCE LAW CERTIFICATIONS

Offerer's Affirmation of Understanding of and Agreement pursuant to State Finance Law §139-j(3) and §139-j(6)(b)

Offerer affirms that it understands and agrees to comply with the procedures of Battery Park City relative to permissible Contacts as required by State Finance Law §139-j(3) and §139-j(6)(b).

By: _____ Date: _____
(Signature)

Name: _____
(Printed)

Title: _____

Contractor Name:
_____
(Company)

Contractor Address:
_____

[NO FURTHER TEXT ON THIS PAGE]

Offerer's Certification Of Compliance With State Finance Law §139-k(5)

I certify that all information provided to Battery Park City Authority, its subsidiaries and affiliates with respect to State Finance Law §139-k is complete, true and accurate.

By: _____ Date: _____
(Signature)

Name: _____
(Printed)

Title: _____

Contractor Name: _____
(Company)

Contractor Address: _____

[NO FURTHER TEXT ON THIS PAGE]



QUALIFICATION FORM B-3

STATEMENT OF NON-COLLUSION

I. By submission of this Proposal, Proposer and each person signing on behalf of Proposer certifies, (and in the case of a joint Proposal each party thereto certifies) as to its own organization, under penalty of perjury, that to the best of his knowledge and belief:

A) The prices in this Proposal have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Proposer or with any competitor.

B) Unless otherwise required by law, the prices which have been quoted in this Proposal have not been knowingly disclosed by the Proposer and will not knowingly be disclosed by the Proposer prior to opening, directly or indirectly to any other Proposer or to any competitor.

C) No attempt has been made or will be made by Proposer to induce any other person, partnership, firm or corporation to submit or not to submit a Proposal for the purpose of restricting competition.

II. A Proposal shall not be considered for award nor shall any award be made where sub-paragraphs IA, IB, and IC above have not been complied with provided however, that if in any case Proposer cannot make the foregoing certification and the Proposer shall so state and shall furnish with its Proposal a signed statement which sets forth in detail the reasons therefore. Where sub-paragraphs IA, IB, and IC above have not been complied with, Proposal shall not be considered for award nor shall any award be made unless the Authority determines that such disclosure was not made for the purpose of restricting competition.

The fact that a Proposer (a) has published price lists, rates, or tariffs covering items Being procured, (b) has informed prospective customers of proposed or pending Publication of a new or revised price lists for such item, or (c) has sold the same items To other customers at the same prices being proposed, does not constitute, without more, a disclosure within the meaning of paragraph A above.

III. This Proposal, if made by a corporate Proposer, shall be deemed to have been authorized by the board of directors of the Proposer and such authorization shall be deemed to include the signing and submission of the Proposal and the inclusion thereof of the statement of non-collusion as the act and deed of the corporation.

(Insert Name of Proposer and **Sign Below)**

By: _____

(PRINT Full legal name of person, firm, partnership, or corporation**)**

STATEMENT OF NON-COLLUSION (CONTINUED)

_____

(Signature)

_____

(Address**)**

_____	_____	_____
Corporate I.D. Number	**Federal I.D. Number**	**Date**

If the Proposer is an **individual,** the Proposer's legal residence is as follows:

_____	_____	_____
Street Address	City	State

If Proposer is a **Firm or Partnership,** complete the following:

NAME OF MEMBERS OR PARTNERS	LEGAL RESIDENCE
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

STATEMENT OF NON-COLLUSION (CONTINUED)

If Proposer is a **Corporation**, complete the following:

NAMES OF ALL OFFICERS

President	
Vice President	
Secretary	
Treasurer	
Title	

[NO FURTHER TEXT ON THIS PAGE]

QUALIFICATION FORM B-4

DISCLOSURE OF PRIOR NON-RESPONSIBILITY DETERMINATIONS

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

_____

Address:

_____

Name and Title of Person Submitting this Form:

_____

Project Name:

_____

Date: _____

1. Has any Governmental Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please check box):

☐No ☐Yes

If yes, please answer the next questions:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j (Please check box):

☐No ☐Yes

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Governmental Entity? (Please check box):

☐No ☐Yes

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

DISCLOSURE OF PRIOR NON-RESPONSIBILITY DETERMINATIONS (CONTINUED)

Governmental Entity:
_____

Date of Finding of Non-responsibility: _____

Basis of Finding of Non-Responsibility:

(Add additional pages as necessary)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information?

(Please circle):

☐No ☐Yes

6. If yes, please provide details below:

Governmental Entity: _____

Date of Termination or Withholding of Contract: _____

Basis of Termination or Withholding:

(Add additional pages as necessary)

Offerer certifies that all information provided to the Governmental Entity with respect to State Finance Law §139-k is complete, true and accurate.

By: _____ Date: _____
(Signature)

Name: _____
(Print)

Title: _____

QUALIFICATION FORM B-5

FINANCIAL INFORMATION SUMMARY

Entity Name:_____

Project Role: _____

		2020[1] (Year End)	2019[1] (Year End)	2018[1] (Year End)
Income Statement				
A	Gross Revenues			
B	Cost of Sales			
C	Gross Profit (A-B)			
D	Operating Expenses			
E	Earnings Before Interest and Taxes			
F	Interest			
G	Taxes			
H	Earnings Before Interest, Taxes, Depreciation and Amortization			
Balance Sheet				
A	Current Assets			
B	Inventories			
C	Goodwill/Intangibles			
D	Total Assets			
E	Current Liabilities			
F	Short-Term Debt			

		2020[1] (Year End)	2019[1] (Year End)	2018[1] (Year End)
G	Long-Term Debt			
H	Total Liabilities			
I	Net Worth (D-H)			
Cash Flow Statement				
A	Cash Flow From Operations			
B	Net Cash Flow from Investing Activities			
C	Net Cash Flow from Financing Activities			
D	End of Year Cash and Cash Equivalents			
Other				
A	Financial Statement Currency			
B	USD: Local Currency Exchange Rate			
C	Ratings (e.g. Fitch Ratings, Moody's Investors Service, and S&P Global Ratings)			

[1] *Express in millions (000,000) of US dollars. Where applicable, companies should indicate the conversion to US dollars, using the average periods' exchange rate for income statements and cash flow statements, and for period end exchange rate for balance sheet times. The local currency and exchange rate used should be identified, if applicable.*

QUALIFICATION FORM C

REFERENCE INFORMATION FOR KEY ENTITIES

Name of Proposer/Key Entity:

Title of Referenced Project:	
Description of the Services Provided:	
Percentage of Overall Project Work Performed by Entity: %	
Reference Owner Name: Contact Name: Email: Phone:	
Contract Amount:	**Other Completion Milestones** Description: Proposed: Actual/Projected: Description: Proposed: Actual/Projected: Description: Proposed: Actual/Projected:
Contracting Method:	
% Complete: %	
Substantial Completion Proposed: Actual/Projected:	
Final Completion Proposed: Actual/Projected:	

QUALIFICATION FORM D

SAFETY QUESTIONNAIRE

(a) Safety Performance

Contractor Description	2016	2017	2018	2019	2020
Average number of employees.					
Number of fatalities. *(OSHA 300 Log column G total)*					
No. days away from work cases, or cases with job transfer or restrictions, or both. (OSHA 300 Log column H & I totals)					
Other recordable cases - medical only; without lost or restricted workdays. (OSH 300 Log column J)					
Total recordable cases (OSHA 300 Log totals of columns G, H, I, & J)					
Total hours worked					
OSHA Total Recordable Incident Rate (TRIR) (Total recordable cases per 200,000 hours worked)					
OSHA Lost Workday Case Incident Rate (TCIR) (Days away cases per 200,000 hours worked)					

SAFETY QUESTIONNAIRE
(CONTINUED)

(b) Safety Violations

List all OSHA (or other health and safety agency) violations issued against any company or organization on the Proposer's team since January 1, 2016.

i.	Team Member:	
	Date of Offence:	
	Description:	
	Info attached?	☐ (Yes/No) - attach further description to Proposal if necessary.
ii.	Team Member:	
	Date of Offence:	
	Description:	
	Info attached?	☐ (Yes/No) - attach further description to Proposal if necessary.
iii.	Team Member:	
	Date of Offence:	
	Description:	
	Info attached?	☐ (Yes/No) - attach further description to Proposal if necessary.
iv.	Additional Offences?	☐ (Yes/No) - attach further description to Proposal if necessary.

(c) Safety Performance – EMR

Provide Worker's Compensation Experience Ratings on the table below.
• If General Contractor is structures contractor and/or excavation contractor then please state 'N/A' or '0' in cells that are not applicable.

SAFETY QUESTIONNAIRE (CONTINUED)

• Final two blank columns are for Proposer to identify (insert name & construction discipline) any other team member company/organization that will be performing over 20% of the project's construction work.
• Include endorsement page from your latest insurance policy, or have your insurance carrier/broker provide this information on their letterhead. In the 'Endorsement' column indicate 'Attached' to say that it is included in your Proposal.

Proposer's Team Member	Endorsement*	2016	2017	2018	2019	2020

☐ If EMR exceeds 1.00 in any of the cells above, attached an explanation with Proposal (Attached/N/A)

(d) OSHA Violations

Provide information and details below for any serious violations of the Occupational Safety and Health Act, as provided in Part 1 (commencing with Section 6300) of Division 5 of the Labor Code, settled against any member of the Proposer's team:

Proposer team member:	
Details	

Proposer team member:	
Details	

SAFETY QUESTIONNAIRE (CONTINUED)

Proposer team member:	
Details	

Additional cases submitted as an attachment to the Proposal (Yes/None) ☐

[NO FURTHER TEXT ON THIS PAGE]