
Design Narratives

Enclosed are the 30% Design Development Narratives to complement the 30% Design Document Package.

These consist of the following:

- 1) **Geotechnical Design and Analysis** (as performed and documented by Oweis Engineering, Inc.)
- 2) **Mechanical, Electrical, and Plumbing Design and Sustainability** (as performed and documented by W. Allen Engineering, PLLC)
- 3) **Civil Design and Sustainability** (as performed and documented by Magnusson Klemencic Associates)
- 4) **Landscape Architecture Design and Sustainability** (as performed and documented by AECOM and SiteWorks)
- 5) **Architectural Design and Sustainability** (as performed and documented by Thomas Phifer & Partners)



September 24, 2019

AECOM
605 3rd Avenue
New York, NY, 10158, USA
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RE: GEOTECHNICAL SUBMITTAL
SBPC 30% Submittal
Manhattan, New York

For the 30% submittal, the geotechnical investigation results including the as drilled boring location plan and typed boring logs are presented. The investigation included drilling nine borings (B-1 through B-8 and B-11). The investigation was conducted in May 2019. It should be noted that two more borings (B-9 and B-10) will be drilled upon MTA approval and their corresponding details will be presented in the next submittal.

The borings were drilled using CME-75 drilling rig and rotary drilling technique. Soil samples were obtained using techniques and equipment in general accordance with the American Society for Testing and Materials (ASTM) Standard Specification D1586-Standard Penetration Test (SPT). All samples were described in the field according to the Burmister Soil Classification Method and assigned a Material Classification in accordance with the requirements of the NYC Building Code. This information will be utilized to prepare geotechnical recommendations for final design of the proposed structures to be summarized in a report.

The geotechnical analyses is ongoing and dependent upon receipt of concept design information from the project team. It is anticipated that the geotechnical report will be completed in 4 to 6 weeks upon receipt of the required information.

30% MEP Design Narrative

Sustainability:

The systems described within reflects the level of effort in design and systems that are required in order to achieve the ILFI net carbon certification and achieve a 38% efficiency above the baseline system as defined in ASHRAE 90.1-2010. Building energy simulation models shall be performed to verify and document the efficiency improvement of the system proposed within over the baseline system and additional measures maybe implemented to achieve the efficiency target specified above. In the case that a geothermal system is unfeasible, a VRF Heat Recovery system with supplemental electric heat or a comparable system shall be implemented. Additional measures shall be explored in conjunction with the alternate systems to achieve a more modest 25% efficiency improvement above the baseline system as defined in ASHRAE 90.1-2010.

HVAC Summary:

The Pavilion is a 2 story structure with a roof public assembly area and a Mezzanine floor that will be primarily used as a mechanical space. The structure will be concrete structure with both outdoor and indoor spaces. Please refer to the architectural narrative for additional space and detailed occupancy information. The outdoor design weather data informing the design will be based on Newark Intl Airport TMY3 weather observations located at Lat 41 deg & long -74.18 deg. The ASHRAE 1% cooling design conditions are 91.1 F DB & 73.1 F WB the ASHRAE 99.6% heating conditions are 12.3 F DB & 8.92 F WB. The HVAC system shall be designed in accordance to the following codes and guidelines:

- The overall system shall comply with NYC Building code 2014.
- Energy code compliance shall be in accordance to NYC ECC 2016 and the current ASHRAE 90.1-2013 or later version enforced at time of filing should a grace period not be granted.
- Heating and cooling load calculations will be based on ASHRAE/ANSI 183 standards.
- Space ventilation requirements shall be in accordance to NYC MC 2014 and the ASHRAE 62.1.
- Refrigerant safety shall be in accordance to ASHRAE 15 standard.
- Energy modeling shall be in accordance to ASHRAE 90.1-2010 Appendix G.
- HVAC and utilities shall comply with the flood zone requirements of the 2014 NYC Building code appendix G.

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HVAC System Overall Description:

The HVAC system shall, upon verification of site suitability, utilize a shallow horizontal geothermal loop system to be located within the limits of Wagner Park. The loops shall be made of High Density Polyethylene material and shall be located within trenches at an approximate site elevation of +4' with the existing grade elevation at +10' approximately. Trenches will be over excavated in order to control soil conditions and backfill with the proper soil to enhance thermal conductivity and system reliability. Thermal transfer enhancing grout shall be used when possible to enhance the heat transfer within the geothermal loop. The system shall be provided with a duplex pumping station within the building. The pumps shall be controlled via VFD drives and shall operate to optimize the heat transfer of the loop, reduce piping and material erosion as well as reduce the buildup of debris within the coil. The system shall also be provided with a duplex strainer to facilitate cleaning and eliminating downtime. The loops shall be provided with a propylene glycol make up system at 16% by volume. The internal building water loop shall be hydraulically decoupled and shall utilize smaller ECM pumps for each individual condensing unit.

Systems & Zoning:

Based on preliminary HVAC load estimate the following zoning will be implemented. A water source heat pump will be utilized one for the restaurant and the dining areas, another unit shall be used for the community room and BPC space at the street level, and a third unit shall be used for the public bathrooms and all other publicly accessed conditioned space. Equipment shall be selected based on peak load and part load efficiencies. The community room and restaurant areas shall have a perimeter radiant heating system utilizing a refrigerant to water heat pump and a small auxiliary electric boiler tied into their respective systems. Demand control ventilation shall be used in the community and restaurant spaces. An exhaust fan shall be provided for occupied storage, janitor's closets and other auxiliary spaces and tempered OA shall be provide to those space. Mechanical spaces and elevator hoists shall each have an exhaust fan to control temperature and in the case of elevator machinery limit humidity exposure to the manufacturer's specified limits.

Community room Interior Environment:

The HVAC system for the community room shall be designed for 40 NC noise criteria level and shall provide a comfortable indoor learning environment.

Back UP Electric Heat:

Back up electric unit heaters shall be provided in the water meter room/sprinkler room, RPZ room, and the geothermal system room.

Kitchen & Restaurant HVAC:

The condensing unit for the kitchen and restaurant shall be installed and the unfinished spaces shall be provided with refrigerant piping taps for the indoor AHU's. The kitchen shall be provided with an up-blast kitchen exhaust fan UL listed for high temperature applications with a variable speed control system and an indoor make-up air unit shall have electric heating and VFD. The approximate air flow rate of the kitchen exhaust is 8,500 CFM +/-, this figure is based on preliminary report from the kitchen consultant; relief air from the dining area shall be used as part of the makeup air to the kitchen space via transfer ducts to reduce OA loads. The exhaust hood shall be specified as part of a performance specification package and shall be specified with energy recovery filter system similar to those manufactured by ACCUREX to pre-heat domestic water for the restaurant's DHW system. The exhaust and make up ductwork taps shall terminate immediately into the kitchen space for future tenant fit-out.

HVAC Controls:

The HVAC system shall be provided with a BACnet BMS system capable of being accessed remotely, further details of the system shall be provided in the upcoming submission.

Plumbing system Summary:

The plumbing system shall serve the entire building and shall be provided with a dedicated 3" water service with an RPZA located at the park level, above the design flood elevation, in a dedicated room to be coordinated with the architect. The incoming water shall be sub-metered and separately tally the restaurant consumption, BPC consumption, and Wagner Park's consumption and report to the BMS system. A 6" sanitary connection shall be provided having two separate traps one dedicated to the kitchen's use and the other for the remainder of the building fixtures. A 6" storm connection at 2% slope shall be provided and routed to the on-site storm detention cistern for the water re-use system. The

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sanitary and plumbing lines shall be provided with backflow preventers to prevent the backflow of storm water into the space.

Kitchen & Restaurant Plumbing:

The kitchen shall be provided with a 2" DCW stub, 6" sanitary connection with dedicated trap, and a grease interceptor. The purpose of providing the grease interceptor is to limit any potential damage that can occur from trenching to the dry flood-proofing that will be implemented in the pavilion. Floor drains and connection shall be provided in strategic location in coordination with the kitchen consultant to limit the need for additional plumbing lines that may require slab demolition and patch work on the dry flood-proofing. Performance specification shall be provided for the DHW heating system to provide the maximum benefit of the water source heat pump.

Fire Protection Summary:

The structure will be provided with a hydraulically calculated sprinkler system in accordance to NFPA 13-2007 as amended by the 2014 NYC Building code appendix Q. The building contains multiple hazard classifications, the kitchen loading dock and possibly the mechanical spaces on the mezzanine floor shall be considered a class 1 ordinary hazard space and shall be provided with a coverage density of 0.15 GPM/SF and the remaining spaces shall be considered light hazard and provided with a coverage density of 0.10 GPM/SF. The applicable stream hose allowances shall be applied to the hydraulic calculations for system sizing. Covered outdoor spaces shall be evaluated for the fire hazard and shall be provided with sprinkler coverage as required. The following assumptions are made:

- No hazardous chemical storage above the quantities allowed in the NYC FC will be onsite.
- The loading area shall not be used to repair any BPCA vehicles or be used to store additional battery replacements for the electric vehicles.

The system shall be monitored via a fire alarm panel and the sprinkler system shall have 6 zones. The kitchen area, the dining room and public spaces at the south, the community room and the public spaces at the north, the north and south mechanical mezzanines each shall be considered a separate zone and the sixth zone shall be dedicated to the storage spaces on the street level. The sprinkler system shall have an incoming 3" fire service protected with DCVA and coordinated with the Civil design team, final calculations to be confirmed at a later submission. City street pressure should be determined via a hydrant flow test at the earliest possible time to inform the design.

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Electrical Systems & Design Criteria for Electrical Systems:

Reference Standards

The following codes and guidelines will be the basis of design of the electrical systems for the subject project:

1. The 2014 building code of the City of New York
2. NEC 2008
3. 2016 New York City Energy Conservation Code
4. NFPA 72 National Fire Alarm and Signaling Code
5. New York City Fire Department Regulations
6. Con Edison requirements for electrical service
7. Verizon requirements for telephone service
8. All local laws that might apply

Electric Service:

A new electric service shall be requested from Con Edison. Based on building area of 22,500 square feet plus Wagner Park, a minimum of 2000 Amps will be required. The load is based on 2-watts per square foot for lighting and 1- watt per square feet for receptacles and 15-watts per square feet for mechanical loads, plus 25% spare capacity.

An electrical switchboard will be provided on the mezzanine level to have two means of egress to comply with NEC 2011 code.

The utility company shall be requested in writing and through coned website for the new service. The letter includes the following data: (1) total load for summer and winter, (2) breakdowns of motor loads, (3) size of the largest motor, to confirm maximum size of motor starting across the line.

The utility company shall be requested: (a) to inform the maximum short circuit current available, (b) to confirm maximum size of motor starting across the line. It is anticipated that the new electrical service shall enter the building from battery place. Please refer to a preliminary one line diagram and electrical

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room layout in appendix A, Sk-1 Legend and Abbreviations, SK-2 Electrical Room Part Plan & SK-3 Electrical One Line Diagram.

The building will have three Service switches each will be metered separately and with TVSS protection at incoming service. Each Service switch will be serve the space as follow: 1- Wagner park, 2- restaurant and 3- community area. All power rises and electrical and telecom service incoming shall run and coordinated with the Architect so that main rooms are aligned, as much as possible.

Distribution System

Main distribution system shall be provided for each service switch as required to supply power to all lighting, receptacles, mechanical equipment, kitchen equipment, park equipment, low voltage systems and other loads throughout the building.

The power distribution equipment shall be installed primarily in the Main electrical meter Room on the mezzanine. Panels will be provided throughout the building as required to serve the loads provided.

Power will be provided to (3) car charging stations at the loading dock exact location will be coordinated with the architect.

Corridors, Lobbies, Places of Assembly, and Mechanical Rooms will be provided with the following minimum receptacles:

- Receptacles for maintenance, 20 Amp, 125 Volts, specification grade, duplex type, will be provided so that all areas in the spaces are accessible by a 50' extension cord.

A. Emergency Power

For emergency power, Provide emergency lighting fixtures connected to a power source recognized by the NYC Electrical Code Section 700-12 (Typically emergency drivers with built-in battery for LED fixtures throughout the building places of assemblies, utilities room and stairs and battery back-up for exit signs).

The emergency lighting fixtures in assembly spaces, elevator lobbies and paths of egress shall be controlled via occupancy sensor and a sensing circuit will be provided off the local electrical panel. A key operated test switch shall be wired into the control circuit

B. Temporary Light and Power

For the construction period, a temporary light and power system shall be provided. It shall consist of distribution boards with all necessary feeders, panels, and branch circuits. The temporary light and power riser consisting of feeders and vertical conduits shall terminate in cut out boxes.

C. Interior Building Lighting controls

Per NYCECC 2016 all lighting will be automatically controlled by programmable control panels for each space as required. Motion sensors and sensors for daylight harvesting will control the lighting throughout the building. Lighting controls shall be provided for each space per NYCECC 2016.

Emergency lighting will be provided for corridors, public assembly areas and stairs to illuminate the path of egress. All electrical and mechanical equipment rooms will be also covered by emergency lighting.

Illumination levels required for emergency lighting will be as follows:

Places of Assembly:

-General	1 FC measured at the floor
-Aisle	2 FC measured at the floor
-Exit Doors	2 FC measured at the floor
-Corridors, exits, exit discharges	2 FC measured at the floor
-Exterior exit lights immediately adjacent to the exit doorways	5 FC measured at the floor
-Safe Areas, including all stairs,	5 FC measured at the floor

Exit lights will be installed on every exit as determined by the Architect. In addition, illuminated exit signs will be provided at spaces intersections and changes of direction. Exit signs shall be in accordance with section BC1101 of the 2014 Building Code. Means of egress will be clearly marked by

illuminated exit signs with eight (8") inch letters so that exits and paths of egress are easily recognized from any point in a corridor or place of assembly.

Exit lights signs shall have "LED" source.

Exit signs will be coordinated with fire alarm strobes so that a minimum separation of five (5') feet is maintained.

D. Exterior Lighting controls:

Perimeter and site lighting will be provided to enhance the building security for after hours and evenings periods. The illumination levels will conform with NYCEEC 2016 and will consist of LED wall packs above all exits and along the perimeter of the building:

- All Entrances and Exits: 1.0 foot-candle (average maintained).
- Building Perimeter: 1.0 foot-candle (average) to a 15-foot depth.

Exterior lighting at the egress path to be provided with a built-in battery (emergency source) as per code.

Lighting Control: All site security lighting will be master controlled by a programmable lighting controller and photocell.

E. Equipment Power Supply

Electrical power shall be provided to elevators, kitchen equipment, motors and other mechanical equipment requiring electric power including air conditioning, kitchen ventilation and exhaust. Unless a disconnect switch/starter/pushbutton is integrated with the motorized equipment, disconnect switches, starters and remote pushbuttons shall be provided.

F. Fire Detection and Alarm System

A fire detection and alarm system integrated with DACT shall be provided in accordance with NYC 2014 Building Code and NFPA.

The fire alarm system will be fully supervised, microprocessor based system with individually addressable devices and Temporal 3 coding scheme. The system will be monitored by a Fire Department approved Central Supervisory Station via dedicated phone lines.

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The fire alarm system main components will be:

- A. Fire Alarm Control Panel (FACP) located in the main entrance of the community room.
- B. Remote annunciators located in the restaurant entrance, to provide visual indication of type of device in alarm.
- C. The fire alarm peripheral devices will include manual pull stations, area smoke detectors, heat detectors, duct smoke detectors, smoke/fire dampers, sprinkler water flow/pressure/temper alarm switch, audible/visual annunciators, air handling systems controls, elevator recall, door holder and release controls.

The fire alarm system will interface with other building systems for specific functions:

- A. HVAC equipment for fan shutdown.
- B. Elevators for recall.
- C. Sprinkler system for monitoring.
- D. Kitchen hood suppression system for monitoring.
- E. Fire/smoke dampers in smoke exhaust ductwork for monitoring.
- F. Fire/smoke dampers in regular ductwork for monitoring.

Fire alarm wiring shall be installed in rigid galvanized steel conduit within 8 feet of finished floor in areas subject to mechanical damage; everywhere else, the fire alarm conduit is to be installed in electric metallic conduit (EMT) and shall be installed in galvanized conduit on street level where under the flood zone.

G. Telephone Cabling System

A telephone and intercom cabling system will be provided. The main distribution frame racks and other system hardware will be located in the Telecommunications Room on the mezzanine level. All horizontal telephone cables will be category 6. Riser cables will be 6-strand fiber.

Dedicated phone line cabling shall be provided for elevator intercom and fire alarm systems.

H. Data Cabling System

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The main distribution racks will be installed in the Telecom Room. We are suggesting each of community services space and the restaurant space have their own telecommunication room.

All horizontal data cables will be category 6.

A separate backbone riser will be provided for BACnet BMS system. BMS system shall be coordinated with control consultant.

I. PA System

The system will function as a public address, intercom and program sound system. The main sound system rack will be installed in the Main Telecommunications Room.

Speakers will be provided throughout the building and places of public assembly. For restaurant space and community space, each space shall have its own PA system

J. Grounding System

A code compliant Grounding System shall be provided. The grounding electrode system is code compliant and consists of the formed and bonded together by the metal frame of the building, a ground ring, a concrete-encased electrode, metal underground water pipe and ground rods.

The Main Telecommunication Room shall have a local ground bus and link to the Main Ground Bus at the incoming water service meter room. All low voltage system inside these rooms shall ground to the ground bus of the rooms.

Wagner Park MEP:

Site Electrical:

W Allen Engineering (WAE) is offering its distinctive expertise for the site electrical design for BPCA (South Battery Park Resiliency project). We will review existing lighting data and information available to us and coordinate all action with BPCA Park, NYC DOT and other affected government agencies. We will evaluate the existing lighting system within the project limits to minimize interference with other utilities; and shall prepare new electrical distribution system for the project area. We will coordinate our efforts with Naik consultants for the dry utilities.

The site will require lighting system design which may include safety enhancement and equipment/design upgrade. To proceed with the electrical distribution and lighting controls scope of work, we need information about the new park lighting pole locations and quantities, which shall be provided by the lighting consultant. The final distribution drawing will be coordinated with BPCA Parks for their review and service request from ConEd and Authority having Jurisdiction.

Wagner Park Hydrants and Fountains & possible features:

Wagner Park shall be provided with two water lines to serve drinking fountains, ground hydrants and proposed water features. System pressure at the city water mains will determine if a booster pump system will be required. A hydrant flow test would be required to inform the design.

Water Reuse:

Where possible the recycled water shall be used to provide irrigation to the green roof and provide water for the flush valves within the building.

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Appendix A:

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LEGEND

























SYMBOL	DESCRIPTION
	SERVICE SWITCH AND ELECTRICAL METER
	MAIN DISTRIBUTION BOARD
	FIRE ALARM DISCONNECT SWITCH
	FUSE CUT-OUT

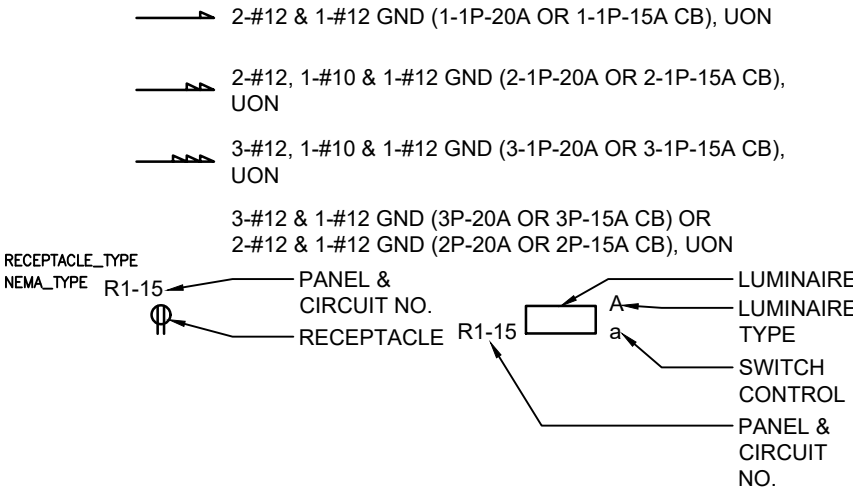
DIAGRAM LEGEND

		MOTOR (x - HORSEPOWER)
		ELECTRICAL METER
		CURRENT TRANSFORMER
		ENCLOSED CIRCUIT BREAKER (AF - FRAME SIZE, AT - TRIP CURRENT RATING)
		CIRCUIT BREAKER (AF - FRAME SIZE, AT - TRIP CURRENT RATING)
		DISCONNECT SWITCH (AS - SWITCH CURRENT RATING)
		FUSED SWITCH (AS - SWITCH CURRENT RATING, AF - FUSE CURRENT RATING)
		GROUND
		LOW VOLTAGE DRAW OUT CIRCUIT BREAKER
		TRANSFORMER (a - PRIMARY VOLTAGE, b - SECONDARY VOLTAGE, c - kVA RATING)
NOTES:		
SOME SYMBOLS MAY NOT BE APPLICABLE FOR THIS PROJECT.		

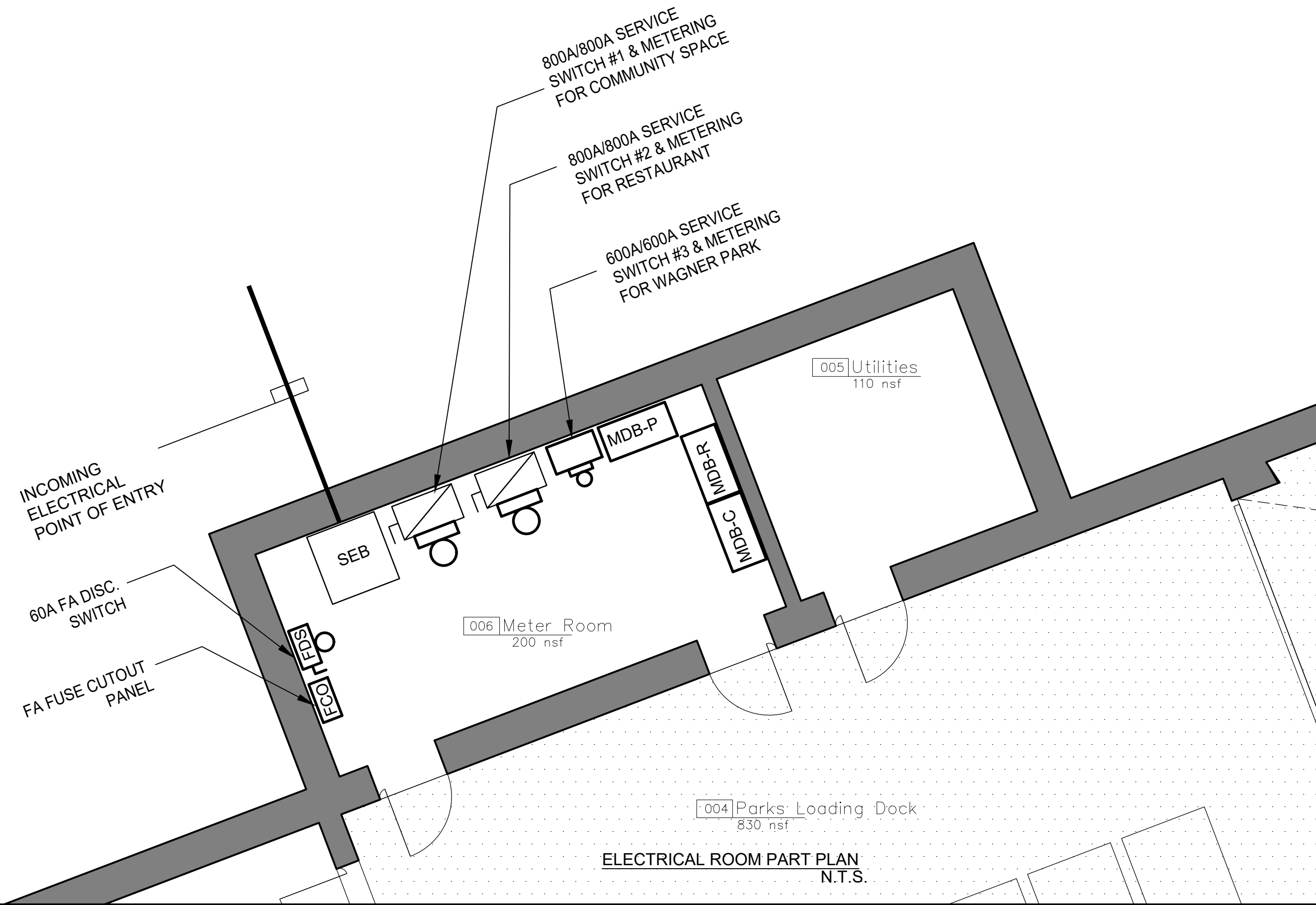
ABBREVIATIONS

MDB	MAIN DISTRIBUTION BOARD
FCO	FUSE CUT OUT
FDS	FIRE ALARM DISCONNECT SWITCH
SEB	SERVICE END BOX

BRANCH CIRCUIT WIRING LEGEND

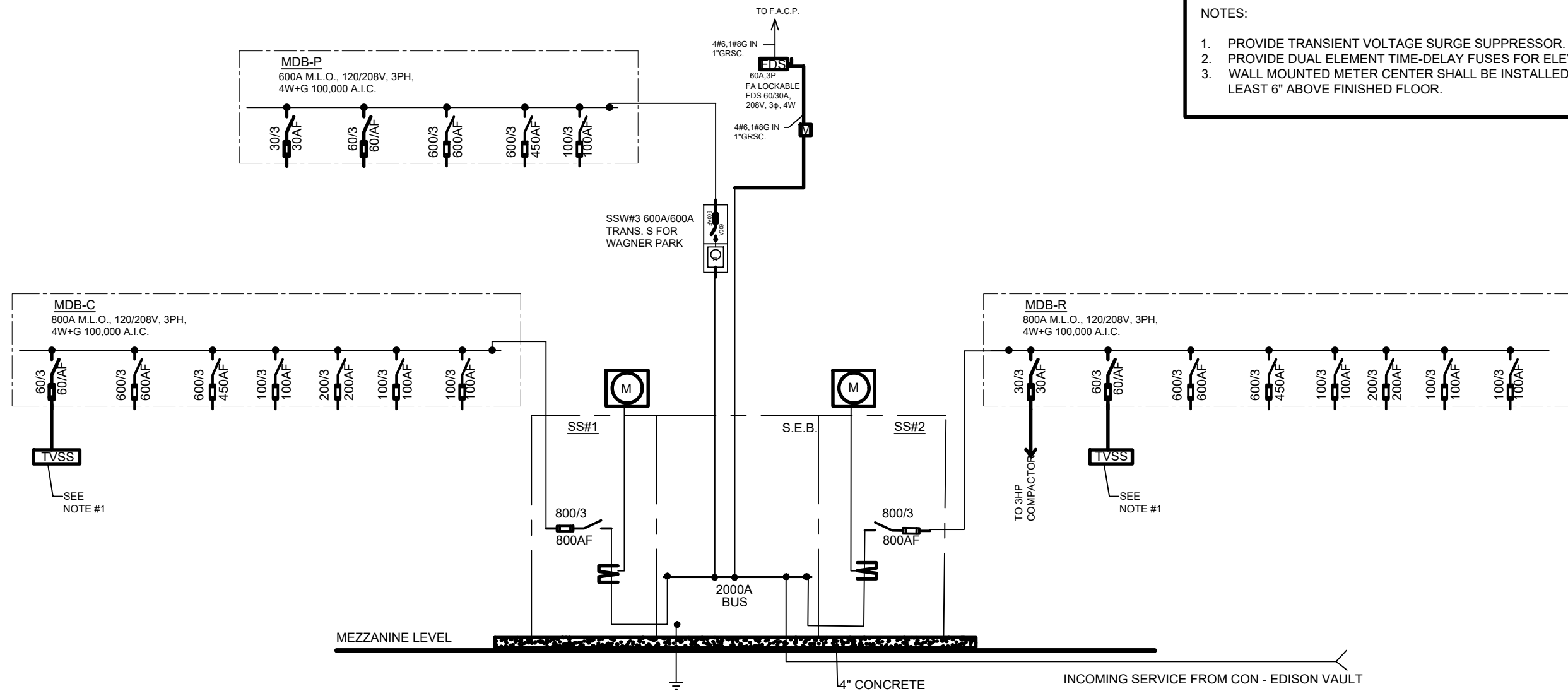


LEGEND AND ABBREVIATIONS
N.T.S.



ROOF

- NOTES:
1. PROVIDE TRANSIENT VOLTAGE SURGE SUPPRESSOR.
 2. PROVIDE DUAL ELEMENT TIME-DELAY FUSES FOR ELEVATOR.
 3. WALL MOUNTED METER CENTER SHALL BE INSTALLED AT LEAST 6" ABOVE FINISHED FLOOR.



ELECTRICAL ONE LINE DIAGRAM
N.T.S.



INTRODUCTION

The South Battery Park City (SBPC) Resiliency Project is a highly urban, coastal flood risk management project for Battery Park City Authority (BPCA) in Lower Manhattan, New York. In 2012, storm and coastal surges from Superstorm Sandy breached Wagner Park and Pier A and inundated the western portions of Lower Manhattan as the water made its way up Route 9A (West Street) and into One World Trade Center and the Battery Park Underpass, impacting much of Lower Manhattan's critical infrastructure.

The goal of this project is to provide Battery Park City and Lower Manhattan with additional protection from future events by designing an integrated flood protection system through the southern portion of Battery Park City (BPC), from 1st Place around the Museum of Jewish Heritage, through Wagner Park and Pier A, and along the north side of The Battery where it will tie into high ground near the intersection of Battery Place and State Street.

This project will advance the conceptual strategies and designs of the SBPC Plan through detailed design and engineering to final construction documents suitable for contractor bidding and construction. The key design elements include a comprehensive flood alignment that will be seamlessly integrated into the public spaces, a new pavilion structure within Wagner Park, and the incorporation of flood risk measures into the landscape.

When construction of this new flood alignment system that will enhance the resilience of a significant portion of southern BPC, West Street and the southwestern Financial District is complete, this project will document this FEMA certified/accredited alignment. When the full Lower Manhattan Coastal Resiliency project is designed, funded, and built, this segment will join the overall alignment to further enhance the flood protection of the project area.

The civil engineering considerations for the project are described below while the 30% Design grading concept is described in the landscape narrative.

SITE DEMOLITION

Prior to Construction, select site demolition activities will commence in order to prepare the site for construction of the proposed improvements. In addition, a final pre-construction meeting shall take place between the contractor, BPCA, the Museum of Jewish Heritage and the Parks Department to confirm which items are to be salvaged and how they shall be stored until they are re-installed. Site demolition of dry utility improvements, including electrical, natural gas and telecommunications, will be documented by the Naik Group.

On-site demolition will include select hardscape and landscape removal in 1st Place and around the Museum of Jewish Heritage to accommodate the proposed flood structure. Several utility lines exist in 1st Place that will cross the new flood alignment which may require the pressure lines (water and dry utilities) to be re-routed under the new flood structure or sleeved through it. The existing 12" water main that encircles the Museum shall remain and be protected in place, except portions of the line will be removed and replaced where more than 1 foot of fill is placed over the line.

Within Wagner Park, most of the hardscape, landscape and utility infrastructure will be removed, except for the portions of the aforementioned 12" water main that will remain in place. The contractor shall work closely with BPCA to determine if any removed items shall be salvaged for their use on this project or other



projects. In addition, it is the team's understanding that the Wagner Park Pavilion houses the irrigation controller that provides irrigation for 12 acres to the north of the project site. This system may need to stay in operation so it will need to be identified and determined what adjustments are needed to continue to operate the irrigation system from Wagner Park.

The design currently intends to maintain the existing curb on Battery Place while replacing the sidewalk surface behind it. The team is also intending to re-use the utility service laterals from Battery Place in order to avoid disturbance of the roadway.

It is likely that excavation will need to extend down to the top of the relieving platform as the design team anticipates a combination of lightweight fill and/or high-density geofoam will be required to offset the weight of the proposed improvements above the relieving platform. This assumption will be confirmed by the structural engineer after further study of the relieving platform. The excavated material shall be analyzed to determine if it is suitable for reuse to reduce and limit truck activities associated with import/export.

Within Pier A Plaza and The Battery, demolition will be limited to excavation associated with the flood structure and utilities needed to serve it such as storm drainage pipes. Once the flood wall foundation elevations are determined and the utility survey is completed, utility crossings will be analyzed to determine if conflicts could occur and how they shall be mitigated. It is likely that some of the existing monuments in The Battery will also need to be relocated. Once the final site plan has been locked down, limits of work will be solidified to confirm which elements and monuments are impacted.

TEMPORARY EROSION AND SEDIMENTATION CONTROL

The visibility of this project, from public awareness and direct visual accessibility, as well as its location adjacent to the Hudson River, elevate the importance of the temporary erosion and sedimentation control practices. Multiple best management practices will be used including stabilized construction access and a concrete truck and pump washout area, silt fence/sedimentation barriers, catch basin inserts, sediment catchment areas with pumped discharge and ground cover practices. Strict maintenance and monitoring criteria will be provided so that the temporary erosion and sediment control systems are in good working order throughout the duration of construction. It should also be noted that temporary erosion and sedimentation control is a prerequisite for achieving SITES certification. Temporary erosion and sedimentation control will be documented by the Naik Group.

FOUNDATION DRAINAGE

A foundation drainage system may be required at footings. If required, the foundation drainage system would consist of vertical drainage material connected to perimeter foundation drainage collection pipes. The collection pipes would convey collected subsurface water to one of the storm drain discharge pipes that connect to Battery Place. A sump and pump may be required if the footing elevations are lower than the storm drain discharge pipe. If that proves to be true, foundation water may be directed to the water reuse system. An underslab or subslab drainage system may also be required and would be hydraulically connected to the perimeter foundation drainage lines. When completed, the geotechnical report will provide requirements for the foundation and underslab/subslab drainage systems.



SITE LAYOUT AND PAVING

Site elements include hardscape which will support both heavy-duty emergency vehicles in 1st Place and medium-duty vehicles, such as a pickup pulling the trailer carrying the deployable stage, at the esplanade. Hardscape will also include site paths that either support light-duty maintenance vehicles or pedestrians. The civil details estimate the pavement sections needed to support the various vehicular loads based on preliminary information from the geotechnical engineer. Final pavement sections will be confirmed in the Geotechnical Report. Refer to Figures 1-3 for Turning Studies of the proposed vehicles and to the Landscape Plans for the proposed materials plan for more information on the exact pavement types.

A couple of the project's key components consist of the flood alignment (see structural plans for more information on the fixed and deployable elements) and the new Pavilion (see architect's plans for additional information on the building).

It is assumed that the existing curb on Battery Place will remain while the sidewalk will be re-paved. Loading activities, refuse and recycling are assumed to occur off Battery Place. The site's topography will be lifted to provide additional resilience that will be accomplished through incorporation of curbs, seat walls, slopes, retaining walls and imported soils.

The landscaped areas will consist of horticultural soil of appropriate depth to serve the proposed planting palette. It is assumed that the horticultural soil will be 18-inches in lawn areas, 24-inches in areas supporting shrubs and 3- to 4-feet in areas supporting trees. See the proposed landscape plans for additional information on horticultural soils as well as site improvements and furnishings including handrails, drinking fountains, trash receptacles, decking, and water features.

STORM DRAINAGE

The goal of the 30% level drainage design is to create a site that treats and slowly releases runoff on the "wet" side and treats, stores, and reuses water on the "dry" side. BPCA has elected to pursue SITES accreditation for the Wagner Park portion of the Project. This manifests itself in different levels of runoff reduction, pollution prevention, and water reuse. SITES benchmarks may ultimately drive the design of the storm system at large.

Generally, precipitation that falls on the "wet" side of the line of protection, the water side of the site, will be treated prior to being conveyed to an aggregate infiltration facility where the water will be stored before it percolates through the soil down to the relieving platform that contains 4-inch diameter weep holes that allow the water to pass through. The infiltration facility will contain a 12-inch overflow pipe that connects to the outfall in 1st Place. Precipitation that falls on the "dry" side of the line of protection, the land side of the site, will be treated prior to being conveyed to an aggregate reuse cistern before connecting to the water reuse room where it will be further filtered and treated prior to reuse. The extent of water reuse is still being developed though the intent is to meet the site irrigation and flush demands.

Regulatory Minimums

The project drainage basins are roughly divided along the Hudson River Greenway, across from Battery Place. Stormwater falling on the west side of the Greenway is conveyed to an existing stormwater main running down the center of Battery Place, that discharges into the Hudson River via a 54" Municipal Separate Storm Sewer System (MS4) in 1st Place. The City of New York has not classified the Hudson River



(along the Project extents) as an Impacted Water Body, therefore, the project will not require treatment of a criteria pollutant.

However, stormwater being directed to the MS4 outfall will be treated as it passes through the landscape vegetation and soil after which it will percolate through a sand layer underlying the landscaped cells. Runoff that does not pass through vegetation will be treated through mechanical means such as a trench drain filter. The intent is that all stormwater runoff from the project site will pass through some form of treatment prior to leaving the site.

New York City Plumbing Code, Section 1101, stipulates that the conveyance system must meet the 5-year, 5-minute storm intensity of 5.95 in/hr. This requirement will be met.

Given these regulatory minimums, BPCA has elected to pursue a more stringent level of stormwater management. The follow sections describe the frameworks guiding the design.

Sustainable SITES

SITES, as mentioned previously, will be the driving framework for much to the stormwater design criteria. Credit 3.1: Manage Precipitation Onsite is a prerequisite that requires the project to retain or treat precipitation to the 60th percentile event which corresponds with a 0.54-inch event.

Credit 3.3: Manage Precipitation Beyond Baseline, provides an opportunity to achieve additional points if precipitation is managed to the following levels:

- Retain or treat precipitation volume corresponding to the following percentile rain events:
 - 80th – 4 points, 0.94 in
 - 90th – 5 points, 1.4 in
 - 95th – 6 points, 1.86 in

Project specific rainfall depths have been calculated using historic NOAA rain gauge data dating back to 1970.

The current storm design depicted on the civil plans addresses the 95th percentile event for BMPs across the site, with additional increases for resilience, as described below.

Climate Change and Resilience

New York City has created a Resiliency Design Guideline for project teams working on projects with an emphasis on resilience. The guideline provides design recommendations that account for future impacts due to sea level rise, increasing rainfall intensities, and more frequent flooding, among other metrics.

The percentage precipitation buildup, as specified in the Resiliency Guidelines is as follows:

- Yearly precipitation baseline - 50.1 in/year
- 2020's increase +10%
- 2050's increase +15%
- 2080's increase +19%
 - In all instances, the high estimate has been chosen, from Table 8 of Appendix B of the Guideline

For this project, yearly rainfall along with sea level rise have been taken into account. The project is being designed to the year 2050 though the current storm design is utilizing the projected rainfall increases associated with 2080. The 2080's percentage increase has been applied to all percentile rain events



mentioned in the SITES minimum section. Therefore, a rain event of 2.21 inches is currently being utilized for BMP calculations.

This rainfall volume may be adjusted for future submittals, pending BPCA approval, project partner inputs, and project team considerations.

Water Quantity Control

The design incorporates a combination of five different flow control and/or treatment BMPs, specifically chosen to fit the constraints of the site:

1. ***Vegetated Roof***

The rebuilt pavilion has 2,000 square feet set aside for a vegetated roof. The vegetated roof is still under development but will provide treating and peak attenuation of rainwater. The treated water will be conveyed to surface planting areas, and eventually to the aggregate cistern for reuse.

2. ***Permeable Pavement***

Permeable pavers will be constructed over an open-graded gravel layer that will allow water to percolate from the surface, through the modular pavers and into the gravel storage layer. The depth of the gravel will vary from 6-12 inches. Paths adjacent to the main lawn will be sloped to drain surface runoff to the permeable pavement areas to the maximum extent practicable. Water will be collected in the gravel layer prior to being conveyed to the reuse cistern.

3. ***Stormwater Infiltration and Treatment Planting Areas***

The stormwater infiltration and treatment areas are depressed landscape areas that will receive surface runoff from adjacent hardscape. These BMPs provide storage for water in a surface, ponding zone (3-in deep); within voids in the treatment soil layer and within the voids of underlying gravel conveyance layer prior to release to one of the two aggregate (cistern/infiltration) storage facilities. Preliminary design of landscape planters assumes a bottom “flat” area that corresponds with the contributing area and water quality treatment volume derived from the New York State Stormwater Design Manual (90th percentile rain event calculation, extrapolated to 2080’s). Note that stormwater “treatment” not only includes filtration through soils but also biological treatment through vegetation interaction within the planting areas.

4. ***Subsurface Reuse Cistern***

On the “dry” side of the line of protection, the current design assumes an aggregate cistern for storage and reuse of captured stormwater runoff. Generally, runoff on the “dry” side of the line of protection will be captured and treated prior to being conveyed to the reuse cistern. The bottom of the cistern is set at elevation 10.00 so that it is placed in a fill condition with the top at elevation 13.00. The cistern is designed with 35% voids and assumes 100% runoff volume from the 2080’s 95th percentile rain event. This results in a 3-foot-deep, 10,000 square foot facility. The cistern will be connected to a water reuse room inside the Pavilion. Stormwater routed to the water reuse room will receive further filtration and treatment prior to reuse. Reused water will be used in subsurface applications. Water balance calculations as well as life-cycle cost calculations will be updated in the next phase.



5. *Subsurface Infiltration Gallery*

A single infiltration gallery for the “wet” side of the project is proposed to manage stormwater and meet SITES criteria. This gallery is situated between the esplanade and the line of protection, is 1-foot deep and encompasses a footprint of approximately 24,000 square feet. The proposed gallery consists of clean, washed aggregate of 1.5-inch to 3-inch diameter rock, with 35% voids assumed for water storage. The volume of the storage facilities is designed to accommodate the 2080's, 95th percentile rain event. As the site plan is still being developed, for the 30% design phase the contributing area has been modeled as impervious surface, therefore 100% of rainfall falling on the site is converted to runoff. Although groundwater is estimated to be at elevation 0.00 (final elevation and infiltration rates will be confirmed in the pending geotechnical report), the bottom of the infiltration gallery has been set at 6.18 feet to maintain 1-foot of separation between the estimated spring high tide level of 5.18 feet in 2050.

For project areas that are too low to be captured and conveyed to the reuse cistern, runoff will be treated prior to release. Stormwater facilities will be refined and resized according to the proposed project's elements between the 30% and 50% design submittals.

Water Quality Treatment

Pre-treatment of stormwater is provided in proposed BMPs prior to entering the underground infiltration gallery and reuse cistern. This pretreatment occurs as water is filtered through the horticultural soil and underlying sand layer. The purpose of pre-treatment is to minimize maintenance of the underground storage BMPs by capturing leaves, debris, trash and detritus materials (that would otherwise be conveyed to the underground storage facilities).

The proposed stormwater design elements will continue to be refined during 50% design. Namely, the proposed stormwater facilities will need to be vetted with the project team, infiltration testing will need to be finalized and recommendations from the Geotechnical Engineer will need to be made and incorporated that consider existing soil strata and the locations of proposed facilities. Additionally, the direction that BPCA decides to take on SITES certification will drive the size of these proposed facilities.

It is assumed that storm sewer manholes will consist of an inside diameter of 48-inch and that storm sewer piping will be ADS HDPE N-12. Additionally, area drains used across the site are assumed to be ADS Nyloplast with domed atrium grates. Trench drains are assumed to be Oldcastle FloGuard+ with FOG absorbent socks. Geotextile fabric will surround the top and sides of the infiltration gallery while the reuse cistern will be wrapped on all sides with an impermeable liner that is currently assumed to consist of Firestone EPDM 30mil or approved equivalent. Backflow prevention devices are assumed to be Tideflex CheckMate UltraFlex inline check valves or approved equivalent.

SANITARY SEWER

An existing 6-inch diameter sanitary sewer lateral extends into the site from the sanitary sewer main in Battery Place. This line will be re-used to serve the site's wastewater discharge. As part of the utility survey, it will be important to investigate the condition of the existing lateral to determine if it is in a condition that is acceptable for reuse.

A new sewer manhole will be placed on the existing line behind the existing curb line. From the manhole, a new 6-inch lateral will stub into the building to serve the Pavilion, restaurant and water reuse room. Separate 6-inch laterals will extend north and south out of the manhole to serve the potential water features on either end of the site.



It is assumed that drinking fountains will be located on-site. If they are placed in reasonable proximity to the water features, they will be connected to the sanitary sewer system. If not, they will be served by drywells. A typical drywell detail is depicted on the civil plans.

It is assumed that sewer manholes will consist of an inside diameter of 48-inch and that sewer pipes will be PVC SDR-35. Refer to the plumbing plans for additional information inside the building.

WATER SERVICE

An existing 4-inch diameter water lateral extends into the site from the water main in Battery Place. This line will be re-used to serve the proposed Pavilion with a sub-meter to indicate the restaurant's water usage. A water meter will be located on the existing line at the opening to Level 1. It is assumed that the backflow preventor will be located inside the building.

An existing 12-inch water loop runs north of the Pavilion before tying into the water main in Battery Place. A portion of this water main will be replaced with a new 12-inch line where fill greater than 1 foot will be placed over the line. The remainder of the site's water needs will be served off this line. A new 6-inch fire service lateral will be installed with a detector check valve assembly (DCVA) located either on-site or in the building. A new 4-inch service lateral with meter and reduced pressure backflow assembly (RPBA) will also connect to the existing 12-inch main to serve the site's exterior water demands including drinking fountains, ground hydrants and water features. A second 4-inch service lateral with meter and RPBA for irrigation will connect to the 12-inch main to provide top-off water for the water reuse system and above grade irrigation.

On the north end of Wagner Park, it is anticipated that an existing fire hydrant will need to be relocated out of the proposed landscape planters. Water pressure and flow rate capacity information has been requested by the design team. If Battery Park City is unable to track down this information, a fire flow test may be needed.

It is assumed that water piping 4-inch and larger will be ductile iron and less than 4-inch will be copper. The locations of all meters, backflow preventers, fire hydrants, post-indicator valves (if necessary), and Fire Department connections will require review by the Utility Department and the Fire Department. Refer to the plumbing plans for additional information inside the building.

DRY UTILITIES

On-site dry utility improvements, including electrical and telecommunications, will be documented by the Naik Group. At a minimum it is anticipated that electrical improvements will be needed to serve the proposed Pavilion building, site lighting, water features, water reuse system and the stage while telecommunications will be needed to serve the Pavilion, water features, water reuse system and the stage. Refer to the electrical plans for additional information inside the building.

30% Project Narrative

Project: South Battery Park City Resiliency Project
Subject: 30% Landscape Architecture Project Narrative
Date: September 24, 2019

Introduction

South Battery Park Resiliency Project is a highly urban and integrated coastal flood risk management project for Battery Park City Authority (BPCA) in Lower Manhattan. This project is one segment of the larger and systemic response of the Lower Manhattan Coastal Resiliency Master (LMCR) Plan. The project area specifically plays an imperative role in the overall flood risk reduction for Lower Manhattan, due to it hosting the lowest existing contours and elevations for coastal surge inundation on the west side. The flood alignment is composed of many different integrated features such as deployables (ranging from flip-up gates to roller gates), buried flood walls, free standing flood walls, and terraced slopes. The project is comprised of 4 main project areas: The Museum of Jewish Heritage, Wagner Park, Pier A Plaza, and The Battery. The legacy designs and the heritage of these cherished public spaces is an important part of the current design process.

The alignment begins on the north side of First Place and The Museum of Jewish Heritage and extends fully across First Place as a flip-up deployable. As the alignment transitions away from First Place, it heads southwest into the landscaped courtyard of the Museum memorial. Existing landscape planters on the north façade of the Museum Memorial will be reconstructed and replaced after the installation of the deployables. As the alignment transitions across the Museum Memorial, there is another flip-up gate across the north facade of the building. The alignment then extends south along the Hudson River side (west) of the Museum. This segment of the flood system is composed of free-standing flood walls that will be integrated into the landscape architecture, terracing, and public use of the space. As the concept moves further south into Wagner Park, and in order to retain view lines and public access to the water front, the flood alignment will transition into a buried flood wall and perform as a passive system below a raised park. Due to the need to meet projected design flood elevations for coastal surge, Wagner Park and the existing pavilion are required to be significantly elevated and redesigned. The buried flood alignment allows all users to occupy the lawn, garden, and public park space. As the concept transitions east into Pier A Plaza (DSBS jurisdiction), the height of interventions to meet the design flood elevations is significantly increased due to Pier A Plaza being the lowest elevation point of the project area. Based on the current use of Pier A Plaza and aesthetics, the conceptual design is considering this segment to be flip up gate deployables that will be nested into the ground and deployed when flood emergencies are declared. Retaining Pier A Plaza's aesthetics of existing materials, hardscape, views to the water, circulation (pedestrian, biking, and vehicular), and programmed use in the new flood design is an important aspect of the Project. Surface treatments or cladding of the gates, columns, or posts will be further developed when the design is carried forward and the manufacturers of these deployables are selected. Posts or columns that seal the edges of the flip up gates when deployed will be needed, but it will not be determined if they will be a permanent feature in the Plaza until the manufacturer of the gates is selected.

The Battery Design Intent

The Battery 30% will be submitted at a later date but the design intent is what follows. As the conceptual design transitions further east out of Pier A Plaza into The Battery it extends into the bikeway on the northern side of The Battery. The design envisions the flood alignment in this section as a combination of flip up deployable gates that allow for existing event vehicular circulation, and exposed flood wall and buried flood wall beneath a landscaped berm. This concept reconfigures the bikeway location as it moves with the landscaped berm, but will split the bikeway and meander as it currently does now to slow down cyclist and provide a pleasant riding experience. This design may require the relocation of two monuments currently situated along The Battery Place sidewalk but the locations being studied were informed by the existing NYC Parks' Monuments plan. As the flood alignment moves west to east, the design flood elevations descend, affected by existing contours and increased distance from the coastal edge. Once the flood alignment reaches the high point in the furthest east section of the Project area, the design will transition down into the existing sidewalks and planters with a series of steps and regrading. Although the grades in this portion of the project area are being elevated to meet design flood elevations, the circulation, landscape architecture, and use of the space will remain as having two bikeway paths and a landscaped public park edge.

Universal Access

A project goal is to provide universal accessibility across the site. In Wagner Park in particular, grade changes are prevalent throughout the park as the site is raised to accommodate the buried floodwall. Through discussions with park and community user groups, community meeting input, input provided by NYC Mayor's Office for People with Disabilities, and the American Society of Landscape Architects best practices for accessible design, we have and will continue to incorporate design changes to park entrances and experiences to provide equal experiences for all. By providing universal accessibility the site will allow for human diversity, social inclusion, and equality for all who might come to the park without the need for adaptation.

SITES Certification Impact to Design

We do not anticipate significant impacts to the approved design because of SITES, however, pursuing SITES Certification is anticipated to require revisions to the design documented in the 30% drawings. SITES certification will impact the design in many ways, the most notable being the selection and sourcing of materials, plants, and site furnishings. The use of non-local materials is discouraged, and the use of native plants and recycled materials is encouraged. Design and site furnishings which encourage active use and on-site energy production are encouraged. SITES certification will also impact the management of stormwater. The landscape architecture team has begun coordinating the development of an integrated stormwater management program with MKA. This will reduce the amount of outdoor water use and manage precipitation on-site.

30% to 50%

Between 30% and 50% Design the landscape architecture team will continue to develop and detail the designs of the battery, Pier A, Wagner Park, and the landscape surrounding the Museum of Jewish Heritage. We will continue to collaborate closely with the full team to identify conflicts and efficiencies. All planned features should be integrated into the design by the 50% submission, including material selection, product selection and location, initial planting palettes, sustainable practices, key design details, and locations for special features such as water features or artwork locations.



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LANDSCAPE ARCHITECTURE NARRATIVE

30% Design Phase

South Battery Park City Resiliency

New York, NY

September 16, 2019

Division 01 – GENERAL REQUIREMENTS

01 56 23 Temporary Paving and Planter Protection

Wood protection shall be provided in areas where existing hex block paving, granite planters and curbing are to remain including areas north, west and east of the Museum of Jewish Heritage and areas adjacent to the Pier Plaza.

01 56 39 Temporary Tree and Plant Protection

Tree protection (individual and grove type) shall be provided within NYC Parks jurisdiction areas

Tree removals within NYC Parks jurisdiction areas will also require tree restitution based on NYC Parks Basal Area Replacement Formula (BARF) calculations and existing tree health.

DIVISION 03 – CONCRETE

03 30 00 Cast-In-Place Concrete

It is anticipated that the project will have a general Cast-in-Place Concrete specification that will be written in coordination with Architecture, Civil and Landscape Architectural disciplines.

Landscape architectural concrete for wall back-up, pavement bases and foundations shall be 3,500 PSI.

03 33 01 Architectural Concrete at Park Areas

Visible cast-in-place concrete shall have a high quality architectural finish obtained by hand rubbed grout finish or by form liner. Architectural concrete work shall include on-site mock-ups.

03 45 01 Precast Architectural Concrete at Park Areas

Visible pre-cast concrete shall be custom fabricated shapes with minimum 5,000 PSI white concrete with controlled admixtures and aggregates. Pre-cast concrete work shall include both factory and on-site mock-ups.

DIVISION 04 – MASONRY

04 20 01 Unit Masonry at Park Areas

Site walls, curbs and steps shall be thermal finish granite unless otherwise noted on the Drawings. Walls shall have solid granite corners with false joints. Between wall corners walls shall have a solid granite cap stones with granite veneer on visible faces. Stairs shall have scored strips with in laid epoxy carborundum strips for traction and visibility. Unit masonry shall accommodate integral step lighting.

DIVISION 05 – METALS



Leveraging design, technology, and building craft to make sites work.

05 53 00 Metal Gratings

Galvanized steel metal gratings and framing at waterside areas.

05 52 13 Pipe and Tube Railings

Park stairs and ramps shall have type 316 stainless steel tub railings.

DIVISION 06 - WOOD, PLASTICS AND COMPOSITES**06 15 01 Wood Decking at Park Areas**

Wood decking and stairs where indicated on the drawings shall be thermally modified ash (or harder wood) with stainless steel fasteners.

DIVISION 07 - THERMAL AND MOISTURE PROTECTION**07 72 73 Vegetated Roof Systems**

Vegetated roof systems shall be light weight soil (Rooflite or similar) depths as indicated on the drawings. Vegetated roof systems shall have a geocomposite drainage board (JDrain 400 or similar) on bottom and sides of off roof planters and shall have the capacity for water detention for stormwater management purposes.

Roof vegetation shall be intensive type vegetation installed at SP4 and #1 Cont. size plantings or larger.

DIVISION 09 – FINISHES**09 91 13 Exterior Painting**

Painted site metals (esplanade railings, etc.) shall be shop coated with an acrylic primer and two coats of alkyd semi-gloss finish paint.

09 93 00 Staining and Transparent Finishing

Wood decking and steps shall have a transparent finish.

09 96 23 Graffiti-Resistant Coatings

Visible cast-in-place, pre-cast granite materials shall have graffiti resistant coatings. Cast-in-place and granite materials shall be coated on site. Pre-cast materials shall be factory coated.

09 98 00 Stainless Steel Protective Treatment

Stainless steel materials will be site coated with Adsil-type material to arrest tea-staining.

DIVISION 13 -SPECIAL CONSTRUCTION**13 12 13 Exterior Fountains**

Site fountain shall be a custom fabricated fountain (by Delta Fountains or similar) with integral computerized controls and remote dial in connections. The fountain mechanicals shall be installed in an in-ground vault or within the park building. The fountain system shall have a palette mounted system with dedicated source water filtration, booster pump, re-circulation treatment system (per NYC DOB Code) and drainage to sanitary.

DIVISION 26 – ELECTIRCAL**26 56 00 Exterior Lighting**

Site lighting shall include high mast mounted LED lighting to provide accent lighting at lawn and garden areas, pedestrian-scaled pole mounted LED lighting along walkways, LED step lighting integrated granite steps, LED lighting integrated into handrails and LED accent lighting at building facade, site walls and specimen plantings.

DIVISION 31 - EARTHWORK – See Civil Narrative**DIVISION 32 - EXTERIOR IMPROVEMENTS**

32 12 16 Asphalt Paving

Milling and resurfacing of Battery Place with a new 2" depth leveling course is assumed. Asphalt pavement repairs are assumed at all roadway curb replacements.

Full depth asphalt (6" aggregate base course, 3" binder and 1 1/2" leveling course is assumed at bikeway areas per NYC DOT. Bikeway areas shall have 4" striping on each outside edge, 4" striped divider line as well as thermal plastic bike symbols and stop lines.

32 13 13 Concrete Paving

Concrete paving is assumed at NYC sidewalk reconstruction areas with 4" depth concrete at sidewalk areas and 7" depth at corners, conforming to NYCDOT requirements. 6" depth integrally pigmented concrete with exposed aggregate finish and custom scoring patterns over a 6" aggregate base for designated locations within Park areas.

32 14 00 Unit Paving

Park area unit paving shall be as indicated.

Hex paving shall be 2.25" asphalt pavers set with neoprene tack coat on a 3/4" bituminous setting bed over a 6" depth concrete paving slab on a 6" aggregate base.

Stone pavers shall be gauged granite, 3" - 4" thick (depending upon size and modulus) with thermal finish set on a 1" wet mortar setting bed with mortared joints over a 6" depth concrete paving slab on a 6" aggregate base.

32 12 43 Porous Flexible Paving

Porous paving shall be open joint precast paving with aggregate filled joints (section 32 14 43) or porous resin-bound stone aggregate paving (section 32 12 43) as indicated on the drawings.

Porous resin-bound stone aggregate paving: 1" depth cold-laid natural stone resin bound paving (Chameleon Ways Addabound surfacing or similar) laid over a 3" depth porous asphalt binder course on a 2" depth no. 8 stone chinking course layer over a 4" depth no. 57 stone base course on an 18" depth no.2 stone subbase. The entire aggregate base assembly (no. 8 stone to no.2 stone shall be encapsulated on the sides and bottom by a 4 oz. non-woven geotextile.

Where porous paving is used over soil cell locations, the pavement aggregate depth shall be reduced to 12" depth.

32 14 43 Porous Unit Paving

Porous paving shall be open joint granite or precast paving with aggregate filled joints (section 32 14 43) or porous resin-bound stone aggregate paving (section 32 12 43) as indicated on the drawings.

Porous unit paving: 3" depth granite or 8,500 psi pre-cast concrete unit paving with aggregate filled joints (no. 8 aggregate) set on a 1 1/2" depth no. 8 stone setting bed over a 4" depth no. 57 stone base course on an 18" depth no.2 stone subbase. The entire aggregate base assembly (no. 8 stone to no.2 stone shall be encapsulated on the sides and bottom by a 4 oz. non-woven geotextile.

Where porous paving is used over soil cell locations, the pavement aggregate depth shall be reduced to 12" depth.

32 17 23 Pavement Markings

Bikeway areas shall have 4" striping on each outside edge, 4" striped divider line as well as thermal plastic bike symbols and stop lines.

Battery Place repaving shall require traffic striping as per NYCDOT

32 17 26 Tactile Warning Surfacing

NYC curb cuts shall have precast concrete detectable warning pavers at curb ramps. BPCA park area curb cuts shall be granite pavers with water jetted detectable warning strips.

32 31 19 Decorative Metal Fences and Gates

Esplanade railings and other heavy duty screen fencing shall be shop galvanized steel tube, bar or plate with a three coat painted finish (see Division 9).

Site walls where required for fall protection shall have panelized type 316 stainless steel decorative metal guardrails with wire mesh and stainless-steel wire rope assemblies.

32 33 00 Site Furnishings

Site furnishings shall include trash receptacles, benches, fixed and loose tables and chairs, bike racks, tree grates at the sloped entry bosque areas, and drinking fountains with high/low configurations for ADA compliance, bottle fillers and dog bowls.

32 84 00 Planting Irrigation

The existing irrigation system within the Wagner Park building, which controls the irrigation of Wagner Park, the Museum of Jewish Heritage landscape and the landscape of the South Cove area shall be split into two separate systems – (1) system dedicated to the landscapes associated with the Museum of Jewish Heritage and the South Cove and (2) a separate Wagner Park system that shall be integrated with the Park's sustainable systems, including storm water capture and re-use

The Museum and South Cove irrigation system scope shall include the tracing, isolation and re-routing of zone control wires and water mains for the Museum and South Cove areas to locations outside of the Wagner Park area. The system separation will require in a location as yet to be determined, electrical, communication and water service, a new controller, RPZ, water filter, booster pump, and flow sensor.

The new Wagner Park irrigation system shall be located within the new park building. The system will require dedicated electrical, communication and water service, a new controller, RPZ, water filter, booster pump, and flow sensor. The system will have both a dedicated potable water source and connection to the on-site storm water collection cistern. The park irrigation system shall consist of pavement mounted ground hydrants, pop up rotary spray at lawn areas and drip tubing at 12"-18" spacing at planting bed areas. Areas where soil cells are indicated shall have drip tubing at 18" on center laid in 3" smooth wall perforated HDPE pipe (ADS Triple wall/Smooth Wall or similar) below porous paving.

Pavement ground hydrants (Murdock M3810 or similar, flush-type locking box freeze protected) shall be located at approximately 100' on-center spacing.

32 91 15 Soil Preparation (Performance Specification)

Planting soils shall be manufactured sand-based soils consisting of a 6" depth sand drainage layer below all planting areas, horticultural subsoil, and planting bed soils, except in areas where soil cells are used, where loam-based soil shall be used. Soil profiles shall be as follows:

Lawn Areas: 8" depth compaction –resistant planting soil, 12" depth horticultural subsoil, 6" Depth horticultural drainage layer

- *Planting Beds (areas without trees):* 3" depth organic mulch, 8" depth planting soil, 16" depth horticultural subsoil, 6" Depth horticultural drainage layer
- *Planting Beds (areas with trees):* 3" depth organic mulch, 8" depth planting soil, 24" depth horticultural subsoil, 6" Depth horticultural drainage layer
- *Silva Cell Areas:* 38" depth sandy loam.

32 91 16 Planting Soil Stabilization

Steeply sloped landscape areas shall be reinforced with polypropylene geofibers blended into the planting soil surface.

32 92 00 Turf and Grasses

New lawn areas shall be turf-type fescue sod mix grown on sand matrix (Tucakhoe Turf Farms or similar).

32 93 00 Plants

As indicated on the drawings. Plants shall be provided with a two year warranty. Allowances for custom growing of specialty perennial plantings, and early sourcing/procurement should be assumed for the project.

32 94 56 Soil Cells

The pavement areas below the tree allees at the building entry ramps shall be installed with a triple layer (45.3" depth) Silva Cell System. The top of the Silva Cells shall be set 12-16" below the finish grade of the porous pavement system. The Silva cells shall be set on a 4" depth compacted base course. Silva cells shall be installed with a loam-based soil (not a manufactured sand-based soil) and with irrigation drip tubing installed within perforated HDPE piping (for ease of servicing and replacement).

DIVISION 33 – UTILITIES

33 46 00 Subdrainage – See Civil Narrative

Exclusions

It is assumed that DIVISION 01–GENERAL REQUIREMENTS will be developed by BPCA staff and shall include the following as work completed in advance of the project start:

01 35 03 Conservation Treatment Procedures

Removal and re-location of existing on-site art work with the BPCA area limits.

32 96 00 Transplanting

Transplanting of existing materials within BPCA area limits

See also LEED other sustainable requirements for the project.

DIVISION 02–EXISTING CONDITIONS

02 42 00 Removal and Salvage of Construction Materials

South Battery Park City Resiliency Project

Wagner Park Pavilion

30% Complete Project Narrative

23 September, 2019

23 Sept 2019

General Description and Program

The pavilion is a two-story structure with a publicly accessible roof and a mezzanine that will be used primarily for mechanical space. It will provide public amenities such as a community room, public restrooms and rooftop decks for viewing the harbor and the Statue of Liberty. It will also provide storage space for BPCA parks maintenance and programming as well as a small informal restaurant. The community room, restaurant and public restrooms are located at the park level of 5585 GSF, while the storage, kitchen and back of house (BOH) services for the restaurant, totaling 7340 GSF are located below the grade of the park, accessed from Battery Place. A small office for parks security located at the south mezzanine level has a view over the park. The program summary is attached.

Sustainability

The building, designed for long-term durability and ease of maintenance, is intended to achieve third party ILFI Zero Carbon certification. Both operational carbon and embedded carbon will be minimized or offset, and the building envelope will be calibrated for maximum energy efficiency. Glass walls at the restaurant and community room facades will be double or triple glazed with low emissivity glass, UV protection and shading provided by substantial overhangs and interior shades; exterior louvers that do not compromise the river views will be evaluated. Controlled daylighting at facades and skylights will be maximized while tempered for glare and seasonal heat gain. Rooftop areas not dedicated to public use will be devoted to a vegetated roof system and energy generating photovoltaic panels.

Accessibility

All spaces in the pavilion are accessible. All park level spaces are approached either from gentle landscaped ramps on the street side or directly from grade on the park side. The street level service areas are accessed directly from sidewalk grade, and an interior ramp leads into the kitchen which is 1'-9" below the level of the entry. Two elevators provide service access to all levels but are publicly accessible only from park level and above. A dumbwaiter links the kitchen at street level to the restaurant at park level and the roof. Three accessible unisex toilets as well as accessible stalls and fixtures in the public toilets are available at park level, as well as two accessible unisex toilets at street level.

Toilets

The pavilion provides 2 unisex toilets at the community room and 2 unisex toilets at the restaurant on park level, and one unisex toilet for parks staff and one unisex toilet for the

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restaurant staff at street level. In addition, two large public restrooms provide 9 toilets for women and 3 toilets and 3 urinals for men at park level. The total fixture count exceeds current code requirements and the existing count as summarized in the attached chart.

Materials

The pavilion will be Type I fireproof concrete construction with architectural finish on the exterior and on the interior of large public spaces. Standard cast-in-place (CIP) finish will be used in BOH areas and bead blasted finish on the treads of egress stairs. Interior partitions that are not cast in place will be concrete block or gypsum wallboard on metal studs. Bathrooms will be lined with ceramic tile. The restaurant fit-out is not included in the scope and will be provided by the tenant. Glass curtain wall at the restaurant and community room facades will be double or triple glazed with low emissivity glass, UV protection and shading. Roof finishes will be a combination of pavers on pedestals for occupied areas and extensive green roof. The finish schedule is provided on sheet A-701 of the drawings.

Next Phase 50% Submission of the Pavilion

For the 50% submission, the team will continue to develop the comprehensive representation of the architectural design and will collaborate to provide locations, dimensions, and details for the structural and MEP systems, full integration with landscape design, sustainable features, product selection and more fully developed architectural details including schedules and finishes.

Wagner Park Pavilion

23 September, 2019- 30% Submission

Program Summary

	Existing Net SF Area	23 Sept, 2019 Net SF Area	Level
Casual Restaurant			
Indoor dining, bar	750	1110	Park
Outdoor dining* (existing in seasonal tent)	1150	1000	Park
*not included in SF total			
Total seated dining area	1900	2110	Park
Restaurant Unisex Toilets (2)	25	80	Park
Service Pantry Upstairs		95	Park
Kitchen, pantry, storage, office	1110	1960	Street
Kitchen staff unisex toilet		45	Street
Trash storage	130	183	Street
Total Enclosed Food Service	2015	3473	
Community Room-multipurpose	0	1140	Park
Community Room Sink and Storage	0	100	Park
Community Room Unisex Toilets (2)		67	Park
Public Restrooms at Park Level	1035	565	Park
Janitor's Closets	50	60	Park
shared)	385	575	Street
shared)	385	730	Street
Parks Loading Area	0	780	Street
Parks Staff Unisex Restroom	0	105	Street
Security Office	0	105	Mezzanine
Total net enclosed space (excl outdoor dining)	3870	7700	Street and Park
Mechanical Space		2211	Mezzanine
Utilities, meter rooms	555	467	Street
Elevators, dumbwaiter	95	129	One level
Gross Areas			
Total Footprint of Enclosed Space at Park Level	7210*	5585	Park
* Existing building without tent			
** New building w/o outdoor covered collector space			
Total enclosed area at street level		7340	Street
Total enclosed space at mezzanine level		3000	Mezzanine
Total Roof Area not incl. open stairwells		6490	Roof
Occupied Roof Deck- 300 people @ 5sf	2625	1500	Roof

Thomas Phifer and Partners

Wagner Park Pavilion, Battery Park City
Summary Occupancy and Toilet Count
190923 30% Submission

Per 2014 Code

Space	Occupancy Category	Occupancy Numbers	Occupant Load in SF	Description	SF Area	WCs Required		WCs Required		Lavatories Req'd		Lavs Required	
						Male	Female	Male	Female	Male	Female	Male	Female
Restaurant-indoor	A-2	74	15	tables/chairs	1110								
outdoor seating		67	15	tables/chairs	1000								
Total		141			2110	1 per 75	1 per 40	1	2	1 per 75		1	1
Community Room	A-3	80	15	tables/chairs	1200	1 per 70	1 per 35	1	2	1 per 200		1	1
Roof Options	A-5	300	5	Standing	1500	1 per 75	1 per 40	2	4	1 / 200	1 / 150	1	1
Restaurant Kitchen	A-2	10	200	gross	1860	1 per 75	1 per 40	1	1	1 per 75		1	1
Parks Storage	S-1, S-2	11	200	gross	2237	1 per 100		1		1 per 100		1	
Subtotal								6	10				
Total Required								16				5	5

Existing Pavilion							Urinals	6					
Public Toilets							Toilets	4	8				
							Sinks					4	9
Restaurant Toilet								1					
Total Fixtures								19				4	9

New Pavilion- number of toilet fixtures exceeds both code required and existing													
Program	Street Level	Park Level	Total										
Restaurant	1 Unisex	2 Unisex											
Community Rm		2 Unisex											
Parks Storage	1 Unisex												
Subtotal Unisex	2	4	6		Prorated		3	3				3	3
Public Toilets							6	9				3	5
Total Fixtures							21					6	8

Wagner Park Pavilion
South Battery Park City Resiliency Project

Zoning Information

Pavilion is located in the Battery Park City Special Purpose District, Park Subdistrict.

Applicable Code: 2014 New York City Building Code

Summary, 23 September, 2019 30% Submission

Chapter 3, Use and Occupancy Classification

Section BC 303, Assembly Group A

Restaurant, A-2, assembly for food and drink

Community Room, A-3, "community hall"

Roof Terrace, A-5, assembly for viewing outdoor activities

Certificate of Operation required for outdoor places of assembly used by 200 persons or more.

Section BC 311, Storage Group S

Storage, S-1 moderate hazard and S-2 low hazard

Chapter 10, Means of Egress

Section BC 1004, Occupant Load

Table 1004.1.12, Maximum Floor Area Allowances per Occupant

Assembly without fixed seats- standing space (on roof terrace)- 5 net sf per person

Unconcentrated (tables and chairs) for restaurant and community space- 15 net sf per person

Kitchen and storage- 200 SF per person

Section BC 1005 Egress Width

1005.1 Minimum required egress width. The total width of means of egress in inches shall not be less than the total occupant load served by means of egress multiplied by .3 inches per occupant for stairways. Multiple means of egress shall be sized such that the loss of any one means of egress shall not reduce the available capacity to less than 50 percent of the required capacity.

[300 people on the roof x .3" = 90 inches or 7'-6" total; each stair from the roof is min. 5' wide

Restaurant service stair from street level to park level for 10 occupants is 5' wide

Parks maintenance stair from street level to park level for 11 occupants is 4' wide]

1007.1 Accessible means of egress required.

Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress are required by Section 1015.1 or 1021.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress. [Two elevators provide egress from roof]

Exception: One accessible means of egress is required from an accessible mezzanine level.

1007.3 Unenclosed exit stairways as permitted by Section 1022.1 are permitted to be considered part of an accessible means of egress.

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1009.4.2 Riser height and tread depth

Stair riser heights shall be 7 inches (178 mm) maximum and 4 inches (102 mm) minimum. The riser height shall be measured vertically between the leading edges of adjacent treads.

Rectangular tread depths shall be 11 inches (279 mm) minimum measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge.

1009.6.2 Outdoor conditions.

Outdoor stairways and outdoor approaches to stairways shall be designed so that water will not accumulate on walking surfaces. In other than occupancies in Group R3, and occupancies in Group U that are accessory to an occupancy in Group R-3, treads, platforms and landings that are part of exterior stairways in climates subject to snow or ice shall be protected to prevent the accumulation of same. [can be snow melt system]

1009.7 Vertical rise.

A flight of stairs shall not have a vertical rise greater than 12 feet (3658 mm) between floor levels or landings.

1014 Exit Access

1014.3 Common path of egress travel

The *common path of egress travel* shall not exceed the following distances for buildings equipped throughout with an *automated sprinkler system* in accordance with Section 903.3.1.1:

- 100' for Business occupancy
- 75' for all other occupancies

1015 Exit and Exit Access Doorways

1015.1 Exit or exit access doorways from spaces

Two exits or exit access doorways required where one of the following conditions exists:

A or B occupancy exceeds maximum occupant load of 49

1015.2.1 Two exits or exit access doorways

Where two exits or exit access doorways are required, they must be placed a distance apart not less than one-half of the length of the maximum overall diagonal dimension of the building or area to be served measured in a straight line between exit doors or exit access doorways.

Exception: Where a building is equipped throughout with an *automatic sprinkler system*, the required separation distance of the exit doors or exit access doorways shall not be less than one-third of the length of the maximum overall diagonal dimension of the area served.

Section 1016 Exit Access Travel Distance

Travel distance within the *exit access* portion of the *means of egress* system shall not exceed the following values for a building equipped with an automated sprinkler system (measured from the most remote point within a story along the natural and unobstructed path of horizontal and vertical egress travel to the entrance to an *exit*):

- 250' for Assembly occupancy

Section 1018 Corridors

1018.2 Minimum corridor width

- 24" for access to mechanical, plumbing or electrical equipment
- 36" for access to a required occupancy capacity less than 50
- 44" for other facilities

1018.4 Dead ends

Where more than one exit or exit access doorway is required, the exit access shall be arranged such that there are no dead ends in corridors more than 20' in length

Section 1023 Exit Passageways

1023.2 Width

The minimum width of exit passageways shall be determined as specified in Section 1005.1 but such width shall not be less than 44" except where occupant load is less than 50.

Section 1027 Exit Discharge

1027.1 General

Exits shall discharge directly to the building exterior at grade or providing direct access to grade. The combined use of Exceptions 1 and 2 shall not exceed 50 percent of the number and capacity of required exits.

Exception 1: A maximum of 50 percent of the number and capacity of interior exit stairways is permitted to egress through areas on the level of exit discharge provided all the following are met:

1.1 Exit free, unobstructed and readily visible

1.2 Entire area is separated from areas below by construction conforming to the fire-resistance rating for the enclosure.

1.3 Egress path protected throughout by approved automatic sprinkler system

30% Design Architectural Outline Specification Wagner Park Pavilion

South Battery Park City Resiliency
New York, NY

24 September 2019 - 30% Design



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INTRODUCTION:

PROJECT DESCRIPTION: The new iconic waterfront pavilion will stand in Wagner Park at the southern tip of Manhattan. The pavilion will accommodate public and private events and includes a community room, public roof terrace, restaurant and parks related support spaces. The architecture of the building is rendered in light architectural concrete with glass facades. The project will be designed meet the sustainable design goals established by the client.

EXECUTION: The design and administration of this project is being completed in cooperation between Architect Thomas Phifer and Partners (TPP) of New York City and AECOM which holds the contract with the Client – Battery Park City Authority. Also cooperating on this project are a team of local and international engineers and experts in various disciplines.

DIVISION 1: GENERAL CONSTRUCTION

QUALITY ASSURANCE AND CONTROL: All activities, actions, and procedures performed before and during execution of the Work shall be performed to guard against defects and deficiencies, deliver the highest quality construction and ensure that proposed construction complies with the Project requirements and Construction Documents. Quality Control measures include testing, inspections, and related procedures during and after execution of the Work. Testing Agencies shall be engaged to perform specific tests, inspections, or both. The Contractor shall be responsible for coordinating and creating samples, shop drawings, manufacturers' literature, and other required information for review by the design team submitted in sufficient time to permit proper consideration and action on same before any materials and items are delivered for the project.

LEED/Sustainable Design: Implement practices and procedures to meet the project's environmental goals.

CODE AND STANDARDS: The above described building shall conform with all applicable Codes, regulations and local norms for projects of a similar kind. Every effort will be made to conform with the highest standards of care and best professional practices.

MOCKUPS: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

DIVISION 2: SITE WORK

Refer to civil and structural specifications.

DIVISION 3: CONCRETE (SEE SAMPLE SPECIFICATION AT THE END OF THIS SECTION)

The scope of the project may include the following items:
Concrete Forming and Accessories, Concrete Reinforcing, Cast-In-Place Concrete, Concrete Samples and Exterior High-Performance Pre-Cast Concrete Assemblies.

Performance and visual mockups for individual products will be required as indicated by the Architect.

See the structural narrative and an Architectural Concrete specification attached to this document.

Architectural concrete finish exposed to view will be included in most spaces of this building (see sample specification attached). This scope includes but is not limited to columns, walls and ceilings. Each element exposed to view shall be of the highest quality conforming to the project drawings and specifications and as accepted by the design and executive architects.

DIVISION 4: MASONRY

The scope of the project may include the following items: Unit Masonry, Exterior Stone Cladding, Stone Paving and Pedestal Mounted Pavers.

Walls separating Mechanical/Electrical spaces and shafts may be constructed of CMU for increased acoustical separation as required by the acoustic consultant. All shaft walls shall conform the building and fire codes.

DIVISION 5: METALS

The scope of the project may include the following items:

Steel Decking, Cold Formed Metal Framing, Miscellaneous Metals, Steel Pan Stairs, Shade Pockets and Ornamental Metals.

Mockups for individual products in this division will be required as indicated by the Architect.

STANDARDS: All metal fabrications shall conform with the National Association of Architectural Metal Manufacturers guidelines. These include but are not limited to the Metal Finishes Manual, Code of Standard Practice for the Metal Industry and Metal Stairs Manual. All custom metal fabrications shall be "Class 1" shop fabricated, and shop finished and installed in accordance with the Code of Standard Practice for the Metal Industry.

ORNAMENTAL METALS: Ornamental metal products may include: Floor gratings, glass fittings, handrails, door bumpers. Stairs, handrails and stair fittings. Floor transitions between dissimilar materials or at joints shall be stainless steel typical (details by Architect). In addition, all metal flashing shall be stainless steel (unless otherwise indicated). Steel structure shall be necessary at all ceiling hung toilet partitions, see plans for locations.

DIVISION 6: WOOD/CARPENTRY

The scope of the project may include the following items, key elements are elaborated in this document: Carpentry, Plastic Laminate Cabinetry and Millwork, Architectural Woodwork, Exterior Woodwork and Composite Solid Surface Material.

Mockups for individual products in this division will be required as indicated by the Architect.

STANDARDS: Architectural woodwork shall conform with AWI guidelines for "Premium Grade" classification and includes selection fabrication, execution, finish and installation of all cabinetry, casework, rails, counter tops and panel products indicated in the drawings. All wood flooring shall be in accordance with NOFMA standards. Fire retardant treated wood or light gauge metal shall be used as blocking to facilitate the installation of mounted cabinetry as necessary. All cabinet

hardware shall be stainless steel (unless otherwise specified).

DIVISION 7: MOISTURE PROTECTION

The scope of the project may include the following items: Modified Bitumen Waterproofing, Thermoplastic Water and Pool Liner, Hot Laminated Asphalt Membrane, Crystalline Waterproofing, Traffic Coatings, Thermal Insulation, Non-Vapor Permeable Air, Vapor and Water Barrier Liquid Membrane, Non-Vapor Permeable Air, Vapor and Water Barrier Sheet Membrane, Metal Panels, Flush Insulated Metal Panels, PVC Roofing, Sheet Metal Work, Manufactured Roof, Specialties, Roof Accessories, Spray Applied Fire Resistive Materials, Intumescent Fireproofing, Firestops and Smoke seals, Joint Sealers, Interior Joint Sealers and Miscellaneous Joint Fillers.

Performance and visual mockups for individual products in this division will be required as indicated by the Architect.

All areas of the building shall be protected from moisture intrusion in conformance with local codes and best practices. If necessary, the Owner will retain expert consultants to verify that the proposed systems conform with those standards. Floor transitions between dissimilar materials or at joints shall be stainless steel typical (details by Architect). In addition, all metal flashing shall be stainless steel (unless otherwise indicated).

DIVISION 8: DOORS, WINDOWS AND GLASS

The scope of the project may include the following items: Steel Doors and Frames, Roll Up Doors, Security Doors and Frames Level III, Bi-Folding Doors, Hydraulic Doors, All Glass Entry Doors and Assembly, Glazed Aluminum Curtain Walls and Windows, Skylights and Clerestory, Security Windows and Bullet Proof Glazing, Finish Hardware, Interior Glass and Glazing.

Performance and visual mockups for individual products in this division will be required as indicated by the Architect.

GLAZING: This project will include the highest quality low iron, low-e coated glazing. Given the project location and climatic conditions and sustainable design goals triple glazing may be required. Some areas of this project will include bullet proof glazing including but not limited to the security guard room. Every effort will be made to visually match the different glass types. The transmittance shading and reflectivity of the glass shall meet the visual and performance requirements established by the design team and are subject to approval by the Design Architect.

METAL DOORS AND GRILLS: All service door and gates; access and egress doors; frames shall be painted hollow metal doors with low profile panic devices (Von Duprin *INPACT* recessed exit device with a smooth push pad, Series 9447 as the basis of design). Coiling or sectional upward acting doors / grills shall be painted steel.

HARDWARE: All door hinges, knobs, levers, plates, locks and associated fittings in public and office spaces shall be composed of stainless steel as selected by the Architect (Products used as the Basis of Design include Dorma, Schlage, Rajack, Nanz). All other hardware shall be Schlage Heavy Duty satin chrome plated finish. See above for panic devices in hollow metal doors.

DIVISION 9: FINISHES

A finish schedule has been included in the drawing package (refer to sheet A701). The scope of the project may include the following items: Veneer Plastering, Gypsum Drywall, Tile Work, Acoustic Panel Ceilings, Access-flooring panels, Vinyl Floor Tile, Wood Plank Finish, Resinous Matrix Terrazzo Flooring, Epoxy Resin Flooring, Carpeting, Impact Resistant Wall Protection, Fiberglass Reinforced Plastic Paneling System, Painting and Finishing. Mockups for individual products in this division will be required as indicated by the Architect. All interior finishes shall meet the LEED goals or other sustainable design requirements for the project.

WALLS: All gypsum board shall be finished to USG Level 5 unless otherwise noted. Some interior walls shall be composed of reinforced concrete masonry unit (CMU) walls, covered with a three-coat custom plaster finish. Scratch and Brown coat on metal lath by Weber Broutin. The finish coat will be a custom color, as selected by the Architect, Clayfix clay plaster (2mm thickness as basis of design) applied as recommended by the manufacturer. All gypsum walls shall be level 5 finish unless otherwise indicated. Only low VOC paint shall be used to conform with LEED or other sustainable design requirements for this project. Service area walls not exposed to public view (other than mechanical rooms) shall be covered with fiber reinforced plastic wall covering (F.R.P.) which meets local Sanitary Code (Acrovyn .060 rigid wall panels; matt finish as basis of design). Kitchen areas shall be treated as "tenant spaces" finished and equipped by others.

FLOORS: The floor finish selection shall be in accordance with the Owner and Architects specifications and finish schedule. Some special areas of the project shall be custom wood floors selected and installed in accordance with NOFMA grades and standards. Bathrooms shall be ceramic floor tiles or as indicated in the drawings. All materials and colors shall be as selected and approved by the design architect. Mechanical, service and storage rooms shall be finished with resilient cleanable materials conforming to sanitary and functional requirements of the project. Floors in public ground floor and basement spaces may be finished with a cementitious topping. Terroxy epoxy matrix topping. <http://www.tmsupply.com/About-Terroxy.aspx> is a thin cementitious topping slab consisting of white cement concrete directly on top of structural slab with invisible joints as basis of design. See finish schedule for areas with finished concrete.

CEILINGS: See Division 3 above and the sample Architectural cast in Place Concrete Speciation attached to this document. Much of the building including the ceilings will be exposed concrete installed in accordance with the drawings and specifications issued for the project. Ceilings in mechanical, service, and storage spaces to be lay-in acoustical access tile ceiling (Armstrong Tech Zone as the basis of design). Bathroom and corridor ceilings may be painted gypsum board finished to level 5 as described in ASTM C840's Standard Specification for Application and Finishing of Gypsum Board.

PAINTS / FINISHES: Unless otherwise noted, all exposed interior surfaces except architectural concrete shall be painted (exclude floor finishes indicated elsewhere). All colors/textures for paints and other interior finishes shall be as selected by Architect. All interior finishes shall meet Flame and Smoke spread ratings required by the Building Code. All interior finishes shall be low VOC (maximum levels as stipulated by the Owner and in conformance with LEED requirements for this project).

DIVISION 10: SPECIALTIES

The scope of the project may include the following items, key elements are elaborated in this document: Identifying Devices (signage), Toilet Accessories and Lockers.

Toilet partitions shall be ceiling and wall mounted (cantilevered). Finish shall be stainless steel for all components including wall hung urinal screens, doors, panels, pilasters and hardware.

Toilet accessories shall be stainless steel. All fire extinguisher cabinets shall be fully recessed stainless steel with glass inset panels where required. Building identification shall be custom fabricated and shall include room identification, site and building signage. Building and room signs shall be accessible type surface mounted (concealed fasteners). Mockups and /or samples for individual products in this division will be required by the Architect.

DIVISION 11: EQUIPMENT

The scope of the project may include the following items, key elements are elaborated in this document: Janitorial / Service Shelving and Equipment, A/V Equipment and Security Access Equipment, Davits and Tie Offs (for building maintenance).

SECURITY: Refer to the Owner's Requirements for specific requirements.

KITCHENS: All equipment is supplied and installed by others (tenant fit out).

DIVISION 12: FURNISHINGS

The scope of the project may include the following items: Window Shades and Entrance Systems (walk off mats).

SOLAR CONTROL: Shading devices shall be installed at all glazing unless otherwise noted.

Shading devices shall be coated polyester core fabric w/ motorized operation (Nysan Shades as basis of design). Systems shall include one roller with diffusing material. Weave / openness shall be designated by the Architect and engineer to meet performance criteria for reduction of heat/glare/ultraviolet light transmission, controls shall be integrated with lighting. In addition to the rolling shades, the building may include curtains or black out shades at public spaces and offices.

DIVISION 13: SPECIALTY CONSTRUCTION

The scope of the project may include specialty items such as sound and vibration control and bullet resistant transaction windows.

DIVISION 14: CONVEYING SYSTEMS

The scope of the project may include the following items: Two (2) Custom traction elevators, models shown below as the basis of design. One (1) dumbwaiter.

Elevators – Basis Nexiez-MRL GQXM2 1275 kg, 2.5 m/s. 4 stops, opens to two sides as indicated on the drawings

Dumbwaiter - Inclinator Model DW-500

Finishes: Cabs, doors and controls shall be custom stainless steel selected from the

manufacturer's premium grade as selected or designed and approved by the Design Architect.

SAMPLE SPECIFICATION: ARCHITECTURAL CAST IN PLACE CONCRETE

Below is a sample specification for information only. Information contained in this specification may or may not pertain to this project and should not be used for bidding or construction.

SECTION - 033300 ARCHITECTURAL CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. *Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.*

1.2 SECTION INCLUDES

- A. *Work of this Section, as shown or specified, shall be in accordance with the Contract Documents.*
- B. *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, but not be limited to the following:*
1. *Ceilings*
 2. *Columns*
 3. *Selected vertical surfaces*
- C. *This section specifies requirements for Cast-in-Place Architectural Concrete work, including concrete materials, mix design, formwork, reinforcement, placement and finishing procedures and other items required in producing of the work. Where an item is not included in this section, the structural requirements of Section 03 30 00 shall apply.*
- D. Green Building Performance Criteria: The Contractor shall implement practices and procedures to meet the Project's GREEN BUILDING requirements. The Contractor shall ensure that the requirements related to these goals, as defined in Section 018113: "Sustainable Design Requirements", and as specified in this Section, are implemented to the fullest extent. Substitutions or other changes to the work shall not be proposed by the Contractor or their sub-contractors if such changes compromise the stated GREEN BUILDING Performance Criteria.

1.3 RELATED SECTIONS

- A. This Section includes additional requirements for and relating to the following sections:
1. SECTION 03 30 00
 2. SECTION 03 10 00
 3. SECTION 03 20 00

1.4 QUALITY ASSURANCE

- A. Project 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, the Architectural Concrete Consultant, Structural Engineer, Contractor, Concrete Subcontractor, Designated Quality Control Technician, Formwork Fabricator, Labor Foreman, Mix Designer, Testing Lab, and Concrete Supplier. Meeting agenda will be to discuss the 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.
- B. Concrete Quality Control Technician: Assign a quality control person to oversee the architectural concrete work. The primary duty is to be responsible for assuring the required tasks in the work plan are accomplished. The Concrete Quality Control Technician shall develop a check list for execution of the work and for sign off by the concrete superintendent and be submitted to the Architect.

1.5 STANDARDS

- A. Comply with the requirements of the structural requirements of Section 03 30 00 and as specified herein.

1.6 SUBMITTALS

General: 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.

Construction Procedure Documents: Contractor shall develop a Quality Control Plan for the architectural concrete work for the entire project. The plan shall be in the form of a Checklist to be used by the Concrete Quality Control Technician in performing the technician's inspection work.

C. Formwork Shop Drawings:

1. Submit drawings showing the layout and details of formwork for the work, including the mock-ups.
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 and water-stopped joints.
3. Shop drawings shall include the following details:
 - a. Details of shop assembly of formwork and field assembly of construction and control joints, reveals, recesses, embedments, back-up, clean out panels, lost formwork.
 - b. The means to be used to seal all joints, including back-up bracing, dry ties and brackets.
 - c. The means to be used to maintain alignment, including back-up bracing, etc.
 - d. Cover of all concrete over reinforcing steel.
 - e. Location of clear placing passages through the steel reinforcing for placing trunks and hoses.

D. Placing: Submit layout or description of each placement showing sequence and projected time between deposits. See "Depositing" in Execution part of this section.

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

1. Cement.
2. Aggregates, each type.
3. Admixtures, each type.
4. Form surface material, each type.
5. Foam gaskets; thickness, width, foam compressibility.
6. Form release coating.
7. Reinforcing accessories.
8. Curing compound; base material type.
9. Solution for surface finish, each type.
10. Water repellent sealer.
11. Inserts and embedments, each type.
12. Concrete mix supplier certification.
13. Qualifications for Concrete Contractor; Carpenter, Laborer, Reinforcing Steel Foremen and designated Quality Control Person.
14. Check list for use by the Concrete Quality Control Technician.

F. Samples:

1. Formwork contact materials, each type, 12 inches square.
2. Foam gaskets, 12 inches long.
3. Reinforcing supports, one each type.
4. Submit concrete samples for color for each type of concrete.
 - a. Cast color samples in a flat form box with tightly sealed edges. For sample form box see drawing at end of section.
 - b. Submit 3 concrete samples 24"x24"x2.5" for color matching the architect's sample.
 - c. Surfaces shall be out of form and clean.

G. Large Samples. Prepare formwork and cast concrete for sample walls as follows:

1. 1M wide x 1M high x typical wall width panels with approved facing material and typical building reinforcing. Cast vertical to test proposed mix design.
2. Column Sample – 1 meter high

H. Mock-ups for Formed Concrete Work:

1. After all samples, product data, and the shop drawings for the Mock-up are reviewed construct mock-ups of the architectural concrete work in an on-site location approved by the Owner and Architect and as described below.
2. General:
 - a. Reinforce as in a similar detail on the drawings and add necessary reinforcing and/or supports to maintain stability.
 - b. Use approved form face materials, reinforcement and accessories and assemble formwork as intended for the building construction.

- c. Place concrete in the wall with methods to be used for typical long wall in building, including anticipated time delays between deposit lifts.
- d. Finish exposed hardened surfaces of the walls with specified finish treatments when directed by the Architect and with the Architect present. Finish wall with minimum 2 ft wide areas as directed by the Architect.
- 3. Mock-up for exposed ceilings, columns and walls which shall consist of the following (constructed second):
 - a. Foundation of a size and reinforcement adequate to support the work.
 - b. Scope of Mock-up:
 - Non-architectural support walls.
 - No form ties to be used. All walls shall be braced to support walls.
 - See suggested details for ceiling mockup at the end of this section.
 - c. Reinforce as in a similar detail on the drawings and add necessary reinforcing and/or supports to maintain stability.
 - d. Use approved form face materials, reinforcement and accessories and assemble formwork as intended for the building construction.
 - e. Place concrete in the forms with methods to be used for typical placements in building, including continuous soffit and wall placements.
 - f. Use AC-1 mix with a low slump as specified in 3.1.B
 - g. Finish exposed hardened surfaces of the walls with specified finish treatments when directed by the Architect and with the Architect present and in locations as directed by the Architect.
- 4. Mock-ups shall be as detailed at the end of this section. Coordinate dimensions and specific details with architectural and structural drawings for the mock-ups.
- 5. If mock-ups are not accepted by the Architect, remove and replace with others at no additional cost to the Owner.
- 6. Additional mock-ups or partial mock-ups shall be required if the above mock-ups are deficient in producing the quality required for the project at no additional cost to the Owner.
- 7. Mock-ups shall be located so they will remain throughout construction. Protect mock-up from damage during construction. Remove mock-up when directed by the architect.

I. Concrete mix designs: As specified in SECTION 03 30 00 CAST-in-PLACE CONCRETE and as specified herein.

J. Green Building Submittal Requirements:

- 1. Submit a completed CONTRACTOR ENVIRONMENTAL MATERIALS REPORTING FORM (CEMRF), located in Section 018113: "Sustainable Design Requirements" Appendix B, for materials provided under the work of this Section in accordance with Section 018113: "Sustainable Design Requirements".
- 2. CEMRF Back-Up Documentation: Submit CEMRF back-up documentation to validate the information provided on the CEMRF (except cost data) for materials provided under the work of this Section in accordance with Section 018113: "Sustainable Design Requirements".
- 3. The GREEN BUILDING submittal information shall be assembled into one (1) package per Section or trade and sent to the Consultant of review. Incomplete or inaccurate GREEN BUILDING submittals may be used as the basis for rejecting the submitted products or assemblies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with General Conditions requirements.

- 1. Store all materials as recommended by the manufacturer. Protect form facing material panels and all material vulnerable to moisture in a dry storage area.

1.8 WARRANTY

A. Comply with General Conditions requirements.

1.9 PERFORMANCE REQUIREMENTS

- A. Responsibility for the design 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.
- B. Design of the mix and formwork shall be performed by contractor's registered professional engineer, registered in the project state.
- C. Performance Criteria:
 - 1. All concrete shall be performed so that no evidence of the following shall exist when the concrete is subject to imposed loads, temperature and weather conditions:
 - a. Damage of any kind.
 - d. Out of alignment or incorrect profiles.

- e. Surface voids not completely covered by a circle 1/4 inches in diameter or more than 25 surface voids larger than 1/8 inch, in longest dimension, in any area 2 ft. square.
- f. Voids, sand pockets or discoloration due to fluid loss through the formwork.
- g. Rockpockets and honeycombs
- h. Discoloration, including lift lines and staining caused from improper placement or procedures.
- i. If any of the above-mentioned 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.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Products of the manufacturers specified in this section establish the minimum functional, aesthetic and quality standards required for work of this section.

2.2 CONCRETE MATERIALS

- A. 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.
- B. Each concrete material shall be the product of a single plant and raw material source throughout project.
- C. Cement: ASTM C-150, Type I.
 - 1. White Cement: Shall be white powder and shall be as distributed by Lehigh Portland Cement Co; or approved equal. Shade as required to produce mix matching Architect's sample.
 - 2. Gray Cement: Shall be gray powder, of shade required to produce mix matching Architect's sample.
 - 3. Cement shall be consistent in color presentation throughout the duration of the project.
- D. 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.
- E. Coarse Aggregate: ASTM C-33.
 - 1. Aggregate shall be stone (AC-1) or lightweight (AC-2) where designated in part-3 and as specified herein and in Section 033000.
 - 2. Stone Aggregate: Washed, hard, natural stone or near cubical shape crushed stone, maximum size 3/4".
 - 3. Lightweight Aggregate: Near cubical shape, maximum size 3/4". Aggregate shall be thoroughly saturated prior to introduction into the mix.
- F. Admixtures:
 - 1. Admixtures must be certified to be compatible with the cement, aggregates, and other constituent materials in the mix and shall contain less than 0.05% of Calcium Chloride.
 - 2. Water Reducing Admixture: ASTM C494, Type F or G
 - a. High Range Water Reducing Admixture (HRWR): "Glenium" by BASF/Master Builders.
 - b. Medium Range Water Reducing Admixture shall all be "Polyheed " by BASF/Master Builders.
 - c. Self-Consolidating Concrete: Shall include polycarboxylic ether based hyperplasticiser materials, High Range Water Reducing Admixtures: HRWR shall be "Glenium" by BASF-Master Builders; Plastol Series by Euclid Chemical Co.; Plastiment by Sika Corp.
 - d. Acceptable Products / Manufacturers:
 - 1) BASF-Master Builders, Cleveland, OH
 - 2) Euclid Chemical Co., Cleveland, OH
 - 3) Sika Corp., Lindhurst, NJ
 - 3. Cement Replacement Admixture: Use one of the following (as determined by samples):
 - a. For light color replacement Admix: White Granulated Blast Furnace Slag.
 - b. Fly Ash is not permitted in architectural concrete.
 - c. Silica Fume is not permitted in architectural concrete.
 - d. Acceptable Products / Manufacturers:
 - 1) Lafarge Cement Co.
 - 4. Color Admixture: Color Admixtures shall be 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.
 - d. Acceptable Products / Manufacturers:
 - 1) Powder shall be "Cromix-P" and Liquid shall be Cromix-L by L.M. Scofield Co., Douglasville, GA,

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. 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.
 - a. Acceptable Products / Manufacturers:
 - 1) BASF-Master Builders, Cleveland, OH
 - 2) Euclid Chemical Co., Cleveland, OH
 - 3) W R Grace, Cambridge, MA
6. Fiber Reinforcement Admixture: Integral fiber reinforcement shall be synthetic macro fibers. Acceptable Product / Manufacturer: "STRUX 90/40" by W R Grace, Cambridge, MA.
7. Admixtures for retardation and acceleration may be used if shown there is no adverse effect on architectural requirements and are reviewed for use.

H. Water: Potable.

2.3 FORMWORK MATERIALS

A. Smooth Surface Formwork Material:

1. Flat form surfaces shall be plastic coated material as follows:
 - a. Panels shall be manufactured as form material and shall be 3/4" thick panels in sizes to cover surface areas between joint lines shown on the drawings.
 - b. Acceptable Products / Manufacturers (as basis of design):
 - 1) Pine plywood core panels, minimum 7 layers High Density Overlay (HDO) panels and shall be "Multipour" as supplied by Olympia Products, Shelton, WA; or approved equal.
 - 2) Birch plywood core panels, minimum 14 plys per inch. Panels shall be "FinnForm" (red) as manufactured by Plywood & Door Corp., Union NJ.
 - 3) Plastic/aluminum core panels shall be "alkus" as supplied by Peri Form, www.PERI-USA.com
2. All formwork panels shall have square, straight, sealed edges. 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 inch, each way, in 10 ft in any butted joint.

B. Form Ties: no form ties shall be used in the formwork for the exposed surfaces

C. Joint Sealing Material:

1. Gaskets for sealing field erected corner form joints shall be
 - a. 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 3M, St Paul, MN.
 - b. Tube applied liquid gaskets shall be "R-Guard" thin joint filler - as manufactured by ProSoCo, Lawrence, KS.
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 DAP Corp.

D. 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 880" by Cresset Chemical Co., Weston, OH.

2.4 REINFORCING AND ACCESSORIES

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

B. Tie wire used to secure reinforcing steel adjacent to architectural form surfaces shall be non-corrosive or plastic-coated wire

2.5 MISCELLANEOUS MATERIALS

- A. Curing Material / Evaporation Retarders: VOC compliant, colorless, diffusive, blend of Sodium, Potassium and Meta Silicate and be 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. Material shall be "L&M Cure" by L&M Construction Chemicals, Inc. Omaha, NE; "SealTight Med-Cure" by W.R. Meadows, Inc., Hampshire, IL.
- B. Concrete Cleaning Solution: 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:
 1. "Enviro Klean" cleaner.
 2. "2010 - Light Duty Concrete Cleaner".
 3. "Heavy Duty Concrete Cleaner".
 4. Cleaning Solutions shall be by Sure Klean, ProSoCo, Lawrence, KS.
 5. 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.
- C. Concrete stain removers shall be as follows:
 1. Rust stains – T#1087, T#1047.

2. Calcium stains – 942 or Pre Klean.
3. Other stain removers as recommended by ProSoCo, Lawrence, KS. Contact: Courtney Murdock, Project Chemist Liaison, 1-800-255-4255
- D. Water Repellent sealer shall be a low molecular, minimum 95% solid, Clear, Silane sealer.
 1. Sealer shall be "SL-100" by ProSoCo, Lawrence, KA. Use product as specified in 3.8.
- E. Patching Additive: Shall be a liquid, acrylic-polymer bonding agent specifically made to be integrally mixed with mortar. Additive shall be "Acryl Set" by BASF-Master Builders.
- F. 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
- G. Water resistant treatment for top of slabs where soffit / ceilings below are exposed.
 - 1 Top of slab shall be treated as herein specified with one of the following treatments:
 - 2 Treatment used shall be coordinated with any material installed to interface with the treatment. Submit written confirmation that the water-resistant treatment used is acceptable to the fill installer and if applicable by the roofing manufacturer.
 - 3 Method #1 – Application of material that requires removal prior to installing a subsequent material on the slab: Initial treatment shall be "KUREZ-RC" and second treatment shall be "KUREZ-RC OFF"
 - 4 Method #2 – Application of material that requires a bonding agent prior to installing a subsequent material on the slab: Initial treatment shall be "Super ACRA Cure Acrylic" and Second treatment shall be "Bonding Agent"
 - 5 Materials supplied by Euclid Chemical Co., Cleveland, OH or approved equal.
- H. LEED Product Requirements:
 1. Regional Materials: Project goal is to provide minimum of 20% of building materials (by cost) that are manufactured and extracted/harvested within a 500-mile radius of the project site, exclusive of labor and delivery costs and not including mechanical, electrical, or plumbing equipment. The Contractor will make all attempts to maximize the procurement of materials within this specified 500-mile radius. Utilize GPS straight-line distance calculator, found at: www.gpsvisualizer.com/calculators to verify distance.
 2. Recycled Content of Materials: The pre-consumer (a.k.a. post-industrial) and/or post-consumer recycled content (by weight) of the products and materials shall be identified and documented. The Contractor will make all attempts to maximize the procurement of materials with recycled content to meet LEED requirements and goals established for this project.
 - a. Recycled content of materials shall be defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16 CFR 260.7 (e): www.ftc.gov/bcp/gmrule/guides980427.htm, and claims should be certified by an independent third party when possible. Recycled content thresholds for this project are largely derived from EPA's Comprehensive Procurement Guidelines and the NYC Department of Design and Construction's Guide Sustainable Specifications.
 3. Cementitious Material:
 - a. Provide composite mix of portland cement and ground granulated blast-furnace slag, limiting percentage (by weight) of portland cement (ASTM C150) in overall cement content, by weight. The purpose of this requirement is to reduce the CO₂ and other pollutant emissions associated with portland cement production. Care should be taken to coordinate with structural engineer and materials supplier or installing Contractor to verify special needs or modifications including assessment of setup times and duration required to achieve specified target strength.
 4. FSC Wood: All new wood-based materials, other than those which contain 100% recycled content, will be FSC-certified in order to meet LEED requirements and goals established for this project.
 5. Composite Wood and Agrifiber Products: All composite wood, agrifiber products shall meet LEED requirements and goals established for this project.
 6. 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 shall meet LEED requirements and goals established for this project.
- I. Substitutions:
 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

- A. Comply with the requirements of Section 03 30 00 and as specified herein. Architectural concrete Regular Concrete as follows.
- B. Concrete for Mix AC-1 Shall be as follows:
 - 1. Concrete shall have the specified Cement, a Cement Replacement Admixture, a Fiber Reinforcement Admixture, a Shrinkage Reduction Admixture, and a Color Admixture if required for color.
 - 2. Concrete shall be fluid enough to achieve a continuous placement, but a stiff mix, as required to cast the soffits and lightwell walls in a single placement. (Optimum slump: 4" +/- 1"). If fluidity is required, it shall be attained by the addition of MRWR.
- C. Concrete for Mix AC-2 shall be as follows:
 - 1. Concrete shall have the specified Cement, Lightweight Aggregate, Self-Consolidating Concrete Admixtures (including HRWR and VMA), a Cement Replacement Admixture, a Fiber Reinforcement Admixture, a Shrinkage Reduction Admixture, and a Color Admixture if required for color.
- D. Color for AC-1 and AC-2 shall be the same as selected in part 1, sample selection. Color shall match the sample in the architect's office. Color shall be attained with the Cement Replacement Admixture or with a combination of the Cement Replacement Admixture and a Color Admixture.
- E. Mixes shall be designed for minimum water content required to activate the cementitious material. (optimum slump prior to admixture: 2.0 inches or less and a water/cement ratio of 0.40 or less).
- F. Mix design shall designate the optimum duration of fluid stability for the mix for the maximum discharge time planned.

3.2. FORMWORK

- A. Fabrication:
 - 1. Comply with the requirements of the Section- 03 10 00 and as specified herein.
 - 2. Design formwork to permit easy removal. Prying against the concrete will not be permitted. Care shall be taken so as not to mar the concrete surface in cutting or removal of the forms.
 - 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 supports to L/300.
 - 4. Forms shall be fabricated so the concrete can be adequately placed, vibrated and finished to achieve the specified finishes for the profiles required.
 - 5. Layout form joints, exposed embedments as shown on the drawings.
 - 6. Smooth surfaces:
 - a. Edges of plastic overlay form panels shall be square, flat and sealed. Seal all cut edges (end grain) with liquid polyurethane.
 - b. 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 into contact with form surface. Contact form surface shall be free of sealant prior to casting concrete.
 - c. Vertical surfaces:
 - 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 1/2" plywood
 - 2) Back fasten plastic face panels with screws. Penetrations through the plastic faced panels in exposed-to-view areas is not permitted.
 - 3) Pre-drill Holes in backer panel to eliminate any drill residue between layers that prevent a tight mating between panels.
 - 4) Facing panel seams shall be sealed as in 3.2.A.6.b above.
 - d. 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.
 - e. Soffit surfaces:
 - 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 12 inches from the facing layer. First layer may be 1/2" plywood.
 - 2) Fasten facing panels with finish nails at corners of panels and at edges, 1/2" from edge. Use minimum nails that will assure adjacent panel surfaces are flush across the joint.

- 3) Facing panel seams shall be sealed as in 3.2.A.6.b above.

B. Form Erection:

1. General:

- a. 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. See suggested form construction detail at the end of this section.
- b. It is the intent that all placements of soffit and lightwell walls will be one continuous placement without a construction joint or ties. In the event construction joints are approved for use they shall be as follows:
 - 1) Vertical construction joints shall be at locations approved by the Architect before the erection of formwork begins.
 - 2) 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) See suggested form construction detail at the end of this section.
- c. Gaskets shall be installed in 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". See suggested form construction detail at the end of this section.

2. Smooth Panels:

- a. Use only form units that are in like new condition. Replace panels with defects with new panels using fabrication procedures in 3.2.A.
 - 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.

C. 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.

1. Coat evenly and remove excess material from form surface by polishing with a damp absorbent cloth.
2. Surface applied with specified release agent shall not be oily to the touch.
3. Do not allow coating to come in contact with previously placed concrete or with reinforcing steel.

3.3 FORMWORK TOLERANCES

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

1. From designed edge elevation in 3M: +5mm, -0mm
2. From designed vertical plane in 3M +5mm, -0mm
3. Cross-Sectional Dimensions: +5mm, -0mm
4. Smooth form surface to surface at butt joint: Maximum variation of panel thickness - fabricate panel edges tight to back-up member.
5. 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.

3.4 REINFORCEMENT

- A. Comply with the requirements of SECTION- 03 20 00 and as specified herein below.
- B. 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.
- C. Horizontal Surfaces: Reinforcing bars for exposed soffits shall be hung from a support structure above the slab. Supports in contact with the deck facing form are not permitted.
- D. 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.
- E. 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.
- F. All reinforcing steel, including bands, shall be secured with concrete cover from the contact surface of the formwork prior to placing concrete as follows:
 1. Interior surfaces: Minimum 1", or as shown on the Structural Drawings. Note: Reinforcing bar shadowing may occur with some mixes with minimum ACI cover. Assessment to be made on mock-up.

3.5 MIXING AND TRANSPORTING CONCRETE

- A. All concrete for each placement, or a minimum of two truckloads shall be on the site prior to starting the 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 into the pump or bucket 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.

3.6 PLACING CONCRETE

- A. Before placing concrete in the forms:
 - 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.
 - 2. Truck/Pump preparation:
 - a. Prior to discharging concrete into pump hopper perform following:
 - b. Mix concrete in drum for 1 minute per yard.
 - c. Allow to set for 30 seconds after mixing and discharge for testing or into pump hopper.
 - d. Assure pump hopper mixing paddles are completely submerged into the wet concrete at all times during placement.
- B. Cleaning and Protecting Forms: Immediately prior to placing concrete, clean all form interiors free of foreign material and debris.
 - 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 wall, beam and soffit bottoms. Pay special attention to soffit formwork to make sure all surfaces are free of debris and adhered material.
 - 2. Protect cleaned forms if placing does not commence immediately, covering openings with tarpaulins.
 - 3. Do not allow direct sunlight to heat forms before casting.
- C. Depositing Concrete:
 - 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.
 - 2. Regular Concrete surfaces:
 - a. Concrete for walls and soffit shall be placed with pumps. In walls insert pump hose onto the form cavity. In soffits concrete placed directly onto the finished facing surface shall be placed with low pressure.
 - b. Deposit concrete as nearly as practical at its final position.
 - c. Do not drop concrete. Keep placing hose or pipe in wet concrete.
 - d. 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 flow prior to removing and injecting the placing "needle" to/from form cavity.
 - e. 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.
 - f. 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. Place concrete to achieve the requirements of 1.9.C.1.
- D. Consolidating Concrete:
 - 1. Concrete for all formed concrete surfaces:
 - a. All 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 approx. 2" to 4" per second). Do not jiggle vibrator up and down during consolidation, use continuous and even insertion and withdrawal of vibrator.
 - b. After topping 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.
 - c. Caution must be exercised in using vibrators to prevent injury to the form surface material or displacement of embedded items.
 - d. Keep one spare working vibrator on site at all times.
 - e. 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 CURING AND FORM REMOVAL

- A. Cure all concrete for a minimum of five days. 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.
- B. Cure formed vertical concrete surfaces by the following method:
 - 1. When the ambient humidity is 70% or above no curing application is required.
 - 2. When the ambient humidity is below 70% - Immediately after stripping vertical surfaces, fog the surface (fine mist nozzle on hose – not a sprinkler head) and apply the approved evaporation retarder material to all surfaces including top surfaces.
- C. Cure horizontal concrete with exposed soffits/ceilings as follows:
 - 1. Immediately after placement of soffit/ceilings treat all open-faced concrete with material as specified herein to protect from water. Note: water on top of the slab should be considered as an element that will stain the soffit surface below. Protection from staining is required.
 - 2. Use treatment Method #1 or Method #2, as specified in Products and as coordinated with the roof fill and the roofing membrane installer.
- D. Form Removal:
 - 1. Comply with the stripping requirements of Section- 033000 Cast-in-Place Concrete Section, and as specified herein.
 - 2. Care shall be taken so as not to mar the concrete surfaces and edges in removing the forms.

3.8 FINISHES FOR FORMED PLACEMENTS

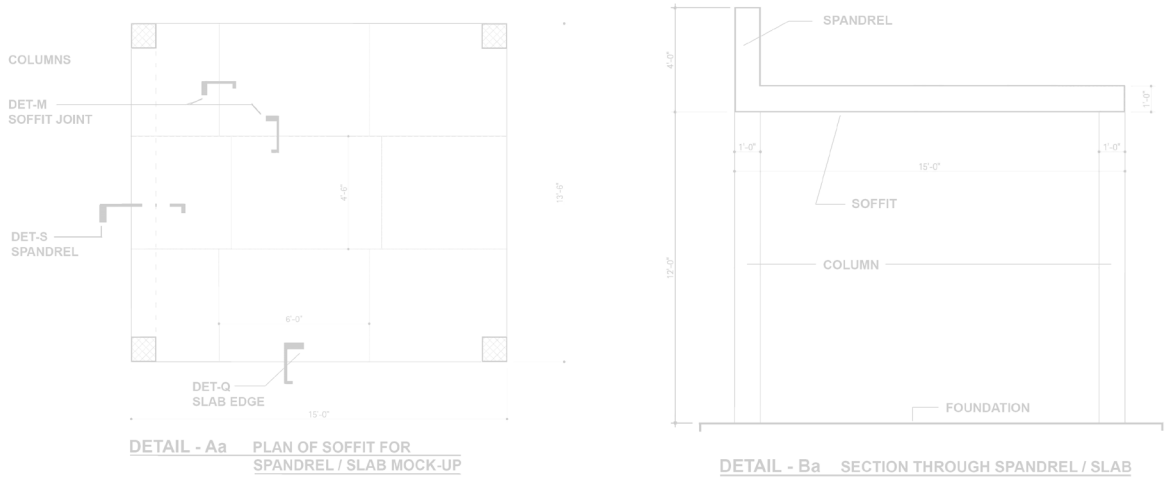
- A. All exposed work shall be finished with the approved finishes determined from sample tests executed in Part 1 on the mock-up. Finishes shall be as specified herein where indicated on the drawings. Minor defects may require fins to be removed (i.e. top edges) or minor patching performed, however, 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.
- B. General: Prior to treating, all surfaces shall receive the following preparation and cleanup.
 - 1. All surfaces to receive treatment shall be a minimum of 21 days old. All surfaces can be treated at end of project.
 - 2. Remove all stains using an appropriate non-abrasive stain remover for each type.
 - 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.
 - 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.
- C. Treat the formed concrete surfaces with the following cleaning applications as determined from tests on the mock-up in Part-1:
 - 1. Etch/Clean Treatment for concrete surfaces:
 - a. After stripping the surface shall be treated for stain removal and cleaning when directed by the architect.
 - b. Cleaning treatment shall be a full strength or a diluted "Heavy Duty Concrete Cleaner" as determined from tests on the mock-up.
 - 2. "Non-acid" Treatment for concrete surfaces:
 - a. After stripping the surface shall be treated for stain removal and cleaning when directed by the architect.
 - b. Cleaning treatment shall be "2010" or "Enviro Klean" as determined from tests on the mock-up.
 - 3. Architect shall determine the extent of 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.
- D. Water Repellent Treatment for all architectural concrete surfaces:
 - 1. Treat all exposed vertical wall surfaces and exposed wall top surfaces.
 - 2. All surfaces receiving treatment shall be dry as required by the manufacturer's instructions.
 - 3. All surfaces receiving treatment shall be clean and free of stains and laitance.
 - 4. To all surfaces apply one wet coat of the specified sealer as per manufacturer's instructions.
 - 5. Where curing agent other than specified sodium silicate-based material used, curing agent must be completely dissipated prior to application of sealer so that sealer will be absorbed into the concrete. Test specified sealer in small area in inconspicuous location to determine if concrete curing material has sufficiently dissipated for proper application of sealer. Sealer representative shall certify the sealer can be applied with maximum penetration applicable to guarantee on surfaces where curing agent has been applied.
- E. Efflorescence Treatment:
 - 1. Required only if the specific mix ingredients emit white salts after stripping and prior to application of final sealer.
 - 2. Apply a very light spray coating of the SL100 sealer to surfaces immediately after stripping.
 - 3. If a white surface appears the contractor shall notify the architect immediately. Application requirement shall be determined by architect as the project progresses.
- F. 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.
- G. 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 PROTECTION

- A. 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. Allowing damage and patching or cleaning at end of project is not acceptable. Protection operation shall assure protection from paint, oils, rust, stains, impact, or any other kind. Pay special attention to any supply activity through light-wells and activity for fire protection piping and electrical work at soffits.

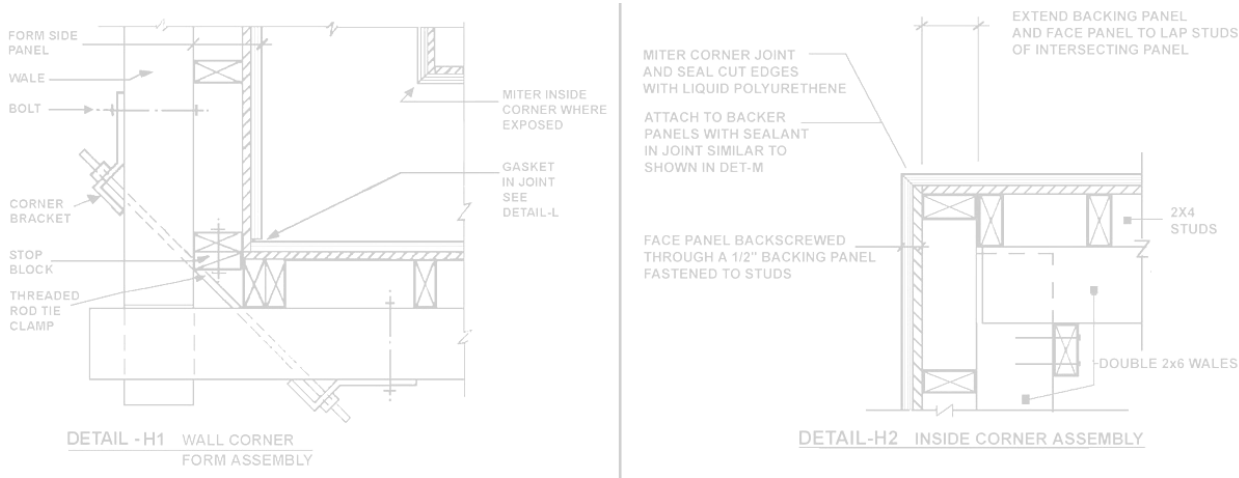
3.10 SAMPLE MOCK-UP DRAWINGS

- A. SAMPLE Mock-up Scope for formwork is as follows:

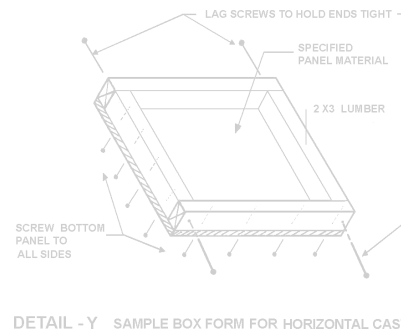
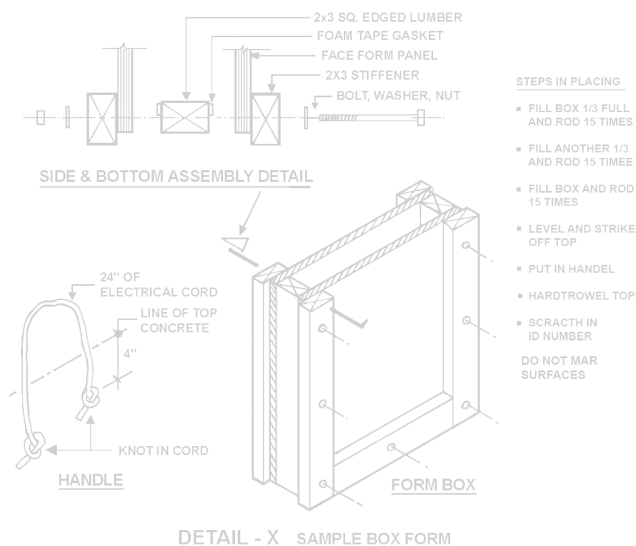
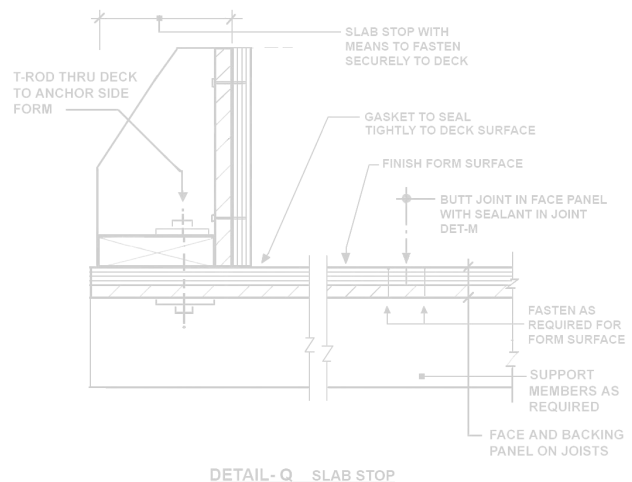
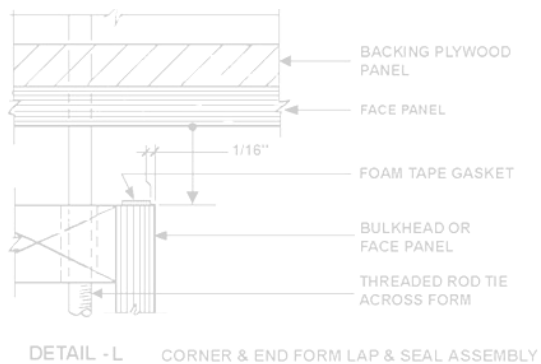
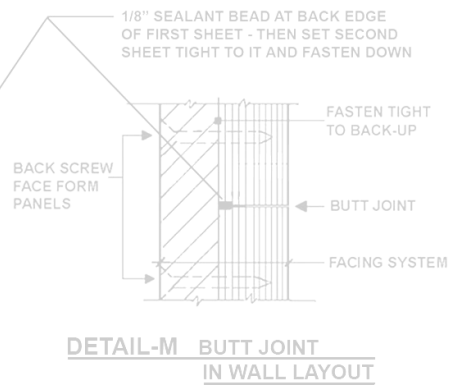
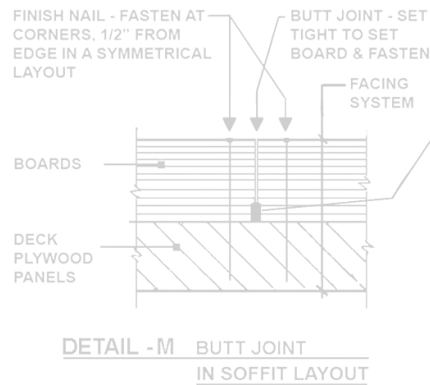


3.11 QUALITY FORMWORK DETAILING **EXAMPLES** FOR ALL FORMWORK

- A. The formwork drawings on the following pages are not part of the contract documents. They represent examples of the formwork principles required to perform the level of quality for work described in the contract documents and are intended to clarify the contract documents only.



EXAMPLES OF TYPICAL FORMWORK DETAILS



END OF SECTION

END OF DOCUMENT