

**TECHNICAL SPECIFICATIONS
FOR**

**BATTERY PARK CITY AUTHORITY
PHASE 3 PILE REMEDIATION
NEW YORK, NEW YORK**

Submitted to:

**HUGH L. CAREY BATTERY PARK
CITY AUTHORITY ONE WORLD
FINANCIAL CENTER NEW YORK,
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Submitted by:

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Battery Park City Authority
Phase 3 Pile Remediation
New York, New York

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SECTION 00005

GENERAL CONDITIONS

1. GENERAL

Notwithstanding anything in the other Contract Documents to the contrary, including the Specifications, all provisions hereof shall supersede any conflicting provisions in other Contract Documents. All other provisions of the Contract Documents shall remain in full force and effect. References to the "Authority" in these Conditions shall be deemed to mean "Owner/Owner's Representative" and vice versa.

2. CONDITIONS

- 2.1 Should questions of labor jurisdiction arise, this Proposer will immediately take steps to settle such disputes and will use such labor as may be determined to have jurisdiction, at no additional cost to the Owner. Should it fail to take expeditious action, it will be responsible for any time lost because of delays arising from such disputes.
- 2.2 All permits required for any part of the Proposer's work shall be procured and paid for by Proposer. This shall apply also to those permits required to be obtained in the name of the Authority.
- 2.3 The (G) General Contractor shall pay for and obtain any and all releases, permitting Owner unrestricted use of the Work.
- 2.4 The Contract includes the cost of all standby trades and Owner Representative fees should Proposer work prior to or later than normal working hours and on Saturdays, Sundays, and Holidays, if Proposer desires to work outside of normal working hours.
- 2.5 Proposer shall comply with all legal regulations, including OSHA safety regulations and other government agencies having jurisdiction concerning the Work of this Contract.
- 2.6 Proposer shall comply with all federal and local laws regarding noise control. Mufflers and whisperized compressors shall be used throughout Proposer's Work.
- 2.7 Proposer has examined the site and the Contract Documents. Proposer agrees that the site and surrounding areas are satisfactory and sufficient for its needs in the prosecution of its work in conformance with the terms of this Contract.
- 2.8 Any temporary and/or permanent power connections required for the execution of the Proposer's Work and/or in connection with the Proposer's Work shall be the responsibility of the Proposer, including restoring all existing conditions that are disturbed during the performance of the work to like new status.
- 2.9 This Agreement covers the complete scope for the type of work included herein, including all incidental work not necessarily indicated or described in the "scope" documents. This Agreement is let on the basis of such documents with the understanding that the Proposer is to furnish all items required for proper completion of the work without adjustment to the Contract Price. It is intended that the Work be of sound and quality installation and the Proposer shall be solely responsible for the inclusion of adequate amounts to cover installation of all items indicated, described or implied.
- 2.10 Contractor shall maintain hours of operation between 7:00 am to 4:30 pm, Mon-Fri and weekends as necessary. Temporary protection is to be coordinated with Owner/Construction Manager or as otherwise noted. Work must be in accordance with all city, state and local jurisdiction agencies and authorities as well as Battery Park City Requirements.
- 2.11 Proposers shall use ultra-low sulfur diesel fuel or compressed natural gas (CNG) for all construction vehicles with a carrying capacity in excess of 5 tons and for all portable generators, consistent with Local Law 77 for Lower Manhattan. All diesel engines of greater than 50 horsepower must use ultra-

- low sulfur diesel fuel with a sulfur content no greater than 15 ppm. Equip the above vehicles with high performance engines and diesel oxidation catalyst (DOC) filters or another previously demonstrated advanced retrofit technology, consistent with NYC Local Law 77 for Lower Manhattan. On-road vehicles used in construction may not idle for more than five consecutive minutes except under practical considerations such as during vehicle maintenance, while stopped in traffic, and in cold weather conditions below 25 degrees F.
- 2.12 Proposer shall not store any material or equipment on site unless directed by the Owner/Owner's Representative. The Proposer shall provide storage space for inspection dive equipment and provide access and material support for the inspection crews.
- 2.13 Proposer shall not use the site for staging of installation materials or equipment except as approved by the Owner.
- 2.14 All engineering layout is the Proposer's obligation.
- 2.15 Each Proposer is responsible for progress cleaning of its own areas on a daily basis. All Proposers are responsible for consolidating any debris caused by their work. The proposer for General Construction (G) shall be responsible for cleanup of the entire site which includes removal of debris for ALL proposers on site on a daily basis. The proposer for General Construction (G) shall legally dispose consolidated debris off-site. Each Proposer is advised that failure to comply with cleaning requirements will result in backcharges and /or reductions in payments.
- 2.16 Contractor shall perform site cleanup and removal of debris on a daily basis and broom clean all installation areas at completion of the day. Surplus equipment, parts & installation materials are to be removed by contractor upon completion of installation unless it is mutually agreed, in writing, from Owner or the Construction Manager that this material can remain on site.
- 2.17 Proposer shall submit within 30 calendar days from Contract or Notice to Proceed, unless otherwise noted, all shop drawings and samples required to the Owner's Representative for approval. Substitutions are frowned upon. Proposers shall meet the design intent without deviation.
- 2.18 Proposer shall submit within two (2) weeks after receipt of Contract or Notice to Proceed a detailed schedule to the Owner's Representative conforming with the project milestone installation dates.
- 2.19 NO access will be granted through the North Cove Marina; all access shall be through the access hatch at Location 1. The overall objective will be to perform the work with **minimal to no disruption** to the daily operation of the North Cove Marina. ALL work shall be staged from a barge at Location 2.
- 2.20 Requisitions for this project shall be due to the Owner by the 15th of every month in the format approved by the Owner.
- 2.21 The Proposer shall follow any and all anti-terrorism security procedures, guidelines, instructions, and regulations with respect to ingress into and egress from the work site, transportation and disposition of material that might be considered contraband as well as any emergency procedures. It is the Proposer's responsibility to make contingencies for the effect upon the scheduling and performance of their work of any and all such regulations and procedures. The cost of such contingencies shall be included in the Contract Price.
- 2.22 The Proposer shall take special care to provide for temporary damage protection for any and all existing conditions to remain in proximity to the work area. The protection shall remain in place while performing the work shown or described herein or elsewhere in the Contract Documents. Any damage to existing conditions to remain as a result of work by the Proposer shall be repaired or replaced to the satisfaction of the Owner and at no cost to the Owner.
- 2.23 As a State Agency, Proposer shall be aware, that all BPCA projects require the employment of labor at prevailing wage rates. Outside State and Federal Agencies will closely monitor all projects.

- 2.24 Proposer shall conduct a "Project Site Visit" prior to submitting a proposal, to familiarize themselves with the Area of Work and the surrounding areas and submit clarifications as such per Appendix IX.
- 2.25 Contractor shall be responsible to meet all project milestone dates, if the contractor does not meet the milestone dates or is progressing behind schedule, the contractor will be directed by the Owner/Construction Manager to work weekends, in order to ensure substantial completion no later than project closeout date. The project milestone dates are as follows:
- 1) Contractor to complete Shop Drawings: April 2014
 - 2) Construction Start: May 1, 2014
 - 3) Substantial Completion: October 2014
 - 4) Punch List Walk-through: October 2014
 - 5) Final Inspection of Punch List: October 31, 2014
- 2.26 Contractor shall be required to submit an original certificate of insurance to the Construction Manager one week prior to commencement of contracted work
- 2.27 Contractor shall be responsible for on-site security of all tools, equipment, stored materials and installation materials until final acceptance by Battery Park City Authority.
- 2.28 Contractor shall be responsible for providing all equipment required for unloading, installation, clean-up and hauling of debris. Contractor is to be aware that due to the spacing limitations of the surrounding area of work there is to be no staging of equipment on site.
- 2.29 Contractor shall be responsible for snow and frost removal at site during construction in order to accommodate performance of work.
- 2.30 Proposer shall include as outlined in the cost proposal a daily rate to tent & heat the area of work to the required temperature as needed.
- 2.31 Contractor shall be responsible to perform field verification of all dimensions indicated on the contract documents, as well as any dimensions required to properly perform the work.
- 2.32 Contractor shall be required to submit an installation plan for approval by the Owner and Construction Manager prior to commencement of the work.
- 2.33 Contractor shall provide interim as-built documents in pdf format and a hard copy with each application for payment. These will be incorporated into the final as-built documentation.
- 2.34 Contractor is to be aware that although certain Drawings pertain to particular phases of the work, there is an overlap. Contractor shall review all Drawings prior to start of each phase.
- 2.35 The contractor is responsible for coordination of their work between the Engineer and the Dockmaster. In keeping with the project philosophy of "Zero Impact" on Marina operations, Contractor shall keep the interruption of quay services and access to moored vessels, their crews and passengers to a minimum.
- 2.36 Contractor shall not use the site for staging of construction materials or equipment. The barges shall be subject to the applicable federal, state and local ordinances in addition to the marina regulations.
- 2.37 The work by the Contractor shall conform to the applicable section of the New York City Noise Code regarding the sound level standards and the time and duration of construction activities.

END OF SECTION 00005

SECTION 01110

SUMMARY OF WORK

PART I - GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Description

The work covered in this project includes all materials, labor, and equipment necessary for the Esplanade Repairs at Battery Park City, Manhattan, NY.

B. In general, the work at the site includes, but is not limited to, the following:

1. Install environmental control booms and silt curtains around work area.
2. Remove and re-install the access hatch and soil (Location 1 only).
3. Demolition, removal, and disposal of loose and unsound concrete from the concrete piles and adjacent structures necessary for the repair or protection of the concrete piles as shown on the Contract Drawings.
4. Install temporary shoring as required for safety and to protect embankment from erosion.
5. Protect concrete piles with a formed and poured-in-place pile protection epoxy grout system, or repair concrete piles with a reinforced, formed and poured-in-place concrete pile repair system.
6. Remove temporary formwork, shoring, backfill excavations, and install additional riprap as necessary.
7. Remove environmental control booms and silt curtains.

1.02 EXISTING WORK

- A. Remove or alter existing work in such a manner as to prevent injury or damage to any portions of the existing work that remains.
- B. Repair or replace portions of existing work which have been altered during construction operations to match existing or adjoining work, as approved by the Owner. At the completion of operations, existing work shall be in a condition equal to or better than that which existed before new work started.

1.03 LOCATION OF UNDERGROUND FACILITIES

- A. Scan the construction site with electromagnetic or sonic equipment, and mark the surface of the ground where existing underground utilities are discovered. Verify the elevations of existing piping, utilities, and any type of underground obstruction not indicated or specified to be removed but indicated or discovered during scanning in locations where other work is to be installed.

- B. Coordinate with the Owner on the location of underground utilities and which utilities are to remain and be protected, and which are to be removed.
- C. Notify the Owner at least 24 hours prior to starting excavation work.

1.04 QUALITY ASSURANCE

- A. Use adequate number of skilled work personnel who are thoroughly trained and experienced in the necessary trades, and familiar with the specified requirements and methods required for proper performance of the work outlined in this specification.
- B. The Contractor shall coordinate the work to insure no conflicts occur to compromise the timely completion of all work specified.

1.05 WORKING CONDITIONS

- A. The Contractor is responsible for any precautions and scheduling necessary in order to maintain this status. Work may begin only after a schedule representing an acceptable plan is approved by the Owner.
- B. The Contractor shall coordinate day-to-day activities with the Owner. All conflicts will be resolved by the Owner's representative.
- C. The Owner shall be notified a minimum of two days prior, when any moored vessels are required to carry out along the esplanade work. The Owner shall be notified a minimum of one week prior, when any moored vessels are required to carry out work in the vicinity of the north cove or ferry terminals.

1.06 WORKING HOURS

- A. The Contractor is permitted to perform construction work between the hours of 7:00 AM and 4:30 PM Mondays through Fridays, excluding Saturdays, Sundays, and Federal Holidays. Work performed at any other time other than these periods will only be allowed pending approval of the Owner, following a 48 hour advanced request (72 hour for Sundays and Holidays).

1.07 AVAILABILITY OF UTILITIES

- A. Electrical: The Contractor shall provide its own electrical power and equipment. OSHA requirements will govern the use of such utility.
- B. Water: The Contractor will be responsible for supplying its own water and equipment, including all hoses, adapters and backflow preventer as required.
- C. Sanitary Facilities: The Contractor shall be responsible for furnishing and maintaining temporary toilet facilities for their employees.
- D. The Contractor is responsible for the cost of all utilities.

1.08 EQUIPMENT

- A. The Contractor shall supply all equipment necessary to perform all work, including but not limited to cleaning materials, ladders, etc.

1.09 RECEIPT OF MATERIALS

- A. Shipments of equipment, materials, and supplies shall be addressed to the Contractor, not the Owner. The Contractor shall provide all equipment, materials and labor for off-loading. The Owner will not accept shipments for the Contractor.

1.10 STORAGE OF MATERIALS

- A. Contractor's materials may be stored on site at a location that is approved by the Owner.

1.11 EXISTING MATERIALS

- A. The Owner shall have the opportunity to salvage all materials removed prior to disposal by Contractor.

1.12 DEFINITIONS

All abbreviations used in this specification shall pertain to the following:

ANSI:	American National Standards Inst. Inc. 1430 Broadway New York, NY 10018
APD/DEPA:	American Plywood Association Douglas Fir Plywood Association 1119 "A" Street Tacoma, WA 98401
ASTM:	American Society for Testing and Materials 1916 Race Street Philadelphia, PA 19103
AWPB:	American Wood Preservers Bureau P. O. Box 6085 Arlington, VA 22206
AWPA:	American Wood Preservers Association 7735 Old Georgetown Road Bethesda, MD 20714
EPA:	Environmental Protection Agency Public Information Center 401 "M" Street, SW Washington, DC 20460
NEC:	National Fire Protection Association National Electrical Code 470 Atlantic Avenue Boston, MA 02210
NFPA:	National Fire Protection Association 60 Battery March Street Boston, MA 02210

NWMA: National Wood Manufacturers Association
205 West Touhy Avenue
Park Ridge, IL 60068

OSHA: Occupational Safety Health Administration
U.S. Department of Labor
Government Printing Office
Washington, DC 20402

PS: Product Standard of NBS
Government Printing Office
Washington, DC 20402

UL: Underwriters Laboratory, Inc.
207 East Ohio Street
Chicago, IL 60611

1.13 SITE OFFICE FACILITIES AND STORAGE SHED (ONLY APPLIES TO LOCATION 2 – NORTH ESPLANADE)

- A. The Contractor shall be required to provide at his own cost and expense one office trailer with equipment having the minimum requirements hereinafter specified. Install and connect all utility services to said trailers within twenty (20) days of start of work. The trailer shall be positioned on the barge.
- B. One trailer shall be for use by the Contractor, the other for use by the Resident Engineer. The trailers shall remain the property of the Contractor.
- C. Trailers provided by the Contractor shall meet the following specifications:
 - 1. Trailers shall be office type trailers of the following general minimum dimensions:

Length, overall	35 feet
Length, inside	32 feet
Width, overall	8 feet
Width, inside	7 feet, 5 inches
 - 2. Trailers shall be similar or equivalent to that manufactured by International Trailer Company, Model No. 1 MU-35-D or Atlantic Trailer Corp., Model No. F-36.
 - 3. The exterior of the trailers shall be given an exterior enamel finish coat of DuPont Orange Lacquer. Trailers shall be lettered with black block lettering having white borders as follows:

Contractors name	2-1/2"
Hugh L. Carey Battery Park City Authority	3-3/4"
Contractors and Resident Engineers Office	2-1/2"

Note: In lieu of painting letters on trailers, the Contractor may substitute a sign constructed of good quality lumber with lettering of the same type and size.
 - 4. All windows and doors shall have insect aluminum screens and wire mesh protective screening.

5. Interior shall be of ¼-inch plywood and finished in natural color, with two coats of varnish or lacquer.
 6. Interior shall be divided by partitions into one large room in front of trailer, and a lockable private office for the Resident Engineer approximately 6 feet by 7 feet 5 inches at rear of trailer, and a washroom located adjacent to the private office.
 7. Washrooms shall be equipped with a flush toilet wash basin with two faucets, and a medicine cabinet, complete with supplies, equivalent to Hospital Supply and Watters Labs., Inc., Model No. 1, and a toilet roll tissue holder. Plumbing and fixtures shall be approved house type, with each appliance trapped and vented, and a single discharge connection. A 5-gallon capacity automatic electric heater for hot water shall be furnished.
 7. Heating systems shall consist of thermostatically controlled electric baseboard heating capable of delivering not less than 30,000 BTU per hour. Heaters shall be as manufactured by Chromalux, size per area with individual approved thermostats or approved equivalent.
 8. Trailers shall be equipped with an approved six-circuit, 110-120 volt armored cable wiring system of adequate capacity complete with entrance connector with provision for grounding, enclosed fused service switch and branch circuit fuse box. The circuit for lighting shall be two-conductor No. 12 and the circuits for water heater, heater, convenience outlets, etc., shall be two-conductor No. 12. The circuits for the space heaters shall be sized minimum No. 12 wire led from individual circuits in the branch circuit fuse box. Metal boxes shall be provided at all outlet points. All wiring shall conform to the requirements of the Electrical Code of the City of New York for armored cable wiring systems.
 9. Lighting to be furnished by a minimum of 4-48 inch single tube fluorescent fixtures for the large rooms and incandescent fixture for the washroom. Lighting fixtures shall be provided with built-in pull chain switches. A minimum of six duplex convenience outlets shall be installed, four in the larger room and two in the smaller room. These outlets shall be in addition to connections for space electric heaters and water heater.
- D. The following shall also be "built-in" to the Resident Engineer's trailer:
1. Drafting or reference table at least 60 inches long by 36 inches wide, with cabinet below, and head shelf at each end of the trailer, wall type plan rack at least 42 inches wide, with wardrobe opposite washroom.
- E. The Resident Engineer's trailer shall be furnished with the following equipment:
1. Four single pedestal desks, 42" x 32". Two swivel chairs with arms, and three side chairs without arms to match desk. Four lockers, metal, olive green or gray, single units, 15" x 18" x 78" overall including 6" legs. Lockers to have flat key locks with 2 keys each, General Steel Products or equivalent. Two (2) vertical steel filing cabinets, 4 drawer legal size with locks, full ball bearing suspension. Size approximately 52" H x 28 1/2" D x 18" W, gray finish. Art Steel No. 2904L as manufactured by the Art Steel Company, Inc., located at 170 West 23rd Street, New York, or approved equivalent.
 2. One 6000 BTU and one 9000 BTU air conditioners. Wiring for air conditioners shall be minimum No. 12 AWG fed from individual circuits in the fuse box.
 3. Two waste baskets, metal, olive green or gray, 13 inches square 15 inches high, with rubber feet and corners. Art Metal Company, No. 168 or equivalent.

4. One fire extinguisher, 1-quart vaporizing liquid type, brass, wall mounted. Pyrene No. C21, or equivalent.
 5. One Crystal Springs water cooler Model No. LP 14058, furnish for the duration of the contract bottled water as required.
 6. Contractor shall provide a copy machine for paper sizes 8-1/2" x 11" & 8-1/2" x 14". Copier shall stay at job site 30 days beyond the Substantial Completion date.
- F. Trailer Temporary Services: Plumbing, heating and electrical work required for the trailers will be furnished and maintained under this contract.
1. Plumbing work: Shall include all water supply and drainage piping required for a complete installation. Provide a temporary water service from the City's water main and extend in the trailer and properly connect all fixtures requiring water supply. Provide all necessary soil, waste, vent and drainage piping.
 2. Frost proof all water pipes to prevent freezing.
 3. Repairs and maintenance: Plumbing work shall be repaired when and as required for a period of thirty (30) days after the date of substantial completion acceptance.
 4. Disposition of plumbing work: At the expiration of the time limit set forth in subparagraph 3, the water drainage connections and piping to the Office Trailer shall be removed and shall be plugged at the mains.
 - a. All piping shall become the property of the contractor and shall be removed from the site as directed.
 - b. The Contractor shall be responsible for all repair work due to these removals.
 5. Electrical work: The Contractor shall furnish, install and maintain a temporary electric feeder to the Resident Engineer's Trailer immediately upon its placement at the job site.
 - a. The temporary electric feeder shall be at least 3 No. 6 THW wire and shall be protected by a 60 ampere fused safety switch, complying with codes and utility requirements having jurisdiction.
 - b. Make all arrangements and pay all costs to provide electric service.
 - c. Pay all costs for current consumed and for maintaining system in operating condition, including furnishing of necessary bulb replacements, lamps, etc., for thirty (30) days after date of substantial completion acceptance.
 - d. Disposition of electric work: Upon expiration date in sub-paragraph c, the temporary feeder, safety switch, etc., shall be removed and disposed of as directed.
 - e. All repair work due to these removals shall be the responsibility of the Contractor.

G. Maintenance

1. The Contractor shall provide and pay all costs for hot and cold water, heat and fuel, and regular daily janitor service. Furnish toilet paper, cloth towels, soap, and maintain the field

office in first-class condition, including all repairs, until 30 days after the date of substantial completion acceptance.

2. Upon final acceptance of all work under the contract, unless sooner directed, the Contractor shall have all services disconnected and capped to the satisfaction of the Resident Engineer.
- H. The Contractor shall provide and pay all costs for the following telephone services for the Resident Engineer's Trailer:
1. Two (2) desk phones
 2. One (1) fax machine
 3. A remote bell located outside trailer
 4. The telephone service shall continue for a period of thirty (30) days following substantial completion.
- I. Should it become necessary to relocate the trailers or move the field office from one location to another, the Contractor shall be responsible for all moves and for reconnecting all utilities described above at new location, and shall assume all costs incurred.
- J. Permits: The Contractor shall make the necessary arrangements for, and obtain all permits required for this work.
- K. The Contractor shall provide his own storage shed or trailer. No equipment or materials storage will be provided by the Owner.
- 1.14 POWER OUTAGE
- A. Needed power outages shall be arranged only with prior approval from the Owner, with duration and affected areas held to a minimum.
- 1.15 SITE VISIT
- A. Offerors or quoters are urged and expected to inspect the site where services are to be performed and to satisfy themselves regarding all general and local conditions that may affect the cost of contract performance, to the extent that the information is reasonably obtainable. In no event shall failure to inspect the site constitute grounds for a claim after contract award.
- 1.16 FINAL INSPECTION
- A. Final Inspection will not be made until all work under the contract is complete. The Contractor shall notify the Owner in writing 48 hours prior to the date on which the project will be ready for final inspection.
- 1.17 DUMPING AREA
- A. All discarded material shall be removed from the Owner's property and disposed of in an approved site complying with Local, State, and Federal regulations. Certified weight tickets shall be supplied to the Owner within 15 days of the date of the weight ticket for all trash and construction debris disposed. All dumpsters/containers shall be supplied by the Contractor. The contractor shall provide appropriate signs or covers to prevent use by Tenants.

- B. No material shall be washed or swept out of equipment or vehicles (including concrete from chutes of trucks, loose debris, etc.) onto Owner property or in the water. Any material spilled from Contractor furnished dumpsters/containers shall be immediately cleaned up by the Contractor.

1.18 RECYCLABLES

- A. The Contractor shall recycle or reuse all material designated as recyclable or prohibited from landfilling. Definitions for recyclables and landfill prohibited material can be obtained from the contracted trash hauler. Certified weight tickets shall be supplied to the Owner within 15 days of the date of removal from the facility for all material recycled or reused, and for landfill prohibited materials.

1.19 AS-BUILT DRAWINGS

- A. The Owner will furnish one complete set of black and white prints of all drawings which shall be used to indicate any changes from the contract set. Each sheet shall be marked "AS-BUILT DRAWINGS" in red pencil, and all changes or modifications shall be noted thereon by the Contractor.
- B. Changes shall be noted during the construction process for all trades.
- C. Keep "AS-BUILT DRAWINGS" current. Do not permanently conceal any work until the required information has been accurately recorded.
- D. Use colored pencils or pens for graphic work conforming to the following color code:
 - Red - Architectural and Structural Work
 - Green - Electrical WorkUse blue pen for written work
- E. Submit a complete set of "AS-BUILT DRAWINGS" to the Owner when all work has been completed, or as directed.

PART II - PRODUCTS

Not used.

PART III - EXECUTION

Not used.

END OF SECTION 01110

SECTION 01140

WORK RESTRICTIONS

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.

1.02 USE OF PREMISES

- A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.
 - 1. Limits: Confine construction operations to those areas delineated as included in the Construction Documents.
 - 2. Owner Occupancy: Allow for Owner occupancy of portions of the site and for use by the public at any and all times during the life of the contract. The Owner reserves the right to maintain and provide full public access to completed portions of the Battery Park City Esplanade within the contract limits at any time during the entire life of the contract. Contractor will be responsible for securing and maintaining temporary construction fencing as necessary to achieve and maintain this access.
 - 3. Contractor shall, throughout the life of the contract, maintain clear access to all areas of the Esplanade to personnel of Battery Park City Authority (Owner) for maintenance and repair operations. Specifically, the Owner and/or its agents shall be unencumbered from performing all required watering, planting, and maintenance operations for all areas adjacent to and within the contract limits.
 - 4. Construction Gates / Entrances: Keep all construction gates / entrances serving the premises clean, clear and available to the Owner, Owner's employees, emergency vehicles at all times. Do not use these areas for parking or storage of materials.
 - a. Schedule deliveries to minimize use of construction gates and entrances.
 - b. Schedule deliveries to coordinate with other contractor's gaining access to the site.
 - c. Provide flag-person services for all deliveries into and out of the site so as to protect the public, at the discretion of the Construction Manager.
 - d. Secure all construction entrances and gates to the site at all times.
 - e. Provide durable signage limiting public access to the construction site at all construction gate / entrances as directed by the Construction Manager.
 - f. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Site: Maintain existing site throughout the construction period. Repair damage caused by construction operations.

1.03 OCCUPANCY REQUIREMENTS

- A. Partial Owner Occupancy: Owner may occupy portions of the site during the construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.

PART II – PRODUCTS

Not used.

PART III – EXECUTION

Not used.

END OF SECTION 01140

SECTION 01310

PROJECT MANAGEMENT AND COORDINATION

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to this section.

1.02 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Conservation.
 - 3. Coordination Drawings.
 - 4. Administrative and supervisory personnel.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 1 – Section “Construction Progress Documentation” for preparing and submitting the Contractor’s Construction Schedule.
 - 2. Division 1 – Section “Execution Requirements” for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Division 1 – Section “Closeout Procedures” for coordinating Contract closeout.

1.03 COORDINATION

- A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
 - 4. Provide detailed written construction work plans within 14 days in a format and containing information as requested by the Construction Manager.

- B. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's Construction Schedule.
 - 2. Preparation of the Schedule of Values for payment to completed work.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Pre-installation conferences.
 - 7. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.04 SUBMITTALS

- A. Coordination Drawings / Work Plans: Prepare Coordination Drawings and/or detailed work plans where careful coordination is needed for installation of products and materials fabricated by separate entities and/or as requested by the Construction Manager. Prepare coordination drawings and/or work plans where limited space availability necessitates utilization of space for efficient installation of different components.
 - 1. Indicate relationship of components shown on separate Shop Drawings and/or work plans.
 - 2. Indicate required installation sequences.
- B. Staff Names: Within 14 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.05 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Project Manager: Submit resume confirming a minimum of 15 years of site construction experience.
2. Project superintendent: Submit resume confirming a minimum of 10 years of site construction experience.
3. Office Engineer: Submit resume confirming a minimum of 5 years of site construction experience.
4. Include special personnel required for coordination of operations with other contractors.

1.06 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner, and Construction Manager of scheduled meeting dates and times.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner, Construction Manager, and the Engineer, within 5 days of the meeting.

B. Pre-construction Conference: Schedule a pre-construction conference before starting construction, at a time convenient to Owner, Construction Manager and the Engineer, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Construction Manager, Engineer, and their consultants; Contractor and its superintendents; major subcontractors; manufacturers; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing.
 - d. Designation of responsible personnel.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for processing Applications for Payment.
 - g. Distribution of the Contract Documents.
 - h. Submittal procedures.
 - i. Preparation of Record Documents.
 - j. Use of the premises.
 - k. Responsibility for temporary facilities and controls.
 - l. Parking availability.
 - m. Office, work, and storage areas.
 - n. Equipment deliveries and priorities.
 - o. Testing and inspection requirements.

- p. Required performance results.
 - q. Protection of construction personnel.
 - r. First aid.
 - s. Security.
 - t. Progress cleaning.
 - u. Working hours.
 - v. MBE/WBE compliance reporting requirements.
 - 3. Record significant conference discussions, agreements, and disagreements.
 - 4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- C. Progress Meetings: Conduct progress meetings at biweekly intervals. Coordinate dates of meetings with preparation of payment requests.
- 1. Attendees: In addition to representatives of Owner, Construction Manager, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review present and future needs of each entity present, including the following:
 - 1. Interface requirements.
 - 2. Sequence of operations.
 - 3. Status of submittals.
 - 4. Deliveries.
 - 5. Off-site fabrication.
 - 6. Access.
 - 7. Site utilization.
 - 8. Temporary facilities and controls.
 - 9. Work hours.
 - 10. Hazards and risks.
 - 11. Progress cleaning.
 - 12. Quality and work standards.
 - 13. Change Orders.
 - 14. Documentation of information for payment requests.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
 - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- D. Coordination Meetings: Conduct Project coordination meetings as needed. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.
 1. Attendees: In addition to representatives of Owner, Construction Manager, and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract time.
 - b. Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report for each meeting.
 - c. Review present and future needs of each contractor present, including the following:
 1. Interface requirements.
 2. Sequence of operations.
 3. Status of submittals.
 4. Deliveries.
 5. Off-site fabrication.
 6. Access.
 7. Site utilization.
 8. Temporary facilities and controls.
 9. Work hours.
 10. Hazards and risks.
 11. Progress cleaning.
 12. Quality and work standards.
 13. Change Orders.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

PART II – PRODUCTS

Not used.

PART III – EXECUTION

Not used.

END OF SECTION 01310

SECTION 01320
CONSTRUCTION PROGRESS DOCUMENTATION

PART I - GENERAL

1.01 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

A. Schedules

1. Construction schedule (Owner)
2. Material delivery schedule (Owner)

1.02 CONSTRUCTION SCHEDULE

Within 10 days after receipt of the Notice of Award, prepare and submit to the Owner's representative for approval a Critical Path Method (CPM) Schedule.

1.03 MATERIAL DELIVERY SCHEDULE

A. Initial Schedule

Within 30 calendar days after approval of the proposed construction schedule, submit for Owner's representative approval a schedule showing procurement plans for materials and equipment. Submit in the format and content as prescribed by the Owner's representative, and include as a minimum the following information:

1. Description.
2. Date of the purchase order.
3. Promised shipping date.
4. Name of the manufacturer or supplier.
5. Date delivery is expected.
6. Date the material or equipment is required, according to the current construction schedule.

1.04 NETWORK ANALYSIS SYSTEM (NAS)

- A. As an alternative to the critical path method (CPM) schedule, the Contractor may use, subject to the approval of the Owner's Representative, some other computer generated network analysis system affording similar and equal information and control to that provided by the CPM.
- B. The schedule shall have a minimum of 25 activities and a maximum of 200 activities. The schedule shall identify as a minimum:

1. Construction time for all major systems and components;
2. Manpower requirements for each activity;
3. Major submittals and submittal processing time; and
4. Major material and equipment lead time.

C. CPM Submittals and Procedures

Submit all network analysis and updates in hard copy. Also submit CPM network schedule on 3-1/2 inch high density (1.4 MB) floppy disks. The network analysis system shall be submitted in a format acceptable to the Owner and be capable of running on an IBM compatible computer (IBM is a registered trademark of International Business Machines), operating with MS DOS 3.3 or later or "Windows" 3.0 or later. The network analysis system shall be kept current, with changes made to reflect the actual progress and status of the construction.

1.05 UPDATED SCHEDULES

Update the construction schedule and material delivery schedule at monthly intervals or when schedule has been revised. Reflect any changes occurring since the last update. Submit copies of the purchase orders and confirmation of the delivery dates as directed by the Owner's representative.

PART II - PRODUCTS

Not used.

PART III - EXECUTION

Not used.

END OF SECTION 01320

SECTION 01330

SUBMITTAL PROCEDURES

PART I - GENERAL

1.01 DEFINITIONS

- A. Submittals consist of shop drawings, product data, samples, and administrative submittals presented for review and approval. All sections of the Construction Contract, General Conditions and Supplemental Conditions apply to all "submittals."
- B. All submittals are classified as indicated in the paragraph "Schedule of Submittal Descriptions." The submittals also are grouped as follows:
 - 1. Shop drawings: As used in this section, drawings, schedules, diagrams, and other data prepared specifically for this Contract, by the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate a portion of the work.
 - 2. Product data: Preprinted material such as illustrations, standard schedules, performance charts, instructions, brochures, diagrams, manufacturer's descriptive literature, catalog data, and other data to illustrate a portion of the work, but not prepared exclusively for this Contract.
 - 3. Samples: Physical examples of workmanship, products, materials, assemblies or equipment that are physically identical to a portion of the work, depicting a portion of the work or establishing standards for evaluating the appearance of the finished work or both.
 - 4. Administrative submittals: Data presented for reviews and approval to ensure that the administrative requirements of the project are adequately met but not to ensure directly that the work is in accordance with the design concept and in compliance with the Contract documents.
- C. Approving Authority is the person authorized to approve a submittal.
- D. Work, as used in this section, on- and off-site construction required by the Contract documents, including labor necessary to produce the construction and materials, products, equipment, and systems incorporated or to be incorporated in such construction.

1.02 PROCEDURES FOR SUBMITTALS

- A. The QC organization shall be responsible for reviewing and certifying that submittals are in compliance with contract requirements. The approving authority on submittals is the QC Manager unless otherwise specified for the specific submittal. At each "Submittal" paragraph in the individual specification sections, the notation "Owner," following a submittal item, indicates the Owner's Representative is the approving authority for that submittal item.
- B. Constraints
 - 1. Submittals listed or specified in this Contract shall conform to the provisions of this section, unless explicitly stated otherwise.

2. Submittals shall be complete for each definable feature of work; components of the definable feature interrelated as a system shall be submitted at the same time.
3. When acceptability of a submittal is dependent on conditions, items, or materials included in separate subsequent submittals, the submittal will be returned without review.
4. Approval of a separate material, product, or component does not imply approval of assembly in which the item functions.

C. Scheduling

1. Coordinate scheduling, sequencing, preparing and processing of submittals with performance of the work so that work will not be delayed by submittal processing. Allow for potential requirements to resubmit.
2. Except as specified otherwise, allow a review period, beginning with receipt by the approving authority, that includes at least 15 working days for submittals for QC Manager approval and 20 working days for submittals for the Owner's Representative approval. The period of review for submittals with the Owner's Representative approval begins when the Owner receives the submittal from the QC organization. The period of review for each re-submittal is the same as for the initial submittal.

D. Variations from contract requirements require the Owner's approval and will be considered where advantageous to the Owner. When proposing a variation, submit a written request to the Owner's Representative, with documentation of the nature and features of the variation and why the variation is desirable and beneficial to the Owner. If lower cost is a benefit, also include an estimate of the cost saving. Identify the proposed variation separately and include the documentation for the proposed variation along with the required submittal for the item. When submitting a variation for approval, the Contractor warrants the following:

1. The Contract has been reviewed to establish that the variation, if incorporated, will be compatible with other elements of the work.
2. In addition to the normal submittal review period, a period of 10 working days will be allowed for consideration by the Owner of submittals with variations.

E. Contractor's Responsibilities

1. Determine and verify field measurements, materials, field construction criteria; review each submittal; and check and coordinate each submittal with requirements of the work and Contract documents.
2. Transmit submittals to the QC organization in orderly sequence to prevent delays in the work, delays to the Owner, or delays to separate contractors.
3. Advise the Owner's Representative of variation, as required by the paragraph entitled "Variations."
4. Correct and resubmit submittal as directed by the approving authority. When resubmitting disapproved transmittals or transmittals noted for resubmittal, the Contractor shall provide a copy of that previously submitted transmittal including all reviewer comments for use by the approving authority. Direct specific attention, in writing or on resubmitted submittal, to revisions not requested by the approving authority on previous submissions.

5. Furnish additional copies of submittals when requested by the Owner's Representative, to a limit of 6 copies per submittal.
6. Complete work which must be accomplished as a basis of a submittal in time to allow the submittal to occur as scheduled.
7. Ensure no work has begun until submittals for that work have been returned as "approved," or "approved as noted ", except to the extent that a portion of the work must be accomplished as a basis of the submittal.

F. QC Organization Responsibilities

1. Note date on each submittal received from the contractor.
2. Review each submittal; and check and coordinate each submittal with the requirements of the work and Contract documents.
3. Review submittals for conformance with project design concepts and compliance with the Contract documents.
4. Act on submittals, determining the appropriate action based on the QC organization's review of the submittal.
 - a. When the QC Manager is the approving authority, take the appropriate action on the submittal from the possible actions defined in the paragraph entitled, "Actions Possible."
 - b. When the Owner's Representative is the approving authority or when a variation has been proposed, forward the submittal to the Owner with a certifying statement or return the submittal marked "not reviewed" or "revise and resubmit" as appropriate. The QC organization's review of the submittal determines the appropriate action.
5. Ensure that material is clearly legible.
6. Stamp each sheet of each submittal with the QC certifying statement or approving statement, except that data submitted in bound volume or on one sheet printed on two sides may be stamped on the front of the first sheet only.
 - a. When the approving authority is the Owner's Representative, the QC organization will certify submittals forwarded to the Owner's Representative with the following certifying statement:

"I hereby certify that the (equipment) (material) (article) shown and marked in this submittal is that proposed to be incorporated with Contract Number [____], is in compliance with the Contract drawings and specification, can be installed in the allocated spaces, and is submitted for Owner approval.

Certified by Submittal Reviewer _____, Date _____
(Signature when applicable)

Certified by QC Manager _____, Date _____
(Signature)

- b. When the approving authority is the QC Manager, the QC manager will use the following approval statement when returning submittals to the Contractor as "Approved" or "Approved as Noted."

"I hereby certify that the (material) (equipment) (article) shown and marked in this submittal and proposed to be incorporated with Contract Number [____], is in compliance with the contract drawings and specification, can be installed in the allocated spaces, and is ____ approved for use.

Certified by Submittal Reviewer _____, Date ____
(Signature when applicable)

Approved by QC Manager _____, Date ____
(Signature)

7. Sign the certifying statement or approval statement. The person signing the certifying statements shall be the QC organization member designated in the approved QC plan. The signatures shall be in original ink. Stamped signatures are not acceptable.
8. Retain a copy of approved submittals at the project site, including the Contractor's copy of approved samples.

G. Owner's Responsibilities

When the approving authority is the Owner's Representative, the Owner will:

1. Note the date on which the submittal was received from the QC Manager, on each submittal for which the Owner's Representative is the approving authority.
2. Review submittals for approval within the scheduling period specified and only for conformance with project design concepts and compliance with the Contract documents.
3. Identify returned submittals with one of the actions defined in the paragraph entitled "Actions Possible" and with markings appropriate for the action indicated.

H. Actions Possible

Submittals will be returned with one of the following notations:

1. Submittals marked "not reviewed" will indicate the submittal has been previously reviewed and approved, is not required as a submittal, does not have evidence of being reviewed and approved by the Contractor, or is not complete. A submittal marked "not reviewed" will be returned with an explanation of the reason it is not reviewed. Returned submittals deemed to lack review by the Contractor or to be incomplete shall be resubmitted with appropriate action, coordination, or change.
2. Submittals marked "approved" "approved as submitted" authorize the Contractor to proceed with the work covered.
3. Submittals marked "approved as noted" authorize the Contractor to proceed with the work as noted provided the Contractor takes no exception to the notations.
4. Submittals marked "revise and resubmit" or "disapproved" indicate the submittal is

incomplete or does not comply with the design concept or the requirements of the Contract documents and shall be resubmitted with appropriate changes. No work shall proceed for this item until the re-submittal is approved.

1.03 FORMAT OF SUBMITTALS

A. Transmittal Form

Transmit each submittal, except sample installations and sample panels, to the office of the approving authority. Transmit submittals with a transmittal form prescribed by the Owner's Representative and the project standard. Transmittal form shall identify the Contractor, the date of submittal, and include information prescribed by the transmittal form and required in the paragraph entitled "Identifying Submittals." Process transmittal forms to record actions regarding sample panels and sample installations.

B. Identify submittals, except sample panel and sample installation, with the following information permanently adhered to or noted on each separate component of each submittal and noted on the transmittal form. Mark each copy of each submittal identically with the following:

1. Project title and location.
2. Construction Contract number.
3. Section number of the specification section by which the submittal is required.
4. When a resubmission, an alphabetic suffix on the transmittal number, for example, SD-10A, to indicate the resubmission.
5. The name, address, and telephone number of the subcontractor, supplier, manufacturer and any other second tier contractor associated with the submittal.
6. Product identification and location in project.

C. Format for Product Data

1. Present product data submittals for each section as a complete, bound volume. Include a table of contents listing page and catalog item numbers of product data.
2. Indicate, by prominent notation, each product that is being submitted; and indicate the specification section number and paragraph number to which it pertains.
3. Supplement product data with material prepared for the project to satisfy submittal requirements for which product data does not exist. Identify this material as developed specifically for the project.

D. Format for Shop Drawings

1. Shop drawings shall not be less than 8-1/2" by 11" nor more than 30" x 42".
2. Present 8-1/2" x 11" sized shop drawings as a part of the bound volume for the submittals required by the section. Present larger drawings in sets.
3. Include on each drawing the drawing title, number, date, and revision numbers and dates, in addition to the information required in the paragraph entitled "Identifying Submittals."

4. Dimension drawings, except diagrams and schematic drawings; prepare drawings demonstrating interface with other trades to scale. Identify materials and products for work shown.
- E. Format of Samples
1. Furnish samples in the sizes below, unless otherwise specified or unless the manufacturer has prepackaged samples of a similar size as specified:
 - a. Sample of Equipment or Device: Full size.
 - b. Sample of Materials Less Than 2 by 3 inches: Built up to 8-1/2" by 11".
 - c. Sample of Materials Exceeding 8-1/2" by 11": Cut down to 8-1/2" by 11" and adequate to indicate color, texture, and material variations.
 - d. Sample of Linear Devices or Materials: 10" length or length to be supplied, if less than 10". Examples include conduit and handrails.
 - e. Sample of Non-Solid Materials: Pint. Examples include sand and paint.
 - f. Color Selection Samples: 2 inches by 4 inches.
 - g. Sample Panel: 4 feet by 4 feet.
 - h. Sample Installation: 100 square feet.
 2. Samples Showing Range of Variation: Where variations are unavoidable due to the nature of the materials, submit sets of samples of not less than three units showing the extremes and middle of the range.
 3. Reusable Samples: Incorporate returned samples into work only if so specified or indicated. Incorporated samples shall be in undamaged condition at time of use.
 4. Recording of Sample Installation: Note and preserve the notation of the area constituting the sample installation but remove the notation at the final clean up of the project.
 5. When a color, texture or pattern is specified in naming a particular manufacturer and style, include one sample of that manufacturer and style, for comparison.
- F. Format of Administrative Submittals
1. When a submittal includes a document to be used in the project or becomes a part of the project record, other than as a submittal, apply the Contractor's approval stamp to a separate sheet accompanying the document.
 2. Operation and Maintenance Manual Data: Submit "Operation and Maintenance Data." Include components required in that section and the various technical sections.

1.04 QUANTITY OF SUBMITTALS

A. Number of Copies of Product Data

Submit 3 copies of product data requiring review and approval only by the QC organization and

4 copies of product data requiring review and approval by the Owner's Representative.

B. Number of Copies of Shop Drawings

Submit shop drawings in compliance with the quantity requirements specified for product data.

C. Number of Samples

1. Submit two samples, or two sets of samples showing range of variation, of each required item. One approved sample or set of samples will be retained by the approving authority and one will be returned to the Contractor.
2. Submit one sample panel. Include components listed in technical section or as directed.
3. Submit one sample installation, where directed.
4. Submit one sample of non-solid materials.

D. Number of Copies of Administrative Submittals

1. Unless otherwise specified, submit the administrative submittals compliance with the quantity requirements specified for product data.

1.05 FORWARDING SUBMITTALS

A. Samples Required of the Contractor

1. Submit samples to the Engineer.

B. Shop Drawings, Product Data, and O&M Data

1. As soon as practicable after award of the contract, and before procurement or fabrication, submit, except as specified otherwise, to the Engineer, shop drawings and product data required in the technical sections of this specification. The Engineer for this project will review and provide surveillance for the Owner's Representative to determine if Contractor approved submittals comply with the contract requirements, and will review and approve for the Owner's Representative those submittals not permitted to be Contractor approved to determine if submittals comply with the contract requirements.

1.06 SUBMITTAL DESCRIPTIONS

A. Data

1. Submittals that provide calculations, descriptions, or other documentation regarding the work.

B. Manufacturer's Catalog Data

1. Data composed of catalog cuts, brochures, circulars, specifications and product data, and printed information in sufficient detail and scope to verify compliance with requirements of the contract documents. A type of product data.

C. Manufacturer's Standard Color Charts

1. Preprinted illustrations displaying choices of color and finish for a material or product. A type

of product data.

D. Drawings

1. Submittals which graphically show relationship of various components of the work, schematic diagrams of systems, detail of fabrications, layout of particular elements, connections, and other relational aspects of the work. A type of shop drawing.

E. Design Data

1. Design calculations, mix designs, analyses, or other data, written in nature and pertaining to a part of the work. A type of shop drawing.

F. Instructions

1. Preprinted material describing installation of a product, system, or material, including special notices and Material Safety Data Sheets, if any, concerning impedances, hazards, and safety precautions. A type of product data.

G. Schedules

1. A tabular list of data or tabular list including location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the work. A type of shop drawing.

H. Statements

1. A document, required of the Contractor, or through the Contractor via a supplier, installer, manufacturer, or other lower tier contractor, the purpose of which is to further the quality or orderly progression of a portion of the work by documenting procedures, acceptability of methods or personnel, qualifications, or other verification of quality. A type of shop drawing.

I. Reports

1. Reports of inspection and laboratory test, including analysis and interpretation of test results. Each report shall be properly identified. Test methods used and compliance with recognized test standards shall be described.

J. Test Reports

1. A report signed by an authorized official of an independent testing laboratory that a material, product, or system identical to the material, product or system to be provided has been tested in accordance with requirements specified by naming the test method and material. The test report must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. Testing must have been within three years of the date of award of this Contract. A type of product data.

K. Factory Test Reports

1. A written report which includes the findings of a test required to be performed by the manufacturer on a prototype or on an actual portion of the work prepared for this project, before it is shipped to the job site. The report must be signed by an authorized official of the

manufacturer's test facility or testing laboratory and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

L. Field Test Reports

1. A written report which includes the findings of a test made at the job site, in the vicinity of the job site, or on a sample taken from the job site, on a portion of the work, during or after installation. The report must be signed by an authorized official of a testing laboratory or agency and must state the test was performed in accordance with the test requirements; state the test results; and indicate whether the material, product, or system has passed or failed the test. A type of shop drawing.

M. Certificates

1. Statements signed by responsible officials of a manufacturer of a product, system, or material attesting that the product, system, or material meet specified requirements. The statements must be dated after the award of this contract, name the project, and list the specific requirements which it is intended to address. A type of shop drawing.

N. Samples

1. Samples, including both fabricated and unfabricated physical examples of materials, products, and units of work as complete units or as portions of units of work. A type of sample.

O. Sample Panels

1. An assembly constructed at the project site in a location acceptable to the Owner's Representative and using materials and methods to be employed in the work; completely finished; maintained during construction; and removed at the conclusion of the work or when authorized by the Owner's Representative. A type of sample.

P. Sample Installations

1. A portion of an assembly or material constructed where directed and, if approved, retained as a part of the work. A type of sample.

Q. Records

1. Documentation to ensure compliance with an administrative requirement or to establish an administrative mechanism. A type of administrative submittal.

PART II - PRODUCTS

Not used.

PART III - EXECUTION

A. Product data sheets to be submitted for review include but are not limited to:

1. Concrete mix.
2. Hydraulic cement.

3. Epoxy Grout.
4. Fiberglass jackets and epoxy joint sealant.
5. Reinforcing bars.
6. Reinforcing mesh (welded wire fabric).
7. Silt boom.

B. Shop drawings and other submittals for review include but are not limited to:

1. Reinforcing steel including splice lengths.
2. Silt boom location.
3. Material laydown, staging plan and fencing.
4. Barge placement and mooring.
5. Construction sequencing.
6. Access Hatch opening and restoration plan (Location 1 only).

END OF SECTION 01330

SECTION 01450
QUALITY ASSURANCE

PART I - GENERAL

1.01 REFERENCES

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A880	Criteria for Use in Evaluation of Testing Laboratories and Organization for Examination and Inspection of Steel, Stainless Steel, and Related Alloys
ASTM C1077	Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation
ASTM C31	Standard Method of Making and Curing Concrete Compressive and Flexural Test Specimens in the Field.
ASTM C39	Standard method of Test for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C94	Standard Specification for Ready-Mix Concrete.
ASTM C138	Standard Method of Test for Unit Weight, Yield, and Air Content of Concrete.
ASTM C172	Standard Method of Sampling Fresh Concrete.
ASTM C192	Standard Method of Making and Curing Concrete Test Specimens in the Laboratory.
ASTM C214	Recommended Practice for Evaluation of Compression Test Results of Field Concrete.
ASTM D3740	(Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E329	Agencies Engaged in the Testing and/or Inspection of Materials Used on Construction
ASTM E543	Evaluating Agencies that Perform Nondestructive Testing

1.02 SUBMITTALS

Submit the following in accordance with Section 01330 entitled "Submittal Procedures."

- A. Contractor Production Report.

1.03 TESTING

Except as stated otherwise in the specification sections, perform sampling and testing required under this Contract.

- A. Provide an independent testing laboratory qualified to perform sampling and tests required by this Contract. When the proposed testing laboratory is not accredited by an acceptable "Qualified National Authority" listed in the paragraph entitled "Qualified National Authority," submit to the Contracting Officer for approval, certified statements, signed by an official of the testing laboratory attesting that the proposed laboratory, meets or conforms to the following requirements:
 - 1. Laboratories engaged in testing of construction materials shall meet the requirements of ASTM E329.
 - 2. Laboratories engaged in testing of concrete and concrete aggregates shall meet the requirements of ASTM C1077.
 - 3. Laboratories engaged in testing of soil and rock, as used in engineering design and construction, shall meet the requirements of ASTM D3740.
 - 4. Laboratories engaged in inspection and testing of steel, stainless steel, and related alloys will be evaluated according to ASTM A880.
 - 5. Laboratories engaged in nondestructive testing (NDT) shall meet the requirements of ASTM E543.
 - 6. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA.
- B. Qualified National Authorities are the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology, the American Association of State Highway and Transportation Officials (AASHTO) program, and the American Association for Laboratory Accreditation (A2LA) program. Furnish to the Owner, a copy of the Certificate of Accreditation and Scope of Accreditation. The scope of the laboratory's accreditation shall include the test methods required by the Contract.
- C. Prior to approval of non-accredited laboratories, the proposed testing laboratory facilities and records may be subject to inspection by the Engineer. Records subject to inspection include equipment inventory, equipment calibration dates and procedures, library of test procedures, audit and inspection reports by agencies conducting laboratory evaluations and certifications, testing and management personnel qualifications, test report forms, and the internal QC procedures.
- D. The Owner retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in this Contract.
- E. Cite applicable Contract requirements, tests or analytical procedures used when reporting test results. Provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. If the item fails to conform, notify Owner immediately. Conspicuously stamp the cover sheet for each report in large red letters

"CONFORMS" or "DOES NOT CONFORM" to the specification requirements, whichever is applicable. Test results shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to the Owner. Furnish a summary report of field tests at the end of each month.

- F. The Contractor shall furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the Owner.

1.04 COMPLETION INSPECTIONS

- A. Near the completion of all work or any increment thereof established by a completion time stated elsewhere in the specifications, the Contractor shall conduct an inspection of the work and develop a "punch list" of items which do not conform to the approved drawings and specifications. Include in the punch list any remaining items on the "Rework Items List" which were not corrected prior to the Punch-Out Inspection. The punch list shall include the estimated date by which the deficiencies will be corrected. A copy of the punch list shall be provided to the Owner. The Contractor or staff shall make follow-on inspections to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Owner that the facility is ready for the Owner "Pre-Final Inspection."
- B. The Owner will perform a pre-final inspection to verify that the facility is complete and ready to be occupied. An Owner "Pre-Final Punch List" may be developed as a result of this inspection. The Contractor shall ensure that all items on this list are corrected prior to notifying the Owner that a "Final" inspection can be scheduled. Any items noted on the "Pre-Final" inspection shall be corrected in timely manner and shall be accomplished within the time slated for completion of the entire work, or any particular increment thereof if the project is divided into increments by separate completion dates.
- C. The Contractor's Project Manager, the superintendent or other primary contractor management personnel, and the Owner's Representative will be in attendance at the Final Acceptance Inspection. Additional Owner personnel may be in attendance. The final acceptance inspection will be formally scheduled by the Engineer based upon results of the "Pre-Final" inspection. Notice shall be given to the Owner at least 14 days prior to the final inspection stating that all specific items previously identified to the Contractor as being unacceptable, along with all the remaining work performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection.

1.05 DOCUMENTATION

- A. Maintain current and complete records of on-site and off-site QC program operations and activities.
- B. Contractor Production Reports are required for each day that work is performed. Account for each calendar day throughout the life of the Contract. The reporting of work shall be identified by terminology consistent with the construction schedule. Contractor Production Reports are to be prepared, signed and dated by the project superintendent and shall contain the following information:
 - 1. Date of report, report number, name of contractor, Contract number, title and location of Contract and superintendent present.
 - 2. Weather conditions in the morning and in the afternoon including maximum and minimum temperatures.

3. Identify work performed by corresponding Scheduled Activity No., Modification No., etc.
4. A list of Contractor and subcontractor personnel on the work site, their trades, employer, work location, description of work performed, hours worked by trade, daily total work hours on work site, and total work hours from start of construction.
5. A list of job safety actions taken and safety inspections conducted. Indicate that safety requirements have been met including the results on the following:
 - a. Was a job safety meeting held? (If YES, attach a copy of the meeting minutes.)
 - b. Were there any lost time accidents? (If YES, attach a copy of the completed OSHA report.)
 - c. Was crane/trenching/scaffold/high voltage electrical/high work done? (If YES, attach a statement or checklist showing inspection performed.)
 - d. Was hazardous material/waste released into the environment? (If YES, attach a description of meetings held and accidents that happened.)
 - e. List safety actions taken today and safety inspections conducted.
6. A list of equipment/material received each day that is incorporated into the job.
7. A list of construction equipment on the work site including the number of hours used, idle and down for repair.
8. Include a "remarks" section in this report which will contain pertinent information including directions received, problems encountered during construction, work progress and delays, conflicts or errors in the drawings or specifications, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a record of visitors to the work site.

1.06 NOTIFICATION ON NON-COMPLIANCE

- A. The Owner will notify the Contractor of any detected non-compliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Owner may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time for excess costs or damages by the Contractor.

PART II - PRODUCTS

Not used.

PART III - EXECUTION

Not used.

END OF SECTION 01450

SECTION 01525

SAFETY REQUIREMENTS

PART I - GENERAL

1.01 REFERENCES

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI A10.14 Construction and Demolition Operations - Requirements for Safety Belts, Harnesses, Lanyards and Lifelines for Construction and Demolition Use

ANSI Z359.1 Safety Requirements for Personal Fall Arrest Systems

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.120 Hazardous Waste Operations and Emergency Response

29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)

NFPA 10 Portable Fire Extinguishers

NFPA 70 National Electric Code

NFPA 241 Safeguarding Construction, Alteration, and Demolition Operations

1.02 DEFINITIONS

- A. Certified Industrial Hygienist: An individual who is certified by the American Board of Industrial Hygiene.
- B. Certified Safety Professional: A safety manager/specialist, or safety engineer that has passed the CSP exam administered by the Board of Certified Safety Professionals.
- C. Confined Space: A space which by design has limited openings for entry and exit, unfavorable natural ventilation which could contain or produce dangerous air contaminants, and which is not intended for continuous employee occupancy, engulfment or any other recognized safety or health hazard. Confined spaces include, but are not limited to storage tanks, process vessels, pits, silos, vats, degreasers, reaction vessels, boilers, ventilation and exhaust ducts, sewers, tunnels, underground utility vaults, and pipelines.
- D. Multi-employer work site (MEWS): The prime contractor is the "controlling authority" for all work site safety and health of the subcontractors.
- E. Recordable Occupational Injuries or Illness: An occupational injury or illnesses that result in serious injuries, lost workday cases, non-fatal cases or significant mishaps.

- F. Serious Injuries & Fatalities: Regardless of the time between the injury and death or the length of the illness; hospitalization of three or more employees; or property damage in excess of \$200,000.
- G. Lost Workday Cases: Injuries, other than fatalities, that result in lost workdays.
- H. Non-Fatal Cases: Cases without lost workdays which result in transfer to another job or termination of employment, or require medical treatment (other than first aid) or involve property damage in excess of \$10,000 but less than \$200,000 or involve: loss of consciousness or restriction of work or motion. This category also includes any diagnosed occupational illnesses that are reported to the employer but are not classified as fatalities or lost workday cases.
- I. Safety Officer: The superintendent or other qualified or competent person who is responsible for the on-site safety required for the project. The contractor quality control person cannot be the safety officer, even though the QC has safety inspection responsibilities as part of the QC duties.
- J. Significant Contractor Mishap: A contractor mishap which involves falls of 4 feet or more, electrical mishaps, confined space mishaps, diving mishaps, equipment mishaps, and fire mishaps which result in a lost time injury, or property damage of \$10,000 or more, but less than \$200,000; or when fire department or emergency medical treatment (EMT) assistance is required.
- K. Medical Treatment: Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment provided by a physician or registered personnel.
- L. First Aid: A one-time treatment, and follow-up visit for the purpose of observation, of minor scratches, cuts, burns, splinters, etc., which do not ordinarily require medical care, even though provided by a physician or registered professional personnel.
- M. Lost Workdays: The number of days (consecutive or not) after, but not including, the day of injury or illness during which the employee would have worked but could not do so; that is, could not perform all or part of his normal assignment during all or any part of the workday or shift; because of the occupational injury or illness.

1.03 SUBMITTALS

- A. Submit site specific accident prevention plan for review and approval at least 15 calendar days prior to start of work at the job site. Conform to requirements of Federal, State and local safety and health laws and regulations. Work cannot proceed until the APP has been reviewed and found acceptable by the Owner or his designated representative. The APP shall be site specific and shall include:
 - 1. Name and safety related qualifications of the superintendent. Superintendent must demonstrate the ability to manage the on-site Contractor safety program through appropriate management controls and maintain a log of safety inspections performed. The superintendent must be able to identify hazards and shall have the direct responsibility for expending resources necessary to correct the hazards. The superintendent shall maintain applicable safety reference material on the job site.
 - 2. Emergency action plan to include a map denoting the route to the nearest emergency care

facility with emergency phone numbers that will be displayed in clear view for on-site employees.

3. Confined Space Entry Plan: Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions. Include procedure for rescue by contractor personnel and the coordination with emergency responders. (If there is no confined space work, include a statement that no confined space work exists and none will be created.)

B. The APP shall include provisions to deal with hazardous materials as follows:

1. Inventory of hazardous materials to be introduced to the site with estimated quantities.
2. Plan for protecting personnel and property during the transport, storage and use of materials.
3. Emergency procedures for spill response and disposal, including a site map with approximate quantities on-site at any given time. The site map will be attached to the inventory, showing where the hazardous substances are stored.
4. Material Safety Data sheets for materials listed in inventory and not required in technical section of specification.
5. Approved labeling system to identify contents on all containers on-site.
6. Plan for communicating high health hazards to employees and adjacent occupants.

C. Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports".

1.04 QUALITY ASSURANCE

A. The safety officer shall attend the required pre-construction conference.

B. Hold safety meetings monthly. Attach minutes showing contract title, signatures of attendees and a list of topics discussed to the Contractor's daily report.

C. Alcohol and Drug Abuse Plan

1. Describe plan for random checks and testing with pre-employment screening in accordance with the DFAR Clause subpart 252.223-7004, "Drug Free Work Force."
2. Description of the on-site prevention program.

D. Fall Protection Plan: The plan shall be site specific and protect all workers at elevations above 6 feet.

E. Site Demolition Plan: The safety and health aspects prepared in accordance with Section 02220, "Demolition".

1.05 ACTIVITY HAZARD ANALYSIS (AHA)

Prepare for each phase of the work. As a minimum, define activity being performed, sequence of work,

specific hazards anticipated, control measures to eliminate or reduce each hazard to acceptable levels, training requirements for all involved, and the competent person in charge of that phase of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall arrest systems. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include excavation safeguarding requirements. The appropriate AHA shall be reviewed and attendance documented by Contractor at the preparatory, initial, and follow-up phases of Quality Control inspection.

1.06 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employees either use illegal drugs or consume alcohol during work hours. Ensure no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine or saliva specimens and test injured employee influence. A copy of the test shall be made available to the Owner upon request.

1.07 FALL HAZARD PREVENTION PROGRAM

- A. Delineate the fall protection requirements necessary during the erection and dismantling operation of scaffolds used on the project in the fall protection plan and activity hazard analysis for the phase of work.
- B. Institute a fall protection program. As part of the Fall Protection Program, contractor shall provide training for each employee who might be exposed to fall hazards.

1.08 DUTIES OF THE SAFETY OFFICER

- A. Ensure construction hazards are identified and corrected.
- B. Maintain applicable safety reference material on the job site.
- C. Maintain a log of safety inspections performed.
- D. Attend the pre-construction.

1.09 DISPLAY OF SAFETY INFORMATION

Display the following information in clear view of all on-site construction personnel:

- A. Map denoting route to the nearest emergency care facility with emergency phone numbers.
- B. Activity hazard analysis (AHA).

1.10 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Owner has no responsibility to provide medical treatment.

1.11 REPORTS

- A. For OSHA recordable accidents, the prime contractor will conduct a suitable investigation, complete the Contractor Significant Incident Report and provide to the Owner within 5 calendar days of the accident.

- B. Notify Owner, within 4 hours, of any accident meeting the definition of OSHA recordable occupational injury or illness. Information shall include Contractor name; contract title; type of contract; name of activity, installation or location where mishap occurred; date and time of mishap; names of personnel injured; extent of property damage, if any; and brief description of mishap (to include type of construction equipment used, PPE used, etc.) In addition to OSHA reporting requirements, initial notification shall be made of any accident involving significant mishaps.
- C. Monthly exposure reporting, to the Owner is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The prime Contractor shall identify, in the APP, who shall complete exposure data (hours worked); accident investigations, reports and logs; and immediate notification of accidents to include subcontractors.
- D. Provide the Owner with a copy of each OSHA citation, OSHA report and Contractor response. Correct violations and citations promptly and provide written corrective actions to the Owner.

PART II - PRODUCTS

Not Used.

PART III - EXECUTION

3.01 CONSTRUCTION

- A. Comply with NFPA 241, the accident prevention plan, the activity hazard analysis and other related submittals and fire and safety regulations.
- B. Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited. Exceptions to the use of any of the above excluded materials may be considered by Owner upon written request by Contractor.
- C. The design should have identified materials such as PCB, lead paint, and friable and nonfriable asbestos. If material, not indicated, that may be hazardous to human health upon disturbance during construction operations is encountered, stop that portion of work and notify the Owner immediately. Within 14 calendar days the Contractor will determine if the material is hazardous. If material is not hazardous or poses no danger, the Owner will direct the Contractor to proceed. If material is hazardous and handling of the material is necessary to accomplish the work, the Contractor shall remove and legally dispose of the hazardous material at no additional cost to the Owner.

3.02 PRE-OUTAGE COORDINATION MEETING

Contractors are required to apply for utility outages at least 15 days in advance. As a minimum, the request should include the utilities being affected, location and duration of the outage, and any necessary sketches. Once approved and prior to beginning work on the utility system requiring shut down, the Contractor shall attend a pre-outage coordination meeting to review the scope of work and the lock out/tag out procedures for worker protection.

3.03 SAFETY QUALIFICATIONS

A. Qualifications for on-site Superintendent, QC or Safety Representative:

1. Demonstrate ability to manage the on-site Contractor safety program through appropriate management controls, and maintain a log of safety inspections performed.
2. Able to identify hazards and have the direct responsibility for expending resources necessary to abate the hazards.
3. Must have worked on similar types of projects that are equal to or exceed the scope of the project assigned with the same responsibilities.
4. Must submit training certifications showing the place and dates of any training.
5. Must attend the pre-construction conference with the Owner and Engineer.

B. Superintendent/QC, can and will be removed if at anytime the Owner or his/her designated representative finds them non-responsive or not enforcing safety issues at the contract work site. It is the responsibility of the Superintendent/QC to enforce safety issues at all times. If removed, all construction activities will be suspended until an acceptable replacement is approved by the Owner.

3.04 PERSONNEL PROTECTION

- A. Provide hazardous noise signs, and hearing protection, wherever equipment and work procedures produce sound-pressure levels greater than 85 dBA steady state or 140 dBA impulse, regardless of the duration of the exposure.
- B. Enforce use of the fall protection device named for each activity in the AHA all times when an employee is on a surface 6 feet or more above lower levels. Personal fall arrest systems are required when working from an articulating or extendible boom, scissor lifts, swing stages, or suspended platform. Fall protection must comply with ANSI A10.14.
- C. Personal fall arrest device equipment, subsystems, and components shall meet ANSI Z359.1, Personal Fall Arrest Systems. Only a full-body harness with a shock absorbing lanyard is an acceptable personal fall arrest device. Body belts may only be used as positioning devices only such as for steel reinforcing assembly. Body belts are not authorized as a personal fall arrest device. Harnesses must have upper middle back "D" rings for proper body suspension during a fall. Lanyard must be fitted with a double locking snap hook attachment. Webbing, straps, and ropes must be of synthetic fiber or wire rope.
- D. Safety nets shall be provided in unguarded workplaces over water, machinery, dangerous operations, or more than 25 feet above surface.
- E. Employees shall be provided with a safe means of access to the work area on a scaffold or work platform. Climbing of any braces or supports not specifically designed for access is prohibited. Contractor shall ensure that scaffold and work platform erection is performed by qualified employees. Do not use scaffold or work platform without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection plan. Minimum platform size shall be based on the platform not being greater in height than four times the dimension of the smallest width dimension for rolling

scaffold. Some Baker type scaffolding has been found not to meet these requirements. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward. The first tie-in shall be at the height equal to 4 times the width of the scaffold base.

F. Use of Material Handling Equipment

1. Material handling equipment such as forklifts shall not be modified with work platform attachments for supporting employees unless specifically delineated in the manufacturer's printed operating instructions. Crane supported work platforms shall only be used in extreme conditions if the Contractor proves that using any other access to the work location would result in a greater hazard to workers.
2. Cranes must be equipped with Load Indicating Devices, two anti-block devices, load, and boom angle moment indicating indicators.

G. The competent person for excavation shall be on site when work is being performed in excavation, and shall inspect excavations prior to entry by workers. Individual must evaluate all potential hazards, including atmospheric, that may be associated with the work, and shall have the resources necessary to correct hazards promptly.

H. Underground electrical spaces must be certified safe for entry before entering to conduct work. Cables intended to be cut must be positively identified and de-energized prior to performing each cut. Perform all high voltage cutting remotely. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation. Plan work near energized components that minimizes worker exposure to all electrical hazards. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized sub-sites, only qualified electrical workers shall be permitted entry. When work requires Contractor to work near energized circuits as defined by the NFPA 70, high voltage personnel must use personnel protective equipment that includes, as a minimum, electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts, coveralls, face shields, and safety glasses. Insulating blankets, hearing protection, and switching suits may be required, depending on the specific job and as delineated in the Contractor AHA.

I. Contractor shall provide mechanical ventilation for all work performed in manholes, unless other hazards such as friable asbestos are present.

J. The Contractor Quality Control Manager shall conduct daily safety inspections as part of his/her quality control inspections and document the results on the Contractor's Daily Report.

3.05 ACCIDENT SCENE PRESERVATION

For serious accidents, ensure the accident site is secured and evidence is protected remaining undisturbed until released by the Owner.

3.06 FIRE PROTECTION

A. Prior to performing "Hot Work" (welding, burning, lead melting, blow torches, tar pots, etc.) or operating other flame-producing devices, the Contractor shall obtain approval from the Owner's on-site Representative.

1. All Hot Work will be shut down 30 minutes before the end of work and a fire watch shall

be kept at the scene of operation during this 30 minutes.

- B. Melt kettles for tar, asphalt, creosote and similar materials shall not be closer than 25 feet to buildings or combustible materials. Provide a minimum of two 20 pound ABC all-purpose type extinguishers at melting kettle and area of hot material application. Equip kettles with heat controls and means of agitation to ensure controlled uniform temperatures throughout contents to prevent spot heating. Do not heat contents above flash point.
- C. The Contractor shall furnish, in accordance with all applicable requirements of the NFPA (National fire Protection association) Standards, sufficient fire extinguishers and fire watch personnel to protect the area in which his work is being performed. The size and type of fire extinguisher used will be subject to review by the Owner through the Engineer.
- D. The burning of trash or other waste material shall be prohibited.
- E. Heating
 - 1. All sources of temporary heat shall carry an "Underwriters Laboratory" label and portable heaters shall be located so as to avoid ignition of combustible materials.
 - 2. Electrical heaters shall not be connected to extension cords.
 - 3. Open "drum fires" are prohibited.
- F. Electrical
 - 1. All portable electric devices (saws, sanders, compressors, lights, extension cords) not required to be left on shall be disconnected at the close of work each day.
 - 2. All wires plugged into electrical outlets shall be equipped with male plugs. The inserting of the bare ends of wires into outlets is prohibited.
- G. Flammables
 - 1. Oil painting materials (paint, brushes, empty paint cans, rags, paint clothes, drop cloths, etc.) and flammable liquids shall be removed from enclosed areas at the close of work each day.
 - 2. Highly flammable liquids such as paints, thinner, etc. that are to be kept inside buildings shall be held to an absolute minimum except in buildings authorized and designed for such storage.
 - 3. Storage of gasoline in excess of five gallon containers shall be permitted only by specific approval from the Owner.
 - 4. All storage areas containing flammable liquids shall be marked with signs indicating "FLAMMABLES" and "NO SMOKING".
- H. Fire hose or extinguishers in existing buildings shall not be removed from their locations, unless specifically being relocated or removed per the plans and specification for the project. No fire hose or extinguishers shall be used for any purpose other than combating a fire.
- I. Smoking is strictly prohibited in or near areas where flammable liquids, highly combustible

materials or explosives are stored, handled or processed. All existing smoking regulations in occupied areas shall be complied with. "NO SMOKING" signs shall be observed and restrictions complied with.

- J. Parking will only be allowed in areas designated for Contractor Personnel.
- K. All contractors providing office space or trailers with telephone service shall place or post the fire reporting phone number by the phone. All contractor personnel shall be instructed how to report a fire. Any fire, no matter how small, shall be reported.
- L. Prior to quitting time, a person, specifically designated by the Contractor, shall make a check of the job site and contract limits to ensure compliance with all safety conditions of this specification, insuring that the area is in a fire safe condition.

3.07 TEMPORARY WIRING

- A. Provide temporary wiring as required in accordance with NFPA 70, NFPA 10, NFPA 241, and NFPA 70, Article 305-6(b), Assured Equipment Grounding Conductor Program. Program shall include frequent inspection of all equipment and apparatus.

3.08 SITE PROTECTION

- A. Contractor shall provide barricades around all work areas to prevent public access.
- B. Fencing shall be provided along the construction site at all open excavations to control access by unauthorized people. Fencing must be capable of restraining a force of at least 200 pounds against it.
- C. Place warning signs at the construction area perimeter designating the presence of construction hazards requiring unauthorized persons to keep out. Signs must be placed on all sides of the project, with at least one sign every 300 feet. All points of entry shall have signs designating the construction site as a hard hat area.

END OF SECTION 01525

SECTION 01575

TEMPORARY ENVIRONMENTAL CONTROLS

PART I - GENERAL

1.01 REFERENCES

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

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910	Occupational Safety and Health Standards
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
49 CFR 171	General Information, Regulations, and Definitions
49 CFR 172	Hazardous Materials, Tables, and Hazardous Materials Communications Regulations
49 CFR 178	Shipping Container Specification

ENVIRONMENTAL PROTECTION AGENCY (EPA)

EPA 832-R-92-005	Storm Water Management for Construction Activities
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1.02 CONTRACTOR LIABILITIES FOR ENVIRONMENTAL PROTECTION

Contractors shall complete and provide environmental training documentation for training required by Federal, State, and local regulations.

1.03 DEFINITIONS

- A. Sediment

Soil and other debris that has eroded and been transported by runoff water or wind.

B. Solid Waste

Rubbish, debris, garbage, and other discarded solid materials, except hazardous waste as defined in paragraph entitled "Hazardous Waste," resulting from industrial, commercial, and agricultural operations and from community activities.

C. Sanitary Wastes

Wastes characterized as domestic sanitary sewage.

D. Rubbish

Combustible and noncombustible wastes such as paper, boxes, glass, crockery, metal, lumber, cans, and bones.

E. Debris

Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

F. Chemical Wastes

This includes salts, acids, alkalies, herbicides, pesticides, and organic chemicals.

G. Garbage

Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Waste

Hazardous substances as defined in 40 CFR 261 or as defined by applicable State and local regulations.

I. Hazardous Materials

Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

J. Landscape Features

Trees, plants, shrubs, and ground cover.

K. Oily Waste

Petroleum products and bituminous materials.

1.04 SUBMITTALS

Submit the following in accordance with Section entitled "Submittal Procedures."

- A. Pre-construction survey report.
- B. Submit a copy of an approved laboratory analysis of materials collected as a result from abrasive blasting operations before disposing of waste materials.
- C. Submit copies of any State and local permits or licenses for the solid waste disposal facility.
- D. Submit a copy of the applicable EPA and State permits, manifests, or licenses for transportation, treatment, storage, and disposal of hazardous waste by permitted facilities.
- E. Submit one copy of the EPA or State permit license, or regulation for the transporter who will ship the hazardous waste to the permitted Treatment, Storage, and Disposal (TSD) facility.
- F. Submit written certification that hazardous waste turned in for disposal was generated on the Owner's property and is identified, packaged, and labeled in accordance with 40 CFR 261, 40 CFR 262, and 40 CFR 263.

1.05 ENVIRONMENTAL PROTECTION REGULATORY REQUIREMENTS

- A. Provide and maintain, during the life of the contract, environmental protection as defined in this Section. Plan for and provide environmental protective measures to control pollution that develops during normal construction practice. Plan for and provide environmental protective measures required to correct conditions that develop during the construction of permanent or temporary environmental features associated with the project. Comply with Federal, State, and local regulations pertaining to the environment, including but not limited to water, air, solid waste, and noise pollution.

1.06 ENVIRONMENTAL PROTECTION PLAN

- A. Contents of Environmental Protection Plan
 - 1. Include any hazardous materials (HM) planned for use on the job. Submit a list (including quantities) of HM to be brought to the site and copies of the corresponding material safety data sheets (MSDS). Submit this list to the Owner. At project completion, remove any hazardous material brought onto the site. Account for the quantity of HM brought to the site, the quantity used or expended during the job, and the left over quantity which (1) may have additional useful life as a HM and shall be removed by the Contractor, or (2) may be a hazardous waste, which shall then be removed as specified herein.
 - 2. The Environmental Protection Plan shall list and quantify any Hazardous Waste (HW) to be generated during the project.
 - 3. Store HW near the point of generation up to a total quantity of 55 gallons of hazardous waste. Move any volume exceeding these quantities to a HW permitted area within 3 days. Properly label all hazardous waste to be stored in accordance with applicable regulations.
 - 4. Contact Owner for conditions in the area of the project which may be subject to special environmental procedures. Include this information in the Pre-construction Survey. Describe in the Environmental Protection Plan any permits required prior to working the area, and contingency plans in case an unexpected environmental condition is discovered.
 - 5. Obtain permits for handling HW, and deliver completed documents to Engineer for review.

File the documents with the appropriate agency, and complete disposal with the approval of Owner. Deliver correspondence with the State concerning the environmental permits and completed permits to Owner.

B. Environmental Protection Plan Format

The Environmental Protection Plan shall conform to the following format:

ENVIRONMENTAL PROTECTION PLAN

Contractor Organization
Address and Phone Numbers

1. Methods to be used to prevent soil erosion
2. Methods to be used to contain spills of oily waste or debris
3. Methods to be used to control dust
4. Methods to be used for solid waste disposal
5. Hazardous materials to be brought onto the site
6. MSDS package
7. Employee training documentation
8. HW storage plan
9. HW to be generated
10. Pre-construction survey results
11. Permitting requirements identified

- C. Perform a pre-construction survey of the project site with the Engineer, and document existing environmental conditions in and adjacent to the site.

PART II - PRODUCTS

Not used.

PART III - EXECUTION

3.01 PROTECTION OF NATURAL RESOURCES

- A. Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified. Conform to the national and state permitting requirements of the Clean Water Act.
- B. Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.
- C. Prevent oily substances or other debris from entering the water. Provide a temporary protective floating boom system, complete with associated hardware and anchors, to prevent debris from escaping from the work area. The boom shall totally enclose any active work or storage area. Booms shall have a minimum of 6 inches of freeboard, 12 inches draft, 11 pounds per foot

buoyancy and a fabric strength of 13,000 pounds.

- D. Do not disturb fish and wildlife. Do not alter water flows or otherwise significantly disturb the native habitat adjacent to the project and critical to the survival of fish and wildlife, except as indicated or specified.

3.02 NOISE

- A. Make the maximum use of low-noise emission products, as certified by the EPA. Blasting or use of explosives will not be permitted without written permission from the Owner, and then only during designated times. Confine pile-driving operations to the period between 7 a.m. and 4 p.m., Monday through Friday, exclusive of holidays, unless otherwise directed.

3.03 EROSION AND SEDIMENT CONTROL MEASURES

- A. Burn-off of the ground cover is not permitted.
- B. Temporary Protection of Erodible Soils

Use the following methods to prevent erosion and control sedimentation:

1. Mechanically retard and control the rate of runoff from the construction site. This includes construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.
2. Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Protect slopes by accelerated growth of temporary vegetation, mulching, netting or other methods approved by the Engineer.

3.04 CONTROL AND DISPOSAL OF SOLID WASTES

- A. Pick up solid wastes on a daily basis, and place in covered containers that are regularly emptied. Do not prepare or cook food on the project site. Prevent contamination of the site or other areas when handling and disposing of wastes. At project completion, leave the areas clean. Dispose of solid waste generated at locations as directed.
- B. Remove rubbish and debris from Owner property and dispose at a licensed disposal facility off-site.
- C. Place garbage in approved containers, and move to a pickup point or disposal area, where directed.

3.05 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

- A. Handle generated hazardous waste in accordance with 40 CFR 262.
- B. Dispose of hazardous waste in accordance with Federal, State, and local regulations, especially 40 CFR 263, 40 CFR 264, and 40 CFR 265. Removal of hazardous waste from project site shall not occur without prior notification and coordination with the Owner. Transport hazardous waste by a permitted, licensed, or registered hazardous waste transporter to a TSD facility. Hazardous waste shall be properly identified, packaged, and labeled in accordance with 49 CFR

172. Provide completed manifest for hazardous waste disposed of off-site to the Engineer within 7 days of disposal. Hazardous waste shall not be brought onto the site.

- C. Store hazardous waste in containers in accordance with 49 CFR 178. Identify hazardous waste in accordance with 40 CFR 261 and 40 CFR 262. Identify hazardous waste generated within the confines of the site by the site's EPA generator identification number.
- D. Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the Owner. Spill response shall be in accordance with 40 CFR 300 and applicable State regulations.
- E. Protect against spills and evaporation during fueling and lubrication of equipment and motor vehicles. Dispose of lubricants and excess oil in accordance with Federal, State, local regulations per 3.05B.

3.06 DUST CONTROL

- A. Keep dust down at all times, including nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Instead, use vacuuming, wet mopping, wet sweeping, or wet power brooming. Air blowing will be permitted only for cleaning non-particulate debris such as steel reinforcing bars. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Do not shake bags of cement, concrete mortar, or plaster unnecessarily.
- B. Abrasive Blasting
 - 1. The use of silica sand is prohibited in abrasive blasting.
 - 2. Provide tarpaulin drop cloths and windscreens to enclose abrasive blasting operations to confine and collect dust, abrasive agent, paint chips, and other. Perform work involving removal of hazardous material in accordance with 29 CFR 1910.
 - 3. Collect dust, abrasive, paint, and other debris resulting from abrasive blasting operations on painted surfaces and store in 55 gallon drums with watertight lids. Take a representative sample of this material, and test for EP toxicity with respect to lead, chromium, and cadmium content. The sampling and testing shall be performed in accordance with 40 CFR 261. Handle debris resulting from the abrasive blasting operations as a hazardous material, and dispose of in accordance with 40 CFR 262, 40 CFR 263, 40 CFR 264, and 40 CFR 265. Transport hazardous material by a transporter licensed and permitted for transportation of hazardous materials. Dispose of hazardous material in an EPA-approved and permitted facility specifically designated for hazardous waste disposal.

END OF SECTION 01575

SECTION 01700

EXECUTION REQUIREMENTS

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

1.02 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction Layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

- B. Related Sections include the following:

1. Division 1, Section "Project Management and Coordination" for procedures to coordinate field engineering with other construction activities.
2. Division 1, Section "Submittal Procedures" for submitting surveys.
3. Division 1, Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.03 SUBMITTALS

- A. Qualification Data: For land surveyor to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- B. Certificates: Submit certificate signed by land surveyor certifying that locations and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit 5 copies signed by land surveyor.
- E. Final Property Survey: Submit 10 copies showing the Work performed and record survey data.

1.04 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART II – PRODUCTS

Not Used.

PART III – EXECUTION

3.01 IDENTIFICATION

- A. The Contractor will identify existing control points and property line corner stakes.
- B. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks, before proceeding to lay out the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points or requirements to relocate reference points due to necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed Project control points. Base replacements on the original survey control points.
- C. Establish and maintain a minimum of 2 permanent benchmarks on the site; referenced to data established by survey control points.
- D. Establish and maintain the Layout Baseline with the stationing indicated on the Contract Drawings.

3.02 EXAMINATION

- A. Existing Conditions: The existence and location of previously installed site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of all site utility systems and other construction affecting the Work.
 - 1. Before construction, verify the location and connection points of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of all underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at connection points of sanitary sewer, storm sewer, gas, telecom, water-service piping, irrigation, and underground electrical services.

2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

3.03 PREPARATION

- A. Existing Utility Information: Furnish information to Owner's Representative that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities services serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 1. Notify the Owner's Representative not less than 2 days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without Owner's Representative's written permission.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to the Owner's Representative. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on CSI Form 13.2A, "Request for Interpretation" or similar form.

3.04 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Contract Documents in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Owner's Representative immediately.
- B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions with tolerances indicated. Do not scale Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.

4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Owner's Representative when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure less than or equal to the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level structures from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by the Engineer.

3.05 FIELD ENGINEERING

- A. Identification: Contractor will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of the Owner's Representative. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to the Owner's Representative before proceeding.
 2. Replace lost or destroyed permanent benchmarks or control points promptly. Base replacements on the original survey control points.
 3. Any required re-calculation and layout plan for an offset baseline shall be provided by the Contractor at no additional cost to the Owner.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

- D. Certified Survey: On completion of substructures, major site improvements, site clearance including debris and/or obstruction removal, controlled fill and horticultural and other work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal lines, and levels of Project are accurately positioned as shown on the survey.
 - 1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
 - 2. Recording: At Substantial Completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey".

3.06 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by the Owner's Representative.
 - 2. Allow for structure movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.07 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements of NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80°F (27°C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris and ensure that no materials enter the adjacent waterway.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed areas.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
 - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage, adverse weather conditions or deterioration at Substantial Completion.

- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.08 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1, Section "Quality Control".

3.09 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove, and replace defective construction. Restore damaged substrates and finishes. Comply with requirements of original construction or installation of Work.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken materials.

END OF SECTION 01700

SECTION 01710

CLEANING

PART I - GENERAL

1.01 DESCRIPTION

- A. Throughout the construction period, maintain the worksites in a standard of cleanliness as described in this Section.
- B. In addition to standards described in this Section, comply with all requirements for cleaning as described in various other Sections of these Specifications.
- C. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- D. At completion of Work, remove and lawfully dispose of waste materials, rubbish, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

1.02 QUALITY ASSURANCE

- A. Conduct daily inspections, and more often if necessary, to verify that requirements of cleanliness are being met.
- B. In addition to the standards described in this Section, comply with all pertinent requirements of governmental agencies having jurisdiction.

1.03 SAFETY REQUIREMENTS

- A. Hazards Control
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes that create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- B. Conduct cleaning and disposal operations to comply with all applicable ordinances and anti-pollution laws.

PART II - PRODUCTS

- A. Provide all required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

PART III - EXECUTION

3.01 PROGRESS CLEANING

A. General

1. Retain all stored items in an orderly arrangement allowing maximum access, not impeding drainage or traffic, and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
4. At least once a week and more often if necessary, completely remove all scrap, debris and waste material from the job site.
5. Provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
6. Combustible waste, scrap, rubbish, etc., shall be stored in adequately sized metal containers (with metal covers) where practical, pending removal from the premises.

B. Worksites

1. Daily, and more often if necessary, inspect each site and move all scrap, debris and waste material to a place designated for their storage.
2. Weekly, and more often if necessary, inspect all arrangements of materials stored on each site; restack, tidy, or otherwise service all arrangements to meet the above requirements.
3. Maintain each site in a neat and orderly condition at all times.

C. Structures

1. Weekly, and more often if necessary, inspect the new structures and move all scrap, debris, and waste material to designated storage area.
2. As required preparatory to installation of succeeding materials, clean the structures or pertinent portions thereof to the degree of cleanliness recommended by the manufacturer of materials required to achieve the required cleanliness.
3. Handle materials in a controlled manner. Do not drop or throw materials from heights.
4. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly finished surfaces.

3.02 FINAL CLEANING

- A. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris and waste.

- B. Employ experienced workmen, or professional cleaners, for final cleaning.
- C. In preparation for substantial completion or occupancy, conduct a final inspection of sight-exposed exterior surfaces, and of any concealed spaces.
- D. Structures
 - 1. Visually inspect all surfaces and remove all traces of soil, waste material, smudges and other foreign matter. Remove all traces of splashed materials from adjacent surfaces. Remove all paint droppings, spots, stains, and dirt from finished surfaces. Use only the specified cleaning materials and equipment.
 - 2. Besides the general broom cleaning, the Contractor shall do the following special cleaning for all trades at the completion of the work and before final acceptance:
 - a. Remove all marks, stains, and other soil or dirt from all newly finished surfaces.
 - b. Remove all stains and clean exposed concrete floors.
 - c. Clean and polish all hardware for all trades; this shall include removal of all stains, dust, dirt, paint, etc., upon completion.
 - d. Clean all new fixtures and equipment installed as part of this Contract, removing all stains, paint, dirt and dust.
 - e. Repair and patch marred surfaces to specified finish to match adjacent surfaces.
- E. Final Cleaning: Schedule final cleaning as approved by the Engineer to enable the Owner to accept a completely clean project.

PART IV - METHOD OF MEASUREMENT

No Method of Measurement is required for this Section.

PART V - BASIS OF PAYMENT

There shall be no separate payment for this Section.

END OF SECTION 01710

SECTION 01770

CLOSEOUT PROCEDURES

PART I - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

1.02 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Project Record Documents.
 - 3. Operation and Maintenance manuals.
 - 4. Warranties.
 - 5. Instruction of Owner's personnel.
 - 6. Final cleaning.
- B. Related Sections include the following:
 - 1. Division 1, Section "Construction Progress Documentation" for submitting final documentation.
 - 2. Division 1, Section "Execution Requirements" for progress cleaning of Project site.
 - 3. Divisions 2 through 16, Sections for specific closeout and special cleaning requirements for products of those Sections.

1.03 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspections for determining date of Substantial Completion, complete the following (List items below that are incomplete in request):
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to the services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, final property surveys, and similar final record information.
 - 6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.

7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 8. Complete startup testing of systems.
 9. Submit test/adjust/balance records.
 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 11. Advise Owner of changeover in all utilities.
 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 13. Complete final cleaning requirements, including touchup painting.
 14. Touchup and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Engineer and/or Owner's Representative will either proceed with inspection or notify Contractor of unfilled requirements. The Owner's Representative will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by the Owner's Representative that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.04 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit a final Application for Payment according to payment procedure.
 2. Submit certified copy of Owner's Representative's endorsed and dated Substantial Completion inspection list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.

- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer and/or Owner's Representative will either proceed with inspection or notify Contractor of unfilled requirements. The Owner's Representative will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction. Use CSI Form 14.1A.
 - 1. Organize list of areas in phases to match construction schedule, starting with the northern areas first and proceeding south.
 - 2. Organize items applying to each phase of work by major element, including categories for earthwork, utility systems, paving, structures, irrigation, water supply, lighting, planting soils and mixes, and site furnishings.
 - 3. Include the following information at the top of each page:
 - a. Project Name.
 - b. Date.
 - c. Name of Engineer and Owner's Representative.
 - d. Name of Contractor.
 - e. Page number.

1.06 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Owner's Representative for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 - 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-½" x 11" paper.
 - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.

3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES", Project name, and name of Contractor.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART II – PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART III – EXECUTION

3.01 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances, and Federal and local environmental and anti-pollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial cleaning and maintenance program. Comply with manufacturer's written instructions.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access along walkways.
 - f. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
 - g. Remove debris from limited access spaces, including trenches, equipment vaults, manholes, and similar spaces.
 - h. Remove labels that are not permanent.
 - i. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 1. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

- j. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - k. Replace parts subject to unusual operating conditions.
 - l. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective fixtures.
 - m. Leave Project clean and ready for occupancy.
- C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests. Prepare a report.
- D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems or waterways. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 02100

SITE WORK GENERAL PROVISIONS

PART I - GENERAL

1.01 SUMMARY OF WORK

- A. Under the applicable Division-2 sections referred to herein, the Contractor shall provide all labor, materials and equipment necessary to perform all site work that is indicated or covered by the Contract Documents.
- B. Site work shall be shown on the site improvement plans, or as specified herein, or as directed by the Owner's Representative. Work shall include, but not be limited to, the following:
 - 1. Earthwork
 - 2. Shoring and Bracing Earthwork
 - 3. Pile Remediation
 - 4. Temporary Environmental Controls
- C. The drawings and General Conditions of the Contract, including General and Supplementary Conditions, apply to work specified in the Division-2 sections indicated herein. The site improvement plans consisting of the following shall be referred to herein as the Site Plan.
 - 1. Site Plan and Sections
- D. Site work shall be accomplished in accordance with the requirements and regulations of the City of New York.
- E. The Contractor shall provide continuous access to the site and shall coordinate work with all other contractors and subcontractors working on the site, adjacent roadway systems, or adjacent properties. The Contractor shall not obstruct access to and from the adjacent properties from the adjacent roadways and driveways.
- F. The Contractor shall provide a safe construction site at all times, and the public shall be protected from unreasonable hazards. Applicable local and/or State requirements shall be observed and necessary permits acquired by the Contractor. The Contractor shall take immediate steps to rectify any hazardous or unsafe condition determined so by the Consultant or the municipal agency having jurisdiction. The Contractor shall conform to the requirements of the municipal agency having jurisdiction; and Industrial Code Rule 23, Protection in Construction, Demolition and Excavation, Operations, of the Rules and Regulations of the State of New York and of Subsection 107-05 "Safety and Health Requirements" of the NYSDOT Standard Specifications.
- G. Throughout the specifications contained herein, reference is made to the requirements of the City of New York and the requirements of the utility having jurisdiction (water, sewer, electric, gas and telephone). When there is a conflict between the referenced specifications, requirements, details, and specifications contained herein, the more stringent requirements shall control, as determined by the Consultant or representative of agency having jurisdiction, as appropriate, shall be final.

- H. The Contractor shall obtain and observe the applicable sections of the following specifications, details and requirements herein referenced. In utilizing referenced Standard Details and Specifications, the Contractor shall conform to requirements governing the work, materials, or project and not the general provisions and other provisions relating to measurement and payment. Standard Specifications, Details, Codes, Requirements, etc., specified herein by reference shall be as binding as if copied verbatim and specified directly herein.
1. The specifications, details and requirements of the City of New York.
 2. "Standard Specifications Construction and Materials, and Details", of the New York State Department of Transportation.
 3. Title 29 Code of Federal Regulations, Part 1926, Safety and Health Regulations for Construction, (OSHA).
 4. Industrial Code Rules of the New York State Department of Labor, Board of Standards and Appeals.
- I. Minimum Standard Reminder: Codes and Standard Specifications listed are minimum standards, and will not relieve the Contractor from carrying out all site work operations in a safe and prudent manner, or from providing a higher quality of material and workmanship. Workmen, the public, and adjacent property shall be protected from unreasonable hazard, and, the work shall be satisfactorily completed without causing damage to adjacent ground and structures.
- J. Conformance to the requirements herein does not relieve the Contractor from implementing additional measures or providing additional materials, work, equipment, personnel, etc., necessary to ensure a safe construction site and protection of existing facilities. The Contractor is placed on notice that safety during construction is considered as important as the construction itself. The Contractor shall, therefore, at all times conduct his operations in a manner to ensure that conditions on the site are adequate and effective for safety; and, to insure the convenience of abutting property, Owners and their safety as well as the safety of his own employees.
- K. Emergency Contact Person: The Contractor shall designate someone to be available to respond to emergency calls. The name of the person and the telephone number at which he/she can be reached at any time shall be given to the Consultant, Owner and all police agencies in the area. Such person shall have full authority and capability to mobilize forces promptly as required to respond to an emergency and protect the public.
- L. The work barges must be moored independently of the pier structures either by mooring piles (spuds) or anchors which must conform to USCG requirements.

1.02 PERMITS AND BONDS

- A. Permits and Bonds: Purchase and submit copies of permits and bonds necessary in connection with the performance of the Work specified in this section. At the job site, post notices and copies of permits necessary for the proper and lawful performance of the work, in accordance with such permits.

END OF SECTION 02100

SECTION 03310

CONCRETE PILE JACKETING AND GROUTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

All provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

1.02 SUMMARY

- A. The work covered by this section consists of furnishing all supervision, labor, materials, testing and equipment necessary to install a pile jacketing and grouting system to repair and/or protect concrete piles as hereinafter specified and detailed on the Contract Drawings.
 - 1. Install a permanent outer jacket of durable, inert and corrosion-free material, and fill the annular space between the pile and the permanent jacket with a hydro-ester pourable epoxy grout.
- B. Location and quantity of piles to be repaired and/or protected shall be as specified on the Contract Drawings.
- C. Related Sections include the following:
 - 1. Division 1 – Section “Submittal Procedures” for procedures and other submittal criteria.

1.03 QUALITY ASSURANCE

- A. General:
 - 1. Insofar as possible, all materials and equipment used in the installation of this work shall be of the same brand or manufacturer throughout for each class of material and/or equipment.
 - 2. Use numbers of skilled workers equal to work requirement or occasion. The skilled workers shall be thoroughly trained and experienced in the necessary crafts and shall be completely familiar with the specified requirements and methods needed for proper performance of the Work in this Section.
- B. Manufacturer’s Qualifications: Firms regularly engaged in the manufacture of pile protection systems of the type, material, and sizes required, whose products have been in satisfactory use in similar service for not less than seven years.
- C. Installer’s Qualifications: A firm with at least five years of successful installation experience on projects with work of installing pile protection systems similar to that required for this Work.

- D. The Contractor shall establish, to the satisfaction of the Engineer, that the planning for grouting and the actual placement of the mixed epoxy grout system is performed by experienced personnel.

1.04 SUBMITTALS

- A. Refer to and comply with Division 1 – Section “Submittal Procedures”, for procedures and other submittal criteria.
- B. Product Data:
 - 1. Prior to the start of any work, the Contractor shall submit to the Engineer for approval a list of all materials and equipment specified or otherwise required to complete the Work of this Section.
 - 2. Submit manufacturer's technical product data, including specifications and installation instructions, on the jacketing forms to be used, to show compliance with the Contract Documents, including a drawing which shows method of support, spacing and stabilization of formwork.
 - 3. Manufacturer's specifications on the pumping equipment used to place the epoxy grout.
 - 4. Supplier's technical product data, including specifications and installation instructions for the epoxy grout.
- C. Production schedule for placing pile jacket forms, and when pumping the epoxy grout on a daily basis for the duration of the Project.
- D. Shop Drawings, detailing at a minimum location of standoff spacers, formwork and bracing details, and bottom seal details, proposed method of installation shall be prepared by the contractor and submitted for approval prior to any field installation.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver the specified products in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged or contaminated materials shall be removed from the site immediately, at Contractor's expense.
- B. Store pile jackets, epoxy grout, binders and accessories together until use as recommended by the manufacturer.
- C. Protect pile jackets, epoxy grout, binders and accessories from damage, dirt, dampness and direct sunlight during storage.
- D. Handle all pile protection system components in accordance with manufacturer's written instructions.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 1. Sika US, Sika Corporation, 201 Polito Ave, Lindhurst NJ 07071
Phone: 800-933-7452
 2. Fox Industries Inc., 3100 Falls Cliff Road, Baltimore, MD 21211
Phone: 888-760-0369; www.fox-ind.com
 3. 5 Star Marine, 750 Commerce Drive, Fairfield CT 06825,
Phone: 800-338-3145; www.5star-marine.com
 4. Denso North America, 9747 Whithorn Drive, Houston Texas 77095
- B. Core Plug Cement: Where applicable, the following products may be incorporated into the Work include, but are not limited to, the following:
 1. Speed Crete Blue Line by The Euclid Company.
 2. High strength underwater curing cement from those manufacturers listed in the previous section.

2.02 MATERIALS

- A. Jackets
 1. Jackets shall be inert and corrosion-free, with an interlocking joint, and fabricated from fiberglass and polyester resins to a minimum thickness of 1/8" unless otherwise shown on the Contract Drawings.
 2. Jackets shall meet the following material properties:

a. Water Absorption (ASTM D570)	1% max.
b. Ultimate Tensile Strength (ASTM D638)	
Longitudinal, transverse and diagonal	15,000 psi
c. Flexural Strength (ASTM D796)	25,000 psi
d. Flexural Modulus of Elasticity (ASTM D790)	700,000 psi min.
e. Barcol Hardness (ASTM D2583)	45 + 5
f. Color: Translucent	
 3. The inside face of the jacket shall be textured similar to that of a sandblasted surface and contain no bond-inhibiting agents that contact the hydro-ester epoxy grouts.
 4. The jackets shall be provided with non-corrosive "standoffs", which will secure the jackets in the required positions.
 5. Jackets shall be capable of being opened, in order to encapsulate the pile, and then returned to its original shape without damage.
 6. Jackets shall be equipped with a compressible sealing strip at the bottom, which will effectively seal the bottom of the annular space between the pile and jacket.

B. Pourable Epoxy Grout

1. Epoxy grout shall be composed of a binder and extender meeting the following:
 - a. Epoxy Binder: The binder shall be a two component (2:1 ratio) hydro-ester epoxy that is moisture insensitive for applications both above and below water that adheres to wet concrete, steel and pile jackets.
 - b. Epoxy Extender: The extender shall be compatible with the hydro-ester epoxy binder and, when mixed with the epoxy binder, produce a smooth flowing pourable grout.
2. Mixing
 - a. The binder and extender shall be mechanically mixed in strict accordance with the manufacturer's instructions to (1) part binder combined with a maximum (3) parts extender.
 - b. When mixed in the ratio of (1) part binder to (3) parts extender by volume, the minimum compressive strength of two inch cubes at 7 days, at a 66 to 74 deg. F curing temperature, shall be 8000 psi when tested in accordance with ASTM C579 Method B.

C. Trowel Grade Epoxy Grout

1. Trowel grade epoxy grout shall be composed of a binder and filler meeting the following:
 - a. Epoxy Binder: The binder shall be a two component (2:1 ratio) trowel grade hydro-ester epoxy that is moisture insensitive for applications both above and below water that adheres to wet concrete, steel and pile jackets.
 - b. Filler: The filler shall be kiln-dried silica sand consisting of natural sand having a fineness modulus of between 2.40 and 3.0. Fifteen (15) to thirty (30) percent should pass the No. 50 screen and five (5) to ten (10) percent should pass the No. 100 screen. The sand shall be sharp, hard and strong and shall be free from adherent coating, salt, clay, loam, alkali, organic material or other deleterious substances.
2. Mixing
 - a. The binder and filler shall be mechanically mixed in strict accordance with the manufacturer's instructions to (1) part binder combined with a maximum (1) part filler.
 - b. When mixed in the ratio of (1) part binder to (1) part filler by volume, the minimum compressive strength of two inch cubes at 7 days, at a 66 to 74 deg. F curing temperature, shall be 8000 psi when tested in accordance with ASTM C579 Method B.

D. Concrete:

1. All concrete work shall conform to requirements of the ACI building codes requirement for structural concrete.
2. Concrete shall meet the following requirements:
 - a. All concrete shall be air entrained, $6\% \pm 1.5\%$ by volume, for 3/8" pea gravel aggregate. No carbonaceous aggregates shall be used.
 - b. All concrete mix shall be mixed, transported and placed in accordance with ACI standards 318 and 304.
 - c. Follow ACI standard 211.1 for mixing water requirements.
 - d. All concrete shall have compressive strength $F_c' = 5,000$ psi at 28 days with a maximum w/c ratio of 0.40 unless otherwise noted.
 - e. Maximum concrete slump shall be 4", prior to the addition of plasticizing admixtures.
 - f. Test cylinders shall be taken from the mixer in accordance with ASTM C172 and the project specifications.
 - g. Construction joints shall be no more than 40 ft on center, unless otherwise noted.
 - h. Concrete shall have 5.4 gal/cy of corrosion inhibitor.

E. Reinforcing:

1. Concrete cover measured to the face of the reinforcing bar (including ties and stirrups) shall be 3" unless otherwise indicated in the Drawings.
2. All splice lengths shall be greater than or equal to $36 \times$ reinforcing bar diameter for #6 bars and smaller. All splice lengths shall be greater than or equal to $45 \times$ reinforcing bar diameter for #7 bars and larger.
3. All reinforcing bars shall be new billet steel conforming to ASTM A615, grade 60.
4. All welded wire mesh shall conform to ASTM 185.
5. All reinforcing bars and welded wire mesh shall be epoxy coated in conformance with ASTM A775.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

The contractor shall provide all labor, material, equipment and supervision necessary to clean the piles and the bottom surface of the pile caps in the areas to be jacketed, as required by the work and specified hereunder. The work shall include, but not be limited to, the following for each pile to be jacketed.

- A. All concrete pile surfaces to be covered with pile jackets shall be thoroughly cleaned of all marine growth, loose and unsound concrete, or any other deleterious material that would prevent proper bonding, as determined by the Engineer.
- B. The underside of the concrete pile cap shall be similarly cleaned of all marine growth, loose and deteriorated concrete, incipient spalls, etc.
- C. All exposed steel reinforcement shall be cleaned of all rust and scale prior to installation of the pile jacket.
- D. The cleaning operation shall result in a clean sound surface, free from materials that would inhibit bonding of the placed grout system to the existing concrete pile or cap surface. Cleaned piles must be encased with the protective grout/concrete system within three days to preclude new marine growth or contamination, or cleaning must be repeated.
- E. The extent of cleaning shall be limited to comply with the heretofore requirements, without reducing or compromising the structural integrity of the piles and pile caps.
- F. Cleaning of concrete may be accomplished by mechanical scalers, hand tools, high-pressure water jet, abrasive blasting, or other approved methods that will yield the desired result.
- G. Placement of pile jackets will not be permitted until the concrete surfaces are cleaned to the satisfaction of the Engineer.

3.02 JACKET PLACEMENT

The Contractor shall provide all labor, materials, equipment and supervision necessary to furnish, install and support the jackets as shown on the drawings and specified below. Contractor shall remove any obstructions that impede jacket placement without damaging piles or cap beams.

- A. Prior to installing jackets, place trowel grade epoxy into female portion of joint, spread jacket open and place around pile, and then allow jacket to return to its original shape to engage the interlocking joint.
- B. Install self-drilling, self-tapping stainless steel screws, and center and position jacket to the proper elevation. Provide timber wedges and bracing as required to prevent movement due to tidal and wave action prior to and during grout placement.
- C. The inside of the jacket shall be roughened to ensure adhesion of the repair material.

3.03 GROUT PLACEMENT

- A. The epoxy grout shall be injected, at equal pressures, into the lower ports at the bottom of the pile jacket. The grout shall be continuously injected until the grout reaches the top injection port of the jacket.
- B. The Contractor, at his option, may install multiple levels of grout ports to minimize the pumping pressures. If this option is selected, inject grout first at the lowest grout port. As the grout appears at the next higher port level, and it has been determined that the space between the pile and the jacket is filled to that level, cap the lower port and continue injecting grout through the next higher open port. Repeat this process from port level to port level until the grout reaches the top of the jacket. Ports must be on alternating faces of the pile.

- C. The injection process shall be continuous, except when briefly interrupted to relocate the injector to the next higher port. During grout placement, the injection flow rate shall be controlled to prevent air and/or water entrapment within the pile jacket cavity. A constant tremie must be maintained.
- D. Remove any bracing materials after completion of grout injection and clean jacket exterior of any excess grout or other extraneous material.
- E. Mixing and pumping equipment approved by the Engineer shall be used in preparation and handling of the grout. All oil and other rust inhibitors shall be removed from the mixing drums, stirring mechanisms and other portions of the equipment in contact with the grout before the mixers are used.
- F. All materials shall be accurately measured by volume or weight as they are fed into the mixer. The quantity of water shall be such as to produce a grout having a pumpable consistency, but in no case should it be more than required for such purpose. Time of mixing shall not be less than one minute.
- G. Six (6) inch thick (minimum) tremie seals shall be poured at the bottom of the form and allowed to set for 24 hours prior to pouring the entire height of the form to prevent river bottom sediment from rising and mixing with the grout.

3.04 CONCRETE PLACEMENT

- A. Concrete trucks are specifically **PROHIBITED** on the pier, excepting those areas for which pile jacketing has been complete for a minimum of 14 days. Concrete buggies or conveyor systems must be used to transport the concrete from the truck to the batch mixer located immediately adjacent to the pump hopper.
- B. Mixing and pumping equipment approved by the Engineer shall be used in preparation and handling of the concrete. All oil and other rust inhibitors shall be removed from the mixing drums, stirring mechanisms and other portions of the equipment in contact with the concrete before the mixers are used.
- C. All materials shall be accurately measured by volume or weight as they are fed into the mixer. The quantity of water shall be such as to produce a concrete having a pumpable consistency, but in no case should it be more than required for such purpose. Time of mixing shall not be less than one minute.
- D. The concrete shall be pumped into place using a single hose placed inside the form. The hose shall be placed so that the end is within 6 inches of the bottom before pumping begins. Concrete shall not be allowed to fall freely through water or air and shall be injected in such a manner as to assure uniformly sound, dense and undiluted concrete in the pile jacket. Unsatisfactory concrete resulting in separation of aggregates and honeycombing will not be accepted. A constant tremie must be maintained and injection ports must be on alternating sides of the piles.
- E. Six (6) inch thick (minimum) tremie seals shall be poured at the bottom of the form and allowed to set for 24 hours prior to pouring the entire height of the form to prevent river bottom sediment from rising and mixing with the concrete.

- F. During all concrete placing operations, Contractor shall make a constant inspection of the form, not allowing any leaks or form shifting to occur. Any leaks or shifting of forms shall be immediately repaired.
- G. All concrete shall be ready-mixed concrete, and shall be mixed and delivered in accordance with the "Specifications for Ready Mixed Concrete", ASTM C94 and as specified herein. The batch plant of the concrete producer shall be certified for compliance with the standards established by the National Ready-Mixed Concrete Association.
- H. All finished concrete shall be free of voids or any other defects.
- I. Pumping or tremie method, once started, shall be carried on as a continuous operation until the section of approved size and shape is completed.
- J. Concrete shall be conveyed as rapidly as practicable from the mixer to the pump by methods which prevent the separation or loss of ingredients. It shall be deposited, as nearly as practicable, in its final position to avoid re-handling or flowing.
- K. Concrete that has partially hardened shall not be deposited in the Work.

PART 4 - TESTING

4.01 SCOPE OF WORK

The Contractor shall provide all labor, material, equipment and supervision necessary to test the concrete and grout in accordance with the requirements stated below.

4.02 TESTING

- A. The methods used in sampling, making, curing and testing of the concrete and grout samples, either in the field or in the laboratory, shall be in accordance with the appropriate ASTM Standards and shall include but not be necessarily be restricted to the following standards:

ASTM C31 -	Standard Method of Making and Curing Concrete Compressive and Flexural Test Specimens in the Field.
ASTM C39 -	Standard method of Test for Compressive Strength of Cylindrical Concrete Specimens.
ASTM C94 -	Standard Specification for Ready-Mix Concrete.
ASTM C138 -	Standard Method of Test for Unit Weight, Yield, and Air Content of Concrete.
ASTM C172 - ASTM C192 -	Standard Method of Sampling Fresh Concrete. Standard Method of Making and Curing Concrete Test Specimens in the Laboratory.
ASTM 214 -	Recommended Practice for Evaluation of Compression Test Results of Field Concrete.

ASTM C579- Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes

- B. In the event the compressive strength of the cylinders, when tested, is below the specified minimum, the Engineer may require test cores of the hardened structures to be taken by the Contractor in accordance with ASTM Designation C42. If such test indicates that the core specimen is below the required standards, the concrete in question shall be removed and replaced by the Contractor without cost to the Owner, or additional piles will be jacketed with concrete at the direction of the Engineer, at no additional cost to the Owner.

END OF SECTION 03310

SECTION 03703

CONCRETE PILE RESTORATION WITH EPOXY GROUT

PART I - GENERAL

1.01 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work specified in this section.

1.02 DESCRIPTION OF WORK:

- A. The extent of work is shown on drawings.
- B. The work shall include but is not limited to the following:
 - 1. Cleaning and preparation of existing concrete.
 - 2. Excavation of soil and riprap.
 - 3. Installation of reinforcement, as necessary.
 - 4. Design and installation of formwork and seals.
 - 5. Mixing the epoxy.
 - 6. Injecting the epoxy.
 - 7. Replacing riprap.
- C. Work not included:
 - 1. Field inspection and testing.

1.03 QUALITY ASSURANCE:

- A. Except as modified by governing codes and by this Specification, comply with the applicable provisions and recommendations of the latest edition of the following:
 - 1. American Concrete Institute Publications:
 - a. ACI 201.1R "Guide for Making a Condition Survey of Concrete in Service".
 - b. ACI 311.4R "Guide for Concrete Inspection".
 - c. ACI 546.1R "Guide for Repair of Concrete Bridge Superstructures".

- d. ACI 224.1R "Causes, Evaluation and Repair of Cracks in Concrete Structures".
 - e. ACI 503R "Use of Epoxy Compounds with Concrete".
- B. Where the language in any of the documents referred to herein is in the form of a recommendation or suggestion, such recommendations or suggestions shall be deemed to be mandatory under this Contract.
 - C. Conflicts: Conform to requirements of above standard unless specified otherwise below. In case of apparent conflict between standards, or between standards and the specifications herein below, refer the matter to the Engineer, whose decision shall be final.
 - D. Owner's acceptance: Owner reserves the right to reject or accept supplier of materials.
 - E. Workmanship: The Contractor is responsible for correction of restoration work which does not conform to the specified requirements, including strength, tolerances, and finishes. Correct deficiencies as directed by the Engineer.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's data, to include: application and installation instructions, technical data sheets, material safety data sheets, and any other items as requested by the Engineer.
- B. Shop Drawings, detailing, at a minimum, location of stand off spacers, formwork and bracing details, and bottom seal details, proposed method of installation shall be prepared by the contractor and submitted for approval prior to any field installation.

1.05 PRODUCT HANDLING

- A. Deliver the specified products in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers. Damaged or contaminated materials shall be removed from the site immediately, at contractor's expense.
- B. Store and condition the specified products as recommended by the manufacturer.
- C. Condition the specified epoxy resin mortar components as specified by the manufacturer.

1.06 JOB CONDITIONS

- A. Environmental Conditions: Do not apply material if ambient surface temperature or water temperature is below manufacturer's minimum application temperature.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the materials. Contractor shall restore any damage incurred to the work zone at his own expense.

PART II - MATERIAL

2.01 EPOXY RESIN ADHESIVE FOR EPOXY INJECTION

- A. The epoxy resin adhesive shall be a 2-component, solvent-free, moisture-insensitive, epoxy adhesive of low viscosity and high strength, formulated specifically for injecting into the annulus of submerged formwork, around a concrete pile, up to one inch thick. It shall meet ASTM C 881 Type I, Grade B and C.
- B. PROPERTIES OF THE CURED MATERIAL
1. Compressive Properties (ASTM D-695) at 28 days
 - a. Compressive Strength 8,000 psi min.
 2. Tensile Properties (ASTM D-638) at 14 days
 - a. Tensile Strength 7,000 psi min.
 - b. Elongation at Break 4-5%
 3. Flexural Properties (ASTM D-790) at 14 days
 - a. Modulus of Rupture 12,000 psi min.
 4. Shear Strength (ASTM D-732) at 14 days 4,500 psi min.
 5. Total Water Absorption (ASTM D-570) at 7 days 1.5% max.
(2 hours boil)
 6. Bond Strength (ASTM C-882) Hardened Concrete to Hardened Concrete
 - a. 2 day (dry cure) 2,400 psi min.
 - b. 14 day (moist cure) 2,300 psi min.

2.02 FIBERGLASS PILE JACKETS

- A. Pile Jackets shall be fiberglass and polyester resin with interlocking joints. The minimum jacket thickness shall be 1/8" unless otherwise shown in the plans. The inside face of the jacket shall be textured similar to a sandblasted surface and have no bond inhibiting agents. Non corrosive standoffs, which will maintain the jackets in the required positions, shall be provided as necessary. The jacket shall be capable of being opened, placed around a pile (and reinforcing cage where applicable), then returned to its original shape without damaging the jacket.
- B. Properties of the Fiberglass Pile Jacket
1. Water Absorption Properties (ASTM D-570)

- a. Water Absorption 1% max.
- 2. Tensile Properties (ASTM D-638)
 - a. Tensile Strength (Any Orientation) 15,000 psi
- 3. Flexural Properties (ASTM D-796, ASTM D-790)
 - a. Flexural Strength 25,000 psi
 - b. Flexural Modulus of Elasticity 700,000 psi
- 4. Hardness Properties (ASTM D-2583)
 - a. Barcol Hardness 45 + 5
- 5. Color: Translucent

PART III - APPROVALS

3.01 ACCEPTABLE CONTRACTORS:

- A. The epoxy injection work shall be performed by an approved Contractor associated with a nationally known and recognized manufacturer.
- B. The approved Contractor shall have satisfactorily completed a program of instruction sponsored by the manufacturer.
- C. The approved Contractor must have, in his possession at the project site, the manufacturers printed literature on the epoxy resin adhesive.
- D. The approved Contractor must furnish a notarized certification that the material proposed for use meets all of the above requirements.

3.02 ACCEPTABLE PRODUCTS:

Epoxy Injection:

- A. Sikadur 35, Hi-Mod LV LPL, as manufactured by Sika Corporation, Lyndhurst, New Jersey, is considered to conform to the requirements of this specification for pile encapsulation and restoration.
- B. Kaufman SurePox HMLV, as manufactured by Kaufman Products, Baltimore, Maryland, is considered to conform to the requirements of this specification for pile encapsulation and restoration. The Contractor is to ensure the appropriate class of product is used depending on the ambient air, water and substrate temperatures.

Epoxy Handpack:

- A. Sikadur 32, Hi-Mod epoxy grout, as manufactured by Sika Corporation, Lyndhurst, New Jersey, is considered to conform to the requirements of this specification for pile encapsulation and restoration.
- B. Kaufman SurePoxy HMLV, as manufactured by Kaufman Products, Baltimore, Maryland, is considered to conform to the requirements of this specification for pile encapsulation and restoration. The Contractor is to ensure the appropriate class of product is used depending on the ambient air, water and substrate temperatures.

Fiber Reinforced Polymer (FRP) Jackets:

- A. FX-70, pile protection system, as manufactured by Fox Industries Incorporated, Baltimore, Maryland, is considered to conform to the requirements of this specification for pile encapsulation and restoration.
- B. PileForm F FRP pile protection system, as manufactured by Five Star Marine, Inc. Fairfield, Connecticut, is considered to conform to the requirements of this specification for pile encapsulation and restoration.

Variations from materials specified - Should the Contractor wish to use any brand or type of material other than as specified herein, he shall so state in writing to the Engineer naming the proposed substitution and manufacturer. This statement shall be accomplished by (a) A certificate of compliance with test results from an approved independent testing laboratory that the proposed substitute meets or exceeds the specified requirements and has been tested in accordance with the specified test standards; (b) Documented proof that the proposed brand or type of material has a proven record of performance when used in the intended application as confirmed by successful installations in place a minimum of ten years, which the Engineer can verify; (c) Certification that the components are supplied by the same manufacturer so as to insure compatibility of material and to maintain single-source manufacturer responsibility.

PART IV - EXECUTION

4.01 SURFACE PREPARATION

- A. Concrete surface must be clean and sound. Remove dust, laitance, grease, curing compounds, waxes, impregnations, foreign particles, coatings, efflorescence, disintegrated materials, and any other bond breaking materials, from the concrete surface by mechanical means, i.e. – wire brush, high-pressure waterblasting, etc., as approved by the Engineer.

4.02 APPLICATION

- A. Mix the epoxy resin components thoroughly, in the proper proportion, in accordance with the manufacturers specifications. Roughen the FRP surface to ensure adhesion.
- B. Placement procedure:

1. Formwork must be sufficiently designed, installed, and braced to resist pumping and or static pressures exerted by the epoxy mortar, depending on placement method. This may include the installation of a "bottom plug" to prevent blowout.
 2. Tremie Method: In accordance with industry standards and specifications, epoxy mortar shall not be allowed to drop to the bottom of the positioned and bottom-sealed formwork from the top. The epoxy mortar shall flow through a "tremie" hose extending down to the bottom of the form. The nozzle must remain submerged in the mortar as the mortar is pumped.
 3. Pumping Method: One or more injection ports installed at the bottom of the formwork shall be used to inject epoxy mortar under pressure. The port(s) shall be placed a minimum of 9 inches above the bottom plug and 180° from the formwork connections. Formwork must be designed to resist pump pressure.
- C. Adhere to all limitation and cautions for the epoxy resin adhesives in the manufacturers current printed literature.

4.03 CLEANING

- A. Epoxy resin shall be cleaned from work area in accordance with the manufacturers specifications.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.

Part V - COMPENSATION

5.01 METHOD OF MEASUREMENT

- A. Pile encasement with epoxy resin mortar shall be measured by the lineal foot grouted in place. The quantity to be paid for shall be the lineal feet grouted actually placed.

5.02 BASIS OF PAYMENT

- A. The pile encasement with epoxy resin mortar will be paid at the contract unit bid price per lineal foot grouted, as stipulated in the schedule of Bid Prices, which payment shall be full compensation for furnishing and installing all materials, labor, tools, equipment, and other incidentals necessary to complete the specified operation. Payment will be made on the percentage of the work completed during each estimated period as determined by the Owner. Contractor shall provide separate unit bid price per lineal foot for reinforced and unreinforced pile restoration.

END OF SECTION 03703