DESIGN & CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 7 TO PROJECT NO. 47331

CONSTRUCTION WORK
REHABILITATE THE EASTERN APPROACH STAIRCASE,
PROMENADES, PORTICO, AND EXECUTIVE RAMP
NEW YORK STATE CAPITOL
STATE STREET
ALBANY, NY 12224

October 18, 2024

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

SPECIFICATIONS

1. SECTION 033000 CAST IN PLACE CONCRETE: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 033000 – 1 through 033000 – 31) noted "Revised 10/18/2024".

2. SECTION 051200 STRUCTURAL STEEL: Discard the Section bound in the Project Manual and substitute the accompanying Section (pages 051200 – 1 through 051200 – 13) noted "Revised 10/18/2024".

APPENDIX

3. SCHEDULE OF SUBMITTALS: Discard all previously issued versions of this Document and substitute the accompanying Document (pages 1-19) noted "REVISED 10/18/2024".

END OF ADDENDUM

Brady M. Sherlock, P.E.
Director, Division of Design
Design & Construction

SECTION 033000

CAST IN PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes but is not limited to the following as shown on the drawings and as specified herein:

1. Foundation systems including footings, walls, beams, piers, pilasters, pits and similar concrete.
2. Slabs on grade.
3. Structural slabs on grade.
4. Cast-in-place slabs, beams, walls, and columns.
5. Topping slabs
6. Stair pan fills.
7. Furnishing and installing all required anchors and inserts.
8. Placing in the forms all inserts, anchors, anchor bolts, bearing plates and the like furnished by other trades for casting into the concrete and cleaning of same after stripping of forms.
9. Protection of all inserts, anchors, hangers, sleeves and supports furnished and set by others for the attachment of other work to the concrete, or required to permit the passage of other work through the concrete.
10. Supply, fabricate and place all required reinforcing bars, mesh and other reinforcement for concrete where shown, called for, and/or required complete with proper supporting devices.
11. Erection and removal of all formwork required to properly complete the work.
12. Finishing of all concrete work as hereinafter specified.
13. Curing and protection of all concrete work.
14. Site concrete consisting of curbs, walls, pads, boxes and the like as shown on the drawings.
15. Cutting, patching, grouting, repairing and pointing up as required.
16. Vapor barrier system below slabs on grade.
17. Dewatering.
18. Waterproofing.
19. Grouting of all beam bearing plates and column base plates.
20. Embedded plates in all foundation walls.
21. Equipment pads as required.
22. All other work and materials as may be reasonably inferred and needed to make the work of this section complete.
23. Waste Management

B. Related Requirements:

1. Division 01 Section “Construction Waste Management and Disposal”
2. Division 05 Section “Structural Steel”
3. Division 05 Section “Metal Fabrications”
4. Division 06 Section “Rough Carpentry”

5. Division 07 Section “Waterproofing”
6. Division 07 Section “Joint Sealants”

1.2 SUSTAINABLE DESIGN REQUIREMENTS

A. The Contractor is to implement practices and procedures to meet the Project’s Sustainable Design goals. The Contractor shall ensure that the requirements related to these goals, as defined in this Section and in Related Sections of the Contract Documents, are implemented. Substitutions, or other changes to the Work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project’s Sustainable Design goals.

B. The Contractor is to efficiently use resources and energy while executing the Work of this Section. Resource efficient aspects to be considered in completing this Project include the use of techniques that minimize waste generation, reuse of construction materials on site where possible, and recycling of waste generated during the construction process.

C. Performance Requirements: The following criteria are required for the products included in this section

1. Preference shall be given to cast-in-place concrete containing raw materials harvested or extracted within 500 miles of the project site.
2. All reinforcing steel, steel anchors, welded wire reinforcement, and other steel items required by the work of this section shall contain a minimum of 50% (combined) pre-consumer/post-consumer recycled content.
3. Adhesives, sealants, paints and coatings used for the work of this section shall meet the Volatile Organic Compound (VOC) limits where applicable.

1.3 SUBMITTALS

A. Product Data: Submit data for proprietary materials and items, including the following:

1. Reinforcement
2. Supports for reinforcement
3. Forming accessories
4. Admixtures
5. Patching compounds
6. Waterstops
7. Joint systems
8. Curing compounds
9. Dry-shake finish materials
10. Other items as requested by Director’s Representative.

B. Shop Drawings; Reinforcement: Submit original shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement. Include special reinforcement required for openings through concrete structures. The shop drawings shall be prepared only by competent detailers, checked by the contractor prior to submission.

1. The shop drawings shall show construction, contraction and isolation joint locations and the added reinforcement required at same.
2. Obtain and coordinate information for sleeves and openings in concrete, which are required for the work of other trades. Make coordinated drawings showing size and location of openings and sleeves and incorporate this information on the reinforcing drawings.
3. Only those splices indicated on the approved shop drawings will be permitted.
4. Provide elevations of all foundation walls and other structural elements to a minimum 1/4" scale.

C. Shop Drawings Formwork: Submit shop drawings for fabrication and erection of specific finished concrete surfaces. Show form construction including jointing, special form joint or reveals, location and pattern of form tie placement, and other items which affect exposed concrete visually. Director's Representatives' review is for general architectural applications and features only. Design of formwork for structural stability and efficiency is Contractor's responsibility, prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Director's Representative.

E. Contraction Joint Layout: Indicate proposed contraction joints required per applicable codes and drawings.

1. Location of contraction joints is subject to approval of the Director's Representative.

F. The use of the Director's Representatives' electronic drawing files as a base for the reinforcement, formwork, and joint layout shop drawings will be permitted at the request of the detailer/designer upon completion and return of the waiver form. The use of the Director's Representative electronic drawing files as a base for shop drawing details will not be permitted. The detailer/designer will be responsible for compatibility of the files with his hardware or software. The electronic files are not to be considered the contract documents, the design team makes no representation regarding the accuracy or completeness of the electronic files given to detailer/designer and their use will be at the detailer/designer's sole risk and without liability to the design team. The detailer/designer shall remove the project title box and all references to the structural drawings including drawing numbers and structural drawing sections and details. The detailer/designer shall also remove all reference to work not included in the concrete contract.

G. Scaling of the Director's Representatives' drawings is not permitted. This applies to hard paper, electronic, and all other versions.

H. Samples: Submit samples of materials as requested by the Director's Representative, including names, sources and descriptions.

I. Laboratory Test Reports: Submit laboratory test reports for concrete materials, mix design test and microwave test.

J. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Director's Representative. Manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements shall sign material certificates. Provide certification from admixture manufacturers that chloride content complies with specification requirements.

K. Cold Weather and Hot Weather Concreting Procedures: Submit written descriptions of contractor's proposed cold weather and hot weather concreting procedures, when applicable.

L. Certification that pozzolanic materials conforms to ASTM C 618-01 (noting class C or class F), ASTM C 989 or ASTM C1240.

M. Certified recycled steel content. Provide cut sheets clearly indicating whether the rebar used meets the minimums for post-consumer OR post-industrial recycled contents. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and if the recycled content is post-consumer or post-industrial.

N. Formwork: Specify whether reusable, permanent, salvaged or new wood forms are to be used.

O. Recycled Aggregate: Provide laboratory reports indicating that aggregate conforms to ASTM C33 for structural concrete or ASTM D1241-00 for sub-base material. Provide cut sheets clearly indicating the source, total weight and volume of the recycled aggregate. If aggregate provided is a mix of virgin and recycled aggregates obtain a written affidavit from the manufacturer stating the recycled content percentage

P. VOC content for curing compounds, sealants and release agents: Provide a cut sheet and a Material Safety Data Sheet (MSDS) for each curing compound, sealant, hardener and release agent used highlighting VOC contents. VOC content must be less than or equal to limits stated under "PRODUCTS".

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

B. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

C. Codes and Standards: Comply with provisions of following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. State of New York Building Code, Latest Edition
2. ACI 117 "Standard Specifications for Tolerances for Concrete Construction and Materials and Commentary."
3. ACI 211.1 "Standard Practice for Selecting Proportions for Normal, Heavyweight and mass concrete."
4. ACI 214R, "Evaluation of Strength Test Results of Concrete."

5. ACI 232.2R, “Use of Fly Ash in Concrete.”
6. ACI 233R, “Guide to Use of Slag Cement in Concrete and Mortar.”
7. ACI 234, “Guide for the Use of Silica Fume in Concrete.”
8. ACI 301 “Specifications for Structural Concrete.”
9. ACI 302.1R “Guide for Concrete Floor and Slab Construction.”
10. ACI 304R, “Guide for Measuring, Mixing, Transporting and Placing Concrete.”
11. ACI 305R “Hot Weather Concreting.”
12. ACI 306.1-90 “Standard Specification for Cold Weather Concreting.”
13. ACI 308.1 “Standard Specification for Curing Concrete.”
14. ACI 309R, “Guide for Consolidation of Concrete.”
15. ACI 311.4R, “Guide for Concrete Inspections.”
16. ACI 315, “Details and Detailing of Concrete Reinforcement.”
17. ACI 318 “Building Code Requirements for Structural Concrete and Commentary.”
18. ACI 347 “Guide to Formwork of Concrete.”
19. Concrete Reinforcing Steel Institute, (CRSI) “Manual of Standard Practice.”
20. CRSI-WCRSI, “Placing Reinforcing Bars.”
21. The ACI Field Reference Manual, SP-15 shall be kept at the job site, and the practices set forth therein shall be strictly adhered to.
22. ASTM Standards as applicable in the building code of the local jurisdiction and as noted in this specification.

B. Concrete Testing Service: Owner will engage a testing laboratory acceptable to Director’s Representative to perform material evaluation tests and to design concrete mixes.

C. Materials and installed work may require testing and retesting at anytime during progress of work. Tests, including retesting of rejected materials for installed work, shall be done at Contractor's expense.

D. Preconstruction Meeting:

1. At least 35 days prior to the start of the concrete construction schedule, the Contractor shall conduct a meeting to review the proposed mix designs and to discuss the required methods and procedures to achieve the required concrete construction. The Contractor shall send a pre-concrete conference agenda to all attendees 20 days prior to the scheduled date of the conference.
2. The Contractor shall require responsible representatives of every party who is concerned with the concrete work to attend the conference, including but not limited to the following:

    a. Contractor's superintendent
    b. Laboratory responsible for the concrete design mix
    c. Laboratory responsible for field quality control
    d. Concrete subcontractor
    e. Ready-mix concrete producer
    f. Admixture manufacturer(s)
    g. Concrete pumping equipment manufacturer.

3. Minutes of the meeting shall be recorded, typed and printed by the contractor and distributed by the contractor to all parties concerned within 5 days of the meeting. One copy of the minutes shall also be transmitted to the following for information purposes: Director’s Representative.

4. The minutes shall include a statement by the concrete contractor indicating that the proposed mix design and placing can produce the concrete quality required by these specifications.
5. A minimum of a 4 cubic yard trial mixture containing all required admixtures shall be placed at the job site using the accepted methods of placing, finishing and curing. All applicable tests including slump, strengthen, air content, permeability, and air content will be performed. This shall occur at least four weeks before actual concreting operations with particular admixture begins. The admixture manufacturer(s) and inspectors shall be present. The same testing should be done in the laboratory at the same time for comparison. A test sample should be done for each condition that is to be placed.
6. The Director's Representatives' will be present at the conference. The Contractor shall notify the Director's Representative at least 10 days prior to the scheduled date of the conference.

1.2 PROJECT CONDITIONS

A. The Contractor, before commencing work, shall examine all adjoining work on which this work is in any way dependent for proper installation and workmanship according to the intent of this specification, and shall report to the Director's Representative any condition which prevents this contractor from performing first class work.

B. Protection of Footings Against Freezing: Cover completed work at footing level with sufficient temporary or permanent cover as required to protect footings and adjacent subgrade against possibility of freezing; maintain cover for time period as necessary.

C. Protect adjacent finish materials against spatter during concrete placement.

D. Provide all barricades and safeguards at all pits, holes, shaft and stairway openings, etc., to prevent injury to workmen and others within and about the premises. Also provide all safeguards as required by the Building Code, OSHA, or any other departments having jurisdiction. Take full responsibility for all safety precautions and methods.

E. Procedure of Work: The contractor shall keep themself constantly informed as to the progress of the work in the field, materials and workers ready to start work immediately when conditions of preceding work are available or ready, wholly or in part, so as not to delay the progress of building work or to interfere with the progress of work of other contractors, and in any event the contractor shall, within 24 hours after notice from the Owner, proceed with such work as directed to maintain the uninterrupted progress of the work.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct of plywood, metal, metal-framed plywood faced, or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient strength and thickness to withstand pressure of newly placed concrete without bow or deflection.

1. Use plywood complying with U.S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better mill oiled and edge-sealed, with each piece bearing legible inspection trademark.

B. Forms for Unexposed Finish Concrete: Plywood, lumber, metal, or other acceptable material. Preference shall go to salvaged or re-used Dimensional Lumber. Provide lumber dressed on at least 2 edges and one side for tight fit.

C. Sustainability Requirements For Wood Used For Formwork

1. New Dimensional Lumber for Formwork: Provide wood certification documentation from the manufacturer/distributor, declaring conformance with Forest Stewardship Council (FSC) guidelines for certified wood building components The following independent certification organizations are accredited by the FSC and provide the manufacturer/distributor with documentation:

   a. Scientific Certification Systems, Inc..
   b. Smart Wood Certification Program: Rainforest Alliance

2. Salvaged or re-used Dimensional Lumber for Formwork: Provide documentation certifying products are from salvaged wood sources. Provide grading certificate for structural applications. For wood salvage wood resources see GreenSpec.
3. If new dimensional Lumber is neither Certified nor salvaged: select regionally grown lumber with the lowest grade that meets performance requirements.

D. Form Coatings: Provide VOC compliant commercial formulation form- coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces. Use biodegradable form release agent listed below or equivalent made from soy or rapeseed oil.

1.	"Bio-Release EF"	Dayton Superior
2.	"Soy Form Away"	Cure & Seal by Natural Soy Products
3.	"Bio-Form"	Leahy-Wolf Company
4.	"Duogard II"	W. R. Meadows, Inc.
5.	"Atlas Bio-Guard"	Atlas Construction Supply, Inc.

E. Form Ties: Form ties and spreaders: prefabricated assemblies by Richmond; Superior, Dayton or approved equal. Wire ties shall not be used. Ties for foundation work shall be of snap design with removal cones and water seal washer.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 REINFORCING MATERIALS

A. Reinforcing Bars:

1. Deformed Carbon Steel bars ASTM A 615/A 615 M, Grade 60(as noted on plan and/or in section).

2. Deformed Stainless Steel bars ASTM A 955/955M Grade 60 (as noted on plan and/or in section)

B. Steel Wire and Welded Wire Reinforcement: ASTM A 1064. Galvanized at exterior locations, conditions permanently exposed to weather and/or water, and where noted on drawings (plan and/or sections).

C. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 , plain-steel bars, cut true to length with ends square and free of burrs.

D. Supports for Reinforcement: Bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire reinforcement in place. Use wire bar type supports complying with CRSI specifications.

1. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 2), at a spacing not to exceed 4'-0" on center in either direction.

2.3 CONCRETE MATERIALS

A. Portland cement: ASTM C 150, Types I, II, or I/II. Total percentage of Portland Cement is NOT to exceed 75% of the cementitious mix. Use one brand of cement throughout project, unless otherwise acceptable to the Director's Representative. Provide either fly ash or GGBF in mix per sections below.

a. Fly Ash: Cast-in-place concrete shall incorporate fly ash as a replacement for at least 25% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Director's Representative. Fly Ash shall not be used in conjunction with Ground Granulated Blast Furnace Slag.
b. Ground Granulated Blast Furnace Slag (GGBF): Cast-in-place concrete shall incorporate GGBF as a replacement for at least 40% (by weight) of the Portland cement. All design mixes must be reviewed and approved by the Director's Representative. GGBF shall not be used in conjunction with Fly Ash.

c. Pozzolans and Slags: These must be completely accounted for in the design mix. Mix design must meet minimum design requirements set in the contract documents. Additional admixtures may be required to meet early strength requirements and alternative cementitious material goals. If a "blended cement" is used which already contains a certain percentage of Pozzolans or Slags this content may offset or entirely satisfy the minimum percentage required.

1) Coal Fly Ash: ASTM C 618 (Class C or Class F): ASTM C 618 (Note: Class F fly Ash will require higher amounts or air entraining ad-mixtures than class C).
2) Blast Furnace Slag: ASTM C989
3) Silica Fume: ASTM C 1240
4) Rice Hull (or "husk") Ash: ASTM C 618 Blended hydraulic cement, as defined by ASTM C 595 or ASTM C 1157

B. Normal Weight Aggregates: ASTM C 33, and as herein specified. Provide aggregates from a single source for exposed concrete.

1. Local aggregates not complying with ASTM C 33 but which have shown by special test or actual service to produce concrete of adequate strength and durability may be used when acceptable to the Director's Representative.
2. Normal weight Fine Aggregate: washed, inert, natural or manufactured or combination thereof, sand conforming ASTM C33 gradation.
3. Normal weight Coarse Aggregate: well graded crushed stone or washed gravel conforming to ASTM C33, sizes 57 for foundations and 67 for slabs and structure.

a. Recycled crushed concrete aggregate in concrete mixes is only to be used with approval of Director's Representative. Recycled aggregate shall be used only as a substitute for coarse aggregate and must also be washed and well-graded, conforming to ASTM C33.
b. For sub-base, slabs on grade and non-structural applications and Recycled Aggregate Materials are NOT required to meet the ASTM C 33 standard. In addition to concrete rubble, glass, porcelain, and tire chips can be used as filler material. Any inert material conforming to ASTM D1241 is acceptable for the applications described in this paragraph.

C. Water: Free from oils, acids, alkali, organic matter and other deleterious material to conform to ASTM C94. ASTM C94 for gray water use in the production of ready mixed concrete per approval by the Director's Representative.

D. Air-Entraining Admixture: ASTM C 260.

1. Liquid air-entrainment: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"Airmix"	Euclid Chemical
b.	"Darex AEA"	W. R. Grace
c.	"MB-VR"	Master Builders

E. Water-Reducing Admixture: ASTM C 494.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"MasterPolyheed 997"	Master Builders
b.	"Euclid MR"	Euclid Chemical
c.	"WRDA 64"	W. R. Grace.

F. High-Range Water-Reducing Admixture (Superplasticizer): ASTM C 494, Type F or Type G and containing not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"Eucon 37, 1037 or Plastol 5000"	Euclid Chemical Co.
b.	"Rheobuild 1000"	Master Builders
c.	"Glenium 7500"	Master Builders
d.	"Daracem-100"	W. R. Grace

G. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.05 percent chloride ions.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"Eucon Retarder 75"	Euclid Chemical Co.
b.	"Pozzolith 100XR"	Master Builders.
c.	"Plastiment"	Sika Chemical Co.
d.	"Daratard"	W.R. Grace.

H. Prohibited Admixtures: Calcium chloride, thyocyanates or admixtures containing more than 0.05 percent chloride ions are not permitted.

I. Certification: Written conformance to the above-mentioned requirements and the chloride ion content of admixtures will be required from the admixture manufacturer prior to mix design review by the Director's Representative.

J. Micro-Fibers: Engineered micro-synthetic fibers.

1. Products: Subject to compliance with requirements, provide the following or equal approved by Director's Representative:

a.	"Fiberstrand N":	Euclid Chemical Co.
b.	"Fibermesh 150":	Propex Concrete Systems
c.	"Ultra-Net"	Forta

K. Natural Fiber Reinforced Concrete: Natural fiber reinforced concrete is permitted only upon review by Director's Representative. Refer to ACI 544.1R, chapter 5

L. Corrosion Inhibitor: 30% calcium nitrite (where called for in the specifications or on the drawings). Subject to compliance with requirements, provide the following at 3 gal/cy:

1.	"Eucon CIA	Euclid Chemical
2.	"DCI"	W. R. Grace
3.	"Rheocrete CNI"	Master Builders.

M. Contractor will be required to provide information demonstrating successful use in prior placement involving all admixtures.

2.4 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal approved by Director's Representative:

   a. Greenstreak
   b. Williams Products, Inc.

2. Profile: As indicated .
3. Dimensions: As indicated; nontapered.

B. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following or equal approved by Director's Representative:

   a. BoMetals, Inc.
   b. Greenstreak
   c. Paul Murphy Plastics Company
   d. Vinylex Corp.

2. Profile: As indicated.
3. Dimensions: As indicated; nontapered.

C. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"MiraSTOP"	Carlisle Coatings & Waterproofing, Inc.
b.	"Waterstop-RX"	CETCO
c.	"Conseal CS-231"	Concrete Sealants Inc.
d.	"Swellstop"	Greenstreak
e.	"Hydro-Flex"	Henry Company, Sealants Division

f. “Earth Shield Type 20” JP Specialties, Inc.

2.5 GROUT

A. Non-Shrink, Non-Metallic Grout: The non-shrink grout shall be a factory pre-mixed grout and shall conform to ASTM C1107, "Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-Shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 4' x 4' base plate.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director’s Representative:

a. "Euco-NS" Euclid Chemical Co.
b. "Five Star Grout" U.S. Grout Corp.
c. "Masterflow 713 Plus" BASF

B. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout shall conform to ASTM C1107, "Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-shrink)." In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 18" x 36" base plate.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director’s Representative:

a. "Euco Hi-Flow Grout" Euclid Chemical Co.
b. "Masterflow 928" BASF
c. “Five Star Fluid Grout 100” Five Star

2.6 RELATED MATERIALS

A. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 1241, Size 57, with 100 percent passing a 1-1/2 inch sieve and 0 to 5 percent passing a No. 8 sieve.

A. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 1241, Size 10, with 100 percent passing a 3/8 inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

B. Non-slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials.

C. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.

D. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Waterproof paper
b. Polyethylene film
c. Polyethylene-coated burlap

E. Curing Compounds: The compound shall conform to ASTM C 309. Limit VOC content to 130 g/L. Use water-based curing compound. For surfaces receiving both a curing compound and additional flooring, verify that the curing compound and additional flooring are compatible.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"SealTight 1100"	W.R. Meadows
b.	"Kurez W VOX"	Euclid Chemical Co.
c.	"Everclear VOX"	Euclid Chemical Co.
d.	'VOCOMP-25"	W.R. Meadows

F. Curing & Sealing Compounds: Only specify for slabs that will remain exposed, i.e. will not receive additional flooring. The compound shall conform to ASTM C1315. Limit VOC content to 130 g/L. Use water-based curing compound.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"Everclear VOX"	Euclid Chemical Co.
b.	"VOCOMP-25"	W.R. Meadows

G. Sealers/Hardeners: For use on concrete surfaces that will remain exposed. Slabs that will receive additional flooring do not require sealing or hardening. Sealers and hardeners must conform to ASTM D1546, not yellow under ultra violet light after 500 hours of test in accordance with and have a maximum moisture loss of 0.039 grams per sq. cm. when applied at a coverage rate of 250 sq. ft. per gallon. Limit VOC content to 130 g/L. Use water- or vegetable-based product.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

a.	"Kure-N-Harden"	BASF

H. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F 710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. Insure coatings and adhesives are "benignly compatible" -- in other words, do not combine substances whose constituents are reactive. Reactivity releases VOCs and /or other toxic fumes.

I. Crack Sealer: Elastomeric liquid crack sealer resistant to water, gasoline, oil and salts.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

   a. "Eucolastic 1NS" Euclid Chemical Co.
   Maximum allowable depth of this product is ½".

J. Bonding Admixture: The compound shall be a latex, non-rewettable type.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

   a. "Flex-Con" Euclid Chemical Co.
   b. "Daraweld C" W.R. Grace
   c. "SBR Latex" Euclid Chemical Co.

K. High Strength Polymer Repair Mortar: For form and pouring or large horizontal repairs, provide the flowable on-part, high strength repair mortar.

1. Products: subject to compliance with requirements, provide the following or equal approved by Director's Representative:

   a. "Eucocrete" The Euclid Chemical Co.
   b. "Euco Speed MP" (Cold Weather) The Euclid Chemical Co.
   c. "Emaco R" Master Builders.

L. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

M. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Type IV for bonding hardened concrete to hardened concrete, and Type V for bonding freshly mixed concrete to hardened concrete.

N. Expansion Joint Filler: ASTM D 1751.

1. Products: Subject to compliance with requirements, provide one of the following or equal approved by Director's Representative:

   a. "Homex 300" Homasote Company
   b. "Standard Cork Expansion Joint Filler" APS Cork
   c. "Fibre Expansion Joint" W.R. Meadows
   d. "X-Foam" W. R. Meadows

O. Water: Potable.

2.7 PROPORTIONING AND DESIGN OF MIXES

A. Preparation of Design Mixes

1. All mix designs shall be proportioned in accordance with Section 5.3, "Proportioning on the Basis of Field Experience and/or Trial Mixtures" of ACI 318 and prepared by a licensed testing laboratory approved by the owner, but paid for by the contractor. Submit mix designs on each class of concrete for review.
2. If previously used mixes are submitted, all materials shall be from the same sources and with the same brand names as the previously utilized mix.
3. If trial batches are used, the mix design shall be prepared by an independent testing laboratory and shall achieve an average compressive strength 1200 psi higher than the specified strength. This over-design shall be increased to 1.10f'c+700 psi when concrete strengths greater than 5000 psi are used.
4. The proposed mix designs shall be accompanied by complete standard deviation analysis or trial mixture test data.

B. Submit each proposed mix to the Director's Representative for review at least 5 days prior to the pre-concrete conference. Do not begin concrete production until the Director's Representative of Record has reviewed and approved mixes.

1. Submit Test reports for any pozzolans or slags indicating compliance with ASTM C 618 or ASTM C 989, respectively.
2. Provide cut sheets clearly indicating the percentages of pozzolans or slags used in the mix design as replacement for Portland cement. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the percentage.
3. Test reports for recycled aggregate indicating compliance with ASTM C 33. Provide cut sheets clearly indicating the percentage of aggregates used that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.
4. Provide cut sheets clearly indicating the percentage of sub-base and filler aggregate materials that are recycled. Or, if cut sheets are not available, obtain a written affidavit from the manufacturer stating the recycled content percentage and source or sources of the material.

C. Design mixes to provide concrete with strength as indicated on drawings and schedules.

D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Director's Representative. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Director's Representative before using in work.

E. Admixtures:

1. Use water-reducing admixture or high range water-reducing admixture (superplasticizer) in all concrete as required for placement and workability.
2. Use non-corrosive, non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50°F (10°C).
   Use high-range water-reducing admixture in pumped concrete, architectural concrete, parking structure slabs, fiber concrete, concrete required to be watertight, concrete with ultimate strength of 5,000 psi or more, and concrete with water/cement ratios below 0.50.

3. Use air-entraining admixture in exterior exposed concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content with a tolerance of plus-or-minus 1-1/2 percent within following limits:

    a. Concrete structures and slabs exposed to freezing and thawing or deicer chemicals.
        1) 4.5 percent (moderate exposure); 5.5 percent (severe exposure): 1-1/2" maximum aggregate
        2) 4.5 percent (moderate exposure); 6 percent (severe exposure): 1" maximum aggregate
        3) 5 percent (moderate exposure); 6 percent (severe exposure): 3/4" maximum aggregate
        4) 5.5 percent (moderate exposure); 7 percent (severe exposure): 1/2" maximum aggregate
        5) 6 percent (moderate exposure); 7.5 percent (severe exposure): 3/8" maximum aggregate

    b. Other Concrete: (not exposed to freezing, thawing, or hydraulic pressure): 2 percent to 4 percent air.

4. Use admixtures for water-reducing and set-control in strict compliance with manufacturer's directions.

F. Water-Cement Ratio: Provide concrete for following conditions with maximum water-cement (W/C) ratios as follows:

1. Concrete for precast slabs, precast beams, structural topping slab, caisson caps, caissons, poured in place slabs and grade beams, columns and walls, over water, on ground or exposed to weather: W/C 0.40.
2. "Quick Dry" Concrete: 0.40.
3. Subjected to freezing and thawing; W/C 0.45.
4. Subjected to deicers/watertight: W/C 0.45.
5. Reinforced concrete subjected to brackish water, salt spray or deicers; W/C 0.40.

G. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:

1. Ramp slabs and sloping surfaces: Not more than 3".
2. Reinforced foundation systems, including mud slabs below hydrostatic slabs: Not less than 1" and not more than 3".
3. Concrete containing HRWR admixture (superplasticizer): Not more than 9" unless otherwise approved by the Director's Representative. The concrete shall arrive at the job site at a slump of 2" to 3" (3" to 4" for concrete receiving a "shake-on" hardener or lightweight concrete), be verified, then the high-range water-reducing admixture added to increase the slump to the approved level.
4. Other Concrete: Not less than 1" or more than 4".

H. Chloride Ion Level: Chloride ion content of aggregate shall be tested by the laboratory making the trial mixes. The total chloride ion content of the mix including all constituents shall not exceed

the limitations set forth in Table 4.4.1 of ACI 318 for concrete subjected to deicers or exposed to chloride in service (0.15% chloride ions by weight of cement).

2.8 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.

B. Provide batch ticket for each batch discharged and used in work, indicating project identification name and number, date, mix type, mix time, quantity, and amount of water introduced.

C. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required. When air temperature is between 85°F (30°C) and 90°F (32°C), reduce maximum mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90°F (32°C), reduce maximum mixing and delivery time to 60 minutes.

D. No water shall be added after mixing to concrete containing HRWR (Superplasticizer). If loss of slump occurs, the concrete treated with HRWR may be redosed as long as a "flash set" has not occurred. Redosage procedures must be discussed and approved by the Director's Representative d and the manufacturer.

PART 3 - EXECUTION

3.1 GENERAL

A. Coordinate the installation of joint materials and vapor retarders with placement of forms and reinforcing steel.

3.2 INSPECTION

A. Examine all work prepared by others to receive work of this section and report any defects affecting installation to the Contractor for correction. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.3 CONCRETE

A. Concrete shall develop the minimum compressive strengths shown on drawings at 28 days when sampled and tested in accordance with ASTM C 31 and C 39 with the maximum slump in accordance with the approved mix design.

B. Concrete shall be in accordance with the requirements and specifications of "Building Code Requirements for Structural Concrete" as modified by the building code noted above.

C. Fly Ash Concrete & Slag Concrete: Concrete mixes containing high volumes of fly ash or Slag have slower set times and may take up to 56 days to reach full strength. The Director's

Representative, agency responsible for concrete mix design, and the concrete subcontractor must coordinate to ensure that the form stripping schedule is consistent with the ability of the structure to support itself and all imposed construction loads.

3.4 FORMS

A. Design formwork to maximize its reusability, reduce resources devoted to formwork construction and minimize waste generated. Where appropriate choose alternative formwork systems (refer to sections listed above).

B. Design, erect, support, brace and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shapes, alignment, elevation and position. Maintain formwork construction tolerances complying with ACI 347. Provide Class A tolerances for concrete exposed to view. Provide Class C tolerances for other concrete surfaces.

C. Design formwork to be readily removable without impact, shocks or damage to cast-in-place concrete surfaces and adjacent materials.

D. Construct forms to size shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back- up at joints to prevent leakage of cement paste.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, recesses, and the like, to prevent swelling and for easy removal.

F. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set tightly to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.

G. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.

I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retightening forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.5 VAPOR BARRIER INSTALLATION

A. Examine the condition of porous fill and remedy any unsatisfactory portions prior to installing vapor barriers.

B. Sub-base material to be per above sections.

C. Following leveling and tamping of sub-base for slabs on grade, place vapor barrier sheeting with longest dimension parallel with direction of pour.

D. Lap joints 6" and seal with appropriate tape.

E. After placement of moisture barrier, cover with granular material and compact to depth as shown on drawings.

F. Avoid cutting or puncturing vapor barrier during reinforcement placement and concreting operations.

3.6 PLACING REINFORCEMENT

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.

C. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as required.

D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.7 JOINTS

A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Director’s Representative.

B. Provide keyways at least 1-1/2" deep in construction joints in walls, slabs and between walls and footings; accepted bulkheads designed for this purpose may be used for slabs.

C. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints, except as otherwise indicated.

D. Waterstops: Provide waterstops in construction joints as indicated. Install waterstops to form continuous diaphragm in each joint. Make provisions to support and protect exposed waterstops during progress of work. Fabricate field joints in waterstops in accordance with manufacturer's printed instructions, using manufacturer's specified welding irons.

E. Contraction (Control) Joints in Slabs-on-Ground: Maximum joint spacing shall be 36 times the slab thickness unless otherwise noted on the drawings. The dry cut saw shall be used immediately after final finishing and to a depth of 1-1/4". A conventional saw shall be used as soon as possible without dislodging aggregate and to a depth of 1/4 slab thickness.

1. Joint sealant material is specified in the section for “Related Materials”.

3.8 INSTALLATION OF EMBEDDED ITEMS

A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.

B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

C. Embedded Plates at Foundation Walls: Install plate at top of forms so that exterior face of steel plate is level and plumb. Use construction documents for locations, sizes and elevations.

3.9 PREPARATION OF FORM SURFACES

A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

B. If form-release compound is required, coat contact surfaces of forms with a form-coating compound *before* reinforcement is placed.

C. Thin form-coating compounds only with thinning agent of type, and amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in- place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

D. Coat steel forms with a non-staining, rust-preventative form oil or otherwise protect against rusting. Rust-stained steel formwork is not acceptable.

3.10 CONCRETE PLACEMENT

A. Ready-mix concrete shall comply with the requirements of ASTM C 94 and ACI 304. All plant and transporting equipment shall comply with the concrete plant standards and truck mixer and agitator standards of the National Ready Mix Concrete Association.

B. Cold weather mixing procedures shall be submitted to the Director's Representative for approval.

C. Notify Director's Representative and Owner's Inspector at least 36 hours (1 1/2 regular working days) before each pour so that forms and reinforcing may be examined. Do not place concrete until inspection has been made or waived.

D. Preplacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.

1. Apply temporary protective covering to lower 2' of finished walls adjacent to poured floor slabs and similar conditions, and guard against spattering during placement.

E. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete," and as herein specified.

1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.

F. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 18" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints. Use internal vibrators penetrating both the top and preceding layers.

G. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.

H. Use and type of vibrators shall conform to ACI 309 "Recommended Practice for Consolidation of Concrete." Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.

I. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

J. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

K. Slabs: Bring slab surfaces to correct level with straightedge and strikeoff. Use highway straightedge, bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations. See also "MONOLITHIC SLAB FINISHES" below.

L. Maintain reinforcing in proper position during concrete placement operations.

M. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.

1. When air temperature has fallen to or is expected to fall below 40°F (4°C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50°F (10°C), and not more than 80°F (27°C) at point of placement.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Use only a non-corrosive, non-chloride accelerator. Calcium chloride, thiocyanates or admixtures containing more than 0.05% chloride ions are NOT permitted.
4. Care must be taken to store water-based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.

N. Hot Weather Placing: When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.

1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90°F (32°C). Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
3. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.

3.11 FINISH OF FORMED SURFACES

A. Concrete mixes containing pozzolans or slags do not set at the same rate or with the same bleed water characteristic as plain Portland cement. Therefore attention must be directed to the proper procedures. Refer to ACI 232.2R and ACI 301.

B. Rough Form Finish: For formed concrete surface not exposed-to- view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.

C. Smooth Form Finish: For formed concrete surfaces exposed-to-view, or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as waterproofing, damp-proofing, painting or other similar system. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections

completely removed and smoothed. Follow all requirements in ACI 301, Chapter 10 for smooth form finish. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction.

3.12 FLOOR FLATNESS/LEVELNESS TOLERANCES

A. FF defines the maximum floor curvature allowed over 24 in. Computed on the basis of successive 12 in. (300 mm) elevation differentials, FF is commonly referred to as the "Flatness F-Number".

B. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 ft. (3.05 m) distance commonly referred to as the "Levelness F-Number".

C. All floors shall be measured within 72 hours of being poured and in accordance with ASTM E 1155 "Standard Test Method for Determining Floor Flatness and Levelness Using the "F Number" System (Inch-Pound Units).

D. All slabs shall achieve the specified overall tolerance. The minimum local tolerance (1/2 bay or as designated by the Director's Representative shall be 2/3 of the specified tolerances.

E. All elevated slabs shall achieve the specified FL tolerance before the removal of the forms.

F. All slabs on metal deck shall achieve the specified FF.

3.13 MONOLITHIC SLAB FINISHES

A. Float Finish: Apply float finish to slabs at crawl spaces, unless otherwise noted. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture. Surface shall achieve an FF 20 - FL 17 tolerance.

B. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view, and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint, or other thin film finish coating system, unless otherwise noted. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance and with a surface leveled to an FF 25/ FL 20 tolerance (FL17 for elevated slabs). Grind smooth surface defects, which would telegraph through applied floor covering system.

C. Trowel and Fine Broom Finish: Where ceramic or quarry tile is to be installed with thin-set mortar, and slab surfaces which are to be covered with membrane or elastic waterproofing, or sand-bed terrazzo, and as otherwise indicated, apply single trowel finish as specified, then immediately follow with slightly scarifying surface by fine brooming. Surface preparation for surfaces receiving waterproofing must be approved by the waterproofing manufacturer prior to construction

3.14 CONCRETE CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least 7 days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
3. In order to avoid plastic or drying shrinkage cracks during warm, dry or windy weather, ACI 302 and ACI 308 shall be followed using wind breaks and sun shades when recommended. Evaporation retardant shall be as specified in Section 2.04.
4. Care must be taken to store water based curing and sealing compounds where they will not freeze. In most cases, they cannot be reconstituted after thawing.

B. Curing Methods: Perform curing of concrete by moisture curing, moisture-retaining cover curing, curing and sealing compound, and by combinations thereof, as herein specified.

1. Provide moisture curing by following methods.

   a. Keep concrete surface continuously wet by covering with water.
   b. Continuous water-fog spray.
   c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.

2. Provide moisture-retaining cover curing as follows:

   a. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Provide curing and sealing compound to exposed interior slabs not receiving additional flooring. A clear curing and sealing compound shall be used on exterior slabs, sidewalks and curbs not receiving a penetrating sealer.
4. Use the specified curing compound on surfaces to be covered with finish or coating material applied directly to concrete, such as liquid densifier/sealer, waterproofing, dampproofing, membrane roofing, flooring, painting, and other coatings and finish materials. Apply compound in accordance with manufacturer’s direction.

C. Curing Formed Surfaces: Cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.

D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of the specified curing compound or a continuous moist curing method approved by the Director’s Representative.

E. Certify that all curing compounds, sealers and hardeners are compatible with all adhesive products intended for attaching co-lateral floor material. In conformance with ASTM F710, coordination with flooring manufacturer is required to insure concrete coatings will not obstruct the bond between the concrete and the adhesive. In addition, insure coatings and adhesives are “benignly compatible” -- in other words, do not combine substances whose constituents are reactive.

3.15 SHORES AND SUPPORTS

A. Comply with ACI 347 for shoring and reshoring in multistory construction, and as herein specified.

B. Extend shoring from ground to roof for structures 4 stories or less, unless otherwise permitted.

3.16 REMOVAL OF FORMS

A. Formwork not supporting weight of concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50^{o}F (10^{o}C) for 12 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided curing and protection operations are maintained.

B. Formwork supporting weight of concrete, such as beam soffits, joints, slabs and other structural elements, may not be removed in less than 14 days and until concrete has attained design minimum compressive strength at 28-days. Determine potential compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.

C. Form facing material may be removed 4 days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.17 RE-USE OF FORMS

A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.

B. When forms are intended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Director’s Representative.

3.18 MISCELLANEOUS CONCRETE ITEMS

A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in- place construction. Provide other miscellaneous concrete filling shown or required to complete work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.

D. Grout base plates and foundations as indicated using specified free-flowing non-shrink grout. Use non-metallic grout for exposed conditions, unless otherwise indicated.

E. Where high fluidity and/or increased placing time is required use the specified high flow grout. This grout shall be used for all base plates larger than 10 square feet.

F. Steel Pan Stairs: Provide concrete fill for steel pan stair treads and landings and associated items. Cast-in safety inserts and accessories as shown on drawings. Screeds, tamp, and finish concrete surfaces as scheduled.

G. Reinforced Masonry: Provide concrete grout for reinforced masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.19 CONCRETE SURFACE REPAIRS

A. Prior to all repairs, an as-built condition sketch and method of repair must be submitted to the Director’s Representative for review and approval.

B. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms, when acceptable to Director’s Representative.

C. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with a bonding grout containing the specified bonding admixture. Place patching mortar after while bonding grout is still tacky.

D. For exposed-to-view surfaces, blend white Portland cement and standard Portland cement so that, when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.

E. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Director’s Representative. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discoloration's that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or pre-cast cement cone plugs secured in place with bonding agent.

F. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

G. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for tureens of slope, in addition to smoothness, using a template having required slope.

H. Repair finished unformed surfaces that contain defects, which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycomb, rock pockets, and other objectionable conditions.

I. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days, except at hydrostatic slabs.

J. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. The specified underlayment compound or repair topping may be used when acceptable to Director’s Representative.

K. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in the same manner as adjacent concrete.

L. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cutout holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part Portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry-pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

M. Structural Repair: All structural repairs shall be made with prior approval of the Director’s Representative as to method and procedure, using the specified polymer repair mortar and/or specified epoxy adhesive. Where epoxy injection procedures must be used, an approved low viscosity epoxy made by the manufacturers previously specified shall be used. In addition, all cracks shall be filled with the specified crack sealer or other method as approved by the Director’s Representative. All garage slabs shall be repaired prior to the slab being treated with the specified penetrating anti-spalling sealer.

N. Underlayment Application: Leveling of floors for subsequent finishes may be achieved by use of specified underlayment material. Underlayment application shall achieve the tolerances specified in "MONOLITHIC SLAB FINISHES" above.

O. Specified Polymer Horizontal Repair Mortar: All exposed floors shall be leveled, where required, with the specified self-leveling repair topping.

P. Repair Methods not specified above may be used, subject to acceptance of Director's Representative.

3.20 FOUNDATION WALLS

A. The contractor shall form and leave openings in walls as shown on drawings and approved shop drawings for work of other contractors. These openings shall be temporarily closed and when so directed, the contractor shall point up in solid and neat manner with waterproofed cement.

3.21 WORK IN CONNECTION WITH OTHER TRADES AND CONTRACTS

A. Sleeves, pockets, openings, etc., shall be set in the concrete walls and arches as required for the mechanical trades as shown on approved shop drawings; these shall be encased or built into the concrete work and shall be properly placed and secured in position in the forms before concrete is placed.

B. Provide all chases, pipe slots, etc., required for the mechanical trades (see mechanical drawings), constructed as shown on the approved shop drawings.

C. Leave temporary access panels where required to install mechanical equipment as required by trade affected. Panels shall be formed with construction joints as specified. Details for such panels shall be submitted to Director's Representative for approval.

D. Coordinate all penetrations, cutting, and patching with waterproofing contractor.

3.22 CUTTING AND PATCHING

A. Contractor for concrete work shall be responsible for all cutting, removing and patching work where concrete surfaces are not installed within the limits shown on the drawings or specified herein. All such work shall meet with the approval of the Director's Representative.

B. Where cutting and patching is required to accommodate the work of other subcontractors, such cutting shall be done at the expense of said subcontractors but shall be performed by the contractor for concrete work.

C. The location and extent of cutting in completed concrete work and the patching thereof shall meet with the approval of the Director's Representative.

3.23 QUALITY CONTROL TESTING DURING CONSTRUCTION

A. The Owner will employ a testing laboratory to perform tests and to submit test reports.

B. Provide special inspections per the applicable Building Code and the requirements of all applicable ACI standards.

C. At locations previously indicated in this specification and on the contract drawings, verify the use of non-magnetic materials. No magnetic materials are permitted in locations where prohibited by this specification or the contract drawings.

D. Sampling and testing for quality control during placement of concrete may include the following, as directed by Director's Representative.

1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
2. Slump: ASTM C 143; one test at point of discharge for each truck; additional tests when concrete consistency seems to have changed.
3. Air Content: ASTM C 173, volumetric method for lightweight or normal weight concrete; ASTM C 231 pressure method for normal weight concrete; one for each truck of air-entrained concrete.
4. Concrete Temperature: Test hourly when air temperature is 40°F (4°C) and below, and when 80°F (27°C) and above; and each time a set of compression test specimens made.
5. Compression Test Specimen: ASTM C 31; one set of 5 standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
6. Compressive Strength Tests: ASTM C 39; one set for each day's pour exceeding 25 cu. yds. plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimens tested at 7 days, three specimens tested at 28 days, and one specimens retained in reserve for later testing if required.

    a. When frequency of testing will provide less than 5 strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
    b. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
    c. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength, and no individual strength test result falls below specified compressive strength by more than 500 psi.

7. Water Cement Ratio Test: Check water content of concrete in accordance with 'Standard Method of Test for Water Content of Freshly Mixed Concrete Using Microwave Oven Drying, AASHTO DESIGNATION:TP 23, SHRP DESIGNATION: 2027' for testing procedure. Frequency of this test shall be the same as that of compressive strength tests, noted above.
8. Floor Preparation to Receive Resilient Flooring: For any concrete that receives resilient flooring, test concrete in accordance with ASTM F 710 prior to acceptance by owner.
9. Test results will be reported in writing to Director's Representative, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing

service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.

a. Non Compliance: All test reports indicating non-compliance shall be faxed immediately to all parties on the test report distribution list and the hard copies submitted on different colored paper.
b. Nondestructive Testing: Windsor probes, sonoscope, or other non-destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.

10. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Director's Representative. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed. Contractor shall pay for such tests when unacceptable concrete is verified.

3.24 WASTE MANAGEMENT

A. Separate and recycle waste materials to the maximum extent feasible.

B. Collect cut off steel and discarded reinforcement steel and place in area for recycling.

C. Place materials defined as hazardous or toxic waste in designated containers.

D. Use trigger operated spray nozzles for water hoses and closed loop system to reduce water consumption.

E. Reusable forms should be cleaned immediately after removal and non-reusable forms recycled to the maximum extent economically feasible.

F. Incorporate crushed concrete or masonry materials in sub-base to the maximum extent feasible in accordance with sub-base specifications.

G. Before concrete pours, designate location or uses for excess concrete. Options include:

1. Additional paving
2. Post footing anchorage
3. Landscaping -- site concrete features
4. Flowable fill

H. To avoid contamination of the local landscape, before concrete pours, designate a location for cleaning out concrete trucks where run-off can be contained, reused or incorporated. Options include:

1. Company owned site for that purpose
2. On-site area to be paved later in project

END OF SECTION

SECTION 051200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes but is not limited to the following as shown on the drawings and as specified herein:

1. Furnish and deliver for installation by others, anchor bolts, bearing plates and loose lintels with complete instructions and templates to facilitate installation.
2. Furnish and erect all struts, columns, bearing plates, beams, girders, bracing, hangers and all related connections (bolted and welded).
3. Openings (unreinforced and reinforced) in structural steel to accommodate mechanical and electrical work.
4. Erection bracing and supports, including steel wedges, shims or nuts required for leveling base plates.
5. Lintels and angles attached to structural steel as shown on drawings.
6. Unless specifically excluded, furnish and install all other items for structural steel work indicated on the drawings, specified, or obviously needed to make the work of this Section complete.
7. Waste Management

B. Related Requirements:

1. Division 01 Section “Construction Waste Management and Disposal”
2. Division 03 Section “Cast in Place Concrete”
3. Division 05 Section “Metal Fabrications.”
4. Division 06 Section “Rough Carpentry.”
5. Division 07 Section “Waterproofing.”
6. Division 07 Section “Joint Sealants.”
7. Division 07 Section “Expansion Joint Cover Assemblies.”
8. Refer to 099600 High Performance Coatings for additional coatings for galvanized steel elements at embedded and exposed locations.

C. Related Work Specified Elsewhere

1. Installation of anchor bolts furnished under this section.
2. Grout under base and bearing plates.
3. Installation of loose lintels furnished under this section.
4. Miscellaneous metal work
5. Stair framing and hangers.
6. Fireproofing systems.

1.2 SUSTAINABLE DESIGN REQUIREMENTS

A. The Contractor is to implement practices and procedures to meet the Project’s Sustainable

Design goals. The Contractor shall ensure that the requirements related to these goals, as defined in this Section and in Related Sections of the Contract Documents, are implemented. Substitutions, or other changes to the Work proposed by the Contractor or their Subcontractors, shall not be allowed if such changes compromise the Project's Sustainable Design goals.

B. The Contractor is to efficiently use resources and energy while executing the Work of this Section. Resource efficient aspects to be considered in completing this Project include the use of techniques that minimize waste generation, reuse of construction materials on site where possible, and recycling of waste generated during the construction process.

C. Performance Requirements: The following criteria are required for the products included in this section

1. Preference shall be given to materials within 500 miles of the project site, and those steel components originating from mills/fabricators located nearest to the building site.
2. All steel shall contain a minimum of 50% (combined) pre-consumer/post-consumer recycled content.
3. Adhesives, sealants and coatings used for the work of this section shall meet the Volatile Organic Compound (VOC) limits where applicable.
4. Require mills and fabricators have ISO14001 certification. Maximize the re-use of salvaged steel (as approved by the Director's Representative) and, for work on existing buildings, alert the design team to any existing steel which could be re-used but has not been indicated on the drawings.
5. Maximize the recycled content of all steel products.
6. Design details penetrating the façade strictly in accordance with the architectural and structural directives.
7. Where possible all connections should be made using bolted as opposed to welded details.
8. Where welding is required use Submerged Arc Welding (SAW). The Gas Metal Arc Welding (GMAW) shall be used where SAW is not applicable (such as for angled connections and anything irregular or short). Field welding shall be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) shall be specified with the use of portable fume exhaust system.
9. Use surface preparation techniques that minimize the use of halogenated solvents and solvents classified as volatile organic compounds. Consider using 'weathering steel' (ASTM A 847) for exterior steel with the approval of the Director's Representative

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of all connections required by the drawings to be completed by structural steel fabricator (including comprehensive engineering analysis by a qualified professional engineer) to withstand loads indicated and comply with other information and restrictions indicated, unless noted otherwise.

1. Select and complete connections using schematic details indicated and AISC 360.

2. Use design method indicated on structural drawings.
3. Moment Connections: Fully restrained unless otherwise noted on drawings.

SUBMITTALS

A. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Condition.

B. Product Data: Submit data for each type of product indicated in the contract documents.

C. Shop Drawings: Submit shop drawings in accordance with the specifications as follows.

1. Show clearly all work, including relationship of structural steel to the adjacent work of other trades and to significant lines of finishes of other trades.
2. Do not fabricate or deliver work to the site before drawings reviewed by the Director's Representative have been returned.
3. Before preparing steel shop drawings, submit proposed submittal schedule for review by the Director's representative.
4. Before preparing steel shop drawings, submit for review a set of job standards showing all necessary joint details with full particulars of connection pieces, shop and field welds, and holes for erection bolts and permanent bolts. These shall include any moment and shear connections. Appropriate marks for designating all types and sizes of joint details shall be included. After approval of these job standards, the erection plans are to be submitted and shall be marked to indicate unmistakably the type and size of joint to be used for every beam connection. Do not order steel in advance of approval of the job standards and the erection plans with joint marks, except at own risk.
5. Submit calculations for design of connections on job standards and all other connections such as moment and brace frames. Calculations shall be signed and sealed by a Professional Engineer licensed in the state in which the project is located.
6. Prepare remainder of steel shop drawings after approval of job standards and erection plans. Drawings submitted prior to approval of job standards will be returned without review.
7. Prepare shop drawings in conformance with the applicable procedures shown in "*Detailing for Steel Construction*," latest edition, published by AISC. Prepare shop drawings under the supervision of competent engineering personnel, licensed by the state in which the construction is to take place. During the preparation of shop drawings, and prior to submittal, coordinate and cross check all shop drawings, including those prepared by subcontractors, for compliance with the Contract Documents.
8. Indicate clearly the size and grade of steel for each component. Identify rolled shapes, tubes and plates by using the standard designations used in "Steel Construction Manual" Latest Edition, by AISC.
9. Indicate welds and nondestructive tests by using the symbols conforming to AWS A2.4 "Symbols for Welding and Nondestructive Testing." Where necessary for clarity, indicate welding procedure designations or other data in the tail of the welding symbol.
10. Show explicitly the type of connection used in each location, the grade, size, and number of bolts; the type, number, position, designation and orientation of each washer; and the size of each hole, whether slotted or round. Ensure that adequate wrench clearance for correct bolt tightening is provided and note special bolt tightening sequences where applicable and necessary.
11. Show holes required for securing work specified in other sections to structural steelwork, as well as all holes required for passage through structural steelwork of work of other

trades. Provide field work drawings for all such holes not shown in shop or erection drawings. Addition of, or change in size or location of openings will not be permitted without prior approval.

12. Use bolted connections wherever possible; avoid field welding unless otherwise noted on drawings.
13. Make details in such a way as to avoid having steel, connections, bracing, bolts, etc., interfere with architectural details or in any way reduce the areas of shafts, openings, clearances, etc.
14. The use of the Director's Representatives' electronic drawing files as a base for the erection shop drawings will be permitted at the request of the structural steel detailer upon completion and return of the waiver form. The use of the Director's Representative 's electronic drawing files as a base for shop drawing details will not be permitted. The structural steel detailer will be responsible for compatibility of the files with his hardware or software. The electronic files are not to be considered the contract documents, the design team makes no representation regarding the accuracy or completeness of the electronic files given to the structural steel detailer and their use will be at the structural steel detailer's sole risk and without liability to the design team. The structural steel detailer shall remove the project title box and all references to the structural drawings including drawing numbers and structural drawing sections and details. The structural steel detailer shall also remove all reference to work not included in the steel contract.
15. Scaling of the Director's Representatives's drawings is not permitted. This applies to hard paper, electronic, and all other versions.
16. Show clearly the size and location of each member and the erection mark assigned to each member. Show each field connection with all data and details necessary for assembling the structure. Direct special attention to the possible need for special guying, bracing, or shoring to prevent deformation of existing or new structure due to stresses caused by erection procedures and equipment, by construction loadings, and by forces of natural phenomena.
17. Prepare, keep up-to-date, and submit a complete drawing index cross-referencing each assigned piece mark with the drawing number in which the piece is detailed. Detail drawings submitted without an up-to-date index and the applicable erection drawing(s) showing the location of each piece will be deemed an incomplete submission and will not be accepted as subject to any agreed shop drawing review schedule.
18. Prepare anchor bolt and base plate erection drawings containing complete location and placing details, including details of all templates. Provide anchor bolt erection drawings to the concrete trade in advance of applicable concrete work and in coordination with concrete construction sequence.
19. Submit, in writing, any proposed deviations from the Contract Documents, prior to the submission of shop drawings showing the proposed deviation. Submit requests for deviations on the steelwork subcontractor's letterhead. Deviations not identified, or identified only in letters of transmittal or in shop drawings or both, without the required written request, may not be accepted, and shall be sufficient cause for the Director's Representative to return each shop drawing containing such deviations without further action. Acceptance of shop drawings containing deviations not detected by the Director's Representative during shop drawing review shall not relieve the steelwork subcontractor from responsibility to conform strictly to the Contract Documents.
20. Prior to resubmission of shop drawings with additions or corrections, circle or bubble and identify all changes. Drawings submitted without each change being clearly identified are subject to return for resubmission.
21. Prior to making shop drawings for any portion of the work involving alterations to an existing structure, make all necessary field observations, measurements and surveys of

existing conditions. If probes are required to accomplish such measurements, give timely notice where probes will be required.

D. Submit certified copies of each survey conducted by a surveyor licensed by the state in which the construction is to take place and employed by the structural steel subcontractor. Survey shall show elevations and locations of base plates and anchor bolts to receive structural steel, and final elevations and locations for major members. Indicate discrepancies between actual installation and Contract Documents.

E. Reports:

1. Submit certified copies of mill test reports for all steel furnished. Perform mechanical and chemical tests for all material regardless of thickness or use.
2. Submit certification of recycled steel content. Certification shall clearly indicate post-consumer AND post-industrial recycled steel content for the particular member or members used.
3. Submit mill and fabricator certification of compliance with ISO14001.
4. Submit anchor bolt checking certification as required.
5. Submit qualification certificates of all welders who will perform work on the project.
6. Submit survey of erected steelwork as required.

F. Submit verification of bio-degradable or low VOC, and low Hazardous Air Pollutants (HAPS) cleaning solutions. Provide a cut sheet for all cleaning solutions used in the surface preparation of steel components. Highlight VOC limits and chemical component limits.

1.5 QUALITY ASSURANCE

A. Except as modified by this specification, comply with the applicable provisions and recommendations of the following codes and standards:

1. State of New York Building Code, Latest Edition
2. AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings".
3. AISC "Code of Standard Practice for Steel Buildings and Bridges" latest edition.
4. Industrial Fasteners Institute "Handbook of Bolt and Bolted Joints" latest edition.
5. RCSC "Specifications for Structural Joints Using ASTM A 325 or A 490 Bolts."
6. ASTM Standards as applicable in the building code of the local jurisdiction and as noted in this specification.
7. AWS D1.1, "Structural Welding Code."
8. AWS A5.18 & A5.28, Structural Welding Code for GMAW

B. Qualifications for welding work shall be as follows:

1. Qualify welding procedures and welding operators in accordance with the AWS "Standard Qualification Procedure."

   a. Include amended requirements of the building code as noted above.

2. Submit certification that all welders to be employed in work are AWS qualified. If re-certification of welders is required, retesting will be responsibility of structural steel subcontractor.

a. Include licensing requirements as per the building code noted above and local jurisdiction.

1.6 TESTING AND INSPECTION

A. Special Inspection as required by the applicable Building Code of all structural steelwork in the shop and field will be performed by an inspection agency retained by the Owner at no expense to the Contractor. The inspection agency shall work under the direction of the Owner. Contractor shall provide the inspection agency with the following:

1. Schedule of all work in both shop and field with at least ten days' written notice before commencement of either activity.
2. A complete set of approved shop and erection drawings.
3. Cutting lists, order sheets, material bills, shipping bills and mill test reports.
4. Information as to time and place of all rollings and shipment of material to shops.
5. Representative sample pieces as requested by the testing agency.
6. Full and ample means and assistance for testing all material.
7. Proper facilities, including scaffolding, temporary work platforms, etc., for inspection of the work in the mills, shop and field.

B. Each person installing connections shall be assigned an identifying symbol or mark and all shop and field connections shall be identified so that the inspector can refer back to the person making the connection.

C. The following minimum criteria shall be adhered to in testing of welds and bolts:

1. All welds and bolts shall be examined by visual means.
2. 25% of all welds, selected randomly, shall be measured.
3. 25% of all bolts, selected randomly, shall be checked with calibrated torque wrench.
4. In addition, all welds subject to tensile stress shall be examined by the Ultrasonic Method for 100% of their length.
5. 10% of all manual fillet welds shall be tested by the magnetic particle method.
6. 1'-0" at each end of automatic fillet welds shall be tested by the magnetic particle method.
7. 100% of groove welds shall be tested by the ultrasonic method.

D. Shop inspection will include examination of steel for straightness and alignment, fissures, mill scale, and other defects and deformities, as described in ASTM A6, examination of fabricated pieces for conforming to approved shop drawings, testing of bolts and welds. All shop welds shall be visually inspected, and spot tested using Ultrasonic Method ASTM E 114 and AWS, Chapter 6, Part C. All inspected welds shall be identified by the inspector.

E. Field inspection will include examination of erected steel for welding, proper fitting and tensioning of bolts, alignment, trueness and plumbness, level of billets and base plates.

F. Inspection of welding will be such as to assure that the work is within the quality requirements specified below and elsewhere in this section of the specifications and will include:

1. Ascertainment that the electrodes and flux used for the SAW, GMAW and FCAW welding processes conform to the requirements of this section of the specifications.
2. Ascertainment that the approved welding procedures and sequence are followed without deviation, unless specific approval for change is obtained from the Director’s

Representative .

3. The testing agency shall be prepared to utilize the following approved methods of testing:

   a. Liquid penetrant inspection: ASTM E 165.
   b. Magnetic particle: ASTM E 1444.
   c. Radiographic inspection: ASTM E 94 and E 1032.
   d. Ultrasonic inspection: ASTM E 114 and AWS, Chapter 6, Section C.

G. When defects are revealed, additional inspection by whatever method is deemed necessary by the inspector, shall be performed to the extent necessary to assure that the full amount of defect has been located. No further work shall be done on the assembly or sub-assembly in question until all the necessary corrections have been made. Defects shall be repaired, using the same welding procedure that was used initially in making the weld, unless otherwise approved by the Director's Representative. Inspection of the repaired weld shall be by the same method that was used to reveal the defect. A second repair of a defective area shall not be made without approval of the Director's Representative.

H. Apparatus and procedure for measuring torque and tension in high strength bolts and for calibrating wrenches shall be furnished and maintained by steel contractor and shall be approved by the inspection agency. Wrenches shall be calibrated each day at the beginning of the work, each time the bolt size or length of pressure hose is changed, and at such other times as the inspection agency may direct. Periodic checks of high strength steel bolt connections will be made in the field by the inspection agency. The steel contractor shall maintain at all times during erection a manual torque wrench, and shall provide a laborer and scaffolding as required for the testing of connections by the inspection agency, and shall at his own expense, furnish such facilities and provide such assistance as may be required for proper inspection.

I. A distinguishing mark will be placed on all work that has been inspected and approved. Material or work that is not acceptable will be designated by words such as "REJECT" or "REPAIR" marked directly on the material or work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. Minimize the disturbances to site and soil conditions.

B. Deliver anchor bolts and anchorage devices, which are to be embedded in cast-in-place concrete, in ample time not to delay work.

C. Store materials to permit easy access for inspection and identification. Keep steel members in a safe, dry, off ground location, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration, discoloration or staining.

D. Do not store materials on structure in a manner that might cause distortion or damage to members of supporting structures. Repair or replace damaged materials or structures as directed.

1.8 PROJECT CONDITIONS

A. The structural steel contractor shall coordinate the structural steel work with the work of other Contracts. Verify all dimensions and details of this Contract and those of other Contracts that

affect the work before proceeding. Any discrepancies shall be immediately reported to the Director's Representative.

B. Be fully responsible for the accurate installation of the work. Any discrepancy which arises from his failure to execute the work in conformity to the drawings and specifications shall be properly remedied at the contractor's own expense and in a manner acceptable to the Director's representative.

C. Locate dimensionally on setting plans all anchor bolts, inserts, bearing and base plates, etc., and prepare and deliver all required templates and fully dimensioned setting plans in time for the proper execution of the work. Anchor bolts shall be set by another subcontractor. The structural steel contractor shall check all such settings for correctness after they have been cast in place, and before proceeding with erection work.

D. Report to the Director's Representative and representative and certify compliance with the above checking requirements in writing and indicate any inaccuracies found in the location of anchor bolts or inserts, and corrections which must be made to their installation. Any inaccuracies not included in the report and found during or after steel erection shall be the responsibility of the structural steel contractor and the cost of corrective measures shall be borne by the structural steel contractor.

E. Use base lines, benchmarks, or other standards for survey work that have been provided or verified by others. If permanent building benchmarks have been established, these will be used for field checking.

F. Coordinate with all other trades to insure that work of this section does not cause undue conflict. Ensure that location of erection devices such as cranes, derricks, booms or hoists, does not cause over-stresses to steel frame to work previously placed by other trades or to existing structures. When required, retain the services of a licensed professional engineer to ascertain that erection devices do not create unsafe conditions or cause overstresses.

G. Ensure full co-ordination with other related trades and professions.

1.9 SUBSTITUTION

A. Director's representative reserves the right to require substitute shapes of other sizes than those indicated on the drawings when it is apparent that the shapes specified cannot be furnished within the time required for the progress of construction. Make said substitutions without additional cost to the owner.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Steel shapes, including structural steel wide flange and structural tee rolled shapes, channels, angles, plates, pipe, and hollow structural sections: As noted on structural drawings.

B. High Strength Bolts: As noted on structural drawings

C. Anchor Bolts: As noted on structural drawings

D. Filler metal for welding electrodes. As noted on structural drawings.

E. Galvanization for all structural steel framing. See Section 3.4.

PART 3 - EXECUTION

3.1 FABRICATION

A. All shop connections shall be high strength bolted unless specifically shown otherwise. Fabricate work in shop in as large assemblies as practicable. Use welded connections ONLY where shown on drawings. If a bolted connection is not possible obtain written approval from the Director's Representative for the welded connection.

B. Mill column ends and bearing stiffeners to give full bearing over the cross section. Plane contact surfaces of bearing plates when required by the AISC Specifications. It is not necessary to plane bottom surfaces of plates on grout beds.

C. Drill or punch holes at right angles to the surface of the metal, not more than 1/16" larger than the connector diameter. Do not make or enlarge holes by burning. Drill material having a thickness in excess of the connector diameter and material thicker than 7/8". Holes shall be clean-cut without torn or ragged edges. Remove outside burrs resulting from drilling operations.

D. Provide holes in members to permit connection of the work of other trades. Use suitable templates for proper location of these holes. Steel requiring adjustment or accurate alignment shall be provided with slotted holes or full bearing shims as shown.

E. Provide holes, slots and openings required by other trades together with necessary reinforcing required. Use suitable templates for proper location of these openings. All such openings shall be shown on the shop drawings. No change in size or location will be permitted without prior approval.

F. Manual flame cutting shall be done only with a mechanically guided torch. An unguided torch may be used provided the cut is within 1/8" of the required line.

3.2 SHOP CONNECTIONS

A. Provide connections as shown on the drawing exactly as detailed. Where connections are not detailed, the minimum connections shall comply with appropriate tables headed, "Framed Beam Connections" shown in the AISC "Manual of Steel Construction" unless otherwise noted on the drawings. Use high strength bolts unless otherwise shown.

B. Do not use welded connections unless shown on details. Field welding is not allowed without written instruction from the Director's Representative.

C. Proportion and detail all connections on shop drawings to resist forces shown on design drawings. If no reactions are indicated on design drawings, design connections for non-composite beams to

resist the end reaction shown in the AISC tables for Uniform Load Constants for Beams.

D. Bolting

1. Bolts shall be of a length that will extend not less than 1/4" beyond the nuts. Enter bolts into holes without damaging the thread.
2. Use high-strength bolts in friction as shown. Make high-strength bolted joints without the use of erection bolts. Bolt heads and nuts shall rest squarely against the metal. Where structural members have sloping surface, bolted connections shall be provided with beveled washers to afford square seating or framing for bolt heads or nuts. Bring members tightly together with sufficient high-strength "fitting-up" bolts which shall be retightened as all the bolts are finally tightened. Manual torque wrenches will not be accepted for final tightening. Protect bolt heads from damage during placing. Final tightening of high-strength bolts shall be by properly calibrated power torque wrenches. Bolts that have been completely tightened shall be marked for identification.

E. Welding

1. The following environmentally preferable welding processes shall be used as described for the related application without exception:

    a. Submerged Arc Welding (SAW): Plate girders, fillet and butt joints in pipes, cylinders, columns and beams, and welds where ‘downhand’ or horizontal positions are possible.
    b. Gas Metal Arc Welding (GMAW) shall be used where SAW is not applicable (such as for angled connections and anything irregular or short).
    c. Field welding shall be allowed only in special circumstances; in such cases Flux Core Arc welding (FCAW) shall be specified

2. Do not begin structural welding until joint elements are inspected for surface preparation, fit-up, and cleanliness of surface to be welded and are then bolted or tacked in intimate contact and adjusted to dimensions shown on drawings, or both, with allowance for any weld shrinkage that is expected. No members are to be spliced without prior approval by the Director’s Representative.

    a. Containment surface preparation debris must meet SSPC-Guide 6 guidelines.

3. Pre-heat and interpass temperature shall be in accordance with Table 4.2 (including footnotes) of the AWS Code for Welding in Building Construction. The temperature shall be measured from the side opposite to that which the pre-heat is applied, where possible.
4. All groove welds shall be continuous and full penetration welds unless otherwise shown on the design drawings. Welds made without the aid of a back-up bar shall have their roots chipped, ground or roughened out to sound metal from the second side, before welding is done from the second side.
5. All welds shall be sound throughout. There shall be no crack in any weld or weld pass. Weld may be considered sound if it contains only slight porosity or fusion defects which are well dispersed.
6. The heat, input, length of weld and sequence of weld shall be controlled to prevent distortions. The surfaces to be welded and the filler metals to be used shall be subject to inspection before any welding is performed.

3.3 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/A 123M.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.

3.4 SOURCE QUALITY CONTROL

A. Refer to testing and inspection requirements specified above.

3.5 EXAMINATION

A. Verify field measurements prior to start of erection. Notify Director’s representative of any errors. Obtain Director’s representative 's approval of methods proposed for correcting errors prior to proceeding with corrections and erection.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.6 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

3.7 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

C. Column billets and bearing plates shall be supported and aligned on steel wedges, shims, or leveling nuts. After the supported members have been plumbed and properly positioned by instrument and anchor nuts tightened, the entire bearing area under the plate shall be packed solidly with grout specified in another Section. Wedges and shims shall be set back a minimum of 3/4" from the edges of plates and shall be left in place. Leveling plates are not permitted.

D. Plumbing, Leveling and Bracing

1. Structural steel shall be erected true and level, and temporary bracing shall be introduced wherever necessary to provide for all loads to which the structure may be subjected, including equipment and the operation thereof. Such bracing shall be left in place as long as may be required for safety. No welding shall be done or bolts drawn up tight until structural steel has been properly aligned. Obtain approval for guy locations to assure lack

of interference with operations of other trades.

E. Drifting

1. Light drifting necessary to draw holes together will be permitted, but drifting of unfair holes will not be permitted. Twist drills shall be used to enlarge holes as necessary to the next larger size; use next larger size bolts as required. Reaming that weakens the members or make it impossible to fill the holes properly or to adjust accurately after reaming, will not be allowed.

3.8 FIELD CONNECTIONS

A. In addition to the requirements for shop connections comply with the following:

1. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
2. Joint Type: As noted on structural drawings.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

3.9 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

3.10 WASTE MANAGEMENT

A. Separate and recycle waste materials to the maximum extent feasible.

B. Separate for recycling and place in designated containers the following metal waste in accordance with the Waste Management Plans and local recycler standards: Steel, iron, galvanized steel, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass and bronze.

C. Collect all metal cut-offs and scraps and recycle as above.

D. Fold up metal banding, flatten and place in designated area.

E. Close and seal tightly all partly used paint and finish containers, and store protected in a well-ventilated, fire-safe area at moderate temperature.

F. Designated un-used paint for:

1. Immediate re-use
2. Long term maintenance needs
3. Recycling by an appropriate facility.
4. Donation

G. Place empty containers of solvent-based paints in areas designated for hazardous materials.

H. Do not dispose of paints or solvents by pouring on the ground. Place amounts too small to re-use in designated containers for proper disposal.

I. Place materials defined as hazardous or toxic waste in designated containers.

END OF SECTION

NEW YORK STATE OF OPPORTUNITY. Office of General Services

Design and Construction
Division of Construction, 35th Floor, Corning Tower
The Governor Nelson A. Rockefeller Empire State Plaza
Albany, New York 12242
Phone: (518) 474-0331 FAX: (518) 474-8201

SCHEDULE OF SUBMITTALS

PROJECT NO.: 47331

FACILITY:

CONTRACTOR:

PROJECT MANAGER:

DESIGN CONSULTANT: JOHN G. WAITE ASSOCIATES, ARCHITECTS, PLLC

ENGINEER-IN-CHARGE:

LEGEND

PACK: SUBMITTAL PACKAGE

SD: SHOP DRAWINGS

PD: PRODUCT DATA

SAM: SAMPLES

QCS: QUALITY CONTROL SUBMITTALS

LEED: LEED SUBMITTALS

CCS: CONTRACT CLOSEOUT SUBMITTALS

SUBMITTAL REVIEW RESPONSIBILITY:
F: OGS FIELD OFFICE
F/O: OGS FIELD OFFICE / OFFICE (ALBANY)
D: CONSULTANT / DESIGNER
S: OGS SCHEDULING DEPARTMENT
RSM: Regional Safety Manager

INSTRUCTIONS TO THE CONTRACTOR

1. Refer to **Section 013300 Submittals** of the Project Manual for general requirements regarding submittals and to **Section 017716 - CONTRACT CLOSEOUT** for project closeout submittals.
2. Refer to Sections of the specifications indicated herein for details of the requirements for each submittal listed.
3. Indicate in the rows (spaces) following each item:
a. Critical submittals and long lead items (mark with an 'X'). Some critical submittals may already be identified by the design team. Confirm that these are critical submittals.
b. The date the item will be submitted, and date approval is required (allow at least 3 weeks), and the date delivery of the material or equipment is necessary for completion of the work in accordance with the Progress Schedule. The date entered for the submittal is the last date a substitution will be considered. Proposed substitutions must be made prior to the date entered if more than one substitution is to be submitted for approval. Spaces which contain N/A do not require dates.
4. An example of a Submittal Transmittal (BDC-42) can be located at: http://www.ogs.ny.gov/BU/DC/forms/ContractorConstForms.asp
5. Submit Contract Closeout Submittals (CCS) prior to final inspection.

INSTRUCTIONS TO THE CONSULTANT / DESIGNER

1. Cut and paste required information from each Division (Div.X) tab and place in the S.O.S. tab.
2. Delete Division (Div.X) tabs after the S.O.S. tab has been in-filled.
3. Indicate F, F/O or D in column E. Items in Div.1 have defaults that can be modified as necessary.
4. Indicate items that are critical submittals in column F.

Note:
The following list of submittals is furnished for your convenience in scheduling submittals. The list is not warranted to be complete and does not take precedence over the contract documents. Enter additional submittals, as required and modify this schedule to the specific project. This S.O.S. will be used to populate the submittals website log.

NEW YORK STATE OF OPPORTUNITY. Office of General Services

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SCHEDULE OF SUBMITTALS

PROJECT NO.: 47331 C

SUBMITTALS FOR APPROVAL				Send to:	Critical Submittals	Contractor's Projected Dates Allow at least 4 weeks for Approval (allows time for any resubmission)		
Spec Section	Sub Section	Type	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
007213			**GENERAL CONDITIONS**					
007213		**PD**	ARTICLE 6: Designate in writing competent supervision and/or management representatives as required - **include contact number in case of an emergency after work hours, including weekends and holidays (see 011000 Summary of Work)**	F				
007213		**PD**	ARTICLE 8: Permits and licenses	F				
011100			**SAFETY**					
011100		**QCS**	Site Specific Safety Plan	RSM				
011100		**QCS**	Employee Safety Orientation Training and Certificates					
011100		**QCS**	Emergency Action and Evacuation Plan					
013113			**PROJECT SCHEDULE**					
013200			**CONSTRUCTION PROGRESS DOCUMENTATION**					
013200		**QCS**	Scheduler Preparer Qualifications	S	X			
013200		**QCS**	Preliminary Project Schedule	S	X			
013200		**QCS**	Baseline Project Schedule	S	X			
013200		**QCS**	CMU-01 Agreement Form	S	X			
013300			**SUBMITTALS**					
013300		**PD**	Schedule of Submittals (This form completed and editted)	F	X			
013300	**1.07.A**	**QCS**	Submittal Coordinator Qualifications	F/O	X			
013591			**HISTORIC TREATMENT PROCEDURES**					
013591	**1.07.A**	**SD**	Historic Treatment Program	F				
013591	**1.08.A**	**QCS**	Preconstruction Documentation	F				
013591	**1.08.B**	**QCS**	Documentation of Title X "Lead-Safe Certified Firm" status	F				
014339			**MOCKUP REQUIREMENTS**					
014339	**1.04.A**	**SD**	Mockup Plan: Detailed, dimensioned plans and elevations.	F				
015000			**CONSTRUCTION FACILITIES & TEMPORARY CONTROLS**					
015000	**1.04.A**	**QCS**	Fire-Prevention Plan					
015000	**1.04.B**	**SD**	Scaffolding Shop Drawings					
015000	**1.04.C**	**SD**	Temporary Shoring Drawings					
015000	**1.04.D**	**PD**	Product Data					

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015000	**1.04.E**	**SD**	Enclosed Walkway Shop Drawings: Include doors, hardware, electrical, and security systems					
015720			**TEMPORARY MAINTENANCE OF SEWER FLOWS AND SEWER SERVICE**					
015720		**PD**	Diversion of Flow Plan	F				
015813			**PROJECT IDENTIFICATION SIGN**					
015813	**1.02.A**	**SAM**	Color samples	F				
015813		**PD**	Framing and Posts	F				
015813		**PD**	Plywood	F				
015813		**PD**	Background Enamel	F				
015813		**PD**	Lettering Enamel	F				
015813		**PD**	Enamel Colors	F				
017123			**FIELD ENGINEERING**					
017123		**PD**	Submit the name, address, telephone number, and registration number of the Land Surveyor before starting the survey work	F				
017123		**PD**	On request, submit documentation verifying accuracy of survey work	F				
017123		**CCS**	Upon completion of the Work, submit a certificate signed and sealed by the Land Surveyor, stating that the elevations and locations of the Work are in conformance with the Contract Documents	F				
017123		**CCS**	Maintain a complete and accurate log of control and survey work as it progresses.					
017123		**CCS**	Record location data for control points in sketch form and turn over 6 copies of sketches and computations to the Director's Representative	F				
017123		**CCS**	Submit Record Documents	F				
017329			**REMOVALS, CUTTING, AND PATCHING**					
017419			**CONSTRUCTION WASTE MANAGEMENT**					
017419		**QCS**	A copy of the Construction Waste Management (CWM) Plan					
017419		**QCS**	Monthly Construction Waste Management (CWM) Reports	F				
017419		**QCS**	Calculations and supporting documentation to demonstrate disposal, recycling, and/or salvage rates meeting the requirements of the CWM Plan.	F				
017419		**CCS**	Final Waste Management Report					
017716			**CONTRACT CLOSEOUT**					
017716	**1.06**	**CCS**	Project Record Documents	F				
017716	**1.07**	**CCS**	Operation and maintenance, 2 copies	F				
017716	**1.08**	**CCS**	Warranties	F				
017716	**1.09**	**CCS**	Spare Parts and Maintenance Materials	F				
024297			**SELECTIVE REMOVALS AND SALVAGING**					

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Spec Section	Sub Section	Type	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
024297	**1.06.A**	**QCS**	Proposed Protection Measures	D				
024297	**1.06.B**	**QCS**	Qualifiication Data	F/O				
024297	**1.06.C**	**QCS**	Program	D				
024297	**1.06.D**	**SD**	Temporary Shoring Shop Drawings	D				
024297	**1.07.A**	**QCS**	List of Items Indicated to Be Salvaged	F/O				
024297	**1.07.B**	**QCS**	Schedule of Selective Removals and Salvaging Activities	F/O				
024297	**1.07.C**	**QCS**	Pre-removals and Salvaging Photographs	F/O				
024297	**1.07.D**	**QCS**	Inventory of Salvaged Items	F/O				
024297	**1.08.A**	**QCS**	Warranties	F/O				
028733			**BIRD, BAT, AND RODENT DROPPINGS REMEDIATION AND DISPOSAL**					
028733	**1.06.A.**	**PD**	Product Data					
028733	**1.06.B.1**	**QCS**	Worker Qualifications					
028733	**1.06.B.2**	**QCS**	Work Plan					
028733	**1.06.B.3**	**QCS**	Waste Transporter Permit					
028733	**1.06.B.4**	**QCS**	Safety Data					
028733	**1.06.C**	**QCS**	Remediation Company Qualification Data					
028733	**1.06.D**	**QCS**	Remediation Worker Qualification Data					
028733	**1.06.E**	**QCS**	Operation and Maintenance Data					
028733	**1.06.F.1**	**CCS**	Disposal Site Receipts					
028733	**1.06.F.2**	**CCS**	Copy of Daily Project Log					
028733	**1.06.F.3**	**CCS**	Assessment Report					
028733	**1.06.F.4**	**CCS**	Air Monitoring Data					
028733	**1.06.F.5**	**CCS**	Bulk Sampling Data					
033000			**CAST-IN-PLACE CONCRETE**					
033000	**1.03.A**	**PD**	Product Data					
033000	**1.03.B**	**SD**	Shop Drawings Reinforcement					
033000	**1.03.C**	**SD**	Shop Drawings Formwork					
033000	**1.03.D**	**SD**	Construction Joint Layout					
033000	**1.03.E**	**SD**	Contraction Joint Layout					
033000	**1.03.H**	**SAM**	Samples					
033000	**1.03.I**	**QCS**	Laboratory Test Reports					
033000	**1.03.J**	**QCS**	Material Certificates					
033000	**1.03.K**	**QCS**	Cold Weather and Hot Weather Concreting Procedures					
033000	**1.03.L**	**PD**	Certification that possolanic materials conforms to ASTM C 618-01, ASTM C 989, OR ASTM C 1240					
033000	**1.03.M**	**PD**	Certified recycled steel content					
033000	**1.03.N**	**QCS**	Formwork					
033000	**1.03.O**	**PD**	Recylced Aggregate					
033000	**1.03.P**	**PD**	VOC content for curing compounds, sealants and release agents					
040310			**HISTORIC MASONRY CLEANING**					
040310	**1.05.A**	**PD**	Product Data					

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040310	**1.05.B**	**QCS**	Masonry cleaning historic treatment program					
040310	**1.05.C.1**	**QCS**	Qualification Data: Historic masonry cleaning specialists					
040310	**1.05.C.2**	**QCS**	Qualification Data: Microabrasion masonry cleaning specialist					
040310	**1.06.A**	**CCS**	Documentation: Masonry cleaning work					
040322			**HISTORIC BRICK UNIT MASONRY REPAIR AND REPOINTING**					
040322	**1.05.A**	**PD**	Product Data					
040322	**1.05.B**	**SD**	Brick Masonry Shop Drawings					
040322	**1.05.C**	**SAM**	Samples					
040322	**1.05.D**	**QCS**	Brick masonry historic treatment program					
040322	**1.05.E**	**QCS**	Qualification Data					
040322	**1.06.A**	**QCS**	Quality-control program					
040323			**BRICK MASONRY VAULTS**					
040323	**1.06.A**	**PD**	Product Data					
040323	**1.06.B**	**SD**	Brick Masonry Vault Shop Drawings					
040323	**1.06.C**	**SD**	Brick Masonry Vault Centering and Form-Work					
040323	**1.06.D**	**SAM**	Samples					
040323	**1.06.E**	**QCS**	Qualification Data					
040323	**1.07.A**	**QCS**	Quality Control Program					
040342			**HISTORIC STONE MASONRY REPAIR**					
040342	**1.05.A**	**PD**	Product Data					
040342	**1.05.B**	**SD**	Stone Control Sample Identification Drawings					
040342	**1.05.C**	**SD**	Stone Repair Shop Drawings					
040342	**1.05.D**	**SAM**	Samples for Initial Selection					
040342	**1.05.E**	**QCS**	Qualification Data					
040342	**1.05.F**	**QCS**	Quality-control Program					
040342	**1.05.G**	**QCS**	Stone repair historic treatment program					
040343			**HISTORIC STONE MASONRY REPOINTING**					
040343	**1.05.A**	**PD**	Product Data					
040343	**1.05.B**	**SD**	Shop Drawings					
040343	**1.05.C**	**SAM**	Samples					
040343	**1.05.D**	**QCS**	Qualification Data					
040343	**1.05.E**	**QCS**	Quality-control Program					
040343	**1.05.F**	**QCS**	Stone repointing historic treatment program					
040343			**HISTORIC STONE MASONRY REPOINTING**					
040343	**1.05.A**	**PD**	Product Data					
040343	**1.05.B**	**SD**	Shop Drawings					
040343	**1.05.C**	**SAM**	Samples					
040343	**1.05.D**	**QCS**	Qualification Data					
040343	**1.05.E**	**QCS**	Quality-control Program					
040343	**1.05.F**	**QCS**	Stone repointing historic treatment program					

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040513			**MORTAR**					
040513	**1.03.A**	**PD**	Product Data					
040513	**1.03.B.1**	**SAM**	Samples: Mortar					
040513	**1.03.B.2**	**SAM**	Samples: Sand					
040513	**1.04.A**	**QCS**	Preconstruction Test Reports					
050170			**ORNAMENTAL METAL REPAIR**					
050170	**1.04.A**	**PD**	Product Data					
050170	**1.04.B**	**SD**	Shop Drawings					
050170	**1.04.C**	**SAM**	Samples					
050170	**1.05.A**	**QCS**	Qualification Data					
050170	**1.05.B**	**QCS**	Ornamental Metal Historic Treatment Program					
051200			**STRUCTURAL STEEL**					
051200	**1.5.B**	**PD**	Product Data					
051200	**1.5.C**	**SD**	Shop Drawings					
051200	**1.5.D**	**SD**	Certified survey copies					
051200	**1.5.E.1**	**QCS**	Report: Certified furnished steel mill test reports					
051200	**1.5.E.2**	**QCS**	Report: Certified recylced steel content					
051200	**1.5.E.3**	**QCS**	Report: Certified compliance with ISO14001					
051200	**1.5.E.4**	**QCS**	Report: Anchor bolt checking certificates					
051200	**1.5.E.5**	**QCS**	Report: Welder qualification certificates					
051200	**1.5.E.6**	**QCS**	Report: Erected steelwork survey					
051200	**1.5.F**	**PD**	Verification of bio-degradable or low VOC, and low HAPS cleaning solutions					
055000			**METAL FABRICATIONS**					
055000	**1.04.A.1**	**SD**	Shop Drawings: Application to Project: Locate anchor bolts required for installation in other Work					
055000	**1.04.A.2**	**SD**	Shop Drawings: Application to Project: Indicate shop and field welds by standard AWS welding symbols in accordance with AWS A2.4.					
055000	**1.04.A.3**	**SD**	Shop Drawings: Floor Grating					
055000	**1.04.B**	**PD**	Product Data					
055000	**1.04C**	**PD**	Environmental Product Declaration (EPD)					
055000	**1.04.D**	**QCS**	Required Certificates					
055000	**1.04E**	**PD**	Product Data: Include analysis data by qualified professional engineer					
055100			**METAL STAIRS**					
055100	**1.04.A.1**	**SD**	Shop Drawings: Application to Project: Include anchor bolt location plan (if any), erection drawings, and detail drawings of all components					
055100	**1.04.A.2**	**SD**	Shop Drawings: Application to Project: Indicate shop and field welds by standard AWS welding symbols in accordance with AWS A2.4.					
055100	**1.04.B**	**PD**	Product Data					

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055100	**1.04.C.1**	**QCS**	Required Certificates					
055100	**1.04.C.2**	**QCS**	Fabricator's Qualification Data					
055100	**1.04D**	**SD**	Delegated Design: Include analysis data by qualified professional engineer					
055100	**1.05B**	**QCS**	Delegated Design Qualification Data					
057000			**ORNAMENTAL METAL**					
057000	**1.03.A**	**PD**	Product Data					
057000	**1.03.B**	**SD**	Shop Drawings: Fabrication details and connections Include location of anchor bolts required					
057000	**1.03.C.1**	**SAM**	Samples: Bars and shapes					
057000	**1.03.C.2**	**SAM**	Samples: Joints					
057000	**1.03.C.3**	**SAM**	Samples: Fittings, Brackets and other Accessories					
057000	**1.04.A**	**QCS**	Fabricator's Qualification Data					
061000			**ROUGH CARPENTRY**					
061000	**1.04.A**	**PD**	Product Data					
071326			**RUBBERIZED ASPHALT SHEET MEMBRANE WATERPROOFING SYSTEM**					
071326	**1.05.A**	**PD**	Product Data					
071326	**1.05.B.1**	**SAM**	Samples: Sheet Membrane					
071326	**1.05.B.2**	**SAM**	Samples: Drainage Panels					
071326	**1.05.C**	**SD**	Shop Drawings					
071326	**1.06.A**	**QCS**	Qualification Data: manufacturer					
071326	**1.06.B**	**QCS**	Qualification Data: installer and supervisor					
071326	**1.06.C**	**QCS**	Sample manufacturer's warranty					
071326	**1.06.D**	**QCS**	Flood testing reports					
071326	**1.07.A**	**CCS**	Manufacturer's warranty	F				
072600			**VAPOR RETARDER UNDER SLABS ON GRADE**					
072600	**1.03.A**	**PD**	Product Data					
072600	**1.03.B.1**	**SAM**	Vapor Barrier Material					
072600	**1.03.B.2**	**SAM**	Pressure-Sensitive Tape					
075216			**SBS MODIFIED BITUMEN ROOFING SYSTEM**					
075216	**1.05.A**	**PACK**	Submit items specified below, except contract closeout submittals, at the same time as a complete package					
075216	**1.05.B**	**PD**	Product Data					
075216	**1.05.C**	**SD**	Shop Drawings					
075216	**1.06.A**	**QCS**	Fire Hazard Certification					
075216	**1.06.B**	**QCS**	Wind Uplift Certification					
075216	**1.06.C**	**QCS**	Material Certification					
075216	**1.06.D**	**QCS**	Membrane Manufacturer's Qualifications Data					
075216	**1.06.E**	**QCS**	Installer's Qualifications Data					
075216	**1.06.F**	**QCS**	SBS -Roofing Manufacturere's Company Field Advisor Qualification Datga					

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075216	**1.06.G**	**QCS**	Field quality-control reports.					
075216	**1.06.H**	**QCS**	Sample Warranty					
075216	**1.07.A**	**CCS**	Manufacturer's Special Warranty	F				
075216	**1.07.A**	**CCS**	Operation and Maintenance Manual	F				
075323			**ADHERED EPDM ROOFING SYSTEM**					
075323	**1.05.A**	**PACK**	Submit all items, except contract closeout submittals, at one time as a complete package.					
075323	**1.05.B**	**PD**	Product Data					
075323	**1.05.C.1**	**SAM**	Sheet Membrane					
075323	**1.05.C.2**	**SAM**	Sheet Flashing					
075323	**1.06.A**	**QCS**	Fire Hazard Certification					
075323	**1.06.B**	**QCS**	Wind Uplift Certification					
075323	**1.06.C**	**QCS**	Material Certification					
075323	**1.06.D**	**QCS**	Membrane Manufacturer's Qualification Data					
075323	**1.06.E**	**QCS**	Installer's Qualificaction Data					
075323	**1.06.F**	**QCS**	EDPM-Roofing Manufacturer's Company Field Advisor Qualification Data					
075323	**1.06.G**	**QCS**	Sample Warranty					
075323	**1.07.A**	**CCS**	Manufacturer's special warranty	F				
075323	**1.07.B**	**CCS**	Operation and Maintenance Manual	F				
076200			**SHEET METAL FLASHING AND TRIM**					
076200	**1.04.A**	**PD**	Product Data					
076200	**1.04.B**	**SD**	Shop Drawings					
076200	**1.04.C**	**SAM**	Samples for Initial Selection					
076200	**1.04.D.1**	**SAM**	Samples for Verification: Sheet Metal Flashing					
076200	**1.04.D.2**	**SAM**	Samples for Verification: Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications					
076200	**1.04.D.3**	**SAM**	Samples for Verification: Unit-Type Accessories and Miscellaneous Materials					
076200	**1.05.A**	**QCS**	Qualification Data: For fabricators and installers					
076200	**1.05.B**	**QCS**	Sample Warranty					
076200	**1.06.A**	**CCS**	Maintenance Data					
076200	**1.06.B**	**CCS**	Special Warranty					
078400			**FIRESTOPPING**					
078400	**1.04.A**	**PACK**	Submit the following items specified below in the same time as a package.					
078400	**1.05.A**	**PD**	Product Data					
078400	**1.06.A**	**QCS**	Qualification Data: For Installer and Company Field Advisor					
078400	**1.06.B**	**QCS**	Listed System Desgins					
078400	**1.06.C**	**QCS**	Firestopping Schedule					
078400	**1.07.A**	**CCS**	Installer Certificates	F				
079100			**PREFORMED JOINT SEALS**					
079100	**1.02.A**	**PD**	Product Data					
079100	**1.02.B**	**SAM**	Samples for Initial Selection					

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079100	**1.02.C**	**SAM**	Samples for Verification					
079100	**1.02.D**	**QCS**	Performed Joint Seal Schedule					
079100	**1.03.A**	**QCS**	Test and Evaluation Reports					
079100	**1.03.B**	**QCS**	Sample Warranties					
079200			**JOINT SEALANTS**					
079200	**1.02.A**	**PD**	Product Data					
079200	**1.02.B**	**SAM**	Samples for Initial Selection					
079200	**1.02.C**	**SAM**	Samples for Verification					
079200	**1.02.D**	**QCS**	Joint-Sealant Schedule					
079200	**1.03.A**	**QCS**	Preconstruction Laboratory Test Reports					
079200	**1.03.B**	**QCS**	Preoconstruction Field-Adhesion-Test Reports					
079200	**1.03.C**	**QCS**	Field Quality-Control Reports					
079200	**1.03.D**	**QCS**	Sample Warranties					
079200	**1.03.E.1**	**QCS**	Installer's Qualifications Data					
079200	**1.03.E.2**	**QCS**	Company Field Advisor Qualifications Data					
079200	**1.04.A**	**CCS**	Manufacturer's special warranties					
080311			**HISTORIC TREATMENT OF STEEL WINDOWS AND DOORS**					
080311	**1.05.A**	**PD**	Product Data					
080311	**1.05.B**	**SD**	Shop Drawings					
080311	**1.05.C.1**	**SAM**	Samples: Refinished Steel Window Members					
080311	**1.05.C.2**	**SAM**	Samples: Refinished Steel Door Leaf					
080311	**1.05.C.3**	**SAM**	Samples:Hardware					
080311	**1.06.A**	**QCS**	Qualification Statements					
080311	**1.06.B**	**QCS**	Steel Door and Window Historic Treatment Program					
081113			**HOLLOW METAL DOORS AND FRAMES**					
081113	**1.05.A**	**PD**	Product Data					
081113	**1.05.B**	**SD**	Shop Drawings					
081113	**1.05.C.1.a**	**SAM**	Samples: Fabrication: Doors					
081113	**1.05.C.1.b**	**SAM**	Samples: Fabrication: Frames					
081113	**1.05.D**	**QCS**	Product Schedule					
081113	**1.06.A**	**QCS**	Field quality-control reports					
081400			**WOOD DOORS**					
081400	**1.03.A**	**PD**	Product Data					
081400	**1.03.B**	**SD**	Shop Drawings					
081400	**1.04.A**	**CCS**	Special Warranty					
083123			**FLOOR DOORS**					
083123	**1.02.A**	**PD**	Product Data					
083123	**1.02.B**	**QCS**	Product Schedule					
085200			**WOOD WINDOWS**					
085200	**1.03.A**	**PD**	Product Data					
085200	**1.03.B**	**SD**	Shop Drawings					

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085200	**1.03.C.1**	**SAM**	Samples for Initial Selection: Color Samples					
085200	**1.03.C.2**	**SAM**	Samples for Initial Selection: Corner Sample					
085200	**1.03.C.3**	**SAM**	Samples for Initial Selection: Hardware and Accessories					
085200	**1.03.D**	**SAM**	Samples for Verification					
085200	**1.03.E**	**QCS**	Product Schedule					
085200	**1.04.A**	**QCS**	Product Test reports					
085200	**1.04.B**	**QCS**	Field quality-control reports					
085200	**1.04.C**	**QCS**	Sample Warranties					
087100			**FINISH HARDWARE**					
087100	**1.06.A**	**PACK**	Quality Control Package					
087100	**1.06.B**	**PACK**	Finish Hardware Package					
087100	**1.07.A**	**CCS**	Closeout Submittals Package	F				
087100	**1.12.A**	**CCS**	Maintenance Materials: Special Tools (2 sets)					
087100	**1.12.B**	**CCS**	Maintenance Materials: Lubricants					
088100			**GLASS AND GLAZING**					
088100	**1.04.A**	**PD**	Product Data					
088100	**1.04.B**	**PD**	Environmental Product Declaration (EDP)					
088100	**1.04.C**	**SAM**	Glass: 12 x 12 inch pieces for each type of glass specified					
089100			**STATIONARY METAL WALL LOUVERS**					
089100	**1.04.A**	**PD**	Product Data					
089100	**1.04.B**	**SD**	Shop Drawings					
089100	**1.05.A**	**QCS**	Sample Special Warranty					
099101			**CONSTRUCTION PAINTING**					
099101	**1.04.A**	**PD**	Product Data					
099101	**1.04.B**	**SAM**	Samples for Initial Selection: Each type of topcoat product					
099101	**1.04.C**	**SAM**	Samples: Each type of paint system and each pattern, color, and gloss					
099101	**1.04.D**	**PD**	Painting Schedule					
099101	**1.04.E**	**QCS**	Qualification Data: Painting historic treatment specialist					
099101	**1.04.F**	**QCS**	Painting Historic Treatment Program					
099101	**1.05.A**	**QCS**	VOC Certificates					
099101	**1.08.A**	**CCS**	Maintenance Material: Provide extra materials, from the same production run, that match rpoducts installed and that are packaged with protective covering for storage and identified with lavels describing contents.					
099600			**HIGH-PERFORMANCE COATINGS**					
099600	**1.03.A**	**PD**	Product Data					
099600	**1.03.B**	**SAM**	Samples for Verification					
099600	**1.03.C**	**QCS**	Product List					
099600	**1.04.A.1**	**CCS**	Coatings: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.					

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108113			**BIRD CONTROL DEVICES**					
108113	**1.02.A**	**PD**	Product Data					
108113	**1.02.B**	**SAM**	Samples					
108113	**1.02.C**	**QCS**	Manufacturer's Certificates					
108113	**1.03.A**	**QCS**	Sample warranty					
108113	**1.03.B**	**QCS**	Installer qualification statement					
133423.16			**FABRICATED CONTROL BOOTHS**					
133423.16	**1.2.A**	**PD**	Product Data					
133423.16	**1.2.C**	**SD**	Shop Drawings					
133423.16	**1.2.E**	**SAM**	Samples for Initial Selection					
133423.16	**1.2.F**	**SAM**	Samples for Verification					
133423.16	**1.2.G**	**QCS**	Delegated Design Submittals					
133423.16	**1.3.A**	**QCS**	Sample Warranty					
133423.16	**1.4.A**	**CCS**	Maintenance Data	F				
220576			**DRAINAGE ACCESSORIES**					
220576	**1.02.A**	**PD**	Product Data					
220576	**1.03.A.1**	**CCS**	Maintenance: Special Tools: Tools for Vandal Resistant Fasteners					
220576	**1.03.A.2**	**CCS**	Maintenance: Special Tools: T-Handle Wrench for Cleanout Plugs					
220577			**FLOOR AND AREA DRAINS**					
220577	**1.02.A**	**PD**	Product Data					
220577	**1.03.A.1**	**CCS**	Maintenance: Special Tools: Rools for Vandal Resistant Fasteners					
220800			**CLEANING AND TESTING**					
220800	**1.01.A**	**QCS**	Test Reports (Field Tests)					
221100			**PLUMBING PIPING**					
221100	**1.02.A**	**PD**	Product Data					
221100	**1.02.B**	**QCS**	Environmental Product Declaration (EPD)					
221100	**1.02.C.1**	**QCS**	Hydraulic press fitting manufacturer's printed field inspection preocedures					
221100	**1.02.C.2**	**QCS**	Brazer Qualification Data					
221426			**ROOF DRAINS**					
221426	**1.03.A**	**PD**	Product Data					
221426	**1.03.B**	**CCS**	Operation and Maintenance Data - 2 copies	F				
221426	**1.04.A**	**CCS**	Special Tools - Tools for Vandal Resistant Fasteners: one for each type	F				
230523			**VALVES**					
230523	**1.02.A**	**PD**	Product Data					
230523	**1.02.B**	**SD**	Valve Schedule					
230529			**PIPE HANGERS AND SUPPORTS**					

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230529	**1.03.A.1**	**SD**	Details of trapeze hangers and upper hanger attachments for piping 4 inches in diameter and over.					
230529	**1.03.A.2**	**SD**	Details of pipe anchors.					
230529	**1.03.A.3**	**SD**	Details and method of installing restraints, anchors, and supports for grooved end piping systems					
230529	**1.03.B**	**QCS**	Environmental Product Declaration (EPD)					
230529	**1.03.C**	**PD**	Product Data					
230552			**FLEXIBLE VIBRATION ELIMINATORS**					
230552	**1.02.A**	**PD**	Product Data					
230553			**PIPE AND VALVE IDENTIFICATION**					
230553	**1.02.A**	**PD**	Product Data					
230593			**CLEANING AND TESTING**					
230593	**1.02.A**	**QCS**	Test Reports (Field Tests)					
230593	**1.02.A.1**	**QCS**	Test Reports - Propylene Glycol System Test					
230594			**BALANCING OF SYSTEMS**					
230594	**1.02.A.1.a**	**QCS**	Testing, Adjustment and Balancing Reports: Hydronic Systems					
230594	**1.02.A.1.b**	**QCS**	Testing, Adjustment and Balancing Reports: Air Systems					
230700			**PIPING INSULATION**					
230700	**1.03.A.1**	**PD**	Product Data: Insulation Materials					
230700	**1.03.A.2**	**PD**	Product Data: Jacket Materials					
230700	**1.03.B**	**QCS**	Installer's Qualification Data					
232000			**HVAC PIPING**					
232000	**1.02.A**	**PD**	Product Data					
232000	**1.02.B**	**QCS**	Environmental Product Declaration (EPD)					
232000	**1.02.C.1**	**QCS**	Installer's Qualification Data					
232000	**1.02.C.2**	**QCS**	Quality Control Submittals for Hydraulic Press Joints					
232001			**STRAINERS**					
232001	**1.02.A**	**PD**	Product Data					
232003			**THERMOMETERS AND GAUGES**					
232003	**1.02.A**	**PD**	Product Data					
232006			**HYDRONIC SPECIALTIES**					
232006	**1.03.A**	**PD**	Product Data					
232006	**1.03.B**	**CCS**	Operation and Maintenance Data - 2 copies	F				
232113			**COMBINATION BALANCING VALVE AND FLOW METERS**					

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232113	**1.02.A**	**PD**	Product Data					
232113	**1.02.B**	**CCS**	Operation and Maintenance Data					
232113	**1.03.A.1**	**CCS**	Special Tools: One portable readout meter for use with combination balancing valve and flow meter					
232113	**1.03.A.2**	**CCS**	Special Tools: One calibrating and cross reference chart designed for mid range of required flows, or one valve calculator					
232123			**PUMPS**					
232123	**1.02.A**	**PD**	Product Data					
232123	**1.02.B**	**PD**	Pump Schedule					
232123	**1.02.C.1**	**QCS**	Performance curves for each pump, showing gpm, brake HP and efficiency from free delivery to shut-off					
232123	**1.02.C.2**	**QCS**	Include parallel pump curve and system curve for parallel operating pumps.					
232123	**1.02.C.3**	**QCS**	Certificates: Affidavit required under QUALITY ASSURANCE Article.					
232123	**1.02.C.4**	**QCS**	Company Field Advisor Data					
232123	**1.02.D**	**CCS**	Operation, Maintenance Data, and Parts Lists: 2 copies	F				
232123	**1.04.A**	**CCS**	Spare Parts: Deliver one spare set of mechanical seals for each size and type of pump equipped with mechanical seals	F				
232201			**STEAM SPECIALTIES**					
232201	**1.02.A**	**PD**	Product Data					
232202			**STEAM TRAPS**					
232202	**1.02.A**	**PD**	Product Data					
235716			**CONVERTERS**					
235716	**1.03.A**	**SD**	Shop Drawings					
235716	**1.03.B**	**PD**	Product Data					
260181			**HISTORIC LIGHT FIXTURE REPLICATION**					
260181	**1.04.A**	**PD**	Product Data					
260181	**1.04.B**	**SD**	Shop Drawings					
260181	**1.04.C**	**SAM**	Samples for Initial Selection					
260181	**1.04.D**	**SAM**	Samples for Verification: Replicated Light Fixtures					
260181	**1.04.E**	**QCS**	Qualification Data: Historic light fixture replication specialist					
260181	**1.04.F**	**QCS**	Light fixture replication historic treatment program					
260505			**WIRING FOR GATE SYSTEMS**					
260505	**1.02.B**	**PACK**	Submit the product data and the shop drawings specified below all at the same time as a package					
260505	**1.02.C**	**PD**	Product Data					

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260505	**1.02.D**	**SD**	Show switches, controls, motors, and other electrical components					
260505	**1.02.E**	**CCS**	Operation and Maintenance Data: Deliver 2 copies	F				
260519			**WIRING, GENERAL - 600 VOLTS AND UNDER**					
260519	**1.01.B**	**SD**	For Electrical Circuit Protective Systems: Show proposed routes and installation details (include UL classification data, listing, and system number)					
260519	**1.01.C**	**PD**	Product Data					
260529			**FASTENERS, ATTACHMENTS, AND SUPPORTING DEVICES**					
260529	**1.01.A**	**SD**	Show support details if different from methods specified or shown on the drawings.					
260529	**1.01.B**	**PD**	Product Data					
260531			**EXPOSED CONDUIT - WET LOCATIONS**					
260531	**1.02.A**	**PD**	Product Data					
260531	**1.02.B**	**QCS**	Environmental Product Declaration (EPD)					
260531	**1.03.A**	**CCS**	Spare Parts: Touch up coating compound for plastic coated rigid metal conduit (one spray type can and one non-spray can with brush top)					
260532			**INTERIOR RACEWAYS, FITTINGS, AND ACCESSORIES**					
260532	**1.02.A**	**PD**	Product Data					
260532	**1.02.B**	**QCS**	Environmental Product Declaration (EPD)					
260532	**1.03.A**	**CCS**	Spare Parts: Touch up coating compound for plastic coated rigid metal conduit (one spray type can and one non-spray can with brush top)					
260534			**OUTLET, JUNCTION, AND PULL BOXES**					
260534	**1.02.A**	**PD**	Product Data					
260543			**UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS UPDATE**					
260543	**1.03.D**	**PD**	Product Data and Installation Instructions					
260543	**1.03.E**	**QCS**	Environmental Product Declaration (EPD)					
260543	**1.03.F**	**SD**	Shop Drawings					
260543	**1.03.G**	**QCS**	Source Quality-control Reports					
260543	**1.03.H**	**QCS**	Field Quality-control Reports					
260543	**1.04.A**	**CCS**	Maintenance Materials					
260544			**SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING**					
260544	**1.02.D**	**PD**	Product Data and Installation Instructions					
260544	**1.02.E**	**QCS**	Environmental Product Declaration (EPD)					
260553			**IDENTIFICATION FOR ELECTRICAL SYSTEMS**					

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260553	**1.02.D**	**PD**	Product Data and Installation Instructions					
260553	**1.02.E**	**PD**	Identification Schedule					
260553	**1.05.F**	**QCS**	Delegated-Design Submittal					
262416			**PANELBOARDS**					
262416	**1.02.B**	**PACK**	Submit the shop drawings, product data, and the quality control submittals specified below at the same time as a package.					
262416	**1.02.C.1**	**SD**	Cabinet and gutter size.					
262416	**1.02.C.2**	**SD**	Voltage and current rating					
262416	**1.02.C.3**	**SD**	Panelboard short circuit rating. Indicate if rating is Fully Rated Equipment Rating, or where acceptable, UL listed Integrated Equipment Short Circuit Rating					
262416	**1.02.C.4**	**SD**	Circuit breaker enumeration (frame, ATE, poles, I.C.)					
262416	**1.02.C.5**	**SD**	When indicated on the panelboard schedule, a coordinated selective scheme between the main circuit breaker and branch/feeder circuit breakers so that under fault conditions the branch/feeder circuit breaker clears the fault while the main circuit breaker remains closed.					
262416	**1.02.C.6**	**SD**	Accessories.					
262416	**1.02.D**	**PD**	Product Data					
262416	**1.02.E**	**CCS**	Operation and Maintenance Data: Deliver 2 copies	F				
262726			**WIRING DEVICES**					
262726	**1.01.A**	**PD**	Product Data					
262815			**CIRCUIT BREAKERS FOR EXISTING PANELBOARDS**					
265119			**LED LIGHTING FIXTURES**					
265119	**1.01.B**	**PACK**	Submit the product data, photometric data, and Quality Assurance specified all at the same time as a package					
265119	**1.01.C**	**PD**	Product Data					
265119	**1.01.D**	**QCS**	Photometric Data					
265700			**HISTORIC LIGHT FIXTURE REPAIR**					
265700	**1.04.A**	**PD**	Product Data					
265700	**1.04.B**	**SD**	Shop Drawings					
265700	**1.04.C**	**SAM**	Samples for Initial Selection: Glass and Accessories					
265700	**1.04.D**	**SAM**	Samples for Verification: Repaired Light Fixture					
265700	**1.04.E**	**QCS**	Qualification Data: Light fixture repair historic treatment specialist					
265700	**1.04.F**	**QCS**	Light Fixture Repair Historic Treatment Program					
265700	**1.05.A**	**CCS**	Documentation: Complete documentation of light fixture repair work performed					

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Spec Section	Sub Section	Type	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
281300			**CARD ACCESS CONTROL SYSTEM**					
281300	**1.02.B**	**PACK**	Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package					
281300	**1.02.C.1**	**SD**	Bill of materials					
281300	**1.02.C.2**	**SD**	Composite wiring and/or schematic diagrams of the complete system as proposed to be installed (standard diagrams will not be accepted).					
281300	**1.02.C.3**	**SD**	Total electrical load of the complete system in supervisory and alarm conditions.					
281300	**1.02.C.4**	**SD**	Detailed description of system operation (format similar to SYSTEM DESCRIPTION).					
281300	**1.02.D**	**PD**	Product Data					
281300	**1.02.E.1**	**QCS**	Copy of license for installing Security Systems					
281300	**1.02.E.2**	**QCS**	Company Field Advisor Data					
281300	**1.02.F.1**	**CCS**	Test Report: System acceptance test report	F				
281300	**1.02.F.2**	**CCS**	Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.	F				
281300	**1.02.F.3**	**CCS**	Operation and Maintenance Data: Deliver 2 copies	F				
310000			**EARTHWORK**					
310000	**1.03.A.1**	**PD**	Product Data: Permanent Sheeting, Shoring and Bracing					
310000	**1.03.A.2**	**PD**	Product Data: Filter Fabric					
310000	**1.03.A.3**	**PD**	Product Data: Geogrid					
310000	**1.03.B.1**	**SAM**	Select Granular Material					
310000	**1.03.B.2**	**SAM**	Subbase Course Type 2					
310000	**1.03.B.3**	**SAM**	Selected Fill					
310000	**1.03.B.4**	**SAM**	Cushion Material					
310000	**1.03.B.5**	**SAM**	Item B-12					
310000	**1.03.B.6**	**SAM**	Crushed Stone					
310000	**1.03.B.7**	**SAM**	Underdrain Filter Material					
310000	**1.03.C.1**	**QCS**	Subbase Materials					
310000	**1.03.C.2**	**QCS**	Other Aggregates					
310000	**1.03.C.3**	**QCS**	Dewartering Procedure					
310000	**1.03.C.4**	**QCS**	Excavation Procedure					
310000	**1.03.C.5**	**QCS**	Sheeting, Shoring, and Bracing (Not shown on the Drawings)					
310101			**SITE RESTORATION**					
311000			**SITE CLEARING**					
311300			**SELECTIVE TREE REMOVAL AND TRIMMING**					
311300	**1.02.A**	**QCS**	Detailed experience and qualifications description of tree trimming and removal					
312316.13			**TRENCHING**					

SCHEDULE OF SUBMITTALS

PROJECT NO.: 47331 C

SUBMITTALS FOR APPROVAL				Send to:	Critical Submittals	Contractor's Projected Dates Allow at least 4 weeks for Approval (allows time for any resubmission)		
Spec Section	Sub Section	Type	Description	F F/O D S	Mark "X" for all that apply	Projected Transmittal Date:	Projected Approval Date:	Projected Delivery Date:
312316.13	**1.04.B**	**PD**	Written confirmation of the status of all utility construction					
312316.13	**1.04.C**	**QCS**	Sample of each type of offsite fill and/or bedding material that is to be used in backfilling					
312513			**EROSION AND SEDIMENT CONTROL**					
315000			**EXCAVATION SUPPORT AND PROTECTION**					
321216			**ASPHALT PAVING**					
321216	**1.04.A.1**	**PD**	Paving Synthetics					
321216	**1.04.A.2**	**PD**	Asphaltic Pavement					
321216	**1.04.B**	**QCS**	Batch plant name, NYSDOT Plant Number, and location of asphalt plant					
321216	**1.04.C**	**QCS**	Material Delivery Tickets					
321300			**CONCRETE WALKS**					
321300	**1.04.A.1**	**PD**	Concrete Design Mix					
321300	**1.04.A.2**	**PD**	Portland Cement					
321300	**1.04.A.3**	**PD**	Air-entraining Admixture					
321300	**1.04.A.4**	**PD**	Water-reducing or High Range Water-reducing Admixture					
321300	**1.04.A.5**	**PD**	Curing and Anti-Spalling Compound					
321300	**1.04.A.6**	**PD**	ADA Detectable Warning Surface					
321300	**1.04.B.1**	**SAM**	Bar Supports					
321300	**1.04.B.2**	**SAM**	Bar Reinforcement					
321300	**1.04.B.3**	**SAM**	ADA Detectable Warning Surface					
321316			**DECORATIVE CONCRETE PAVING**					
321316	**1.05.A**	**PD**	Product Data					
321316	**1.05.B**	**SAM**	Samples					
321316	**1.05.C**	**QCS**	Design Mixtures					
321316	**1.06.A**	**QCS**	Qualification Data: qualified Installer and ready-mix concrete manufacturer					
321316	**1.06.B**	**QCS**	Material Certificates					
321316	**1.06.C**	**QCS**	Mateiral Test Reports: Aggregates					
321316	**1.06.D**	**QCS**	Field quality-control reports					
321373			**CONCRETE PAVING JOINT SEALANTS**					
321373	**1.02.A**	**PD**	Product Data					
321440			**STONE PAVING**					
321440	**1.03.A**	**PD**	Product Data					
321440	**1.03.B.1**	**SAM**	Samples: Pavers					
321440	**1.03.B.2**	**SAM**	Samples: Packaged Grout					
321613			**PORTLAND CEMENT CONCRETE CURBS**					
321613	**1.05.A**	**PACK**	Submit product data for design mix(es) and materials for concrete specified below at the same time as a package.					

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321613	**1.05.B.1**	**PD**	Mix Design					
321613	**1.05.B.2**	**PD**	Portland Cement					
321613	**1.05.B.3**	**PD**	Fly Ash					
321613	**1.05.B.4**	**PD**	Air-entraining Admixture					
323113			**CHAIN LINK FENCE**					
323113	**1.03.A**	**SD**	Shop Drawings					
323113	**1.03.B**	**PD**	Product Data					
323113	**1.03.C.1**	**SAM**	Fence Fabric					
323113	**1.03.C.2**	**SAM**	Fence and Gate Posts					
323113	**1.03.C.3**	**SAM**	Miscellaneous Materials and Accessories					
323113	**1.03.D.1**	**QCS**	Test Reports: Security coils test procedure report.					
323113	**1.03.D.2**	**QCS**	Certificates: Affidavit required under Quality Assurance Article					
323113	**1.05.A**	**CCS**	Extra Materials: Furnish additional 800 feet fo 30 inch security coils. Furnish rachet tool and sufficient quantity of stainless steel twistable wire ties for installation of coils by facility personnel	F				
323115			**SLIDING GATE OPERATOR SYSTEM**					
323115	**1.05.B**	**PACK**	Submit shop drawings and product data at the same time as a package					
323115	**1.05.D**	**SD**	Show relationship of system with other Work. Include details of all major components. Include parts list showing manufacturers' names and part numbers for the complete installation					
323115	**1.05.E**	**PD**	Product Data					
323115	**1.05.F.1**	**QCS**	Test Report: System acceptance test report					
323115	**1.05.F.2**	**QCS**	Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.					
323115	**1.05.F.3**	**QCS**	Company Field Advisor Data					
323115	**1.05.G**	**CCS**	Operation and Maintenance Data: Deliver two copies	F				
323115	**1.08.A.1**	**CCS**	Spare Parts: One motor	F				
323115	**1.08.A.2**	**CCS**	Spare Parts: One reduction gear assembly.	F				
323115	**1.08.A.3**	**CCS**	Spare Parts: One chain	F				
323115	**1.08.A.4**	**CCS**	Spare Parts: Two of each type limit switch	F				
323115	**1.08.A.5**	**CCS**	Spare Parts: Two of each type circuit breaker	F				
323115	**1.08.A.6**	**CCS**	Spare Parts: Two of each type light.	F				
323115	**1.08.A.7**	**CCS**	Spare Parts: Special tools if required for the regular maintenance and minor repairs of the system.	F				
323115	**1.08.A.8**	**CCS**	Spare Parts: Required amounts of recommended lubricants for 3 years of service	F				
323119			**DECORATIVE METAL FENCES AND GATES**					
323119	**1.03.A**	**PD**	Product Data					
323119	**1.03.B**	**SD**	Shop Drawings					

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323119	**1.03.C**	**SAM**	Samples: For each fence material and for each color specified					
323119	**1.03.D**	**PD**	Environmental Product Declaration (EPD)					
323119	**1.04.A**	**QCS**	Field quality-control reports					
323119	**1.05.A**	**CCS**	Maintenance Data: For gate operators to include in maintenance manuals					
329120			**TOPSOIL**					
329120	**1.01.A**	**SAM**	Topsoil for Testing					
329219			**SEEDING**					
329219	**1.01.A**	**PD**	Hydro Mulch: Manufacturer's specifications and application rate					
329219	**1.01.B**	**PD**	Erosion Control Blanket: Manufacturer's specifications					
329219	**1.01.C**	**SAM**	One pound of seed in vendor's unopened package with label and seed analysis.					
333913			**SANITARY MANHOLES, FRAMES & COVERS**					
333913	**1.05.A**	**SD**	Shop Drawings					
333913	**1.05.B**	**PD**	Product Data					
334103			**DRAINAGE PIPE (STORM DRAINAGE)**					
334103	**1.04.A**	**PD**	Product Data					
334103	**1.04.B**	**QCS**	Construction permits obtained for work					
334103	**1.04.C**	**QCS**	Reports: field tests made and results obtained					
334103	**1.04.D**	**QCS**	Manufacturer's Installation Instructions					
334103	**1.04.E**	**QCS**	Manufacturer's Certification					
334103	**1.05.A**	**CCS**	Project Record Documents	F				
334104			**CORRUGATED POLYETHYLENE STORM DRAIN PIPE**					
334104	**1.02.A**	**PD**	Product Data					
334416			**TRENCH DRAINS**					
334416	**1.02.A**	**SD**	Shop Drawings					
334416	**1.02.B**	**PD**	Product Data					
334416	**1.02.C**	**SAM**	6 inch section of trench drain and grate					
334416	**1.02.D**	**CCS**	Operation and Maintenance Data: Deliver 2 copies	F				

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