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END OF SECTION 000110

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Delaware Department of Transportation (DelDOT) Standard Specifications, DelDOT Standard Special Provisions, and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Phased construction.
4. Access to site.
5. Coordination with occupants.
6. Work restrictions.

1.3 PROJECT INFORMATION

A. Project Identification: Delaware Department of Transportation Agreement 1672 – Task 8A: HAC Parking Garage (Tweeds Mill Parking Structure Repairs)

1. Project Location: 100 Fitness Way, Hockessin, New Castle County, DE.

B. Owner: Delaware Department of Transportation (DelDOT).

C. Engineer: Neil Shemo, PE, AECOM, 100 Sterling Parkway, Suite 205, Mechanicsburg, PA 17050.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and consists of the repair of the existing Tweeds Mill Parking Structure and select associated elements. Work shown within the Contract documents includes, but is not limited to the following:

1. Repair damaged connections at double-tee (DT) panel joints (Types A, B and C)
2. Rout-and-seal cracks at upper-level deck
3. Epoxy inject cracks at upper-level DT stems
4. Rout-and-seal cracks at lower-level slab-on-grade
5. Demolish and replace upper-level concrete approach slab
6. Injection grout cracks at retaining walls
7. Repair spalls at retaining walls
8. Repair corroded lifting lugs at spandrel panels

9. Restore bearing at shelf-angles below DT panel joint along northern retaining wall
10. Replace DT joint sealants
11. Install waterproofing coating at upper-level
12. Install sealer at lower-level
13. Re-stripe parking at upper and lower-levels
14. Remove existing and install new canopy and handrail at access stair
15. Replace vehicular height restrictors at lower and upper-levels
16. Bevel-grind sidewalk tripping hazard at lower-level
17. Replace expansion joint cover at upper stair landing
18. Clean and paint corroded steel archway at upper-level
19. Re-grade drainage swale at north end of garage
20. Install additional fire extinguishers and signage
21. Replace damaged illuminated exit sign
22. Install new illuminated exit signs
23. Replace seals at upper-level floor drains
24. Clean lower-level floor drains
25. Install additional lighting at main electrical distribution center
26. Replace corroded conduit, junction boxes, condulets, couplings and hangers
27. Remove abandoned-in-place conduit and cabling
28. Replace existing lighting fixtures at lower-level with new LED fixtures

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

A. Portions of the Work shall be conducted in five phases, with each phase substantially complete prior to commencement of the subsequent phase. The five phases span 162 calendar days, exclusive of the non-phased work. The “Phased Rehabilitation Tasks” shown on drawings CP-100 and CP-101 represent those tasks which are required to be performed in separate construction phases in order to maintain sufficient parking at the garage during rehabilitation work. The remaining tasks which are included within the Contract documents do not result in major disruption to the garage operations and therefore may be performed at the Contractor’s discretion. All tasks shall be coordinated by the Contractor and shall employ adequate signage, barricades and protection for patrons, vehicles, and contractors. At all times the contractor shall maintain access to entrances/exits and a minimum availability of 50% of the total garage parking spaces for use by patrons during rehabilitation efforts. The following descriptions of the Phase Work are intended to provide a general orientation and sequence only; they are not to be interpreted as limiting the scope or defining the means and methods in a Phase:

1. Phase 1: This Phase includes, but is not limited to construction noted below at the eastern area of the upper and lower-levels of the garage.
   a. Repair damaged connections at double-tee (DT) panel joints
   b. Repair cracks at DT panel flanges and stems
   c. Repair cracks at lower-level slab-on-grade
   d. Partially demolish and replace upper-level concrete approach slab
   e. Replace DT joint sealants
2. Phase 2: This Phase includes, but is not limited to construction noted below at the northern and western areas of the upper and lower-levels of the garage.

a. Repair damaged connections at double-tee (DT) panel joints
b. Repair cracks at DT panel flanges and stems
c. Repair cracks at lower-level slab-on-grade
d. Demolish and replace remainder of upper-level concrete approach slab
e. Replace DT joint sealants

3. Phase 3: This Phase includes, but is not limited to construction noted below at the center aisle of the upper and lower-levels of the garage.
   a. Repair damaged connections at double-tee (DT) panel joints
   b. Repair cracks at DT panel flanges and stems
   c. Repair cracks at lower-level slab-on-grade
   d. Replace DT joint sealants
4. Phase 4: This Phase includes, but is not limited to construction noted below at the upper-level of the garage.
   a. Install waterproofing coating
   b. Re-stripe parking
5. Phase 5: This Phase includes, but is not limited to construction noted below at the lower-level of the garage.
   a. Install sealer at concrete slab-on-grade
   b. Re-stripe parking
6. The remaining rehabilitation tasks may be performed at any point during the Work and shall be substantially complete and ready for occupancy at time of Substantial Completion for the Work.
   a. During Phase 5, use of the access stair by patrons may not be impeded by the rehabilitation efforts. The removal of the existing canopy and construction of the new canopy at the access stair shall not be performed during Phase 5. When public use of the access stair is impeded the Contractor shall furnish and install temporary signage at the base of the garage entrance ramp and at the upper-level of the garage indicating the access restriction and the appropriate detour route.

B. Before commencing the Work of each phase, submit an updated copy of Contractor's construction schedule showing the sequence, commencement and completion dates for all phases of the Work.

1.6 ACCESS TO SITE

A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.

B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Driveways, Walkways and Entrances: Keep driveways, parking garage and entrances serving premises clear and available to garage patrons, Hockessin Athletic Club patrons, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

      a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
      b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

C. Condition of Existing Building: The Contractor shall assume an absolute obligation to protect existing structures and equipment, new work, and the general public from damage, loss, or injury resulting from the Contractor's operations at the project site. In the event of such damage or loss, the Contractor shall promptly restore or replace the work to an equivalent quality acceptable to the Engineer and at no expense to the Owner.

1.7 COORDINATION WITH OCCUPANTS

A. Partial Owner Occupancy: The Owner and garage patrons will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.

1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from the Engineer and authorities having jurisdiction.
2. Provide not less than 72 hours' notice to the Engineer of activities that will affect Owner's operations.

1.8 WORK RESTRICTIONS

A. Work Restrictions, General: Comply with restrictions on construction operations.

1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify Engineer not less than seven days in advance of proposed utility interruptions.
2. Obtain Engineer's written permission before proceeding with utility interruptions.
3. Any interruptions to the electrical service at the garage resulting from the Work shall be restored at the end of each work day. Unless approval is granted by the Engineer, the Contractor shall maintain power to the garage emergency exit signage and emergency lighting at all times.
4. Lighting shall be maintained at all publicly-accessible areas of the garage at all times. As necessary the Contractor may provide temporary power and lighting if service to the main lighting fixtures is interrupted. Temporary lighting shall provide a minimum illumination at all publicly-accessible areas of 1 footcandle (measured horizontally at the floor level).

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 030135 - CONCRETE REHABILITATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Delaware Department of Transportation (DelDOT) Standard Specifications, DelDOT Standard Special Provisions, and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Removal of deteriorated concrete and subsequent replacement and patching.
2. Floor joint and crack repair.
3. Epoxy and hydro-active grout crack injection.

B. Related Requirements:
1. Per DelDOT Standard Specifications and Bridge Design Manual.
2. Products to be compatible with Architectural treatments including traffic coatings and sealers.

1.3 UNIT PRICES

A. General: Unit prices include the cost of preparing existing construction to receive the work indicated . The General Contractor shall perform all measurements for payment in the presence of the Engineer.

B. The General Contractor shall prepare a listing of the types and locations of concrete repairs performed as described herein and on drawings including the units and actual quantities repaired under each repair category and present this list to the Engineer for review and approval.

C. Payment for all work performed under this Section shall be determined by the agreed-upon quantities of repairs actually incorporated in the work. The basis for payment shall be the actual measured quantity of each repair type incorporated in the work, delineated by the specified unit of measure, multiplied by the corresponding contractual unit price shown on the Bid Form.

D. Concrete Removal and Replacement or Patching: Work will be paid for by the square foot for each repair type indicated on the drawings, computed on the basis of rectangular solid shapes approximating the actual shape of concrete removed and replaced with average widths and lengths, measured to the nearest inch.

E. Epoxy Crack Injection and Hydro-Active Grout Crack Injection: Work will be paid for by the linear foot of crack injected.

1.4 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Convene a pre-installation meeting prior to commencement of concrete restoration work with the Engineer, the Contractor and the manufacturer's representative. Review surface preparation, mixing, placement, finishing, curing, protection and coordination with other work.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installers and manufacturers.

B. Material Certificates: For each type of portland cement and aggregate supplied for mixing or adding to products at Project site.

C. Product Test Reports: For each product, for tests performed by manufacturer and witnessed by a qualified testing agency.

D. Field quality-control reports.

E. Maintenance Program: Submit before work begins.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Each product manufacturer shall employ factory-trained technical representatives who are available for consultation and Project-site inspection and assistance at no additional cost. Arrange for, and provide, the services of the product manufacturer's technical representative for initial concrete rehabilitation operations. Services shall include detailed instructions to the General Contractor's personnel on the use of the concrete repair materials, including surface preparation, mixing, application, and curing, and witnessing the first application of each system.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved in writing by the manufacturer to apply the manufactured products.

C. Maintenance Program: Prepare a written plan for maintenance of cast-in-place concrete, including each phase or process, protection of surrounding materials during operations, and control of debris and runoff during the Work. Describe in detail materials, methods, equipment, and sequence of operations to be used for each phase of the Work.

D. Mockups: Mockups shall be comprised of the first two instances of each type of concrete repair and shall be prepared to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Upper-Level Deck Connector Repairs: Repair two connectors of each type A, B and C as indicated on the drawings.
2. Rout and Seal Repairs: Rout and seal two cracks per the drawings, one each at the Lower-level and Upper-level, each approximately 48 inches long.
3. Epoxy Crack Injection: Perform epoxy crack injection in two double-tee stems.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Referenced Standards:
1. American Society for Testing and Materials (ASTM):
   a. A276, Stainless Steel Bars and Shapes.
   b. C494, Chemical Admixtures for Concrete.
   c. C881, Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
2. Society for Protective Coatings (SSPC); Steel Structures Painting Manual.
   a. SSPC - SP2, Hand Tool Cleaning.
   b. SSPC - SP3, Power Tool Cleaning.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.

B. Store cementitious materials off the ground, under cover, and in a dry location.

C. Store aggregates covered and in a dry location; maintain grading and other required characteristics and prevent contamination.

1.9 FIELD CONDITIONS

A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.

1. Use only ASTM C881 Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within 8 hours.
2. Use only ASTM C881 Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within 8 hours.
3. Use only ASTM C881 Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for 8 hours.

B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless concrete-surface and air temperatures are above 40 deg F and will remain so for at least 48 hours after completion of Work.

C. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:

1. When air temperature is below 40 deg F, heat patching-material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.

D. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Source Limitations: Obtain each color, grade, finish, type, and variety of product from single source with resources to provide products of consistent quality in appearance and physical properties.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

2.2 BONDING AGENTS

A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Manufactured product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement. Subject to compliance with requirements, provide one of the following:

1. Sika Corporation, Construction Product Division; Armatec 110 EpoCem (Basis-of-Design Product).
2. BASF Construction Chemicals - Building Systems; Emaco P24.
3. Euclid Chemical Company (The), an RPM company; Duralprep A.C.
4. Kaufman Products, Inc.; Surepoxy HM EPL.
5. Sto Corp., Concrete Restoration Division; Sto Bonding and Anti-Corrosion Agent.
6. Or Approved Equal.

B. Mortar Scrub Coat: Mix consisting of 1 part portland cement and 1 part fine aggregate complying with ASTM C 144 except 100 percent passing a No. 16 sieve.

2.3 CAST-IN-PLACE CONCRETE

A. Conform to DelDOT Standard Specifications for Road and Bridge Construction, Class A concrete:
   1. For pier footings and slab-on-grade – DelDOT Class A, with minimum compressive strength not less than 4500 psi at 28 days when tested according to ASTM C 109/C 109M.
   2. For all other concrete (including concrete repairs) – DelDOT Class A, with minimum compressive strength not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.4 PATCHING MORTAR

A. Patching Mortar, General:

   1. Only use patching mortars that are recommended by manufacturer for each applicable horizontal, vertical, or overhead use orientation.
   2. Color and Aggregate Texture: Provide patching mortar and aggregates of colors and sizes necessary to produce patching mortar that matches existing, adjacent, exposed concrete. Blend several aggregates if necessary to achieve suitable matches.
   3. Coarse Aggregate for Patching Mortar: ASTM C 33, washed aggregate, Size No. 8, Class 5S. Add to patching-mortar mix only as permitted by patching-mortar manufacturer.

B. Polymer-Modified, Cementitious Patching/Repair Mortar: Packaged, two component, Portland cement, fast-setting dry mix for repair of concrete and that contains a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing. Provide minimum compressive strength not less than 5000 psi at 28 days.

   1. For repair of Horizontal Top Surfaces, use a trowel-grade mortar specifically intended for repair of horizontal surfaces. Subject to compliance with requirements, provide one of the following:
      a. SikaTop 122 Plus by Sika Corporation (<u>Basis-of-Design Product</u>):
      b. Duraltop Fast Set; The Euclid Chemical Company, Cleveland, OH.
      c. MasterEmaco T 302; BASF, Shakopee, MN:
      d. Or Approved Equal

   2. For repair of Vertical and Overhead Surfaces, use a non-sag mortar specifically intended for repair of vertical and overhead surfaces. Subject to compliance with requirements, provide one of the following:
      a. SikaTop 123 Plus by Sika Corporation (<u>Basis-of-Design Product</u>): if SikaTop 123 Plus is discontinued or unavailable, provide SikaRepair 223 by Sika Corporation.
      b. Duraltop Gel; The Euclid Company, Cleveland, OH.
      c. MasterEmaco N 400: BASF, Shakopee, MN:

d. Or Approved Equal

2.5 JOINT FILLER

A. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A Shore durometer hardness of at least 80 according to ASTM D 2240. Subject to compliance with requirements, provide one of the following:

1. Sikadur 33; Sika Corporation, Lyndhurst, NJ
2. Sikadur 35; Sika Corporation, Lyndhurst, NJ (horizontal surfaces only).
3. Duralith Gel; Tamms Industries, Mentor, OH.
4. Euco #452 Gel Epoxy System; Euclid Chemical Company, Cleveland, OH.
5. Or Approved Equal.

B. Color: Similar to existing concrete color.

2.6 EPOXY CRACK-INJECTION MATERIALS

A. Epoxy Crack-Injection Adhesive: ASTM C 881/C 881M, Type IV, free of VOCs, compatible with chosen Polymer Sealer and Traffic Coating. Subject to compliance with requirements, provide one of the following:

1. Sikadur 52, Sika Corporation, Lyndhurst, NJ. (Basis-of-Design Product)
2. Dural 335; Tamms Industries, Mentor, OH.
3. Eucopoxy Injection Resin; Euclid Chemical Company, Cleveland, OH.
4. Or Approved Equal.

B. Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.

C. Color: Provide epoxy crack-injection adhesive and capping adhesive as indicated by manufacturer's designations that will blend with existing, adjacent concrete and will not stain concrete surface.

2.7 HYDRO-ACTIVE GROUT CRACK-INJECTION MATERIALS

A. Hydro-Active Grout Crack-Injection Material: High-solids, hydrophobic, polyurethane, liquid chemical grout, free of VOCs. Subject to compliance with requirements, provide one of the following:

1. SikaFix HH LV, Sika Corporation, Lyndhurst, NJ. (Basis-of-Design Product).
2. Hydro-Active Flex LV with accelerator Hydro-Active Flex Cat; DeNeef Construction Chemicals, Inc., Waller, Texas.
3. Scotch Seal Chemical Grout 5600 (Foam); 3M Construction Market Division, St. Paul, Minnesota.
4. Or Approved Equal

B. Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.

C. Color: Provide epoxy crack-injection adhesive and capping adhesive as indicated by manufacturer's designations that will blend with existing, adjacent concrete and will not stain concrete surface.

2.8 OTHER MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II unless otherwise indicated.

2.9 MIXES

A. General: Mix products, in clean containers, according to manufacturer's written instructions.

1. Do not add water, thinners, or additives unless recommended by manufacturer.
2. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
3. Do not mix more materials than can be used within time limits recommended by manufacturer. Discard materials that have begun to set.

B. Mortar Scrub Coat: Mix dry ingredients with enough water to provide consistency of thick cream.

C. Dry-Pack Mortar: Mix patching-mortar dry ingredients with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.

D. Concrete: Comply with DelDOT Standard Specifications and Bridge Design Manual, and:
1. Compressive Strength: Not less than 5000 psi (34.5 MPa)] at 28 days when tested according to ASTM C 109/C 109M.

2.10 ZINC-RICH PAINT

A. Where indicated on the Contract Drawings, provide high zinc-dust/zinc oxide content paint for protection of existing steel that meets the following requirements:
1. Compliant with ASTM A 780: “Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings”
2. One application shall provide a minimum dry coating thickness of 2.0 mils.
3. Dried film shall have a minimum zinc dust content equal to 94% by weight.
4. The applied coating shall provide barrier protection and be anodic to steel.
5. The coating may be applied under both shop and field conditions.
6. The product used shall be inert in concrete and compatible with the steel to be painted.

B. Products: Subject to compliance with requirements, provide one of the following:
1. ZRC, Z.R.C. Worldwide, Quincy, MA

2. Zinc Clad; Sherwin Williams, Cleveland, OH

3. Or approved equal.

2.11 POST-INSTALLED CONCRETE ANCHORS

A. Chemical Adhesive Anchors:
   1. Where shown on the Contract Drawings or otherwise approved by the Engineer on a case-by-case basis, use a two-component chemical adhesive system to anchor reinforcing bars into hardened concrete.
   2. Inject adhesive mix with a static mixing nozzle in accordance with manufacturer's printed instructions.
   3. Provide embedment depth in accordance with manufacturer's recommendations to provide minimum allowable bond strength equal to 125 percent of the yield strength of the bar, unless noted otherwise on the Contract Drawings.
   4. Obtain Engineer's approval for use of a dowel adhesive system at locations other than those indicated on the Contract Drawings.
   5. Products: Subject to compliance with requirements, provide one of the following products. If not providing the Basis of Design product, submit calculations demonstrating that the proposed product matches the capacity of the Basis of Design product for each specific condition indicated on the construction drawings:
      a. HIT HY-200 Injection Adhesive Anchor System: Hilti, Inc., Tulsa, OK (Basis-of-Design Product)
      b. SET-XP by Simpson Strong Tie
      c. AC100 Gold+ by Powers-Rawl
      d. Or approved equal

B. Mechanical Expansion Anchors
   1. Provide wedge-type torque-controlled mechanical expansion anchors manufactured from galvanized steel meeting the requirements of Fed. Spec. A-A-1923A. Anchor may be headed or countersunk depending on intended use.
   2. Products: Subject to compliance with requirements, provide one of the following products. If not providing the Basis of Design product, submit calculations demonstrating that the proposed product matches the capacity of the Basis of Design product for each specific condition indicated on the construction drawings:
      a. Kwik Bolt TZ Expansion Anchor, Hilti, Inc., Tulsa, OK (Basis-of-Design Product)
      b. TruBolt Wedge Anchors, ITW Ramset/Red Head, Glendale Heights, IL
      c. Strong Bolt, Simpson-Strong Tie Anchor Systems, Columbus, OH
      d. Power-Stud by Powers-Rawl
      e. Or approved Equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Notify Engineer seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.

B. Locate areas of deteriorated or delaminated concrete to be repaired using Contract Drawings and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries as indicated on drawings or directed by the Engineer. At columns and walls make boundaries level and plumb unless otherwise indicated.

C. Pachometer Testing: Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer using depth of cover measurements, and verify depth of cover in removal areas using pachometer.

D. Perform surveys as the Work progresses to detect hazards resulting from concrete-maintenance work.

3.2 PREPARATION

A. Ensure that supervisory personnel are on-site and on duty when concrete maintenance work begins and during its progress.

B. Preparation for Removal of Deteriorated Concrete: Examine construction to be repaired to determine best methods to safely and effectively perform concrete maintenance work. Examine adjacent work to determine what protective measures will be necessary. Make explorations, probes, and inquiries as necessary to determine condition of construction to be removed in the course of repair.

1. Verify that affected utilities have been disconnected and capped.
2. Inventory and record the condition of items to be removed for reinstallation or salvage.
3. Provide and maintain shoring, bracing, and temporary structural supports as required to preserve stability and prevent unexpected or uncontrolled movement, settlement, or collapse of construction being demolished and construction and finishes to remain.

C. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from concrete maintenance work.

1. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
2. Use only proven protection methods appropriate to each area and surface being protected.
3. Provide barricades, barriers, and temporary directional signage to exclude public from areas where concrete maintenance work is being performed.
4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of concrete maintenance work.
5. Contain dust and debris generated by concrete maintenance work and prevent it from reaching the public or adjacent surfaces.
6. Use water-mist sprinkling and other wet methods to control dust only with adequate, approved procedures and equipment that ensure that such water will not create a hazard or adversely affect other building areas or materials.
7. Protect floors and other surfaces along haul routes from damage, wear, and staining.
8. Provide supplemental sound-control treatment to isolate removal and dismantling work from other areas of the building.

9. Protect adjacent surfaces and equipment by covering them with heavy polyethylene film and waterproof masking tape. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
10. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
11. Dispose of debris and runoff from operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

D. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify the Engineer immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is in working order.

1. Prevent solids such as aggregate or mortar residue from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from concrete maintenance work.
2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
3. Coordinate with drain cleaning and maintenance Work as shown on the Plumbing Contract Drawings.

E. Concrete Removal:

1. Provide shoring, bracing, and supports as necessary at retaining wall. Do not overload structural elements with debris.
2. Saw-cut perimeter of areas indicated for removal to the depth indicated on drawings. Make cuts perpendicular to concrete surfaces unless noted otherwise on drawings and no deeper than cover on reinforcement.
3. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement using a 17 lb maximum demolition hammer.
4. Remove additional concrete if necessary to provide a depth of removal of as indicated on drawings over entire removal area.
5. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least a 3/4-inch clearance around bar.
6. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and de-bonded concrete is completely removed.
7. Provide surfaces with a fractured profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces unless noted otherwise on drawings. At columns and walls, make top and bottom surfaces level unless otherwise directed.
8. Thoroughly clean removal areas of loose concrete, dust, and debris.

F. Reinforcing-Bar Preparation: Remove loose and flaking rust from reinforcing bars by high-pressure water cleaning, abrasive blast cleaning, needle scaling, or wire brushing until only tightly adhered light rust remains.

1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in two or more adjacent bars, cut bars and remove and replace as directed by the Engineer. Remove additional concrete as necessary to provide at least 3/4-inch clearance at existing

and replacement bars. Splice replacement bars to existing bars according to ACI 318 by lapping or using mechanical couplings. Do not cut pre-stressing strands.

G. Preparation of Floor Cracks and Joints for Repair: Saw-cut cracks and joints full width to edges and 3/4 inch deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.

3.3 APPLICATION

A. General: Comply with manufacturer's written instructions and recommendations for application of products, including surface preparation.

B. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete if required by manufacturer’s written instructions.

C. Mortar Scrub Coat for Job-Mixed Patching Mortar : Dampen repair area and surrounding concrete 6 inches beyond repair area. Remove standing water and apply scrub coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub coat dries, recoat before placing patching mortar or concrete.

D. Slurry Coat for Cementitious Patching Mortar: Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar into substrate, filling pores and voids.

E. Placing Patching Mortar: Place as follows unless otherwise recommended in writing by manufacturer:

1. Provide forms where necessary to confine patch to required shape.
2. Wet substrate and forms thoroughly and then remove standing water.
3. Pretreatment: Follow manufacturer’s written instructions regarding application of bonding agent and/or slurry coat.
4. General Placement: Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
5. Vertical Patching: Place material using maximum and minimum lifts in accordance with manufacturer’s recommendations. Do not feather edge.
6. Overhead Patching: Place material using maximum and minimum lifts in accordance with manufacturer’s recommendations.. Do not feather edge.
7. Consolidation: After each lift is placed, consolidate material and screed surface.
8. Multiple Lifts: Where multiple lifts are used, score surface of lifts to provide a rough surface for placing subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
9. Finishing: Allow surfaces of lifts that are to remain exposed to become firm and then finish to a surface matching adjacent concrete.

10. Curing: Wet-cure cementitious patching materials, including polymer-modified cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

F. Dry-Pack Mortar: Use where indicated. Place as follows unless otherwise recommended in writing by manufacturer:

1. Provide forms where necessary to confine patch to required shape.
2. Clean and wet substrate and forms thoroughly and then remove standing water.
3. Place dry-pack mortar into cavity by hand, and compact tightly into place. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.
4. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
5. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

G. Concrete: Place according to DelDOT Standard Specifications and Bridge Design Manual, and as follows:

1. Pretreatment: Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcement.
2. Standard Placement:

    a. Use vibrators to consolidate concrete as it is placed.
    b. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.

3. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
4. Concrete shall attain a minimum compressive strength of 4,000 psi prior to exposure to vehicle loading.
5. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.

H. Floor Crack and Joint Repair: Cut out deteriorated concrete and reconstruct any damaged sides of joint with patching mortar as indicated on Drawings. Install joint filler in nonmoving floor joints where indicated and as follows:

1. Depth: Install joint filler to a depth of 3/4 inch as indicated on drawings. Use fine silica sand no more than 1/4 inch deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
2. Top Surface: Install joint filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.

I. Epoxy Crack Injection:

1. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
2. Place injection ports as recommended by epoxy manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
3. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
4. Inject cracks indicated on drawings wider than 0.005 inch to a minimum depth of 8 inches.
5. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
6. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

J. Post-Installed Concrete Anchor Installation:
1. Chemical Adhesive Anchor Installation
   a. Install dowels in hardened concrete using an approved dowel adhesive system in strict conformance with the manufacturer's recommendations. Support dowels in the correct position until the adhesive sets and gains enough strength to prevent any dislocation.
2. Mechanical Expansion Anchor Installation
   a. Install mechanical expansion anchors in strict accordance with the manufacturer’s written instructions.

3.4 FIELD QUALITY CONTROL

A. The Contractor shall be responsible to perform the following tests and inspections:

1. Packaged, Cementitious Patching Mortar: At least five randomly selected sets of samples for each type of mortar required, tested according to ASTM C 928.
2. Job-Mixed Patching Mortar: At least five randomly selected sets of samples for each type of mortar required, tested for compressive strength according to ASTM C 109/C 109M.
3. Concrete: As specified in Contract Documents.

4. Joint Filler: Core-drilled samples to verify proper installation.

   a. Testing Frequency: One sample for each 100 feet of joint filled.
   b. Where samples are taken, refill holes with joint filler.

5. Epoxy Crack Injection: Core-drilled samples to verify proper installation.

   a. Testing Frequency: 2 samples from mockup and 1 sample for each 100 feet of crack injected.
   b. Where samples are taken, refill holes with epoxy mortar.

B. Product will be considered defective if it does not pass tests and inspections. Defective work will be repaired or replaced by the Contractor at no additional expense to the Owner.

C. Prepare test and inspection reports.

END OF SECTION 030135

SECTION 071800 - TRAFFIC COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes traffic coatings and pavement markings for the following applications:

1. Vehicular traffic.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with manufacturer's representative. Manufacturer's representative is to be on-site for first installation of each traffic coating product.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including installation instructions.

B. Shop Drawings: For traffic coatings.

1. Include details for treating substrate joints and cracks, flashings, deck penetrations, and other termination conditions.

C. Samples: For each exposed product and for each color and texture specified herein.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

B. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for materials and execution.
1. Build mockup for traffic coating and substrate to receive traffic coatings.

2. Size: 200 sq. ft. of each substrate to demonstrate surface preparation, joint and crack treatment, thickness, texture, color, and standard of workmanship.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Manufacturer's Warranty: Manufacturer agrees to repair or replace traffic coating that fails in materials or workmanship within specified warranty period.

1. Warranty Period: Manufactures standard Five (5) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Material Compatibility: Provide primers; base-, intermediate-, and topcoat; and accessory materials that are compatible with one another and with substrate under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

2.2 TRAFFIC COATING

A. Traffic Coating: Manufacturer's standard, traffic-bearing, seamless, high-solids-content, cold liquid-applied, elastomeric, waterproofing membrane system with integral wearing surface for vehicular traffic according to ASTM C 957.

B. Basis of Design is Tremco Inc.
1. Provide Vulkem 350/345/346 Elastomeric Waterproofing Traffic Deck Coating, A three coat minimum coat system with aggregate broadcast in second 345 and final 346 coat a total of 54 mil thickness or demonstrated approved equal

2. BASF-Corporation Master Seal Traffic 2500

3. Pecora Corporation P-801VOC or P-808/802/804 /806 System

4. Or Approved Equal

C. Primer: Liquid primer recommended for substrate and conditions by traffic-coating manufacturer.

D. Preparatory and Base Coats: Polyurethane

E. Intermediate Coat: Polyurethane

1. Aggregate Content: As recommended in writing by traffic-coating manufacturer for substrate and service conditions indicated.

F. Topcoat: Polyurethane

1. Aggregate Content: As recommended in writing by traffic-coating manufacturer for substrate and service conditions indicated.
2. Color: As selected by The Engineer from manufacturer's full range.

G. Aggregate: Manufacturer's standard aggregate for each use indicated of particle sizes, shape, and minimum hardness recommended in writing by traffic-coating manufacturer.

H. Fire-Test-Response Characteristics: Provide traffic-coating materials with the fire-test-response characteristics as determined by testing identical products per test method below for deck type and slopes indicated by an independent testing and inspecting agency that is acceptable to authorities having jurisdiction.

1. Class A roof covering per ASTM E 108 or UL 790.

I. Energy Performance: Provide traffic coating with an initial Solar Reflectance Index of not less than 78 when calculated according to ASTM E 1980 based on the testing of identical products by a qualified testing agency.

J. VOC Content: Traffic coating shall have a VOC content of 150 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

K. Low-Emitting Materials: Traffic coating shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 ACCESSORY MATERIALS

A. Joint Sealants: Tremco Dymonic or approved equal and as specified in Section 079200 "Joint Sealants."ASTM C 920.

B. Sheet Flashing: Nonstaining sheet material recommended in writing by traffic-coating manufacturer.

C. Adhesive: Contact adhesive recommended in writing by traffic-coating manufacturer.

D. Reinforcing Strip: Fiberglass mesh recommended in writing by traffic-coating manufacturer.

2.4 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Latex, waterborne emulsion, lead and chromate free, ready mixed, complying with FS TT-P-1952, Type II, with drying time of less than 45 minutes.

1. Color: White for designated tenants names and Yellow for parking stalls and related no parking areas diagonal stripping areas, and black for traffic flow arrows and as indicated and drawings.

2. Markings are not to be applied until traffic coating (at upper level) and concrete sealer/water repellant (at lower-level) have cured per manufacturer’s written recommendations.

B. VOC Content: Pavement-marking paints shall have a VOC content of 150 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Low-Emitting Materials: Pavement-marking paints shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Clean and prepare substrates according to ASTM C 1127 and manufacturer's written instructions to produce clean, dust-free, dry substrate for traffic-coating application.

1. Application of coating indicates acceptance of surfaces and conditions.

B. Mask adjoining surfaces not receiving traffic coatings to prevent overspray, spillage, leaking, and migration of coatings. Prevent traffic-coating materials from entering deck substrate penetrations and clogging weep holes and drains.

C. Concrete Substrates: Mechanically abrade surface to a uniform profile acceptable to manufacturer, according to ASTM D 4259. Do not acid etch.

1. Remove grease, oil, paints, and other penetrating contaminants from concrete.
2. Remove concrete fins, ridges, and other projections.
3. Remove laitance, glaze, efflorescence, curing compounds, concrete hardeners, form-release agents, and other incompatible materials that might affect coating adhesion.
4. Remove remaining loose material to provide a sound surface, and clean surfaces according to ASTM D 4258.

3.2 TERMINATIONS AND PENETRATIONS

A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains, and sleeves according to ASTM C 1127 and manufacturer's written instructions.

B. Provide sealant cants at penetrations and at reinforced and nonreinforced, deck-to-wall butt joints.

C. Terminate edges of deck-to-deck expansion joints with preparatory base-coat strip.

D. Install sheet flashings at deck-to-wall expansion and dynamic joints, and bond to deck and wall substrates according to manufacturer's written recommendations.

3.3 JOINT AND CRACK TREATMENT

A. Prepare, treat, rout, and fill joints and cracks in substrates according to ASTM C 1127 and manufacturer's written recommendations. Before coating surfaces, remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Comply with recommendations in ASTM C 1193 for joint-sealant installation.

B. Apply reinforcing strip in traffic-coating system where recommended in writing by traffic-coating manufacturer.

3.4 TRAFFIC-COATING APPLICATION

A. Apply traffic coating according to ASTM C 1127 and manufacturer's written instructions.

B. Apply number of coats of specified compositions for each type of traffic coating at locations as indicated on Drawings.

C. Apply traffic coatings to prepared wall terminations and vertical surfaces to height indicated; omit aggregate on vertical surfaces. Provide removable tape along vertical surface to prevent over-coating.

D. Cure traffic coatings.

3.5 PAVEMENT MARKINGS

A. Do not apply pavement-marking paint for striping and other markings until layout, colors, and placement have been verified with The Engineer and traffic coating has cured.

B. Sweep and clean surface to eliminate loose material and dust.

C. Apply pavement-marking paint with mechanical equipment to produce markings of dimensions indicated with uniform straight edges. Apply at manufacturer's recommended rates for a 15-mil- to 24 mil minimum, wet film thickness.

3.6 PROTECTING AND CLEANING

A. Protect traffic coatings from damage and wear during remainder of construction period.

B. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 071800

SECTION 071900 - WATER REPELLENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes penetrating water-repellent treatments for the following horizontal surfaces:

1. Cast-in-place concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with manufacturer's representative. Manufacturer's representative is to be on-site for first installation of each water repellent product.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of water repellent and substrate indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Product certificates.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: An employer of workers trained and approved by manufacturer.

PART 2 - PRODUCTS

2.1 PENETRATING WATER REPELLENTS

A. Silane/Siloxane-Blend, Penetrating Water Repellent: Clear, silane and siloxane blend with 400 g/L or less of VOCs.
1. The Euclid Company – Baracade WB 244
2. Kryton International, Inc. – Hydrostop Sealer
3. L&M Construction Chemicals – Aquapel
4. Or Approved Equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements and conditions affecting performance of the Work.

1. Verify that surfaces are clean and dry according to water-repellent manufacturer's requirements. Check moisture content in representative locations by method recommended by manufacturer.
2. Verify that there is no efflorescence or other removable residues that would be trapped beneath the application of water repellent.
3. Verify that required repairs are complete, cured, and dry before applying water repellent.

B. Test pH level according to water-repellent manufacturer's written instructions to ensure chemical bond to silica-containing or siliceous minerals.

3.2 PREPARATION

A. New Construction and Repairs: Allow concrete and other cementitious materials to age before application of water repellent, according to repellent manufacturer's written instructions.

B. Cleaning: Before application of water repellent, clean substrate of substances that could impair penetration or performance of product according to water-repellent manufacturer's written instructions.

C. Do not provide pavement markings until such time the sealer has cured per written recommendations from the manufacture.

D. Coordination with Sealant Joints: Do not apply water repellent until sealants for joints adjacent to surfaces receiving water-repellent treatment have been installed and cured.

1. Water-repellent work may precede sealant application only if sealant adhesion and compatibility have been tested and verified using substrate, water repellent, and sealant materials identical to those required.

3.3 APPLICATION

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of water repellent and to instruct Applicator on the product and application method to be used.

B. Apply coating of water repellent on surfaces to be treated using low-pressure spray to the point of saturation. Apply coating in dual passes of uniform, overlapping strokes. Remove excess material; do not allow material to puddle beyond saturation. Comply with manufacturer's written instructions for application procedure unless otherwise indicated.

C. Apply a second saturation coating, repeating first application. Comply with manufacturer's written instructions for limitations on drying time between coats and after rainstorm wetting of surfaces between coats. Consult manufacturer's technical representative if written instructions are not applicable to Project conditions.

3.4 CLEANING

A. Immediately clean water repellent from adjoining surfaces and surfaces soiled or damaged by water-repellent application as work progresses. Correct damage to work of other trades caused by water-repellent application.

B. Comply with manufacturer's written cleaning instructions.

END OF SECTION 071900

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Urethane joint sealants.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with manufactures representative. Manufacture representative is to be on-site for first installation of sealant applications.

ACTION SUBMITTALS

B. Product Data: For each joint-sealant product.

C. Samples: For each kind and color of joint sealant required.

D. Joint-Sealant Schedule: Include the following information:

   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

A. Product test reports.

B. Preconstruction laboratory test reports.

C. Preconstruction field-adhesion-test reports.

D. Field-adhesion-test reports.

E. Sample warranties.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1021 to conduct the testing indicated.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Adhesion Testing: Use ASTM C 794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. Compatibility Testing: Use ASTM C 1087 to determine sealant compatibility when in contact with glazing and gasket materials.

B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates. Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

1.6 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period. Removal of traffic coating to perform remedial work to sealant application is to be replaced in kind.

1. Warranty Period: Ten years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 URETHANE JOINT SEALANTS- Product is to be compatible with traffic coating and silane /siloxane penetrating sealer; written approval from manufacture is to be provided.

A. Urethane, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C 920, Type S, Grade NS, Class 100/50, Uses T and NT.

1. Basis of Design Tremco Dynamo 100 High-Performance, High-Movement Polyurethane Sealant

2. Sikaflex- Sikaflex – WS-290

3. Zinsser – Watertite Polyurethane Sealant

4. Or approved Equal

2.2 JOINT-SEALANT BACKING

A. Cylindrical Sealant Backings: ASTM C 1330, Type C closed-cell material with a surface skin and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

B. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer.

2.3 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove laitance and form-release agents from concrete.
2. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces.

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Comply with ASTM C 1193 and joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

C. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.

1. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.3 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed and cured sealant joints as follows:

a. Perform 10 tests for the first 1000 feet of joint length for each kind of sealant and joint substrate.
b. Perform one test for each 1000 feet of joint length thereafter or one test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.4 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:
a. Joints between plant-precast concrete parking deck.
b. Joints between horizontal and vertical surfaces.
c. Other joints as indicated on Drawings.

2. Joint Sealant: Urethane, M, P, 50, T, NT.

3. Joint-Sealant Color: As selected by The Engineer from manufacturer's full range of colors

END OF SECTION 079200

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings, Delaware Department of Transportation (DelDOT) Standard Specifications, DelDOT Standard Special Provisions, and general provisions of the Contract apply to this Section.

1.2 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates;

1. Concrete.
2. Steel.
3. Galvanized metal.

B. Related Requirements:

1. Section 071800 "Traffic Coatings" for concrete paint specifications.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials**,** from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: 1 gal. of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. The Engineer will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.

   a. Vertical and Horizontal Surfaces: Provide samples of at least 20 sq. ft.
   b. Other Items: Engineer will designate items or areas required.

2. Final approval of color selections will be based on mockups.

   a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Engineer at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Engineer specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F .

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Carboline
2. Tnemec
3. Rust-Oleum
4. International
5. Or Approved Equal

B. Products: Subject to compliance with requirements, “The Basis of Design to be ‘Carboguard 890’ by Carboline , a cycloaliphatic amine wpoxy”, with a urethane top coat by Carboline “Carbothane 133LH” but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors:
1. Blue color for the steel post and horizontal supports for the clearance bars at two locations and post supporting exit sign on upper deck.

2. Red color to match existing archway located at the upper level.
3. Light Grey for coating the steel plates embedded in concrete stair on the West side of the parking facility; colors as selected by the Engineer.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:

1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants, follow recommendations of coating manufacture; Remove oil or grease from surface to be coated with clean rags soaked in Thinner #2 or surface Cleaner #3 (refer to Surface Cleaner #3 instructions) in accordance with SSPC-SP 1-Reference is made according to Basis of Design.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-off Blast Cleaning."
4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

F. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

G. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. Paint the following work where exposed to view:

a. Existing steel archway at upper level-the first three feet of the archway posts from the parking deck is to be prepared for the application of the epoxy coating and urethane top coat.

b. Two steel post and horizontal frame assemblies supporting the traffic height restrictor

c. All steel plates embedded in the existing concrete stair from the ground to the landing at the upper level

D. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

END OF SECTION 099113

SECTION 107343 – CUSTOM STAIR CANOPY

PART 1 - GENERAL

1.1 SUMMARY

A. Drawings, Delaware Department of Transportation (DelDOT) Standard Specifications, DelDOT Standard Special Provisions, and general provisions of the Contract apply to this Section.

1.2 WORK INCLUDED

A. Design, engineering, manufacture, and installation of translucent glazing single panel canopy system. An assembly of extruded polycarbonate glazing panels incorporated into a structural framing system from the ground up without horizontal cross bracing, and which has been tested and warranted by the manufacturer.

a. Canopy shall be sufficiently enclosed by roof and wall panels to protect stairs and landings from accumulation of water and ice. Egress paths shall remain open for the full width of the existing stairway and landings.

b. Canopy is to be installed at the existing concrete stairway. All information shown in the Contract Drawings is based on limited field data and shall be verified by the Contractor prior to ordering or fabrication of any materials.

c. Canopy shall incorporate an integral handrail at each side of the stairway.

B. All anchors, brackets, and hardware attachments necessary to complete the specified structural assembly, weatherability and water-tightness performance requirements. All flashing up to but not penetrating adjoining work are also required as part of the system and shall be included.

C. Design, engineering and installation of lighting and electrical components for canopy.

D. Trained and factory authorized labor with supervision to complete the entire panel installation.

1.3 REFERENCES

A. Federal Specifications (Fed. Spec.):
1. QQ-A-200/9C(1)…Extruded aluminum members 6063-T5
2. HH-I-521B…Insulation board, Thermal, Semi-Rigid Polyurethane.
3. TT-S-001657…Sealants, Type 1.

B. American Society for Testing Materials (ASTM):
1. C-920-79…Elastomeric Joint Sealants Type S, Class 12, Grade NS
2. C-518...Insulation Board, Semi-Rigid Polyurethane.
3. E-84…Standards method of test for surface burning characteristics of building materials.

C. American National Standards Institute (ANSI): ANSI A58.1… Gravity and Lateral Loads Design.

D. Uniform Federal Accessibility Standards: FED-STD-795, 4/1/88….4.13 Door Accessibility.

E. The Aluminum Association (AA): Designation System for Aluminum Finishes (March 1973)

F. International Conference of Building Officials, Uniform Building Code.

G. Public Law 101-336: Americans with Disabilities Act of 1990 (ADA).

1.4 DESIGN REQUIREMENTS

A. ASCE 7-10
   a. Basic Wind Speed: 105 mph
   b. Exposure Category: B
   c. Ground Snow Load: 25 psf

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, including materials, components, finish and all accessories and equipment furnished.

B. Shop Drawings: Submit manufacturer's shop drawings, including plans, elevations, sections and details, dimensions, anchorage, fasteners and locations, flashing and seal details if applicable, finish, and options. Coordinate final sizes, locations and quantities of foundations with those shown in the Contract Drawings.

C. Design Calculations: Submit for review structural design calculations for all canopy structural members and connections not shown on the Contract Drawings. Calculations shall be prepared under the direct supervision of, and signed and sealed by, a licensed Professional Engineer registered in the State of Delaware and experienced in the structural design of canopies.

D. Erection Drawings: Submit manufacturer’s instructions and drawings, and develop erection procedures to enable field installation and repair.

E. Manufacturer’s Project References: Submit list of completed projects including project name and location and type of canopies manufactured.

F. Maintenance Data: The manufacturer shall provide recommended maintenance procedures, schedule of maintenance and materials required or recommended for maintenance.

G. Warranty: Submit manufacturer's standard warranty.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications:
   1. Continuously engaged in Canopy manufacturing, stocking, engineering, designing and building of canopies using polycarbonate (not glass) panel systems with a minimum of ten years successful experience. Manufacturers shall provide a list of at least ten projects having been in place a minimum of ten years, with similar size, scope, climate and type.
   3. Responsible for the configuration and fabrication of all components, including structural and electrical design.

B. Installer's Qualifications:
   1. Authorized by manufacturer to install Canopies.
   2. Trained by manufacturer' standard training methods and policies.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name, manufacturer, and location of installation with detailed written instructions for installation.

B. Storage: Store materials in a clean, dry area indoors in accordance with manufacturer's instructions.

1.8 WARRANTY

A. Provide warranty against defective materials and fabrication. Submit manufacturer's written warranty agreeing to repair canopy system work, which fails in materials within one year of substantial completion.
B. Provide manufacturer's 10 year glazing panel warranty. Third party warranty for glazing panels shall not be acceptable. Glazing warranty to include:
   1. Change in light transmission of no more than 6% per ASTM D-1003.
   2. No delamination of panel affecting appearance, performance or structural integrity of the panel or the system.
   3. Thermal aging - the light transmission and the color shall not change after exposure to heat of 300°F for 25 minutes. (When measured per ASTM D-1003 and ASTM D-2244 respectively).
C. In addition submit installer's written warranty agreeing to repair installation workmanship, defects and leaks within one year of the substantial completion.

PART 2 PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Duo-Gard Industries Inc., 40442 Koppernick Road, Canton, Michigan 48187. Phone (734) 207-9700. Fax (734) 207-7995. Web Site www.duo-gard.com. E-Mail info@duo-gard.com.
B. CPI Daylighting, Inc., 28662 N. Ballard Drive, Lake Forest, Illinois 60045. Phone (847) 816 1060. Fax (847) 816 0425. Web Site www.cpidaylighting.com. E-Mail info@cpidaylighting.com
C. Or approved equal

2.2 GLAZING

A. Window panels shall be: 1/4" thick tempered safety glass. Panels shall be gasketed with wrap-around PVC extrusion, and secured to the framing structure with special extrusions to provide a safe weather-protective canopy. Window color shall be as approved by the Engineer.

B. Wall and roof panels shall be sealed as required to provide a water-proof barrier in compliance with Fed. Spec. II-S-001657 using ASTM C-920-79 sealants.

2.3 STRUCTURAL FRAMING

A. The canopy framework (columns, sills and headers) shall be fabricated using 6063-T5 extruded aluminum members Fed. Spec. QQ-A-200/9C(1). 6061-T6 and 6005-T6 alloy/temper shall be used where required.

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B. Extrusion shapes shall be engineered to provide a framework of adequate structural integrity to satisfy the International Building Code (IBC), and to meet the requirements for snow, wind and seismic loading for the location(s) being considered.

C. Framing members shall be 3” x 3” x 1/8” thick square extruded aluminum tubes. Mullions shall be 1.5” x 2.5” x 1/8” thick extruded aluminum tubes. Other framing members to be used as required.

D. The framework shall be assembled with only stainless steel and aluminum fasteners to prevent rusting or electrolytic interaction with framing members. Screw-type fasteners shall not be used for main structural framing connections. Connections for main force resisting systems shall be fastened via bolted connections.

E. Canopy framing components, and the method of fastening them to the supporting foundations, shall be capable of withstanding lateral loads per ANSI A58.1, the IBC, or applicable local building codes, whichever is more stringent.

F. Foundations shown in Contract Drawings are based on preliminary analysis of a prototypical stair canopy structure. Final size, locations and quantity of foundations shall be coordinated after final selection of the canopy manufacturer and canopy design.

G. Use of the existing concrete stair for main structural support of the canopy will only be allowed pending the submission of structural analysis calculations which demonstrate the capacity of the stairs to withstand the proposed loading. It shall be acceptable to utilize the stairway as a lateral brace point for canopy posts which run past the stair en-route to anchorage to new at-grade foundations.

2.4 MATERIALS

A. Roof configuration shall be shall be: barrel vault with 6mm polycarbonate structured sheet, with integral fascia/gutter member, min. 1/8” thick and: 2.5” fascia, supporting loads listed herein. Rain collection system shall discharge directly to the local storm drainage collector adjacent to the parking garage stairway.

B. Joint Sealant:
   1. Factory-Applied Sealant: Gunnable, nonhardening, elastomeric sealant. ASTM C 920, Type S, Class 12, Grade NS. Fed Spec TT-S-1657, Type 1.n.
   2. Field-Applied Sealant: Approved by canopy manufacturer.

C. Field Fasteners:
   1. Comply with Section 2.3.D above and canopy manufacturer’s instructions for fastener types, quantities, and usage.

2.5 COLOR AND FINISH

A. Extruded aluminum framework shall be Class I anodized in accordance with the Aluminum Association. Color: As approved by the Engineer.

B. Polycarbonate roof panel color: As approved by the Engineer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas to receive canopy. Notify the Engineer of conditions that would adversely affect installation. Do not proceed with installation until unsatisfactory conditions are corrected.

B. All submitted opening sizes, dimensions and tolerances are to be field verified by general contractor unless otherwise stipulated.

C. General Contractor to verify when structural support is ready to receive all work in this section and to convene a Pre-Installation Conference at least one week prior to commencing work of this Section. Attendance required of General Contractor, canopy installer and the Engineer.

3.2 PREPARATION

A. Ensure location to receive canopy is clean, flat, level, plumb, square, accurately aligned, and correctly located.

3.3 INSTALLATION

A. The manufacturer shall provide installation instructions complete with diagrams. Installation shall be performed by the manufacturer or his representative and shall be in strict conformance with the manufacturer's instructions and approved shop drawings. The manufacturer shall guarantee the installation for a period of one year from the date of acceptance.

B. Remove all protective coverings on panels immediately after installation.

3.4 CLEANING

A. Clean canopy in accordance with manufacturer's instructions.

B. Clean inside and outside of canopy immediately after installation.

C. Do not use harsh cleaning materials or methods that would damage the metal finish or glazing.

3.5 PROTECTION

A. Protect installed canopy from damage during construction.

END OF SECTION 107300