

**NEW YORK STATE THRUWAY AUTHORITY
DEPARTMENT OF ENGINEERING**

**ALBANY, NY
JUNE 17, 2026**

**AMENDMENT NO. 2
TO**

**CONTRACT TAS 26-20A
D215099
REHABILITATION/REPLACEMENT OF
THE WASTEWATER TREATMENT PLANT AT
THE CLIFTON SPRINGS SERVICE AREA
AT I-90, MILEPOST 337.10 EASTBOUND
IN THE SYRACUSE DIVISION
OF THE NEW YORK STATE THRUWAY
IN ONTARIO COUNTY**

**IN THE LETTING OF
JUNE 24, 2026**

NOTE: This amendment shall be attached to and become a part of the Proposal for Contract TAS 26-20A.

NOTICE

For Electronic Bidders, the Project's amended EBSX file will automatically account for any necessary item changes (deletions, changes in quantities, or additions) that this Amendment may describe as being required regarding the project's estimated cost. Instructions to make physical changes to the Project Proposal's bid sheets are intended for "paper" Bidders who choose to submit bids via paper.

Questions and Answers for this project are available from the Authority's website, specifically at: https://content3.thruway.ny.gov/netdata/contractors/documents/d215099_tas26-20a_questions-and-answers-06-17-2026.pdf. This document may be updated periodically without formal issuance of an Amendment. Prospective bidders are advised to revisit this link weekly and before proposals are due, for any possible additional questions and answers information.

PROPOSAL

1. **ADD** the attached Special Specifications Table of Contents as new pages **15A** and **15B**. This information was not previously provided.
2. **DELETE** pages **19** and **20** and **REPLACE** with the attached revised pages **19-A2** and **20-A2**. On page 19, Part 1 – General, 1.2 Contract, A., the previous reference to "... an Electrical Contract" has been removed. On page 20, 1.3 Work Summary, B., the previous entry for iv. Disinfection System Installation has been removed. The remaining original entries have been renumbered accordingly (previously v. is now (the new) iv., vi. is now v., etc.).

3. **DELETE** pages 53 through 59 and **REPLACE** with the attached revised pages 53-A2 through 59-A2. There are no specification related changes to page 53 other than to document the amended changes to the specifications for **Section 02 41 00 DEMOLITION** that will physically begin on the next page. On page 54, Part 1 – General, a new Section **1.7 SUBMITTALS**, has been added to the specifications. On Part 3 – EXECUTION, a new entry has been added as **A. Trickling Filter Stone Media:** and the original remaining entries have been renamed accordingly (previous A. is now B., previous B. is now C., etc.). With the new added information, Section 02 41 00, Demolition is now comprised of 8 pages (new page 59B is to be added before original page 60).
4. **DELETE** pages 60 and 61 and **REPLACE** with the attached revised pages 60-A2 and 61-A2. On Page 60, Part 1. **DESCRIPTION:** a new entry “1.04” has been added. On Page 61, under Item 1.01 of the SPECIFICATION SUMMARY, a new entry “B.” has been added to reference the new to be added/included specifications for Section 03 60 00 – GROUTING.
5. **ADD** pages 66A through 66F. The specifications for new to be included Section 03 60 00 – GROUTING is now available. This specification comprises of 6 pages.
6. **DELETE** the following Item:

<u>Contract Proposal Page</u>	<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>
353	627.0007 25	Thermal and Moisture Protection	Lump Sum	1

The “paper” Bidder shall **CROSS OUT** and not enter a bid for these items in the Contract Proposal. If the Bidder fails to make these changes, the Authority will do so and adjust the TOTAL BID, accordingly.

DELETE all other references to the above items in the Contract Plans and Contract Proposal, including the Special Specifications as shown on pages 75 through 83, to also include the specifications for Section 07 41 13 – ALUMINUM METAL ROOF PANELS.

7. **ADD** the following Item:

<u>Contract Proposal Page</u>	<u>Item No.</u>	<u>Description</u>	<u>Unit</u>	<u>Estimated Quantity</u>
354A-A2	627.0005 25	Metals	Lump Sum	1

The “paper” Bidder must **RETURN THE ATTACHED PAGE 354A-A2** with its bid for this Contract.

8. **ADD** new pages 66G through 66AG. The Special Specification and Summary for newly added (above) Item 627.0005 25, METALS is now available. It shall also include the specifications for Section 05 30 00 – ALUMINUM METAL ROOF PANELS, comprising of 6 pages; Section 05 51 17 – ALUMINUM STAIRS, comprising of 5 pages; and Section 05 52 15 – ALUMINUM HANDRAILS AND RAILINGS, comprising of 13 pages.

9. **DELETE** page 105 and **REPLACE** with the attached revised page **105-A2**. The Special Specification Summary for Item 627.0023 25, Heating, Ventilation and Air Conditioning (HVAC) has been updated. The name of Section 23 34 16 – CENTRIFUGAL EXHAUST FAN has been revised, and the addition of a Control Building basement exhaust fan has been added to Section 1.02 A.
10. **DELETE** page 109 and **REPLACE** with the attached revised page **109-A2**. The specification for Section 23 34 16, CENTRIFUGAL EXHAUST FAN, Part 2 – PRODUCTS, Section 2.2 DIRECT DRIVE ROOF DOWNBLAST CENTRIFUGAL EXHAUST FANS – GREENHECK MODEL G, A. General Description: Item 2., Performance Capabilities: has been updated.

PLANS

11. **CHANGE** Drawing Number C-1, Existing Site Conditions & Demolition Plan, Sheet 5 of 40. On the DEMOLITION NOTES: at the end of Note 2., **ADD** to the end of this note the following: “THERE ARE 5 VALVES PER CLARIFIER.”.
12. **CHANGE** Drawing Number C-2, Site Improvements & Yard Piping Plan, Sheet 6 of 40. On the Proposed Improvement Table, **ADD** the following new entry as follows:

I.D.	ASSET	PROPOSED IMPROVEMENT
18	SITE GRADING	GRADE AREA OF DECOMMISSIONED SLUDGE HOLDING TANK TO PROVIDE AN EVEN SLOPE FROM DRIVEWAY EDGE TO EXISTING GRADE AT 556.00

13. **CHANGE** Drawing Number M-9, Primary and Secondary Clarifiers Proposed Plan, Sheet 15 of 40. Under the Secondary Clarifier Proposed Improvements Plan Detail, and specifically in the callout to install concrete curb, **REPLACE** the previous reference to Sheet **M-5** with Sheet **M-10**, instead. The callout shall now read as:
"INSTALL CONCRETE CURB 6" HIGH AROUND TANK WALL. SEE SHEET **M-10** FOR SECTIONS.".
14. **CHANGE** Drawing Number M-10, Primary and Secondary Clarifiers Sections and Details, Sheet 16 of 40. **ADD** the following note in between the PRIMARY CLARIFIERS ELEVATION and SECONDARY CLARIFIERS ELEVATIONS details to read as: “NOTES: 1. DOWELS SHALL BE #4 REBAR WITH 12” SPACING AND 4” EMBEDMENT.”.
15. **DELETE** Drawing Number SD-4, Site Details, Sheet 28 of 40 in its entirety.

The Bidder **MUST** complete Page **369** of the Proposal acknowledging receipt of this amendment. If the Bidder fails to complete the “Amendment Acknowledgement” sheet, his bid could be declared informal thereby delaying award of the contract.

PLEASE BE GOVERNED ACCORDINGLY WHEN SUBMITTING BIDS.

Brent E. Howard, P.E.
Chief Engineer

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SECTION 01 10 00**SUMMARY****PART 1 – GENERAL****1.1 WORK COVERED BY CONTRACT DOCUMENTS**

- A. Project Identification:
 - 1. PROJECT LOCATION: Wastewater Treatment Plant (WWTP) located at the Clifton Springs Service Area. Clifton Springs Service Area on the eastbound lane of I-90 between Exit 43 (Manchester) and Exit 42 (Geneva) in the Town of Manchester, Ontario, County. It is located at milepost 377.10 on the eastbound lane of the New York State Thruway (Interstate 90).
 - 2. OWNER: New York State Thruway Authority (AUTHORITY).
- B. Engineer Identification: The Contract Documents dated January 2026 were prepared for Project by Colliers Engineering & Design Architecture, Landscape Architecture, Surveying CT, P.C. (CED).
- C. The work includes all labor, materials, equipment, and coordination necessary to construct wastewater treatment plant improvements while maintaining continuous plant operation and compliance with the NYSDEC SPDES Permit. This includes the following:
 - 1. All construction activities, temporary bypasses, operational adjustments, and sequencing shall be coordinated with the New York State Thruway Authority. The Contractor shall work closely with Thruway Authority operations staff to ensure uninterrupted treatment and compliance with all permit conditions, including effluent limits. Any costs, penalties, or violations of the SPDES permit resulting from contractor actions shall be the sole responsibility of the Contractor. During periods when treatment processes are offline, the Contractor shall provide influent wastewater storage, transfer, hauling, and off-site disposal at a regulated wastewater treatment facility.
 - 2. Work includes demolition and abandonment of existing headworks, process equipment, piping, valves, site features, and selected treatment units; installation of new piping, manholes, and site improvements; earthwork, grading, pavement, and restoration; and heat tracing and insulation of shallow-buried piping.

1.2 CONTRACT

- A. Project will be constructed under a General Construction Contract.

1.3 WORK SUMMARY

- A. The proposed project includes rehabilitation of the existing Clifton Springs Service Area Wastewater Treatment Plant to replace aging equipment, improve operational efficiency,

enhance worker safety, and maintain long-term regulatory compliance. The work focuses on targeted upgrades to existing infrastructure rather than full plant replacement.

- B. Major elements of the proposed work include:
- i. Headworks Improvements – Replace the existing hydraulic grinder with a direct-drive electric grinder and associated electrical components to improve reliability and reduce maintenance.
 - ii. Sludge Handling Improvements – Convert one existing equalization tank into a new sludge holding tank with decant capability, abandon and demolish the existing sludge holding tank, and replace sludge pumps to improve solids management and reduce hauling volumes.
 - iii. Pumping and Process Equipment Replacement – Replace trickling filter feed pumps, replace the trickling filter distributor mechanism and rotating arms, and upgrade associated process piping in the control building basement.
 - iv. Clarifier Upgrades – Install concrete curbs around the primary and secondary clarifiers to increase freeboard, replace clarifier weirs with fiberglass v-notch weirs, and allow for improved floatables and solids control.
 - v. Control Building and Wet Well Modifications – Seal wet well openings within the control building to eliminate hazardous gas migration, add ventilation to meet NFPA 820 requirements, and provide non-slip flooring for worker safety.
 - vi. Site and Yard Improvements – Replace all buried and inoperable yard valves, replace existing access hatches with fall-protection hatches, and perform limited site restoration as needed.
 - vii. Fire Alarm and Communication Systems – Install a fire alarm and occupant notification system in occupied spaces, and add an alarm communication system with auto-dialer capability to transmit critical alarms to operators and NYSTA systems.
 - viii. Electrical and Controls Modifications – Modify branch circuits, conduits, disconnects, and control wiring as required to support new equipment, reuse existing electrical infrastructure where feasible, and integrate alarm and monitoring functions into the NYSTA intranet.
- C. This scope of work rehabilitates the existing treatment plant while maintaining the current permitted capacity, minimizes construction impacts, and provides the most cost-effective approach to sustaining reliable wastewater treatment service at the Clifton Springs Service Area.
- D. Use of Premises
- 1. General: Contractor shall have full use of premises for construction operations, including use of Project site, during construction period. Contractor's use of premises

SECTION 02 41 00**DEMOLITION****PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specification sections, apply to this section.

1.2 SUMMARY

- A. Section Includes
 - 1. Demolition
- B. Related Sections
 - 1. Section 31 23 16 – Excavation.
 - 2. Section 31 25 00 – Erosion and Sedimentation Controls.

1.3 DEFINITIONS

- A. ACM – Asbestos-containing material.
- B. Demolition – Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof.
- C. Modify – Provide all necessary material and labor to modify an existing item to the condition indicated or specified.
- D. Relocate – Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components require to make the equipment fully functional, to the new location identified on the Drawings.
- E. Renovation – Altering a facility or one or more facility components in any way.
- F. Salvage/Salvageable – Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property is to remain that of the Owner. Unless otherwise specified, title to items identified for demolition shall revert to the Contractor.
- G. Universal Waste Thermostat – A temperature control device that contains metallic mercury in an ampule attached to a bimetal sensing element, and mercury-containing ampules that have been removed from these temperature control devices in compliance with the requirements of 40 CFR 273.

1.4 REGULATORY AND SAFETY REQUIREMENTS

- A. Comply with federal, state, and local hauling and disposal regulations. In addition to any applicable requirements, Contractor's safety requirements shall conform to ANSI A10.6.

1.5 USE OF EXPLOSIVES

- A. Use of explosives for demolition is not permitted.

1.6 ENVIRONMENTAL PROTECTION

- A. Prior to beginning demolition, the Contractor shall establish temporary erosion and sediment control in accordance with Section 31 25 00 – Erosion and Sedimentation Controls.

1.7 SUBMITTALS

- A. Certified Waste Characterization Report: Provide documentation of laboratory testing results proving the hazardous or non-hazardous status of the trickling filter media.
- B. Disposal Facility Acceptance: Provide written confirmation from a permitted landfill stating the submitted lab results have been reviewed and approved by the receiving landfill for the material for disposal.
- C. Hauler Permits: Provide a copy of the transporter's valid 6 NYCRR Part 364 Waste Transporter Permit.
- D. Disposal Receipts: Certified weight tickets and completed waste manifests signed by the landfill, to be submitted within 5 days of disposal.

PART 2 - PRODUCTS

NOT USED

PART 3 – EXECUTION

3.1 EXISTING FACILITIES TO BE DEMOLISHED OR RENOVATED

- A. Trickling Filter Stone Media:
 - 1. Scope:
 - a. The Contractor shall provide all labor, tools, equipment, testing, permits, transportation, and disposal fees required to completely remove and legally dispose of all stone media from the designated trickling filter.
 - 2. Regulatory Compliance:
 - a. All work, testing, transport, and disposal shall comply strictly with New York State Department of Environmental Conservation (NYSDEC) 6 NYCRR Part 360, 363, 364, and 371 regulations.
 - 3. Contractor Waste Testing:
 - a. The Contractor shall retain an independent, certified laboratory to sample and test the stone media as required by the chosen disposal facility and NYSDEC rules.

- b. Testing must include, at a minimum, TCLP RCRA Metals and any other parameters required by the receiving landfill.
 - c. All costs for sampling, laboratory analysis, and profiling shall be borne entirely by the Contractor.
 - 4. Removal and Housing:
 - a. Protection of Infrastructure: The Contractor shall use removal methods that prevent any damage to the underlying underdrain system, center column, and concrete walls. Any damage caused by the Contractor's operations shall be repaired at the Contractor's sole expense.
 - b. Odor and Runoff Control: The Contractor is solely responsible for managing odors, vectors, and dust. If stockpiled on-site, the media must be placed on and completely covered by heavy-duty plastic sheeting to prevent contaminated stormwater runoff
 - 5. Transportation and Disposal:
 - a. Hauled Restrictions: The Contractor shall transport the material using water-tight, securely tarped vehicles permitted under 6 NYCRR Part 364.
 - b. Disposal Prohibitions: The stone media shall not be taken to a standard Construction and Demolition (C&D) landfill.
 - c. Approved Facility: The Contractor must dispose of non-hazardous materials at a permitted 6 NYCRR Part 363 Municipal Solid Waste (MSW) landfill or authorized industrial facility. If material tests hazardous, the Contractor shall be responsible for routing and disposal of materials to a permitted Part 373 hazardous waste facility at no additional cost to the Owner.
 - 6. Post-Removal Cleaning:
 - a. Following stone removal, the Contractor shall power-wash the remaining underdrain system and filter floor to remove all remaining fragments, grit, and slime.
 - b. All wash water must be captured and pumped back to the plant headworks as directed by the plant operator.
- B. Facilities:
 - 1. Buildings and adjacent designated areas scheduled for complete demolition are as shown on the Drawings.
 - 2. Portions of buildings and other areas scheduled for selective demolition, partial demolition, and renovation are as shown on the Drawings.
- C. Utilities and Related Equipment:
 - 1. Notify Owner or appropriate utilities to turn off affected services at least 48 hours before starting demolition or renovation activities.
 - 2. Remove existing utilities as indicated and terminate in a manner conforming to the nationally recognized code covering the specific utility and approve by the Owner.
 - 3. When utility lines are encountered that are not indicated on the Drawings, notify the Owner prior to further work in that area.
 - 4. Remove meters and related equipment and deliver to a location as determined by the Owner.
 - 5. Excavate and remove utility lines serving buildings to be demolished to a distance of 10 feet beyond the outside perimeter of the demolition.

6. Provide a permanent leak-proof closure for water and gas lines.
 7. For lines less than 8 inches in diameter, plug sewer lines with concrete to a minimum plug length of 2 feet to prevent groundwater infiltration. For lines 8 inches and larger, or for all pipes abandoned under a roadway, completely fill the abandoned line with flowable fill in accordance with Section 31 23 16 – Excavation
- D. Paving and Slabs - Provide neat saw cuts at limits of pavement removal as indicated.
- E. Masonry – Saw cut and remove masonry so as to prevent damage to surfaces to remain and to facilitate the installation of new Work. Where new masonry adjoins existing, the new Work shall abut or tie into the existing construction as indicated.
- F. Concrete – Saw concrete along straight lines to a depth of not less than 2 inches. Make each cut in wall perpendicular to the face and in alignment with the cut in the opposite face. Break out the remainder of the concrete provided that the broken area is concealed in the finished Work, and the remaining concrete is sound. At locations where the broken face cannot be concealed, grind smooth or saw cut entirely through the concrete. Where new concrete adjoins existing, the new Work shall abut or tie into the existing construction as indicated.
- G. Patching:
1. Where removals leave holes and damaged surfaces exposed in the finished Work, patch and repair to match adjacent finished surfaces as to texture and finish.
 2. Where new work is to be applied to existing surfaces, perform removals and patching in a manner to produce surfaces suitable for receiving new Work.
 3. Fill holes and depressions left because of removals in existing surfaces with an approved patching material, applied in accordance with the manufacturer's printed instructions.
- H. Electrical:
1. Cut off concealed or embedded conduit, boxes, or other materials a minimum of 3/4 inch below final finished surface.
 2. When removing designated equipment, conduit and wiring may require rework to maintain service to other equipment.
 3. Rework existing circuits or provide temporary circuits as necessary during renovation to maintain service to existing lighting and equipment not scheduled to be renovated. Existing equipment and circuiting shown are based upon limited field surveys. Verify existing conditions, make all necessary adjustments, and record the Work on the Record Drawings. This shall include, but is not limited to, swapping and other adjustments to branch circuits and relocation of branch circuit breakers with panelboards as required to accomplish the finished Work.
 4. Reuse of existing luminaires, devices, conduits, boxes, or equipment will be permitted only where specifically indicated.
 5. Raceways and Cabling:
 - a. Scheduled for retirement:
 - 1) Inaccessibly Concealed: Cut off and abandon in place.
 - 2) Exposed or Accessible: Remove.
 - b. Scheduled for future use:
 - 1) Cap/seal and tag

- c. Schedule for relocation:
 - 1) Extend existing wiring or run new wiring from the source.
- d. Where the existing raceway is concealed, the outlet box shall be cleaned, and a blank cover plate installed.
- e. Where concealed raceway is uncovered, remove raceway or extend to new location as appropriate.
- 6. Provide new typewritten panelboard circuit directory cards.

3.2 PROTECTION

- A. Dust and Debris Control:
 - 1. Prevent the spread of dust and debris to the occupied portions of the building and avoid the creation of a nuisance or hazard in the surrounding area. Do not use water if it results in hazardous or objectionable conditions such as, but not limited to, ice, flooding, or pollution.
 - 2. Vacuum and dust interior Work areas daily.
 - 3. Sweep pavements as often as necessary to control the spread of debris that may result in foreign object damage potential to vehicular traffic.
- B. Traffic Control Signs – Where pedestrian and driver safety are endangered in the area of removal Work, use traffic barricades with flashing lights.
- C. Existing Work:
 - 1. Survey the site and examine the Drawings and Specifications to determine the extent of the Work before beginning any demolition or renovation.
 - 2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of the Owner. Any Contractor-damaged items shall be repaired or replaced as directed by the Owner.
 - 3. Provide temporary weather protection during intervals between removal of existing exterior surfaces and installation of new to ensure that no water leakage or damage occurs to the structure or interior areas of existing buildings.
 - 4. Ensure that structural elements are not overloaded as a result of or during performance of the Work. Responsibility for additional structural elements or increasing the strength of existing structural elements as may be required as a result of any Work performed shall be that of the Contractor. Repairs, reinforcement, or structural replacement must have Owner approval.
 - 5. Do not overload pavements to remain.
- D. Weather Protection – For portions of the building scheduled to remain, protect the building interior, materials, and equipment at all times. Where removal of existing roofing is necessary to accomplish the Work, have materials and workmen ready to provide adequate and temporary covering of exposed areas so as to ensure effectiveness and to prevent loss.
- E. Trees – Protect trees within the Site that might be damaged during demolition and are indicated to be left in place using a 6-foot-high fence. The fence shall be securely erected a minimum of 5 feet from the trunk of individual trees or follow the outer perimeter of branches or clumps of

trees. Any tree designated to remain that is damaged during the Work shall be replaced in kind, as approved by the Owner.

F. Facilities:

1. Protect electrical and mechanical services and utilities. Where removal of existing utilities and pavement is specified or indicated, provide approved barricades, temporary covering of exposed areas, and temporary services or connections for electrical and mechanical utilities.
2. Floors, roofs, walls, columns, pilasters, and other structural elements that are designed and constructed to stand without lateral support or shoring and are determined by the Contractor to be in stable condition, shall remain standing without additional bracing, shoring, or lateral support until demolished, unless directed otherwise by the Owner.
3. Protect all facility elements not scheduled for demolition.
4. Provide interior shoring, bracing, or support to prevent movement, settlement, or collapse of structures or elements to be demolished and adjacent facilities.

G. Protection of Personnel:

1. During demolition, continuously evaluate the condition of the demolished structure and take immediate action to protect all personnel working in and around the demolition site.
2. Provide temporary barricades and other forms of protection to protect Owner's personnel and the general public from injury due to demolition Work.
3. Provide protective measures as required to provide free and safe passage of Owner's personnel and the general public to occupied portions of the structure.

3.3 BURNING

- A. The use of burning at the Site for the disposal of refuse and debris will not be permitted.

3.4 RELOCATIONS

- A. Perform the removal and reinstallation of relocated items as indicated with workmen skilled in the trades involved. Clean all items to be relocated prior to reinstallation, to the satisfaction of the Owner. Repair items to be relocated which are damaged or replace damaged items with new undamaged items as approved by the Owner.

3.5 BACKFILL

- A. Demolition debris shall not be used as backfill material.

3.6 TITLE TO MATERIALS

- A. All equipment will be discarded, or may be salvaged, by the Contractor unless specifically identified to remain the property of the Owner in the contract documents.

3.7 DISPOSITION OF MATERIAL

- A. Do not remove equipment and materials without the approval of the Owner.

- B. Remove materials and equipment that are indicated and specified to be removed by Contractor and deliver to a location to be determined by the Owner.
- C. Remove salvaged items in a manner to prevent damage and pack or crate to protect the items from damage while in storage or during shipment. Properly identify containers as to contents.
- D. Repair or replace, at the discretion of the Owner, items damaged during removal or storage.
- E. The Owner will not be responsible for the condition or loss of, or damage to, property scheduled to become the Contractor's property after Owner's authorization to begin demolition. Materials and equipment shall not be viewed by prospective purchasers or sold on the Site.
- F. Owner will not be responsible for the condition or loss of, or damage to, such property after Owner's authorization to begin demolition.
- G. Store salvaged items as approved by the Owner or Inspector and remove them from Owner's property before completion of the Contract.

3.8 REUSE OF MATERIALS AND EQUIPMENT

- A. Remove and store materials and equipment listed to be reused or relocated to prevent damage and reinstall as the Work progresses.
- B. Properly store and maintain equipment and materials in the same condition as when removed.
- C. Store equipment and material designated to be reused in a location designated by the Owner.
- D. Equipment and material designated to be reused shall be cleaned, serviced and checked for proper operability before being put back into service.
- E. The Owner shall determine condition of equipment and materials prior to removal.

3.9 UNSALVAGEABLE MATERIAL

- A. Concrete, masonry, and other noncombustible materials, except concrete permitted to remain in place, shall be disposed of by the Contractor at a facility permitted to receive the waste by the appropriate state, federal, or local authority.
- B. Combustible material shall be disposed of off-Site.

3.10 CLEANUP

- A. Debris and rubbish shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

- B. All materials removed from the sewer lines during cleaning operations shall be trapped and removed from the system at the downstream manhole of the section being cleaned. All materials shall be disposed of in compliance with all applicable laws and regulations and in a manner approved by Owner.
- C. Under no circumstances shall sewage or solids removed in the cleaning process be dumped onto streets or into ditches, catch basins, storm drains, sanitary sewer manholes, cleanouts, or dumps.

END OF SECTION

ITEM 627.0003 25 CONCRETE**1. DESCRIPTION:**

- 1.01 Furnish all labor, materials, equipment and services necessary to complete the work as indicated on the Contract Plans and the attached Specification Summary.
- 1.02 All work shall conform to the requirements specified in Part 1 – General, of the Sections listed.
- 1.03 Provide all labor, materials, and equipment necessary to repair miscellaneous areas of concrete spalling as directed by the Engineer. Repairs shall include removal of deteriorated concrete, surface preparation, treatment of reinforcement, and placement of approved repair materials in accordance with project specifications.
- 1.04 Provide all labor, materials, and equipment necessary to perform all grouting as indicated on the Contract Drawings or as directed by the Engineer. Grouting shall be completed in accordance with the referenced standards and specifications herein.

2. MATERIALS:

- 2.01 The materials shall be as specified in Part 2 – Products, of the Sections listed within the Specification Summary of this bid item.

3. CONSTRUCTION DETAILS:

- 3.01 The construction details shall be as specified on Part 3 – Execution, of the Sections listed.

4. METHOD OF MEASUREMENT:

- 4.01 This item shall be measured for payment on a lump sum basis for the work completed in accordance with the Contract Documents and as directed by the Engineer.

5. BASIS OF PAYMENT:

- 5.01 Payment for this item shall be made at the lump sum bid price bid. The lump sum price bid shall include cost of furnishing all labor, material, equipment and appliances necessary to complete the work as indicated on the Contract Plans and as specified herein in the Sections listed.
- 5.02 Detailed Estimate:
 - A. Before the first certificate of payment is issued for the work under this item, submit a detailed estimate of quantities and prices for all materials, labor, and other items included under this item, which shall aggregate the contract lump sum price bid for this item. Prepare the detailed estimate in the same sequence as the Sections listed.
 - B. The detailed estimate shall be supported by such evidence, including certified copies of subcontracts, as NYSTA may require.

ITEM 627.0003 25 CONCRETE

- C. The detailed estimate must be approved by the Engineer who may revise it as, in his/her reasonable judgment, is necessary to make the various items conform to their true values. The value of each certificate of payment will be based on the approved detailed estimate.

5.03 Monthly payments will be made for this item in proportion to the total amount of work completed.

1. SPECIFICATION SUMMARY

1.01 This Item includes the following specifications:

- A. Section 03 30 00 – CAST-IN-PLACE CONCRETE
- B. Section 03 60 00 – GROUTING

1.02 This item shall include, but not be limited to, the following:

- A. Installation of concrete curbs around existing circular tanks.
- B. Filling the existing hatch in the control building basement to the wet well.
- C. Repair of isolated areas of concrete spalling identified during construction that are not specifically delineated in the contract drawings. Work under this item generally includes:
 - i. Field identification and marking of spalled or delaminated concrete areas as directed by the Engineer
 - ii. Removal of unsound concrete by mechanical means (e.g., chipping, grinding, or hydro-demolition) to expose sound substrate
 - iii. Cleaning and surface preparation, including removal of debris, dust, and contaminants
 - iv. Treatment of exposed reinforcement, including cleaning and application of corrosion protection where required
 - v. Application of bonding agents as needed
 - vi. Placement of repair materials, such as cementitious repair mortar or polymer-modified concrete, compatible with the existing structure
 - vii. Finishing and curing of repaired surfaces to match adjacent conditions
- D. Furnishment and Installation of grouting in accordance with the Contract Drawings.

SECTION 03 60 00**GROUTING****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Portland cement grout.
 - 2. Rapid-curing epoxy grout.
 - 3. Nonshrink cementitious grout.
- B. Related Requirements:
 - 1. Section 03 30 00 – Cast-in-Place Concrete
 - 2. Section 05 52 15 – Aluminum Handrails and Railings

1.2 REFERENCE STANDARDS

- A. American Concrete Institute:
 - 1. ACI 301 - Specifications for Structural Concrete for Buildings.
 - 2. ACI 318 - Building Code Requirements for Structural Concrete.
- B. ASTM International:
 - 1. ASTM C33 - Standard Specification for Concrete Aggregates.
 - 2. ASTM C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete.
 - 3. ASTM C150 - Standard Specification for Portland Cement.
 - 4. ASTM C191 - Standard Test Methods for Time of Setting of Hydraulic Cement by Vicat Needle.
 - 5. ASTM C307 - Standard Test Method for Tensile Strength of Chemical-Resistant Mortar, Grouts, and Monolithic Surfacing.
 - 6. ASTM C531 - Standard Test Method for Linear Shrinkage and Coefficient of Thermal Expansion of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - 7. ASTM C579 - Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic Surfacing, and Polymer Concretes.
 - 8. ASTM C827 - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures.
- C. U. S. Army Corps of Engineers Concrete Research Division (CRD):
 - 1. CRD-C621 - Non-Shrink Grout.

1.3 SUBMITTALS

- A. Submittals for this section are subject to the requirements identified in Section 01 33 00 – Submittal Procedures.
- B. Manufacturer's installation instructions shall be provided along with product data.

- C. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
- D. Product Data: Submit manufacturer information regarding grout
- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- F. Include separate Paragraphs for additional certifications.
- G. Manufacturer Instructions: Submit instructions for mixing, handling, surface preparation, and placing epoxy-type and nonshrink grouts.
- H. Field Quality-Control Submittals: Indicate results of Contractor-furnished tests and inspections.
- I. Qualifications Statement:
 - 1. Submit qualifications for manufacturer.

1.4 QUALITY ASSURANCE

- A. Perform Work according to ASTM C531 standards.

1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum three years' documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Inspection: Accept materials on Site in manufacturer's original packaging and inspect for damage.
- B. Store materials according to manufacturer instructions.
- C. Protection:
 - 1. Protect materials from moisture and dust by storing in clean, dry location remote from construction operations areas.
 - 2. Provide additional protection according to manufacturer instructions.

1.7 AMBIENT CONDITIONS

- A. Maximum Conditions: Do not perform grouting if temperatures exceed manufacturer recommended conditions.
- B. Minimum Conditions: Maintain minimum temperature of manufacturer recommended conditions before, during, and after grouting, until grout has set.

PART 2 - PRODUCTS

2.1 PORTLAND CEMENT GROUT

- A. Portland Cement: Comply with ASTM C150, Type I and II.
- B. Water:
 - 1. Potable.
 - 2. No impurities, suspended particles, algae, or dissolved natural salts in quantities capable of causing:
 - a. Corrosion of steel.
 - b. Volume change increasing shrinkage cracking.
 - c. Efflorescence.
 - d. Excess air entraining.
- C. Fine Aggregate:
 - 1. Washed natural sand.
 - 2. Gradation:
 - a. Comply with ASTM C33.
 - b. Represented by smooth granulometric curve within required limits.
 - 3. Free from injurious amounts of organic impurities according to ASTM C40.
- D. Mix:
 - 1. Portland cement, sand, and water.
 - 2. Do not use ferrous aggregate or staining ingredients in grout mixes.

2.2 RAPID-CURING EPOXY GROUT

- A. Manufacturers:
 - 1. ARDEX Americas.
 - 2. Euclid Chemical Company.
 - 3. Sika Corporation.
 - 4. Approved equivalent.
- B. Description:
 - 1. High-strength, three-component epoxy grout formulated with thermosetting resins and inert fillers.
 - 2. Rapid-curing, high adhesion, and resistant to ordinary chemicals, acids, and alkalis.
- C. Performance and Design Criteria:
 - 1. Compressive Strength:
 - a. 12,000 psi at seven days.
 - b. Comply with ASTM C579.
 - 2. Minimum Tensile Strength:
 - a. 2,000 psi.
 - b. Comply with ASTM C307.
 - 3. Coefficient of Expansion:
 - a. 30×10^{-6} inch per degree F.

- b. Comply with ASTM C531.
- 4. Shrinkage:
 - a. None.
 - b. Comply with ASTM C827.

2.3 NONSHRINK CEMENTITIOUS GROUT

- A. Manufacturers:
 - 1. ARDEX Americas.
 - 2. Euclid Chemical Company.
 - 3. Sika Corporation.
 - 4. Approved equivalent.
 - 5. Furnish materials according to ACI & ASTM standards.
- B. Description:
 - 1. Pre-mixed and ready-for-use formulation requiring only addition of water.
 - 2. Nonshrink, non-corrosive, nonmetallic, non-gas forming, and no chlorides.
- C. Performance and Design Criteria:
 - 1. Certified to maintain initial placement volume or expand after set, and to meet following minimum properties when tested according to CRD-C621 for Type D nonshrink grout:
 - a. Setting Time:
 - 1) Initial: Approximately two hours.
 - 2) Final: Approximately three hours.
 - 3) Comply with ASTM C191.
 - b. Maximum Expansion: 0.10 to 0.40 percent.
 - c. Compressive Strength:
 - 1) One-Day: 4,000 psi.
 - 2) Seven-Day: 7,000 psi.
 - 3) 28-Day: 10,000 to 10,800 psi.
 - 4) Comply with CRD-C621.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify areas to receive grout.

3.2 PREPARATION

- A. Remove defective concrete, laitance, dirt, oil, grease, and other foreign material from concrete surfaces by brushing, hammering, chipping, or other similar means until sound and clean concrete surface is achieved.
- B. Roughen concrete lightly, but not to interfere with placement of grout.
- C. Remove foreign materials from metal surfaces in contact with grout.

- D. Align, level, and maintain final positioning of components to be grouted.
- E. Saturate concrete surfaces with clean water and then remove excess water.

3.3 INSTALLATION

- A. Formwork:
 - 1. Construct leakproof forms anchored and shored to withstand grout pressures.
 - 2. Install formwork with clearances to permit proper placement of grout.
 - 3. As specified in Section 03 30 00 – Cast-In-Place Concrete.
- B. Mixing:
 - 1. Portland Cement Grout:
 - a. Use proportions of two parts sand and one part cement, measured by volume.
 - b. Prepare grout with water to obtain consistency to permit placing and packing.
 - c. Mix water and grout in two steps:
 - 1) Premix using approximately 2/3 of water.
 - 2) After partial mixing, add remaining water to bring mix to desired placement consistency and continue mixing two to three minutes.
 - d. Mix only quantities of grout capable of being placed within 30 minutes after mixing.
 - e. Do not add additional water after grout has been mixed.
 - f. Minimum Compressive Strength: 2,400 psi in 48 hours and 7,000 psi in 28 days.
 - 2. Rapid-Curing Epoxy Grout:
 - a. Mix and prepare according to manufacturer instructions.
 - b. Minimum Compressive Strength: 2,400 psi in 48 hours and 7,000 psi in 28 days.
 - 3. Nonshrink Cementitious Grout:
 - a. Mix and prepare according to manufacturer instructions.
 - b. Minimum Compressive Strength: 2,400 psi in 48 hours and 7,000 psi in 28 days.
 - 4. Mix grout components in proximity to Work area and transport mixture quickly and in manner not permitting segregation of materials.
- C. Placing of Grout:
 - 1. Place grout material quickly and continuously.
 - 2. Do not use pneumatic-pressure or dry-packing methods.
 - 3. Apply grout from one side only to avoid entrapping air.
 - 4. Do not vibrate placed grout mixture or permit placement if area is being vibrated by nearby equipment.
 - 5. Thoroughly compact final installation and eliminate air pockets.
 - 6. Do not remove leveling shims for at least 48 hours after grout has been placed.
- D. Curing:
 - 1. Prevent rapid loss of water from grout during first 48 hours by use of approved membrane curing compound or by using wet burlap method.
 - 2. Immediately after placement, protect grout from premature drying, excessively hot or cold temperatures, and mechanical injury.
 - 3. After grout has attained its initial set, keep damp for minimum three days.

3.4 FIELD QUALITY CONTROL

- A. Inspection and Testing:
1. Comply with ACI 301
 2. Submit proposed mix design of each class of grout to Owner for review prior to commencement of Work.
 3. Tests of grout components may be performed to ensure compliance with specified requirements.

END OF SECTION 03 60 00

ITEM 627.0005 25**METALS****1. DESCRIPTION:**

- 1.01 This item shall consist of furnishing all labor, materials, equipment, and services necessary to provide a complete aluminum metal roof panel system, including structural framing, roof panels, flashing, fasteners, anchors, sealants, accessories, safety line system, and appurtenances, in accordance with the Contract Plans and Specifications.
- 1.02 This item shall consist of furnishing all labor, materials, equipment, and services necessary to provide a complete aluminum metal roof panel system, including structural framing, roof panels, flashing, fasteners, anchors, sealants, accessories, safety line system, and appurtenances, in accordance with the Contract Plans and Specifications.
- 1.03 The work includes engineering, fabrication, delivery, installation, inspection, testing, and warranty of the aluminum roof system as shown on the Drawings and specified herein.

2. MATERIALS:

- 2.01 Materials shall conform to the requirements of Part 2 – Products of the Sections listed in the Specification Summary of this Item.

3. CONSTRUCTION DETAILS

- 3.01 Construction methods and installation procedures shall conform to the requirements of Part 3 – Execution of the Sections listed in the Specification Summary of this Item.

4. METHOD OF MEASUREMENT

- 4.01 This item shall be measured for payment on a lump sum basis for the work completed in accordance with the Contract Documents and as directed by the Engineer.

5. BASIS OF PAYMENT

- 5.01 Payment shall be made at the lump sum price bid for ITEM 627.0005 25 – Metals.
- 5.02 The lump sum price shall include, but not be limited to:
 - A. Engineering and preparation of shop drawings and structural calculations stamped and signed by a Professional Engineer licensed in the State of New York
 - B. Furnishing and installing aluminum roof panels and structural framing
 - C. Furnishing and installing anchors, fasteners, flashings, trims, closures, bird screens, and sealants

ITEM 627.0005 25**METALS**

- D. Furnishing and installing safety line and fall-protection anchorage system
- E. Performance testing and manufacturer's field inspection
- F. Coordination with concrete structures and process equipment below the roof
- G. Protection of installed work and replacement of damaged materials
- H. All labor, materials, tools, equipment, and incidentals necessary to complete the work
- I. Warranties required by the Specifications

5.03 Detailed Estimate:

- A. Prior to the first partial payment, the Contractor shall submit a detailed estimate of quantities and prices for all work under this item, which shall total the lump sum price bid.
- B. The estimate shall be in the same sequence as the Sections listed in the Specification Summary.
- C. The Engineer may revise the estimate as necessary to reflect true values.
- D. Progress payments shall be based on the approved detailed estimate.

ITEM 627.0005 25**METALS****1. SPECIFICATION SUMMARY**

1.01 This item includes the following Specification Sections:

- A. Section 05 30 00 – Aluminum Metal Roof Panels
- B. Section 05 51 17 – Aluminum Stairs
- C. Section 05 52 15 – Aluminum Handrails and Railings

1.02 This item shall include, but not be limited to, the following:

- A. Engineered aluminum roof panel system for circular concrete structures.
- B. Structural aluminum framing and roof panels.
- C. Shop drawings and calculations stamped by a New York State Professional Engineer.
- D. Flashings, trims, closures, bird screens, and sealants.
- E. Safety line and fall-protection anchorage system.
- F. Manufacturer's field inspection with written report.
- G. Laboratory performance testing for air infiltration, water penetration, and wind uplift.
- H. Protection of installed roof system during construction.
- I. Final demonstration and Owner training.
- J. All warranties required by Section 05 30 00 – Aluminum Metal Roof Panels.

SECTION 05 30 00**ALUMINUM METAL ROOF PANELS****PART 1 – GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. Engineered aluminum metal roof panel system for circular concrete process tanks and structures.
 - 2. Structural aluminum frame-supporting roof panels.
 - 3. Flashings, sealants, anchors, fasteners, closures, and accessories required for a complete roof system.
 - 4. Safety line and fall-protection anchorage system.
- B. Work includes engineering, fabrication, delivery, installation, inspection, testing, and warranty of a complete aluminum roof system.
- C. Related Requirements:
 - 1. Section 03 30 00 – Cast-in-Place Concrete.
 - 2. Section 46 53 24 – Trickling Filter Media and Distribution System.

1.2 REFERENCES

- A. ASCE 7 – Minimum Design Loads and Associated Criteria for Buildings and Other Structures.
- B. New York State Building Code (BCNYS).
- C. AWWA D108 – Aluminum Dome Covers.
- D. ASTM B209 – Aluminum Sheet and Plate.
- E. ASTM B221 – Aluminum Extrusions.
- F. ASTM A240 – Stainless Steel Sheet and Plate.
- G. ASTM C920 – Elastomeric Joint Sealants.
- H. Aluminum Design Manual, Aluminum Association.

1.3 SUBMITTALS

- A. Product Data:
 - 1. Manufacturer's literature describing roof system components and materials.

B. Shop Drawings:

1. Roof plan, elevations, and sections.
2. Panel layout and joint locations.
3. Framing member sizes and layout.
4. Anchorage and embedment details.
5. Flashing, penetration, and edge details.
6. Safety line and fall-protection layout.

C. Engineering Submittals:

1. Structural design calculations and drawings for the complete aluminum roof system.
2. Calculations and drawings shall be prepared, stamped, and signed by a Professional Engineer licensed in the State of New York.
3. Calculations shall demonstrate compliance with ASCE 7 and the NYS Building Code.

D. Performance Test Reports:

1. Laboratory test data demonstrating compliance with ASTM standards for air infiltration, water penetration, and wind uplift.

E. Samples:

1. Roof panel finish sample.
2. Sealant and flashing samples.

F. Operation and Maintenance Manuals.

G. Warranty documentation.

1.4 QUALITY ASSURANCE

A. Manufacturers' Qualifications:

1. Minimum ten (10) years documented experience designing and fabricating aluminum roof systems for municipal or industrial facilities.

B. Installer Qualifications:

1. Installer shall be trained and approved by manufacturer.
2. Installer shall have experience with similar aluminum roof systems.

1.5 FABRICATION QUALITY CONTROL

- A. Factory fabricate panels and framing members.
- B. Maintain documented quality-control procedures for fabrication.
- C. Verify dimensional tolerances prior to shipment.

1.6 REINSTALLATION MEETINGS

- A. Conduct preinstallation conference at Project site prior to delivery of roof materials.

1. Attendees: Owner's Representative, Engineer of Record, manufacturer's representative, roof installer, structural-support installer, and installers of interfacing work.
2. Review project schedule and sequencing.
3. Review stamped shop drawings and calculations.
4. Examine supporting structure for alignment and tolerances.
5. Review design loading criteria and construction-phase load restrictions.
6. Review flashing, penetrations, drainage, and equipment interfaces.
7. Review applicable codes, insurance, inspection, and safety requirements.
8. Review protection measures during installation.
9. Review procedures for repair or replacement of damaged components.
10. Record and distribute meeting minutes.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original packaging.
- B. Store materials off ground and protected from moisture, dirt, and damage.
- C. Handle aluminum components to prevent distortion and surface damage.

1.8 WARRANTY

- A. Provide manufacturer's written warranty for aluminum roof system.
- B. Warranty period shall be not less than ten (10) years from date of Substantial Completion.
- C. Provide extended warranty of twenty (20) years from date of Substantial Completion.
- D. Warranty shall cover:
 1. Defects in materials and workmanship.
 2. Structural performance of framing and panels.
 3. Watertightness of roof system and flashings.
 4. Fasteners and anchorage systems.
- E. Warranty shall not relieve Contractor of obligations under Contract Documents.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Basis of Design:
 1. CTS Covers,
 2. Element 13 Aluminum Geodesic Batten Domes,
 3. Or Engineer approved equal.

2.2 MATERIALS

- A. Structural Framing:
 1. Aluminum extrusions, alloy 6005A-T61 or 6061-T6.

- B. Roof Panels:
 - 1. Aluminum sheet complying with ASTM B209, alloy 3003-H16.
 - 2. Minimum thickness: 0.050 inch.
- C. Fasteners:
 - 1. 300-series stainless steel or compatible aluminum fasteners.
 - 2. Isolate dissimilar metals to prevent galvanic corrosion.
- D. Anchors:
 - 1. 300-series stainless steel suitable for concrete embedment.
- E. Sealants and Gaskets:
 - 1. Silicone sealant complying with ASTM C920.

2.3 ACCESSORIES

- A. Flashings and Trim:
 - 1. Aluminum flashing of same thickness as panels.
 - 2. Bird screens and closures at perimeter openings.
- B. Safety System:
 - 1. Stainless steel apex eyebolt.
 - 2. Stainless steel wire rope.
 - 3. Carabiner or approved connector.

2.4 DESIGN CRITERIA

- A. General: Design roof system in accordance with NYS Building Code and ASCE 7.
- B. Snow Loads:
 - 1. Ground snow load, P_g : not less than 55 psf.
 - 2. Roof snow load, P_f : calculated per ASCE 7 including exposure, thermal, importance, slope, and drifting.
- C. Roof Live Load: Not less than 20 psf and shall not be used in lieu of snow load.
- D. Wind Loads: Design per ASCE 7 for Syracuse, NY.
- E. Concentrated Load: Not less than 300 lb. for maintenance access areas.
- F. Manufacturer Recommendations:
 - a. CTS Covers,
 - b. Element 13 Aluminum Geodesic Batten Domes,
 - c. Engineer approved equal.

PART 3 – EXECUTION**3.1 EXAMINATION**

- A. Verify supporting structure is complete, level, and free of obstructions.
- B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install aluminum roof system in accordance with manufacturer's written instructions and approved shop drawings.
- B. Install framing members plumb and true.
- C. Install panels to provide watertight joints.
- D. Install flashing, trim, and sealants to prevent water intrusion.
- E. Provide anchorage as detailed.
- F. Coordinate installation with equipment and access openings below roof system.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service:
 - 1. Engage a factory-authorized service representative to inspect aluminum roof system installation, including framing, panels, flashings, anchors, and accessories. Provide written inspection report.
- B. Remove and replace roof system components that do not comply with Contract Documents.
- C. Perform additional inspections and corrective work at Contractor's expense until compliance is achieved.
- D. Prepare and submit inspection reports.

3.4 PERFORMANCE TESTING

- A. Provide laboratory test data demonstrating compliance with ASTM requirements for:
 - 1. Air infiltration.
 - 2. Water penetration.
 - 3. Wind uplift resistance.

3.5 STARTUP AND DEMONSTRATION

- A. Demonstrate safety line system and roof access procedures.
- B. Instruct Owner in inspection and maintenance procedures.

3.6 PROTECTION

- A. Protect aluminum roof system from damage during construction.
- B. Replace damaged components.

END OF SECTION 05 30 00

SECTION 05 51 17**ALUMINUM STAIRS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section Includes:
 - 1. CONTRACTOR shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to design, furnish and install aluminum stairs including surface preparation and shop priming.
 - 2. The extent of aluminum stairs shall be as shown.
 - 3. The Work also includes:
 - a. Providing openings in and attachments to aluminum stairs to accommodate the Work under this and other Sections and providing for the aluminum stairs all items such as anchor bolts, studs and all items required for which provision is not specifically included under other Sections.
 - b. Providing openings in and attachments to aluminum stairs to accommodate the work under other contracts, and assisting other contractors in building on or attaching to the aluminum stairs all items such as anchor bolts, studs and all items required for which provision is not specifically included under other contracts.
- B. Coordination:
 - 1. Review installation procedures under this and other Sections and coordinate the installation of items that must be installed with, or before the aluminum stairs Work.
 - 2. Notify other contractors in advance of the installation of the aluminum stairs to provide them with sufficient time for the installation of items included in their contracts that must be installed with, or before, the aluminum stairs Work.
- C. Related Sections:
 - 1. Section 05 52 15, Aluminum Handrails and Railings.
 - 2. Section 09 91 00, Painting

1.2 REFERENCES

- A. Standards referenced in this Section are listed below:
 - 1. Aluminum Association (AA), Specification for Aluminum Structures.
 - 2. American Society for Testing and Materials, (ASTM).
 - a. ASTM B 209, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
 - b. ASTM B 211, Specification for Aluminum and Aluminum-Alloy Bar, Rod and Wire.
 - c. ASTM B 221, Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - d. ASTM B 308/B 308M, Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles.

- e ASTM B 429, Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- f ASTM F 593, Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.
- g ASTM F 594, Specification for Stainless Steel Nuts.
- 3. American Welding Society, (AWS).
 - a AWS D1.2/D1.2M, Structural Welding Code-Aluminum.
- 4. National Association of Architectural Metal Manufacturers, (NAAMM).
 - a NAAMM, Metal Stairs Manual and Metal Finishes Manual.

1.3 QUALITY ASSURANCE

- A. Manufacturer's Qualifications:
 - 1. Manufacturer shall have a minimum of five years experience producing substantially similar equipment and shall be able to show evidence of at least five installations in satisfactory operation for at least five years.
- B. Component Supply and Compatibility:
 - 1. Obtain all products included in this Section regardless of the component manufacturer from a single pre-engineered aluminum stair manufacturer.
 - 2. The pre-engineered aluminum stair manufacturer to review and approve or to prepare all Shop Drawings and other submittals for all components furnished under this Section.
 - 3. All components shall be specifically constructed for the specified service conditions and shall be integrated into the overall assembly by the pre-engineered aluminum stair manufacturer.
- C. Codes: Comply with the applicable requirements of the state and local building codes.
- D. Source Quality Control: CONTRACTOR shall be responsible for entire design, fabrication, and installation of pre-engineered aluminum stair Work.
- E. The Shop Drawings and calculations shall be prepared by a Registered Professional Engineer licensed in the State in which the pre-engineered aluminum stairs will be installed and is a recognized expert in the type of Work shown and specified.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Product Data:
 - a Manufacturer's literature describing roof system components and materials.
 - 2. Shop Drawings:
 - a Erection and detailed Shop Drawings, which show the plan location, elevation and details for the fabrication and erection of the aluminum stair Work. Show anchorage and accessory items. Include details of all connections between all materials.

3. Engineering Submittals:
 - a. Provide signed and sealed Shop Drawings and calculations, which are prepared by a Registered Professional Engineer licensed in the State in which the aluminum stairs will be installed.
4. Samples:
 - a. Nosing and tread samples

1.5 DELIVERY, STORAGE AND HANDLING

- A. Packing, Shipping, Handling and Unloading:
 1. Deliver materials to the Site to ensure uninterrupted progress of the Work. Deliver anchor bolts and anchorage devices which are to be embedded in cast- in-place concrete in ample time to prevent delay of that Work.
- B. Storage and Protection:
 1. Store materials to permit easy access for inspection and identification. Keep all material off the ground, using pallets, platforms, or other supports. Protect materials from corrosion and deterioration.
- C. Acceptance at Site:
 1. All boxes, crates and packages shall be inspected by CONTRACTOR upon delivery to the Site. CONTRACTOR shall notify ENGINEER, in writing, if any loss or damage exists to equipment or components. Replace loss and repair damage to new condition in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 DESIGN CRITERIA

- A. Pre-engineered aluminum stairs shall comply with the requirements of the NAAMM, "Metal Stairs Manual".
- B. Sizes of miscellaneous items such as carrier angles and platform stiffeners, and design stresses shall be as recommended in Section 4 of the "Metal Stairs Manual", unless otherwise shown.
- C. All required stair loadings and other stair related requirements shall comply with the governing building code in which the pre-engineered aluminum stairs will be installed.

2.2 FABRICATION

- A. General:
 1. Use welding for joining pieces together, unless otherwise shown or specified. Welding to comply with the applicable provisions of AWS D1.2/D1.2M. Fabricate units so that bolts and other fastenings do not appear on finish surfaces. Make joints true and tight and make connections between parts light-proof tight. Provide

- continuous welds, ground smooth where exposed.
2. Construct stair units to conform to sizes and arrangements as shown. Provide pre-engineered aluminum framing, hangers, columns, struts, clips, brackets, bearing plates and other components for the support of pre-engineered aluminum stairs and platforms. Erect pre-engineered aluminum stair Work to line, plumb, square, and true with runs registering level with floor and platform levels.
 3. Provide brackets and bearing surfaces as detailed and as required to anchor and contain the pre-engineered aluminum stairs on the supporting structure.
 4. Where masonry walls support the aluminum stair Work, provide temporary supporting struts, designed for the erection of stair components before installation of masonry.
 5. Finish: Provide Architectural mill finish as specified in the NAAMM Manual.
 6. Protection of Aluminum from Dissimilar Materials: Coat all surfaces of aluminum in contact with dissimilar materials, such as concrete, masonry and steel as specified in Section 09 91 00, Painting
- B. Stair Framing:
1. Fabricate stringers of structural aluminum channels, or plates, or a combination thereof, as shown. Provide closures for exposed ends of stringers.
 2. Construct platforms of structural aluminum channel headers and miscellaneous framing members, as shown. Bolt or weld headers to stringers. Bolt or weld framing members to strings and headers.
- C. Aluminum Floor Plate Treads and Platforms:
1. Provide raised pattern aluminum floor plate. Provide pattern shown or, if not shown, as selected from manufacturer's standard patterns.
 2. Form treads of 3/8-inch thick aluminum floor plate with integral nosing and back edge stiffener. Weld aluminum supporting brackets to stringers and bolt treads to brackets.
 3. Fabricate platforms of aluminum floor plate of thickness shown. Provide nosing matching that on treads at all landings. Secure floor plates to platform framing members with bolts.
- D. Stair Aluminum Railing:
1. Aluminum railings shall conform to the requirements of Section 05 52 15, Aluminum Handrails and Railings.

PART 3 – EXECUTION

3.1 INSPECTION

- A. CONTRACTOR shall examine the conditions under which the Work is to be installed and notify the ENGINEER, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide concrete inserts, anchor bolts, and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction.

3.3 INSTALLATION

- A. Fastening to In-Place Construction:
 - 1. Provide anchorage devices and fasteners where necessary for securing pre-engineered aluminum stairs to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts and other connectors as required. The anchorage devices and fasteners shall be Type 316 stainless steel.
- B. Cutting, Fitting and Placement:
 - 1. Perform cutting, drilling, and fitting required for the installation of the pre-engineered aluminum stairs. Set the pre-engineered aluminum stairs accurately in location, alignment, and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
 - 2. Fit exposed connections accurately together to form tight hairline joints. Weld connections that are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch-up shop paint coat. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.

END OF SECTION 05 51 17

SECTION 05 52 15**ALUMINUM HANDRAILS AND RAILINGS****PART 1 – GENERAL****1.1 SUMMARY**

- A. Scope:
1. CONTRACTOR shall provide all labor, materials, tools, equipment, and incidentals as shown, specified, and required to furnish and install aluminum handrail and railing systems. The Work also includes:
 - a. Providing openings in, and attachments to, aluminum handrail and railing systems to accommodate the Work under this and other Specification Sections. Provide all items for aluminum handrails and railings, including anchorages, fasteners, studs, and other items required for which provision for is not specifically included under other Sections.
 - b. Provide openings in and attachments to aluminum handrails and railings to accommodate work under other contracts. Assist other contractors in building on or attaching to aluminum handrails and railings all items such as fasteners and other items required for which provision is not specifically included under other contracts.
 2. Aluminum handrails and railings Work shall include components and features shown and specified, and all components and features available from specified manufacturers required for providing complete aluminum handrail and railing system in accordance with the Contract Documents.
- B. Coordination:
1. Review installation procedures under this and other Sections and coordinate installation of items to be installed with or before aluminum handrails and railings Work.
 2. Notify other contractors in advance of installing aluminum handrail and railings to provide them with sufficient time to install items included in their contracts that are to be installed with or before aluminum handrails and railings Work.
 3. Aluminum handrail and railing locations shall comply with Laws and Regulations.
- C. Related Sections:
1. Section 03 60 00 – Grouting.
 2. Section 05 51 17 – Aluminum Stairs
 3. Section 09 91 00 – Painting.

1.2 REFERENCES

- A. Standards referenced in this Section are:
1. AA, Aluminum Design Manual.
 2. ASTM B26/B26M, Specification for Aluminum-Alloy Sand Castings.
 3. ASTM B117, Standard Practice for Operating Salt Spray (Fog) Apparatus.

4. ASTM B136, Standard Method for Measurement of Stain Resistance of Anodic Coatings on Aluminum.
5. ASTM B137, Standard Test Method for Measurement of Coating Mass per Unit Area on Anodically Coated Aluminum.
6. ASTM B221, Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
7. ASTM B241/B241M, Specification for Aluminum and Aluminum-Alloy Seamless Pipe and Seamless Extruded Tube.
8. ASTM B244, Standard Test Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
9. ASTM B247, Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and rolled Ring Forgings.
10. ASTM B429, Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
11. ASTM E 935, Standard Test Methods for Permanent Metal Railing Systems and Rails for Buildings.
12. NAAMM/Architectural Metal Products Division (AMP), Pipe Railing Manual.
13. NAAMM/AMP AMP-501 Finishes for Aluminum.

1.3 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer:
 - a. Upon request manufacturer shall submit document at least five years successful experience in fabricating aluminum handrail and railing systems of scope and type like that required.
 - b. Manufacturer shall be capable of providing custom detail drawings for the products required.
2. Professional Engineer:
 - a. CONTRACTOR or handrail and railing manufacturer shall retain a registered professional engineer legally qualified to practice in same state as the Site. Professional engineer shall have at least five years' experience designing aluminum handrails and railings.
 - b. Responsibilities include:
 - 1) Reviewing aluminum handrail and railing system performance and design criteria stated in the Contract Documents.
 - 2) Preparing written requests for clarifications or interpretations of performance or design criteria for submittal to ENGINEER by CONTRACTOR.
 - 3) Preparing or supervising preparation of design calculations verifying compliance of aluminum handrail and railing system with requirements of the Contract Documents.
 - 4) Signing and sealing all calculations.
 - 5) Certifying that:
 - a) Design of aluminum handrail and railing system was performed in accordance with performance and design criteria stated in the Contract Documents, and

- b) Design conforms to all applicable local, state, and federal Laws and Regulations, and to prevailing standards of practice.
- 3. Installer:
 - a. Retain a single installer trained and with record of successful experience in installing aluminum handrail and railing systems.
 - b. Installer shall have record of successfully installing aluminum handrail and railing systems in accordance with recommendations and requirements of manufacturer or shall provide evidence of being acceptable to the manufacturer.
 - c. Installer shall employ only tradesmen with specific skill and successful experience in the type of Work required.
 - d. When requested by ENGINEER, submit name and qualifications of installer with the following information for at least three successful, completed projects:
 - 1) Names and telephone numbers of owner and architect or engineer responsible for each project.
 - 2) Approximate contract cost of the aluminum handrail and railing systems for which installer was responsible.
 - 3) Amount (linear feet) of aluminum handrail and railing installed.
- B. Component Supply and Compatibility:
 - 1. Obtain all materials furnished under this Section regardless of component manufacturer, from a single aluminum handrail and railing system manufacturer.
 - 2. Aluminum handrail and railing system manufacturer shall review and approve or prepare all Shop Drawings and other submittals (except for delegated design submittals, when professional engineer is retained by other than handrail and railing manufacturer) for all components furnished under this Section.
 - 3. Components shall be specifically constructed for specified service conditions and shall be integrated into overall assembly by aluminum handrails and railings manufacturer.
- C. Regulatory Requirements: Comply with Laws and Regulations including:
 - 1. OSHA Part 1910.23, Guarding Floor and Wall Openings and Holes.
- D. Certifications:
 - 1. Submit certification, signed by authorized officer of manufacturer and notarized, stating that handrail and railing systems comply with the design prepared by the professional engineer.
 - 2. Submit certification, signed by authorized officer of CONTRACTOR and notarized, stating that all components and fittings are furnished by the same manufacturer.

1.4 SUBMITTALS

- A. Action Submittals: Submit the following:
 - 1. Shop Drawings:
 - a. Drawings for fabrication and installation of aluminum handrail and railing systems with sizes of members, pipe wall thickness, information on

components, and anchorage devices. Show all anchorages. Provide details drawn at scale of 1.5-inch equal to one foot.

- b. Indicate required location of posts.
 - c. Indicate locations and details of all expansion joints, if any.
 - d. Indicate locations and details of gaps across seismic joints, if any.
 - e. Profile drawings of aluminum handrail and railing system components.
 - f. Custom detail drawings. Details of forming, jointing, sections, connections, internal supports, trim and accessories. Provide details drawn at scale of 1.5-inch equal to one foot.
2. Product Data:
 - a. Manufacturer's specifications, standard detail drawings, and installation instructions for aluminum handrail and railing systems.
 - b. Manufacturer's catalogs showing complete selection of standard and custom components and miscellaneous accessories for selection by ENGINEER.
 3. Delegated Design Submittals:
 - a. Design Data:
 - 1) Design computations or complete structural analysis of handrail and railing systems, signed and sealed by professional engineer. Professional engineer's seal shall be clearly legible, including state of registration, registration number, and name on seal.
 - 2) Certification by professional engineer that professional engineer has performed design of aluminum handrail and railing systems in accordance with performance and design criteria stated in the Contract Documents, and that design conforms to all local, state, and federal Laws and Regulations, and to prevailing standards of practice.
 4. Samples:
 - a. Full-size Sample, two feet long, of assembled railing system at post and rail intersections. Sample shall have all associated components including typical connections, mounted toeboard and sleeve, and handrail at wall return, complete with mounting brackets, all with specified controlled uniform metal finish.
 - b. Color Samples: Maximum range of clear, anodized aluminum that shall appear in finished Work. Prepare range Samples, to show highest level of color control feasible for actual handrail and railing systems, as determined by licensor of finishing process specified, on actual extrusions and castings of the Work.
 - c. ENGINEER will review Samples for finish, color, joint tolerances, workmanship, and general component assembly only. Compliance with other requirements is the responsibility of the CONTRACTOR.
 5. Test Procedure: Submit detailed description of proposed shop testing procedures. Do not perform shop testing until ENGINEER approves shop test procedure:

B. Informational Submittals: Submit the following:

1. Certificates:
 - a. Certification on source of supply, as specified in Article 1.3 of this Section.
 - b. Manufacturer certification specified in Article 1.3 of this Section.

2. Source Quality Control Submittals:
 - a. Manufacturer's load testing report in accordance with ASTM E935 for completed aluminum handrail and railing systems, demonstrating compliance with applicable requirements of building codes, safety codes, and other Laws and Regulations.
 3. Qualifications Statements: Submit qualifications for the following:
 - a. Manufacturer, when requested by ENGINEER.
 - b. Professional engineer.
 - c. Installer, when requested by ENGINEER. Qualifications statement shall include record of experience with specified references.
- C. Closeout Submittals: Submit the following:
1. Maintenance Manuals: Furnish detailed maintenance manuals that include the following:
 - a. Product name and number.
 - b. Detailed procedures for routine maintenance and cleaning, including cleaning materials, application methods and precautions in use of products that may be detrimental to finish when improperly applied.
 - c. Handrail and railings systems manufacturer's current catalog including individual parts.
 - d. Maintenance manuals shall be in accordance with Division 01 Specifications.
 2. Guarantee: Provide in maintenance manual with the guarantee specified.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Storage and Protection:
1. Keep products off ground using pallets, platforms, or other supports. Protect products from corrosion and deterioration.
- B. Handling of Products:
1. Do not subject handrail and railing products to bending or stress.
 2. Do not damage edges or handle products in a manner that will cause scratches, warping, or dents.
 3. Protect handrails and railings by paper or coating as acceptable to handrail and railing manufacturer, against scratching, splashes of mortar, paint, and other marring during transportation, handling, and erection. Protect until completion of adjacent work.

1.6 GUARANTEE

- A. Guarantee: Manufacturer shall provide written guarantee of availability of replacement parts and components for period of at least five years after completion of the Project.

PART 2 – PRODUCTS

2.1 SYSTEM PERFORMANCE

- A. System Description: Aluminum handrail and railing system shall consist of equally spaced horizontal rails with totally concealed mechanical fasteners, internally threaded tubular rivets and components fastened to posts spaced no more than five feet on centers and system of handrails supported from adjacent construction by mounting brackets spaced at no more than five feet on centers.
- B. Design Criteria and Performance Criteria:
 - 1. Design, fabricate, and install aluminum handrail and railing systems to withstand the most critical effects resulting from the following loads (loads listed below do not act concurrently):
 - a. Uniform Load: 50 pounds per foot, applied at top in any direction.
 - b. Concentrated Load: 200 pounds single load, applied at any point along the top in any direction.
 - c. Components: Intermediate rails (all rails except the handrail), balusters, and panel fillers, if any, shall withstand horizontally applied normal load of 50 pounds on an area equal to one square foot, including openings and space between rails. Reactions due to this loading are not required to be superimposed to loading specified for main supporting members of handrails and railings.
 - d. Comply with AA Aluminum Design Manual for determining allowable stresses and safety factors for aluminum structural components.
 - e. Limit deflection in each single span of railing and handrail to 1.5-inch maximum, and to 1/4-inch maximum on railing posts. Applied loads shall not produce permanent deflection in the completed Work when loads are removed.
 - 2. Thermal Control: Provide adequate expansion within fabricated systems that allows for thermal expansion and contraction caused by material temperature change of 140 degrees F to -20 degrees F without warp or bow of system components. Distance between expansion joints shall be based on providing 1/4-inch wide joint at 70 degrees F, which accommodates movement of 150 percent of calculated amount of movement for specified temperature range.
 - 3. Where handrail and railing systems cross expansion joints in the building or structure, provide expansion joints in handrail and railings systems.
 - 4. For posts located at or near end of runs as shown, uniformly space intermediate posts as required to conform to loading and deflection criteria specified, at intervals no greater than maximum post spacing specified. Where posts are shown for handrails along both sides of walkways and other similar locations, locate posts opposite each other; do not stagger post locations.

2.2 MANUFACTURERS

- A. Products and Manufacturers: Provide one of the following:
 - 1. Custom Fabricated Connectorail System, by Julius Blum & Company, Inc.

2. Custom Fabricated Series 500 Non-Welded Aluminum Pipe Aluminum handrails and railing systems, by Superior Aluminum Products, Inc.
3. Or equal.

2.3 MATERIALS

- A. Extruded Aluminum Architectural and Ornamental Shapes: ASTM B221, Alloy 6063-T52.
- B. Aluminum Forgings: ASTM B247.
- C. Extruded or Drawn Aluminum Pipe and Tube:
 1. ASTM B429 or ASTM B241/B241M, Alloy 6063-T5, 6063-T52, or 6063-T832 as required by loadings, deflections, and post spacing specified.
 2. Provide Schedule 40 pipe, minimum, unless conditions of detail and fabrication require extra-heavy pipe to comply with Specifications. Rails and posts shall have minimum outside diameter of 1.90 inches.
- D. Reinforcing Bars: Solid, circular profile, two feet long, 6061-T6 aluminum reinforcing bars with same outside diameter as inside diameter of post.
- E. Anchors and Fastenings:
 1. For anchors and fasteners, use Type 316 stainless steel; minimum 3/8-inch diameter.
 2. Provide minimum of four bolt fasteners per post where surface-mounted posts are shown. Components shall be in accordance with manufacturer's recommendations and as approved or accepted (as applicable) by ENGINEER on submittals.
 3. Anchors: Stainless steel, capable of withstanding structural design loads specified
- F. Castings:
 1. Provide high-strength aluminum alloy brackets, flanges, and fittings suitable for anodizing as specified.
 2. Aluminum alloy sand castings: ASTM B26/B26M.
- G. Connector Sleeves: Schedule 40, five-inch long by 1.610-inch diameter.
- H. Sockets: Provide six-inch deep by 2.5-inch outside diameter aluminum sockets with 3.5-inch-wide socket cover on bottom of each socket and on top and bottom of removable post sockets.
- I. Custom Cover Flanges: 1/4-inch high by four-inch diameter, aluminum.
- J. Adhesive: Two-part waterproof epoxy-type as recommended by handrail and railing systems manufacturer.
- K. Non-shrink Grout: Comply with Section 03 60 00 – Grouting.

- L. Toeboards:
 - 1. Provide extruded Alloy 6063-T5 or T52 aluminum alloy toeboards, unless railing is mounted on curbs or other construction of sufficient height and type to comply with OSHA 1910.23. Bars or plates are not acceptable.
 - 2. Unless otherwise specified, toeboards shall comply with OSHA 1910.23, Section (e).

- M. System Components and Miscellaneous Accessories: Provide complete selection of manufacturer's standard and custom aluminum handrail and railing systems components and miscellaneous accessories required. Show type and location of all such items on Shop Drawings and other submittals as applicable.

2.4 FABRICATION

- A. General: Unless otherwise shown or specified, provide typical non-welded construction details and fabrication techniques recommended in NAAMM/AMP Pipe Railing Manual and NAAMM/AMP AMP 501.

- B. Fabricate handrail and railing systems true to line and level, with accurate angles surfaces and straight edges. Fabricate corners without using fittings. Provide bent- metal corners to smallest radius possible without causing grain separation or otherwise impairing the Work. Form elbow bends and wall returns to uniform radius, free from buckles and twists, with smooth finished surfaces, or use prefabricated bends. Provide not less than four-inch outside radius.

- C. Remove burrs from exposed edges.

- D. Close aluminum pipe ends by using prefabricated fittings.

- E. Weep Holes:
 - 1. Fabricate joints that will be exposed to weather to exclude water.
 - 2. Provide 15/64-inch diameter weep holes at lowest possible point on each post in handrail and railing systems.
 - 3. Provide pressure relief holes at closed ends of handrail and railing systems.

- F. Toeboards:
 - 1. Provide manufacturer's standard toeboard, that accommodates movement caused by thermal change specified without warping or bowing toeboards.
 - 2. Provide manufacturer's standard toeboard, which accommodates storage for removable socket covers.
 - 3. Coordinate and cope toeboard as required to accommodate cover flanges at posts.
 - 4. Toeboards shall follow curvature of railing. Where railing is shown to have curved contours at corners, or other locations, toeboard shall likewise be curved to follow line of railing system.

- G. Reinforcing Bars: Provide reinforcing friction-fitted bar at each post in railing system.

Extend reinforcing bars of tubes six inches into cast-in-place sleeves or other types of supporting brackets.

- H. Mechanically Fitted Component Pipe Handrail and Railing System:
1. Use non-welded pipe handrail and railing system with posts, top and intermediate rail(s), and flush joints.
 2. Provide top and one intermediate horizontal rail(s), equally spaced.
 3. Do not use blind rivets, pop rivets, or other exposed fastening devices in the Work under this Section. Fasteners used for side-mounting fascia flanges where shown or specified may be exposed in the Work. Provide internal threaded aluminum rivets, stainless steel through-bolts with lock nuts, stainless steel sheet metal screws with lock washers, and epoxy adhesive for fastening components of the Work.

2.5 FINISHES

- A. General:
1. Prepare surfaces for finishing in accordance with recommendation of aluminum producer and the aluminum finisher or processor.
 2. Adjust and control direction of mechanical finishes specified to achieve best overall visual effect in the Work.
 3. Color and Texture Tolerance: Provide uniform color and continuous mechanical texture for aluminum components. ENGINEER reserves the right to reject aluminum materials because of color or texture variations that are visually objectionable, but only where variation exceeds range of variations established by manufacturer prior to fabrication, by means of range of Samples approved by ENGINEER.
 4. Anodize aluminum components.
- B. Finish:
1. Mechanically finish aluminum by wheel or belt polishing with aluminum oxide grit of 180 to 220 size, using peripheral wheel speed of 6,000 feet per minute; AA Designation - M32 Medium Satin Directional Texture.
 2. Hand-Rubbed Finish: Where required to complete the Work and provide uniform, continuous texture, provide hand-rubbed finish to match medium satin directional texture specified to even out and blend satin finishes produced by other means.
- C. Cleaning:
1. Provide non-etching chemical cleaning by immersing aluminum in inhibited chemical solution, as recommended by coating applicator, to remove lard oil, fats, mineral grease, and other contamination detrimental to providing specified finishes.
 2. Clean and rinse with water between steps as recommended by aluminum manufacturer.
- D. Exposed Aluminum Anodic Coating:
1. Provide anodic coatings as specified that do not depend on dyes, organic or inorganic pigments, or impregnation processes to obtain color. Apply coatings using only the alloy, temperature, current density, and acid electrolytes to obtain specified

colors in compliance with designation system and requirements of NAAMM/AMP Pipe Railing Manual and NAAMM/AMP AMP 501. Comply with the following:

2. Provide Architectural Class I high density anodic treatment by immersing the components in tank containing solution of 15 percent sulfuric acid at 70 degrees F with 12 amperes per square foot of direct current for minimum of sixty minutes; AA Designation A41 Clear.
3. Physical Properties:
 - a. Anodic Coating Thickness, ASTM B244: Minimum of 0.7-mils thick.
 - b. Anodic Coating Weight, ASTM B137: Minimum of 32 mg/sq. in.
 - c. Resistance to Staining, ASTM B136: No stain after five minutes dye solution exposure.
 - d. Salt Spray, ASTM B117: 30,000 hours exposure with no corrosion or shade change.
4. Seal finished anodized coatings using deionized boiling water to seal pores and prevent further absorption.
5. Products and Manufacturers: Provide one of the following:
 - a. Alumilite 215 Clear by Aluminum Company of America, Inc.
 - b. Or equal.

2.6 SOURCE QUALITY CONTROL

A. Allowable Tolerances:

1. Limit variation of cast-in-place inserts, sleeves and field-drilled anchor and fastener holes to the following:
 - a. Spacing: Plus-or-minus 3/8-inch.
 - b. Alignment: Plus-or-minus 1/4-inch.
 - c. Plumbness: Plus-or-minus 1/8-inch.
2. Minimum Handrails and Railings Systems Plumb Criteria:
 - a. Limit variation of completed handrail and railing system alignment to 1/4-inch in 12 feet with posts set plumb to within 1/16-inch in 3.0 feet.
 - b. Align rails so variations from level for horizontal members and from parallel with rake of stairs and ramps for sloping members do not exceed 1/4-inch in 12.0 feet.
3. Provide "pencil-line" thin butt joints.

B. Factory Testing:

1. Perform load test on completed handrail and railing systems. Extent of handrail and railing systems to be factory-tested shall be as shown and specified. Load test completed handrail and railing systems in accordance with requirements of ASTM E935. Provide written report to ENGINEER identifying and documenting testing methods used, magnitude and location of loads superimposed, and results of such tests on actual completed handrail and railing systems, including all anchors and fasteners to be used in the Work. Testing setup shall simulate actual conditions of installation to be used in the Work.
2. Do not ship products from factory until ENGINEER accepts load testing report.

PART 3 – EXECUTION

3.1 INSPECTION

- A. Examine conditions under which Work will be performed and notify ENGINEER in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with installation until unsatisfactory conditions are corrected.
- B. Verify to ENGINEER the gage of aluminum pipe railing posts and rails brought to the Site by actual measurement of on-Site material in presence of ENGINEER.

3.2 INSTALLATION

- A. General:
 - 1. Do not erect components that are scarred, dented, chipped, discolored, otherwise damaged, or defaced. Remove from Site railing and handrail system components that have holes, cuts, gouges, deep scratches, or dents of any kind. Repairs to correct such Work will not be accepted. Remove and replace with new material.
 - 2. Comply with installation and anchorage recommendations of NAAMM/AMP Pipe Railing Manual and NAAMM/AMP AMP 501 in addition to requirements specified and approved or accepted (as applicable) submittals.
- B. Fastening to In-Place Construction:
 - 1. Remove protective plastic immediately before installation.
 - 2. Adjust handrails and railings prior to securing in place, to ensure proper matching at butting joints and correct alignment throughout their length. Plumb posts in each direction. Secure posts and rail ends to building or structure as follows:
 - a. Anchor posts in concrete by providing sockets set and anchored into concrete floor slab. Provide closure secured to bottom of sleeve. Before installing posts, remove debris and water from sleeves. Verify that reinforcing bars or tubes have been inserted into posts before installation. Do not install posts without reinforcing bar. For all non-removable handrail and railing systems sections, after posts have been inserted into sockets, fill annular space between posts and sockets solid with grout as specified in Section 03 60 00 – Grouting. Crown the grout and slope grout to drain away from posts.
 - b. Provide posts set in concrete with an aluminum floor cover flange.
 - 3. Use devices and fasteners recommended by handrail and railing systems manufacturer and as shown on approved or accepted (as applicable) submittals.
- C. Cutting, Fitting, and Placement:
 - 1. Perform cutting, drilling, and fitting required for installation. Set the Work accurately in location, alignment, and elevation, plumb, level, true, and free of rack, measured from established lines and levels.
 - 2. Fit exposed connections accurately together to form tight hairline joints. Do not cut or abrade surfaces of units that have been finished after fabrication and are intended for field connections.

3. Make permanent field splice connections using manufacturer's recommended epoxy adhesive and five-inch minimum length connector sleeves. Tight press-fit field splice connectors and install in accordance with manufacturer's written instructions. Follow epoxy manufacturer's recommendations for requirements of installation and conditions of use.
 4. Make splices as near as possible to posts, but not exceeding 12 inches from nearest post.
 5. Field welding is not allowed. Make splices using pipe splice lock employing a single allen screw to lock joint.
 6. Secure handrails to walls with wall brackets and end fittings as shown. Drill wall plate portion of the bracket to receive one bolt, unless otherwise shown for concealed anchorage. Locate brackets as shown or, if not shown, at not more than five feet on centers. Provide flush type wall return fittings with same projection shown for wall brackets. Secure wall brackets and wall return fittings to building or structure.
 7. Securely fasten toeboards in place with not more than 1/4-inch clearance above floor level.
 8. Drill one 15/64-inch diameter weep hole not more than 1/4-inch above top of location of solid reinforcing bar or tube in each post.
- D. Expansion Joints:
1. Provide slip joint with internal sleeve extending not less than two inches beyond joint on each side.
 2. Construct expansion joints as for field splices, except fasten internal sleeve securely to one side of rail only.
 3. Locate joints within six inches of posts.
- E. Protection from Dissimilar Materials:
1. Coat aluminum surfaces in contact with dissimilar materials such as concrete, masonry, and steel, in accordance with Section 09 91 00, Painting.
 2. Do not extend coating beyond contact surfaces. Remove coating where exposed-to-view in the finished Work.

3.3 CLEANING AND REPAIRING

- A. Cleaning:
1. Clean exposed surfaces of handrail and railing systems after completion of installation. Comply with recommendations of both handrail and railing system manufacturer and finish manufacturer. Do not use abrasives or unacceptable solvent cleaners. Test cleaning techniques on an unused section of railing before employing cleaning technique.
 2. Remove stains, dirt, grease, and other substances by washing handrails and railings systems thoroughly using clean water and soap; rinse with clean water.
 3. Do not use acid solution, steel wool, or other harsh abrasives.
 4. If stain remains after washing, remove defective sections and replace with new material complying with this Section.

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- B. Handrails and railings shall be free of dents, burrs, scratches, holes, and other blemishes. Replace damaged or otherwise defective Work with new material that complies with this Section at no additional cost to OWNER.
- C. Prior to Substantial Completion, replace adjacent work marred by the Work of this Section.

END OF SECTION 05 52 15

ITEM 627.0023 25 HVAC**1. SPECIFICATION SUMMARY**

1.01 This Item includes the following specifications:

A. Section 23 34 16 – CENTRIFUGAL EXHAUST FANS

1.02 This item shall include, but not be limited to, the following:

- A. Furnish and install Trickling Filter Exhaust Fan and Control Building Basement Exhaust Fan and associated electrical wiring and control switches.
- B. Furnishing and installing anchors, fasteners, flashings, trims, closures, and sealants
- C. Coordination with roof construction
- D. Protection of installed work and replacement of damaged materials
- E. All labor, materials, tools, equipment, and incidentals necessary to complete the work
- F. Warranties required by the Specifications

- C. Handling: Handle and lift fans in accordance with the manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage. Follow all safety warnings posted by the manufacturer

1.6 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under Contract Documents.
 - 1. The warranty of this equipment is to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at the Manufacturers option when returned to Manufacturer, transportation prepaid.
 - 2. Motor Warranty is warranted by the motor manufacturer for a period of one year. Should motors furnished by us prove defective during this period, they should be returned to the nearest authorized motor service station.

1.7 MAINTENANCE

- A. Refer to Manufacturer's Installation, Operation and Maintenance Manual (IOM), to find maintenance procedures.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Greenheck, PO Box 410, Schofield, Wisconsin 54476. Phone (715) 359-6171
 Fax (715)355-2399. Website: www.greenheck.com

2.2 DIRECT DRIVE ROOF DOWNBLAST CENTRIFUGAL EXHAUST FANS - GREENHECK MODEL G

- A. General Description:
 - 1. Downblast fan shall be for roof mounted applications
 - 2. Performance capabilities: 1.) Trickling Filter: 2,500 cubic feet per minute (cfm)
 2.) Control Building Basement: 700 cfm
 - 3. Fans are available in twenty sizes with nominal wheel diameters ranging from 8 inches through 30 inches (071 - 300 unit sizes)
 - 4. Maximum continuous operating temperature is 180 Fahrenheit (82.2 Celsius)
 - 5. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.
- B. Wheel:
 - 1. Constructed of aluminum
 - 2. Non-overloading, backward inclined centrifugal
 - 3. Statically and dynamically balanced in accordance to AMCA Standard 204-05
 - 4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.



**Thruway
Authority**

06/10/2026 8:59:49 AM

AASHTOWare Project™ Version 5.02.04 Revision 045

Proposal Schedule of Items

Proposal ID: D215099

Project(s): S53092

Contractor: _____

SECTION:

Alt Set ID:

Alt Mbr ID:

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price		Bid Amount	
			Dollars	Cents	Dollars	Cents
0100	627.0005 25 METALS	LUMP SUM	LUMP SUM		_____.	
Section:			Total:		_____.	