SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY
1234 MARKET STREET, PHILADELPHIA, PA 19107

SPECIFICATION FOR
GALVANIZED AND PAINTED STEEL EXIT STRUCTURE
FOR THE
GIRARD STATION EXIT IMPROVEMENTS

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Specification Sections:

Drawings:

Schedule:

Quantity	Unit	Description	Finish
1	EA	Steel Roof Structure	Per drawings & specifications
7	EA	Steel Tube Columns	Per drawings & specifications

APPROVED BY:

Manager of Structural Engineering
Bridges and Buildings Department

ORIGINATOR:

Structural Engineer
Bridges and Buildings Department

DATE: May 2023

PROJECT: GIRARD STATION EXIT IMPROVEMENTS

DIVISION 1: GENERAL REQUIREMENTS
SUBMITTALS AND CONTRACTOR RESPONSIBILITIES

PART 1 – GENERAL

1.1 Description

A. The work of this specification consists of the fabrication and delivery of structural steel items, specifically, a steel exit structure.

B. The Contractor shall be responsible for all materials, labor and transportation required for delivery of fabricated components to a location designated on the purchase order.

C. SEPTA shall be responsible for final installation.

1.2 Submittals

A. General

1. The Contractor shall provide to SEPTA the required submittals within the timeframe specified in the purchase order and after the Contractor's receipt of Notice to Proceed.
2. The Submittals shall be reviewed by SEPTA's Project Manager. The results of each submittal review shall have the following status stamp:
   -NO EXCEPTIONS TAKEN
   -PROCEED AS NOTED; REVISE AND RESUBMIT FOR RECORD
   -DO NOT PROCEED; REVISE AND RESUBMIT
   -REJECTED
   -NOT APPLICABLE
3. Review and processing shall not relieve the Contractor from responsibility for errors which may exist in the submitted data.
4. Submittals not in compliance with the Contract will be returned to the Vendor for revision. Any loss of time and additional costs associated with re-submittal(s) shall be the Contractor’s responsibility.
5. Submittals are due within 30 calendar days after the contractor’s receipt of SEPTA’s Notice to Proceed.
6. Submittals that are marked "Proceed as Noted" are for the purpose of expediting procurement and/or fabrication of the intended work. The Contractor shall incorporate all corrections and resubmit to SEPTA within 10 working days the required copies of all submittals marked "Proceed as Noted."
7. The Contractor shall allow 10 working days for review and processing by SEPTA following its receipt of the submittals.

1.3 Substitutions

A. “Or Equal” Substitutions

B.

1. Restricted Items: Where items of equipment and/or materials are specifically identified in the Specifications or on the Drawings by a manufacturer's name, model or catalogue

number, only such specific items may be used. When several materials are specified by name for one use, the Contractor may select any of those specified. Materials specified by manufacturer's trade name shall comply with the manufacturer's printed Specifications and data.

2. Equals Considered: Whenever a material or article required is specified or shown on the plans by using the name of the proprietary product or of a particular manufacturer or vendor, any material or article which will, in the opinion of SEPTA's Project Manager, perform adequately the duties imposed by general design will be considered equal and satisfactory provided material or article so proposed is of equal aesthetic, substance and function in SEPTA's Project Manager's opinion. It shall not be purchased or installed without SEPTA's Project Manager's written approval. "Or Equal" requests will be considered only when substantiated by the Contractor's submittal of data documenting the "or equal" nature of material or article within ten (10) calendar days after the date of receipt of Notice to Proceed.

PART 2 – PRODUCTS

2.1 Submittals

A. Provide submittals per Sections 051200, and 099600.

PART 3 – EXECUTION

3.1 Packing and Shipping

A. All items shall be shipped at one time as complete packages, with all components and mounting hardware included.
B. Units shall be shipped fully assembled where possible.
C. All components shall be packaged and shipped so as to protect the integrity and finish from any damage whatsoever.
D. The Contractor shall contact SEPTA at least 48 hours prior to delivery.

3.2 Installation

A. Assembly and installation on the platform shall be by SEPTA work forces.

END OF SECTION

SECTION 051200 - STRUCTURAL METAL FRAMING

PART 1 GENERAL

1.1 This section covers the submittals, quality assurance, detailing, fabrication, and delivery of structural steel for the exit structure at Girard Station in conjunction with the contract drawings.

PART 2 - SUBMITTALS AND QUALITY ASSURANCE

2.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify demand critical welds.

C. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

2.2 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer, fabricator (including shop-painting), professional engineer, and testing agency.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:
1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.

F. Survey of existing conditions.

G. Source quality-control reports.

H. Field quality-control and special inspection reports.

2.3 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Shop-Painting Applicators: Qualified according to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

D. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

PART 3 – PRODUCTS

3.1 MATERIALS

A. ASTM A992 – Structural Steel for plates and structural shapes.

B. ASTM F3125 Type 1 Galvanized – High Strength Bolts for Structural Steel Joints.

C. ASTM A563 Grade DH Galvanized – Carbon and Alloy Steel Nuts.

D. ASTM F436 Type 1 Galvanized – Hardened Steel Washers.

E. ASTM A500 Grade C Galvanized – Cold-Formed Welded and Seamless Carbon Steel Structural Tubing.

F. ASTM F593 Condition CW – Stainless Steel Anchor Rods.

G. Welding Materials: AWS D1.1: Low Hydrogen electrodes of the type required for materials being welded. Weld material shall have a minimum tensile strength Fexx = 70 KSI.

3.2 FINISH

A. All steel shall be hot-dip galvanized per ASTM A123 after fabrication

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

C. All hardware shall be galvanized per ASTM A153.

D. After galvanizing, all steel shall be shop painted with a three (3) coat paint system.

E. Refer to Specification Section 099600 for painting and coating requirements.

PART 4 – EXECUTION

4.1 DETAILING

A. Detailing shall be in accordance with AISC Steel Construction Manual and AISC Code of Standard Practice for Steel Buildings and Bridges.

B. All welding shall utilize E70 or E80 series electrodes. The weld process used shall be Flux Core Arc Welding (FCAW) or Gas Metal Arc Welding (GMAW) or Shielded Manual Arc Welding (SMAW per ANSI/AWS D1.1) “Structural Welding Code.”

C. Unless otherwise noted, all connections shall be designed for a minimum vertical load of 75% of the section’s shear capacity but not less than 10 kips.

D. D. Special attention shall be given to developing sufficient weld throats on tubular members.

1. The frame section’s welded connection shall develop 100% of the HSS section strength.
2. Fillet weld details shall be in accordance with AWS D1.1, Section 3.9 (See AWS Figure 3.2).
3. Unless determined otherwise by testing, the loss factor “Z” for heel welds shall be in accordance with AWS Table 2.8.
   Fillet welds which run onto the radius of a tube shall be built up to obtain the full throat thickness.
4. The maximum root openings of fillet welds shall not exceed 3/16” in accordance with AWS D1.1, Section 5.22.
5. Weld size or effective throat dimensions shall be increased in accordance with this same section where applicable (i.e. fit-up gaps > 1/16”).

E. The minimum fillet weld size is 3/16” except for seal welds.

F. The open end of all HSS sections shall be closed with either a fascia plate or gutter system as shown in the drawings.

G. When the collection of water inside a structural tube is a possibility, either during construction or during service, the tube shall be provided with a drain hole at its lowest point to allow drainage.

H. Provide vent holes as needed for hot-dip galvanizing. Exposed vent holes shall be located as not to permit ponding inside of erected members and to permit drainage.

I. Provide 5/16” thick plate washers for all oversized holes and slotted holes in exterior plies connection.

J. If the Fabricator proposes any modification to the design and connections, these changes must be reviewed and sealed by a professional engineer registered in the Commonwealth of Pennsylvania. SEPTA must review and approve any and all changes and has sole responsibility for determination of the acceptability of any proposed changes. Field welding is not acceptable.

4.2 FABRICATION

A. Fabrication shall be in accordance with the applicable provisions of AISC Steel Construction Manual and AISC Code of Standard Practice for Steel Buildings and Bridges.

B. B. Welding shall be in accordance with AWS D1.1.

C. All steel members shall be shop assembled progressively and piece marked prior to shipping and delivery to the site.

D. All materials shall be shop leveled or straightened, as required, before layout of fabricating work is started.

E. All pieces must be straight, square-cut, and burr-free.

F. Compression joints depending on contact bearing shall have a surface roughness not in excess of 500 micro inches as determined by ASME B46.1, and ends shall be square within the tolerances for milled ends specified in ASTM A 6/A 6M.

G. The use of a burning torch is permissible for cutting members, provided all irregular edges are trimmed smooth. Stresses shall not be transmitted into the metal through a burned surface. The material shall not be considered a part of the net section for tension members. The use of a burning torch for cutting bolt holes will not be allowed.

H. Fabricate items with joints tightly fitted and secured.

I. Seal joined members by continuous welds.

J. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt-tight, flush and hairline. Ease exposed edges to small uniform radius.

4.3 HANDLING AND DELIVERY

A. Material shall be stored out of contact with the ground in such manner and location as will minimize deterioration.

B. Site Access – Access to the site shall be coordinated through SEPTA.

C. The fabricator shall be responsible for transporting the fabricated steel to Fern Rock Shop, Philadelphia.

D. Deliver in accordance with industry standards, federal, state and local regulations, and as specified herein. Offloading will be conducted by SEPTA.

E. Handle fabricated steel in a manner that will not overstress or damage the steel and coatings. Nylon slings or other suitable devices shall be utilized to minimize damage to the coatings. The Fabricator is responsible to repair all damaged steel and coatings to the satisfaction of SEPTA.

F. Provide SEPTA one week notice prior to shipment and delivery to the site.

G. The fabricator is responsible to obtain any and all permits and approvals required to ship the units.

4.4 INSTALLATION

A. Installation will be by SEPTA.

END OF SECTION

SECTION 099600 – PAINTING AND COATING

PART 1 – GENERAL

1.1 This section covers the application of a factory finished coating system over hot-dip galvanized surfaces for the steel exit structure. Paint shall not be applied to field bolts or to the faying surfaces of bolted connections.

1.2 The coating applicator shall have single source responsibility of galvanizing and paint application. All paint shall have a 1 year warranty against peeling.

1.3 The galvanizer shall be a member of American Galvanizers Association (AGA) or approved by state DOT for hot-dip galvanizing.

1.4 The galvanizer shall have a galvanizing bath large enough to galvanize the roof system without splicing. An example of a galvanizer having this capacity is American Galvanizing Company located in Folsom, New Jersey.

PART 2 – PRODUCTS

2.1 FABRICATION REQUIREMENTS

A. Fabricate structural steel in accordance with Class I, II, III guidelines as described in AGA's Recommended Details for Galvanized Structures.

B. Fabrication practices for products to be in accordance with the applicable portions of ASTM A 143, A 384, and A 385, except as specified herein. Avoid fabrication techniques that could cause steel distortion or embrittlement.

C. The fabricator shall consult with SEPTA and hot-dip galvanizer regarding potential concerns, including handling issues, during the galvanizing process that may require design modification before fabrication proceeds.

D. Remove all welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing.

E. Provide holes and/or lifting lugs to allow for handling during galvanizing.

F. Avoid unsuitable marking paints. Consult with the galvanizer about removal of grease, oil, paint and other deleterious material prior to fabrication.

G. Remove by blast-cleaning, or other methods, surface contaminants and coatings that are not removable by the normal chemical cleaning process in the galvanizing operation.

2.2 PAINT

A. General:

1. All materials used in the coating system shall be compatible. Mixing materials from two or more sources is only acceptable when the contractor receives in writing compatibility from each manufacturer supplying material and by SEPTA.

2. All materials shall be in unopened, original, dated containers from the manufacturer. Material used must be within manufacturer's shelf life.

3. All materials shall have been and continue to be stored in such a manner as to prevent freezing and/or overheating. Manufacturer's recommendations shall be followed as to maximum and minimum storage temperatures.

B. Materials
1. SSPC-SP1 solvent clean galvaprep #5.

2. Undercoat: Corothane 1 Aluminum Primer SW B65S14 @ 2.0-3.0 mils dft

3. Intermediate coat: High Solids Polyurethane SW B65300 @ 2.0-4.0 mils dft

4. Top coat: High Solids Polyurethane SW B65300 @ 2.0-4.0 mils dft

5. Color to be Sherwin Williams Color SW6523 "DENIM"

PART 3 – EXECUTION

3.1 SURFACE PREPARATION

A. Pre-clean steel work in accordance with accepted methods to produce an acceptable surface for quality hot-dip galvanizing.

3.2 COATING APPLICATION – GALVANIZING

A. Galvanize steel members, fabrications and assemblies after fabrication by the hot-dip process in accordance with ASTM A 123 / 123M.

B. Galvanize bolts, nuts, washers and iron and steel hardware components in accordance with ASTM A 153 / 153M.

C. Safeguard products against steel embrittlement in conformance with ASTM A 153.

D. Galvanizing system shall be suitable for paint finish work.

E. Galvanized steel to be painted shall not be quenched.

F. Handle all articles to be galvanized in such a manner as to avoid any mechanical damage and to minimize distortion.

G. Conform to paragraph 6.1 of ASTM A 123 / 123M as appropriate.

H. Surface Finish: Continuous, adherent, as smooth and evenly distributed as possible and free from any defect detrimental to the stated end use of the coated article. The steel framing will be exposed to close public view after erection.

I. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

3.3 FACTORY APPLIED FINISH OVER NEWLY GALVANIZED MATERIAL (DUPLEX COATING SYSTEM)

A. The Work includes application of a factory finished coating over the fresh galvanized surface to all materials except the faying surfaces of bolted connections.

B. Coating applicator shall provide in writing, single source responsibility for both hot dip galvanizing and paint system application.

C. There shall be absolutely no "QUENCHING" of galvanized material that is to be painted.

D. Surfaces shall be properly prepared in accordance with AGA and the paint manufacturer's written recommendations. Blasting if required, should be done with very soft media such as walnut shells, hydro sand blasting or synthetic sponges with low pressure. Surface must be dry and free from dust, dirt, oil, grease or other contaminants.

E. Paint System:
1. SSPC-SPI solvent clean galvaprep #5.
2. Prime coat surface with 4-5 mils DFT of high build polyamide epoxy
3. Intermediate and top coats shall be 2-3 mils DFT aliphatic polyurethane.
4. Total milage of the coating should not be less than 8-11 mils dry film thickness.

3.4 TESTS

A. Inspection and testing of hot-dip galvanized coatings shall be done under the guidelines provided in the AGA publication Inspection of Products Hot-dip Galvanized After Fabrication.

B. Include visual examination and tests in accordance with ASTM A 123 / 123M or A 767, as applicable, to determine the thickness of the zinc coating on the metal surface.

C. Furnish notarized Certificate of Compliance with ASTM standards and specifications herein listed. The Certificate must be signed by the galvanizer and contain a detailed description of the material processed. The Certificate shall include information as to the ASTM standard used for the coating.

D. Complete records of all tests of the coating, and operating atmosphere shall be maintained in proper order and be held ready for inspection during the coating process. A copy of the records shall be provided to SEPTA upon completion of the project.

3.5 REPAIR OF DAMAGED COATING

A. The maximum area to be repaired is defined in accordance with ASTM A 123 / 123M, Section 6.2, current edition.

B. Touch-up and repair damaged paint in accordance with the paint manufacturer's written procedures.

END OF SECTION