

DATE: 07/02/2024

NON-CONSTRUCTION CONTRACT SOLICITATION NOTICE

MTA- HQ IS NOW ADVERTISING FOR THE FOLLOWING:

SSE #: 0000477773

OPENING/DUE DATE: 07/12/2024

TYPE OF SOLICITATION: IFB

DOCUMENT AVAILABILITY DATE: 07/02/2024

SOLICITATION TITLE: Provide Work Labor and Material for Removal, Repair, Replacement and Installation of Metal Works in the 5 Boroughs and Yonkers

DESCRIPTION: The work to be performed under this contract will be to provide work labor and materials for removal, repair, replacement and installation of metal works like stainless steel, structural steel and aluminum work. This SOW will provide fireproofing for steel structures as required by codes. This scope of work will provide fireproofing to existing structure as directed by the engineer. Under this scope of work contractor is responsible to remove the lead paint material from the existing structures. Contractor will also provide all special inspection required by codes. The Work includes, but not limited to repair, replacement and installation of structural steel works, staircase, handrails, guard rails, structural steel framings, guard rails, Bird screen, bearing plates, metal deck, grating, equipment platform, lintel, shoring, and bracing, steel bar joists, steel truss, dunnage structure for equipment supports, and any other related work.

Funding: 100% Operating
Contract Term: 5 Years

Goals:15% MBE; 15% WBE; 6% SDVOB

Est \$ Range: \$1M - \$5M

******PLEASE SEE THE ATTACHED SOW FOR ADDITIONAL INFORMATION******

PRE-BID CONFERENCE:

DATE:

TIME:

SITE TOUR

DATE:

TIME:

PLACE:

FOR MORE INFORMATION, PLEASE CONTACT:

PROCUREMENT REPRESENTATIVE: Zumrad Rashidova

EMAIL: zumrad.rashidova@mtahq.org

ATTACHMENT A

**UPDATED SCOPE OF WORK
(SOW)**

**STATEMENT OF WORK – General Technical Specifications
Scope of Work (SOW)**

Section 1 GENERAL REQUIREMENT

The work to be performed under this SOW will be to provide work labor and materials for removal, repair, replacement and installation of metal works like stainless steel, structural steel and aluminum work. This SOW will provide fireproofing for steel structures as required by codes. This scope of work will provide fireproofing to existing structure as directed by the engineer. Under this scope of work contractor is responsible to remove the lead paint material from the existing structures. Contractor will also provide all special inspection required by codes.

Section 2 DESCRIPTION OF THE WORK:

The Work includes, but not limited to repair, replacement and installation of structural steel works, stair case, handrails, guard rails, structural steel framings, guard rails, Bird screen, bearing plates, metal deck, grating, equipment platform, lintel, shoring, and bracing, steel bar joists, steel truss, dunnage structure for equipment supports, and any other related work, as described below:

- A. New install of structural steel beams, columns, steel bar joists, steel truss, shoring bracing, foundation bolts, galvanized metal deck roofing, galvanized metal deck for floor slab, steel stairs, steel supports for equipment and systems, guard rails, hand rails, Galvanized metal deck wall, wrought iron fence & gates, Guard rails, Handrails, bird cages, steel lintels and structural steel crane, metal fabrication for mechanical and electrical systems, supper structure for building system, and substructure for building systems.
- B. Repair and replace structural steel beams, columns, steel bar joists, steel truss, shoring bracing, foundation bolts, galvanized metal deck roofing, galvanized metal deck for floor slab, steel stairs, steel supports for equipment and systems, guard rails, hand rails, Galvanized metal deck wall, wrought iron fence & gates, bird cages, steel lintels and structural steel crane, metal fabrication for mechanical and electrical systems, supper structure for building system, and substructure for building systems.
- C. Provide and install temporary shoring and bracing for the new and existing structural steel framing building system. Provide and install temporary sidewalk shedding and/or protective system structure.
- D. Remove all types of structural steel beams, columns, steel weld & bolt connections, angles, metal decks, stairs, stringers, equipment frames, lintels, guard rails, handrails, crane, rails, bar joists, struts, trusses, gates and fences.

- E. Install of concrete foundation required performing structural steel installation, concrete metal deck floor slab, and concrete filled steel pan for staircase. Provide CMU block wall, and/or brick masonry for the support of structural steel works, lintel masonry creating door openings, cementitious fire proofing work for fire protection, wood carpenter for covering the steel work, and gypsum board (sheet rock) coverage for fire protection to the steel systems etc.
- F. Perform excavation, concrete installation, mechanical work, masonry works and any other cutting and patching required for new installation and/or repairs of structural steel system
- G. Inspection of fire proofing condition, removal of fire proofing and installation of fireproofing.

Emergency work shall also generally consists of the items above stated.

Section 3 **SCHEDULE:**

The Contractor shall submit, for approval by the MTA Project Manager (PM), a schedule of procedures showing a step by step method of performing all work for each specific assignment required under this Contract. No work shall be performed until directed by the Project Manager. The Contractor shall provide weekly progress reports on large jobs, as directed by the PM.

Section 4 **REMOVAL, REPLACEMENT AND INSTALLATIONS OF STRUCTURAL STEEL WORKS:**

The Contractor shall remove all existing structural steel beams, columns, lintels, metal deck, guard rails, handrails, chain link fence and gates, metal decks, bar joists, gratings, equipment platforms consisting of foundations, bearing plates, steel sizes, bolts & nuts, web stiffeners, welding metal, connection plates, roll up supports, posts, fabric, rails, locking plates, rollers, and all other parts of structural steel framing, not to remain in service, as directed by the Project Manager, or as required. Where the structural steel framings are removed, proper shoring and bracing, proper patchwork and/or finishing shall be done, as directed by the Project Manager. The Contractor shall not dispose the scrape steel materials. The Contractor shall deposit and/or hand over the removed structural steel materiel and metal to MTA and dump into MTA's scrape metal container.

Section 4A **REMOVAL, REPLACEMENT, AND INSTALLATIONS OF FIREPROOFING:**

The Contractor shall inspect, remove, and replace the existing fireproofing from structural steel beams, columns, lintels, metal deck, bar joists or any other structures as approved by the Project Manager. Where there is not structural steel repair this item will allow us to remove and replace the fireproofing as needed.

Section 4B.

REMOVAL, OF LEAD MATERIAL FROM THE EXISTING STRUCTURE

The requirements of this SOW apply to any disturbances of materials which potentially contain lead including painted surfaces. Note that abrasive blasting of materials which potentially contain lead is strictly prohibited.

1. The contractor must submit the following information to the project manager at least 30 days prior to proposed commencement date of lead disturbance work for immediate transmittal to the Buses' departmental lead representative (DLR):
 - a. Department and contract chain of command including cell phone numbers.
 - b. The name of the hazardous waste.
 - c. Lead disturbance procedures include a description of the materials which will be disturbed, methods (tools and equipment) resulting in the disturbance, containment, storage and disposal methods, cleanup methods for the work area and for the individuals performing the work.
 - d. Worker protection plan which includes, worker qualifications, training, and all measures to protect MTA's employees outside the work area.
 - e. Emergency response and notification plan.
 - f. Detailed schedule of when work will be performed including a two-week contingency for any potential project delays.

Upon review and approval of this information, NYCT's Office of System Safety (OSS) will issue a placard. The contractor must post this placard at the work site during all lead disturbance procedures.

2. The contractor is responsible to ensure employees conducting lead disturbance activities have all required training mandated for applicable regulatory agencies for this work. The contractor must provide copies of employee training records with 48-hours of the request.
3. The contractor must ensure that its employees utilize proper PPE and follows all internal and external safety protocols (see attached Lead Particulate Management Policy Instruction).
4. The contractor must clean the work area in accordance with applicable regulatory requirements prior to removing the containment. Tarps and containment sheeting must be HEPA vacuumed or wet wiped and wet swept and taken with the vendor for

reuse.

5. The contractor must provide MTA's designated on site representative with paint chips in a sandwich size zipper locked plastic bag (bag must be completely full) for transmittal to the location's General Superintendent, Safety & Environmental management (GSSEM) for analysis. The bag must be labeled as follows:
 - Site name
 - Sample ID number (use the internal drum tracking number discussed below)
 - Paint chips
 - Sample date
 - Sample time

The remainder of this waste stream must be placed in heavy duty garbage bags, drummed and stored in the hazardous waste storage area (HWSA). The project manager must notify the GSSEM that the drum(s) will be moved to HWSA and obtain an internal tracking number from the GSSEM. Drums must be labeled as follows:

- Potentially Hazardous Waste – Awaiting Analytical Results
- The internal tracking number provided by the GSSEM
- Paint Chips
- Potentially toxic

6. The contractor must provide MTA's designated on site representative with a sample of clippings of non-reusable PPE, such as Tyvek suits and gloves, in a one-gallon size zipper locked plastic bag (bag must be completely full) for transmittal to the location's General Superintendent, Safety & Environmental management (GSSEM) for analysis. Respirator cartridges are not to be put in the sample bag. The bag must be labeled as follows:
 - Site name
 - Sample ID number (use the internal drum tracking number discussed below)
 - PPE
 - Sample date
 - Sample time

The remainder of this waste stream must be placed in heavy duty garbage bags, drummed, and stored in the hazardous waste storage area (HWSA). The project manager must notify the GSSEM that the drum(s) will be moved to HWSA and obtain an internal tracking number from the GSSEM. Drums must be labeled as follows:

- a. Potentially Hazardous Waste – Awaiting Analytical Results
- b. The internal tracking number provided by the GSSEM
- c. PPE
- d. Potentially toxic
- e. Accumulation date (date drum was placed in the HWSA)

Section 5 **COORDINATION:**

The Contractor shall contact Project Manager for all the assistance required for the repair, replacement and installation of structural steel frame work. The Contractor shall coordinate the entire job with PM.

Section 6 **SURVEYS:**

NOT USED

Section 7 **SHOP DRAWINGS:**

The Contractor shall provide shop drawing for repair, replacement and installation of structural steel frame works. The Contractor shall not start to fabricate the structural steel work in the shop without approval of submitted shop drawings. The structural shop drawings shall be prepared certified and signed by licensed professional engineer registered in the State of New York.

Section 8 **QUALITY OF WORK:**

The construction, equipment, and material shall be of the highest class, and shall be applied in the best manner and according to the industry standards for the repair replacement and installation of structural steel works. Where no specific requirements are given, the work and the materials shall conform to the latest applicable standards of material and construction of nationally recognized associations.

At the discretion of the Project Manager, samples of gratings, column, beams, bolts &nuts, plates, metal deck, bar joists, joint fabrication, locking devices, and catalog cuts for the equipment's shall be submitted to the Project Manager for approval before the Contractor proceeds with the repairs, replacement and installation of structural steel works.

Section 9 **QUALITY ASSURANCE:**

For the repair, replacement and installation of structural steel works (in addition to standards specified in individual work sections), the following standards are imposed, as applicable to the work in each instance:

- AISC- American Institute of steel construction
- ASTM, American Standards Testing Materials.
- New York City Building code.
- NEC, National Electrical Code.
- BOCA, National Building Code
- UL, Underwriters Laboratories
- AASHTO, Highway Code
- OSHA – Safety Standards
- New York State Code

Section 9A **ADDITIONAL SPECIFICATION:**

For the repair, replacement and installation of structural steel works, the fireproofing work the lead paint removal the following standards are imposed, as applicable to the work in each instance:

- 5A Structural Steel
- 5D Aluminum Work
- 9A Painting Steel Work
- 9L Sprayed Fireproofing
- 12L Lead Removal

Section 10 **INSTALLATIONS:**

The Contractor shall not proceed with the installation any structural steel work, before (a) the approval of the shop drawings, (b) holding a preconstruction meeting with depot management and (c) work release order from the Project Manager is obtained. See sample of typical release order (exhibit #1). (c) Provide a work plan and safety procedure for all work performed.

Section 11 **LABELING:**

All equipment, parts and material installed by the Contractor shall be labeled by the Contractor (in order) to clearly identify the proper instruction and/or application, as required by the Project Manager. Markings with pen and markers are not acceptable.

Section 12 **DRAWINGS:**

Upon completion of each the work for Release Order, As-Built Drawings indicating the work performed shall be submitted by the Contractor to the Project Manager. The complexity of the drawings shall be determined by the size of job. In some cases, the MTA shall provide the Contractor, with drawings of the work to be performed. With the approval from the Project Manager, the Authority drawings given to the Contractor may be submitted as "As-Built" after all the field additions and changes have been made to them. In general, 8-1/2" x11" Letter size "As-Built" sketches may be submitted to the Project Manager only when jobs cost \$10,000 or more.

Section 13 **SPECIAL INSPECTIONS:**

General Requirement for Special Inspection

- The responsibilities of the Contractor related to the performance of Special Inspections and Tests that require special expertise to ensure compliance with the Contract Documents and the 2020 New York State Uniform Fire Prevention and Building Code NYS Uniform Code.
- The Contractor will retain and employ qualified Special Inspectors and Testing Agencies for concrete testing and The Contractor shall utilize these Special Inspectors and Testing Agencies for all required Special Inspections and Tests. The Engineer from MTA Bus will perform inspection for steel reinforcement and concrete.
- The Contractor shall be responsible for coordinating, supervising, and directing all day-to-day activities of the Special Inspectors that are required by Chapter 17 of Building Code of New York State (BCNYS).
- The Contractor shall allow for and coordinate the presence of Special Inspectors and employees of the Testing Companies at the Work Site during the progress of the Work at times as required by Chapter 17 of BCNYS.

The contractor shall ensure that the Special Inspection Companies submits to MTA Bus and the Contractor at the same time the following:

- Preliminary list of special inspections.

- Identification of Third-Party testing laboratories.
- Final list of Special Inspections and Tests.
- Schedule of Special Inspections and Tests.
- Documentation of satisfactory completion of Special Inspections and Tests.
- Reports of nonconforming Special Inspections and Tests.
- Signed statement of Special Inspections to identify the Special Inspections or tests prior to issuance of a construction permit.
- Resubmittal of a signed statement of Special Inspections-Form IIA to identify the Special Inspections or tests added or removed after issuance of a construction permit.

Project Manager shall act as the Contractor's main coordinator/liaison for all Special Inspection and Test activities including the following:

- *Coordinate Special Inspection and Test activities with the Project Manager and the Engineer in charge.*
- *Ensure that Special Inspection and Test are performed in accordance with the Inspection and Scope of work, codes, and the schedule of Special Inspection and Tests.*
- *Monitor and control Special Inspection and Test activities.*
- The Contractor shall attend a kick-off meeting with the Special Inspection companies and the Project Manager to review the scope of the Special Inspections and Tests required for the Contract, including any unique or complex construction requirements.
- The Contractor shall provide safe access for the Special Inspectors and testing agencies to the Work, including, but not limited to, labor, facilities, equipment such as ladders and/or other mechanical or electrical lift equipment and scaffolding, required safety equipment to obtain, handle, and deliver samples to facilitate testing and inspection, and for storage and curing test samples.

- The Contractor shall provide access for the Special Inspectors and testing Companies to the most recent approved documents or drawings.
- The Special Inspectors and Testing companies shall bring any non-conformance to the immediate attention of the Project Manager and the Engineer in charge for correction and the Contractor shall promptly complete all required corrections of non-conformances, unresolved items, or any discrepancies in inspection coverage, such as missed inspections, periodic inspections when continuous inspection is required. If the non-conformances cannot be corrected within twenty-four (24) hours, the Contractor shall promptly bring them to the attention of the Project Manager prior to the completion of that phase of Work, or prior to being covered, shipped, energized, or placed into service.
- Special Inspectors and Testing companies shall keep records of inspections and directly furnish to MTA Bus within 48-hours after inspection or sooner if directed by the Project Manager. Reports shall indicate that Work inspected was completed in conformance with the Contract Documents.

Documentation of Special Inspections and Tests

- The Contractor shall maintain and retain documentation of Special Inspections and Tests.
- Forms to be used for Special Inspection and testing may be provided to the Contractor at the Kickoff Meeting regarding Special Inspections.

Special Inspections Nonconformance Reporting Procedure

The Contractor shall identify and process all nonconformances in accordance with the Scope of work, and furnish the following information to the Project Manager:

1. Documentation of satisfactory completion of required Special Inspection and tests.

2. Status report of nonconforming Special Inspections and tests including documentation of all nonconformances that have been satisfactorily resolved.

Final Report

- A. The Special Inspectors and Testing Companies shall submit a final report certified by its Professional Engineer and signed by the Contractor's Code Compliance Coordinator stating that all items requiring Special Inspections and/or tests were performed in accordance with the Contract Documents. Items not in conformance, unresolved items, or any discrepancies in inspection coverage (e.g., missed inspections, periodic inspection when continuous inspection was required, etc.) shall be specifically itemized in this report. The report shall be forwarded to the project Manager.
- B. A final report with any items not in conformance or unresolved items shall be resolved prior to the issuance of a Code Compliance Certificate.

Other Required Inspections

Other required inspections may include observation of any of the following elements that may be included in the Contract:

- *Foundation.*
- *Concrete Construction*
- *Steel Construction Welding and Bolting*
- *Soil Compaction.*

The Contractor shall provide access and personnel to permit these observations and/or inspections to be performed.

1.0 GENERAL REQUIREMENTS

1.1 Scope

- a. Furnish all labor, materials, tools and equipment, and perform all operations necessary for structural steel work as indicated on the Contract Drawings and specified herein.

1.2 Related Work

- a. Painting shall be as specified in Section 9A.

1.3 Applicable Codes, Standards and Specifications

- a. ASTM International (ASTM)

DESIGNATION

DESCRIPTION

A6/A6M	Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
A36/A36M	Standard Specification for Carbon Structural Steel
A108	Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
A240/A240M	Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications
F3125/F3125M	Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions

Grade	Min. Strength	Type		Style
A325	120 ksi	1	3	Heavy Hex Head
A325M	830 MPa	1	3	Heavy Hex Head
F1852	120 ksi	1	3	Twist-Off
A490	150 ksi	1	3	Heavy Hex Head
A490M	1040 MPa	1	3	Heavy Hex Head
F2280	150 ksi	1	3	Twist-Off
Type 1 - 120 ksi (830 MPa) - carbon steel, carbon boron steel, alloy steel or alloy steel with boron addition				
Type 3 - 120 ksi (830 MPa) or 150 ksi (1040 MPa) - weathering steel				
Type 1 - 150 ksi (1040 MPa) - alloy steel or alloy steel with boron addition				

A563	Standard Specification for Carbon and Alloy Steel Nuts.
A572/A572M	Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
A992/A992M	Standard Specification for Structural Steel Shapes.

E164	Standard Practice for Contact Ultrasonic Testing of Weldments
E709	Standard Guide for Magnetic Particle Testing
F436	Standard Specification for Hardened Steel Washers.
F1554	Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

b. American Institute of Steel Construction (AISC)

1. AISC Steel Construction Manual
2. AISC 303-10 Code of Standard Practice for Steel Buildings and Bridges
3. AISC 341-10 Seismic Provisions for Structural Steel Buildings.
4. AISC 360-10 Specifications for Structural Steel Buildings

c. Specification for Structural Joints Using High Strength Bolts, by the Research Council on Structural Connections (RCSC)

d. American Railway Engineering and Maintenance-of-Way Association Manual for Railway Engineering (AREMA)

e. American Welding Society (AWS).

1. AWS D1.1 Structural Welding Code - Steel

f. New York City Transit Department of Subways Division of Maintenance of Way Standard Specification for Track, Infrastructure & Power Distribution Materials.

g. Building Codes of New York state

h. American National Standards Institute (ANSI):

<u>DESIGNATION</u>	<u>DESCRIPTION</u>
B18.2.1	Square and Hex Head Bolts and Screws (inch series) including Hex Cap Screws and Lag Screws
B18.2.2	Square and Hex Nuts (inch series)

1.4 Quality Control

- a. The steel fabricator shall have a quality program in effect at their facility. The fabricator shall provide evidence that the quality program is in accordance with AISC or equivalent quality certification. Approval of the fabricator is subject to successful implementation of the quality program and audit by the Engineer. AISC Quality Certification in the category most closely associated with the structural steel work of this contract will be acceptable in lieu of an internal quality program.

- b. Welding shall be performed only by welders, welding operators, and tackers who have been qualified by tests as prescribed in the AWS code to perform the type of welding required.

1.5 Facilities for Inspection

- a. Furnish access and facilities for inspection of materials and workmanship in the mill and shop.
- b. Furnish a suitably equipped office space at the mills and shops and provide sufficient information to enable a thorough inspection of materials and workmanship.

1.6 Material Orders and Shipping Statements

- a. Maintain full records of all material orders and shipping statements for the inspection by the Engineer. The shipping statements shall show the weights of individual pieces and members. Maintain manufacturer's specifications and installation recommendations, including certified copies of laboratory and mill test reports covering chemical and physical properties of the steel.
- b. Submit traceability documents for all structural steel shapes to the Engineer such that all steel can be traced to its mill certification through its piece mark.

1.7 Notice of Rolling

- a. Since steel mills have long lag times between rolling various steel shapes and sizes, it may not be possible to inspect the rolling process. However, all steel members shall be accompanied with the mill certifications prior to fabrication for inspection. If the steel has not been rolled yet, then inspections shall be made at the mills. Consult the Engineer to confirm the extent of notice required to schedule inspections prior to the beginning of the rolling at the mill and fabrication work at the shop. No material shall be fabricated prior to notification of the Engineer.

1.8 Cost of Testing

- a. Furnish test specimens as specified herein, as may be necessary to determine the quality of the material, and all labor, testing machines and tools necessary to make specimens and full size tests. If the Engineer approves the use of steel or iron from stock, and a testing machine is not available, furnish the test specimens and the Engineer may make the tests, for which the Contractor shall pay for each specimen tested.

1.9 Errors in Plans

- a. Perform field inspections and take all necessary measurements to verify the dimensions and field conditions shown on the Contract Drawings. Notify the Engineer of any discrepancies found on the Contract Drawings.
- b. The Contractor shall be responsible for the accuracy of the work, including shop drawings. The approval of such shop drawings by the Engineer shall not relieve the Contractor of this responsibility.

1.10 Acceptance and Rejection of Materials

- a. The Authority will retain an inspection agency (the Inspector) to perform Quality Assurance inspection of steel at the mill and at the Contractor's fabrication shop. For

contracts which do not contain specification Section 1SI: “Structural Tests and Special Inspections”, 100% of Quality Assurance inspections will be performed by the Authority’s Inspector. For contracts which do contain specification Section 1SI, the Authority’s QA inspection shall be done on a sampling basis as determined by the Engineer. The Inspector will make detailed reports of the inspection and submit them to the Engineer, and will notify the Contractor of any defects in the material or workmanship. The acceptance of any material or finished members by the Inspector shall not be a bar to their subsequent rejection, if found defective. All acceptances made by the Inspector shall be considered temporary, and this inspection shall in no way relieve the Contractor of full responsibility for the character and accuracy of the work. Promptly replace rejected material. Steel orders subject to this inspection shall not be released from the fabrication shop until it has been inspected and accepted by the Authority’s Inspector, or released by the Engineer.

1.11 Handling and Storage

- a. All parts shall be carefully loaded, unloaded and protected from damage during transportation in a manner satisfactory to the Inspector. After delivery of materials to the work site or in storage, place such materials on skids at least 6 inches above the ground and keep such materials in good condition. Any piece damaged due to improper handling, installation or protection at any stage before the final acceptance of the work will be rejected.

1.12 Marking and Shipping

- a. Every piece of steel shall have its identification mark painted upon a background of shop primer paint applied to the surface of the steel. Members weighing more than 5 tons shall have the weight marked thereon. Fasteners of one length and diameter, and loose nuts and/or washers of each size shall be packed separately. Small parts and small packages of bolts, washers and nuts shall be shipped in boxes, crates, kegs or barrels, but the gross weight of any package shall not exceed 300 pounds. The manufacturers or distributors shall stamp or affix a lot identification or date of manufacturer code marking to each outer shipping container, box or keg. A list and description of the enclosed material shall be plainly marked on the outside of each container.

1.13 Shop Drawings

- a. Submit structural steel Shop Drawings for approval. The Shop Drawings shall include but not be limited to the following items:
 1. Erection Plans.
 2. Fabrication details of all new structural steel members.
 3. Modification details of existing structural steel members.
 4. Connection details (bolted and/or welded).
 5. Field welding details to existing steel (submit coupon test results).
 6. Bolted assemblies that are intended to be shipped with un-pretensioned high strength bolts shall be marked “bolt-to-ship”.
- b. Shop drawings submitted for approval shall clearly identify nominal and detail dimensions that shall be verified in the field prior to fabrication. The Authority’s prior approval of shop

drawings shall not preclude revisions to member lengths, overall and/or detail based on actual field measurements. Resubmit "Approved" shop drawings indicating all final dimensions per actual field measurements.

1.14 Submittals

- a. The submittals required for the Engineer's/Designer's approval shall be as set forth in the Specifications and may also be indicated in the submittal table at the end of this section for the Contractor's convenience. Other items and/or submittals required to indicate conformance with the Contract Documents shall be available for the Engineer's inspection.

2.0 MATERIALS

2.1 Structural Steel Materials

- a. W-Shapes: ASTM A 992
- b. Channels: Angles, M, S-Shapes: ASTM A 36.
- c. HP shapes: ASTM A572 Grade 50.
- d. Plate and Bar: ASTM A 36, unless otherwise noted.
- e. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- f. Steel Pipe: ASTM A 53, Grade B.
- g. Welding Electrodes: Comply with AWS requirements

2.2 High-Strength Bolts

- a. High-strength bolts shall conform to ASTM F3125/F3125M Grade A325. Bolts manufactured to these specifications shall be marked on the bolt head with the designation A325, with the identifying mark of the manufacturer and with three radial lines 120 degrees apart. Hex nuts shall conform to ASTM A563. Flat circular washers and square or rectangular beveled washers shall conform to ASTM F436.
- b. Alloy steel high-strength bolts with nuts and washers shall be provided where indicated on the Contract Drawings, or as required for connections. Alloy steel high-strength bolts shall conform to ASTM F3125/F3125M Grade A490. Bolts manufactured to these specifications shall be marked on the bolt head with the designation A490 and with the identifying mark of the manufacturer. Hex nuts shall conform to the requirements of ASTM A563 Grade "DH" or better. Nuts manufactured to these specifications are identified by the manufacturer's mark and legend "DH". Flat circular washers and square or rectangular beveled washers shall conform to ASTM F436.
- c. Alternate Design Bolts such as button head tension control (TC) bolts with standard heavy hex nut and hardened washer and conforming to ASTM F3125/F3125M Grade F1852, or ASTM F3125/F3125M Grade F2280 shall be used where indicated on the Contract Drawings or otherwise approved by the Engineer. Direct Tension Indicator type bolts will not be permitted.

- d. Unless otherwise specified herein, bolts shall be full-body bolts conforming to the dimensions for heavy hexagon structural bolts specified in ANSI Standard B18.2.1. In determining bolt lengths, the grip (total thickness of all connected material, exclusive of washers) shall be calculated and the values indicated in Table I shall be added thereto. For each hardened flat washer that is used, add 5/32 inch, and for each beveled washer add 5/16 inch. The total length shall be adjusted to the next longer 1/4-inch increment.
- e. Nut dimensions shall conform to the requirements for heavy and semi-finished hexagon nuts specified in the ANSI Standard B18.2.2.
- f. Circular washers shall conform to the dimensions and shall be within the tolerances provided in ASTM F436. Beveled washers shall taper in thickness. Where necessary, washers may be clipped on one side to a point not closer than 7/8 of a bolt diameter from the center of the washer.
 - 1. Where bearing faces of the bolted parts have a slope of 16-2/3% with respect to a plane normal to the bolt axis, hardened beveled washers shall be used to compensate for the lack of parallelism.
 - 2. All washers adjacent to the bolt head and nut shall be hardened in accordance with the requirements of ASTM F436.

Maintain test documentation with each shipment (obtained from accredited laboratories) showing mill certification, chemical content and physical and dimensional characteristics of the high-strength bolts, nuts and washers.

TABLE – I
BOLTS LENGTHS (IN INCHES)

Bolt Size (inches)	Add to Grip (inches)
1/2	11/16
5/8	7/8
3/4	1
7/8	1-1/8
1	1-1/4
1-1/8	1-1/2
1-1/4	1-5/8
1-3/8	1-3/4
1-1/2	1-7/8

2.3 Steel Studs

- a. Steel studs shall be solid flux filled, cold-finished carbon steel conforming to ASTM A108.

2.4 Stainless Steel for Expansion Joint Rehabilitation

- a. Stainless Steel for expansion joint rehabilitation shall conform to ASTM A240/A240M, Type 304 stainless steel sheet with No. 4 finish.

2.5 Lubricant for Bearing Surfaces

- a. Lubricate expansion joints at bearing surfaces as indicated on Contract Drawings using rail lubrication grease as specified in Section 48 of the Authority's Standard Specifications for Track, Infrastructure & Power Distribution Materials.

3.0 CONSTRUCTION METHODS

3.1 Quality

- a. The workmanship and finish shall be equal to the best practices in modern bridge fabrication shops. Material at the shops shall be kept clean and protected from the weather as far as practicable. Unpainted structural steel shall be cleaned and scale and rust removed before encasing in concrete or applying sprayed-on fireproofing.

3.2 Material Straightened in the Shop

- a. All rolled material before being laid or worked, shall be straight. If straightening or flattening is necessary, it shall be done by methods that will not damage the materials. After punching and before assembling, the material shall again be straightened, if required by the Inspector. Sharp kinks and bends may be cause for rejection.

3.3 Finish

- a. Shearing and clipping shall be neatly and accurately done. All portions of the work exposed to view shall be neatly finished.

3.4 Holes for Fasteners

- a. If the thickness of the material is not greater than the nominal diameter of the fastener plus 1/8-inch, the holes may be punched. If the thickness of the material is greater than the nominal diameter of the fastener plus 1/8-inch, the holes shall be drilled.

3.5 Punched Holes

- a. Full size punched holes shall be 1/16-inch larger than the nominal diameter of the fastener. The diameter of the die shall be as small as required to punch a clean hole, and shall not exceed the diameter of the punch by more than 3/32-inch. If any holes must be enlarged to admit the fasteners, they shall be reamed. Holes shall be clean-cut without torn or ragged edges. Poor matching of holes may be cause for rejection.

3.6 Subpunched and Reamed Holes

- a. Where subpunched and reamed work is required, the holes shall be punched 3/16-inch smaller than the nominal diameter of the fastener, and prior to assembling, reamed to a diameter not more than 1/16-inch larger than the nominal diameter of the fastener. The diameter of the punch shall be 3/16-inch smaller than the nominal diameter of the fastener and the diameter of the die not more than 3/32-inch larger than the diameter of the punch. Outside burrs shall be removed with a tool making a 1/16-inch fillet.

3.7 Accuracy of Punching in Reamed Work

- a. In subpunched and reamed work, the punching shall be accurately done. Poor matching of holes will be cause for rejection.

3.8 Reaming After Assembly

- a. Reaming shall be done in accordance with the standards of the AISC and shall be done after the pieces forming a member are assembled and so firmly bolted together that the adjoining surfaces are in close contact. Before fastening, they shall be taken apart, if necessary, and all shavings removed. When it is necessary to take the members apart for shipping or handling, the respective pieces that are reamed together shall be so marked that they may be reassembled in the same position in the final setting up. No interchange of reamed parts will be permitted. The use of lubricants in reaming will not be allowed.

3.9 Accuracy of Reaming and Drilling

- a. When holes are reamed or drilled, 85 percent of the holes in any contiguous group shall, after reaming or drilling, show no offset greater than 1/32-inch between adjacent thicknesses of metal.

3.10 Reamed Holes

- a. Reamed holes shall be spherical, perpendicular to the member, and not more than 3/32-inch larger than the nominal diameter of the fastener. Reamers shall not be directed by hand. Outside burrs shall be removed with a tool making a 1/16-inch fillet.

3.11 Drilled Holes

- a. Drilled holes shall be 1/16-inch larger than the nominal size of the fastener. Burrs on the surfaces shall be removed.

3.12 Assembling for Drilling

- a. Connecting parts requiring drilled holes shall be assembled and securely held together while being drilled.

3.13 Shop Assembling

- a. The parts of members to be connected shall be well pinned and firmly drawn together with bolts before assembly is commenced. The drifting done during assembling shall be only such as to bring the parts into position, and not sufficient to enlarge the holes or distort the metal.

3.14 Welding

- a. Welding will not be permitted for members or connections subjected to impact or fatigue loading, or for members or connections for elevated structures, unless otherwise indicated on the Contract Drawings. Shop welding of structural steel parts is otherwise allowed. Field welding is not permitted except for buildings unless otherwise indicated on the Contract Drawings. All welds shall be detailed on the shop drawings.
- b. Stiffeners shall be welded to the compression flange and to the web of the beam. Welding to the tension flange will not be permitted. Welds on stiffener bearing ends shall not extend closer than 1/2-inch to the outer edge of the stiffener.
- c. All welding shall be electric arc welding using low hydrogen electrodes, and the work shall be performed in accordance with the American Railway Engineering and Maintenance-

of-Way Association specifications for elevated, subway and below ground structures, and in accordance with the American Welding Society. Workmanship, technique, qualification of welders and inspection of welds shall be in accordance with the AWS Structural Welding Code, D1.1.

- d. All welded joint procedures shall be prequalified as defined in Section 4 of AWS D1.1 and thereby exempt from test or qualification. The welding procedure specification conforming to the format indicated in Appendix E of AWS D1.1 shall be submitted to the Engineer for approval, prior to the submission of shop details.
 - 1. In the event that a weld joint necessary to meet the structural contract requirements does not meet the AWS D1.1 parameters to be prequalified, the weld shall be qualified by testing as specified by AWS D1.1, Chapter 4.
 - 2. Following approval of the welding procedure, the Contractor shall submit six (6) copies of the document to the Authority.
- e. All welds (shop and field) shall receive a full visual examination of condition and quality to insure that size, length and location conforms to the Contract Drawings. In addition, all shop and field fillet welds shall receive full magnetic particle inspection in accordance with ASTM E709 and the standards of acceptance shall be in accordance with Section 6 of AWS D1.1.
 - 1. All shop groove welds shall be inspected by full visual as well as ultrasonic testing in accordance with ASTM E164 and standards of acceptance in accordance with Section 6 of AWS D1.1, When indicated on the Contract Drawings, groove welds shall be radiographically tested and the record of all weld inspections shall be maintained.
 - 2. The Contractor shall hire a qualified welding consultant on a full-time basis to monitor and supervise all field welding. The consultant shall have a minimum of five (5) years of related recent experience. The Consultant is required to provide Certification and Test Reports that all field welds are sound and conform to the applicable codes of practice.
- f. All nondestructive testing procedures, techniques and personnel qualifications shall be as per Section 6 of AWS D1.1. The provisions of AWS D1.1, Section 6, shall govern the extent of spot inspection and requirements for additional inspection in case of detected defects.

3.15 Planing Sheared Edges

- a. Planing or finishing of sheared or thermally cut edges of plates is not required unless specifically called for in the contract documents, or included in a stipulated edge preparation for welding.

3.16 Stiffeners

- a. Stiffeners on plate girders or beams carrying stress shall be faced on the ends where the load is applied and brought to a true contact bearing with the flange. The other ends of the stiffeners shall be sheared square and brought to a tight fit with the flange. All other stiffeners shall be sheared square and brought to a tight fit with the flange to provide full bearing. Web splice plates and fillers under stiffeners shall be cut to fit within 1/8-inch of built-up flange angles or fillet of rolled members, top and bottom.

- b. Stiffeners and splice plates on built-up members shall not be crimped. Filler plates shall be used as required. Where bolts carrying computed stress pass through fillers, the fillers shall be extended and adequately bolted to distribute the total stress uniformly.

3.17 Web Plates

- a. Web plates for built-up members shall not project beyond the flanges. The edges of web plates of built-up girders shall not be more than 1/4-inch back of the top and bottom flange.

3.18 Bearing and Abutting Surfaces Planed

- a. All abutting surfaces, except abutting ends of subway roof and invert beams, shall be accurately milled or faced so as to insure even bearing, unless otherwise indicated on the Contract Drawings. The top and bottom surfaces of base and cap plates of columns, except those surfaces in contact with masonry, shall be press straightened up to 4 inches thick. Base and cap plates larger than 4 inches thick shall be milled to receive columns. Parts of members in contact with them shall be faced to fit.
- b. Sole plates of plate girders shall have full contact with the girder flange. Sole plates shall be press straightened or milled.

3.19 Finished Members

- a. Finished members shall be true to line and free from twist, bends and open joints.

3.20 Screw Threads

- a. Screw threads shall make close fits in the nuts and shall be in compliance with U.S. Standard and properly filleted.

3.21 Annealing

- a. Steel, except in minor details that have been partially heated, shall be properly annealed.

3.22 Splicing and Field Connections

- a. The erection of all splices and field connections shall be securely bolted and shall have 50 per cent of the holes filled with bolts and drift pins. Light drifting will be permitted in order to draw the parts together, but drifting for the purpose of matching unfair holes will not be permitted. Unfair holes shall be reamed or drilled.

3.23 High Strength Bolts

- a. High-strength bolt installation and tightening shall be in accordance with the RCSC Specification, 2009 Edition, for Structural Joints Using High Strength Bolts.
- b. High-strength bolts shall be used for field and shop connections. The heads of bolts shall be placed to face the public where possible. Vertical bolts shall have their heads on the top of the member.
- c. Before installing a bolt in the hole of renovated structures, remove all nicks, burrs, corrosion, scale, paint and foreign substances, if any, from inside of the hole and from the surfaces around the hole, with a power grinding wheel to ensure proper seating of the nut, bolt head and washers.

- d. Surfaces of bolted parts in contact with the bolt head and nut shall be parallel; except that they may have a slope of not more than 5% with respect to a plane normal to the bolt axis if the requirements of subparagraph (e) are observed. Bolted parts shall fit solidly together when assembled without interposition of gaskets or any other flexible material. The contact surfaces, when assembled, shall be free of scale or carry the normal tight mill scale. The surfaces shall be free of paint, lacquer, dirt, oil, loose scale, burrs, pits or other defects.
- e. Bolts shall be provided with washers under heads or nuts. Flat washers may be used if abutting surfaces adjacent to bolt heads and nuts have a slope less than 5% with respect to a plane normal to the bolt axis; provided that, in all cases on non-parallel abutting surfaces, the nut shall be torqued against a non-sloping surface.
 - 1. Washers shall be placed under the element to be turned.
 - 2. All nuts shall be tightened to give at least the required minimum bolt tension values given in Table II, upon completion of the joint.
 - 3. For A490 bolts, washers shall be placed on both sides of the members being connected, if the material against which it bears, has a yield point of less than 40 ksi.
- f. Nuts shall be tightened with impact wrenches by the "Turn-of-Nut" method.
 - 1. Impact wrenches shall be of adequate capacity and sufficiently supplied with compressed air to perform the required tightening of each bolt in approximately ten seconds.
 - 2. The impact wrench shall be of an adequate size (capacity) to properly tighten the size of bolt used. Wrench sockets shall be of the bolt clearance type and have hardened inserts to scuff-up the outside nut face. The square and hexagon internal broached surfaces of wrench sockets shall be in good condition. Legible marks extending from the tightening end back of the drive end, 90 degrees apart and suitably differentiated, shall be placed on the outside walls of wrench sockets. The use of universal or straight extension adapters will not be permitted. The Engineer may allow straight extensions built into the wrenches so that there is no power loss. Impact wrenches shall be checked frequently (at least once a day) using a hydraulic tester, and wrenches that cannot be properly adjusted shall be immediately removed from service. Wrenches shall be properly lubricated and otherwise maintained to prevent variations in proper tightening-up procedure.
- g. Persons experienced and competent in the use of tightening procedures by the "Turn-of-Nut" method with high-strength bolts shall be employed in tightening gangs.
 - 1. Generally, nuts shall be placed on the side of the connection so that torquing will be against a non-sloping surface. Where conditions at the connection require tightening the bolt head instead of the nut, place a hardened washer under the head and tighten following the same procedure as for nuts, and with the proper size chuck employed on the impact wrench. In no case shall nuts or bolt heads be tightened against a sloping surface greater than 5%.
 - 2. Each connection when completed shall bear an identifying mark.

3. Where one or both sides of a bolted connection will be exposed to view, the head of the bolt shall be placed on the exposed side or outer side of the connection.
 4. Washers shall be placed under the element to be turned without exception.
- h. The connections shall be tightened as follows:
1. Holes shall be faired up with drift pins to maintain dimensions and plumbness of the structure. Drift pins shall not be removed until the bolts in the balance of the holes have been installed and made snug tight as defined in subparagraphs (2) and (3).
 2. Bolts shall be installed in the remaining holes in the sequence specified in subparagraph (4). Only hand tightening shall be required at this point. All connected parts shall be properly fitted.
 3. After the remaining holes have been filled with bolts, each bolt shall be torqued to a "snug tight" condition. At "snug tight", all abutting surfaces shall be firmly in contact. Drift pins shall now be removed.
 4. Impact wrenches shall be used to tighten up bolts by means of the required turn beyond the "snug tight" condition. Tightening of the bolts in a joint shall, whenever possible, commence at the most rigidly fixed or stiffest point, and progress toward the free edges, both in the initial snugging up and in the final tightening.
 5. The torque of each initial bolt shall be checked with the impact wrench and further tightened if necessary.
 6. During tightening, the bolt head shall be secured to prevent turning.
- i. An impact wrench of sufficient capacity for the bolt size shall be employed. The nut of the bolt shall be spun to a "snug tight" condition, and shall then be further tightened at least one-third to one turn, depending on the bolt length as indicated in Table III. "Snug tight" is achieved when the wrench starts to impact.
- j. A minimum of two and one half ($2 \frac{1}{2}$) threads shall be visible beyond the nut after torqueing. Connections containing bolts of insufficient length or without washers or beveled washers under head or nut shall be removed and replaced by the proper combination of bolts, nuts and washers or beveled washers.
1. Upon completion of each connection, it shall be inspected mechanically to see that bolts have been torqued to at least the specified minimum tension. A hand torque wrench calibrated for torque at minimum tension may be used. This calibration can be established by torqueing a bolt to the minimum tension in the hydraulic tester; then torqueing the nut slightly tighter and reading the foot-pounds required to turn the nut after the nut has been set in motion. (See Table II, Note 3.)
 2. For each field connection, at least 10 percent of the bolts but not less than two bolts shall be selected at random and checked for tension.
 3. For shop connections, upon delivery at the work site, and before erection, at least 10 per cent of the bolts in any connection, but not less than one bolt of each size in each connection, shall be checked for tension. Should any bolt fail to meet the requirements of this test, all the bolts in that member shall be retightened by properly adjusted power wrenches before the member is erected.

- k. A hydraulic tester for setting and checking impact wrenches and a hand torque wrench (with dial gauge) together with facilities for setting and checking shall be provided and maintained at the site.
- l. Bolts meeting the requirements of ASTM F3125/F3125M Grade A325 may be reused once if approved by the Engineer. Galvanized A325 and A490 bolts may not be reused.
- m. Testing and installation of Alternate Design Bolts, such as tension control bolts, shall conform to the requirements of the Specification for Structural Joints Using High Strength Bolts, prepared by RCSC (2009 Edition).

3.24 Steel Studs.

- a. Steel studs shall be welded to structural steel where indicated on the Contract Drawings. Welding may be performed in the shop or in the field.
- b. Studs shall be free of rust, scale, rust pits and oil at the time of welding and immediately before concrete is placed. The surface of steel to which the studs are welded shall be free of mill scale, rust, dirt, paint, grease or any other material that might impair the quality of the weld. Welds or studs that are found to form cracks will not be accepted and the stud shall be removed and replaced. Ceramic ferrules shall be removed after completion of the welding process.
- c. Steel studs shall be automatic end-welded similar to those manufactured by Nelson Stud Welding, or approved equal.

TABLE II - BOLT TENSION

Bolt (in.)	Minimum Fastener Tension*	
	In Thousands of Pounds (kips)	
	A325	A490
1/2	13	16
5/8	20	25
3/4	29	37
7/8	41	51
1	54	67
1 1/8	59	84
1 1/4	75	107
1 3/8	89	127
1 1/2	108	155

*Equal to 70 per cent of specified minimum tensile strengths of bolts, rounded off to the nearest kip.

NOTE 1- Calibrated Wrenches should be set to induce a bolt tension not less than 5 percent in excess of the required minimum bolt tension given in Table II.

NOTE 2 - In using a power wrench, the recommendations of the wrench manufacturer shall be consulted in its operation and care shall be taken that the machine is maintained in proper working condition and proper calibration.

NOTE 3 - Torque wrenches used for inspection shall be calibrated as ordered, and at least three bolts of the same type, size and condition of thread shall be checked in the hydraulic tester to determine the average torque equivalent to the minimum required tension. These tools shall be used for testing only.

TABLE III NUT ROTATION FROM SNUG TIGHT CONDITION*

	Disposition of Outer Face of Bolted Parts		
Bolt Length (Underside of head of end of bolt)	Both faces normal to bolt axis	One face normal to bolt axis and other sloped not more than 1:20 (beveled washer not used)	Both faces sloped not more than 1:20 from normal to the bolt axis (beveled washer not used)
Up to and including 4 diameters	1/3 turn	1/2 turn	2/3 turn
Over 4 diameters but not exceeding 8 dia.	1/2 turn	2/3 turn	5/6 turn
Over 8 diameters but not exceeding 12 dia.	2/3 turn	5/6 turn	1 turn

Nut rotation is relative to bolt regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn or less, the tolerance should be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance should be plus or minus 45 degrees.

3.25 Steel Rehabilitation

a. Requirements:

1. Rehabilitation of existing steel shall be performed maintaining the integrity of the structure at all times.
2. No rehabilitation work shall be allowed to encroach on the clearances required for railroad or vehicular operation. If encroachment seems likely, notify the Engineer before proceeding with the work.

3. Rehabilitation work shall comply with the Personnel Clearance requirements of the Authority. In the event of an encroachment of the Personnel Clearance requirements, notify the Engineer.
 4. All rehabilitation work shall be completed without disturbing the existing track profile. Take all necessary measures to assure the profile of the track will remain within acceptable tolerances, which may be tested by the Authority's geometry car.
- b. The work for rehabilitation of existing steel shall include but not be limited to:
1. Condition survey of existing structural steel members at locations of suspected impairments as shown on the Contract drawings.
 2. Providing temporary support as required.
 3. Cutting, removing and disposing of existing structural steel.
 4. Coupon testing for field welding.
 5. Modifying existing structural steel to accommodate new work.
 6. Repairing, reinforcing or replacing existing deteriorated structural steel members.
- c. Condition Survey:
1. Prior to any structural steel cutting or removal for rehabilitation work, make a condition survey of existing structural steel. The condition survey shall be made in the presence of the Engineer. A survey report shall be prepared and submitted for the Engineer's approval.
 2. At locations of suspected impairments, do all necessary chipping, cutting, removing and disposing of existing concrete or brick encasement, waterproofing, sprayed-on fireproofing, as well as any existing construction such as wall panels covering mezzanine hangers, etc., to expose existing steel for inspection purposes. Clean steel surfaces of dirt, debris and surface film by appropriate methods, such as high-pressure water so that cracks and corrosion can be readily observed and mapped. Any rust or loose paint on the steel surfaces shall be removed to a bright sound metal. After inspection, or after necessary repair/replacement is completed, restore to the satisfaction of the Engineer the encasements, waterproofing, or fireproofing and any other construction removed for inspection purposes.
 3. Measure the remaining thickness of the existing structural steel element (web, flange) in the presence of the Engineer, with suitable instruments including but not limited to calipers and/or ultra-sonic devices) as follows:
 - i. Within the area of the defect, carefully clean the steel to sound metal using chipping hammers and/or wire brushes and take measurements of the remaining steel thickness every six inches in both directions (minimum of three in the depth of the member) to fully define the loss of steel. The average remaining steel thickness across the depth of the member at a particular point along its length shall be computed by dividing the sum of the measured thickness measurements by the total number of measurements at the subject section. This average thickness shall be considered the "thickness of the

element remaining after loss". Furnish to the Engineer sketches as necessary to define the area of corrosion and the remaining thickness of steel.

4. The survey report shall provide the locations and identification of the steel members, the extent of damage (length of corrosion or crack in steel, size and quantity of rivets or bolts damaged or missing), and remaining thickness of the damaged element.
 5. The Engineer shall establish the priorities for rehabilitation of the existing steel members.
 6. Provide the equipment necessary to conduct a detailed assessment of the impairment including, but not limited to scaffolding, temporary jacking, lighting, tools, and gauges.
- d. Temporary Support:
1. If necessary, prior to any structural steel cutting or removal work, provide a temporary support system for the existing structure designed in accordance with the Authority's Field Design Standards.
 2. The temporary support system shall not interfere with nor encroach upon clearances required for railroad or vehicular operations.
 3. The temporary support system shall be designed by a Professional Engineer licensed to practice in the State of New York. The installation procedure, design calculations and shop drawings for the temporary support system, stamped and signed by the Professional Engineer shall be submitted for the Engineer's review and comments.
 4. The jacking procedure and details shall be submitted for the Engineer's review and comments prior to start of the work. The procedure and details shall include jacking forces, jack locations and jack capacity, and shall be stamped and signed by the Professional Engineer.
- e. Cutting, Removal, and Disposal:
1. Cutting and removal of existing steel or iron shall be undertaken with proper precautions and planning so that the new work can be accommodated without extensive removal or damage to the existing structure. The use of flame cutting methods for the removal of existing steel will not be permitted. The procedure to cut and remove existing steel shall be available for the inspection of the Engineer.
 2. Rivets shall be removed from the existing structure by knocking off the heads and backing out the rivets. Flame cutting to facilitate the removal of rivets or bolts will not be permitted. Plasma rod may be used to facilitate rivet removal.
 3. If rivet shanks cannot be removed by punching without damaging the base metal, the rivet shank shall be removed by drilling. If any structural steel to remain in place is damaged by construction operations, repair or replace it in a manner acceptable to the Engineer. If the new bolt cannot be placed in the hole originally occupied by the rivet, the hole shall be reamed to the proper size.

4. If reaming produces an oblong hole in any material, the largest diameter of which, is more than 3/16 inch larger than the diameter of the removed rivet, increase the diameter of the new bolt by one size and ream the hole to fit the larger bolt.
 5. Additional fasteners may be removed in order to separate existing steel to facilitate cutting operations while protecting the steel to remain. High-strength bolts shall be provided to fill the unused holes.
 6. Steel and iron removed and not reused, and waste steel resulting from the modification or rehabilitation work, except where otherwise provided, shall become the property of the Contractor and shall be disposed of by the Contractor.
- f. Coupon Testing:
1. Take coupons of the existing steel members and have them tested in an approved testing laboratory. The laboratory shall prepare a report indicating (a) the type of steel (showing tensile and yield strength), (b) chemical composition, (c) weldability and (d) the matching electrode. The test results along with the laboratory report shall be submitted to the Authority before approval is given to perform repairs using field welding.
- g. Modification of Existing Steel:
1. For the purpose of accommodating new work, modify certain portions of the existing steel framework, generally as indicated on the Contract Drawings. For modification work, make all necessary field measurements, and prepare and submit required shop drawings for approval. Such work shall include, but not be limited to; cutting steel shapes and built-up members, framing into existing steel, countersinking and drilling holes (round or slotted), reaming and countersinking existing holes, removing old rivets, plugging and welding holes and removing and re-erecting steel of the existing structure. Unused holes in steel to be encased in concrete need not be plugged or welded.
 2. Where existing rivets are in physical interference with new holes to be drilled in the field, the rivets shall be removed and the rivet holes shall be plugged and welded. Where knee braces are removed, rivet heads shall be cut off and shanks ground smooth and flush with the underside of the existing roof beams and with flanges of the existing columns that are not to be removed.
 3. Where new steel is connected to existing steel, the surfaces of the existing steel shall be cleaned to bright metal.
- h. Repair and/or Replacement of Existing Deteriorated Steel:
1. Existing deteriorated steel members shall be restored to the required condition or replaced as shown on the Contract Drawings.
 2. Based on the information obtained by the condition survey and directions provided by the Engineer, prepare and submit shop drawings showing rehabilitation schedule of all deteriorated steel members, for approval. The schedule shall show the locations of the deteriorated steel members, the deteriorated elements of each member, the extent of deterioration, remaining steel thickness of the elements, and

the reference to the types of repair or replacement to be used for these steel members.

3. The priority of repair or replacement of the steel members will be established by the Engineer after approval of the shop drawings.
4. The criteria for repair or replacement shall generally be as indicated on the Contract Drawings.
5. If a steel member is to be replaced, prepare all existing surfaces to receive the new member.
6. If the new steel member is to be framed into existing steel members, clean the existing steel surfaces at the locations of new connections to bright metal. The surfaces shall be thoroughly wire brushed to remove loose rust and loose mill scale, and any grease or shop paint on such surfaces shall be removed with proper solvents. If these surfaces are deteriorated, repair them following the criteria set forth on the Contract Drawings, before the new member is installed.
7. If new steel members are to be installed on existing concrete or masonry surfaces, the surfaces shall be prepared by scraping, cleaning and removing all foreign matter. If these surfaces are deteriorated and uneven, they shall be repaired and irregularities shall be corrected before the new steel member is installed.
8. All deteriorated, corroded, bent, broken and missing rivets and bolts shall be removed and replaced with new high-strength bolts. Prior to installing the new bolts, remove all nicks, burrs, corrosion, scale, paint and foreign substances from inside of the hole and from the surfaces around the hole, to ensure proper seating of the nut, the bolt head and the washers.
9. If the existing steel is encased in concrete or brick, or coated with sprayed-on fireproofing, the same condition shall be restored after steel repair is completed.
10. Expansion joints shall be rehabilitated as indicated on the Contract Drawings. The types of expansion joints shall include the following:
 - i. Rocker Pin Expansion Joints.
 - ii. Sliding Plate Expansion Joints.
 - iii. Slotted Hole Expansion Joints.

4.0 MEASUREMENT AND PAYMENT

4.1 Measurement for Payment

- a. Any item not included in price schedule will be paid as current market price.

Submittal Approvals

Item No.	Paragraph No.	Submittal	Approval By (Engineer or Designer)
1	1.13	Structural Steel Shop Drawings	Engineer
2	3.14(d)	Welding Procedure Specifications	Designer
3	3.25(d)(3)	Temporary Support System	Designer
4	3.25(d)(4)	Jacking Procedure	Engineer
			Designer
			Designer
			Designer
			Engineer

Notes:

1. This table does not include approvals for “or-equal” proposals. Approvals for “or-equal” proposals are covered in Information For Bidders, Paragraph 9 and Specification Section 1B, Paragraph 1.38.

PART 1 - GENERAL REQUIREMENTS

1.1 Scope of Work

- a. Furnish and install all materials, tools and equipment and perform all operations necessary for aluminum work as indicated on the Contract Drawings and specified herein.

1.2 Related Work

- a. Structural Steel shall be as specified in Section 5A.

1.3 Codes and Standards

- a. At a minimum, all materials and work furnished pursuant to this Specification shall comply with the latest edition of the following applicable code provisions and all applicable standards listed below. The publications listed below are incorporated herein by reference to the extent applicable.
- b. ASTM - ASTM International
 1. ASTM B 221-13 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes

1.4 Quality Assurance

- a. Use adequate number of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.5 Submittals

- a. Submit product specifications, installation instructions, manuals and other data necessary to prove compliance with the requirements specified herein and the referenced standards.
- b. Shop drawings and working drawings in accordance the requirements of Section 1C, Drawings. Include plans, elevations, sections and details of components and their connections.
- c. Samples: Submit samples of specified finish on 24 inch lengths of aluminum work. Engineer reserves right to require additional samples, which will show fabrication techniques and workmanship, and design of hardware and accessories.

1.6 Warranty

- a. Provide manufacturer's written warranty agreeing to repair or replace materials that are defective or shows substandard workmanship or fail within one (1) year from the Date of Substantial Completion.

1.7 Delivery, Storage and Handling

- a. Deliver aluminum work to project site in undamaged condition. Use care in handling and hoisting aluminum work during transportation and at job site. Store aluminum work and components, at the site, on edge, out of contact with the ground, and under weather-tight covering. Arrange storage to avoid bending, warping, or otherwise damaging the work. Where damage occurs to structural member of aluminum units such units shall be replaced with new units at no additional expense to the Authority or Contracting Party.
- b. The Authority reserves the right to reject any materials that has been stored improperly.

PART 2 - MATERIALS

2.1 Aluminum

- a. Aluminum shall be made from the best grades of ore and scrap of known and approved composition. Aluminum shall be of the proper alloy and shall receive an anodizing surface treatment in accordance with the specifications and recommendations of the Aluminum Company of America suitable for the purpose for which the material is intended to be used. Aluminum shall also receive a protective coating of an approved lacquer.
- b. Aluminum sheet shall be true to gauge, uniform in quality and temper and shall be sound, smooth, clean, free from seams, laminations, buckles or other defects and shall be commercially flat to a degree suitable for the purpose for which it is to be used.
- c. All bolts, nuts, washers, screws and rivets shall be of stainless steel.
- d. Where aluminum comes in physical contact with other metals or concrete, special precaution shall be taken to prevent galvanic action between the metals, and corrosion between the aluminum and concrete.
- e. Aluminum shall be reinforced for the attachment of hardware. Steel hinges and bronze hardware in direct contact with aluminum work shall be heavily chromium plated and given a satin finish.

- f. The exposed surfaces of aluminum unless otherwise specified herein, shall have a "satin finish". "Satin finish" shall mean that the surfaces of aluminum be finished with very fine scratched lines obtained by the use of various grades of abrasive; the abrasive being used in steps from coarse to fine sizes. It is contemplated that the final finish shall be produced by the use of No. 180 emery.

PART 3 - EXECUTION

3.1 Quality of Work

- a. The workmanship and finish shall be equal to the best grade of modern shop and field practice known to recognized manufacturers specializing therein. Material at the shops shall be kept clean and protected from rust and other surface defects. Connection shall be by welded seams and joints including reinforcements. Fitting and fabrication shall be accurate, with surfaces free from warp, wave, buckle or other defects, made with square corners and angles, unless otherwise shown; work set in proper alignment; surfaces straight and to true plane. Trim shall be neatly and accurately mitered or coped together and joints then welded. Welded joints shall be neatly made, dressed clean, smooth and flush with surface of base metal. Exposed face jointing of all aluminum work shall be made invisible.

3.2 Installation

- a. All work shall be installed in the correct location, in alignment and plumb to true planes. Breaks, angles and corners shall be made square with walls. Work that is to be built in shall be correctly set in and thus maintained until built in or enclosed and securely fastened and made rigid. Where coordination with adjoining work is necessary, measurements shall be taken at the Project Site. Anchorage, sealing, closure pieces and other materials, as recommend by the manufacturer shall be installed to comply with field conditions.
- b. Upon the complete erection of aluminum work, all aluminum surfaces shall be carefully cleaned. Defective finish shall be removed and refinished, as directed by the Engineer.

3.3 Protection

- a. All finished aluminum work shall be suitably protected with approved satisfactory means of protection in order to maintain the finished material in proper condition until completion of the Project.

3.4 Welding

- a. Welding of aluminum alloy shall be by the oxy-acetylene, oxy-hydrogen or the electric arc process and by the latest approved method.
- b. All welded joints shall be thoroughly cleaned with wire brush and water to remove all welding flux.
- c. Welding rods, used in the welding of aluminum alloy, shall produce a weld metal that matches the aluminum alloy in color.
- d. Welding shall be accomplished according to the best practice of the industry. All welds shall be sound, free from blisters, blowholes, twists and strains. There shall be no weld marks evident on exposed surfaces. Welds shall be located and spaced in accordance with the best engineering practice to assure a substantial, sound, watertight and thoroughly workmanlike installation.

3.5 Aluminum Coping

- a. Aluminum coping shall be 14 gauge, mill finish, as manufactured by Alcoa Aluminum Company or approved equal. The assembly of the copings shall consist of mitered corners, joint covers, anchor-gutter bar and anchor bolt and plate assembly.

3.6 Stationary Drainable Blade Louvers

- a. Stationary drainable blade louvers shall be of type indicated on the Contract Drawings and as designed and manufactured by Airolite Co., or approved equal.
- b. Louvers shall be constructed of extruded aluminum alloy 6063-T5. Blades and frames shall be .081 inch minimum wall thickness. The assemblies shall be of depth as indicated with 35-degree stationary drainable blades.
- a. Stationary double drainable blade louvers shall be of type indicated on the Contract Drawings and as designed and manufactured by Greenheck, Schofield, Wi. (715) 359-6171, or approved equal.

- b. Louvers shall be constructed of extruded aluminum alloy 6063-T5. Blades and frames shall be .081 inch minimum wall thickness. The assemblies shall be of depth as indicated with stationary drainable blades.
- c. Louvers shall be fitted with 1/2 inch mesh x .063 inch diameter aluminum bird screen in re-wirable extruded aluminum frame.
- d. Louvers shall be primed and finished with Kynar 500 or approved equal.
- e. Louvers shall bear Air Movement and Control Association (AMCA) Certified Ratings seals for air performance and water penetration ratings

3.7 Aluminum Louvers with Bird Screens

- a. Special care shall be taken in transporting, handling, storing and installing of louvers to prevent damage. Louvers that are found to be bent, twisted or otherwise deformed or to have the finish damaged before installation will be rejected and removed forthwith from the site.
- b. Aluminum louvers and circular aluminum louvers with fixed blades shall be as manufactured by Construction Specialties Inc. or an approved equal. They shall be constructed of extruded aluminum sections, except for hollow metal doors. Louvers shall be provided as indicated on the Contract Drawings.
- c. Extruded sections shall be in accordance with ASTM B221 of 6063-T52 aluminum alloy, aluminum 12 gauge (.081), formed as indicated on the Contract Drawings.
 - 1. Blades, except where otherwise indicated on the Contract Drawings, shall be of the storm proof type and provided with reinforcing bosses.
 - 2. Surfaces shall be anodized and shall be medium bronze AA-M32-C22-A42.
 - 3. All component parts of the louvers shall be assembled by means of welding or other approved method.
 - 4. Head, sill and jamb sections shall each be of one continuous piece with formed caulking slots.
 - 5. All joints between louver blades and frames shall be clean, smooth and not visible to the eye.
 - 6. Where indicated on the Contract Drawings, louvers shall be provided with mullions of extruded, integral tongue and groove sections, with provisions of expansion and contraction.

- d. Louvers shall be secured in masonry openings by means of expansion bolts or other approved method. The space between the masonry opening and the louvers shall be filled with an approved type caulking compound.
- e. Where indicated on the Contract Drawings, louvers shall be provided with continuous aluminum angle.
- f. Louvers and bird screens shall be constructed and installed that they may be readily removed for maintenance cleaning, and repair.
- g. Bird screens with 12 gauge aluminum wire, one-half inch mesh, secured in extruded aluminum channel frames shall be provided where indicated on the Contract Drawings. Frames shall be mitered at corners and locked. Bird screens shall be fastened to louver frames with aluminum self-tapping screws.
- h. Back draft dampers for louvers shall be constructed of extruded aluminum frame, blades and bearing housing of such gauges as indicated on the Contract Drawings. The dampers shall be designed for use with a powered roof exhauster to prevent entrance of outside air when the exhauster is inoperative. Back draft damper's shall be as manufactured by Air Balance, Inc., or approved equal.
- i. When applicable, motors for operation of dampers shall be 110 V. A.C., 60 cycle, of a type suitable for the intended application. Dampers, motors, operating rods, etc. shall be installed by the Contractor. Electrical connections shall be terminated in a junction box. Provision shall be made for emergency manual operation of dampers.
- j. Louvers shall be tested in a closed position for water penetration and air infiltration
- k. Where indicated on the Contract Drawings, insert screen shall be provided.

3.8 Cast Aluminum Letters

- a. Cast aluminum letters shall be anchored in the wall with 3/8-inch diameter aluminum pins fastened to the letters and provided with spacers, all as indicated on the Contract Drawings. Stags of letter shall be provided with two pins and diagonals and bars with one pin. Curved letters shall have a sufficient number of pins so as to properly anchor and support the letter. Holes, of proper size to receive the pins, shall be drilled in masonry walls and the pins shall be secured in place with an approved cement.
- b. Aluminum channel clips, 16 gauge, full length, shall be welded to return of letters.
- c. Cast aluminum letters shall have an approved anodized finish and all points shall be weather-tight.

3.9 Cast Aluminum Plaque

- a. The Contractor shall provide a cast aluminum plaque in the location indicated and of the size indicated on the Contract Drawings.
- b. The plaque shall have a minimum depth of 9/16 of an inch from back to face of plate, and a minimum thickness of 3/16 of an inch and shall bear a three line inscription. The letters of the inscription shall be as indicated on to the Contract Drawings.
- c. The inscription shall be formed true to line with even edges and properly placed in the inscription field.
- d. The plaque shall be cast aluminum. Ornamental work and lettering shall be hand tooled, clean and sharp, well undercut and chased. The flat faced letters and the border shall be satin finished and the background shall have an etched finish. The use of applied letters will not be permitted. Surfaces shall be free from pits, scratches and other blemishes.
- e. Lugs shall be cast integrally with the back of the plaque and shall be threaded to receive aluminum pins, 3/8-inch diameter and suitable length. Holes of proper size to receive the pins shall be drilled in masonry walls and the pins shall be secured in place with an approved cement.

3.10 Aluminum Brick Vents

- a. Aluminum brick vents with duct and damper shall be installed where indicated on the Contract Drawings. They shall be as manufactured by Construction Specialties Inc., Model No. 22EX, or approved equal.

3.11 Miscellaneous Aluminum Sections

- a. Miscellaneous aluminum sections, such as angles, beams, channels, tubing, bent and flat plates, closure pieces, column covers, Duranodic aluminum fascias, window heads, fillers and other sections shall be provided where indicated on the Contract Drawings, or as required.

3.12 Removable Aluminum Grating Hatch Covers

- a. Removable aluminum grating hatch covers, set in steel frames, shall be provided where indicated on the Contract Drawings. The hatch covers shall consist, of removable aluminum grating sections (panels). The hatch covers shall fit into the fixed frame snugly and evenly and shall be flush with the adjacent surface. A pair of lifting devices of the general type indicated shall be provided for each grating panel. Steel frames shall be galvanized. Removable wide-flange beams supported on and

secured to channels recessed in and secured to the masonry shall be provided for the support of the hatch cover, as indicated on the Contract Drawings.

3.13 Door Saddles

- a. Doors, where indicated on the Contract Drawings or directed by the Engineer, shall be provided with cast abrasive aluminum saddles as manufactured by Wooster Products Inc. or approved equal. The type shall have an approved cross section of a length and width as indicated on the Contract Drawings or directed by the Engineer, and scribed and fitted to the door jambs. Neoprene stripping shall be installed where required.
- b. Wood block and metal anchors, or expansion bolts shall be set in the concrete floors for securing saddles in place.

3.14 Aluminum Fascia

- a. Aluminum fascia shall be 12 gauge aluminum as manufactured by Construction Specialties Inc., or approved equal, shall be fastened to 12 gauge aluminum bent plate with stainless steel machine screws with neoprene washers and with 12 gauge aluminum off-set clips as indicated on the Contract Drawings.

3.15 Aluminum Cap Flashing

- a. Aluminum cap flashing shall be 14 gauge sheet aluminum and shall be provided where indicated on the Contract Drawings.

3.16 Floor Access Door

- a. Aluminum floor access door shall be " K-3" as manufactured by The Bilco Company or as indicated on the Contract Drawings, or approved equal.

Submittal Approvals

Item No.	Paragraph No.	Submittals	Approval By (Engineer or Designer)
1.	1.5, a.	Product specifications	Engineer
2.	1.5, b.	Samples, Shop Drawings	Designer

Notes:

1. This table does not include approvals for “or-equal” proposals. Approvals for “or-equal” proposals are covered in Information for Bidders, Paragraph 9 and Specification Section 1B, General Clauses, Paragraph 1.38.

Specification Section 5D - Aluminum Work

PART 1 GENERAL REQUIREMENTS

1.1 Scope of Work

- a. Furnish and install all materials, tools and equipment and perform all operations necessary for painting work as indicated on the Contract Drawings and specified herein.
- b. All surfaces that are encompassed by, or are part of the Contract, are to be painted, except as otherwise noted.
- c. The extent of painting and the surfaces to be painted shall be as indicated on the Contract Drawings. Where any discrepancy exists, or a surface is not clearly noted to be painted on the Contract Drawings, the surface shall be deemed to be required to be painted as specified herein.

1.2 Related Work (Not Used)

1.3 Codes and Standards

- a. At a minimum, all materials and work furnished pursuant to this Specification shall comply with the latest edition of the following applicable code provisions and all applicable standards listed below. The publications listed below are incorporated herein by reference to the extent applicable.
 1. NYCTA Standard Specifications for Track and Structures Materials, Section 38.
 2. NYCT General Requirements for Paints and Coatings
 3. NYCT Specification # CCSS-002
 4. Federal Specifications, Fed. Spec. SS-W-110C.
- b. Air Pollution Code: All paints, solvents, varnish and architectural coatings specified in this Contract shall conform to Section 24-148 of the New York City Air Pollution Control Code.
 1. In the event that the precise formulations of the paints, solvents, varnishes and architectural coatings specified in this Contract and in the New York City Transit Authority Standard Specifications for Track and Structures Materials Section 38, do not conform to the New York City Air Pollution Control Code, such formulations shall be modified, subject to the approval of the Engineer, so as to conform to the requirements of the New York City Air Pollution Control Code.

2. The Contractor shall furnish the Engineer with a certification of compliance from the manufacturer that the paints, solvents, varnishes and architectural coatings conform to the New York City Air Pollution Control Code. This certification shall list the total volume of photo-chemically reactive solvents contained in the particular products.
3. As provided in the New York City Air Pollution Control Code, the Contractor, subject to the prior consent of the Engineer, may apply for and obtain a variance permitting the use of materials not conforming to the Code in the performance of the work under this Contract. Two copies of the variance shall be furnished to the Engineer when obtained. The Contractor will be permitted to use such non-conforming materials in the work provided that the materials for which the variance was obtained are acceptable to the Engineer.

1.4 Quality Assurance

- a. Inspection: All paints, solvents, varnish and architectural coatings shall be subject to inspection at the place of manufacture and subject to such tests as may be ordered by the Engineer. The Engineer may be at the paint manufacturer's plant to witness the entire manufacturing process including filling and closing of the cans for each batch of paint manufactured. Samples of the paint may be taken by the Engineer or forwarded to the Engineer as directed. The Engineer shall have access, at all times, to all places to inspect the methods of manufacture and shall have liberty to inspect the daily laboratory records and analysis of all such paints, solvents, varnishes or architectural coatings as are subject to his inspection. Such analyses as are required will be made by the Engineer.
 1. The Contractor shall furnish the Engineer with certification, on the manufacturer's letterhead, stating the name of the Contractor or Subcontractor, the Contract number, and the point of delivery, in addition to stating that the paint meets the VOC requirements of the New York City Air Pollution Control Code as stated in Paragraph 1.3, Air Pollution Code, the New York State Environment Conservation Law - Part 205, amended Jan 1, 2005 and the requirements of the Contract Documents.

1.5 Submittals

- a. Product specifications and other data necessary to prove compliance with the requirements specified herein and with the referenced standards.
- b. Manufacturer's certification that the paints are compatible with the surfaces upon which they will be applied.
- c. Material Safety Data Sheets (MSDS) for all products

- d. Samples and Colors: Color palette of standard paint colors can be inspected in the Authority's Architectural Design Division, New York, New York. Paints, varnishes, lacquers and fillers and their ingredients shall conform to these samples in all respects. When requested by the Engineer, the Contractor shall submit separate samples of all ingredients intended for use in the paints, varnishes, lacquers and fillers and upon approval of same shall then submit two one-pint samples of the finished paints, varnishes, lacquers and fillers. After the approval of these samples, all paints, varnishes, lacquers and fillers shall be manufactured from materials identical with such samples.

PART 2 MATERIALS

2.1 Formulae

- a. Paint will generally be referred to hereinafter by letters and numerals indicating its quality or formula as per Section 38 of the New York City Transit Authority Standard Specifications for Track and Structures Materials, (Sept. 1991). All paint, enamel, varnish, lacquer, and the materials used in the manufacture of the paints, enamels, varnish and lacquer shall conform to the afore mentioned specifications. A copy may be reviewed in the office of the Engineer, or may be purchased from New York City Transit for the fee of seventy-five dollars (\$75) which is not refundable. Paints will also be referred to by Military Specification, Federal Specification, ASTM and other specifications.

2.2 Approval of Manufacturer

- a. Paint shall be as manufactured by PPG Industries Inc., Sherwin-Williams Co., Mercury Paint Corp., or approved equal. All manufacturers must have a Quality Control/Quality Assurance Program approved by the Engineer.
- b. Before purchasing any paint or varnish the Contractor shall obtain approval of the manufacturer who is to furnish such paint and/or varnish in the manner set forth in ARTICLE 1.08, SUBCONTRACTS.
- c. A manufacturer of paint and/or varnish in order to be acceptable shall have manufactured good grades of paint and/or varnish for at least 5 years. The manufacturer's plant shall be within 100 miles of New York City, unless approved by the Engineer, in order that the cost of inspection shall be a minimum.

2.3 Paint Materials

The manufacturer's brands shown below indicate the quality of the materials to be furnished for each listed formula. Where brand or manufacturer is not specified, submit names and brands to the Engineer for approval.

d. Primers

M-1-1 Rust Inhibitive Oil Primer (yellow)

Mercury: Mercguard Rust Inhibitive Primer, Series 3100

Or approved equal

M-1-2 Rust Inhibitive Primer (white)

Mercury: Mercguard Rust Inhibitive Primer, Series 3100

Or approved equal

M-3-1 Alkyd Enamel Primer

Mercury: Alkyd Primer Sealer Series 5100

Sherwin Williams: Preprite Wall and Wood Interior Primer/Undercoater (B49W2)

Or approved equal

b.

M-3-2 Primer Undercoat Sealer-Latex

Mercury: TTP650 Latex Primer Sealer Series 5300

Sherwin Williams: Harmony Primer

Or approved equal

M-20-1 Rust Inhibitive Undercoat (Red)

PPG: 90-709

Mercury: Wood and Metal Primer, Series 3000

Sherwin Williams: Pro-Cryl Metal Primer B66-310 Series

Or approved equal

M-29-1 Zinc Primer

Mercury: Alkyd Zinc Dust Primer, Series 3500
Or approved equal

a. Finish Coats

M-4 Silicone Alkyd Enamel

Mercury: Silicone Alkyd Enamel
PPG: Interior/Exterior Silicone Enamel
Sherwin Williams: Industrial Silicone Enamel
Or approved equal

M-12 Alkyd Gloss Enamel (M-12-1 to M-12-17)

Mercury: HS High Gloss Enamel, Series 5200
PPG: 7-282 Series
Or approved equal

M-25 Bituminous Paint (Coal Tar)

Mercury: Mermas 200 CW modified Epoxy Mastic
Or approved equal

M-31 Acrylic Latex

Mercury: Series 8000 Latex Semi-gloss
PPG: 9-510 Series
Sherwin Williams: Harmony Semi-gloss
Or approved equal

M-32 Deck Paint

Mercury: Alkyd Deck Enamel, Series 5400
Sherwin Williams: High Performance Floor Enamel
Or approved equal

M-35 Epoxy Mastic Coating

Mercury: Mermas 100 CW (for steel), Mermas 200 CW (for concrete)

Or approved equal

2.4 Preparation of Paint

- a. All paints shall be properly prepared in accordance with manufacturer's instructions and as specified herein. Paints shall vary not more than 4 ounces using only the specified materials in the proportion stated per gallon from the standard weight.
- b. The primer, undercoat, and topcoat shall be made by the same manufacturer, unless approved by the Engineer.
- c. Safety precautions such as handling instructions, ventilation requirements, use of adequate clothing and safety equipment shall be specified by the manufacturer on the label, and in the product data and Material Safety Data Sheet (MSDS), as per Section 38.8.1 of New York City Transit Authority Standard Specifications for Track and Structures Materials.
- d. The flash point of any of the paints of the coating system used within New York City shall not be less than 100 degrees Fahrenheit as determined by the Pensky Martens Flash Point tester, unless approved by the Engineer.
- e. Colors shall be as indicated on the Contract Drawings or as directed by the Engineer.

PART 3 EXECUTION

3.1 Preparation of Surfaces

- b. All galvanized iron before being painted shall have all the rosin scraped from soldered joints and shall be thoroughly cleaned with mineral spirits as to remove all grease and dirt.
- c. All dirt, grease, rust, scale, loose paint or other foreign matter shall be completely removed from surfaces to be painted, varnished, or lacquered, prior to the application of any paint, varnish or lacquer. The preparation and cleaning of existing surfaces to be painted shall include hand scraping, wire brushing, power tool cleaning, abrasive (vacuum) blasting, etc. to achieve surface preparation levels specified by the paint manufacturer, as specified in Section 38 of the New York City Transit Authority Standard Specification for Track and Structures Materials and as directed by the

Engineer. The Engineer shall be the sole judge of the surface preparation and shall determine whether the structures or any part hereof have been properly prepared and cleaned before paint, varnish or lacquer is applied.

- d. The Engineer may require that any surface to be painted shall first be wiped with a cloth dipped in mineral spirits. When the mineral spirits have dried, the surface shall be thoroughly and evenly painted. Such wiping of any surface will in no case be considered as a coat of paint. Existing varnished and lacquered surfaces shall be washed with an approved solvent.
- e. Prior to painting, new concrete, masonry and plastered surfaces shall be washed with an approved neutralizing solution or a solution of two pounds of zinc sulfate crystals dissolved in one gallon of hot water. After the surfaces have been rinsed and dried thoroughly, the Contractor shall remove any remaining residue with a stiff brush. All wash and rinse water shall be collected and disposed of in accordance with the New York City Sewer Code.
- f. No paint, varnish or lacquer shall be applied until the Engineer has approved the surface preparation and cleaning and issued written permission to proceed with the painting.

3.2 Application

- a. All paint and varnish shall be applied so as to produce a smooth, even film of uniform adequate thickness. Brushes shall be used in the application of paint. The Engineer may permit the use of rollers where, in his opinion, the use of rollers will produce satisfactory results. Application shall be as follows:
 - 4. Round or oval brushes shall be used. The Engineer may allow the use of flat brushes (4 or 5 inch width) on large flat surfaces only.
 - 5. The first field coat on all interior and exterior surfaces shall be applied by brushing. Subsequent field coats shall be applied by brushing. The Engineer may permit the use of rollers for applying subsequent coats to wide area of concrete, transite, composition board and paneling.
 - 6. All shop painting on structural and ornamental iron and steel work, hollow metal work and metal panels, shall be applied by the use of brushes or approved spray equipment. In the application of such shop coats, the use of rollers will not be permitted.
 - 7. All field painting on exposed structural steel surfaces shall be applied by brushing.
 - 8. The size and type of brushes, rollers and spray equipment shall be approved by the Engineer. Whenever a method of application of paint to a surface is approved

or directed to be used, it is understood that all areas of surfaces inaccessible to coating by that method of application shall be coated by an approved alternate means.

- b. No paint shall be applied during damp or rainy weather or on wet or damp surfaces. No paint shall be applied when the air temperature at the site of work is below 50 degrees Fahrenheit.
- c. The paint shall not liver or curdle and shall cover properly and work freely under the brush. The pigment shall remain in suspension in a satisfactory manner.
- d. When it is necessary to do painting under unfavorable conditions, the Contractor may be required to thin the paint, as directed by the Engineer, with mineral spirits, and to apply additional coats as ordered by the Engineer.
- e. Surfaces of exposed members inaccessible after erection, shall be prepared, cleaned and painted before erection. All recesses that might contain water, or through which water could enter, shall be filled with an approved caulking material before receiving a final painting.
- f. All surfaces so close together as to prevent the insertion of a brush shall be painted thoroughly with the prescribed coats by using a piece of cloth or painting mitten, if necessary.

3.3 Drying

- a. The paints shall dry, under normal conditions, dust free in 18 hours, and the film shall be sufficiently dry to re-coat in not more than 72 hours.

3.4 Shop Coats

- a. All ornamental steel and iron shall have surface preparation as specified by the paint manufacturer so as to be free from scale and rust and shall receive one coat of a rust inhibitive oil primer as herein specified before leaving the shop. Surfaces in contact, when riveted in the shop or when bolted with high strength bolts, shall not be painted but shall be thoroughly prepared and cleaned before assembling. Surfaces in contact, when fastened in the field, shall be prepared, cleaned and then coated with the paint system specified in Paragraph 3.5, Number of Coats.
- b. Fabricators shall have facilities and equipment to keep the temperature of painted steel at a minimum of 50 degrees Fahrenheit, during paint application and initial drying periods. These drying periods last approximately 8 hours.

- c. When necessary, indoor facilities shall be available to protect painted steel from adverse weather conditions during initial drying periods. These conditions include temperatures below 50 degrees Fahrenheit, and atmospheric moisture condensation.

- d. Where the shop coat has become damaged before or after erection, through any cause whatever, it shall be renewed with the same kind of paint as originally used, such renewal to be considered as a part of the original shop coat. The protruding portions of field driven fasteners and component units, unless encased in concrete, shall be given a coat of paint similar to the shop coat before receiving the field coats.

3.5 Number of Coats

- a. Structural steel, iron, rods, bars and bolts embedded in concrete (except where otherwise specifically provided) shall not be painted on those surfaces in contact with concrete, except that the shop coat on any structural member, the surface of which is partly in contact with concrete, shall extend at least two inches into area in contact with concrete. Reinforcement bars shall not be painted.

- b. Ornamental iron or steel work, unless otherwise specified, shall be painted as follows:

Shop Coat/Second Coat: M-20-1, Rust Inhibitive Undercoat (red)

Third Coat: M-12, Alkyd Gloss Enamel

- c. Exposed new structural steel surfaces, except as specified in paragraph (g), shall be painted as follows:

Prime Coat: Mercury: Series 3000-Metal Primer

PPG: 6-208, 6-212 Series

Sherwin Williams: Kromik Metal Primer E41N1

Or approved equal

Second Coat/Third Coat/Fourth Coat: M-12, Alkyd Gloss Enamel

Colors shall be as indicated on the Contract Drawings or as directed by the Engineer.

- d. Exposed new aluminum surfaces shall be painted as follows:

Prime Coat: Mercury: Series 2100 100% Acrylic Metal Primer

PPG: 90-709 Series

Sherwin Williams: Pro-Cryl Metal Primer B66-310 Series

Or approved equal

Second Coat/Third Coat: M-12, Alkyd Gloss Enamel

Colors shall be as indicated on the Contract Drawings or as directed by the Engineer.

- e. Galvanized steel and galvanized surfaces of pipes, (see Division 17 for painting requirements for signal and communication conduits), boxes and equipment shall be painted as follows:

Prime Coat: Mercury: Series 2100 100% Acrylic Metal Primer

PPG: 90-709 Series

Sherwin Williams: Pro-Cryl Metal Primer B66-310 Series

Or approved equal

Second Coat/Third Coat: M-12, Alkyd Gloss Enamel

Colors shall be as indicated on the Contract Drawings or as directed by the Engineer

- n. Canvas pipe coverings shall be painted as follows:

Primer Coat: Approved paint, of color to match the adjacent surfaces or as directed by the Engineer.

Finish Coats: Approved paint, of color to match the adjacent surfaces or as directed by the Engineer.

- o. All new structural steel surfaces that will be inaccessible for painting after erection shall be painted as follows:

Two Coats: M-25

- p. All surfaces of hollow metal work which are not accessible after erection and all exposed surfaces of hollow metal work (other than stainless steel and aluminum surfaces) shall be painted as follows:

Prime Coat: Mercury: Series 2100 100% Acrylic Metal Primer

PPG: 6-208

Sherwin Williams: Kromik Metal Primer E41N1

Or approved equal

Second Coat/Third Coat: M-12, Alkyd Gloss Enamel

- q. All wood, except as otherwise specifically provided, shall be painted as follows:

Prime Coat: M-32, Deck Paint

Second Coat/Third Coat: M-32, Deck Paint

- r. Handrails and Railing – galvanized

Shop Coat: M-20-1, Rust Inhibitive Undercoat (red)

Finish Coat: M-12, Alkyd Gloss Enamel

- s. Interior concrete ceiling and wall surfaces and masonry walls shall be painted as follows:

Prime Coat: Mercury: Series 5300-Latex Primer/Sealer (new work)

Sherwin Williams: Harmony Primer

Or approved equal

Second Coat/Third Coat:

Mercury: Series 8000-Latex Semi-Gloss Enamel (new work)

PPG: 9-510 Series

Sherwin Williams: Harmony Semi-Gloss

Or approved equal

- t. Gypsum board shall be painted as follows:

Prime Coat: M-3-2

Second Coat/Third Coat:

Mercury: Series 8000-Latex Semi-Gloss Enamel

PPG: 9-510 Series

Sherwin Williams: Harmony Semi-Gloss

Or approved equal.

- u. Safety Yellow

First Coat: M-12, Alkyd Gloss Enamel

- a. Additional requirements for painting are specified in other sections of these Specifications.

3.6 Weatherproofing

- a. The exposed surface of the existing exterior wall of the structure shall be made weathertight by means of the application of two coats of an approved transparent colorless weatherproofing compound. Before the compound is applied, all mortar joints shall be carefully inspected; defective joints to be re-pointed solid so as to be free from holes, cracks, or other defects. The compound shall be applied continuously from the roof downward. All surfaces of the masonry shall be clean and dry before applying the compound and no work shall be done when the temperature is below that recommended by the manufacturer of the compound. At least 12 hours shall elapse between the applications of coats. The weatherproofing compound shall be a solvent solution containing more than 5% silicone, a flash point above 100 degrees Fahrenheit, and meet the requirements of the Fed. Spec. SS-W-110C.

Two Coats: Seal Krete Waterproofer, Acrylic Primer

3.7 ANTI-GRAFFITI PAINT - (*Designer to determine if this is applicable to the Project*)

- b. Graffiti shall be removed from the lower portion of exterior walls with an approved graffiti remover and the surface shall be painted with an approved anti graffiti paint, as indicated on Contract Drawings and as directed by the Engineer.

Prime Coat: Mercury: Mermas 200 CW Epoxy
Or approved equal

Second Coat/Third Coat: Anti-Graffiti Urethane, approved by the Engineer

3.8 Epoxy Paint

- a. Where epoxy paint is called for on the Contract Drawings, the Contractor shall proceed as follows: All exposed floor, ceiling and wall surfaces of rooms or as indicated on Contract Drawings, shall have all existing surfaces prepared and cleaned in full conformity with paragraph 3.1. Clean all surfaces of piping and related equipment furnished and installed under this Contract in full conformity with Paragraph 3.1.
Provide temporary portable heating/cooling equipment to maintain air temperature between 50 and 90 degrees F. Provide temporary portable dehumidifying equipment to maintain a 50 percent relative humidity or less. The surface temperature shall be maintained at least 5 degrees F above the air temperature dew point. Brush paint all surfaces, piping and related equipment (except where otherwise specified) as follows:

1. Walls and Ceiling:

First Coat: M-35 Epoxy Mastic Coating

Second Coat: M-35 Epoxy Mastic Coating

2. Floor:

a) Light Duty-Foot and Light Vehicular Traffic

Two Coats: Mercury: Series Zoom Sure Grip 100% Acrylic Floor Coating

PPG: 98 Line

Sherwin Williams: Con-Lux Floor Plex 7100 Series

Or approved equal

b) Heavy Duty-Heavy Vehicular Traffic

Prime Coat: Mercury: Series 900A Merc-Tex Water Based Epoxy

Sherwin Williams: Armorseal water-Based Epoxy Primer

Or approved equal

Second Coat: Mercury: Series 900B Merc-Tex Water Based Epoxy Finish

Sherwin Williams: Armorseal 650 SL/RC @ 10-20 mils dft

Or approved equal

- b. The prime and finish coats shall be applied in accordance with the paint manufacturer's technical data bulletins, recommendations and all Material Safety Data Sheets (MSDS).
- c. Final coat of epoxy floor paint to receive a non-slip aggregate as approved by the Engineer.
- d. All of the work set forth above also includes approved equals.

3.9 Cleaning and Disposal Procedures

- a. The Contractor shall clean areas affected by painting of all debris and dirt, including scraping of loose dirt as required to the satisfaction of the Engineer.

- b. All rollers, paint brushes, rags, etc. that are saturated with oil based paint or solvent which is ignitable (i.e. flash point less than 140 deg. F.) shall be collected in a drum and disposed of as hazardous waste. The drum shall remain closed at all times, except when being filled.

Submittal Approvals

Item No.	Paragraph No.	Submittal	Approval By (Engineer or Designer)
1			Engineer
2			Engineer
3	1.5, a.	Product specifications and data to prove compliance with requirements specified.	Engineer
4	1.5, b.	Manufacturer's certification that paints are compatible with surfaces applied.	Engineer
5	1.5, d.	Material Safety Data Sheets (MSDS)	Engineer

Notes:

1. This table does not include approvals for “or-equal” proposals. Approvals for “or-equal” proposals are covered in Information for Bidders, Paragraph 9 and Specification Section 1B, Paragraph 1.38.

Specification Section 9A – Painting

1.0. GENERAL REQUIREMENTS.

1.1. Scope of Work.

- a. Furnish all labor, materials, tools and equipment, and perform all operations necessary for a Sprayed Fireproofing Work as specified.
- b. Sprayed Fire – Resistive Materials is herein abbreviated as SFRM.
- c. **The contractor shall provide fireproofing in steel in any depot even when there is no steel work required.**

1.2. Related Work.

- a. Structural Steel shall be as specified in Section 5A
- b. Painting shall be as specified in Section 9A.

1.3. Applicable Codes, Standards and Specifications

- a. American Society of Testing and Materials (ASTM)

<u>DESIGNATION</u>	<u>DESCRIPTION</u>
ASTM E84	Test Method for Surface Burning Characteristics of Building Materials.
ASTM E119	Test Method for Fire Tests of Building Construction and Materials.
ASTM E605	Test Method for Thickness and Density of SFRM Applied to Structural Members.
ASTM E736	Test Method for Cohesion/Adhesion of SFRM Applied to Structural Members.
ASTM E759	Test Method for Effect of Deflection of SFRM Applied to Structural Members.
ASTM E760	Test Method for Effect of Impact on the Bonding of SFRM Applied to Structural Members.
ASTM E761	Test Method for Compressive Strength of SFRM Applied to Structural Members.
ASTM E859	Test Method for Air Erosion of SFRM Applied to Structural Members.
ASTM E937	Test Method for Corrosion of Steel by SFRM Applied to Structural Members.
ASTM E1513	Standard Practice for Application of SFRM.

1.4. Testing and Acceptance

- a. The sprayed fire-resistive material (SFRM) shall be tested for the following properties and shall meet the acceptance criteria as stated:
 - 1) Deflection: When tested in accordance with ASTM E759, the SFRM shall not crack or delaminate when the non-concrete topped galvanized deck to which it is applied is subjected to a one time vertical center load resulting in a downward deflection of 1/120th of the span.
 - 2) Bond Impact: When tested in accordance with ASTM E760, the SFRM shall not crack or delaminate from the concrete topped galvanized deck to which it is applied.
 - 3) Cohesion/Adhesion: When tested in accordance with ASTM E736, the SFRM applied over uncoated or galvanized steel shall have average bond strength of 150 psf.
 - 4) Air Erosion: When tested in accordance with ASTM E859, the SFRM shall not be subject to losses from the finish application greater than 0.025 grams per sq. ft.
 - 5) Compressive Strength: When tested in accordance with ASTM E761, the SFRM shall not deform more than 10 percent when subjected to a crushing force of 750 psf.
 - 6) Corrosion Resistance: When tested in accordance with ASTM E937, the SFRM shall not promote corrosion of steel.
 - 7) Non-combustibility: When tested in accordance with ASTM E136, the SFRM shall be noncombustible.
 - 8) Surface Burning Characteristics: When tested in accordance with ASTM E84, the SFRM shall exhibit the following surface burning characteristics: Flame Spread...0, Smoke developed...0
 - 9) Density: When tested in accordance with ASTM E605, the SFRM shall meet the minimum individual and average density values as listed in the appropriate UL/ULC design or as required by the authority having jurisdiction, or shall have a minimum average of 15 pcf.
 - 10) The SFRM shall have been tested and reported by Underwrites Laboratories, Inc. (UL) in accordance with the procedures of UL 263 (ASTM E119).

1.5 Submittals.

- a. The submittals required for the Engineer's/Designer's approval shall be as set forth in the Specifications and may also be indicated in the submittal table at the end of this section for the Contractor's convenience. Other items and/or submittals required to indicate conformance with the Contract Documents shall be available for Engineer's inspection.

2.0. MATERIALS.

2.1. Materials.

- a. The sprayed fireproofing materials shall be CAFCO product as manufactured by the Isolatak or approved equal. All manufactured material shall be delivered in original, unopened packages bearing the name of the manufacturer, the brand, and the UL label.
- b. Water shall be clean, fresh, potable water free from such amounts of mineral or organic substance as would affect the set of the fireproofing materials.
- c. SFRM shall be free of all forms of asbestos, including actinolite, amosite, anthophyllite, chrysotile, crocidolite and tremolite. Material manufacturer shall provide certification of such.

3.0. CONSTRUCTION METHODS.

3.1. Installation.

- a. The materials shall be kept dry until ready to use. The packages of materials shall be kept off the ground, under cover, and away from sweating walls and other damp surfaces. Material that has been exposed to water before actual use shall be discarded.
- b. The thickness of the SFRM shall be in accordance with the manufacturer's recommendation to meet the NYS Building Code specified Fire Rating requirement and the Code Analysis provided in the Architectural Contract documents. Thickness shall be controlled by utilizing a workable gauge to meet minimum specified thickness.
- c. Application of SFRM shall be in accordance with the manufacturer's recommendations. Work shall be performed by a firm with demonstrated expertise in the installation of SFRM. This firm shall be licensed or otherwise approved by the manufacturer of the fire resistive material.
- d. All surfaces to which sprayed fireproofing is applied shall be free of oil, grease, dirt, loose paint, mill scale or any other matter which would impair bonding. These surfaces shall not be painted or primed. However if painted or primed surfaces are encountered in the field and are to be fireproofed the manufacturer of the SFRM should be contacted and his recommended procedures shall be followed. Painted steel surfaces may require a test application of the SFRM to determine that the paint formulation will not impair adhesion.
- e. When the prevailing outdoor temperature at the site is less than 40 degrees F, a 40 degrees F temperature within the building, including steel surfaces, shall be maintained for 24 hours before and after application of SFRM. The Contractor shall arrange for ventilation to properly dry the fireproofing during and subsequent to its application by use of temporary circulators, exhaust fan or other suitable methods. Ventilation shall not be less than 4 complete air exchanges per hour until the SFRM is fully cured. Additional exchanges may be required if spraying in enclosed areas such as stair wells, small rooms, shafts and basements.
- f. After the completion of fireproofing Work, all equipment shall be removed and all exposed wall and floor areas shall be cleaned of deposits of the SFRM. Clips, hangers, supports, sleeves and other attachments to the substrate are to be in place prior to the application of the SFRM.

However the ducts, piping, conduit or other suspended equipment shall not be installed until the application of the SFRM.

- h. SFRM shall not be applied on the underside of a steel deck prior to completion of the concrete work on the deck.
- i. When roof traffic is anticipated, as in case of periodic maintenance, roofing pavers shall be installed as walkways to distribute the loads. No SFRM shall be applied to the underside of a roof deck prior to completion of the roof mounted equipment and until the construction roof traffic has ceased.

Submittal Approvals

Item No.	Paragraph No.	Submittal	Approval By (Engineer or Designer)
1		None	
2			
3			
4			
5			
6			
7			
8			
9			

Notes:

1. This table does not include approvals for “or-equal” proposals. Approvals for “or-equal” proposals are covered in Information for Bidders, Paragraph 9 and Specification Section 1B, Paragraph 1.38.

1.0 GENERAL

- 1.1. The Contractor shall furnish all labor, materials, tools, equipment, and perform all Work necessary for and incidental to the removal of lead containing materials and waste in accordance with all federal, state, and local regulations.
- 1.2. All Steel contracts shall follow the procedure as listed in this Section. Contractor will verify that all material suspected to be lead is tested and removed in compliance with testing and removal procedure.
- 1.3. Payment to Contractor shall be pending approval and sent out as per the project schedule. Contractor to review Project schedule for stages of completion and examine accordingly.

2.0 PRODUCTS

- 2.1. All power tools used to remove/disturb paint or other lead containing materials shall be supplied with manufactured-equipped shrouds and HEPA vacuum attachments
- 2.2. Containers: Containers acceptable for storage of hazardous waste. Containers must meet the requirements set forth at 40 CFR Parts 260-264, 6NYCRR Parts 370-373 and 49 CFR Parts 171-178.
- 2.3. Labels: Provide for handling, transportation, and disposal of hazardous waste as required by 40 CFR Part 172.

3.0 EXECUTION

3.1. Codes and Standards

The Contractor shall comply with the latest requirements in effect at the time of the Work, including but not limited to the following:

- a. Occupational Safety and Health Administration (OSHA)
 1. 29 CFR Part 1926.62 Lead
- b. United States Environmental Protection Agency (USEPA)
 1. 40 CFR Parts 262-270 – Hazardous Waste Regulations
- c. United States Environmental Protection Agency (USEPA)
 1. 49 CFR Parts 171-180 – Hazardous Materials Regulations
- d. New York State Department of Environmental Conservation (NYSDEC)
 1. NYSDEC – 6 NYCRR Part 364 – Waste Transporter Permit
 2. NYSDEC – 6 NYCRR Part 370 – 373 – Hazardous Waste Management
 3. NYSDEC – 6 NYCRR Part 376 – Land Disposal Restrictions
- e. New York City Department of Environmental Protection (NYCDEP) Regulations
 1. Title 15 of the RCNY – Chapter 19 – Use of Public Sewers

Specification Section 12L – Removal/Disturbance and Disposal of Lead Containing Materials

2. NYC DEP Groundwater Discharge to Sanitary or Combined Sewer – Table A – Limitations for Effluent to Sanitary or Combined Sewers
 3. <https://www1.nyc.gov/assets/dep/downloads/pdf/about/water-and-sewer-forms/dewatering-wastewater-quality-control-application-for-discharges-over-10000-gallons-per-day.pdf>
- f. New York State Department of Health (NYSDOH)
1. Environmental Laboratory Approval Program (ELAP)
- g. Industry Standards and Codes
1. The Society for Protective Coatings (SSPC) – Technology Guide No. 6 – Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
 2. SSPC – C3 Initial Lead / Hazardous Coating Removal and C5 Lead / Hazardous Coating Removal Refresher

3.2. Submittals

- a. Lead Disturbance Placard Package (see Paragraph 3.3)
- b. Weekly inspection reports of Storage Areas (see Specification 12W Waste Handling and Removal)
- c. Employee Exposure Assessment Results (see Paragraph 3.4q)
- d. Laboratory analysis of lead content in paint (see Paragraph 3.4.p) - performed by the MTA
- e. Waste testing results (see Paragraph 3.4.v) - performed by the MTA
- f. NYCDEP Written Authorization to Discharge Wastewater in City Sewer System (see Specification 12W)
- g. Manifests (see Specification 12W)
- h. Certificate of Disposal (see Specification 12W)

3.3. Lead Disturbance Placard Package

- a. Prepare and submit a Lead Disturbance Placard Package at least 30 days prior to the start the start of Work activities that disturb lead.
- b. The Lead Disturbance Placard Package shall include the following:
 1. Written site/task specific work plans (SSWPs) for each subcontractor performing lead disturbance Work, describing the methods and procedures for the removal/disturbance and disposal of all lead-containing materials. Address control measures to prevent the release of lead-containing materials outside of the Work Site. Specify the location of the temporary storage area where the Contractor plans to store the waste while it is being accumulated.
 2. A schedule, including dates and times, of when the lead paint removal/disturbance activities will take place.
 3. Written Lead Health and Safety Plan (LHASP), pursuant to 29 CFR 1926.62(e)(2),

Specification Section 12L – Removal/Disturbance and Disposal of Lead Containing Materials

4. Written OSHA personal air monitoring program in compliance with 29 CFR 1926.62(d).
 5. Written Emergency Response and Contingency Plan in compliance with 6NYCRR Part 373-3.4 and Specification 12W.
 6. Waste Management Plan (see Specification 12W)
 7. Documentation that all employees involved with removal/disturbance of lead containing materials have completed training required by 29 CFR 1926.62.
 8. Documentation that all employees have completed, hazardous waste training for all workers involved with the handling of hazardous wastes generated on the Project in accordance with 6 NYCRR 373 – 3.2(g).
 9. Reporting structure for all Contractor and all Subcontractor personnel who will be involved with lead paint removal/disturbance activities. include office and cellular telephone numbers of the owners, project managers, and site supervisors for each company.
 10. SDS and PDS for chemical strippers, encapsulating agents, and/or any other chemicals to be used as part of the lead paint removal/disturbance Work. These products shall be approved by the Project CEO prior to their use.
 11. A letter from the transporting company listing the states it will be traveling through to the TSD Facility and a Valid Hazardous Waste Haulers Permit for each state. The letter must include a statement that the transporting company is authorized by the regulatory agency issuing the permit to transport hazardous waste to the TSD Facility selected by the Contractor
 12. Valid Hazardous Waste TSD Facility Permits and letter from the TSD stating it is authorized to accept the hazardous wastes generated, has the capacity to accept such hazardous wastes, and will ensure the ultimate disposal method is followed.
 13. A draft copy of a Land Disposal Restriction Form (LDR) from the TSD facility.
 14. Valid Testing Laboratory Certification – NYSDOH Environmental Laboratory Approval Program (ELAP) - performed by the MTA.
- c. Upon approval of the Lead Disturbance Placard Package, the Project CEO will provide an original signed permit placard for disturbance and disposal of lead-containing materials issued by NYCT – Office of System Safety (OSS) for the Contractor to post at the Work Site.
1. Do not perform any removal/disturbance and disposal activities without this signed placard prominently posted at the Work Site.
 2. Cease all activities involving the removal/disturbance of lead-containing upon expiration of the placard.
 3. Do not resume Work until a request for a placard extension has been approved by MTA C&D.
 4. For drilling through a painted surface, the Contractor shall follow all requirements of this Specification, however, NYCT-OSS will not issue a permit placard for this activity.

5.

3.4. General Requirements

- a. The Contractor shall utilize removal methods and containment systems that will eliminate or minimize the risk of worker and community exposure to lead dust/debris generated during preparation for painting or any other construction activity that causes surfaces which may contain lead to be disturbed.
- b. The Contractor shall consider all painted surfaces, metal-sheathed cables, and ceramic tiles to be lead containing, and shall treat any disturbance to these as a potential lead hazard. In addition, paint might contain arsenic, barium, cadmium, chromium, mercury, selenium, silver and PCBs.
- c. The Contractor shall ensure that all fugitive dust, debris, and/or paint chips resulting from manual wet scaping, power tool cleaning, chemical stripping, demolition, rivet busting, torch cutting, open flame burning or welding, saw cutting, bolting/unbolting, drilling, scarification or cable splicing activities are properly collected and disposed of.
- d. The Contractor shall capture all debris and paint chips that may extend beyond the boundaries of the Work Site resulting from its Work.
- e. The Contractor and all its Subcontractors shall possess all permits and/or licenses required under the Toxic Substance Control Act (TSCA), the Resource Conservation and Recovery Act (RCRA), as well as any other permits required by federal, state or local regulations, for the removal, repackaging, transportation and disposal of lead containing materials.
- f. The Contractor shall have a Competent Person who has extensive training (i.e., at a minimum C3/C5 SSPC certified and refreshed on an annual basis) and experience in identifying occupational hazards associated with the removal/disturbance of lead containing materials, onsite at all times when lead removal or disturbance Work performed.
- g. The Contractor shall ensure that all its employees, including those of its Subcontractors, are trained and experienced to prepare, remove, and dispose of the lead-containing materials. All employees shall be knowledgeable in the pertinent environmental regulations and in personal protection and other safety procedures.
- h. The Contractor shall follow the procedures for paint removal issued by SSPC in its Technology Guide No. 6. "Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations on." (2015) and the requirements of this Specification. Table 1 details the required minimum containment systems for lead disturbance and removal activities. The material that will make up the containment shall be fire retardant, water impermeable and air impenetrable. Chemical resistant containment material shall be used if chemical strippers are utilized.

**TABLE 1 - Typical Lead Disturbance/Removal Activities and
Containment Requirements**

Lead Paint Removal/Disturbance Activity	Minimum Containment Requirements
Application of Encapsulant	Class 3C* (See Note)
Manual Wet Scraping	Class 3P
Power Tools with shroud and HEPA Vacuum attachment	Class 3P
Chemical Strippers	Class 3C
Demolition of painted surface (steel, concrete, wallboard, plaster, ceramic tiles)	Class 3P
Rivet Busting	Class 3P
Torch Cutting, Open Flame Burning or Welding (visible paint must be removed 6 inches from cut line on both sides of steel prior to hot work operation)	Fire Retardant Ground Tarp
Saw Cutting (tape & cut method)	Class 3P* (See Note)
Bolting/Unbolting	Class 3P* (See Note)
Drilling	Fire Retardant Ground Tarp
Scarification (including tiles)	Class 3P
Cable Splicing/Soldering/Cutting/Removal	Class 3P

*Note: For saw cutting (tape and cut), bolting/unbolting, and encapsulation application, the Contractor may request approval to downgrade the containment system identified in Table 1 to a horizontal barrier consisting of ground covers and caution tape, if it observes and documents that these activities generate minimal amounts of paint chips and debris. Do not downgrade the containment without approval in writing from the Project CEO. The Project CEO may require the Contractor to reinstall the initial containment if conditions change and result in excessive paint chips and debris generated after approval is issued.

- i. The Contractor shall post warning signs at each entry point to the Work Site that comply with 29 CFR 1926.62(m)(1)(i).
- j. Clean the Work Site using a vacuum equipped with HEPA filters. Only use a “wet-sweeping” technique, which involves the thorough wetting of the lead debris prior to sweeping, where vacuuming has been tried and found not to be effective. **DRY SWEEPING IS STRICTLY PROHIBITED.**
- k. Prior to the start of any disturbance of lead containing material, the Contractor shall clean the Work Site of all visible signs of paint chips and/or other lead contaminated material.

Specification Section 12L – Removal/Disturbance and Disposal of Lead Containing Materials

- i. For Work on elevated structures, the Contractor shall clean the area directly below and adjacent to the Work Site prior to the start of Work. The area below the structure includes but is not limited to streets, sidewalks, and parks.
- m. On any structure where torch cutting, open flame burning, welding, lancing, or other operations where high temperatures are required and which may cause lead particulate releases, the Contractor shall only perform Work after all visible paint has been removed from all sides of the structure down to the substrate surface for a minimum of six (6) inches on all sides of the cut line.
- n. Prior to rivet busting, the Contractor shall remove all visible paint from the area on and around the rivets or shall apply a lead encapsulating agent to the contact surface.
- o. Activities which require paint to be removed prior to operations will also require specific containment as per this Specification when performing those activities.
- p. Painted surfaces of new steel that will be disturbed by construction activities shall be considered lead containing and treated as potential lead hazard to workers in accordance with 29 CFR 1926.62 Lead Exposure in Construction and this Specification unless the Contractor can show through written confirmation from the paint manufacture that the paint contains no lead or through testing and analysis that shows no detectable level of lead in the paint. Laboratory analysis shall be performed utilizing the Inductively Coupled Plasma Atomic Emission Spectrometry (ICP-AES) method. Laboratory analysis results shall be submitted to the Project CEO.
- q. The Contractor and all its Subcontractors shall perform employee exposure assessments in accordance with OSHA 29 CFR 1926.62 (d) for lead disturbance activities for the Contract and submit the exposure assessment to the Project CEO for review within 5 days after receipt of results. The air samples shall be analyzed by the MTA that has a current NYSDOH – ELAP Certification for the analysis of LEAD. The exposure assessment shall include the following: description and location of Work activities, type of removal tools utilized, the type of substrate from which paint was disturbed (concrete, steel, etc.), laboratory chain of custody, laboratory results, 8 Hour TWA calculations.
- r. The Contractor and its Subcontractors' shall make available employee respiratory fit testing results, depersonalized medical records and blood testing results, and other criteria related to worker lead exposure upon request.
- s. The Contractor shall ensure that all paint chips that are dislodged from any surface, including adjacent surfaces, within or beyond the Work Site, due to any construction, rehabilitation, demolition or improvement activities, are properly contained, collected and stored in accordance with this Specification.
- t. The Contractor shall clean the Work Site periodically during each Work shift and at the end of each Work Day to prevent excessive buildup of lead-containing debris.
- u. Storage shall be in accordance with Specification 12W. The Contractor shall segregate the waste generated from the Project using separate storage containers for each of the following wastes:
 - 1. lead paint chips/debris,
 - 2. protective clothing,

Specification Section 12L – Removal/Disturbance and Disposal of Lead Containing Materials

3. containment material,
 4. wastewater from personal hygiene and removal activities,
 5. spent solvents,
 6. used brushes/rollers and rags
- v. Waste Testing
1. Paint chips/debris are designated as hazardous waste for lead.
 2. All drums that hold lead paint chips/debris, containment material and protective clothing shall be sampled, shipped with tracking number to, and tested by the MTA certified by NYSDOH ELAP to determine if the material is to be transported and disposed of as Hazardous Waste. The sampling shall be performed on MTA property. The waste shall be tested for the following parameters:
 - i. Containment Material and protective clothing shall be tested for RCRA metals using the Toxicity Characteristic Leaching Procedure (TCLP) and PCBs using EPA Method 8082A
 - ii. Lead Paint Chips/Debris shall be tested for PCBs using EPA Method 8082A

Do not combine samples from multiple drums into one sample for testing purposes. Sample and test each drum separately.
 3. Spent solvent and used brushes/rollers and rags saturated with paints that have flash points less than 140°F shall be disposed of as hazardous waste.
 4. Prior to disposal of the containment material and disposable protective work clothing, the MTA shall produce the certified lab analysis for each of these waste streams to the Project CEO for determination as to whether this material is to be transported and disposed of as Hazardous Waste.
 5. MTA to receive sample via tracked delivery to Test wastewater for total RCRA metals first. If results are below the level, listed in Table 1 of 6NYCRR 371.3, that classifies the wastewater as hazardous, then no further testing is required. If results are equal to or greater than the threshold levels that classify a waste as hazardous, then perform TCLP testing.
- w. Waste metal components, which have lead-based coatings, shall be recycled as scrap metal. The Contractor shall inform the scrap metal recyclers in writing that they will be receiving non-hazardous metal waste coated with lead paint and obtain written approval from the scrap metal recycler. The Contractor shall submit a copy of its letter and the approval letter, as well as a copy of the recycler's operating permit, to the Project CEO.
- x. Non-metal construction materials and ceramic tiles to be removed and disposed of with lead containing paint still attached, shall be considered non-hazardous construction and demolition debris.
- y. Recycle metal sheath covering for cables shall be recycled as scrap metal or discard as construction and demolition debris. Recycling shall be the preferred method of waste management for cables.

*Specification Section 12L – Removal/Disturbance and Disposal of Lead Containing
Materials*

- z. If TCLP test results for containment material and disposable protective work clothing show classification as non-hazardous, they shall be disposed of as construction and demolition debris.
- aa. The storage, transportation and disposal of the lead waste shall be in accordance with Specification 12W.