GUIDE TECHNICAL SPECIFICATIONS

FOR CONSTRUCTION OF

FIELD SERVICE CENTER ROOF REPLACEMENT

PROJECT NO. 7018000058

ON BEHALF OF

METRO

METROPOLITAN TRANSIT AUTHORITY OF HARRIS COUNTY, TEXAS

CIVILTECH ENGINEERING, INC. REGISTRATION NO. F-382 FOR STRUCTURAL DESIGN

SMITH & COMPANY ARCHITECTS FOR ARCHITECTURAL DESIGN

JONES ENGINEERS, L.P. REGISTRATION NO. F-3811 FOR MECHANICAL DESIGN

PREPARED BY:

CivilTech Engineering, Inc.

JUNE 2019

Metropolitan Transit Authority / Standard Specification
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SECTION 01010
SUMMARY OF WORK

PART 1 - GENERAL

1.01 DESCRIPTION

A. Location

The METRO Field Service Center (FSC) is located at 1215 Labco St, Houston, TX 77029 as shown below:

B. General

The Scope of Work for this Project shall consist of providing all supplies, support services, data, labor, tools, materials, equipment, supervision, construction and all else required to prepare the site and construct the new roof at the METRO Field Service Center.
C. Project Scope

- The Work shall include, but not be limited to, the following major items, to the extent specified and indicated:
  - Provide administration and construction support services to complete work.
  - Coordination with utility owners, governing agencies, and other contractors.
  - The existing roofing will have to be demolished and replaced with new roofing.
  - The recommended roof assembly uplift ratings are 1-90 field, 1-135 edges and 1-180 corners. These ratings are based on the information above as well as a 27 ft. eave height, partially enclosed building (due to inadequately rated dock doors) and building importance factor of 1.15. The strip width for the building should be 11 feet.
  - Based on recent field verification, the existing roofing has found to have reached the end of its effective service life. Core samples indicate wetting of the plywood substrate and asphalt built-up roof membrane. The roof to be replaced measures 65,609 sft. The recovery project will also include new overflow drains and repairs to the steel deck and replacement of deteriorated wood nailers, as required. The existing roof components will be removed down to the steel roof deck, and the selected roof assembly will be constructed as follows:
    - One layer of mechanically attached R-25 polyisocyanurate roof board
    - One layer of ½ in. cement fiber board
    - Three plies of fiberglass felt and asphalt built-up roof membrane
    - One layer of cool-roof rated SBS modified asphalt membrane
  - There are approximately 16 roof top units (RTU) providing air conditioning to the building. The RTUs secured to roof curbs are tied to the existing roofs with approximately 4 (four) tie downs. There is a gas line connected to the RTU as shown below:
The proposed roofing need to continue up to the roof curbs. As part of the roofing demo work, the tie downs will have to be taken out. After roofing work is complete, new tie downs will have to be attached. Some portion of the gas line (approximately 4 to 5 feet) may need to be replaced if found to be non-usable.

The Contractor shall review, field verify, and confirm all existing conditions (to include but not limited to: stated dimensions, drawings, layouts, etc.) prior to performing this work. The Contractor shall also comply with all applicable METRO Specifications as stated in METRO’s Facility Upgrade Project Standard Specifications Volumes 1 and 2 dated August 31, 2001.

All work shall comply with the requirements of this document including national specification and standards, City of Houston Building, Plumbing, Electrical, Mechanical and Fire Codes, state and local government authority codes, regulations, and specifications.
• In case of conflicts or discrepancies between States, National, City and local standards, local requirements shall govern unless otherwise directed in writing. All conflicts shall be brought to the attention of METRO PM in writing for resolution.

• The Contractor shall submit manufacturer’s specification, detailed construction schedule and phasing plans to METRO’s Project Manager for review and approval prior to beginning of the work.

• The Contractor is to coordinate with METRO’s Project Manager for construction vehicle access and related personnel activities within the facility.

• The Contractor shall comply with all METRO and OSHA safety requirements and shall be fully responsible for any and all occurrence or accidents due to his work.

• The Contractor shall coordinate his work to minimize disruptions to METRO’s operations and as directed by METRO. The normal hours for this facility are 7:00 am to 5:00 pm (Monday thru Friday). Any necessary after hour / weekend work shall be scheduled with Project Manager 48 hours in advance.

• The Bid Documents have the engineer’s sealed set of plans & specs (Appendix A & B).

• It will be the responsibility of the selected Contractor to schedule necessary city inspections and obtain City of Houston final approval for all work associated with the rehabilitation of the fire alarm and fire on systems.

• The Contractor shall submit a site specific safety plan to METRO’s Project Manager for approval prior to beginning of work. The Contractor shall safely haul and legally dispose of all removed material from the site, and follow all safety and environmental codes and regulatory requirements for this work.

• Space will be assigned to the Contractor for staging and placing of equipment during the construction. The Contractor shall barricade this area and maintain it in a neat, clean and orderly fashion always.

• A daily sweeping and cleaning initiative will be required to keep the transit center in an operable condition.

• Prior to bidding, The Contractor shall visit the facility, review and verify each site field condition; and shall validate all existing fire alarm and fire suppression systems condition, information, dimensions and layout on drawings as applicable. METRO highly recommends that the Contractor attends the original site visit to be scheduled. METRO will arrange an alternate site visit if requested by the Contractor in writing.

• All work should comply with the requirements of this document including; all national specification and standards, NFPA 70, NEC, COH building, plumbing, electrical, mechanical and fire codes, state and local government authority codes, regulations, and specifications.
• The Contractor will be required to conduct weekly progress meetings with all operations personnel. These meetings will consist of safety review and a two week look ahead for progress.

• The Contractor will be responsible for leading weekly progress meetings and distributing progress meeting minutes to METRO personnel.

• The Contractor shall provide a containment system as required, around the perimeter of the work. The containment system must be enough in size and nature to ensure personnel safety.

• The Contractor will be held responsible for any damages associated with the work performed.

• Contractor will supply METRO Project Manager with all O&M Manuals and a written Preventative Maintenance Program.

• Upon the completion of the project the Contractor will submit a written letter of warranty to the METRO Project Manager. Warranty period of performance for workmanship must be a minimum of 12 months from the date of final acceptance.

• The Contractor shall produce redline of as-built drawings. The engineer of record shall produce CADD as-built/record drawings from that.

• The overall period of performance for the project is up to 150 calendar days.

• If there are security related issues during construction, the contractor is recommended to file a report immediately to METRO Police @ 713-224-COPS

• METRO will pay the permit fee at cost. Include pricing in the bid.

• METRO will pay for bonds (bid/payment & performance) at cost. Include pricing in the bid.
1.02 QUALITY ASSURANCE

A. The Work shall comply with the requirements of the Contract Documents including cited national specifications and standards; state and local government authority codes, regulation, and specifications.

B. In case of conflicts or discrepancies between cited national and local standards, local requirements shall govern unless otherwise directed in writing. All conflicts shall be brought to the attention of METRO in writing for resolution.

1.03 OTHER REQUIREMENTS

A. A CPM for the Project shall be submitted in accordance with Section 01311 - CPM Schedule of these specifications.

B. Except as otherwise specified or indicated, the following shall be provided as part of the Project:

1. Labor, management, and superintendence as required to complete the work.

2. Construction supplies, equipment, products, tools, machinery, materials, and all appurtenances necessary to execute and complete the Work of the Contract.


4. Other facilities and services as necessary to execute and complete the Work of the Contract.

5. All governmental permits, licenses and fees required for execution and completion of the Work, in the Contractor's name.

C. The City of Houston and any affected utility owner shall be notified not less than 14 days prior to starting work in an area in which a utility may be located. Notices shall be in writing. An affected utility owner and METRO shall be notified 72 hours prior to commencing construction operations.

D. The Contractor shall prosecute the Work as indicated, in accordance with the Contract Documents, and in a timely manner so as to ensure coordination of all parts of the Work with work of other parties under adjoining and interfacing contracts, including governmental bodies and utility companies.

E. Proposals for scheduling work at times other than the normal work period of a calendar day shall be submitted to METRO not less than 48 hours in advance of
those times. Such proposals shall outline all special precautions to be taken to control the hazards presented by prosecuting the Work at times other than the normal work period of a calendar day. The proposal shall include supplementary lighting of work areas, availability of medical facilities, security precautions and all other precautions necessary.

F. Construction equipment and vehicles which exceed the weight, size and noise limitations of the authorities having jurisdiction shall not be operated outside the Construction limits of the Site. Refer to Section 01560 - Environmental Impact Controls of these Specifications.

1.04 DEFINITIONS

A. CONSTRUCTION DRAWINGS: All professional design drawings, exclusive of Shop Drawings, prepared for parts of the Work not indicated on METRO-furnished Drawings. Construction Drawings become part of the Contract Drawings upon written approval of that Drawing by METRO.

B. CONTRACT DOCUMENTS: Documents applicable to and specified to an individual Contract, normally consisting of, but not necessarily limited to, the Agreement or Contract, Standard Technical Specifications, Contract Drawings, and errata thereto. Addenda to the Contract Documents issued prior to the Bid date will become part of the Contract Documents. Change orders issued after Contract execution will become part of the Contract Documents.

C. CONSTRUCTION SPECIFICATIONS: Normally consisting of the technical specifications prepared to cover corresponding construction operations, materials, workmanship, and/or service performance required to produce the work.

D. CONTRACT DRAWINGS: The plans, profiles, cross-sections, elevations, schedules and details which show locations, character, dimensions and arrangements of the parts of the Work, including, METRO-furnished Drawings, approved Construction Drawings and approved Shop Drawings. Unless otherwise defined, the term Drawings shall mean the Contract Drawings.

E. CONTRACTOR: The individual, firm, partnership, or corporation, or combination thereof, private, municipal, or public, including joint ventures, who, as an independent contractor, has entered into a contract with METRO to carry out the intent of the Contract Documents.

F. DAYS: Whenever used in the Contract Documents, "days" means calendar days.

G. ENGINEER: For definition refer to Article 1, Definitions of the Proposed Contract, of the Invitation for Bid.

H. FURNISH: Except as otherwise defined, term "furnish" is used to mean supply and
SECTION 01040

PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the minimum administrative and supervisory requirements necessary for integration and coordination of work on Project including, but not limited to, the following:

1. Project Meetings
2. Outside Agencies
3. Quantity Measurements
4. Special Reports
5. Conservation and Salvage

B. Work Included: To enable orderly review during progress of the work and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.

C. Related Work

1. Documents affecting work of this Section include, but are not necessarily limited to, Contract Articles, Drawings and Technical Specifications.

2. The Contractor's relations with his subcontractors and materials suppliers, and discussions relative thereto, are the Contractor's responsibility and normally are not part of project meetings content.

1.02 QUALITY ASSURANCE

A. For those persons designated by the Contractor to attend and participate in project meetings, provide required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.03 SUBMITTALS

A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:
1. Agenda Items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding items to be added to the agenda.

2. Minutes: The Engineer will compile minutes of each project meeting, and will furnish one copy to the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - MEETINGS

3.01 MEETING SCHEDULE

A. Except as noted below for Pre-construction Meeting, project meetings shall be called throughout the progress of the work as deemed necessary by the Engineers.

B. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.02 MEETING LOCATION

A. The Engineer will establish meeting location. To the maximum extent practicable, meetings will be held at the job site.

3.03 PRE-CONSTRUCTION MEETING

A. Pre-construction Meeting will be scheduled by METRO prior to the Notice to Proceed.

1. Provide attendance by authorized representatives of the Contractor and major subcontractors.

2. The Engineer will advise other interested parties.

B. Minimum Agenda: Data will be distributed and discussed on at least the following items:

1. Organizational arrangement of Contractor's forces and personnel, and those of subcontractors and materials suppliers.

2. Channels and procedures for communication.

3. Construction schedule, including sequence of critical work.
4. Contract Documents, including distribution of required copies of original Documents and revisions.

5. Processing of Shop Drawing and other data submitted for review.

6. Processing of Change Orders, Bulletins, and field decisions.

7. Rules and regulations governing performance of the work.


9. Other contracted related items such as conflicts/compatibility problems, weather limitations, manufacturer recommendations, acceptance of substrates/adjoining work, temporary facilities, space and access limitations, governing regulations and inspection/testing requirements.

3.04 PROJECT MEETINGS

A. Attendance

1. The Contractor's Project Manager and/or Superintendent shall represent the Contractor at all project meetings throughout progress of the work.

2. Subcontractors, materials, suppliers, and others may be invited to attend those project meetings in which their aspect of the work is involved.

B. Minimum Agenda

1. Review, revise as necessary, and approve minutes of previous meetings.

2. Review progress of the work since last meeting, including status of submittals for approval.

3. Identify problems which impede planned progress.

4. Develop corrective measures and procedures to regain planned schedule.

5. Complete other current business.
C. Revisions to Minutes

1. Unless published minutes are challenged in writing prior to the next regularly scheduled progress meeting, they will be accepted as properly stating the activities and decisions of the meeting.

2. Persons challenging published minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes three working days prior to next regularly scheduled meeting.

3. Challenge to minutes shall be settled as priority portion of "old business" at the next regularly scheduled meeting.

PART 4 - OUTSIDE AGENCIES

4.01 Contractor shall interface with outside agencies as required for Contract conformance. Contractor shall appraise/copy METRO on all correspondence, between Contractor and governing agencies, which is necessary to meet the terms of this Contract.

4.02 Contractor shall coordinate the inspection of work from all outside governing agencies as required.

PART 5 - QUANTITY MEASUREMENTS

5.01 The Contractor shall supply necessary manpower, equipment, and tools to assist METRO representative in the field measurement of Contract pay quantities.

PART 6 - SPECIAL REPORTS

6.01 REPORT TIMING

A. Contractor shall submit special reports directly to METRO within one (1) day of an occurrence on the site. A copy of the report shall also be submitted to the other entities that are affected by the occurrence within one (1) day.

6.02 REPORTING UNUSUAL EVENTS

A. When an event of an unusual, unscheduled, or significant nature occurs at the Site, Contractor shall prepare and submit a special report. Such special report shall list chain of events, and times of occurrence, persons participating, action by Contractor's personnel, an evaluation of the results or effects and similar pertinent information.
6.03 REPORTING ACCIDENTS

A. Contractor shall prepare and submit reports of accidents at Site and anywhere else related work is in progress. Report shall record and document names, dates and actions. For this purpose, "accident" is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury. Reporting shall comply with requirements of OSHA and other local authorities having jurisdiction.

PART 7 - CONSERVATION AND SALVAGE

7.01 GENERAL

A. During supervision and administration of the work, construction operations shall be carried out with the maximum possible consideration given to conservation of materials. In addition, maximum consideration shall be given to salvaging materials and equipment involved in performance of the work, but not incorporated therein. Disposition of salvage materials which are METRO’s property shall be as directed in writing by METRO.

END OF SECTION 01040
SECTION 01205

PROJECT TESTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the testing responsibilities and guidelines for the Contractor.

1.02 METRO'S INDEPENDENT TESTING LABORATORY

A. METRO will employ an Independent Testing Laboratory (ITL) to perform testing of materials.

B. The ITL shall not be authorized to revoke, modify, or release any requirement of the Specifications, nor to approve or accept any portion of the Work.

1.03 CONTRACTOR DUTIES

A. Contractor may employ a Testing Laboratory Service (TLS), to ensure Contract Document compliance for areas not covered by METRO's ITL.

B. The Contractor shall fully cooperate with any ITL employed by METRO.

C. Contractor shall provide access for METRO's ITL representative to obtain samples of materials proposed for use and which are required to be tested. Contractor shall cooperate in obtaining material samples for testing. Advise METRO's ITL at least 48 hours in advance to allow for test completion and personnel assignments.

D. Representatives of METRO's ITL shall have access to the Work at all times. The Contractor shall provide for and facilitate such access in order that METRO's ITL may properly perform its functions.

1.04 SPECIAL INSTRUCTIONS

A. Inspections or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

B. When initial tests indicate noncompliance with the Contract Documents, any subsequent retesting occasioned by such noncompliance will be performed by the ITL and the cost thereof borne by the Contractor.
C. The Contractor shall immediately notify METRO in writing, if, at any time during construction, the concrete resulting from the approved mix design proves to be unsatisfactory for any reason. The Contractor's Testing Laboratory Service shall modify the design, subject to written approval, until a satisfactory concrete mix is obtained.

D. If, as determined by the Engineer, concrete of poor quality or workmanship has been placed, additional tests shall be made as directed by the Engineer and at the expense of the Contractor. Tests may be compression test on cored cylinders, ASTM C 42, or load tests as outlined in ACI 318, Section 20.3.

E. The Contractor shall be furnished copies of all test reports by the Engineer. The Contractor may use these reports for his own convenience, but at his own risk.

END OF SECTION 01205
SECTION 01311
CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.01 DESCRIPTION
A. This Section specifies the requirements for the Construction Schedule.

1.02 QUALITY ASSURANCE
A. The scheduling approach shall be either a formal Critical Path Method (CPM) computerized schedule or a progress chart in a bar chart format of suitable scale to indicate appropriately the percentage of Work scheduled for completion by any given date during the construction period.

1.03 SUBMITTALS
A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Within 10 days after the effective date of the Notice to Proceed, five copies of a Schedule showing Contractor's planned operations and his planned general approach to the Work, for METRO review.

2. If the Schedules are not submitted when required, progress payments may be withheld.

PART 2 - PRODUCTS

2.01 CONSTRUCTION SCHEDULE
A. The Construction Schedule, either computer generated CPM or bar chart shall contain the following as a minimum:

1. A list of the different types of work activities or work elements.

2. The start and completion of each work activity.

3. Logical dependencies (ties) indicating what work must be accomplished before other work can begin.
4. The "weighing" or relative worth of each work activity or work element in relation to the total project cost.

2.02 CONSTRUCTION SCHEDULE SUPPORTING DATA

A. Written supporting data such as the proposed number of days per week on which work will be performed, planned number of shifts per day and number of hours per shift shall be furnished with the Construction Schedule. Unusual or unique situations or constraints shall be described.

PART 3 - EXECUTION

3.01 PREPARATION

A. Prior to performing the Work of this Section, the Contractor shall thoroughly study the sequence-of-work, R-O-W availability, utility and other work which interface with this Contract.

B. The Schedule shall be maintained by the Contractor, on a monthly basis, throughout the duration of the Contract, showing the current and forecasted status compared to the original schedule.

3.02 PROGRESS REPORTING AND CHANGES

A. Monthly Site progress meetings shall be held on dates mutually agreed to by METRO and the Contractor. The Contractor’s CPM consultant, if Contractor has engaged such consultant, may be required to attend such progress meeting. Presence of subcontractors during progress meeting is optional, unless specifically required by METRO. Additional meetings may be required by METRO. The Contractor shall have his copies of the Schedule and other data required by this Section, accurately filled in and completed prior to the meeting. Work progress will be reviewed by METRO to verify:

1. Percentage for completed and partially completed activities.

2. Remaining duration required to complete each activity started, or scheduled to start, but not completed.

3. Identification of any problems that have developed or are anticipated in the next reporting period.

B. In addition to the foregoing, the Contractor shall submit a narrative report and an annotated schedule to METRO once each month. The narrative report shall include a description of the amount of progress during the last month in terms of completed
activities, a description of problem areas, current and anticipated delaying factors, estimated impact on performance of other activities and completion dates and an explanation of corrective actions taken or proposed. All proposed changes in activity duration or activity dependence shall be submitted to METRO for review.

C. If, in the opinion of METRO, the Contractor has fallen behind the approved schedule, the Contractor shall take steps necessary to improve his progress, including those that may be required by METRO, without additional cost to METRO. Such METRO requirements may include an increase in the number of shifts, an increase in the number of hours or days of work and/or the amount of construction plant. The Contractor shall submit, for METRO approval, a supplementary schedule demonstrating how the approved rate of progress will be regained.

D. Failure of the Contractor to comply with METRO's requirements under this clause shall be grounds for termination of the Contractor's right to proceed with the work, or any separable part of it, in accordance with the default terms of this Contract.

3.03 REVISIONS TO APPROVED SCHEDULE

A. If Contractor desires to change the approved schedule, METRO shall be notified in writing stating reasons for proposed change. If METRO considers the change to be of a major nature, METRO may require Contractor to revise and submit for approval, at no additional expense to METRO, all of the affected portion of the Construction Schedule to show effect on entire Project. A change may be considered to be of a major nature if either the time estimated to be required for an activity or the sequence of activities is varied to a degree that there is reasonable doubt by METRO that the Contract completion date, or dates, will be met.

END OF SECTION 01311
SECTION 01340

SHOP DRAWINGS, PRODUCT DATA, SAMPLES AND RECORD DOCUMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for preparing and submitting Shop Drawings, product data, samples and Record Documents required by the Contract Documents.

1.02 SHOP DRAWINGS

A. General

Shop Drawings shall be identified by cross references to Contract Drawing numbers and to Technical Provisions Section and page numbers. The maximum size of Shop Drawings shall be 22 in. x 34 in.

B. Changes

Changes in products for which Shop Drawings have been reviewed and approved will not be permitted, unless those changes have been submitted to and approved in writing by METRO, as specified in Section 01630 - Products and Substitutions of these Specifications.

C. Quality Assurance

Shop Drawings shall be prepared to a standard of quality as set forth in the latest revision of DOD-STD-100, Military Standard Engineering Drawing Practices. Drafting quality shall enable microfilming in accordance with applicable standards of the National Microfilm Association.

D. Coordination

Submittals hereunder shall be coordinated with the requirements of Section 1340 - Shop Drawings, Project Data Samples and Record Documents, and Section 01700 - Project Closeout of these Specifications.
1.03 PRODUCT DATA

A. Manufacturer’s standard schematics, drawings, diagrams, details, procedures, instruction, schedules, illustrations, calculations and other descriptive data shall be modified to delete information which is not applicable to the Project and to highlight project-related pertinent information. Dimensions, coordination, clearances, performance characteristics and capacities, interfaces, limitations, precautions, wiring diagrams, inputs, outputs and controls shall be shown.

B. Notarized Certificates of Compliance shall be submitted for those products for which no samples or test results are specified. Notarized Certificates shall demonstrate proof positive of compliance of product with specification requirements and shall be signed by an authorized representative of the manufacturer. One copy of such certificates shall accompany each lot of product delivered to the Site. METRO may refuse the use of certain products where the only basis of compliance is a certificate of Compliance.

C. Part replacement and maintenance data for products shall be as specified in Section 01730 - Operating and Maintenance Data of these Specifications.

1.04 SAMPLES

A. Samples shall be of size and quantities to clearly illustrate full color range and functional characteristics of products and materials, with complete accessories or attachment devices. After review and written approval by METRO, samples may be used in construction, if not damaged and as directed by METRO.

B. Changes in products for which samples have been approved will not be permitted, unless those changes have been reviewed and approved in writing by METRO.

1.05 SUBMITTAL RESPONSIBILITY

A. Deviations in submittals from requirements of the Contract Documents shall not be relieved by METRO review and approval of submittals, unless those specific deviations have been acknowledged and waived in writing by METRO.
1.06 LIMITED APPROVALS

A. All Shop Drawings, product data and samples submitted by the Contractor shall illustrate details of work, equipment, materials, products, systems, designs or workmanship that the Contractor intends to use in order to comply with the design concept established in the Contract Documents. METRO's review of these submittals is only for the limited purpose of checking the same for conformity with the design concept of the Work as established in the Contract Documents, and is not intended to be for the purpose of determining the accuracy of other matters that they may be contained in such submittals, including but not limited to such matters as dimensions, quantities, performance of equipment and systems designed by the Contract, Contractor-furnished engineering and design, construction means, methods, techniques, sequences, procedures or safety precautions, the correctness of which shall be the sole responsibility of the Contractor. METRO will undertake its review within ten working days so as to cause minimum delay. METRO's review of a specific item shall not indicate approval of an assembly of which the item is a component or in which it functions.

1.07 SUBMISSION REQUIREMENTS

A. Submittals, including test results and Certificates of Compliance, shall be made in sufficient time before the work covered by the submittal is scheduled to be performed. Times may be mutually agreed upon so as not to delay the Project Schedule. Unless otherwise directed, submittals for a given Technical Section of these Specifications shall be completed in one submission.

1.08 DISTRIBUTION OF APPROVED SUBMITTALS

A. Ten (10) copies of Shop Drawings and product data bearing the Contractor's stamp of approval and signature shall be transmitted to METRO. METRO shall return three (3) copies of Shop Drawings and product data to the Contractor approved as noted.

1.09 RECORD DOCUMENTS

A. One record copy of all Contract Documents, Shop Drawings, and one set of full-size Contract Drawings shall be maintained at the Site. A set of the Contract Documents, including a full-size set of the Contract Drawings, shall be annotated by the Contractor to indicate the following.

1. Horizontal and vertical location of underground facilities and utilities.

2. Location of utilities, equipment and appurtenances concealed in construction as referenced to visible and accessible features of the construction.
3. Field changes of dimensions, details, locations and substitutions, as changes occur.

4. Details not on original Contract Drawings.

5. All other changes as required to result in a complete set of Record Documents to reflect "as built" conditions of the Project.

6. All changes and notations to record drawings shall be made with red erasable pencil and dated.

7. Record Drawings shall be kept current and shall be reviewed by METRO or METRO's representative for being up to date prior to the approval of any progress payment.

B. All such documents shall be stamped "Record Documents" and kept available for examination by METRO. Record Documents shall be maintained in a dry, clean and legible condition.

C. One copy of all certificates for installed material, mill certificates, weight tickets, product modifications, and related documents shall be maintained and submitted to METRO for inclusion in the Record Documents.

D. A clean reproducible copy of the Record Documents shall be transmitted to METRO at the time of Project closeout. Record Documents shall become the property of METRO. Refer to Section 01700 - Project Closeout of these Specifications for detailed closeout requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01340
SECTION 01380
CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 DESCRIPTION
A. This Section specifies the requirements for taking and submission of construction photographs in color.

1.02 QUALITY ASSURANCE
A. Photographs shall be clean, sharp and shall clearly show details. Appropriate filtration shall be used to reduce haze and ghosts.

1.03 SUBMITTALS
A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Before starting Work, within 10 days after starting Work, and within the first 10 days of each month thereafter, three prints and the negative of each construction photograph as follows:

a. In sets with each photograph numbered in sequence beginning with the numeral one.

b. Each photograph shall be enclosed in a clear plastic protector punched to fit a standard 8-1/2 in. by 11 in. three ring binder.

PART 2 - PRODUCTS

2.01 PHOTOGRAPHS
A. Each photographic print shall be standard commercial quality, in color, 8 in. by 10 in., single weight glossy paper.
B. Each print shall be identified on the back of the print with the following information typed in a 2 in. by 4 in. box in the lower right hand corner:

METROPOLITAN TRANSIT AUTHORITY
HARRIS COUNTY, TEXAS

Contract No.: ________________________________
Contract Title: _______________________________
Contractor: __________________________________
Photograph No.: _______ Date: _______________
Description: __________________________________

2.02 NEGATIVES

A. Negatives shall be a minimum of 2 inches by 2 inches.

B. Negatives shall be submitted to METRO with the photographs.

PART 3 - EXECUTION

3.01 INITIAL PHOTOGRAPHING

A. Pre-construction photographs shall be taken of the entire Site before starting the Work and prior to disturbing the Site in any manner.

3.02 PROGRESS PHOTOGRAPHING

A. A minimum of 10 photographs shall be made prior to construction. After construction operations have been started at the Site, photographs shall be taken each month, with a sufficient number of views, no less than 10, to indicate progress in construction.

B. METRO shall direct views to be photographed and number of photographs required.

END OF SECTION 01380
SECTION 01451

PROJECT QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. In addition to the CONTRACT ARTICLE, "INSPECTION OF CONSTRUCTION", this section specifies the Contractor Quality Control (CQC) requirements for the Work of this Contract.

B. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system to perform inspections, tests, and retesting in the event of failure for items of work, including that of subcontractors, to ensure compliance with the Contract.

1.02 CONTRACTOR QUALITY CONTROL ORGANIZATION

A. The Contractor shall provide a Contractor Quality Control Manager (CQCM), to provide inspection of the Work. After METRO's approval of the individual, the Contractor shall appoint the CQCM by a letter addressed to the CQCM and signed by an Officer of the construction firm. The CQCM shall report directly to an officer of the firm. An alternate CQCM shall be designated in the event that the CQCM is temporarily absent from the work site.

B. The minimum qualification requirements for the CQCM follow:

The CQCM shall have a minimum of 6 years combined experience in construction management and construction quality control. The CQCM shall be experienced in the construction of complex public works projects, including roadways, bridges, embankments and drainage systems. Experience is required in the handling of product submittals, interpretation of contract documents, and in the testing of construction materials.

C. METRO's Approval of CQCM: CQCM qualification statement must be detailed to show actual related experience in performing similar duties and responsibilities. Construction activities shall not begin until a CQCM is approved by METRO. The Contract time will not be extended for failure to propose an acceptable CQCM.
1.03 CONTRACTOR QUALITY CONTROL (CQC) PLAN

A. The Contractor shall furnish two copies of the CQC plan to METRO for review and acceptance. METRO will not issue the Notice to Proceed until the CQC plan has been received.

B. The CQC plan shall detail the procedures, instructions, and reports to be used to assure compliance with the Contract. Construction shall not be started until the CQC plan is accepted. The CQC Plan shall include:

1. The letter appointing the CQCM, signed by an officer of the firm, which outlines the CQCM’s duties, responsibilities, and authority, to include the authority to direct removal and replacement of any defective work and a Resume of the CQCM.

2. A listing of the definable features of work (DFW) for which the QC inspection process will be applied.

3. Procedures for documenting:
   a. Quality Control Operations
   b. Inspections
   c. Testing - to include acceptance test performed by the Contractor (e.g., hydrostatic testing of water lines, leak testing of sanitary sewers, etc.)

4. A list of all tests to be performed to meet the requirements of the contract specifications. The list shall give the test name, specification paragraph containing the test requirements and the personnel and laboratory responsible for each type of test. The list of tests shall include, in addition to the specified, those required at successive stages of the performance of the Work occurring in the field to document progressive quality of the Work, such as compaction tests in various lifts in backfilling of a trench or the subgrade prior to construction of a facility.

5. Procedures for documenting:
   a. Changes to drawings and specifications.
   b. Handling, storage and delivery of supplies and materials.
   c. Release for shipment of fabricated items.
   d. Evidence of compliance.
   e. Corrective action.
   f. Calibration/certification of measuring equipment.
   g. Audit.
C. METRO's acceptance of the CQC plan is conditional and will be predicated on satisfactory performance during construction. METRO reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

PART 2 - PRODUCTS (Not Used.)

PART 3 - EXECUTION

3.01 CONTROL DOCUMENTATION

A. Prior to the commencement of construction activities, the Contractor shall meet with METRO's Quality Assurance Staff to discuss the quality control requirements. The purpose of the meeting is to develop a mutual understanding relative to details of the system. Subcontractors involved in quality control should have their responsible personnel attend this meeting. The CQCM shall prepare and distribute minutes of this QA/QC coordination meeting.

B. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. The CQCM shall document all CQC meetings and provide copies of the minutes to METRO. A log of preparatory and initial inspections shall be maintained by the CQCM. At least three phases of control shall be conducted by the CQCM for each definable feature of work as follows:

1. PREPARATORY PHASE (PREWORK MEETING): In the presence of METRO's designated representative, Contractor shall perform a preparatory inspection before beginning any work on any definable segment of work. Include in preparatory inspection a review of the Contract requirements, the review of approved shop drawings and other submittal data, assurance that required control testing is to be provided, a physical examination to ensure that all materials and equipment conform to approved shop drawings and submittal data and assurance that all required preliminary work has been completed. CQCM shall prepare minutes of this meeting and provide copies to METRO within seven calendar days.

2. INITIAL PHASE: In the presence of METRO's designated representative, Contractor shall perform an initial inspection as soon as a representative segment of the particular item of work is underway. Include in initial inspection performance of scheduled tests, examination of the quality of workmanship, a review for omissions or dimensional errors, and approval or rejection of the initial segment of the Work. Where applicable, standards of
acceptance shall be mutually agreed upon. Initial phase inspections are to be logged and reported in daily CQC reports.

3. FOLLOW-UP PHASE: Contractor shall perform follow-up inspections daily, and more frequently as necessary, and include continued testing and examinations to ensure continued compliance with the Contract requirements. Results to be noted in daily CQC reports.

C. METRO shall have access to all work areas during the Contractor's working time and shall have the right to monitor the methods and procedures used to construction related activities and testing. METRO shall be given 24 hour notice in advance of inspections.

D. The CQCM shall submit daily CQC reports to METRO identifying prime and subcontractor personnel and equipment on the Site, idle equipment and personnel, material deliveries, weather conditions, work accomplished, inspections and tests conducted, results of inspections, nature of defects found, causes for rejection, and corrective actions taken, together with the following certification: "I hereby certify that this report is complete and accurate and that all materials and equipment incorporated in the work and workmanship are in full compliance with the contract documents except as noted above". This certification shall be signed on behalf of the Contractor by the CQCM. The Contractor shall use METRO's CQC Report or approved equal. The Contractor shall submit the CQC Report each day for the preceding day's activities.

E. The Contractor shall maintain adequate records to provide evidence of quality and accountability. These records shall include results of inspections, material and acceptance tests, process controls, certification of processes and personnel, discrepant material (including records of disposition), and other quality requirements defined in the Contract. These records shall be maintained, completed, and available to METRO at all times during the performance of the Contract.

3.02 TESTING OF MATERIALS

A. The Contractor shall perform inspections, tests and other services to ensure that all work conforms to Contract requirements. Where required by the specifications to conduct such testing, the Contractor shall request the services of an independent testing laboratory employed and paid for by METRO. The Contractor shall direct it's requests for testing to METRO's Resident Engineer. The testing work performed by METRO's independent laboratory will be under the general direction of the Resident Engineer. Tests performed by the Contractor shall be documented. Notification shall be given to the Resident Engineer of acceptance testing to enable the tests to be witnessed by the QA representative.
B. Repeat Tests and Inspections:

The testing laboratory will perform acceptance tests and inspections as directed only once at no cost to the Contractor. The Contractor shall be responsible for the cost of all repeat acceptance tests and inspections. The Contractor shall be responsible to make corrections to nonconforming materials and workmanship.

C. Coordination:

It shall be the Contractor's responsibility to cooperate and coordinate with the testing laboratory to perform the tests specified by the Contract or required by the Engineer to verify that the Contractor's quality control measures and/or performance are adequate to provide a product which conforms to the contract requirements. A list of tests which the Contractor understands it is to perform to meet the contract requirements shall be furnished as a part of its CQC plan to the Engineer. For collection of test samples, conducting field tests, etc., the testing laboratory shall be given twenty-four (24) hours notice.

3.03 SUBMITTALS

A. The CQCM shall certify all submittals required by the technical sections of the Contract by the Contractor in accordance with the Contractor Quality Control plan and submit as specified in Section -1340, "SHOP DRAWINGS, PRODUCT DATA, SAMPLES & RECORD DOCUMENTS". Clearly mark each item proposed to be incorporated into the Project, identify on the submittals and catalog cuts and cross-reference to the drawings and Specifications so as to identify clearly the use for which it is intended. Maintain at the Worksite an up-to-date submittal status log showing the status of all submittals required by the Contract.

B. Certified Test Reports: Before delivery of materials and equipment, submit for approval certified copies of the reports of all tests listed in the technical sections (and referenced publications). Accompany test reports with certificates from the manufacturer certifying that the material and equipment proposed to be supplied is of the same type, quality, manufacturer and make as that tested.

C. Manufacturer’s Certificates of Conformance or Compliance: Preprinted certifications are not acceptable. The originals of all manufacturer’s certifications shall name the appropriate item of equipment or material, specification, standard or other document specified as controlling the quality of that item and have attached thereto certified copies of test data upon which the certifications are based. Furnish all certifications signed by the manufacturer's official authorized to sign certificates of conformance or compliance.
D. Laboratory Reports: The Contractor shall provide reports which cite the Contract requirements, the test or analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to conform to the specification requirements.

3.04 NOTIFICATION OF NONCOMPLIANCE

METRO will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. If the Contractor fails or refuses to comply promptly, METRO may issue an order stopping all or part of the work until satisfactory corrective action has been taken.

3.05 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in CONTRACT ARTICLE, "PERIOD OF PERFORMANCE", or Specification Section 01700, "PROJECT CLOSEOUT", the CQCM, along with METRO's Quality Assurance Representative, shall conduct a completion inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list shall be included in the CQC documentation and shall include the estimated date by which the deficiencies will be corrected. The completion inspection and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 GENERAL

No separate measurement is made for this section. The payment for work in this section is incidental to the total bid for the project.
SECTION 01452

CONTRACTOR QUALITY CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. In addition to the CONTRACT ARTICLE, "INSPECTION OF CONSTRUCTION", this section specifies the Contractor Quality Control (CQC) requirements for the Work of this Contract.

B. The Contractor is responsible for quality control and shall establish and maintain an effective quality control system to perform inspections, tests, and retesting in the event of failure for items of work, including that of subcontractors, to ensure compliance with the Contract.

1.02 CONTRACTOR QUALITY CONTROL (CQC) PLAN

A. The Contractor shall furnish two copies of the CQC plan to METRO for review and acceptance.

B. The CQC plan shall document the Contractor’s policy statement regarding quality, identify the Contractor’s representative responsible for CQC activities and contain a listing of definable features of work for which preparatory and completion inspections shall be conducted and documented.

C. METRO’s acceptance of the CQC plan is conditional and will be predicated on satisfactory performance during construction. METRO reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

PART 2 - PRODUCTS (Not Used.)

PART 3 - EXECUTION

3.01 CONTROL DOCUMENTATION

A. Contractor Quality Control is the means by which the Contractor ensures that the construction, to include that of subcontractors and suppliers, complies with the requirements of the contract. METRO’s Resident Engineer will ensure that all CQC
meetings and inspections are properly documented and copies provided to all parties.

B. In the presence of METRO’s designated representative, Contractor shall perform a CQC inspection before beginning work on each definable feature of work. Include in the inspection a review of:

1) Contract Documents
2) Approved Shop Drawings and data submittals
3) Manufacturer’s recommended installation procedures
4) Manufacturer’s certified test reports and certificates of conformance and compliance for materials and equipment
5) Physical examination of conformed materials and equipment
6) Request for services of independent testing laboratory
7) Procedures, tolerances and standards established

C. METRO shall have access to all work areas during the Contractor's working time and shall have the right to monitor the methods and procedures used in construction related activities and testing. METRO shall be given 24 hour notice in advance of inspections.

D. The Contractor shall maintain adequate records to provide evidence of quality and accountability. These records shall include results of inspections, material and acceptance tests, process controls, certification of processes and personnel, discrepant material (including records of disposition), and other quality requirements defined in the Contract. These records shall be maintained, completed, and available to METRO at all times during the performance of the Contract.

3.02 TESTING OF MATERIALS

A. The Contractor shall perform inspections, tests and other services to ensure that all work conforms to Contract requirements. Where required by the specifications to conduct such testing, the Contractor shall request the services of an independent testing laboratory employed and paid for by METRO. The Contractor shall direct its requests for testing to METRO’s Resident Engineer. The testing work performed by METRO's independent laboratory will be under the general direction of the Resident Engineer.

B. Repeat Tests and Inspections:

The testing laboratory will perform acceptance tests and inspections as directed only once at no cost to the Contractor. The Contractor shall be responsible for the
cost of all repeat acceptance tests and inspections. The Contractor shall be responsible to make corrections to nonconforming materials and workmanship.

C. Coordination:

1. It shall be the Contractor's responsibility to cooperate and coordinate with the testing laboratory to perform the tests specified by the Contract or required by the Engineer to verify that the Contractor's quality control measures and/or performance are adequate to provide a product which conforms to the contract requirements. For collection of test samples, conducting field tests, etc., the testing laboratory shall be given twenty-four (24) hours notice.

3.03 SUBMITTALS

A. Certify submittals required by the technical sections of the Contract by the Contractor in accordance with the Contractor Quality Control plan and submit as specified in Section 1340, "SHOP DRAWINGS, PRODUCT DATA, SAMPLES & RECORD DOCUMENTS". Clearly mark each item proposed to be incorporated into the Project, identify on the submittals and catalog cuts and cross-reference to the drawings and Specifications so as to identify clearly the use for which it is intended. Maintain at the Worksite an up-to-date submittal status log showing the status of all submittals required by the Contract.

B. Certified Test Reports: Before delivery of materials and equipment, submit for approval certified copies of the reports of all tests listed in the technical sections (and referenced publications). Accompany test reports with certificates from the manufacturer certifying that the material and equipment proposed to be supplied is of the same type, quality, manufacturer and make as that tested.

C. Manufacturer's Certificates of Conformance or Compliance: Preprinted certifications are not acceptable. The originals of all manufacturer's certifications shall name the appropriate item of equipment or material, specification, standard or other document specified as controlling the quality of that item and have attached thereto certified copies of test data upon which the certifications are based. Furnish all certifications signed by the manufacturer's official authorized to sign certificates of conformance or compliance.

D. Laboratory Reports: The Contractor shall provide reports which cite the Contract requirements, the test or analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to conform to the specification requirements.

3.04 NOTIFICATION OF NONCOMPLIANCE
METRO will notify the Contractor of any noncompliance with the foregoing requirements. The Contractor shall, after receipt of such notice, immediately take corrective action. If the Contractor fails or refuses to comply promptly, METRO may issue an order stopping all or part of the work until satisfactory corrective action has been taken.

3.05 COMPLETION INSPECTION

At the completion of all work or any increment thereof established by a completion time stated in CONTRACT ARTICLE, "PERIOD OF PERFORMANCE", or Specification Section 01700, "PROJECT CLOSEOUT", the Contractor, along with METRO's representative, shall conduct a completion inspection of the work and develop a "punch list" of items which do not conform to the approved plans and specifications. Such a list shall be included in the CQC documentation and shall include the estimated date by which the deficiencies will be corrected. The completion inspection and any deficiency corrections required by this paragraph will be accomplished within the time stated for completion of the entire work.

PART 4 - MEASUREMENT AND PAYMENT

4.01 GENERAL

No separate measurement is made for this section. The payment for work in this section is incidental to the total bid for the project.

END OF SECTION 01452
SECTION 01505

MOBILIZATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the mobilization of the construction facilities and equipment at the Work Site; the requirements for materials and supplies necessary for the prosecution of the work, but not to be incorporated in the Work; the construction of temporary buildings and facilities; the requirements for personnel and facilities for work preparatory to commencing the Work; and demobilization. Mobilization also includes the following:

1. Providing construction fences and gates or repairing any existing fencing used for construction site security.

2. Providing a field office for the exclusive use of METRO if called for and as specified in Section 01590.

1.02 SUBMITTALS

A. Provide a layout of the proposed construction site including fences, roads, parking, temporary buildings and material storage areas within 7 days after the effective date of the Notice-to-Proceed.

PART 2 - PRODUCTS

2.01 FACILITIES AND EQUIPMENT

A. Construction facilities and equipment shall be of the capacity, type, quality and function suitable for, and provided in the quantity necessary for, timely prosecution of the Work.

PART 3 - EXECUTION

3.01 GENERAL

A. The location of construction facilities and equipment shall be subject to approval by the Engineer prior to commencing operations.

B. The construction facilities, including equipment and personnel, shall not only have sufficient excess capacity to permit the work to progress and to be completed within the time stipulated in the Contract, but shall also have sufficient excess capacity for emergencies and overloading.
C. METRO shall have the right to inspect, and will reject, construction facilities and equipment which are unsafe, improper, or inadequate. Rejected construction facilities and equipment shall be brought to acceptable condition, or shall be removed from the work site and replaced with acceptable items. Neither increase in Contract time nor cost will be allowed for delays occasioned by such rejection.

3.02 DEMOBILIZATION

A. Upon completion of the work, the Contractor shall remove construction facilities, equipment, materials, supplies, temporary buildings and other items necessary for mobilization and the area restored to acceptable conditions as directed.

B. Contractor shall submit all required Record Documents and reports.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. MOBILIZATION of the construction facilities and equipment shall be measured per Lump Sum, in place at the work site.

B. PERMITS AND FEES will not be separately measured for payment, but shall be included in the measurement for each item requiring permitting.

4.02 PAYMENT

A. The basis for payment shall be the lump sum, fixed price for “Mobilization” as it appears on the bid form, which shall be full compensation for furnishing all labor and materials necessary for timely preparation and prosecution of the work, including demobilization. Contractor shall receive partial payments for staged mobilization.

1. The Contractor shall receive 25% of lump sum payment when the contractor mobilizes on the work site.

2. The Contractor shall receive 50% of lump sum payment upon receipt and approval by METRO of the following items, as applicable:
   a. Safety Program;
   b. Contractor’s Quality Control Plan;
   c. Initial Construction Photographs;
   d. Preliminary Construction Schedule and Billing Forecast;
   e. Construction Schedule;
   f. Submittal Schedule.

3. The Contractor shall receive 25% of the lump sum payment when demobilization including all required submittals is complete.

END OF SECTION 01505
SECTION 01510
TEMPORARY UTILITIES AND OTHER FACILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for providing, maintaining and removing temporary utility services, construction facilities, protection provisions and support facilities for construction and testing.

1.02 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. NECA: National Electrical Contractor's Association

2. NFPA: National Fire Protection Association
   a. 10: Standard for Portable Fire Extinguishers.
   b. 70: National Electrical Code.

3. UL: Underwriters Laboratories

B. Temporary facilities shall comply with the applicable regulations and standards of the City of Houston, the requirements of the utility companies involved and the requirements specified herein.

C. Electrical facilities and their installation shall comply with the applicable requirements of the City of Houston, NFPA 70, UL, and NECA NJG-6, "Temporary Job Utilities and Services Guidelines".
D. The provision and installation of fire protection facilities for construction shall comply with the applicable requirements of the City of Houston, NFPA 10, NFPA 241, and the UL.

PART 2 - PRODUCTS

2.01 TEMPORARY SUPPORT FACILITIES

A. Temporary support facilities may include, but not be limited to, field offices, storage sheds, fabrication sheds, sanitary facilities, drinking water, first aid facilities, bulletin board, telephones, clocks, thermometer, project identification signs, clean-up facilities, waste disposal service, rodent/pest control and similar miscellaneous services, all as may be reasonably required for proficient performance of the Work and accommodation of personnel at the Site, including METRO personnel.

B. Discontinue and remove temporary support facilities, and make incidental similar use of permanent work of the Project, only when and in manner authorized by METRO; and, if not otherwise indicated, immediately before time of Substantial Completion. Locate temporary support facilities for convenience of users, and for minimum interference with construction activities.

2.02 TEMPORARY UTILITY SERVICES

A. Water Service

1. Water service shall comply with the applicable requirements of City of Houston, Public Works Department, Water Division.

2. Water shall be potable, from municipal supplies approved by the State or City Health Department.

B. Electrical Service

Electrical service shall comply with the applicable requirements of City of Houston, NFPA 70, Houston Lighting and Power Company, and NECA NJG-6, "Temporary Job Utilities and Services Guidelines".

C. Telephone Service

1. Telephone service shall comply with the applicable requirements of Southwestern Bell Telephone Company.

2. Provide two (2) phone lines to METRO's field office.
D. Contractor shall be responsible for all Temporary Utility Service Fees.

2.03 TEMPORARY CONSTRUCTION FACILITIES

A. Water Distribution System

A water distribution system shall be provided which is sufficient to provide the water needs for construction operations and Site fire protection.

B. Enclosures

Temporary enclosures shall be provided as needed and where required to ensure protection from inclement weather and unsatisfactory ambient conditions. Tarpaulins, where used, shall be UL labeled and have a flame spread of 15 or less.

C. Heating

Temporary heating shall be provided where necessary to ensure specified minimum ambient conditions for installation of materials. Fuel-burning heaters shall be equipped with individual-space thermostatic controls and be UL labelled. Spaces heated with fuel-burning heaters shall have adequate ventilation. Oil-fired heaters shall not be used.

D. Electrical Service Distribution System

1. An electrical service distribution system shall be provided which is sufficient to accommodate construction operations requiring electrical power, use of power tools, electric heating, lighting and start-up testing of permanent electric-powered equipment prior to connection to permanent electrical system.

2. Distribution system shall be weatherproof, grounded and provided with short circuit and overload protection. Outlets shall be spaced so that any area requiring power tools can be reached with a single 100 ft. extension cord.

3. Engine-driven power-generators shall be provided for power for electric welding.

E. Lighting

Lighting shall be sufficient to ensure proper workmanship throughout construction. Task lighting shall be provided as necessary.
F. Access Provisions

Ramps, stairs, ladders, sidewalk bridges and protection, and similar temporary access provisions shall be provided as required to safely perform the Work and facilitate its inspection.

G. Roads and Parking Areas

Temporary roads and parking areas shall be provided to service construction areas. Roads and parking areas shall be surfaced sufficiently to provide all-weather, uninterrupted access. Access to the site for construction vehicles and equipment shall meet the requirements of the project's storm water pollution prevention plan as specified in Section 01566 - Storm Water Pollution Prevention Plan.

2.04 TEMPORARY PROTECTION PROVISIONS

A. Telephone Service

Telephone service shall be provided, accessible to all construction personnel, for emergency use. Emergency telephone service shall have emergency telephone numbers prominently displayed. Emergency telephone numbers shall include METRO transit police, local police, ambulance, fire department, utility companies and other emergency telephone numbers as may be required.

B. Environmental Protection

Environmental protection shall be provided as specified in Section 01560 - Environmental Impact Controls of these Specifications.

C. Fire Extinguishers

Provide types, sizes, numbers and locations as would be reasonably effective in extinguishing fires during early stages at Project Site. Provide Type A extinguishers at locations of low-potential for either electrical or grease-oil-flammable liquids fires; provide Type ABC dry chemical extinguishers at other locations; comply with recommendations of NFPA No. 10. Post warning and quick-instructions at each extinguisher location, and instruct personnel at Project Site, at time of their first arrival, on proper use of extinguishers and other available facilities at Project Site. Post local fire department and METRO Transit Police call number on each telephone instrument at Project site.
2.05 TEMPORARY SUPPORT FACILITIES

A. Field Office

A field office shall be provided as specified in Section 01590 - Field Office of these Specifications.

B. Construction Support Facilities and Equipment

Construction support facilities and equipment shall be provided as specified in Section 01505 - Mobilization of these Specifications.

C. Sanitary Facilities

Temporary sanitary facilities shall be provided at accessible locations, and shall be secluded from public observation insofar as practicable. Facilities shall be relocated as the center of activity moves. Sanitary facilities shall be serviced as often as necessary to prevent accumulation of wastes and unsanitary conditions.

D. First Aid Facilities

First aid facilities shall be provided consisting of the following:

1. Supplies: Not less than one 16 unit first aid kit for each 50 persons, or fraction thereof, employed at the Site.

2. Personnel: Not less than one certified First Aid person for each 50 persons, or fraction thereof, employed at the Site. First aid personnel shall have valid certificates issued by the U.S. Bureau of Mines or the American Red Cross. First aid personnel shall be provided with a hard hat with the first aid emblem affixed. First aid personnel may be assigned other duties not interfering with their first aid duties.

E. Drinking Water

Drinking water shall be provided in dispenser-type units. Dispenser units shall have adequate supplies of paper cups and waste receptacles. Drinking water shall be cooled during hot weather.

F. Contract Identification Signs

Identification signs shall be provided and located as directed by METRO. Size of sign, wording, letter sizes, colors, layout, and construction shall be as shown on METRO Standard Drawing No. TRS-1053-2.
PART 3 - EXECUTION

3.01 INSTALLATION

A. Temporary facilities shall be established prior to beginning construction operations requiring the use of the temporary facility.

B. Facilities shall be installed, operated, maintained and relocated as necessary. Installations shall be at locations which will be non-hazardous, sanitary, protective of persons and property and free of deleterious effects.

3.02 REMOVAL

A. Temporary facilities shall be removed when the need for the facility no longer exists. The area occupied by the facility shall be cleaned and restored to its original condition or as directed.

END OF SECTION 01510
SECTION 01560
ENVIRONMENTAL IMPACT CONTROLS

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the controls required to control and minimize environmental impact caused by construction activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 GENERAL

Contractor shall provide facilities, establish procedures, and conduct construction activities in a manner which will ensure compliance with those regulations controlling construction activities at Project Site. Contractor shall designate one person, the General Superintendent or other, to enforce strict discipline on activities related to generation of wastes, pollution of air/water/soil, generation of noise, and similar harmful or deleterious effects which might violate regulations or reasonably irritate persons at or in vicinity of Project Site.

3.02 NOISE CONTROL

A. General

1. Noise caused by construction activities shall be minimized. Construction equipment and machinery shall be equipped with efficient noise suppression devices for the protection of both employees and the public.

3.03 TEMPORARY IMPROVEMENTS FOR WATER QUALITY/FLOODING/ DRAINAGE

A. Work hereunder shall be coordinated with the work of Section 01505 -Temporary Facilities of these Specifications. The City of Houston and Harris County Flood Control District and Water Pollution ordinances of the City, State and Federal Governments and the Texas Natural Resource Conservation Commission (TNRCC) regulations shall govern.
B. Temporary improvements shall be demolished when no longer required. Debris shall be removed and Site shall be restored to its original condition or as directed by METRO.

3.04 AIR POLLUTION

A. Motor Emissions

1. Emission control devices shall be used on gasoline and diesel construction equipment. Idling and unnecessary operation of equipment shall be prohibited to prevent and control air pollution in accordance with applicable City of Houston ordinances and Environmental Protection Agency criteria.

2. Contractor shall use low-sulfur (500 ppm or less) diesel fuel in all diesel operating vehicles and motorized equipment used by the contractor and its subcontractors in the performance of this work. No diesel operating vehicle or motorized equipment used in the performance of this work shall utilize a high-sulfur diesel fuel in excess of the required 500 ppm sulfur content. If the contractor or its subcontractors are found to be using high-sulfur diesel fuel during the performance of this work, METRO may, at its discretion, order the contractor to cease operation of all such vehicles and motorized equipment until this requirement has been complied with. The contractor shall not be entitled to any claims for compensation therefor. Either off-road sulfur "red-eye" diesel fuel or on-road low-sulfur diesel containing 500 ppm or less sulfur content may be used to comply with this requirement. Contractors and subcontractors using this type of fuel must have invoices/receipts available upon demand by METRO's Contract Administrator to ensure compliance with this low-sulfur fuel use requirement.

B. Dust Control

Work and access areas shall be maintained free of dust. Loaded trucks shall be covered and dust-generating surfaces shall be sprinkled with water or receive a light application of bitumen. Trucks and equipment shall be washed down prior to leaving the construction Site. Adjacent streets shall be swept as directed by METRO to remove all spilled material. Sediments and construction materials reaching a public or private road shall be removed by street cleaning, not flushing before the end of each working day.
C. Burning

Burning of trees, shrubs, rubbish and other materials is prohibited. Burning of waste materials on METRO-controlled property will not be permitted. All materials shall be disposed of off-site in a legal manner.

3.05 EROSION AND SEDIMENT CONTROLS

A. General

Erosion and sediment controls shall:

1. Divert upslope water around disturbed areas of the Site.
2. Limit the exposure of disturbed areas of the Site.
3. Remove sediment from storm water before it leaves the Site.

B. Seeding, mulching, netting and watering shall be provided on sloped surfaces, berms at the top of the slopes, interceptor ditches at end of berms and at locations to ensure that erosion during construction will be minimized.

C. Sediment Controls

1. Silt dams, traps, dikes, barriers, fences, and related control appurtenances shall be provided as required to prevent sedimentation of existing drainage systems.
2. Temporary improvements for sedimentation control shall be removed upon completion of the Work for which the controls were provided.

D. Stabilization Practices

1. Undertake stabilization practices to cover or maintain existing cover over site soils. Minimize the amount of existing vegetated area that is disturbed or denuded, especially those areas outside the immediate zone of construction activity.
2. Stabilization practices shall include temporary and permanent seeding, mulching (or combinations of seeding and mulching applied by hydraulic planting or hydro-mulch seeding), sodding, the use of vegetative buffer strips, protection of trees and other mature vegetation, the use of woven geotextile fabrics, riprap, gabions; erosion mats, blankets or netting made of certain...
fibrous materials; and other appropriate measures, such as specialized soil retaining systems, or other practices specified or approved by METRO.

E. Implementation of Stabilization Practices

1. Stabilization practices shall be undertaken within 14 days after construction activity on any portion of the construction site has temporarily or permanently ceased.

2. If construction activities on a portion of the site are scheduled to resume within 21 days of being suspended, METRO may allow the Contractor to delay implementing temporary stabilization on that portion of the site if its storm water runoff is discharged through an appropriate sediment trapping device.

3. METRO will determine the definition of Portion of the Construction Site based on construction sequencing, the Contractor's submitted construction schedule, or the type and scope of the project.

F. Construction and Maintenance of Stabilization Practices

1. Stabilization practices shall be in accordance with HC/COH Storm Water Management Handbook for Construction Activities, Appendix C; as specified in Sections 01533 - Tree Protection and Trimming of these Specifications, 02933 - Seeding of these Specifications, and 02935 - Sodding of these Specifications; as shown on the drawings; and in accordance with the project Storm Water Pollution Prevention Plan (SWPPP) specified in Section 01566 - Storm Water Pollution Prevention of these Specifications.

2. Stabilization practices shall be inspected after each storm event of record for erosion or other storm related damage. Repair any storm damage within 24 hours of said inspection and promptly repair any other degradation to the effectiveness of a specific stabilization practice.

G. Structural Practices

1. Structural practices specified in the project SWPPP shall be designed to prevent water from crossing disturbed areas of the site or to remove sediment from site runoff before it is discharged or both.

2. Approved structural practices shall include earth dikes and drainage swales (when combined, commonly called diversions), silt fences, sediment traps, check dams, level spreaders, subsurface drains, pipe slope drains,
temporary storm drain diversions, storm drain inlet protection, rock outlet protection, sump pits, temporary or permanent sediment basins, temporary waterway crossings, wind breaks, construction entrance/exit stabilization measures, and other practices specified or approved by METRO.

3. Structural practices that are not approved for implementation on METRO projects include the use of brush barriers and the use of straw bales as sediment fences, traps, barriers, dikes, or check dams - inclusive of whether or not said brush barriers or straw bales are proposed to be covered with filter fabric.

H. Construction and Maintenance of Structural Practices

1. Structural practices shall be in accordance with HC/CH Storm Water Management Handbook for Construction Activities, Appendix C, and in accordance with the dimensions shown on drawings or specified in the project SWPPP or both.

2. Structural practices shall be inspected after each storm event of record for damage or sediment accumulation. Repair any storm related damage within 24 hours of said inspection and otherwise perform routine maintenance of structural practices as stated in the project SWPPP, or as directed by METRO.

3.06 STORM WATER MANAGEMENT MEASURES (SWMMs)

A. Specified Management Measures

SWMMs include the use of on-site infiltration devices, storm water flow attenuation by the use of vegetative swales or natural depressions, storm water outfall velocity dissipation devices, storm water retention structures including those with artificial wetlands, storm water quality detention structures, combinations of these management measures, and other approved measures.

B. Construction and Maintenance of SWMMs

1. SWMMs shall be constructed in accordance with the project plans and/or as specified in the project SWPPP.

2. SWMMs that are constructed to function during construction shall be inspected after each storm event of record for damage or sediment accumulation. Repair any such storm related damage within 24 hours of said inspection and shall otherwise perform routine maintenance of SWMMs as stated in the project SWPPP, or as directed by METRO.
3. Responsibility for the maintenance of permanent SWMMs constructed as part of the project shall revert to METRO or another designated party at the completion and close-out of the project.

3.07 CONSTRUCTION SITE HOUSEKEEPING BEST MANAGEMENT PRACTICES

A. General

Appropriate construction site housekeeping Best Management Practices (BMPs) shall be instituted to minimize the opportunities for toxic and hazardous substances to enter storm water discharges from construction activities.

3.08 CLEANING

A. Safety Requirements

1. The Site shall be maintained in a neat, orderly and hazard-free condition in accordance with local ordinances and anti-pollution regulations until final acceptance of the Work.

2. Volatile wastes shall be stored in covered metal containers and removed from the Site daily.

3. Accumulation of wastes which create hazardous conditions shall be prevented.

4. Adequate ventilation shall be provided during the use of volatile or noxious substances.

B. Interim Cleaning

1. Cleaning shall be performed daily to ensure that the Site facilities, shelters, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

2. Loose materials on exposed surfaces shall be removed or secured at end of each day’s work or more often to maintain the Site in hazard-free condition. Dislodgement of materials due to wind and other forces shall be prevented.

3. Dry materials and rubbish shall be wet down to prevent blowing dust.
4. On-site containers shall be provided for collection of waste materials, debris and rubbish. Containers shall be regularly emptied and contents disposed of legally off-site.

5. Interiors of shelters shall be vacuum cleaned when ready to receive finish painting or special coatings. Vacuum cleaning shall continue as required, until shelters are ready for final acceptance.

6. Dropping or throwing of materials from heights will be prohibited.

7. Cleaning operations shall be scheduled so that dust and other contaminants resulting from cleaning processes will not fall on wet, newly painted surfaces.

8. Waste materials shall not be buried in site excavations.

C. Final Cleaning

1. Refer to Section 01700 - Project Closeout of these Specifications. A final inspection shall be conducted, in the company of METRO, of exposed interior and exterior surfaces in preparation for Substantial Completion. The cognizant METRO Division Directors and Assistant General Managers may be in attendance.

2. Grease, dust, dirt, stains, spilled paint and concrete, labels (except UL and FM labels), fingerprints and other materials shall be removed from exposed finished surfaces.

3. Marred surfaces shall be repaired and refinished to specified finish to match adjacent surfaces at no additional cost to METRO. Paved surfaces shall be broom cleaned.

4. Thoroughly sweep and washdown pavement surfaces on or along the site and adjacent streets or properties subject to off-site tracking of sediments or fugitive dust as specified in this Section and the project’s SWPPP specified in Section 01566 - Storm Water Pollution Prevention of these specifications.

5. Cleaning operations shall continue until Work has been finally accepted by METRO in writing.

3.09 SITE SPECIFIC COMMITMENTS

A. Where specific mitigation measures or more rigorous criteria and specifications are identified in such documents, the more stringent requirements shall take precedence over these Specifications.
END OF SECTION 01560
PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for a field office for the exclusive use of METRO and METRO representatives at the Site of the Work. The actual field office shall be provided by the Contractor.

B. Field office provided by the Contractor and equipped with furnishings, fittings, equipment and utility connections, will remain the property of the Contractor and shall be removed from the Site of the Work upon written acceptance of the Work by METRO.

C. The Contractor shall retain responsibility for risk of loss or damage to the field office during performance of the Contract.

D. Field office provided by the Contractor shall be separate from any building used by the Contractor.

1.02 SUBMITTALS

A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Location and Layout

   a. Drawings showing the proposed location of the field office, including access from public streets, parking provisions and utility connections.

   b. Drawings showing the internal space arrangement, windows and accesses for the field office provided by the Contractor.

   c. Location, utility and layout drawings within 5 working days of the effective date specified in the Notice to Proceed.
2. Manufacturer's Data

Manufacturer's complete technical data shall be submitted for new equipment and furnishings. Photographs, with technical data noted thereon, shall be submitted for used furnishings.

PART 2 - PRODUCTS

2.01 FIELD OFFICE, CONTRACTOR-PROVIDED

A. Field office shall be a factory-manufactured, mobile unit at least 10 ft. wide by 30 ft. long having a minimum of 250 sq. ft. of useable floor space. Unit shall be weather tight, resist heat transmission and have a structurally sound foundation and superstructure.

B. Field office shall be free of damage and defects which would impair its suitability to perform the intended function. Field office will be inspected by METRO for suitability, prior to installation at the Site. Field offices found unsuitable will not be approved for use and shall not be transported to the Site.

C. Field office floor space shall be divided into a private office at one end, a restroom, a storage closet, and a general open office space.

D. Field office shall include the following finishes and fittings:

1. Exterior walls, floors and ceilings: Insulated for the climate indigenous to the Houston, Texas area.

2. Floors: Resilient flooring.

3. Restroom fittings: Water closet, lavatory with hot and cold water supply, mirror, soap holder, toilet tissue dispenser and paper towel dispenser.

4. Lighting: General lighting shall be not less than 100 footcandles at desk height. Restroom lighting shall be adequate.

5. Electrical receptacles: Duplex receptacles on 10 ft. centers on all walls, except in restroom.

6. Water cooler: Electric water cooler with refrigerator compartment, drinking cup dispenser, cups and cup disposal.

7. Water heater: Not less than 20 gallon capacity.
8. Heating and air conditioning: Thermostatically controlled system capable of maintaining office spaces at an ambient temperature of between 68 and 78 F in the climate indigenous to the Houston, Texas area.

9. Doors and locks: Restroom door shall have privacy lock. Exterior doors shall have cylinder lock keyed alike and two keys shall be furnished for each lock.

10. Telephone: One (1) telephone with extra long cord and Two (2) service lines, one (1) line with call waiting feature and answering service or answering machine, the second line shall be used for the fax machine.

11. Burglar alarm: Burglar alarm system with a central control box and audible alarm. Alarm system shall be connected to all windows and exterior doors.

12. Tie-downs: Field office shall be secured in place using tie-downs and methods capable of withstanding winds up to hurricane force and meeting local codes.

13. Outside stairs and landing.

E. Unless otherwise directed by METRO, field office shall include the following furnishings and equipment. Furnishings and equipment may be either new or used. Used furnishings and proposed substitutions of equal furnishings, shall be subject to review and approval by METRO.

<table>
<thead>
<tr>
<th>QUANTITY</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Double pedestal desk, Jasper Office Furniture, Model F 2660.</td>
</tr>
<tr>
<td>1</td>
<td>Hi-Lo Thermometer.</td>
</tr>
<tr>
<td>2</td>
<td>Executive posture chair: Jasper Office Furniture, Model 1750.</td>
</tr>
<tr>
<td>1</td>
<td>Conference Table: 30&quot; x 72&quot;</td>
</tr>
<tr>
<td>8</td>
<td>Stack chairs: GF Business Equipment, Model 40/4.</td>
</tr>
<tr>
<td>1</td>
<td>Built-in plan table, in general office open space.</td>
</tr>
<tr>
<td>1</td>
<td>Desk lamp: Art Specialty, Model K4-2241.</td>
</tr>
<tr>
<td>1</td>
<td>Plan rack, 12 stick.</td>
</tr>
<tr>
<td>1</td>
<td>Rain Gauge.</td>
</tr>
<tr>
<td>1</td>
<td>Fire extinguisher, 8-1/2 lb., Class ABC.</td>
</tr>
<tr>
<td>1</td>
<td>First Aid Kit: Zee Medical Products Co., Model 150.</td>
</tr>
<tr>
<td>1</td>
<td>Printing calculator: Sharp, Model EL-2168S, including maintenance and supplies.</td>
</tr>
<tr>
<td>QUANTITY</td>
<td>ITEM</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Coat Rack: Vogel Peterson, Model E4-S-48cDTN.</td>
</tr>
<tr>
<td>1</td>
<td>Fireproof file, 4 drawer: Hon, Model HN-94CP.</td>
</tr>
<tr>
<td>1</td>
<td>Copy machine, with multiple paper trays (3) and enlarge/reduce</td>
</tr>
<tr>
<td></td>
<td>functions. Canon, NP 2020 (or approved equal), including maintenance</td>
</tr>
<tr>
<td></td>
<td>and supplies.</td>
</tr>
<tr>
<td>1</td>
<td>Plain paper fax machine, 14.4 kbps fax modum, with 10 page</td>
</tr>
<tr>
<td></td>
<td>incoming memory, including maintenance and supplies.</td>
</tr>
</tbody>
</table>

PART 3 - EXECUTION

3.01 GENERAL

A. Field office, including utility connections, tie-downs, access and parking therefor shall be installed prior to beginning construction activities at the Site.

3.02 ACCESS AND PARKING

A. Field office shall be located as indicated on the approved location Drawings with clear access from public streets.

B. Parking space shall be provided for not less than three vehicles adjacent to the field office. Signs shall be posted indicating that the parking is reserved for METRO personnel.

C. Access road and parking space shall be graded for drainage and surfaced with gravel, asphalt or concrete so as to provide an all-weather surface.

3.03 SEWER CONNECTION

A. The restroom shall be connected either to an existing sanitary sewer line or to a chemical holding tank. The holding tank shall be serviced as often as necessary to prevent an accumulation of wastes and an unsanitary condition.

3.04 TELEPHONE AND UTILITY SERVICES

A. Telephones and utilities shall be connected and all connection and service charges paid by the Contractor.
3.05 MAINTENANCE

A. Field office shall be maintained and serviced daily, by the Contractor’s forces, during normal working hours. Servicing shall include complete janitorial services including supplies such as soap, toilet tissue, paper towels and cups.

3.06 REMOVAL

A. The utilities shall be disconnected and field office shall be removed from the Site upon written acceptance of the Work by METRO.

B. All evidence of parking, access and utility connections shall be removed and the field office site shall be restored to a satisfactory condition as directed by METRO. Disconnection charges shall be paid and accounts closed out.

END OF SECTION 01590
PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for preparing and submitting requests for substitution for specified products and methods.

1.02 LIST OF PRODUCTS PROPOSED FOR USE

A. General

The Contractor's options in selecting products are limited by requirements of the Contract Documents and governing regulations. They are not controlled by industry traditions or procedures experienced by the Contractor on previous construction projects.

B. Standards

Where products are specified in the Contract Documents by reference standards or code only, any product meeting or exceeding those standards may be proposed. Listing shall indicate the name and address of manufacturer, model number or catalog designation, manufacturer's reference standards and pertinent test data indicating compliance with the referenced standard, code, or regulation.

C. Approved Equal

Where products are specified by naming one or more products and "approved equal", the intent shall be to establish a quality standard, a performance standard and an appearance standard for the product and any other product equaling or exceeding those standards, for the application intended, may be proposed. A formal request for substitution shall be submitted for consideration of any product not specifically named in the Contract Documents. Contractor shall comply with the Contract Documents provisions for substitutions to obtain METRO approval of an unnamed product.

D. Proprietary

Where products are specified by naming only one product, or manufacturer, the intent is to establish not only a quality standard, but continuity to ensure form, fit,
function, and compatibility on all METRO projects and facilities, and not to restrict
competition. Other products may not be accepted, unless the Specification
indicates possible consideration of other products. Advise METRO before
proceeding, when it is discovered that the named product is not a feasible solution.

E. Response

METRO will respond to the Contractor in writing within 10 working days of receipt of
the product-listing submitted. No response by METRO within the 10 working day
time period constitutes no objection to the listed products or manufacturers, but
does not constitute a waiver of the requirement that products comply with the
requirements of the Contract Documents. METRO's response will include the
following:

1. Listing of unacceptable product selections, if any, containing an explanation
   of the reasons for this action.

2. A request for additional data necessary for the review and possible
   acceptance of the products and manufacturer's listed.

1.03 SUBSTITUTIONS FOR PRODUCTS AND METHODS

A. General

Three copies of written requests for substitutions for products or methods, to
replace those items specified or indicated, shall be submitted to METRO in
sufficient time for METRO's review and comment so as not to delay the Work.

B. Limited Approval

1. Approval of substitutions by METRO shall be only for the characteristics and
   use specifically indicated in the approval. Approved substitutions shall
   neither be interpreted as a modification to the Contract Document
   requirements nor as an acceptance of the product or method for any use
   other than that specifically indicated in the approval for the substitution.

2. All Shop Drawings, product data and samples submitted by the Contractor
   shall illustrate details of work, equipment, materials, products, systems,
   designs or workmanship that the Contractor proposes to use in order to
   comply with the design concept established in Contract Documents.
   METRO's review of these submittals is only for the limited purpose of
   checking the same for conformity with the design concept of the Work as
   established in the Contract Documents. This review is not intended to be for
   the purpose of determining the accuracy of other matters that may be
contained in such submittals, including but not limited to such matters as
dimensions, quantities, performance of equipment and systems designed by
the Contractor, Contractor-furnished engineering and design, construction
means, methods, techniques, sequences, procedures or safety precautions,
the correctness of which as set forth in the submittal shall be the sole
responsibility of the Contractor. METRO will undertake its review with
reasonable promptness so as to cause no delay. METRO's review of a
specific item shall not indicate approval of an assembly of which the item is a
component or in which it functions.

C. Suitability Evaluation

Where a request for use of a substitute product or method requires redesign or
rework of another portion of the Work, the time and cost required to effect such
redesign or rework shall be considered in evaluating the suitability of the requested
substitution. The costs of all such redesign or rework as required to incorporate the
substitution shall be considered a part of the Work.

D. Written Requests

In each request, identify the product or fabrication or installation method to be
replaced by the substitution; include related Specification section and Drawing
numbers, and complete documentation showing compliance with the requirements
for substitutions. Include the following information, as appropriate, with each written
request:

1. Complete product data, drawings, descriptions, and procedures
substantiating compliance with the Contract Documents requirements.

2. Detailed comparison of the proposed substitution with the product or method
specified or indicated. Comparison shall include estimated service life in the
application intended, estimated preventive maintenance, spare parts
availability, repair service availability, energy consumption, performance,
operating characteristics and requirements, warranties and other significant
qualities and differences.

3. Product identification including manufacturer's name, address, local
representative and complete literature relative to the proposed substitution.

4. Detailed description of construction methods, means, techniques,
sequences, and procedures, including drawings or photographs illustrating
such items, where necessary for clarification.
5. Provide complete coordination information. Include all changes required in other elements of the Work to accommodate the substitution, including work performed by METRO and other Contractors.

6. Provide a statement indicating the effect the substitution will have on the Work schedule in comparison to the schedule without approval of the proposed substitution. Include information regarding the effect of the proposed substitution on the Contract Period of Performance.

7. Provide complete cost information, including a proposal of the net change, if any in the Contract Sum.

8. Provide certification by the Contractor to the effect that, in the Contractor's opinion, after thorough evaluation, the proposed substitution will result in work that in every significant respect is equal-to or better than the work required by the Contract Documents, and that it will perform adequately in the application indicated. Include in this certification, the Contractor's waiver of rights to additional payment or time due to failure of the substitution to perform adequately.

E. Certification

In making a request for substitution, Contractor shall certify in writing that he will:

1. Provide at least the same guarantee for the substitution as may be required for the product specified or indicated.

2. Coordinate the installation of the substitution and make or have made all necessary adjustments and changes to interfacing work.

3. Replace substitutions which fail to meet the Contract Documents requirements, including substitutions in kind which have not yet failed, if so directed, at no additional cost to METRO.

F. Conditions

The Contractor's request for a substitution will be considered when extensive revisions to the Contract Documents are not required, when the proposed changes are in keeping with the general intent of the Contract Documents, when the requests are timely, fully documented and properly submitted. Substitutions will not be considered if indicated or implied on Shop Drawings or product data submittals for which no written request for substitution has been submitted. The Contractor's submittal of and METRO's acceptance of Shop Drawings, product data or samples which relate to work not complying with requirements of the Contract Documents,
does not constitute an acceptable or valid request for a substitution, nor approval thereof.

G. Notification

Within 7 working days of receipt of the Contractor's request for substitution, METRO will request additional information or documentation as may be needed for evaluation of the request. Within 10 working days of receipt of the request, or within 7 working days of receipt of the requested additional information or documentation, whichever is later, METRO will notify the Contractor of either the acceptance or rejection of the proposed substitution. Acceptance will be in the form of a Change Order. Rejection will include a statement giving reasons for the rejection. METRO's approval of substitutions shall not be construed as approval of the Contractor's methods, means, techniques, sequences, and procedures submitted for clarification purposes at METRO's request.

H. Visual Matching

Where matching an established sample is required, the final judgment of whether a product substitution proposed by the Contractor matches the sample satisfactorily will be determined by METRO. Where there is no product available within the specified product category that matches the sample satisfactorily and also complies with other specified requirements, Contractor shall comply with the provisions of this Section 01630 and the Contract Documents concerning "substitutions" for selection of a matching product.

I. Visual Selection

Except as otherwise indicated, where specified product requirements include the phrase "as selected from the manufacturer's standard colors, patterns, textures..." or similar phrases, the Contractor may select the proposed product and manufacturer, provided the selection complies with other specified requirements. METRO will select the color, pattern and texture from the product line proposed by the Contractor.

J. Producer's Statement of Applicability

Where directed by METRO, the Contractor shall submit a written certified statement from the producer stating that the producer has reviewed the proposed application of the product. This statement shall state that the producer agrees with or does not object to METRO's specification and the Contractor's selection of the product for use in the Work. The statement shall also state that the proposed application of the product on the Work is suitable and proper.
PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01630
SECTION 01700
PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for completing, documenting, and closing out the Project.

1.02 DEFINITIONS

A. Project Closeout

Project closeout is the term used to describe certain collective requirements, indicating completion of the Project, that are to be fulfilled near the end of the Contract Period of Performance in preparation for final acceptance of the Project by METRO, as well as final payment to the Contractor and the normal termination of the Contract.

B. Other Requirements

Specific requirements for individual units of work shall be as included in the appropriate Sections in Divisions 2 through 16 of the Contract Documents.

C. Time

Time of closeout is directly related to "Substantial Completion"; therefore, the time of closeout may be either a single time period for the entire Project or a series of time periods for individual elements of the Project that have been certified as substantially complete at different dates. This time variation, if any, shall be applicable to the other provisions of this Section.

D. Substantial Completion

This milestone shall be the stage of the Project at which when solely determined by METRO, the Project is ready for intended service to the extent required by METRO.
1.03 PREREQUISITES TO SUBSTANTIAL COMPLETION  

A. General  

Contractor shall complete the following, as applicable, before requesting METRO's inspection for certification of Substantial Completion, either for the entire Project or for portions of the Project. List known exceptions in the request.

1. In the progress payment request that coincides with, or is the first request following, the date Substantial Completion is claimed, show either 100% completion for the portion of the Project claimed as "substantially complete", or list incomplete items, the value of incomplete work, and reasons for the work being incomplete. Include supporting documentation for completion as indicated in the Contract Documents.

2. Submit a statement showing an accounting of Change Orders to the Contract Sum.

3. Advise METRO of all pending insurance change-over requirements.

4. Submit specific warranties, workmanship/maintenance bonds, maintenance agreements, final certifications and similar documents.

5. Obtain and submit releases enabling METRO's full, unrestricted use of the Project and access to services and utilities. Where required, include occupancy permits, operating certificates and similar releases.

6. Assemble Record Drawings, maintenance manuals, final photographs, damage or settlement survey, property survey, and similar final record information for turnover after final acceptance.

7. Assemble special tools, spare parts, extra stock of material and similar physical items for turnover after final acceptance.

8. Make the final change-over of locks and transmit the keys to METRO. Advise METRO personnel of the change-over in security provisions.

9. Complete start-up testing of systems, and instruction of METRO operating and maintenance personnel. Discontinue or change over and remove temporary facilities and services from the Project Site, along with construction tools and facilities, mock-ups, and similar elements.
10. Complete final cleaning up requirements, including touch-up painting of marred surfaces. Touch-up and otherwise repair and restore marred exposed finishes.

B. Inspection Procedures

Upon receipt of the Contractor’s request for inspection, METRO will either proceed with inspection or advise the Contractor in writing of unfilled prerequisites. Following the initial inspection, METRO will either prepare the Certificate of Substantial Completion, or will advise the Contractor in writing of work which must be performed before the certificate will be issued. METRO will repeat, or have repeated, the inspection when requested and when assured that the Project has been Substantially Completed. Results of the completed inspection shall form the initial "punch-list" for final acceptance.

1.04 PREREQUISITES TO FINAL ACCEPTANCE

A. General

Contractor shall complete the following, as applicable, before requesting METRO’s final inspection for certification of final acceptance, and final payment as required by the Contract Documents. List known exceptions in request.

1. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final cost statement, accounting for final additional Change Orders to the Contract Sum.

3. Submit a certified copy of the final punch-list of itemized work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance and has been endorsed and dated by METRO.

4. After receipt of Substantial Completion, Contractor shall transfer potable and irrigation water, sanitary, electrical and phone services over to METRO. Utilities shall address their invoices to:

   Director of Accounting
   Metropolitan Transit Authority
   1201 Louisiana, 18th Floor
   P. O. Box 61429
   Houston, Texas  77208-1429
Upon transfer of utilities to METRO, Contractor shall provide documentation on date of utility transfer along with meter readings for potable and irrigation water and electric services.

5. Submit consent of surety.

6. Submit a final liquidated damages or incentive settlement statement, acceptable to METRO.

7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

B. Reinspection Procedure

1. METRO will reinspect the Project upon receipt of the Contractor's notice that the punch-list items resulting from earlier inspections, have been completed, except for those items whose completion has been delayed because of circumstances that are known to and acceptable by METRO.

2. Upon completion of reinspection, METRO will either prepare a Certificate of Final Acceptance, or will advise the Contractor in writing of work that is incomplete or of obligations that have not been fulfilled, but are required for final acceptance. If necessary, the reinspection procedure shall be repeated until final acceptance.

1.05 RECORD DOCUMENTS REQUIRED AT CLOSEOUT

A. General

1. Requirements for Record Documents shall be as indicated herein. General submittal requirements are indicated in the various "Submittals" Articles and in Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications.

2. Do not use Record Documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to Record Documents for METRO's reference during normal working hours.

B. Record Drawings

1. Maintain a Record Drawings set of blue or black line white-prints of Contract Drawings and Shop Drawings in a clean, undamaged condition. Mark-up the set of Record Drawings to show the actual installation where the installed
work varies from the work as originally shown. Mark whichever Drawing is most capable of showing the actual "field" condition fully and accurately; however, where Shop Drawings are used for mark-up, record a cross-reference at the corresponding location on the working drawings. Give particular attention to concealed work that would be difficult to measure and record at a later date.

2. Mark Record Drawing sets with red erasable pencil and where feasible, use other colors to distinguish between variations in separate categories of work.

3. Mark-up new information which is known to be important to METRO, but for some reason was not shown on either Contract Drawings or Shop Drawings.

4. Note related Change Order numbers where applicable.

5. Organize Record Drawing sets into manageable sets, bind with durable paper or cardboard cover sheets, and print suitable titles, dates and other identification on the cover of each set.

C. Record Specifications

Maintain one complete copy of the Contract Documents, including Specifications and Addenda, and one copy of other written documents such as Change Orders and similar modifications issued during construction. Mark these documents to show variations in the actual work performed in comparison with the text of the Specifications and modifications as issued. Give particular attention to substitutions, selection of options and similar information on work where it is concealed or cannot otherwise be readily discerned at a later date by direct observation. Note related Record Drawing information and Record Product Data, where applicable. Upon completion of the Project, submit Record Specifications to METRO for retention.

D. Record Storm Water Pollution Prevention

Maintain inspection reports on storm water pollution prevention, one copy of each revision to the SWPPP and one signed copy of the Notice of Termination, all as specified in Section 01566 - Storm Water Pollution Prevention.

E. Record Product Data

Maintain one copy of each Product Data submittal. Mark these Record Documents to show variations in the actual work performed in comparison with the submitted information. Include both variations in the products as delivered to the Site, and variations from the manufacturer's instructions and recommendations for installation.
Give particular attention to concealed products and portions of the Project which cannot otherwise be readily discerned at a later date by direct observation. Note related Change Orders and mark-up of Record Drawings and Specifications. Upon completion of mark-up, submit complete set of Record Product Data to METRO for retention.

F. Record Sample Submittals

Immediately prior to the date of Substantial Completion, the Contractor shall meet at the Site with METRO personnel who so desire, to determine which, if any, of the submitted samples that have been maintained by the Contractor during progress of the Work, are to be transmitted to METRO for retention.

G. Miscellaneous Record Submittals

Refer to other Sections of these Specifications for requirements of miscellaneous record-keeping and submittals in connection with the actual performance of the Work. Immediately prior to the date of Substantial Completion, Contractor shall complete miscellaneous records and place in good order, properly identified and bound or filed, ready for continued use and reference and submit to METRO for retention.

H. Maintenance Manuals

Contractor shall organize operating and maintenance data into sets of manageable size. Bind data into individual binders, properly identified and indexed. Bind each set of data in a heavy-duty 2-inch, 3-ring vinyl-covered binder, with pocket folders for folded sheet information. Mark the appropriate identification on both front and spine of each binder in accordance with Section 01730 - Operating and Maintenance Data.

1.06 MEASUREMENT AND PAYMENT

No separate measurement or payment will be made for project closeout. This cost will be considered incidental to the total contract bid amount.
1. Contractor shall comply with Section 01730 - Operating and Maintenance Data of these Specifications.

2. Arrange for each Installer of operating equipment and other work that requires regular or continuing maintenance, to meet at the Site with METRO personnel to provide necessary basic instruction in the proper operation and maintenance of the entire Work. Where Installers are not experienced in the required procedures, arrange for instruction by the manufacturer's representatives.

3. As part of this instruction, provide a detailed review of the following items, as appropriate:
   - Maintenance manuals
   - Record Documents
   - Spare parts and materials
   - Tools
   - Lubricants
   - Fuels
   - Identification systems
   - Control sequences
   - Hazards
   - Cleaning
   - WARRANTIES, bonds, maintenance agreements and similar continuing commitments.

4. As part of this instruction, for operating equipment demonstrate the following procedures:
   - Start-up
   - Shut-down
   - Emergency operations
   - Noise, vibration, control, and flow adjustments
   - Safety procedures
   - Economy and efficiency adjustments
   - Effective energy utilization

3.02 FINAL CLEANING

A. General

1. Contractor shall comply with Section 01560 - Environmental Impact Controls of these Specifications. Provide final cleaning of the Project at the time so directed by METRO in writing. Employ experienced workers or professional
cleaners for final cleaning. Clean each surface or unit of work to the condition expected from a normal, commercial cleaning and maintenance program. Comply with the manufacturer's instructions for cleaning and make ready operations.

2. Complete the following cleaning operations before requesting METRO inspection for certification of Substantial Completion:

   a. Remove labels which are not required as permanent UL or FM labels.

   b. Clean transparent materials, including mirrors and glass, to a polished condition. Remove putty and other substances which are noticeable. Replace chipped or broken glass and other damaged transparent materials.

   c. Clean exposed exterior and interim hard-surfaced finishes to a dust-free condition, free of dirt, dust, stains, films and similar noticeable distracting substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors and pavers broom clean. Vacuum interior surfaces.

   d. Wipe and clean surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

   e. Clean the Project Site, including landscape areas, of rubbish, litter and other foreign substances. Sweep paved areas to a broom clean condition; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

B. Pest Control

When so directed in writing by METRO, Contractor shall engage an exterminator to make a final inspection of the Project, and to rid the Project of rodents, insects and other pests.

C. Removal of Temporary Protection

Contractor shall comply with Section 01510 - Temporary Facilities of these Specifications. Except as otherwise indicated or directed in writing by METRO, remove temporary protection devices and facilities which were installed during the course of the Project to protect previously completed work during the remainder of the construction period.
D. Compliance

Contractor shall coordinate his efforts hereunder with Section 01560 - Environmental Impact Controls of these Specifications. Comply with safety standards and governing regulations for cleaning operations. Do not burn waste materials at the Site. Do not bury debris or excess materials on METRO property. Do not discharge volatile or other harmful or dangerous materials into drainage systems. Remove waste materials from the Site and dispose of in a lawful manner. Where extra materials of value, which remain after completion of associated work, have become METRO property, dispose of these materials as directed in writing by METRO.

END OF SECTION 01700
SECTION 01730

OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. This Section specifies the requirements for preparing operating and maintenance data for products, equipment, and systems and for instructing METRO personnel in the operation and maintenance of products, equipment and systems at the Project Site.

1.02 SUBMITTALS

A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Two copies of a preliminary draft of proposed data formats and outlines of contents to METRO for review, not less than 90 calendar days prior to final inspection and acceptance of the Work.

2. Two copies of the completed data in final form to METRO for approval, not less than 30 calendar days prior to final inspection and acceptance of the Work.

3. Six copies of the approved data to METRO for record and retention, within 10 working days after written acceptance of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 OPERATING AND MAINTENANCE MANUALS

A. General

1. Contractor shall comply with Section 01700 - Project Closeout of these Specifications. Operating and maintenance data shall be assembled using the appropriate manufacturer's latest applicable standard commercial data.

2. Data shall be prepared in form of an instructional and operations manual.
B. Format

1. General Title on Cover and Title Page: Operating and Maintenance Instructions.

2. METRO Contract No. and Title.

3. Subject: Mechanical or Electrical Equipment or Systems Identification.

4. Table of Contents and Index.

5. Text: Manufacturer's printed data.

6. Name, address and telephone numbers of manufacturer's local service representative and stock point, subcontractor or installer, and maintenance contractor, as appropriate.

C. Contents

1. Physical and Functional Description of System and Components
   a. System and equipment functions, normal operating characteristics and limiting conditions.
   b. Performance curves, engineering data and tests.

2. Operating Procedures
   a. Safety precautions and pre-operation warnings or cautions.
   b. Start-up, break-in, routine and normal operating instructions.
   c. Control, stopping, shut-down and emergency instructions.
   d. Special operating instructions.

3. Maintenance Procedures
   a. Routine maintenance operations and preventive maintenance schedule.
   c. Adjustment and repair instructions to the level of effort commensurate with METRO operating personnel.
4. Servicing and lubricating schedule, operating hours checklist and log.

5. Manufacturer's printed operating and maintenance instructions.

6. Manufacturer's parts list, illustrations, assembly drawings, diagrams and illustrated parts breakdown.

7. Control and wiring diagrams and one-line schematics.

8. List of original manufacturer's spare parts, manufacturer's current prices, recommended stockage quantities, and name and address of nearest parts vendor or stock point.

D. Manual Updating

Contract technical data shall be maintained current. Updating of operating and maintenance manuals shall be accomplished by the manufacturer, by service bulletins, and other printed notices as revisions occur throughout the life of the equipment.

3.02 OPERATING AND MAINTENANCE INSTRUCTION

A. Prior to acceptance of the completed Project by METRO, METRO personnel shall be instructed in hands-on operation and maintenance of products, equipment and systems. METRO may require others to be in attendance at such demonstrations.

B. The operating and maintenance manual, as specified in Article 1.02 C of this Section, shall constitute the basis of instruction.

C. Start-up, shut-down, emergency operations, lubrication, cleaning, adjustments, safety, and similar operations shall be demonstrated and all procedures pertaining thereto shall be validated.

D. Additional data shall be included to supplement the operating and maintenance manual when the need for such data becomes apparent during instruction.

END OF SECTION 01730
SECTION SS 05300
STEEL ROOF DECKING REMEDIATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. Work of this Section includes, but is not necessarily limited to, replacing deteriorated decking with new decking matching existing in gauge and configuration.

1.02 RELATED SECTIONS

A. Section SS 06100– Miscellaneous Rough Carpentry.

B. Section SS 07200 – Roof Deck and Insulation.

C. Section SS 07600 – Flashing and Sheet Metal

1.03 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section

1. ASTM: American Society for Testing and Materials

   a. A. 446: Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.


2. AWS: American Welding Society


3. FS: Federal Specifications

   a. TT-P-641: Primer Coating, Zinc Dust-Zinc Oxide (for Galvanized Surfaces).
4. SDI: Steel Deck Institute

5. City of Houston Building Code.

B. Section 01451 – Project Quality Control.


D. Performance Requirements

   Roof deck units shall be installed and anchored to support the indicated design loads and shall achieve the UL Class 90 Wind Uplift Resistance classification.

E. Qualification for Welding

   Welding procedures shall be in accordance with AWS D1.1 and all welders, welding operators and tackers shall be qualified in accordance with ASW D1.1.

F. Installer Qualifications

   Installer shall be licensed or authorized by manufacturer/licensee, with a minimum of 5 years experience in installation of metal roofing systems similar to the Projectspaceframe roof.

1.04 SUBMITTALS

A. In accordance with Section 01340-Shop Drawings, Product Data Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Shop Drawings

   Shop Drawings showing layout and type of deck panels, details of fabrication and erection, including materials, finishes, dimensions, methods of joining, welding, accessories, fastenings, and reinforced openings through deck.

2. Product Data
Manufacturer's literature indicating product specifications and roof decking and accessory installation instructions.

3. Certificated & Qualification Procedures

Welding certificated and qualification procedures, if requested by METRO, for each welder, welding operator and tacker.

1.05 PRODUCT HANDLING

a. Section 01660– Products and Substitutions.

b. Store off ground with one end elevated to provide drainage.

c. Do not allow installation of damaged or otherwise non-complying material.

1.06 REPLACEMENT

A. In the event of damage, immediately make all necessary repairs and replacements to the approval of and at no additional cost to the owner.

1.07 STANDARDS

A. Steel Deck Institute.

1.07 WARRANTY

A. Provide a 2-year contractor's warranty to correct defects in material or workmanship within a two-year period after Date of Substantial Completion or Final Acceptance.

PART 2 - PRODUCTS

2.01 METAL DECK

A. Matching existing in gage, profile, and finish. Minimum of:
   Section Modulus 0.073
   Moment of Inertia 0.037
   Design Thickness 0.0179
   26 Gauge

B. Galvanizing

   ASTM A 525, Coating G 90.
C. Accessories

Anchor clips, vent clips, flexible closure strips, welding washers, flashing, saddle plates, sump pans, and other accessories shall be those types, sizes and configurations recommended by the roof decking manufacturer for a UL Class 90 rating, and shall be of the same material and finish as the deck units.

D. Galvanizing Repair Paint

Solvent Based, inorganic, two-component, zinc-rich coating, FS TT-P-641.

E. Closure Strips

Decking manufacturer's standard vulcanized, closed-cell, synthetic rubber.

F. Screws

Screws for connection to structural supports shall be 12-14 x 3/4" HWH teks 3, 4, or 5 self-drilling self-tapping as recommended by manufacturer for material thickness or approved equal.

Screws for metal deck side lap connections shall be 12-14 3/4" HWH teks/1 self drilling self-tapping or approved equal.

2.02 – FABRICATION

A. General

Roof deck units shall be fabricated in lengths to span three or more support with flush, telescoped or nested 2 in. laps at the ends and nested side laps, unless otherwise indicated.

B. Metal Closure Strips

Metal closure strips shall be fabricated for cell raceways and openings between decking and other construction. Closure strips shall be a minimum of 18 gauge sheet metal and formed to provide tight-fitting closures at open ends of cells and sides of decking.

C. Roof Sump Pans

Roof sump pans shall be fabricated from a single piece of sheet metal a minimum of 14 gauge thick. Sump pans shall have level bottoms and sloping sides unless otherwise indicated. Pans shall be of adequate size to receive roof drains and have bearing flanges a minimum of 3 in. wide.
Pans shall be recessed a minimum of 1-1/2 in. below deck surface.
Opening for drains shall be field cut.

PART 3 – EXECUTION

3.01 DEMOLITION

A. Remove existing decking in entire sections.
B. Protect building interior, contents, and occupants to assure that debris does not enter building and to prevent harm to occupants.

3.02 INSTALLATION

A. Roof deck units shall be installed in accordance with the manufacturer's recommendations, ready to receive the insulation specified in Section 7200 Roof Deck and Insulation.
B. Steel deck units shall be anchored to supporting members, including bearing walls, to provide lateral stability to the top flange of the supporting structural members.
C. Steel deck units shall be anchored to supporting members to resist the gross uplift force of 45 pounds per square foot minimum.
D. All deck shall be securely fastened to supporting structural members by the use of self-drilling metal screws.
E. All roof deck shall be attached at a maximum of 1211 O.C. at ends and intermediate supports of each deck unit.
F. For spans 6 feet, or less, side laps shall be fastened together at the center point of lap; and for spans greater than 6-feet, and side laps shall be fastened together at the third points.
G. End laps shall be overlapped a minimum of two 2 inches.
H. Ensure that fasteners do not penetrate conduit or miscellaneous piping located at bottom of the decking.
I. Place deck in straight alignment for entire length of run with adjoining deck units.
J. Place deck units flat and square, secured to adjacent framing without warp or excessive deflection.
K. Cutting and Fitting

Deck units and accessories shall be cut and fit neatly around other work projecting through or adjacent to the decking.

L. Reinforcement of Openings

Openings in decking shall be reinforced and have closure strips as necessary for strength, continuity of decking and support of other work.

A. Roof Sump Pans

Roof sump pans shall be installed at each opening provided for roof drainage. Sump pans shall be welded to the top decking surface with welds at each corner and a maximum of 12 in. o.c. along each side. Openings for drains shall be cut after sumps have been securely installed.

M. Closure Strips

a. Metal closure strips shall be welded to roof decking at open, uncovered ends and edges of decking and in voids between decking and other construction.

b. Flexible closure strips may be used in lieu of metal closure strips, wherever their use will ensure complete closure. Flexible closure strips shall be installed with adhesive in accordance with the manufacturer’s instructions.

N. Provide approved structural supports at all penetrations larger than 6 inches, on any side.

O. Painting On Exposed Side

Finish coating shall be in accordance with Section 09900, Painting.

P. Touch-up

After decking installation is complete, all unfinished scarred areas, welds and rust spots shall be wire brushed, solvent cleaned, and painted with galvanizing repair to like new condition.

Q. Anchorage and Design

Steel deck units shall be anchored to supporting members, including bearing walls, to provide lateral stability to the top flange of the supporting structural members and to resist the following gross uplift forces:
a. 45 pounds per square foot for eave overhangs.

b. 30 pounds per square foot for all other roof areas.

The dead load of the roof deck construction shall be deducted from the aforementioned uplift forces.

3.03 COORDINATION

A. Coordinate all work closely with owner’s representative.

B. Work cannot disrupt owner’s activities. Care shall be taken that no work is done without owner’s approval on a daily basis.

3.04 CLEAN UP

A. Section 01700– Project Close Out.

3.05 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all components are complete and properly installed.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. STEEL DECK REPLACEMENT shall be measured per Square Foot and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form for “Extra Work Items”. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
PART 1 - GENERAL

1.01 DESCRIPTION

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. Work of this section includes replacing deteriorated or damaged rough carpentry, and installation of new carpentry where indicated on the Drawings are as required for the installation of adjoining components.

1.02 RELATED SECTIONS

A. Section SS 05300 – Metal Roof Decking.

B. Section SS 07220 – Building Insulation.

C. Section SS 07511 – Built-Up Asphalt Roofing

1.03 QUALITY ASSURANCE

A. Section 01451 – Project Quality Control.

B. Miscellaneous Rough Carpentry Lumber: Visible grade stamp of agency certified by SFPA.

C. Provide Underwriters’ Laboratories (UL) approved identification for fire resistant treated materials.

D. Provide manufacturer’s approved identification for wood preservation pressure treated wood.

1.04 REGULATORY REQUIREMENTS

A. Conform to applicable building code, latest edition, for fire retardant requirements of wood.

B. Conform to FM Bulletin I-49 for securement requirements.

1.05 SUBMITTALS

A. Section 01340 – Shop Drawings, Product Data (Samples and Record Documents).
B. Submit manufacturer's certifications that wood treatment is in accordance with applicable requirements.

1.06 WARRANTY

A. Provide a 2-year contractor’s warranty to correct defects in material or workmanship within a two-year period after Date of Substantial Completion or Final Acceptance.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Lumber and Wood Nailers: No. 2 Grade Yellow Pine or Standard Douglas Fir.

B. Plywood: 3/4 inch, Exterior grade.

C. Wood Treatment: Wood Preservative (Pressure Treatment). Shop pressure treatment using waterborne preservatives; Osmose K-33, 0.25 pounds per cubic foot of preservative, maximum 19 percent moisture content prior to pressure treatment.

D. Schedule of Fasteners (Blocking, Nailers, Framing, Curbs, Coping Cap):
   1. General:
      a. Fasteners compatible to all contacted materials so that dielectric corrosion does not occur.
      b. Unless shown otherwise on Drawings, maximum fastener spacing shall be 8 inches on-center.
   2. Dimension Wood and/or Plywood Substrate: Common nails, galvanized, for exterior, high humidity, and treated wood locations; size as required to suit application.
   3. Sheet Metal Deck Substrate: Truss Head Roof Screws, Phillips drive, high-performance coated steel, drill point, FM/UL approved, length to suit application (minimum 1/2 inch deck penetration).
   4. Concrete, CMU and Brick Masonry Substrate: 1/4-inch diameter, one-step steel screw anchor; Phillips head; length as required to ensure 1 inch minimum embedment into substrate; such as Rawl Tapcon Fasteners, or approved equivalent.
   5. Structural Steel Substrate: Hex-Head Cap Screws with washers and nuts, Grade 8 Zinc-Plated Alloy Steel; 1/4-inch diameter (minimum); length to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work.

B. Verify mechanical, electrical, and building items affecting work of this Section are placed and ready to receive this work.
C. Beginning of installation means acceptance of existing conditions.

3.02 FIELD TEST

A. Before proceeding with routine fastener installation, perform a minimum of two pullout tests on each fastener/substrate condition. Tests should be performed in general conformance with ASTM E 488.

B. Notify Owner and Roof Consultant of tests a minimum of 24 hours before proceeding with the tests. Consultant or Owner may be present to observe the tests.

C. If any of the pullout test resistance are less than the minimum specified by the respective fastener manufacturer, immediately notify the Owner and Consultant orally and in writing. Do not proceed with the installation of that fastener type until authorized by Owner.

C. Consultant shall review deficient fastener installation conditions and provide a recommendation of alternate fasteners, if necessary.

3.03 PREPARATION

A. Before installation, prime and paint wood surfaces of items or assemblies to be in contact with other materials.

B. Install new or modify existing wood curbs to meet the requirements indicated in the Drawings and/or Specifications. Take care not to damage existing equipment. Coordinate this activity with Owner.

C. New curbs should be of sufficient height to lift existing roof mounted equipment a minimum of 8 inches above the finished roof surface.

3.04 INSTALLATION

A. Set and secure materials and components in place, plumb, level and properly aligned.

B. Bring areas of wood members or assemblies suspected of being deteriorated or otherwise damaged to the attention of Consultant or Owner and obtain written approval to repair suspected areas prior to proceeding with repair of the area.

C. Install wood nailers, and as shown in Details and/or in accordance with manufacturer's recommendations.

D. Wood Nailer Installation: Attach new nailers to substrate with two rows of appropriate fasteners spaced 24 inches on-center. Offset fasteners from underlying wood nailer fasteners.
E. Wood Curb Installation: Fasten wood curb to nailer with appropriate fastener spaced a maximum of 12 inches on-center; minimum of three fasteners per side.

F. Ensure that existing wood nailers, curbs, and blocking to remain in place are fastened to the substrate in accordance with the above-specified fastening requirements. Correct any deficiencies.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. MISCELLANEOUS ROUGH CARPENTRY shall be measured per Linear Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07015
PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Full tear-off of entire roof system down to steel deck.
   2. Full tear-off of flashings and counterflashings.

B. Related Requirements:
   1. Section 01010 “Summary of Work” for use of premises and for phasing requirements.
   2. Section 01510 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.

1.3 UNIT PRICES

A. Allowance for removal of existing deteriorated metal roof deck, and replacement with new metal roof deck, is specified under Section 01 22 00 "Unit Prices."

B. Allowance for removal of existing deteriorated wood nailers and curbs, and replacement with new wood, is specified under Section 01 22 00 "Unit Prices."

1.4 DEFINITIONS

A. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.

B. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.5 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at the project site.
   1. Meet with Owner, Architect, Consultant, and Owner's insurer, if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:
a. Reroofing preparation, including roofing system manufacturer's written instructions.
b. Existing roof drains and roof drainage during each stage of reroofing, and roof drain plugging and plug removal.
c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
d. Existing roof deck conditions requiring Architect notification.
e. Existing roof deck removal procedures and Owner notifications.
f. Condition and acceptance of existing roof deck substrate for reuse.
g. Structural loading limitations of roof deck during reroofing.
h. Special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
i. HVAC shutdown and sealing of air intakes.
j. Shutdown of fire-suppression, protection, and alarm and detection systems.
k. Governing regulations and requirements for insurance and certificates if applicable.
l. Existing conditions that may require Architect notification before proceeding.

1.6 ACTION SUBMITTALS

A. Section 01340 “Shop Drawings, Product Data (Samples and Record Documents)

B. Product Data: For each type of product.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
   1. Include certificate that Installer is approved by warrantor of existing roofing system.
   2. Include certificate that Installer is licensed to perform asbestos abatement.

B. Field Test Reports:
   1. Fastener pullout test report.

C. Photographs: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.
   1. Submit before Work begins.

1.8 CLOSEOUT SUBMITTALS

A. Section 01340 “Shop Drawings, Product Data (Samples and Record Documents)

B. Section 01770 “Closeout Procedures”.

1.9 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with governing EPA notification regulations before beginning roofing removal.
   2. Comply with haulng and disposal regulations of authorities having jurisdiction.

1.10 FIELD CONDITIONS

A. See notes on Drawings sheets.

B. Owner will occupy portions of building immediately below reroofing area.
   1. Conduct reroofing so Owner's operations are not disrupted.
   2. Provide Owner with not less than 72 hours' written notice of activities that may affect Owner's operations.
   3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
   4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.
      a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.

C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
   1. The results of an analysis of core sampling from existing roofing system are presented on under notes on the Drawings sheets.
   2. Construction Drawings and Project Manual for existing roofing system are provided for Contractor's convenience and information, but they are not a warranty of existing conditions. They are intended to supplement rather than serve in lieu of Contractor's own investigations. Contractor is responsible for performing own investigative procedures.

F. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
   1. Remove only as much roofing in one day as can be made watertight in the same day.
G. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.
   1. Hazardous materials will be removed by Owner before start of the Work.
   2. Existing roof will be left no less watertight than before removal.
   3. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.
      a. Hazardous materials will be removed by Owner under a separate contract.

H. Hazardous Materials: A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
   1. Hazardous material remediation is specified elsewhere in the Contract Documents.
   2. Do not disturb hazardous materials or items suspected of containing hazardous materials except according to procedures specified elsewhere in the Contract Documents.
   3. Coordinate reroofing preparation with hazardous material remediation to prevent water from entering existing roofing system or building.

PART 2 - PRODUCTS

2.1 INFILL AND REPLACEMENT MATERIALS

A. Steel roof decking repair or replacement is specified in Section 05300 “Metal Roof Decking”.

B. Wood blocking, curbs, and nailers are specified in Section 06100 "Miscellaneous Rough Carpentry."

C. Plywood roof sheathing is specified in Section 06100 "Miscellaneous Rough Carpentry."

D. Fasteners: Factory-coated steel fasteners with metal or plastic plates listed in FM Approvals' RoofNav, and acceptable to new roofing system manufacturer.

2.2 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

PART 3 - EXECUTION

3.1 PREPARATION

A. Shut off rooftop utilities and service piping before beginning the Work.

B. Test existing roof drains to verify that they are not blocked or restricted.
   1. Immediately notify Architect of any blockages or restrictions.
C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.
   1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

E. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.
   1. Prevent debris from entering or blocking roof drains and conductors.
      a. Use roof drain plugs specifically designed for this purpose.
      b. Remove roof drain plugs at end of each workday, when no work is taking place, or when rain is forecast.
   2. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding.
      a. Do not permit water to enter into or under existing roofing system components that are to remain.

3.2 ROOF TEAR-OFF

A. Lower removed roofing materials to ground and onto lower roof levels, using dusttight chutes or other acceptable means of removing materials from roof areas.

B. Full Roof Tear-off: Remove existing roofing and other roofing system components down to the existing roof deck.
   1. Remove roof insulation.
   2. Remove base flashings and counterflashings.
   3. Remove perimeter edge flashings.
   4. Remove copings.
   5. Remove expansion joint covers.
   6. Remove flashings at pipes, curbs, mechanical equipment, and other penetrations.
   7. Cover through-wall scuppers as indicated on Drawings.
   8. Remove fasteners from deck or cut fasteners off slightly above deck surface.
   9. Inspect wood blocking, curbs, and nailers for deterioration and damage.
      a. If wood blocking, curbs, or nailers have deteriorated, immediately notify Architect.
      b. Removal is paid for by adjusting the Contract Sum according to unit prices included in the Contract Documents.

3.3 DECK PREPARATION

A. Inspect deck after tear off of roofing system.
B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect.
   1. Perform repairs in accordance with section 05 31 23.13 “Steel Roof Decking Remediation”.

C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect.
   1. Do not proceed with installation until directed by Architect.

3.4 BASE FLASHING REMOVAL

A. Remove existing base flashings.
   1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain.
   1. Replace metal counterflashings damaged during removal with counterflashings of same metal, weight or thickness, and finish as existing, or as shown on the architectural drawings.

C. Inspect parapet sheathing, wood blocking, curbs, and nailers for deterioration and damage.
   1. If parapet sheathing, wood blocking, curbs, or nailers have deteriorated, replace with material of same type, thickness, and manufacturer treatment to match existing or better.

D. Remove existing parapet sheathing and replace with new parapet sheathing to comply with Section 061600 “Sheathing.”
   1. If parapet framing, wood blocking, curbs, or nailers have deteriorated, replace with material of same type, thickness, and manufacturer treatment to match existing or better.

3.5 FASTENER PULLOUT TESTING

A. Perform fastener pull-out tests according to SPRI FX-1, and submit test report to Architect and to roofing manufacturer before installing new roofing system.
   1. Obtain Architect's and roofing manufacturer's approval to proceed with specified fastening pattern.
      a. Roofing manufacturer to furnish fastening pattern commensurate with pullout test results or in accordance with Factory Mutual RoofNAV assembly number.

3.6 DISPOSAL

A. Collect demolished materials and place in containers.
   1. Promptly dispose of demolished materials.
   2. Do not allow demolished materials to accumulate on-site.
   3. Storage or sale of demolished items or materials on-site is not permitted.
B. Transport and legally dispose of demolished materials off Owner's property.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. PREPARATION FOR REROOFING shall be measured per Square Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07220

ROOF AND DECK INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 REFERENCES

A. Section SS 05300 – Steel Roof Deck Remediation
B. Section SS 06100 – Miscellaneous Rough Carpentry
C. Section SS 07511 – Built-Up Asphalt Roofing
D. Section SS 07600 – Flashing and Sheet Metal

1.03 QUALITY ASSURANCE

A. Section 01430 – Quality Assurance.

1.04 DELIVERY, STORAGE, AND PROTECTION.

A. Section 01660 – Product Storage and Handling Requirements.

1.05 REGULATORY REQUIREMENTS

A. Fire hazard classification: UL Class A
B. Roof Assembly Classification: Conform with applicable RoofNAV assembly number #390823-389939-0.

1.06 SUBMITTALS

A. Section 01330 – Submittal Procedures.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Insulation:
1. Polyisocyanurate Insulation:
   a. Insulation to be closed cell, polyisocyanurate foam core with factory laminated facers. Insulation shall have 2.0-pound (nom.) density as per ASTM D 1622. Board shall have a fiberglass reinforced facer mat on both sides. Insulation to be supplied in 4 feet by 8 feet at thickness to meet R-25. Provide tapered boards with 0.50-inch per lineal foot for crickets and 1-inch per lineal foot for drain sumps.
   b. Approved products for membrane manufacturers:
      1. ACFoam II
      2. As approved.

2. Gypsum Board: Nonstructural, glass mat-faced, non-combustible, water-resistant roof board used as a thermal fire-barrier, recover board, or as a bonding surface, meeting the requirements of UL Class A. Supply board with dimensions of 4 feet by 8 feet by 1/2 inch. Approved manufacturer and product: Securock, or as approved.

C. Fasteners
   1. Factory assembled screw and 3-inch Galvalume stress plate. Steel screw coated with CR-10 corrosion resistant coating, exhibiting less than 15 percent red rust after 30 Kesternich cycles, meeting requirements of FM Standard 4470. Length of fastener to penetrate top flute of steel deck minimum 3/4 inch.
   2. Approved manufacturers and products:
      a. OMG, ASAP 3S.
      b. As approved.

PART 3 - EXECUTION

3.01 DECK PREPARATION

A. Examine decking for deflection, depressions, cracks and breaks. Make all necessary corrections prior to installation of board insulation.

B. Repair or replace deteriorated or steel decking, Section SS 05300.

C. Install no more insulation than can be covered in one day.

D. Ensure wood nailers and associated members are installed prior to installing board insulation. Nailer height shall match insulation thickness.

E. Ensure installed board insulation provides positive slope-to-drain and does not provide for ponding water beyond 48-hours, or as required by membrane manufacturer.

F. Install insulation as per 3.03 of this Specification.
3.02 INSTALLATION

A. Mechanically Attached
   1. Loose lay board insulation over steel decking.
   2. Offset and tightly butt insulation joints, minimum 6 inches. Fit insulation snuggly around penetrations.
   3. Offset from adjoining boards and stagger from previously installed layers minimum 6 inches.
   4. Fill gaps measuring 1/4 inch or greater with same insulation.
   5. Ensure tapered provides positive slope to drain.
   6. Ensure installed tapered insulation does not allow for ponding water exceeding 48 hours in duration.
   7. Fill gaps measuring ¼-inch or greater with same insulation.
   8. Secure with fasteners and stress plates to meet FMG RoofNAV assembly number.

3.03 CLEAN-UP

A. Section 01742 – Final Cleaning
   B. Examine installed insulation to ensure all components are installed and complete. Verify insulation is fully adhered, providing a solid and smooth surface for application of the roofing membrane.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. BUILDING INSULATION shall be measured per Square Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07511

BUILT-UP ASPHALT ROOFING

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 RELATED SECTIONS

A. Section SS 05300 – Steel Roof Deck Remediation
B. Section SS 06100 – Miscellaneous Rough Carpentry
C. Section SS 07600 – Flashing and Sheet Metal

1.03 REFERENCES

B. UL – Fire Resistance Directory

1.04 SYSTEM DESCRIPTION

A. Roof membrane to consist of three plies of fiberglass felt set in moppings of hot asphalt, and a cool roof rated granule surfaced modified asphalt cap sheet.
B. Base Flashing System – Asphalt built-up membrane with a cool roof rated granule surfaced cap sheet.

1.05 WARRANTY AND GUARANTEE

A. Provide a manufacturer’s ten year No-Dollar-Limit (NDL) warranty to repair any defects in material or workmanship.
B. Provide a two-year contractor’s guarantee to repair defects in material or workmanship. Defects shall include, but not limited to, the following:
   1. Leakage of water into the building’s interior, resulting from roofing construction defects.
   2. Leakage of bitumen inside or outside the building.
   3. Blistering, tearing, subsurface moisture, or other physical defect.

1.06 SUBMITTALS FOR REVIEW

A. Section 01330 – Submittals Procedures.
1.07 SUBMITTALS FOR PROJECT CLOSEOUT
   A. Section 01770 – Contract Closeout.

1.08 QUALITY ASSURANCE
   A. Section 01430 – Quality Assurance.
   B. Perform Work in accordance with manufacturer’s instruction.
   C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
   D. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.

1.09 REGULATORY REQUIREMENTS
   A. Fire Hazard Classification: UL Class A.
   B. Roof Assembly Classification: Conform with applicable RoofNAV assembly numbers for zones, and their respective wind uplift ratings:
      1. Field of roof - #418316-418214-0 (FM1-90).
      2. Perimeters - #390823-389939-0 (FM-165).
      3. Corners - #196332-196327-0 (FM 1-225)

1.10 PREINSTALLATION MEETING
   A. Section 01311 – Project Meetings.

1.11 DELIVERY, STORAGE, AND PROTECTION
   A. Section 01660 – Materials and Equipment.

1.12 ENVIRONMENTAL REQUIREMENTS
   A. Section 01660 – Materials and Equipment.
   B. Do not apply roofing membrane during unsuitable weather when ambient temperature, or wind chill factor, is below 40 degrees Fahrenheit.
   C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
   D. Do not expose materials vulnerable to water or sun damaging quantities greater than can be weatherproofed the same day.
PART 2 - PRODUCTS

2.01 GENERAL

A. Product and product requirements have been provided in this Section for the installation of the roofing membrane. Products are to be purchased from the primary manufacturer. Products not available from the primary manufacturer shall be purchased from a manufacturer approved source.

2.02 ROOFING MEMBRANE

A. Roofing membrane components:
   1. Glass Fiber Felts: Meeting requirements of ASTM D 2178, Type IV, consisting of glass fiber reinforcement mat coated on both sides with weathering grade asphalt.
   2. Cap Sheet: Meeting ASTM D6164, Type II, Grade G SBS modified asphalt membrane constructed of heavy-duty polyester mat and surfaced with cool roof rated reflective chips or ceramic granules meeting City of Houston Commercial Energy Conservation Code reflectivity and emissivity values.

B. Approved manufacturers:
   1. Certainteed
   2. Firestone
   3. GAF
   4. Johns Manville
   5. Polyglass
   6. Siplast
   7. Soprema
   8. Tremco
   9. US Ply

2.03 ROOFING MATERIALS

A. Bituminous Materials:
   1. Asphalt Bitumen: ASTM D 312, Steep, Type IV.

B. Fiber Cants:
   1. Wood fiber, preformed to 45-degree angle with nominal 3-1/2 inch horizontal and vertical lengths, as acceptable to the Primary Membrane Manufacturer.
   2. Treated wood cant measuring 4-inches wide by 4-inches tall.

C. Accessories:
   1. Section 07726 – Non-Penetrating Portable Rooftop Supports.
   2. Protection Pad for Conduit/Pipe Support Blocks: SBS modified bitumen.
3. Lead Jacks: 4-lbs lead, extending a minimum of four inches beyond the base of the vent stack, and crimped a minimum of one inch into the vent stack.
4. Fasteners: Fasteners for roof securement will be ring shanked, stainless steel or hot-dipped zinc, double coated, with one-inch caps.
5. Pourable Sealer: Used to fill pitch pans, as manufactured by primary manufacturer.

PART 3- EXECUTION

3.01 GENERAL

A. Installation shall be in accordance with the manufacturer's recommendations and with the general recommendations of the NRCA.

B. All roofing materials described in Part 2 will be supplied by the manufacturer, or be supplied by a secondary source approved by the Primary Manufacturer. Such approval will be established by the Primary Manufacturer and documented in writing.

C. Heating of Asphalt: Have laboratory calibrated thermometer on site. Do not heat asphalt above the manufacturer's written recommended maximum limit. If information is not furnished by the manufacturer, the following maximum heating temperatures shall be used as guidelines:
   1. Asphalt (Type IV)
      a. Bitumen shall not be heated to or above the actual Cleveland Open Cup (COC) Flash Point. (ANSI/ASTM Method D 92, test method for Flash and Fire Points.)
      b. Bitumen shall not be heated and held above the Finished Blowing Temperature (FBT) for more than four hours.
      c. Application of Asphalt – Continuously mop asphalt and apply at the rate recommended by the Primary Manufacturer, but not less than 25 pounds per 100 square feet (+ 15 percent). Apply asphalt at Equiviscous Temperature (EVT) plus or minus 25 degrees Fahrenheit.

3.02 INSPECTION

A. Verify that surfaces and site conditions are ready to receive work.

B. Verify that substrate is supported and secured.

C. Verify that substrate is clean and smooth, free of depressions, waves, or projections.

D. Verify that deck surfaces are free of moisture.

E. Verify that insulation boards, roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, and cant strips, wood nailing strips, and reglets are in place.

F. Apply primer to substrates to receive roofing membrane or base flashings. Apply primer at rate of 1-1/2 gallons per 100 square feet. Allow primer to dry.
G. Beginning of installation means installer accepts existing surfaces.

3.03 APPLICATION

A. Roof Installation per RoofNAV Assembly Number

1. Field of roof - RoofNAV Assembly #418316-418214-0 (FM 1-90):
   If the existing roof deck securement to the structure is found to be secured with minimum 5/8-inch diameter puddle welds at 12-inch oc, then extra deck securement would not be required for the field of roof areas on each roof section. This should be verified when the deck is exposed and prior to installation of the new roof components. The cover board securement rate should be at least 1 fastener per 4 sf (8 fasteners per 4-ft by 8-ft board).

2. Perimeters - RoofNAV Assembly #390823-389939-0 (FM 1-165)
   The roof deck would need to be resecured to the roof structure using FM approved deck fasteners spaced 6-inch oc (every deck rib). The cover board securement rate would need to be at least 1 fastener per 1.33 sf (24 fasteners per 4-ft by 8-ft board).

3. Corners – RoofNAV Assembly #196332-196327-0 (FM 1-225)
   The roof deck would need to be resecured to the roof structure using two (2) FM approved deck fasteners (plus ¾-inch washer if compatible) in every deck rib (double stitched). The cover board securement rate would need to be at least 1 fastener per 1 sf (32 fasteners per 4-ft by 8-ft board).

B. Roofing Ply Installation

1. Install rigid board insulation in accordance with Section 07220.
2. Over insulation board, and starting at the low point of the roof, set ply felts in solid moppings of asphalt. Install a 12-inch wide, a 24-inch wide, then 36-inch wide felts.
3. Install subsequent plies with 11.33-inch exposures.
4. Ensure that asphalt bleedout occurs along the side and end laps. At no time shall dry laps, or “felt on felt”, be allowed to occur.
5. Squeegee or "broom" felts promptly to eliminate air pockets and wrinkles, and to ensure proper adhesion. Felts should be smooth and free from fishmouths, blisters, wrinkles, ridges or tears.
6. Prevent foot or vehicle traffic from crossing newly laid glass fiber felts until bitumen cools to below softening point.
7. Ensure field of roof extends up cant strips and is trimmed level 2 inches above the height of the cants or as directed by the primary manufacturer.
8. Install water cutoffs at the end of day's operation. Remove prior to resuming additional work. Seal perimeters to achieve a watertight condition.

C. Embedded Metals

1. Fabricate hooded vents, pitch pans, lead jacks, and perimeter fascia in accordance with Section 07620 Sheet Metal Flashing and Trim.
2. Install sheet metal components and other roof penetration metal flashings only over the installed field of roof.
3. Prime the flanges of the metal flashings and allow to dry.
4. Set metal flashings in a solid bed of mastic. Secure flanges to wood blocking or substrate with appropriate fasteners installed at 3 inches on center.
5. Strip-in the flanges with two plies for fiberglass felt set in solid moppings of asphalt.
6. Crimp lead jacks inside the soil stacks a minimum of 1 inch.
7. Fill bottom 2 inches of pitch pans with a non-shrink grout. Fill in top 2 inches of pitch pan with pourable sealer.

D. Cap Sheet Installation
1. Insure field of roof, base flashings, and strip-in plies have been completely installed. Correct all wrinkles, blisters, fishmouth, ridging, and other defects in the completed membrane prior to installation of the cap sheet. Insure that field of roof is free of dirt, debris, and moisture prior to application of the surfacing.
2. Consultant shall inspect the completed field of roof prior to surfacing application. All punch list items shall be completed prior to cap sheet installation.
3. Over completed field of roof membrane install granule surfaced cap sheet in accordance with primary manufacturer instruction.

E. Base Flashing Installation
1. Prime vertical surfaces and allow to dry. Surfaces primed and allowed to be exposed overnight shall be primed the day the membrane is installed over the vertical surface.
2. Maintain 8-inch minimum height at all base flashings, ensuring that they are fully adhered to the curb and field of roof.
3. Fully adhere base flashings to vertical surfaces, extending flashings onto the field of roof as shown on the drawings or directed by the primary manufacturer.
4. Ensure bleedout occurs along the edges of the base flashings, embedding loose granules into the bleedout.
5. Curbs: Secure the top of the base flashing to the curb with ring shanked nails with caps spaced at 3 inches on center.

3.04 WATER CUT-OFF APPLICATION

A. Construct temporary water cut-offs at the end of each working day. Ensure that the underside of the membrane, insulation, and facility interior is protected from moisture infiltration.

B. Remove water cut-off for continued installation of the roofing system.

3.05 CLEANING

A. Remove all construction debris and equipment from the job site prior to job completion.
B. Remove all bituminous markings from existing surfaces.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT
A. BUILT–UP ASPHALT ROOFING shall be measured per Square Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07600

FLASHING AND SHEET METAL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. Install new sheet metal components as described in these Specifications and as indicated on the Drawings. The following items are included:
   1. New coping cap.
   2. New fascia.
   3. New continuous cleat.
   4. New equipment counterflashings and receivers.
   5. New hooded vents and pitch pans.

1.02 RELATED SECTIONS

A. Section SS 07511 – Built-Up Asphalt Roofing

1.03 WARRANTY AND GUARANTEE

A. Provide a two-year contractor’s guarantee to repair defects in material or workmanship. Defects shall include, but not limited to, leakage of water into the building’s interior due to poor workmanship or material defect.

1.04 SUBMITTALS FOR REVIEW

A. Section 01340 – Shop Drawings, Product Data (Samples and Record Documents)

1.05 SUBMITTALS FOR PROJECT CLOSEOUT

A. Section 01700 – Project Close out.

1.06 QUALITY ASSURANCE

A. Section 01451 – Project Quality Control.

B. Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

C. Applicator Qualifications: Company specializing in performing the work of this section with minimum five years documented experience.
1.07 REGULATORY REQUIREMENTS

A. Fire Hazard Classification: UL Class A.

B. Factory Mutual Global Data Sheet 1-49.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Section 016600 – Product Storage and Handling Requirements.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Sheet Metals:
   2. Galvanized Steel: ASTM A 525, G90 coating weight.
   3. Prefinished Steel: Kynar 500 coated, meeting following requirements. Owner shall select color:
      a. ASTM G-23 – Accelerated weathering.
      b. ASTM 2247 – Humidity resistance.
      c. ASTM D 3363 – Hardness.
      d. ASTM D 2794 – Impact Resistance.
   4. Lead: FS QQ-L-171e, hard lead, containing no less than 4 percent or no more than 6 percent antimony.

B. Sheet Metal Components:
   1. New coping cap and fascia – 24 gage, prefinished sheet metal.
   4. Lead Sleeves: Minimum 4 pounds per square foot.

2.02 ACCESSORIES

A. Clamping Collar: Stainless steel of size necessary to fit over vent or pipe circumference, as applicable, "Create-A-Clamp" manufactured by Arrow Enterprises, Inc.

B. Asphalt Primer: ASTM D 41.

C. Asphalt Roof Cement: ASTM D 4586, asbestos free.

D. Sealant:
1. Urethane: Application exposures to sunlight, single component, gun grade, polyurethane sealant, such as "NP-1" as manufactured by Sonneborn or approved equivalent.

2. Silicone: Applications for metal to metal, silicone rubber-based sealant, such as "790 Building Sealant" as manufactured by Dow Corning or approved equivalent.

E. Sealant Backer Rod: Reticulated closed-cell polyethylene foam; size to suit application, such as Sonneborn Sonofoam, or approved equivalent.

F. Pitch pan sealant: Two-part polyurethane pourable sealant in top two inches of pan. Bottom two inches shall be filled with non-shrink grout.

G. Solder: ANSI/ASTM B 32 50/50 Type.

H. Lead Flashings for Drains: 4-lbs per square foot, minimum; 30 inches by 30 inches.

2.03 SCHEDULE OF FASTENERS

A. Exposed Fasteners: Stainless steel with bonded neoprene washers. Finish of exposed fasteners same as flashing metal, size to suit application.

B. Fasteners shall be compatible to all materials to which they come in contact.

C. Cleat and Pressure Bar Fasteners:
   1. Wood Substrate: No. 10 stainless steel wood screws with stainless steel bonded neoprene washers of length necessary to penetrate wood substrate 1 inch, minimum.
   2. Concrete and Masonry Substrate: Expandable masonry fastener with sealable rubber washer such as "Zamac Nailin", manufactured by Rawl.

D. Metal Edge: Galvanized common nails, gauge and length to suit application and as necessary to penetrate underlying wood support members 1/2 inch, minimum.

2.04 FABRICATION

A. Form pieces in lengths not exceeding 10 feet.

B. Hem exposed edges of metal 1/2-inch; miter and solder corners.

C. Form materials with cover plate seam.

D. Weld, solder, mechanically fasten or crimp and seal metal joints.

E. Fabricate corners from one piece with minimum 18-inch and maximum 36-inch long legs; weld for rigidity, seal with sealant.
F. Fabricate vertical faces with bottom edge formed outward 1/4-inch and hemmed to form drip.

G. Fabricate with required connection pieces.

H. Form sections square, true, and accurate in size, in maximum possible lengths and free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.

I. Slot all holes for fastening counterflashing as necessary to allow for thermal expansion and contraction. Cover exposed holes with appropriate washers.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set, cant strips are in place, and nailing strips located.

B. Verify membrane termination and base flashings are in place, sealed, and secure.

C. Beginning of installation means acceptance of existing conditions.

3.02 PREPARATION

A. Field measure site conditions prior to fabricating work.

B. Apply bituminous protective backing on surfaces in contact with dissimilar materials.

3.03 INSTALLATION

A. General
   1. Secure starter and edge strips, and cleats before installation.
   2. Secure flashings in place using concealed fasteners. Use exposed fasteners only in locations approved by Consultant.
   3. Lock and seal all joints.
   4. Apply roof cement generously between metal flashings and felt flashings.
   5. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
   6. Prime metal flanges to receive roof cement or bitumen.

B. Fascia
   1. Set fascia in solid bed of mastic and prime flange top.
   2. Secure to wood nailer with fasteners installed 3 inches OC, staggered.
3. Provide for 1/4-inch gap at gravel guard joints. Install joint cover plate set in asphaltic mastic.
4. Install strip-in.

C. Coping Cap
1. Install continuous cleat and coping cap as indicated on the Drawings.
2. Install continuous cleat with butt joints and fasteners installed at 6 inches oc.
3. Hook coping cap onto continuous cleat and secure with grommetted fasteners installed at 12 inches oc.
4. Provide for ¼-inch gap at coping cap joints. Install joint cover plate set in sealant and secure through center of cover plate with grommetted fasteners.

D. Counterflashings and Receivers
1. Install sheet metal components as indicated on the Drawings.
2. Where counterflashings meet or exceed 3-inches wide install hooks strips secured with two fasteners per clip. Hook onto counterflashings with ½” hem.
3. Provide for 2” laps set in sealant.
4. Secure with fasteners installed at 8” oc.

F. Embedded Metal Flanges (pipes sleeves, hooded vents, and pitch pans).

3.04 RECONDITIONING OF SHEET METAL APPURTENANCES REINSTALLED

A. Using mechanical and/or other means, remove all rust and other deleterious materials from sheet metal surfaces of existing roof-top appurtenances to be reinstalled on roof (i.e. gravity vents, power vents).

B. Prime and paint prepared surfaces in accordance with paint manufacturer’s written instructions.

C. Touch-up scratches and/or other defects caused by reinstallation using specified paint.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. FLASHING AND SHEET METAL shall be measured per Linear Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.
A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07723

TYPE S ROOF HATCH

PART 1 – GENERAL

1.01 SUMMARY

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM), 100 Bar Harbor Drive, West Conshocken, PA 19428-2959; (610) 832-9585, fax (610) 832-9555.
   1. ASTM A 36-93a: Standard Specification for Structural Steel

   1. N.O.A. 11-0722.10 High velocity hurricane zone, large and small missile impact.

C. Florida Building Commission, 1940 North Monroe Street, Tallahassee FL 32399, phone: 850-487-1824
   1. Florida Product Approval number FL13501 High velocity hurricane zone, large and small missile impact.

1.03 SUBMITTALS

A. Section 01340 – Shop Drawings, Product Data (Samples and Record Documents).

1.04 PRODUCT HANDLING

A. Section 01660 – Products and Substitutions.

1.05 WARRANTY GUARANTEE

A. Manufacturer’s standard warranty: Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge. Electrical motors, special finishes, and other special equipment (if applicable) shall be warranted separately by the manufacturers of those products.
PART 2 – PRODUCTS

2.01 MANUFACTURER


2.02 ROOF HATCH

A. Metal roof hatch Type S, size 6'-0"x5'-0". Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.

B. Performance Characteristics:
1. Cover shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 1/150th of the span or a maximum design pressure of + or- 70 psf with a factor of safety of 2.
2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
3. Operation of the cover shall not be affected by temperature.
4. Entire hatch shall be weathertight with fully welded corner joints on cover and curb.

C. Cover: Shall be with a 3" beaded flange with formed reinforcing members. Cover shall have a heavy extruded EPDM rubber gasket that is bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.

D. Cover insulation: Shall be fiberglass of 1" thickness, fully covered and protected by a metal liner 18" oc gauge aluminum.

E. Curb: Shall be 12" in height and of 11 gauge aluminum. The curb shall be formed with a 3-1/2" flange with 7/16" holes provided for securing to the roof deck. The curb shall be equipped with an integral metal capflashing of the same gauge and material as the curb, fully welded at the corners, that features the Bil-Clip® flashing system, including stamped tabs, 6" on center, to be bent inward to hold single ply roofing membrane securely in place.

F. Curb insulation: Shall be rigid, high-density fiberboard of 1" thickness on outside of curb.

G. Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.

H. Hardware:
1. Heavy pintle hinges shall be provided.
2. Cover shall be equipped with a spring latch with interior and exterior turn handles.
3. Roof hatch shall be equipped with interior and exterior padlock hasps.
4. The latch strike shall be a stamped component bolted to the curb assembly.
5. Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1-inch diameter red vinyl grip handle to permit easy release for closing.
6. Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be zinc plated and chromate sealed.
7. Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.

I. Finishes: Factory finish shall be mill finish aluminum.

J. Models S-50 aluminum cover and curb shall be Miami-Dade Product Control approved, latest approval meeting large and small missile impact requirements.

PART 3 – EXECUTION

3.01 INSPECTION

A. Verify that roof hatch installation will not disrupt other trades. Verify that the substrate is dry, clean, and free of foreign matter. Report and correct defects prior to any installation.

3.02 INSTALLATION

A. Submit product design drawings for review and approval to the architect or specifier before fabrication.

B. The installer shall check as-built conditions and verify the manufacturer’s roof hatch details for accuracy to fit the application prior to fabrication. The installer shall comply with the roof hatch Manufacturer’s installation instructions.

C. The installer shall furnish mechanical fasteners consistent with the roof requirements.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

A. TYPE S ROOF HATCH shall be measured per EACH at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

4.02 PAYMENT
B. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION SS 07900

JOINT SEALANTS

PART 1 – GENERAL

1.01 SUMMARY

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

B. Work of this section shall include removal of the existing sealant and backer rod or bond breaker tape. Clean and prime, as required. Install new backer rod, bond breaker tape, and sealant. Color to be selected by Owner.

1.02 QUALITY ASSURANCE AND CONTROL

A. Section 01451 – Project Quality Control.

B. Manufacturer qualifications: Company specializing in manufacturing the products specified in this Section with minimum ten years documented experience.

C. Applicator qualifications: Company specializing in the work of this Section with minimum five years experience and certified by materials manufacturer to install manufacturer's system.

1.04 SUBMITTALS

A. Section 01430 – Shop Drawings, Product Data (Samples and Record Documents).

1.05 WARRANTY AND GUARANTEE

A. Provide a manufacturer's 20-year warranty to repair any defects in material or workmanship.

B. Provide 5-year contractor warranty to repair defects in materials or workmanship. Defects shall include, but not be limited to the following:
   1. Leakage of water into the building's interior, resulting from installation or material defects.
   2. Loss of sealant adhesion or cohesion.

C. It is the Contractor's responsibility to ensure that all requirements are fulfilled to ensure issuance of the appropriate guarantee to Owner.

1.06 DELIVERY, STORAGE, AND HANDLING
A. See Section 01630 – Product and Substitutions.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Do not install sealant during, or immediately prior to, inclement weather.
B. Do not apply sealant or components to damp or frozen substrate.
C. Cautions and warnings: At ambient temperatures of 40 degrees Fahrenheit or less, including wind chill, precautions must be taken to ensure that sealants maintain the minimum acceptable temperature at the point of application, as recommended by the manufacturer.

1.08 QUALITY ASSURANCE

A. Section 01451 – Project Quality Control.

PART 2 – PRODUCTS

2.01 SEALANT

A. Silicone: One-part silicone rubber-based sealant manufactured for structural and non-structural glazing and weatherproofing applications. Supply sealant in foil sausage containers.
B. Approved manufacturers and their sealants:
   1. Dow Corning, 795 Silicone Building Sealant.
   3. As approved.

2.02 ACCESSORIES

A. Joint Cleaning Solvent: Non-corrosive, non-staining type recommended by sealant manufacturer. Compatible with joint forming materials.
B. Primer: As recommended by sealant manufacturer.
C. Closed-Cell Backer Rod: Reticulated closed-cell polyethylene foam; size to suit application, compressing to 25 percent of its size, as recommended by sealant manufacturer.
D. Bond Breaker Tape: Pressure-sensitive, adhesive polyethylene tape, as recommended by sealant manufacturer.
E. Cloth: 100 percent cotton, lint-free.
PART 3 – EXECUTION

3.01 EXAMINATION

A. Perform all work of this section in accordance with sealant manufacturer’s recommendations.

B. Verify sealant and primer compatibility and adhesion to all substrates. Notify Consultant of any non-compatible materials adjacent to sealant, proceeding only after approval.

C. Remove, clean, prime, and pack no more area than can be sealed in the same day. Take precautions to protect building interior from water entry.

D. Beginning of installation implies inspection and acceptance of existing conditions.

3.02 PREPARATION

A. Remove existing sealant from all specified joints, grinding masonry units to produce a clean substrate. Ensure joint is free of contamination and laitance.

B. Widen narrow joints to maintain manufacturer’s specified joint dimensional tolerances.

C. Grind edges to a smooth, clean, uniform width and profile.

D. Verify joint width with check block. Ensure check block slides easily along joint.

E. Notify Consultant of joints wider than 1 inch before sealing.

F. Clean joint faces with cloth and solvent approved by sealant manufacturer, removing all dirt, grease, loose materials, water, and foreign matter. Final wipe joints with second clean cloth.

3.03 INSTALLATION

A. Form shape and size in accordance with sealant manufacturer and SWRI’s published recommendations.

B. Priming
   1. Adhere to sealant manufacturer’s recommendations when applying primer.
   2. Pour primer from original container into separate container. Apply primer from separate container onto surface.
   3. Wipe off excess primer with second clean cloth.
C. Sealant Application
   1. Adhere to sealant manufacturer’s recommendations when applying sealant.
   2. Apply sealant with appropriate equipment and pressure ensuring sealant penetration to required depth.
   3. Ensure solvents do not mix with sealant in application equipment.
   4. Push sealant ahead of nozzle and slightly overfill joints to avoid air pockets.
   5. Immediately dry tool sealant bead smooth:
      a. Butt Joints: Tool slightly concave.
      b. Fillet Joints: Tool slightly convex or triangular profile.
   6. Scrape excess sealant off face of substrate with single edge razor immediately after tooling. And before curing.
   7. After final tooling, do not disturb sealant until fully cured. Ensure sealant is full smooth bead, free of ridges, wrinkles, sags, air pockets, and embedded impurities.

D. Butt Joints:
   1. Install backer rod to specified depth. Use bond-breaker tape when joint depth cannot accommodate backer rod.
   2. Use longest pieces of backer rod practicable. Cut, do not tear, backer rod.
   3. Tightly butt backer rod ends. Do not bend backer rod at corners.
   4. Ensure consistent and uniform depth of backer rod. Tolerances for backer rod depth:
      a. Depth of sealant at center of joint shall not exceed width of joint.
      b. Maximum sealant depth at center of joint shall not exceed 1/2 inch.
      c. Minimum sealant depth across any section shall be at least 1/4 inch.

E. Fillet Joints
   1. Apply bond-breaker tape to 1 face of joint. Ensure tape remains adhered to substrate to prevent dragging into sealant during tooling.
   2. Ensure joint dimensions remain uniform with no sudden changes in depth or width.
   3. Ensure sealant thickness is minimum 1/4 inch over entire width of bond breaker tape. Sealant edges shall not be feathered.
   4. Ensure sealant bite is minimum 1/4 inch to each substrate.

3.04 CLEANING
   A. Clean surfaces of residue and excess sealant. Discard all trash and debris.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT
   A. JOINT SEALANTS shall be measured per Linear Foot at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.
4.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION
SECTION 09900

PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Requirements.

1. This Section specifies the requirements for providing a three-coat aliphatic urethane paint system on hot-dip galvanized spaceframe components, and exposed or visible metal surfaces, two-coat lusterless (flat) latex finish on interior unglazed concrete masonry units; and a two-coat lusterless (flat) latex finish on drywall.

2. Aliphatic urethane paint shall be shop or factory applied, except where on-site application is approved by METRO, and where field touch-up is necessary.

3. Color selection for the aliphatic urethane paint system shall be as specified herein.

4. Color selection for the latex finishes for the interior unglazed concrete masonry units and the drywall shall be as indicated in the Color Schedule on the Drawings.

B. Painting shall include:

1. The solvent cleaning of all galvanized items to be painted in accordance with SSPC SP1 and the preparation of the cleaned galvanized surface in accordance with the paint manufacturer's recommendations for painting over a hot-dip galvanized surface.

2. Paint system materials including primers, and materials used as sealers, prime, intermediate or finish coats.

C. Paint shall be applied to:

1. The painting of visible, exposed, bare piping, raceways, conduits, hangers, telephone backboard electrical equipment and enclosures, galvanized, steel
and iron work and primed metal surfaces of equipment installed under other Sections of these Specifications.

2. Electrical service and distribution cabinets.

3. Exposed surfaces, whether or not designated in schedules or indicated on Drawings except where natural finish of material is specifically noted as a surface not to be painted. Where surfaces have not been designated or indicated, such surfaces shall be painted the same as adjacent similar items, unless otherwise directed by METRO.

4. Painting inspection procedures.

5. Documentation stating that the paint has been applied in accordance with this specification.
   a. Paint thickness test reports.
   b. Surface preparation reports.

5. Exposed interior unglazed concrete masonry units.


D. Finished metal surfaces of steel, aluminum, stainless steel, chromium plate, copper, bronze and similar finished material will not require finish painting, unless otherwise indicated.

1.02 QUALITY ASSURANCE

A. Reference Standards Applicable to this Section.

   c. D 3359: Measuring Adhesion by Tape Test.
   d. D 3363: Film Hardness by Pencil Test.

2. FS: Federal Standards and Specifications.
   b. TT-F-1098: Filler, Block, Solvent-Thinned, For Porous Surfaces (Concrete Block, Cinder Block, Stucco, Etc.)
   c. TT-P-29: Paint, Latex.
   d. TT-P-650: Primer Coating, Latex Base, Interior, White (For Gypsum Wallboard).


4. SSPC: Steel Structures Painting Council, Steel Structures Painting Manual (SSPC) Volumes 1 & 2.
   a. PA2: Measurement of Dry Paint Thickness with Magnetic Gages.
   b. SP 1: Surface Preparation Specification No. 1 Solvent Cleaning.
   c. SP 10: Surface Preparation Specification No. 10 Near-White Metal Base Cleaning.
   d. SP 7: Surface Preparation Specification No. 7 Brush-off Blast Cleaning.

5. Caution is advised that this specification be read in its entirety. Submittal of a proposal constitutes acknowledgement that every paragraph of this Specification is fully understood and agreed to. The Contractor is responsible for informing METRO of any item as specified herein that is not sufficiently clear in order to complete the work in compliance with the requirements of this Specification.
6. Any expense incurred due to unforeseen circumstances which is the direct result of neglect in estimating or reviewing of the problems prior to the bidding shall be totally borne by the Contractor.

7. Paint system materials; primer, intermediate coat and top coat, shall all be obtained from a single manufacturer.

B. Responsibilities.

1. The painter is responsible for all surface preparation on all articles to be painted to insure against any paint system failure.

2. The galvanized surface to be painted shall be prepared as specified as a minimum. If the paint manufacturer requires additional measures to be performed in the surface preparation the paint applicator shall be contacted in writing advising him of any additional surface preparation required before any item is painted.

C. Matching of Samples.

Aliphatic urethane paint shall match the color, gloss, thickness, light resistance, chemical resistance, texture, application quality, hardness and durability of standard aliphatic urethane paint samples submitted to METRO.

D. Manufacturer and Applicator.

The manufacturer of the aliphatic urethane paint shall have produced the coating products for not less than 5 years and shall be capable of furnishing both products and instructions of their use. Applicators of paint shall have not less than 5 years of experience in successful application of paint such as those specified and indicated.

E. Standards of Finishing.

The manufacturer of the aliphatic paint coating shall provide each applicator or fabricator of items which receive the coating with 3 in. by 5 in. stepped samples of each color to be used, as standards of uniform quality during the shop-finishing operation.

F. Color Coordination.

Finishes and colors provided for the Work shall be as indicated in Color Schedule in the Drawings.
G. Optional Procedure.

To maintain uniform quality and color of the paint, the procedure of processing various items that are specified to receive aliphatic urethane paint in one shop is an option that may be exercised by the Contractor. Items to be in a special shop shall be protected in their galvanized state while in transit to the shop, since the primer shall be applied by the aliphatic urethane paint specialist, not the original fabricator, to comply with the recoating time specified.

1.03 SUBMITTALS

A. In accordance with Section 01340 - Shop Drawings, Product Data, Samples, and Record Documents of these Specifications, the following shall be submitted:

1. Sample panels of each application, 4 in. x 12 in. stepped to show each coat, including each color, texture and finish. Panels shall indicate each of the various coats to be applied with each coat identified as to manufacturer's name, brand, type, finish and color. Panels shall be identified as to the item to which the paint is to be applied and the location of the represented finish in the Project. The substrate for the samples shall be the same as the surface to which the paint will be applied.

2. Contractor shall submit one gallon samples of each coat of the paint system and one gallon samples of the paint manufacturer's approved thinner for each of the coats of the paint system.

3. Manufacturer's printed data for each aliphatic urethane paint, including recommended procedures for mixing, thinning, color matching, applying and precautions to be observed.

4. Letter stating the length of time this manufacturer has produced the specified paint, a list of three projects for which the paint has been furnished, and instruction on application and quality assurance to fabricators.

5. Letter stating names and years of experience of applicators.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer's original, unopened containers, clearly labeled with the manufacturer's name and material brand, type, finish and color.

B. Store coating material in an area protected from the elements and with labels intact. Handle materials in a manner that prevents contamination.
1.05 SHOP APPLICATION CONDITIONS

A. Apply and cure coating in dust free surroundings, in a humidity range of 30 percent to 95 percent, and in a surrounding air temperature of not less than 50°F.

B. Do not apply paints to surfaces which are dirty, dusty, rusty, damp or oily and substrate is less than 5°F above dew point.

C. Where repetitive items must be painted under production line conditions, the curing time may be accelerated using heat lamps and warmboxes as recommended by the paint manufacturer. Do not cure in temperatures greater than 150°F. Do not alter the formulation on the cured properties of the coating to achieve quicker cure.

1.06 FIELD APPLICATION CONDITIONS

A. Apply and cure paint when wind is less than 10 miles per hour, when a freshly painted test plate does not pick up visible dust upon two minutes exposure, in a humidity range of 30 percent to 95 percent, when rain is not falling, and in a surrounding air temperature between 40°F to 110°F or minimum as recommended by paint manufacturer.

B. Do not apply paint to surfaces which are dirty, dusty, rusty, damp or oily. Shade and hood for 8 hours the surfaces to be painted.

C. If an item has received only a prime coat or prime and intermediate coats, do not field apply final coat(s) until the last coat has been prepared by cleaning, brush-off blast cleaning in accordance with SP-7 or other preparation as recommended by the paint manufacturer. This preparation is not necessary if the last shop coat is less than 48 hours old and clean.

PART 2 - PRODUCTS

2.01 MATERIALS FOR THREE-COAT SYSTEM

A. First Coat (also referred to as prime coat and primer).

Two component, high build, epoxy primer with rust-inhibitive pigment.


2. Pigment: Lead, chrome and cadmium free.
3. Standards:
   a. Adhesion, 5 rating, meeting ASTM D 3359, Method B.
   b. Exposure, 3,000 hours, meeting salt fog testing of ASTM B 117.

4. Primer shall have contrasting color to intermediate coat.

5. Sources:
   c. Awlgrip 545 Primer, by U.S. Paint Division, Grow Chemical Corporation, (314) 621-0525.
   d. Tnemec Series 66 Hi-Build Epoxoline, distributed by Barry & Company, Inc., (713) 975-9113.

B. Second Coat (also referred to as intermediate coat, and color coat).

Two component aliphatic-type system, non-yellowing. Do not provide either single component urethane, moisture-curing urethane, or isocyanate-reacting drying oil urethane systems.

1. First component: Pigmented polyol with organic/metallcatalyst.


3. Surface temperature: No yellowing, chalking, softening or crazing between 40 F and 120 F.

4. Chemical and solvent resistance: No yellowing, darkening, discoloration, chalking, softening, blistering or crazing after seven day immersion at 20 C in salt water, lubricating oil, gasoline, xylol, 0.1 N sodium hydroxide or 0.1 sulfuric acid.
5. Drying time: Coating shall not pick up dust after 4 hrs. curing in place on surfaces at 60 to 75 F.

6. Recoating time: Coating shall permit addition of a chemically similar coating without sanding or etching at any time from 16 to 48 hrs. without lessening adhesion of succeeding coating.


8. Colors: (As selected by Architect in conjunction with METRO.)

9. Standards.
   a. Flame Spread and Smoke Density, Class A of NFPA 101 and meeting ASTM E 84.
   b. Exposure, 1000 hours, meeting salt fog testing of ASTM B 117.
   c. Humidity, 1000 hours, meeting ASTM D 2247.
   d. Hardness, 3H Hardness meeting ASTM D 3363.
   e. Abrasion, Not more than 130 mg. loss after 1,000 cycles, meeting FS 141, Method 6192, 1,000 gm. load with CS 17 size wheels.
   f. Adhesion, Not less than 5 rating, meeting ASTM D 3359, Method B.

10. Sources:
   d. Tnemec Series 71 Endura-Shield, distributed by Barry & Company, Inc., (713) 975-9113.
C. Third Coat (also referred to as finish coat and top coat).

Two component aliphatic type system, non-yellowing. Do not provide either single component urethane, moisture-curing urethane, or isocyanate-reacted drying oil urethane systems.

1. First component: Pigmented polyol with organic/metallic catalyst.
3. Surface temperature: No yellowing, chalking, softening, or crazing between 40 F and 120 F.
4. Chemical and solvent resistance: No yellowing, darkening, discoloration, chalking, softening, blistering or crazing after seven day immersion at 20 C in salt water, lubricating oil, gasoline, xylol, 0.1 N sodium hydroxide or 0.1 sulfuric acid.
5. Drying time: Coating shall not pick up dust after four hours curing in place on surfaces at 60 to 75 F.
7. Color: Color shall be finish color and different from intermediate coat.
8. Standards.
   a. Flame Spread and Smoke Density, Class A of NFPA 101, and meeting ASTM E 84.
   b. Exposure, 1,000 hours, meeting salt fog testing of ASTM D 2247.
   c. Humidity, 1,000 hours exposure, meeting ASTM D 2247.
   d. Hardness, 4H Hardness meeting ASTM D 3363.
   e. Abrasion, Not more than 70 mg. loss after 1,000 cycles, meeting FS 141, Method 6192, 1,000 gm. load with CS 17 size wheels.
9. Sources:


c. Awlgrip 9263 Clear Urethane Enamel, U.S. Paint Division, Grow Chemical Corporation, (314) 621-0525.

d. Tnemec Series 71 Endura-Shield, distributed by Barry & Company, Inc., (713) 975-9113.

e. Tnemec Series 73 Endura-Shield III, as above.


D. Shop Prime Coat for Ancillary Equipment or Structural Members.

Where field application of intermediate and top coats cannot be avoided, use a shop-applied prime coat that will permit adhesion of color coat if the latter is applied within 90 days after prime coat. Use either an inorganic zinc-rich prime coat or a shop coat/tie coat system consisting of a polyamide epoxy with corrosion-inhibiting pigment augmented by a polyamide epoxy zinc chromate coat.


E. Field Repair Prime Coat.

Only where field application of intermediate and top coat cannot be avoided and where priming of surfaces which have been welded or damaged by welding must be performed, use a field repair prime coat. Use either a polyamide epoxy zinc-rich prime coat or an epoxy shop coat/tie coat system.


2.02 ACCESSORY MATERIALS

A. Provide sandblast materials, cleaning, etching and thinning materials as needed to prepare surfaces, to thin coatings and to clean up.

PART 3 - EXECUTION

3.01 SHOP OR FACTORY SURFACE PREPARATION

A. General

Remove nameplates, bright plated fasteners and other finish items from surface before preparing for coatings.

B. Hot Rolled Steel, Structural Steel Shapes, Oxidized Steel Surfaces.

Near-White metal blast cleaning in accordance with SSPC SP 10.

C. Cold Rolled Steel Shapes, Steel Sheet, Bright Steel Surfaces.

Remove oil, dirt and contaminants with solvent cleaning in accordance with SSPC SP 1. Remove rust and scale in accordance with SSPC SP 10.

D. Galvanized Steel: Remove soluble contaminants in accordance with SSPC SP 1, solvent cleaning. Rinse surface with clean water. Etch surface in accordance with paint manufacturer's recommendations.

3.02 SITE SURFACE PREPARATION

A. General

Remove hardware, accessories, nameplates and other finish items from surface before preparing for coating system.

B. Galvanized Steel
Remove soluble contaminants in accordance with SSPC SP 1, solvent cleaning. Rinse surface with clean water. Etch surface in accordance with paint manufacturer's recommendations.

C. Previously Shop Primed Metal.

Where primer has cured more than 72 hours, brush-off blast clean in accordance with SSPC SP 7. Remove all dust from blasted surfaces.

1. Provide manufacturer's recommended barrier coats over incompatible primers or remove and re-prime as required. Notify METRO in writing of any anticipated problems in using the specified coating systems with substrates primed by others.

D. Previously Aliphatic Urethane Painted Metal (touch-up).

Remove dirt, grease and bond breaking substances and roughen areas to be touched up and with fine abrasive paper.

E. After field welding of shop-fabricated steel items is complete all welds shall be ground smooth and all welding residue shall be removed to a near-white condition. Apply the specified field repair prime coat to minimum of 4.0 mils above metal profile. If a tie coat is used, apply to a thickness of not less than 1.0 mil.

F. Cementitious Materials

1. Concrete masonry units, and plaster surfaces shall be prepared by removing efflorescence, chalk, dust, dirt, grease and oils.

2. Alkalinity and moisture content of the surfaces shall be determined. Where the alkalinity exceeds the paint manufacturer's recommendations for application of the paint, the condition shall be corrected in accordance with the paint manufacturer's recommendations. Paint shall not be applied to surfaces while the surface moisture content exceeds the paint manufacturer's moisture content limitations.

3.03 COLOR MATCHING

A. Aliphatic urethane paints shall be formulated and applied to maintain uniform color, texture, gloss and match the samples approved by METRO.

3.04 MIXING, GENERAL APPLICATION REQUIREMENTS
A. Mix and apply each element of the aliphatic urethane paint system according to manufacturer's published recommendations.

B. Due to the sensitivity of these paints to dust pickup during their extended curing times, apply all coats of aliphatic urethane paint system at shop or factory, under dust free, temperature and humidity- controlled conditions, unless otherwise approved by METRO, and except where field touch-up of damaged coats is necessary.

C. The specified prime coat shall be followed by the specified intermediate coat within 48 hours of priming, unless the surface of the primer is lightly abraded or otherwise prepared as recommended by the manufacturer of the coating.

3.05 SHOP OR FACTORY APPLICATION

A. Apply intermediate coat and top coat as flow coats to build specified dry film thickness.

B. Apply each coat in accordance with paint manufacturer's published recommendations.

C. Re-install nameplates, fasteners and other items removed prior to coating.

D. Finished surfaces shall be fully and uniformly coated without pinholes, bubbles, sag, runs, lumps, brush marks or discoloration, and shall be of uniform color and gloss. The samples submitted to METRO shall be used as the standard to judge all painted members and structures.

3.06 SITE APPLICATION

A. When applying over galvanized surfaces, prepare surfaces for optimum adhesion by use of cleaning and etching washes.

B. When applying coats or touching up over previously shop primed or urethane painted metal, degrease the surface of the soft primer or urethane coating and flow on the coats to build each coat to specified dry film thickness. Use type of brush or other means of application that provides a paint system that matches the appearance of shop or factory-applied paints. When applying aliphatic urethane coats over the hard primer specified in this Section, lightly abrade the prime for optimum adhesion.

1. Provide manufacturer's recommended barrier coats over incompatible primers or remove and re-prime as required. Notify Architect in writing of
any anticipated problems in using the specified coating systems with substrates primed by others.

C. Apply each coat in accordance with coating manufacturer's published recommendations.

D. Reinstall hardware, accessories, nameplates and other items removed prior to coating.

E. Finished surfaces shall be fully and uniformly coated without pinholes, bubbles, dust, sag, runs, lumps, brush marks, abraded areas, scratches or discoloration, and shall be of uniform color and gloss equal in quality and appearances to shop or factory coated work.

F. Where shop-fabricated steel items must be assembled by welding at the Work site, and a soft prime coat has been applied by the fabricator followed by a field repair prime coat after grinding and wire brushing, complete the aliphatic urethane painting by applying the specified intermediate coat and top coat after cleaning the soft prime coat and field repair coat.

3.07 TOUCH UP

A. After aliphatic urethane paints have been in place at least 15 days, and within 30 days of METRO's inspection of the product prior to certification that the Work is complete, check all aliphatic urethane painted surfaces for damage, missed areas and discoloration.

B. Prepare surfaces and touch up damaged, missed and discolored areas to bring paint system to full dry film thickness, in color and gloss matching that of adjacent coat areas.

3.08 PAINTING SCHEDULE

A. Exterior Enamel on Exterior Steel.

1. Type of Coating: Rust-inhibitive epoxy prime coat; aliphatic urethane intermediate coat; aliphatic urethane top coat.

2. Dry film thickness:
   a. Prime coat: 4 mils minimum.
   b. Intermediate coat: 2.0 mils minimum.
c. Top coat: 2.0 mils minimum.

B. Exterior Enamel on Exterior Galvanized Steel.

1. Type of coating: Rust-inhibitive epoxy prime coat; aliphatic urethane intermediate coat; aliphatic urethane top coat.

2. Dry film thickness:
   a. Prime coat: 4.0 mils minimum.
   b. Intermediate coat: 2.0 mils minimum.
   c. Top coat: 2.0 mils minimum.

C. Concrete Masonry Units (Unglazed).

1. Two-coat lusterless (flat) latex finish over a filler coat:
   a. First Coat: Blockfiller, FS TT-F-1098.
   b. Second Coat: Latex emulsion, FS TT-P-29.
   c. Third Coat: Latex emulsion, FS TT-P-29.
   d. Total Dry Film Thickness: Not less than 3.5 mils, excluding the first coat.

D. Drywall.

1. Two-coat lusterless (flat) latex finish:
   a. First Coat: Latex primer, FS TT-P-650.
   b. Second Coat: Latex emulsion, FS TT-P-29.
   c. Total Dry Film Thickness: Not less than 2.5 mils.

3.09 MEASUREMENTS

A. Measurements of paint thickness shall be in accordance with SSPC PA2.
SS SECTION 15412

PLUMBING PIPING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Pipe, pipe fittings, specialties, and connections for piping systems.
   1. Storm water
   2. Pipe hangers and supports

1.02 REFERENCES

A. ASME B31.9 - Building Services Piping; 2014.

1.03 QUALITY ASSURANCE

A. Section 01430 – Quality Assurance.
B. Perform work in accordance with applicable codes.

1.04 SUBMITTALS

A. Section 01330 – Submittal Procedures.
B. Product Data: Provide data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

1.05 DELIVERY, STORAGE, AND PROTECTION.

A. Section 01660 – Product Storage and Handling Requirements.
B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Storm Water Piping, above Grade:
      a. Fittings: Cast iron.
      b. Joint Seals: ASTM C564 neoprene gaskets, or lead and oakum.

B. Pipe Hangers and supports
   1. Provide hangers and supports that comply with MSS SP-58.
      a. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.
      b. Overhead Supports: Individual steel rod hangers attached to structure or to trapeze hangers.
      c. Trapeze Hangers: Welded steel channel frames attached to structure.
      d. Vertical Pipe Support: Steel riser clamp.

   2. Plumbing Piping - Storm:
      a. Wall Support for Pipe Sizes 4 Inches (100 mm) and Over: Welded steel bracket and wrought steel clamp.
      b. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

C. Hanger Fasteners: Attach hangers to structure using appropriate fasteners, as follows:

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that excavations are to required grade, dry and not over-excavated.
3.02 PREPARATION
   A. Verify that excavations are to required grade, dry and not over-excavated.

3.03 INSTALLATION
   A. Install in accordance with manufacturer's instructions.
   B. Pipe Hangers and Supports:
      1. Install in accordance with ASME B31.9.
      2. Support horizontal piping as indicated.
      3. Install hangers to provide minimum 1/2 inch (15 mm) space between finished covering and adjacent work.
      4. Place hangers within 12 inches (300 mm) of each horizontal elbow.
      5. Use hangers with 1-1/2 inch (40 mm) minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
      6. Support cast iron drainage piping at every joint.

3.04 SCHEDULES
   A. Pipe Hanger Spacing:
      1. Metal Piping:
         a. Pipe Size: 4 inches (100 mm) to 6 inches (150 mm):
            1) Maximum Hanger Spacing: 10 ft (3 m).
            2) Hanger Rod Diameter: 5/8 inch (15 mm).
         2. Pipe Size: 8 inches (200 mm) to 12 inches (300 mm):
            1) Maximum hanger spacing: 14 ft (4.25 m).
            2) Hanger Rod Diameter: 7/8 inch (22 mm).
PART 4 – MEASUREMENT AND PAYMENT

3.01 MEASUREMENT

A. ROOF DRAINS shall be measured per Each at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

B. CAST IRON STORM PIPING shall be measured per Linear Foot including hangers and supports at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

C. CAST IRON STORM FITTINGS shall be measured per Each at the locations indicated on the drawings and the measurement shall include all equipment, labor and materials required to provide a complete and serviceable installation.

3.02 PAYMENT

A. The work performed and the materials furnished as prescribed by this item and measured as provided under “MEASUREMENT” shall be paid for at the contract unit price bid for each item as presented in the bid form for “Mechanical”. The unit price bid for each item shall be full compensation for furnishing and placing all materials, and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work in accordance with the drawings and specifications.

END OF SECTION