



**ARLINGTON COUNTY, VIRGINIA
AGREEMENT NO. 24-DES-PPEA-342
AMENDMENT NUMBER 2**

This Amendment Number 2 is made on 12/1/2023 and amends Agreement Number 24-DES-PPEA-342 Comprehensive Agreement (“Main Agreement”) dated August 4, 2023, between East Entrance LLC (“Contractor”) and the County Board of Arlington County, Virginia (“County”).

The County and the Contractor agree to amend the Main Agreement as follows:

1. **Exhibit I – Required FTA Contract Clauses** is corrected as follows:
 - a. Davis Bacon General Decision Number VA20220035 dated 03/24/23 is corrected to Davis Bacon General Decision Number VA20230035 dated 03/24/23.
 - b. Davis Bacon General Decision Number VA20230013, dated 01/06/23 [with the publication date 01/13/2023](#) for trade classifications not included in Davis Bacon General Decision Number VA20230035 dated 03/24/23, as referenced in **16. Davis-Bacon and Copeland Anti-Kickback Acts, Clause Language, Davis-Bacon and Copeland Anti-Kickback Acts, (1) Minimum wages** is acceptable.
2. **Revised Exhibit J – WMATA Specifications Manual Division 1 (Crystal City East Metro Entrance, Design=Build Services)** is removed and replaced in its entirety with the attached [Revised Exhibit J – WMATA Specifications Manual Division 1 \(Crystal City East Metro Entrance, Design-Build Services\)](#) to incorporate the following changes:
 - a. **Remove** a minimum of 15 years’, a minimum of 10 years, and a minimum of 5 years’ experience from WMATA section 01 11 10, section 1.05, D, 3.a. Construction General Superintendent.
 - b. WMATA section 01 47 00, section 1.04, D, 2.d is revised to change the Quality Assurance Manager (QAM) minimum advance notice from 14 days [to 48 hours](#).
 - c. WMATA section 01 58 00 Project Signs, 102 Project Identification Signs, C is changed from 20 days after NTP (per amendment no. 1) to [20 days prior to the start of construction](#).
 - d. **Remove** the requirement to submit “within 45 days following NTP” in WMATA section 10 14 26, 1.04.B: Shop Drawings.
 - e. WMATA section 01 11 50 1.04.A.5.a: Certifiable Items Lists (CILs) is changed from “within 90 days following NTP” to [“within 180 days following NTP”](#).

All other terms and conditions of the Main Agreement remain in effect.

WITNESS these signatures:

THE COUNTY BOARD OF ARLINGTON
COUNTY, VIRGINIA

EAST ENTRANCE LLC

AUTHORIZED DocuSigned by:
SIGNATURE: Dr. SHARON T. LEWIS
89B86B1AD301462...
NAME: DR. SHARON T. LEWIS

AUTHORIZED DocuSigned by:
SIGNATURE: Mo Hosseini
23DA6BBD4CEE4D9...
NAME: Mo Hosseini

TITLE: Purchasing Agent

TITLE: Division President and CEO

DATE: 12/1/2023

DATE: 12/1/2023

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY



SPECIFICATIONS MANUAL

Division 1

**Crystal City East Metro Entrance
Design-Build Services**

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

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SECTION 01 11 00 - SUMMARY OF WORK

PART 1 – GENERAL

1.01 SUMMARY

- C. Spare Parts Allowance
 - 1. Contractor shall provide manufacturer's recommended spare parts for all components and systems required for this project.
- D. Scaffolding used must be designed for egress and approved and stamped by a Professional Engineer licensed in the jurisdiction where the scaffolding will be constructed/installed.
- E. OEM must provide consent prior to closing any shaft serving as an Emergency Exit.
- F. All dry standpipes must remain in service and accessible during the project duration.
- G. The Design-Builder shall submit a salvage plan as follows:
 - 1. The Design-Builder shall coordinate with WMATA and submit a list of all potential items for salvage to include, at a minimum:
 - a. all electrical equipment,
 - b. mechanical equipment,
 - c. fiber and electrical cables, and
 - d. architectural elements including, but not limited to, metal stairs, swing doors, locksets and handrails.
 - 2. The submittal list shall be reviewed by WMATA department managers and finalized with delivery locations identified on WMATA property and WMATA shall designate temporary storage locations at the construction site to coordinate removal.
 - 3. The Design-Builder shall maintain property control records for materials or equipment identified for salvage and shall be responsible for the storage and protection of materials and equipment and shall replace materials and equipment, which are broken or damaged during construction operations as the result of negligence or while in the Design-Builder's care.
 - 4. Salvaged materials shall be packaged and protected for transport, bag and tag all nuts, bolts, connectors, etc. The Design-Builder shall provide all rigging, transport and handling. WMATA shall inspect delivery and provide a delivery receipt for all salvageable material returned to WMATA.
 - 5. Salvaged material not identified for reuse shall become the property of the Design-Builder and shall be removed from WMATA property. WMATA shall inspect all non-returned salvageable material prior to removal from site.
 - 6. The Design-Builder shall provide record photos of and inventory list for the delivery of all materials salvaged.
- I. The Project shall function as an integral part of and be fully compatible with the existing WMATA system.

1.02 DAYS/HOURS OF WORK

- A. The standard work week for the project will be 5 consecutive 8-hour days Monday-Friday, with the work scheduled between 7 AM to 4 PM or as defined in Section 01 14 10, ACCESS TO SITE.
- B. Provide WMATA 7 Days advance notice prior to changing shift hours and 48 hours advance notice for planned work shifts outside the established work week and work day.

1.03 SITE LOGISTICS

- A. Access to and egress from the construction site and any other construction areas within WMATA property shall be through designated entrances only. The station may be utilized for access and egress by properly badged personnel during off-peak hours and non-revenue time. Personnel entering via the stations shall not enter the roadway, unless pre-approved and shall be RWP trained personnel.
- B. Contractor shall submit a work plan that addresses track isolation, tunnel ventilation, WMATA SAFE and Arlington Fire Department requirements. Design-Builder's plan shall isolate the track from the work area to prevent fouling the track. Once isolated, the Design-Builder may request additional work hours from WMATA.
- C. Contractor shall comply with WMATA SAFE's requirements for ventilation and the control of existing tunnel ventilation systems.
- D. Design-Builder may request use a prime mover supplied by the Design-Builder or Authority, but may not be available at any time.
- E. Construction equipment and materials shall be staged at one or more of the following locations:
 - 1. Within public right-of-way at street level at locations determined by the Design-Builder, and as approved by the Authority and Arlington County.
 - a. The Design-Builder shall apply and pay all fees associated with obtaining all temporary easements, approvals, and Maintenance of Traffic (MOT) permits as required and in accordance with Section 01 55 00, MAINTENANCE OF TRAFFIC ACCESS AND PARKING.
 - 2. The Design-Builder is responsible for the filing of all applicable permit applications in its entirety, including drawings, maps, calculations, or other items required to fulfil the requirements of each permit, including the cost associated with each permit required for the implementation of the project.
- I. Parking
 - 1. WMATA will not provide parking.
 - 2. Design-Builder shall park at locations determined by the Design-Builder acquired through the appropriate permitting procedures.
- K. Permits: Obtain permits from Utilities and Jurisdictional Authorities as needed.
- L. Systems Integration: Develop a Systems Integration Plan as part of design development and perform and manage Systems Integration for the project in accordance with Section 01 11 30, SYSTEMS INTEGRATION

- M. Safety: Establish and manage Project safety in accordance with Section 01 11 40, SAFETY/ ENVIRONMENTAL REQUIREMENTS and Section 01 11 50, SAFETY AND SECURITY CERTIFICATION.
- N. Quality: Establish and manage a Quality System in accordance with Section 01 47 00, QUALITY MANAGEMENT SYSTEM.
- O. Inspection and Testing
1. Inspect the Work to ensure that construction is being performed in accordance with Issued for Construction Drawings, Issued for Construction Specifications, and applicable submittals. Maintain Inspectors Daily Reports and submit to the Arlington County Project Officer and WMATA Representative weekly.
 2. Establish and perform component testing and system integration testing as specified in various specification sections and the Technical Requirements and in accordance with Section 01 47 00, QUALITY MANAGEMENT SYSTEM.
 3. Provide and manage the services of an independent testing agency that shall conduct material testing.
 4. Provide and manage the services of independent inspectors for those disciplines required by jurisdictional authorities. Independent inspectors shall perform third party inspections necessary to certify that construction has been performed in accordance with Issued for Construction Drawings and Issued for Construction Specifications. Independent inspectors shall have the qualifications required by jurisdiction authorities.
 5. The independent testing agency and independent inspectors may be provided through a single entity.
 6. All inspection and testing reports shall be submitted through the Arlington County QAM for record and to WMATA representative.
- P. As-Built Documents: Maintain a hard copy drawing and specification record of as-built conditions during construction phase and provide updated REVIT models of As-Built conditions and As-Built Specifications at the completion of the Project in accordance with Section 01 77 50, CLOSEOUT.
- Q. Training and Commissioning: Provide support for commissioning in accordance with Section 1 of the Technical Requirements, and the Functional Requirements, and provide training to WMATA staff as indicated in Section 01 82 00, DEMONSTRATION AND TRAINING for requirements.
- R. There should be no impacts to communications provided through train antenna system. If there is any impact to existing train antenna a temporary, fully functional antenna must be installed prior to the removal of an existing one.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 10 - DESIGN-BUILDER KEY STAFF

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies key staff that form the Design-Builder's team and identifies their basic functions.

1.02 REFERENCES

- A. Registrar Accreditation Board of the American Society for Quality (RABASQ)
- B. Occupational Safety and Health Association (OSHA)
 - 1. Construction Safety Training
 - 2. First Aid/CPR/Blood Borne Pathogens Training

1.03 SUBMITTALS

- A. Submit the following within 10 days of Award in accordance with Section 01 33 00, SUBMITTAL PROCEDURES:

1.04 DESIGNER

- A. The Design-Builder shall be responsible for performing or furnishing design professional services and related services in all phases of the Project and require its Designer to perform the services in accordance with the specifications and requirements of the Contract and in accordance with professional standards of skill, care, and diligence adhered to by firms recognized for their expertise, experience, and knowledge in performing these services. The Design-Builder shall be responsible for the professional quality, technical accuracy, completeness, and coordination of the services and shall serve as the Architect of Record and the Engineers of Record for the Project.
- B. All architecture, engineering, and other design services rendered by or through the Design-Builder shall be accomplished, reviewed, and approved by the Designer's team of architects and engineers licensed to practice in their respective disciplines in the jurisdiction where the Project will be constructed. The Design-Builder shall comply with local laws regarding the licensing of design firms and personnel providing services for the Project.
- C. All positions shall be filled by competent personnel satisfactory to the Arlington County Project Officer. Each position shall be held by a separate full-time employee unless otherwise specifically approved by the Arlington County Project Officer.
- D. Key Designer Staff
 - 1. Design Manager
 - a. Design manager shall have previous experience managing design on Design-Build projects of a similar type and financial magnitude in the transportation industry.
 - b. The Design Manager shall:

- 1) Be responsible for managing design and design services during construction for all disciplines involved in the Project.
- 2) Assign Engineer(s) of Record for Project and shall establish and implement design milestone submittal schedules.
- 3) Ensure that the design of all project elements is done in accordance with Industry Standards, and jurisdictional codes and regulations.
- 4) Manage design sub-consultants that support the Designer, developing and implementing a Design Control Plan (DCP), and a Design Quality Plan (DQP) in carrying out design of Project elements and ensuring that sub-consultants do the same, coordinating with Jurisdictional Authorities and utility companies and ensuring that all design complies with applicable jurisdictional codes and standards, preparation and submittal of design milestone and Issued for Construction Drawings and Issued for Construction Specifications, preparation of Working Drawings, responding to and managing review comments from the Authority and other reviewers, and assisting the Construction Manager in obtaining permits, all in a timely manner without affecting Project schedule.
- 5) Be responsible for managing the preparation of As-Built Drawings and As-Built Specifications.

2. Engineers of Record

- a. Registered Professional Engineers licensed to practice in their respective disciplines in the jurisdiction where the Project will be constructed, with sufficient experience in design of similar projects.
- b. Responsible for signing and sealing Issued for Construction Drawings and Specifications.
- c. Responsible for ensuring that design within their disciplines is done in accordance with Contract Documents, Industry Standards, and jurisdictional codes and regulations. Responsibilities also include but are not limited to, implementing the Design Control Plan (DCP) and a Design Quality Plan (DQP), supporting the Design Manager in coordinating with Jurisdictional Authorities and Utility companies and ensuring that all design complies with applicable jurisdictional codes and standards, preparation and submittal of design milestone and Issued for Construction Drawings and Issued for Construction Specifications, and/or preparation of Shop Drawings and Working Drawings, and responding to and addressing review comments from WMATA and other reviewers.
- d. Engineers of Record shall be active participants in all phases of the Project, including the construction phase, for review of submittals, approval of samples and mock-ups, coordination of the Work of their respective disciplines with other disciplines, and regular Site visits to verify conformance with the approved design.

3. Systems Integration Manager

- a. The Systems Integration Manager shall be a Professional Engineer or Architect with experience in the integration of systems similar to those required in this project and experience in the design and/or integration of project systems of similar size and complexity.

- b. The Systems Integration Manager shall be responsible for the final integration and coordination of Design-Builder's drawings, plans and specifications, required to fully implement the systems integration of all work required in this contract in accordance with WMATA Standards/Specifications and Manual of Design Criteria.
- c. The Systems Integration Manger shall:
 - 1) establish, implement, and maintain all Systems Integration documentation, drawings, specifications, and integration planning,
 - 2) serve as a liaison officer with the Authority on matters relating to the Design-Builder's System Integration Plan,
 - 3) be responsible for ensuring that the Systems Integration is effective in ensuring that the Contract requirements are satisfied, and
 - 4) be responsible for the oversight of onsite and offsite Systems Integration design, testing, and final acceptance by the Authority.

1.05 DESIGN-BUILDER

- A. The Design-Builder shall be responsible for management of the Project and for performing as the builder, including furnishing the services of Subcontractors and vendors, to perform/contract/approve, as relevant, to all manufacture, fabrication, installation, and construction to complete the Project in accordance with the approved Issued for Construction Drawings and Issued for Construction Specifications, all applicable jurisdictional codes and regulations, the approved Quality Management System; the approved Safety Plan; the approved Systems Integration Plan, and environmental and other applicable requirements to achieve Acceptance in accordance with the approved Project Schedule. The Design-Builder shall obtain jurisdictional approvals and permits, and Utility approvals.
- B. All personnel involved in the performance of construction work shall be experienced and qualified to perform their trade, and all construction work shall be performed in a skilled and workmanlike manner.
- C. Individuals holding these key staff positions shall not be changed without written approval from the Arlington County Project Officer for any substitutions of key staff.
- D. Key Design-Builder Staff
 1. Design-Build Project Manager
 - a. Project Manager shall have experience managing design and construction of complex multi-discipline projects. Project manager shall have previous experience managing design and construction on Design-Build projects of a similar type and financial magnitude in the transportation industry.
 - b. Project Manager shall be in charge of construction of the Project as a whole with overall responsibility for the successful and timely completion of the Project.
 - c. The Project Manager shall:
 - 1) supervise the other Key Personnel (except the Quality Manager),
 - 2) be the primary point of contact with the WMATA Representative,
 - 3) be responsible for coordinating with outside agencies as required,

- 4) be responsible for managing cost and maintaining schedule of the Project,
 - 5) be responsible for ensuring that QA/QC and safety guidelines are followed, and
 - 6) be responsible for satisfactory completion of all testing, commissioning, and close-out of the Project.
2. Construction Manager
- a. The Construction Manager shall have previous experience in managing complex multi-discipline heavy construction projects and the construction of projects of a similar type and financial magnitude in the transportation industry.
 - b. Be responsible for managing construction of all facets of the Project.
 - c. Retain overall responsibility the day-to-day construction activity of the Project. Responsibilities include but are not limited to:
 - 1) Acquiring construction permits,
 - 2) Managing Subcontractors, independent testing companies, fabricators and Suppliers,
 - 3) Coordinating with Quality Manager and Safety Manager in the implementation of project Quality and Safety plans,
 - 4) Development, management, and implementation of Project Schedule construction activities,
 - 5) Preparation, submittal, and management of construction submittals,
 - 6) Ensure that construction is based on Issued for Construction Drawings and Issued for Construction Specifications and that all applicable codes and standards are complied with.
 - 7) Maintaining as-built documentation,
 - 8) Coordinating with outside agencies and utility companies on construction related matters, and
3. Construction General Superintendent
- a. Shall have experience in complex multi-discipline heavy construction, experience in the rapid transit industry, and experience in a supervisory capacity supervising projects of a similar type and financial magnitude.
 - b. Responsible for oversight of day-to-day construction at the Site.
 - c. Responsibilities include but are not limited to supervising construction activity, overseeing coordination between Subcontractors, and ensuring that construction is based on current Shop Drawings and Working Drawings. The Construction General Superintendent is also responsible for maintaining as-built documentation.
4. Quality Manager
- a. The Quality Manager shall be trained as a Lead Auditor in a Registrar Accreditation Board of the American Society for Quality (RABASQ) approved course on the requirements of ISO 9001 and shall have related experience in a design and

- construction environment, transportation projects, and management positions performing QA/QC auditing.
- b. The Quality Manager shall be responsible for the quality assurance and quality control for the Project and shall be fully familiar with FTA quality requirements.
 - c. The Quality Manager shall:
 - 1) be a full-time staff member of the Design-Builder's team,
 - 2) Reports to one or more levels of management above the Design-Builder's Project Manager,
 - 3) establish, implement, and maintain the Quality Management System,
 - 4) serve as a liaison officer with the Authority and the Jurisdictional Authorities on matters relating to the Design-Builder's quality system,
 - 5) be responsible for ensuring that the Quality Management System is effective in ensuring that the Contract requirements are satisfied, and
 - 6) be responsible for the oversight of onsite and offsite testing by the Design-Builder.
 - d. The Quality Manager may, if suitably qualified, be approved as the Safety and Security Certification Manager as defined in SECTION 01 11 50 SAFETY AND SECURITY CERTIFICATION.
5. Project Scheduler:
- a. The Project Scheduler shall have experience managing the construction schedules, design, and construction of complex multi-discipline projects of a similar type and financial magnitude in the transportation industry.
 - b. The Project Scheduler shall support the Design-Builder with scheduling and coordination of the Pre-construction, Procurement, and Construction activities.
 - c. The Project Scheduler shall:
 - 1) Provide, maintain, and continuously update CPM and summary level schedules, including, but not limited to, the review of project baseline schedules, monthly progress schedules, weekly look-ahead schedules, time impact analysis, risk analysis, and tracking schedule conformance,
 - 2) Describe the tools and methodology of the development of the baseline schedule, including durations, sequencing, logic and skilled labor availability for determination of labor projections,
 - 3) Assist in the monitoring of project activities and progress reporting,
 - 4) Participate in Over the Shoulder (OTS) and constructability reviews as necessary,
 - 5) Support assessment of work-around/contingency planning for major work events,
 - 6) Develop, from a construction perspective, of each trade contract, which shall include, but is not limited to, elements such as schedule, site phasing, construction methods, and special or difficult circumstance, and
 - 7) Develop measurable goals for each trade contract.

6. Safety Superintendent

- a. The Safety Superintendent shall have experience in heavy industry construction safety practices and in transportation construction operating conditions and shall have completed OSHA Construction Safety Training and First Aid/CPR/Blood-borne Pathogens Training. Certified Safety Professional (CSP) is preferred.
- b. Be responsible for development of a construction safety plan.
- c. Be a full-time member of the Design-Builder and devote full-time to worksite safety in implementing, enforcing, and maintaining the safety program for the Contractor and Subcontractor forces.
- d. Have no duty other than safety supervision of persons, equipment, and property affected by Contract work.
- e. Reports to one or more levels of management above the Design-Builder's Project Manager.
- f. Have specialized training and experience in construction safety supervision and have a thorough knowledge of all OSHA regulations. The Safety Superintendent shall have the ability to develop and conduct safety-training courses. The Safety Superintendent shall be familiar with industrial hygiene equipment and testing as required for the protection of all personnel and the public.
- g. Able to develop and conduct safety-training courses.
- h. Be familiar with industrial hygiene equipment and testing as required for the protection of all personnel and the public,
- i. Have OSHA-30 hour, in-class, training for construction.
- j. The superintendent will be required to visit the site on a regular basis to determine that the assigned foreman of the work crew is properly performing all work per approved submittal requirements and the work is being performed safely. The superintendent shall visit the site, at a minimum once a day and check in with the WMATA inspector on site in the performance of their duties as the Superintendent. If required site visits are not performed, a work stoppage at the Design-Builder's cost may occur.

7. Welders

- a. Shall be qualified in accordance with the requirements of American Welding Society (AWS) D1.1 Structural Welding Code, Steel.

8. Personnel performing non-destructive testing (NDT)

- a. Shall be certified by the American Society for Non-Destructive Testing (ASNT).
- b. Only personnel certified for NDT Level I and working under a NDT Level II person or persons certified for NDT Level II may perform non-destructive testing.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 20 - DESIGN AND PROGRAM REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies requirements for carrying out detailed design and design support during construction, as indicated, and provides requirements for design management to be followed by the Design-Builder. The Section also establishes Program Requirements for the Project.

1.02 REFERENCES

- A. WMATA Manual of Design Criteria and Contract Drawings, Specifications, and any Technical Requirements
- B. WMATA Adjacent Construction Project Manual
- C. American Railway Engineering and Maintenance-of Way Association (AREMA)

1.03 SUBMITTALS

- A. Make the submittals of this Section for Approval by the Authority in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, unless noted otherwise.
 - 1. Milestone documents as specified within this Section.
 - 2. Check sets of Design Drawings and Design Specifications at each design milestone.
 - 3. Test, acceptance, and verification criteria and procedures for the product being specified as described in Section 01 47 00, QUALITY MANAGEMENT SYSTEM.
 - 4. Meeting minutes of all design coordination meetings attended by third-party entities as described in Section 01 31 20, Project Meetings
 - 5. At the end of the Contract, submit in accordance with Section 01 77 50, CLOSEOUT, a complete configuration management database.

1.04 GENERAL DESIGN REQUIREMENTS

- A. Review Project requirements and discuss any issues needing clarification with WMATA Representative along with WMATA design review team, end users and other stake holders at the Pre-Design-Build Meeting prior to beginning any design work. The meeting shall be attended by the Design-Builder's Project Manager, Design Engineering Manager, Architect and Engineers of Record involved in designing the Project elements.
- B. All design and field engineering Work required to be performed by the Design-Builder shall be performed under the direct supervision of the Design Engineering Manager by a licensed professional and shall satisfy the laws of the jurisdiction in which the Project is located.
- D. Perform a code review for the Project and identify any potential conflicts amongst the design requirements, assumptions, field conditions, WMATA Manual of Design Criteria and jurisdictional codes that may affect scope, cost schedule, or quality of work. Notify the Arlington County Project Officer and WMATA Representative of potential conflicts as soon as practicable but no later than within thirty (30) Days of discovery. The notification shall include a clear

statement of the conflict, the source of the requirement and criteria, and a recommended solution to the potential conflict.

- E. Perform additional detailed surveys and investigations to verify the Site conditions as needed for development of the final design.
- F. Perform additional detailed environmental investigations and coordinate with the Jurisdictional Authorities as needed for development of the final design and for obtaining all necessary permits.
- G. ADAAG Design and Construction Compliance
 - 1. Design and construct the Work in accordance with ADAAG regulations and Federal Transit Administration Accessibility Handbook for Transit Facilities. In projects that address only a portion of an existing facility, ADAAG requirements state that the connection to public use space shall be accessible to the public at finish of construction. Alterations cannot decrease public accessibility. Accessible paths must be provided both within scope of the facility being constructed or renovated and to adjacent properties. ADAAG requirements apply to facilities open to the public as well as facilities for Authority employees in accordance with ADAAG reference 4.1.1.5.
 - 2. Should ADAAG regulations and Federal Transit Administration Accessibility Handbook for Transit Facilities requirements conflict, the most stringent shall apply.
 - 3. Ensure that facility designs, except as noted, comply with ADAAG and FTA requirements by providing a duly certified ADAAG Design Compliance Certification Form using the form provided by the Authority.
- H. Develop and provide Design Drawings and Design Specifications. WMATA Standard Drawings and WMATA Standard Specifications shall be incorporated into the Design Drawings and Design Specifications, without edits, where referenced in the Technical Requirements. Develop Project-specific specifications for work not addressed in the WMATA Standard Specifications. Submittals specified in the Project-specific specifications developed by the Design-Builder shall be submitted to WMATA for information only.
- I. Design work pertaining to rehabilitation of existing facilities shall be based on the assumption that the facility will remain operational during on-Site inspections, design development, and construction. Coordinate facility access through the WMATA Representative.
- J. Design Reviews: Arlington County and WMATA will review and Approve milestone design submittals based on the requirements of the Contract Drawings, Technical Requirements, WMATA Manual of Design Criteria, WMATA Standard Specifications as referenced in the Technical Requirements, and program requirements established in this Section. Set up meetings with Authority including outside agencies, if needed, to present the design packages for all milestone submittals. The Design Engineering Manager is responsible for obtaining comments from Jurisdictional Authorities and Utilities. Proceeding with furthering design prior to the resolution of all review comments from all entities to the Authorities satisfaction is at the Design-Builder's own risk.
- K. Permits: Prepare designs necessary to submit plans and obtain all permits needed to implement the Project. Do not modify Contract Document requirements based on comments from Jurisdictional Authorities or Utilities without approval from the Arlington County Project Officer and concurrence of WMATA.
- L. Provide Engineering and Architectural services during construction, such as performing Request for Information and submittal reviews prior to their submittal to the Arlington County Project Officer and WMATA Representative as further described in Section 01 33 00,

SUBMITTAL PROCEDURES, and prepare As-Built Drawings and As-Built Specifications as further described in Section 01 77 50, CLOSEOUT.

1.05 DESIGN CONTROL PLAN

- A. Develop and maintain a Design Control Plan (DCP) that establishes basic guidelines for the preparation and development of design documents culminating in Issued for Construction Drawings and Issued for Construction Specifications. The DCP shall address the following requirements as a minimum:
 1. Control of design inputs and changes shall be managed by the Design-Builder in a manner that assures Contract and Design-Builder requirements are correctly translated into the drawings and specifications used for procurement, manufacturing, construction, and testing.
 2. Establish processes and procedures for preparing and checking of design calculations, drawings, and specifications for each milestone design submittal.
 3. Detailed checking of documents shall be carried out by an individual who has qualifications and experience equal to or greater than the preparer. Maintain record of check sets through the life of the Project and submit these with each milestone design submittal. Authority will audit these check sets periodically. Identify superseded documents with a stamp to avoid wrongful use of documents.
 4. Configuration management.
- A. Prepare plans for each design activity and define responsibility for its implementation.
- B. Provide verification and validation of software products designed for the Project.
- C. Design verification shall include checking and back-checking calculations, drawings, specifications, and other design elements without reliance on review and comments from the Authority and shall be conducted before providing each milestone design submittal to the Authority and before the start of construction or fabrication.
- D. Provide certification with each milestone design submittal stating that the documents being submitted are reviewed, checked and backchecked.
- E. Design or provide documentation for submission/approval for all required test, acceptance, and verification criteria and procedures for the product being specified. Test and acceptance criteria and procedures may be used by the Authority and its on-call architectural and engineering consultants to verify designs and products. The design verification process shall test the design to assure that it meets Contract Document requirements.
- F. Implement configuration management and document change control for the duration of this Project for calculations, drawings, specifications, documents, systems, operating and maintenance documentation, and the physical materials. Maintain document change control and update all documents as the design and installation progresses. Configuration management system shall provide an accurate historical record that can trace decisions made through the life of the Contract. At the end of the Contract, submit to Arlington County and WMATA in accordance with Section 01 77 50, CLOSEOUT, a complete configuration management database.
- G. Arlington County and/or WMATA have the right to accept or deny a requested design change and no design change shall be implemented without Authority Approval. The Authority will only consider requested design changes, which are submitted to the WMATA Representative with the following supporting documentation:

1. A valid reason for the change.
 2. Evidence that the change is feasible
 3. An explanation of why the change is desirable
 4. Estimates of effects on performance, costs and schedule
- H. Include a means for contemporaneously relating the modification status of equipment and construction to the corresponding drawing or specification.
- I. Maintain process control, including:
1. Completion of quality procedures, work instructions, and initial coordination meetings prior to the start of a design activity.
 2. Documented procedures for checking of calculations and survey computations.
 3. A formal system of continuous feedback of problems and their resolution shall be developed between the Designer and construction staff.

1.06 MILESTONE DESIGN SUBMITTALS

- A. Intermediate Design (60% Design)– required for all electrical, mechanical and shaft work - Design Drawings, Design Specifications, calculations, and all associated design documents shall be completed to include the minimum requirements listed below:
1. Drawings:
 - a. Plan and profile location of all potentially affected utilities and structures – Complete
 - b. Plan confirming adjacent property lines – Complete
 - c. Plan showing temporary and permanent Right-of-Way requirements – Complete
 - d. Plan of existing conditions – Complete
 - e. Civil sections – In Progress
 - f. Sizing of primary structural members – Complete
 - g. Retaining wall elevations and sections – In Progress
 - h. Architectural plans and elevations – In Progress
 - i. Architectural wall sections – In Progress
 - j. Architectural floor plans – In Progress
 - k. Structural plans – In Progress
 - l. Mechanical plans – In Progress
 - m. Electrical plans – In Progress
 - n. ICA plans – In Progress
 - o. Architectural plans – In Progress

- p. Mechanical equipment list – In Progress
 - q. Electrical single line diagram – In Progress
 - r. Applicable codes and standards – Complete
 - s. CADD files for verification of file structure
2. Specifications: Index of all specification Sections - Complete
 3. Intermediate design calculations for each discipline commensurate with design development.
 4. Design Report including documentation of:
 - a. Constructability and Construction Staging Plan - Draft
 - b. Utility and Structures Relocation/Protection/Support - Draft
 - c. Traffic Impact Assessment including constraints, maintenance plans, parking inventories, truck haul routes, and new/modified road systems - Draft
 - d. Handling and Disposal of Excavated Material - Draft
 - e. Hydrology/Stormwater Management and Drainage -Draft.
 - f. Supplemental Geotechnical Investigation – Complete
 - g. Supplemental Environmental Documentation – Draft
 - h. Systems Interface Management Plan - Complete
 - i. Identification of required permits and jurisdictional authority approvals - Complete
 5. Public meeting presentation materials
 6. Quality Assurance Documentation
 7. Risk Assessment Documentation
 8. Design Schedule - Complete.
 9. Response to Authority and Jurisdictional Authority Review Comments
- B. Pre-Final Design (90% Design)– required for all portions (electrical, mechanical and shaft work as well as structural platforms design) of the project - Design Drawings, Design Specifications, calculations, and all associated design documents shall be completed to include the minimum requirements listed below:
1. Drawings:
 - a. Plan and profile location of all potentially affected utilities and structures
 - b. Plan confirming adjacent property lines
 - c. Plan showing temporary and permanent Right-of-Way requirements
 - d. Plan of existing conditions

- e. Sizing of all structural members
 - f. Structural plans
 - g. Mechanical plans
 - h. Electrical plans
 - i. ICA plans
 - j. Architectural plans
 - k. Mechanical equipment list
 - l. Electrical single line diagram
 - m. Applicable codes and standards
 - n. CADD files for verification of file structure
2. Design Specifications
 3. Pre-Final design calculations for each discipline commensurate with design development.
 4. Design Report including documentation of:
 - a. Constructability and Construction Staging Plan
 - b. Utility and Structures Relocation/Protection/Support
 - c. Traffic Impact Assessment including constraints, maintenance plans, parking inventories, truck haul routes, and new/modified road systems.
 - d. Systems Interface Management Plan
 - e. Identification of required permits and jurisdictional authority approvals.
 5. Public meeting presentation materials
 6. Quality Assurance Documentation
 7. Risk Assessment Documentation
 8. Design Schedule
 9. Response to Authority and Jurisdictional Authority Review Comments
- C. Final Design (100% Design)– required for all portions (electrical, mechanical and shaft work as well as structural platforms design) of the project – Design Drawings, Design Specifications, calculations, and all associated design documents shall be complete, checked, and ready for signing and sealing after Approval by the Authority.
- D. Issued For Construction – Design Drawings, Design Specifications, and calculations signed and sealed by Architect and Engineer of Record.

1.07 ADDITIONAL PROGRAM REQUIREMENTS

- A. Project-specific Program Requirements that supplement or replace requirements imposed by WMATA Manual of Design Criteria are as stated in the Technical Requirements, Contract Drawings, and Contract Specifications.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 DESIGN MANAGEMENT

- A. Appoint a Design Engineering Manager to lead and coordinate the Design-Builder's design effort.

3.02 IMPLEMENTATION

- A. Prepare the design by developing detailed Issued for Construction Drawings, Issued for Construction Specifications, design calculations, analyses and reports, with all engineering required in accordance with accepted industry practices and submit milestone design submittals to Arlington County and the WMATA Representative for Approval.
- B. Provide the engineering design as specified for facilities owned by states, cities, agencies, districts, and utilities including service connections, and facility modifications and relocations as applicable.
- C. Coordinate and resolve conflicts for locations and sizes of openings, conduits, equipment placement, power and HVAC requirements, and clearances and weights of all elements among all the disciplines as applicable.
- D. Immediately notify the Arlington County Project Officer and WMATA Representative in writing upon identification of design issues or problems, which may affect cost, schedule, the work of Utilities, or other contracts.
- E. Issued for Construction Drawings and Issued for Construction Specifications, design calculations, analyses, and reports and certifications shall be signed and sealed by registered Professionals licensed to practice engineering in all jurisdictions where the Project will be constructed, as applicable.
- F. Coordinate design with governmental, public and private agencies and others. Such coordination shall include attending meetings as may be necessary. Notify WMATA Representative of coordination meetings a minimum of 2 Days prior to meetings. Prepare and submit to the Arlington County Project Officer and the WMATA Project Representative through e-Builder meeting minutes of all such meetings attended. Promptly notify Arlington County and the WMATA Representative in writing through e-builder of any betterments or other work beyond the scope of the Contract Documents that are requested by jurisdictional authorities, Utilities, and property owners.

3.03 INTERFACE REQUIREMENTS

- A. Investigate existing systems. Design, furnish, and install systems and materials, which interface with and are fully compatible with existing systems and that function in a fully compatible regard to safety, reliability, and maintainability as specified in Section 01 11 30, SYSTEMS INTEGRATION.

- E. Systems, which require functional and physical interface coordination, may include, but are not limited to:
1. Drainage Systems
 2. Existing Underground Utilities
 3. Traffic Maintenance during Construction and Traffic Signalization
 4. Power and Energy Management System
 5. Mechanical Systems
 6. Plumbing Systems
 7. Electrical Systems
 8. Communications Systems including Voice and Data
- F. Interface and compatibility requirements within various other interfaces for the Communications Systems include:
1. Ancillary and Remote Facilities: Coordinate provisions for Fire and Intrusion Alarm System and wayside telephones.
 2. Local Fire Jurisdictional Authorities: Coordinate provisions for fire detection, alarm, and suppression to ensure compliance.
- G. Interface and compatibility requirements for the Utility systems:
1. Coordinate equipment location and drain inlets and pipes. Coordinate new drain inlets and pipes with existing manholes, drain inlets, and pipes. Coordinate new sanitary sewer pipes with existing manholes and pipes.
 2. Coordinate electrical power requirements and location of equipment, feeders, and ductbanks.
- H. Interface and compatibility requirements for the Public Telephone system:
1. Right-of-Way: Coordinate required changes to telephone company facilities affected by construction.
- I. Develop a Systems Interface Points matrix, which shall identify all system interfaces and describe in detail the functional and physical interfaces between new and existing systems. The descriptions shall include interface locations, operating parameters, and applicable test points. The Systems Interface Points matrix shall:
1. Assign primary and secondary responsibilities to the providers of the interfaced systems and provide assurances that the systems provided under this Contract are fully compatible and that interface connections will not degrade, be compromised, or otherwise interfere with the normal operations of either of the interfaced systems.
 2. Provide assurances that the systems provided under this Contract are interfaced in a manner similar to existing WMATA systems performing the same functions. Differences in the manner in which the systems are interfaced shall be clearly described and subject to the Approval of the WMATA Representative.

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3. Provide a direct reference to one or more test procedures contained in the Design-Builder's approved Systems Integration Plan, which will verify that each system interface fully satisfies the requirements described therein.
 4. Be developed before or concurrent with the systems designs and shall be submitted for review along with each milestone design submittal.
- J. Control systems installation, its current configuration, and provide appropriate documents to support system configuration. Issue engineering recalls, update installed material, and update support material such as test equipment and documentation.

END OF SECTION

SECTION 01 11 30 - SYSTEMS INTEGRATION

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies systems integration requirements for the Project.
- B. The purpose of this Contract is for Arlington County to deliver to the Authority a complete system that functions efficiently as a part of the overall WMATA System and within the local community. The Contract Documents set out the requirements that define the Arlington County and WMATA's intent. The designs of Communications, Mechanical, and Electrical systems as applicable are conceptual. It is the Design-Builder's responsibility to complete these designs and integrate these systems into the WMATA System. The Design-Builder is expected to advance the designs into a single unified whole.
- C. Systems Integration shall ensure that individual elements fit into components; components fit into subsystems; subsystems fit into systems; and systems fit into the existing WMATA System as applicable. The WMATA System includes train, bus, paratransit, and support facilities as necessary for operations.
- D. As part of the Systems Integration process, the Design-Builder shall implement a systems engineering program designed to assure attainment of the reliability, availability, and safety goals of WMATA.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, and as noted below for WMATA Representative's Approval:
 - 1. Systems Integration Database software licenses, if other than Microsoft Access, and database structure within 120 Days of NTP.
 - 2. Integrated System Test Plan: Within 180 Days of NTP and updated monthly thereafter.
 - 3. Systems integration design at each milestone design submittal, as applicable.
 - 4. Integrated system test procedures: 60 Days before use.
 - 5. Authority notification of testing within 15 Days of testing.
 - 6. Test results - within 10 Days of completion of test.
 - 7. Operations procedures: 60 Days prior to operations training.
 - 8. Documentation including drawings, manuals, and flow charts as system integration is completed for each interface.
 - 9. Certificates of compliance - before Acceptance

1.03 QUALITY ASSURANCE

- A. Systems Integration Manager shall be qualified per Section 01 11 10, DESIGN-BUILDER KEY STAFF.

1.04 PROCESS REQUIREMENTS

- A. Establish and maintain a systematic, documented, comprehensive, verifiable, and continuous systems integration process applied throughout the duration of the Contract to implement the intent of the Contract Documents and the Issued for Construction Drawings and Issued for Construction Specifications. At a minimum, the systems integration effort shall:
1. In addition to the Initial Systems Integration Plan, provide a Systems Integration Plan that defines the process for accomplishing these goals.
 2. Utilize the System Interface Points matrix specified in Section 01 11 20, DESIGN AND PROGRAM REQUIREMENTS, to develop the Systems Integration Plan that systematically identifies a process for integrating each interface identified therein.
 3. Provide a mechanism and assign project responsibility for interface management and control, such that every interface has a single entity within the Design-Builder's organization accountable for engineering and verifying the interface.
 4. Define methods to confirm interface compatibility and demonstrate said compatibility through tests or other approved verification methods.
 5. Assure that reliability, availability, maintainability, and safety requirements are propagated through all systems and system components so as to meet the overall availability, dependability, and safety criteria set out in this Contract.
 6. Develop special drawings for the sole purpose of demonstrating coordination among crafts, disciplines and systems, and work by others.
 7. Coordinate all disciplines, civil/structural/architectural, utilities, landscaping, track-work, mechanical, electrical, train control, communications, and traction power, as applicable, to ensure that all systems are integrated and there are no integration issues.
 8. Allow WMATA to independently assess the effectiveness of, and audit, the Design-Builder's systems integration process.
- B. Provide systems integration procedures that:
1. Define a method for tracking system integration of physical, mechanical electrical, electronic, software, and operational interfaces of all systems components and between new and existing WMATA System components.
 2. Define a method for tracking contacts needed for systems integration coordination.
 3. List all Suppliers, Subcontractors, and their interfaces.
 4. Identify major coordination milestones.
 5. Identify major system integration demonstrations.
 6. Identify conflict resolution procedures.
- C. Provide system operations descriptions in text, flow charts, and simple graphics. Describe the system's function and how the function will be achieved. The purpose of these descriptions is to ensure that the Design-Builder and WMATA have a common understanding of the system's use and operation so that WMATA receives a truly turnkey product that will function as desired. These descriptions shall be in sufficient detail to assure a complete understanding of WMATA's intent and the Design-Builder's approach to meeting that intent.

- D. The systems integration design shall be provided in stages in accordance with milestone design submittals specified in Section 01 11 20, DESIGN AND PROGRAM REQUIREMENTS:
1. The intermediate systems integration design shall be delivered with the intermediate milestone design submittal and shall:
 - a. Provide draft description of TVS as applicable.
 - b. Provide draft systems integration procedures.
 - c. Provide a working model of the Systems Integration Database.
 - d. Identify the Design-Builder's Systems Integration Manager.
 - e. Identify all major systems.
 - f. Identify all major coordination efforts.
 - g. Identify interfaces that are on the critical path.
 - h. Identify WMATA reliability, availability, and safety goals.
 - i. Provide written disposition of the intermediate design review comments 10 Days after receiving comments from the Authority.
 2. The pre-final systems integration design shall be delivered with the pre-final milestone design submittal, shall build on the intermediate systems integration design, shall incorporate the comments on the intermediate systems integration design, and shall:
 - a. Provide a final draft description of TVS as applicable.
 - b. Provide final draft systems integration procedures.
 - c. Deliver a populated Systems Integration Database.
 - d. Identify all systems, their interfaces and schedule impact.
 - e. Identify all coordination efforts.
 - f. Identify interfaces that are on the critical path.
 - g. Identify compliance with WMATA reliability, availability, and safety goals.
 - h. Provide written disposition of the pre-final design review comments 10 Days after receiving comments from the Authority.
 3. The final systems integration design shall be delivered with the final milestone design submittal, shall build on the pre-final systems integration design, shall incorporate the comments on the pre-final systems integration design, and shall:
 - a. Provide a complete set of drawings, cut sheets, and specifications, progressed to the final level.
 - b. Provide TVS as applicable.
 - c. Provide final systems integration procedures.
 - d. Deliver a fully populated Systems Integration Database.

- e. Update all impacts.
 - f. Identify all coordination efforts.
 - g. Identify interfaces that are on the critical path.
 - h. Identify compliance with WMATA reliability, availability, and safety goals.
 - i. Provide written disposition of the final design review comments 10 Days after receiving comments from the Authority.
4. The final systems integration design shall be delivered with the final milestone design submittal, shall build on the pre-final systems integration design, shall incorporate the comments on the pre-final systems integration design, and shall as applicable:
- a. Provide a complete set of Final Design Specifications and Final Design Drawings, including cut sheets, progressed to the final level.
 - b. Provide TVS as applicable.
 - c. Deliver a fully populated Systems Integration Database.
 - d. Update all impacts.
 - e. Identify all coordination efforts.
 - f. Identify interfaces that are on the critical path.
 - g. Identify compliance with Authority reliability, availability, and safety goals.
- E. Integration Design and Documentation:
1. Provide full technical documentation of the integration of each interface, and when required, provide detailed descriptive and operations procedures for operation of any particular interface. Systems Integration services shall address interfaces such as interactions with Authority operations and maintenance, local fire fighters, and others as applicable. When required, provide operations and procedures manuals to define exactly how each interface is designed and operated.
 2. When the systems integration process results in a complete integrated product with no special parts or features, the Issued for Construction Drawings and Issued for Construction Specifications and approved Shop Drawings shall suffice as complete documentation. When the systems integration process requires a separate element, physical or otherwise, to assure proper operation, separate and full documentation will be required. Required documentation may take the form of additional drawings, procedures, manuals, flow charts, or other material. The WMATA Representative shall be the sole arbiter of what documentation is required.
 3. Documentation includes test and other records that relate to the performance of any particular interface.

1.05 INTERFACE STANDARDS

- A. The use of English (US customary units) standard measures shall be consistent with the current use of those standards at the Authority.
- B. A standard shall be deemed to exist when a previously existing interface, similar to that required by this Contract, is already in use on Authority property. Standard, in this context, means that

this is the standard way to make this interface at this location. Provide a system that is consistent with current practices so as to minimize effects on the balance of the system. Adhere to standards unless an explicit written waiver is granted. Notify the Arlington County Project Officer and WMATA Representative in writing of deviations.

- C. When no existing standard for an interface exists, propose an interface standard to the WMATA Representative. Minimize the number of interface types.

1.06 SYSTEMS INTEGRATION DATABASE

- A. Develop and maintain a Systems Integration Database that lists all physical, mechanical, electrical, electronic, software, operational, and other interfaces. The database shall be developed in the software of the Design-Builder's choice provided the software is ODBC (Open Data Base Connectivity) compliant and the data tables can be imported directly into Microsoft Access. Provide the WMATA Representative with two licensed copies of the database software used and upgrades, if any are required, so that the Authority may also run the database for the Period of Performance of the Contract. Submit the database structure to the WMATA Representative for Approval. Further enhancements can be added to the database provided the initial Approved data fields are maintained unchanged upon Approval of the WMATA Representative. Submit updated copies of the interface database at each progress meeting and when requested by the WMATA Representative.
- B. Systems Integration Database shall include a full set of reporting tools. Retain the services of a database developer who is familiar with these reporting tools and who can create custom reports. Demonstrate the developer's adequacy by providing a sample database with sample reports showing how this tool can be used to manage the system interfaces. The WMATA Representative shall be the sole judge of the adequacy of the database, its structure, and the developer.
- C. Maintain, in the Systems Integration Database, a complete listing of all interfaces and their relevant characteristics. Also maintain a library of standards and specifications relevant to the system interfaces. Provide the WMATA Representative with copies of such standards and specifications. Provide samples of interface materials (e.g., connectors, protocol conversion software, and black boxes as specified in the Issued for Construction Specifications.
- D. Data fields/tables to be included in the database shall include such items as:
1. Interface ID number.
 2. Type of interface (e. g. physical, mechanical, electrical, electronic, software, operational)
 3. Interface Level as applicable (e. g. between subsystems, between subsystems and major systems, between major systems)
 4. Purpose of interface.
 5. Side-one identification including side-one standard and side-one contact person.
 6. Side-two identification including side-two standard and side-two contact person.
 7. Safety standard.
 8. Status.
 9. Open Issues/Conflicts.
 10. Person taking action.

11. Projected resolution date.
12. Scheduled test date and test results (pass/fail).
13. Scheduled demonstration date and demonstration results (pass/fail).
14. Schedule conflict (yes/no).
15. Results/Impacts.
16. List of all interfaces, their characteristics, and specification references.
17. Training requirements.
18. Contacts including name, organization, address, telephone, fax, and e-mail.

1.07 INTEGRATED SYSTEM TEST PLAN

- A. An Integrated System Test Plan shall be submitted that delineates the specific integrated system tests required. These tests will directly involve Authority personnel. Revise, update, and submit this plan for Approval monthly.
- B. The Integrated System Test Plan shall include the following:
 1. A matrix of all systems testing required by the Contract Documents and the Issued for Construction Drawings and Issued for Construction Specifications to be performed by Design-Builder, Suppliers, or Subcontractors.
 2. Samples of test reports that shall meet the minimum requirements called for in the applicable test standards or specifications.
 3. Coordinate on-Site and off-Site testing.
 4. Comply with Authority notification requirements for planned tests and inspections.
 5. Prepare integrated system test procedures in compliance with the Integrated Systems Test Plan and include the following information:
 - a. System to be tested
 - b. Specification Section, Article, and Paragraph relative to test
 - c. Applicable standard
 - d. Type of test (e.g. total system, sub-system, factory)
 - e. Test equipment required
 - f. Qualifications required to perform test
 - g. Step-by-step procedures for the test and parameters to be tested
 - h. Test frequency
 - i. Test data sheets or test report forms
 - j. Responsibility for test performance
 - k. Completion status

- I. Means of tracking and recording corrective actions being taken to assure compliance with the Contract Documents.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.01 SYSTEMS INTEGRATION MANAGER

- A. Appoint a Systems Integration Manager to lead and coordinate the integration efforts. Do not change the designated person without the prior written approval of the Arlington County Project Officer and acceptance by WMATA.

3.02 INTEGRATED SYSTEMS TESTING PREREQUISITES

- A. A prerequisite to integrated system testing shall be that all component testing has been satisfactorily completed and that system installation is complete and ready for system integration testing.

3.03 IMPLEMENTATION

- A. Implement system integration. System integration shall have been achieved once the Design-Builder demonstrates that all systems and subsystems operate as a unit with each other and within the overall WMATA System as applicable. All systems, including but not limited to Communications, Electrical, and Mechanical Systems shall be integrated to perform as specified in the Contract Documents and the Issued for Construction Specifications.
- B. Provide composite clearance verification drawings that demonstrate the spatial location of all utilities and their relation to other utilities, facilities, and items such as foundations. The composite clearance verification drawings shall also demonstrate clearances for train movement.

3.04 INTEGRATED SYSTEM TESTING

- A. Provide integrated system testing to assure that system components interface properly. Appropriately test all interfaces and certify that the interfaces work properly and meet all Contract requirements. Create test procedures and test data sheets that fully exercise the interface and prove that the interface performs its intended function.
- B. The WMATA Representative has the right to reject any integrated system test procedure or require additional integrated system tests if, in the WMATA Representative's sole opinion, the proposed test does not adequately exercise or demonstrate the performance of the interface.
- C. Notify the WMATA Representative in advance of each test. All test results shall be submitted to the WMATA Representative.

3.05 PERFORMANCE DEMONSTRATION

- A. Integrated system testing shall culminate in system Performance Demonstration that shall simulate all operations and shall exercise all systems and system elements as specified in Section 01 82 00, DEMONSTRATION AND TESTING.

3.06 MONITORING AND AUDIT

- A. The Authority shall have the right to monitor and audit the systems integration process. Facilitate these audits by providing information and arranging for the Authority's auditors to have access to all relevant records. Provide timely information to the WMATA Representative about interface problems that are identified, and the steps being taken to resolve them. Also invite Authority to attend meetings held within the organization or with Subcontractors to resolve interface definitions or systems integration issues. Furnish Authority with minutes of such meetings within 10 Days after such meeting, regardless of whether Authority attends.
- B. In addition, Authority reserves the right to witness all interface and systems integration tests. Notify the WMATA Representative of each upcoming test. The Authority reserves the right to direct supplemental testing of a component, element, subsystem, or system in the interest of verifying achievement of specified performance levels, at no cost to the Authority.

END OF SECTION

SECTION 01 11 40 - SAFETY/ENVIRONMENTAL REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes construction safety and security and environmental safety requirements for the Project including WMATA's Safety Awareness Program.

1.02 REFERENCES

- A. WMATA Construction Safety and Environmental Manual (CSEM)
- B. ANSI/ISEA 107 - American National Standard for High-Visibility Safety Apparel
- C. Occupational Safety and Health Association (OSHA)
 - 1. 29 CFR §1910
 - 2. 29 CFR §1926
 - 3. 49 CFR §172
 - 4. 49 CFR §390-397
- D. U.S. Army Corps of Engineers - Safety Manual EM-385-1-1
- E. National Commission for the Certification of Crane Operators
- F. Resource Conservation and Recovery Act (RCRA) of 1976 and amendments
- G. Metrorail Safety Rules and Procedures Handbook (MSRPH) - SOP No. 19
- H. WMATA, Office of Rail Transportation Maintenance Operations Control, Administrative Procedure OAP 200-33, Site Specific Work Plan (SSWP)

1.03 QUALITY ASSURANCE

- A. Safety Superintendent: As specified in Section 01 11 10, DESIGN-BUILDERS KEY STAFF
- B. First Aid Attendant
 - 1. SHALL HAVE CURRENT FIRST AID AND CPR CERTIFICATION. A RESUME, CERTIFICATIONS, AND EVIDENCE OF TRAINING SHALL BE SUBMITTED DOCUMENTING EDUCATION AND EXPERIENCE.
 - 2. Shall be trained in Blood-borne Pathogens in accordance with CFR §1910.1030.

1.04 SUBMITTALS

- A. Submit to the Arlington County Project Officer for approval in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, 60 Days prior to commencing construction, unless noted otherwise:
 - 1. Documentation and Certifications of Safety Superintendent's and First Aid Attendant's, as applicable, experience in construction safety.

2. Design-Builder's Organizational Health and Safety Program Plan that includes OSHA required plans listed below that are applicable to the Work.
 - a. Site-specific Emergency Response Plan.
 - b. Site-specific Temporary Fire Protection System Plan.
 - c. Site-specific Waste Water Discharge Plan if wastewater is generated.
 - d. Site-specific Pollution Control Program.
 - e. Site-specific Dust and Debris Control Plan.
 - f. Site-Specific Work Plans for all work that will be performed in the right-of-way and operational ancillary rooms within the station.
 - g. Site-specific Fall Protection Plan.
 - h. Bloodborne Pathogens Exposure Control Plan.
 - i. Hearing Conservation Program if employees are exposed to continuous noise in excess of the OSHA Action Level.
 - j. Respiratory Protection Program if employees are exposed to dust (including crystalline silica) or other toxic atmospheres in excess of the OSHA permissible exposure limits. If a respiratory program is required, provide documentation of training, medical clearance for respirator use, and respirator fit testing.
 - k. Hot Work Program.
 - l. Lockout Tagout Program.
 - m. Confined Space Program.
 3. Job Hazard Analysis submitted prior to each element of construction.
 4. Documentation to show that all Confined Space entrants and attendants are trained in Confined Space Entry, including hands-on-training or Confined Space Awareness, as applicable, and possess applicable licenses and certifications.
 5. Site-specific Confined Space Permits at least seven (7) business days before entry is required.
 6. Identity of all materials or chemicals to be used on Authority property (including welding rods), GHS-compliant Safety Data Sheet (SDS) for these products, and a brief explanation of how they will be used and if wastes will be generated. Submit SDS Review Request Forms to the Arlington County Project Officer and WMATA Representative prior to the use these materials or chemicals.
 7. Certification of Crane Operators (CCO) Certificate(s) for each crane and each crane operator prior to any crane operator working on the Site.
- B. Submit to the Arlington County Project Officer and WMATA Representative for information in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, 60 Days prior to commencing construction, unless noted otherwise:
1. Certificates of Insurance for pollution liability coverage, if applicable, in accordance with Section 00 87 70, INDEMNIFICATION AND INSURANCE REQUIREMENTS, for Design-

- Builder or Subcontractors performing work involving hazardous materials, hazardous substances, hazardous wastes, or contaminated soil or water.
2. Results of noise monitoring, air monitoring, and soil, water or waste sampling submitted weekly during work activities.
 3. Documentation of medical surveillance submitted monthly.
 4. Identity of equipment that may generate toxic atmospheres such as gasoline or diesel-powered generators, welding, and cutting equipment.
 5. Documentation of licenses and certificates required for lead or asbestos abatement, UST removal, or installation, OSHA's Hazardous Waste Operations and Emergency Response Standard (HAZWOPER), or other work requiring licensing or certification such as welding.
 6. Documentation of licenses, certificates, and U.S. EPA identification numbers required for transportation of hazardous materials, hazardous substances, or hazardous wastes.
 7. Documentation of licenses, permits, and certificates required for disposal of hazardous wastes including the name and address of the waste disposal facility where hazardous waste materials are to be disposed.
 8. Identification of air monitoring devices that will be used to monitor air quality at the Work Site. Provide copies of most recent manufacturer calibration and all Design-Builder field calibration checks.

1.05 SAFETY REQUIREMENTS

- A. The Design-Builder shall be responsible for all Subcontractors, Suppliers, and other persons working under its direction to comply with all requirements as noted herein and shall disseminate these requirements to those personnel.
- B. Cooperate with representatives of the Authority and federal, state, and local regulatory agencies during Site inspections or investigations. Inspection and investigation activities do not involve directing of Design-Builder's work but may involve interviews with Design-Builder personnel. WMATA shall immediately notify the Design-Builder of those items that threaten property and/or a person's life and limb and that may require the Design-Builder to stop work on a specific task or operation. All other WMATA observations shall be directed to the Arlington County Project Officer.
- C. Immediately report all accidents and incidents (including near misses) that occur during the performance of the Work to the Arlington County Project Officer or WMATA Representative.
- D. The storage of hazardous and flammable materials (including such items as rags, mops, paper towels, or other combustible materials contaminated with hazardous or flammable products) on Authority property, is restricted. Design-Builders seeking to store hazardous or flammable materials on Authority property must obtain approval from the Authority by submitting safety data sheet (SDS) for each specific chemical and the quantity of each chemical to be stored on the Site. It may not always be possible to grant permission to store hazardous or flammable materials on Authority property. If permission is granted, store the materials in compliance with the jurisdictional codes and regulations. Acquire permits for use of hazardous materials as required by the jurisdictional Fire Marshal.
- E. The use of explosives for the performance of Contract work will not be permitted without written Approval from the WMATA Representative. Obtain all permits and approvals from the Jurisdictional Agencies.

- F. Prior to performing any work on or above or under the right-of-way, arrangements shall be made through the WMATA Representative for access rights and power outage in accordance with SOP No. 19 contained in the Metrorail Safety Rules and Procedures Handbook and OAP 200-33 (SSWP). All special requests for access, single tracking, power outages, escorts, and other Authority support shall be submitted in writing. Site Specific Work Plans shall be submitted for all Work conducted in Authority Right-of Way and any operational facility. Ensure that all personnel complete minimum required WMATA safety training on the rules and procedures for working on the Right-of-Way before starting such work.
- G. Employ and assign to the construction work a Safety Superintendent as specified in Section 01 11 10, DESIGN-BUILDER KEY STAFF. A first aid station shall be established and fully equipped to meet the needs of the anticipated work force. In no event shall work at the Site be performed until the approved Safety Superintendent is available to the Project.
- H. If, at any time, the Work Site is without the services of an approved Safety Superintendent for a period of 15 Days or more, the Work may be closed down at the discretion of the Arlington County Project Officer. If WMATA observes a lack of a Safety Superintendent Arlington County will be informed. The Safety Superintendent shall be acceptable to the Arlington County Project Officer and WMATA Representative, and his/her performance will be reviewed and documented by the WMATA Representative on a continuing basis. If the Safety Superintendent's effectiveness is below standard, the Design-Builder shall provide immediate replacement at the request of the Arlington County Project Officer after consultation with the WMATA Representative. Once employed, the Safety Superintendent shall not be changed without permission of the Arlington County Project Officer and concurrence of the WMATA Representative.
- I. For all work within Confined Spaces, comply with all OSHA, state, and local Jurisdictional Authority rules and regulations for confined spaces defined by 29 CFR §1910.146. Confined spaces shall be classified as either non-permit confined space or permit-required confined space in accordance with OSHA regulations.
- J. Prior to the initial entry into a confined space, coordinate entry with the Arlington County Project Officer and WMATA Representative and take air quality readings to establish base readings and conditions. At a minimum, oxygen, lower explosive limit, carbon monoxide, and hydrogen sulfide, shall be measured. Measurement of additional parameters may be required depending on the location of the space and potential for atmospheric hazards related to contamination or work activities.
- K. Air quality and any additional parameter reading results shall be provided to the Arlington County Project Officer and the WMATA Representative for recording purposes and shall determine if atmospheric hazards exist, which would classify the space as a permit-required confined space. Continuous and follow-up monitoring of air quality shall meet OSHA requirements, and all subsequent results shall be provided to the Arlington County Project Officer and WMATA Representative.
- L. Prior to the start of any work involving non-permit confined spaces, submit the following:
1. Written Job Hazard Analysis for all work to be performed in the confined space, including SDSs for chemicals to be used in the space. Submit SDSs for all chemicals to be used on Authority property along with a brief description of how and where they will be used and if wastes will be generated. The SDSs will be reviewed by Authority and if approved, the materials can be used in the system. If they are rejected, submit a substitute for Authority approval. The SDSs must be recent (less than 3 years old) and comply with the OSHA Hazard Communication Standard 29 CFR §1910.1200. The Design-Builder is responsible for complying with the requirements of the SDSs.

2. Written Emergency Response Plan, which identifies emergency responders for rescue operations.
 3. Written plan for a temporary Fire Protection System as specified in Section 00 74 00, PROTECTION OF PERSONS AND PROPERTY, for use during the term of the Contract, for Arlington County and WMATA approval. Ensure that work activities do not adversely impact existing fire protection system(s) i.e., sprinklers, stand pipes, and portable extinguisher.
 4. Identification of air monitoring devices that will be used to monitor air quality at the work Site. Provide copies of most recent manufacturer calibration and all Design-Builder field calibration checks. As a minimum, Authority requires field calibration checks on air monitoring instruments, each day (or shift) before use. The field calibration check information shall include the date, time, calibration check data, and the printed name and signature of the person performing the calibration check. Such documentation shall be available during the day and submitted to the Arlington County Project Officer and WMATA Representative for the record.
 5. Documentation to show that all personnel working in or near non-permit confined spaces are trained in Confined Space Awareness.
- M. Prior to the start of any work involving permit-required confined spaces, submit the following in addition to those items required for non-permit confined spaces:
1. Written Site-specific Confined Space Program.
 2. Confined space permit for applicable space. Each permit is valid for a maximum of 24 hours.
 3. Written Respiratory Protection Program.
 4. Documentation to show that all personnel required to wear respiratory protection have received respiratory protection training, have been fit tested for the respirators they are required to wear (applies to tight fitting respirators) and have been medically evaluated to verify that they have no health problem that would interfere with their safe use of a respirator.
 5. A warning sign to identify the work Site as a permit-required confined space requiring authorization to enter.
 6. The Design-Builder is required to notify the State or Arlington County Project Officer as applicable at least 24 hours prior to entering permit-required confined spaces or to employ State certified Safety personnel who will manage permit-required confined space access and who will perform the required record keeping.
- N. Provide a Job Hazard Analysis prior to the start of each phase of work.
- O. Work clothing consists of long pants, shirts with long or short sleeves, sturdy work boots, and appropriate personal protective equipment. Jewelry that hangs, loose clothing, or clothing with non-detachable hoods, drawstrings, or anything that can become entangled in machinery, shall not be worn on the work Site if machinery is in use on the work Site. Personal protective equipment such as hard hats and footwear shall meet the requirements of 29 CFR §1910.135 and §1910.136. Athletic-type footwear shall not be worn on the Site.
- P. Smoking is prohibited in the Metrorail system, Metrobus system, other Authority facilities, and in Authority vehicles. The Arlington County Project Officer, with consultation from the WMATA Representative, will select a designated smoking area outside the system or facilities and Design-Builder will be informed of its location. Design-Builder personnel found smoking in un-

designated areas will be subject to removal from Authority property. The Design-Builder's Safety Superintendent shall be responsible for ensuring compliance.

- Q. The OSHA Standard for Sanitation, 29 CFR §1910.141, shall be followed. Prior to starting work, furnish for the Design-Builder's staff, necessary toilet convenience secluded from public view. They should be kept in a clean and sanitary condition and shall comply with the requirements and regulations of the area in which the work is being performed. Potable drinking water shall be provided with individual cups and sanitary conditions for the water dispenser shall be maintained. A common drinking cup and other common utensils are prohibited.
- R. For all work at heights above 6 feet, submit a detailed, site-specific Fall Protection Plan. Comply with the most stringent OSHA requirements for Walking-Working Surfaces (29 CFR Part 1910 Subpart D), Scaffolds (29 CFR Part 1926, Subpart L), and Fall Protection 29 CFR Part 1926, Subpart M.
- S. Comply with 29 CFR §1910.95, Occupational Noise Exposure for all work on Authority property, including construction. This standard requires that employees exposed to continuous noise in excess of the OSHA Action Level, participate in a Hearing Conservation Program. Instruments used for noise measurements must be appropriate for the type of noise being measured (impact/impulse or continuous).
- T. If the Work involves removal of paints or coatings, test the paint or coatings to determine if they contain heavy metals such as lead that require special handling and disposal considerations. As a minimum, testing shall be conducted for the eight metals (arsenic, barium, cadmium, chromium, lead, mercury, silver, and selenium) required by the Resource Conservation and Recovery Act (RCRA) of 1976 and amendments. If any of these are present, the components will require special handling and disposal to prevent exposure to workers, patrons, the community, and the environment. The Design-Builder's personnel performing lead-based paint abatement, removal, or control, shall have all licenses and accreditation required by the jurisdiction in which the work is performed. Jurisdictions that do not have their own state lead plans fall under the auspices of the Environmental Protection Agency (EPA). The Design-Builder shall provide medical monitoring to meet the requirements of 29 CFR §1910.1025 and §1926.62. As a minimum, medical monitoring shall consist of biological monitoring for lead and zinc protoporphyrin and shall include a physician's medical determination. As a minimum, biological monitoring shall be conducted immediately prior to working on Authority property where the employee may be exposed to lead, and immediately upon completion of this work. The Design-Builder shall provide training for lead workers and supervisors as required by the jurisdictional regulations. Documentation shall be submitted to the Arlington County Project Officer and WMATA Representative prior to commencement of work. All documentation shall be authentic and verifiable. All materials shall be handled and disposed of in compliance with the jurisdictional regulations. SDSs for replacement paints/coatings must be approved by Authority prior to use on Authority property.
- U. If the Work involves removal of insulation, flooring, cove base, mastic, ceiling tile, roofing materials, or any other material that is suspected of containing asbestos, the Design-Builder must have the materials sampled and analyzed to determine if they contain asbestos. If the Design-Builder will be handling or removing asbestos-containing materials, the Design-Builder shall have all licenses and accreditations required by the jurisdiction in which the work is performed. The Design-Builder is required to provide medical monitoring to meet the requirements of 29 CFR §1910.1001 and §1926.1101. The Design-Builder shall provide training for asbestos workers and supervisors as required by the jurisdictional regulations. Documentation shall be provided to the WMATA Representative prior to commencement of work. All documentation shall be authentic and verifiable. All materials shall be handled and disposed of in compliance with the jurisdictional regulations. All replacement materials shall be free of asbestos.

- V. Design-Builder's personnel shall not be exposed to asphalt fumes in excess of the National Institute for Occupational Safety and Health (NIOSH) recommended ceiling limit of 5 milligrams of asphalt fumes per cubic meter of air (5 mg/m³), in any 15-minute period. NIOSH provides recommendations for control of asphalt fumes.
- W. Work that generates visible dust requires submission of a Dust and Debris Control Plan to prevent exposure of employees, patrons, and the community to dust including crystalline silica dust. Be prepared to submit air-monitoring data to demonstrate effectiveness of dust control measures. If dust cannot be controlled, submit Respiratory Protection Program in compliance with 29 CFR §1926.103 or 29 CFR §1910.134, and submit evidence of air monitoring, training documentation, medical clearance for respirator use, and respirator fit tests for tight-fitting respirators.
- X. Ensure that the level of exhaust emissions from equipment such as air compressors and generators, are within acceptable limits to comply with clean air regulations and that workers are not exposed to exhaust fumes or gases (carbon monoxide, sulfur dioxide, nitrogen oxides, hydrogen sulfide, aldehydes) in excess of the most stringent of occupational exposure limits.
- Y. For all work generating waste water, submit a Waste Water Discharge Plan that describes how the Design-Builder will treat and release wastewater generated by activities at the work Site, for all work that generates wastewater. Apply for Temporary Discharge Permit from local sewer authority, as required by specific site activities. Comply with Consolidated Plan prepared by Authority for Bus Divisions and Rail Yards.
- Z. For Abrasive Blasting activities, all SDSs for abrasives shall be submitted for Approval prior to abrasive blasting activities. Only abrasives containing less than 1 percent crystalline silica shall be used for abrasive blasting.
- AA. For Hot Work activities, provide documentation on certification for personnel who perform welding on Authority property. Ventilation in accordance with OSHA regulations shall be provided for hot work such as welding, cutting, or brazing.
- BB. At the Site of the work, a First Aid Kit shall be provided and fully equipped to meet the needs of the anticipated work force. Employees expected to render First Aid or CPR shall have the proper current certifications and be trained in Bloodborne Pathogens in accordance with 29 CFR §1910.1030.
- CC. Work shall not be performed in any area in use by the public, unless specifically required by the Contract or directed in writing by the Arlington County Project Officer and approved by the WMATA Representative. Give at least 48 hours' notice to the WMATA Representative before beginning such work.
- DD. In cases where the movement of Design-Builder's motorized equipment is necessary, flag persons shall be provided to warn and direct personnel and patrons away from the area of travel. Flag persons shall be certified as trained in proper flagging techniques and Design-Builder employees involved in traffic control and devices shall be certified as trained in traffic management as required by the State or local jurisdiction. Certification shall be documented.
- EE. When it is necessary to maintain use of work areas involving stations, sidewalks, elevators, platforms, bus shelters, vehicular roadways, building entrances, and corridors, protect the area with guardrails, substantial barricades, temporary fences, overhead protection, and temporary partitions as deemed necessary by the Arlington County Project Officer and/or the WMATA Representative. Under no circumstances will yellow or orange tape strung between barricades, or the like, be acceptable as a substantial barricade. Open manholes, access openings, or other breaks in the normal walking surface shall be isolated from personnel and the public using barricades.

FF. Sidewalks, entrances, platforms, mezzanines, or any other location where personnel or the public traverses, shall always be kept clear of obstruction, tools, ladders, and work debris, and excavation materials. When necessary, temporary sidewalks or pathways shall be provided for pedestrian traffic. Temporary sidewalks or pathways shall be free of tripping hazards and protected by proper guardrails and barricades. Temporary means of egress and access shall be marked for easy recognition. If work is required above sidewalks, overhead protection shall be provided. Protected walkways shall be Approved by the Authority.

GG. Appropriate warning signs and instructional safety signs shall be conspicuously posted in all areas involving construction activities. Work involving electrical systems or equipment in or near the area to which personnel or the public have access shall be isolated using barricades and partitions. Exposed, live circuits shall not be left accessible to personnel or the public or left dangling overhead. Before completion of the Work:

1. Ensure that all wiring is insulated and properly positioned.
2. Verify grounding, bonding, or both, of all metallic conduit, wiring or electrical equipment that is in the areas of contractual effort, and to which the public can make contact.
3. Notify the Arlington County Project Officer and WMATA Representative immediately in those instances where verification cannot be made.
4. Design-Builder's personnel working near the platform edge or in the right-of-way shall wear reflective safety vests with the tear-away feature, to identify them to passing trains, as directed by the Authority at the right-of-way safety training required in this Section. The safety vests shall comply with the ANSI/ISEA 107 guideline entitled American National Standard for High-Visibility Safety Apparel. All of the Design-Builder's personnel are required to attend safety training provided by the Authority before starting work near the platform edge or in the right-of-way.

HH. Use of Cranes and Derricks:

1. General Safety Requirements. Comply with the following:
 - a. 29 CFR §1910.180 through §1910.189.
 - b. 29 CFR §1926.550 through §1926.556
 - c. U.S. Army Corps of Engineers, Safety Manual EM-385-1-1.
2. No part of any crane or derrick boom shall swing over Authority patrons, tracks, or stations without an Authority Approved shield or procedure.
3. Placement of crane or derrick shall be coordinated with the WMATA Representative.
4. A supervisory or a red tag power outage is required. Exceptions may be granted on an individual basis after a review and approval by the Authority.
5. Hardhat requirements are enforced.
6. "Swing Stop" requirements may be instituted based on the hazards involved.
7. Use of cranes and derricks over common corridor railroads and highways is under the rules of the affected common corridor railroad or highway owner.
8. ALL CRANES USED FOR ERECTING COMPONENTS OF PRECAST CONCRETE ON THE PROJECT SHALL BE EQUIPPED WITH LOAD MOMENT INDICATING (LMI) DEVICES OR RATED CAPACITY INDICATORS (RCI), AN ANTI-TWO-BLOCK DEVICE.

ALL CRANE OPERATORS SHALL BE CERTIFIED TO OPERATE THE TYPE OF CRANE USED BY THE NATIONAL COMMISSION FOR THE CERTIFICATION OF CRANE OPERATORS (CCO) AND THEIR CCO CERTIFICATES SHALL BE SUBMITTED TO THE WMATA REPRESENTATIVE. TO INCREASE THE FACTOR OF SAFETY WHEN PICKING STRUCTURAL ELEMENTS OF THE BUILDING, ALL CRANES SHALL HAVE LOAD CAPACITY CHARTS REDUCED (DE-RATED) BY A FACTOR OF 30 PERCENT. SUBMIT A LIFT PLAN SHOWING ALL PERTINENT INFORMATION DEMONSTRATING THAT THE TOTAL LOAD DOES NOT EXCEED 70 PERCENT OF THE MAXIMUM BEFORE CRANE DELIVERY TO THE PROJECT SITE.

- II. All jobsite visits for visitors and tours shall be coordinated through the Arlington County Project Officer and WMATA Representative in accordance with the WMATA Construction Safety and Environmental Manual, and Design-Builder insurance requirements.

1.06 ENVIRONMENTAL SAFETY REQUIREMENTS

- A. Comply with the most stringent of federal, state, or local environmental regulations for air, water, land, and waste in order to maintain the safety and health of employees, Authority patrons, and the community.
 1. Any jurisdictional permits for the discharge/treatment of wastewater/runoff as a result of dry ice blasting or any other method of cleaning will be required. Permits to be obtained and paid for by Design-Builder.
- B. If task requires specialized licenses or certifications, for example "lead or asbestos abatement Design-Builder's license or certified tank installer/remover", show evidence of such registration prior to commencement of work. If the Work requires specialized training, for example lead or asbestos training, show evidence that employees have received such training prior to commencement of work.
- C. If the Work requires transportation of hazardous materials or hazardous substances, provide evidence of Department of Transportation General Awareness Driver's Training in compliance with 49 CFR §172 and Commercial Driver's License in compliance with 49 CFR §390-397, prior to commencement of work.
- D. All hazardous materials and hazardous substances shall be stored in "Performance Oriented Packaging" in compliance with 49 CFR §178, Subpart L.
- E. If the Work requires disposal of hazardous wastes, disposal shall be to a Treatment/Storage/Disposal facility with a Part B Permit and the waste hauler shall have a state or local license and U.S. EPA identification number. Apply and pay for temporary EPA Generator ID number required to dispose of hazardous waste. Submit evidence of all applicable licenses and permits along with the name and address of the waste disposal facility where hazardous waste materials are to be disposed, prior to commencement of work.
- F. If the Work involves response to spills of hazardous materials, hazardous substances or hazardous wastes, all personnel shall have appropriate training that complies with 29 CFR §1910.120.
- G. Environmental surveys shall be conducted to identify locations and quantities of hazardous materials present in all areas to be disturbed during the project. The environmental surveys shall be conducted by personnel and firms certified and/or licensed by each jurisdiction, as required, to conduct the surveys and sampling, with laboratory analyses performed by laboratories certified and/or licensed to perform the analyses. The Design-Builder must identify suspect environmental materials, collect samples and perform analyses required to identify them. Where present, the extent of these materials must be identified and documented and materials must be properly abated in accordance with all regulations. Submit detailed

documentation of environmental surveys and sampling results to SAFE/EMAC, including quantities and locations of all hazardous materials identified, and qualifications/certifications/licenses for survey personnel and laboratories. Properly remove and dispose of all hazardous materials and wastes in accordance with all applicable regulations, with documentation submitted to SAFE/EMAC.

- H. Contractors seeking to use or store hazardous or flammable materials on WMATA property must request permission from the WMATA Project Manager, who will submit copies of the Safety Data Sheets (SDS) and a request through WMATA's SDS system for review by SAFE/EMAC prior to use.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 50 - SAFETY AND SECURITY CERTIFICATION

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies WMATA Project Safety and Security Certification (SCC) program requirements for contractors during a typical project life cycle's design, construction/installation, testing, and pre-revenue/start-up phases.
- B. B. Per Federal Transit Administration (FTA) and Washington Metropolitan Safety Commission (WMSC) guidance, these activities are required before allowing the agency to commence revenue service or occupancy of stations, facilities, parking lots, rail platforms, rolling stock, and operating new and upgraded systems.
- C. C. As part of this project's SSC process, all WMATA and contractor Project Managers (PMs) shall comply and implement this certification process to assure adherence to WMATA's safety goals.

1.02 REFERENCES

- A. FTA Handbook for Transit Safety & Security Certification (2002).
- B. FTA Guideline 5800.1 - Safety and Security Management Guide for Major Capital Projects - Safety and Security Management Plan (SSMP).
- C. 49 CFR Part 633 – Project Management Oversight (PMO).
- D. WMATA Public Transportation Agency Safety Plan (PTASP) (latest version).
- E. WMATA Security Emergency Preparedness Plan (SEPP) (latest version), Security Sensitive Information (SSI) document with limited access.
- F. WMATA Safety and Security Certification Program Plan (SSCPP) and associated Standard Operating Procedures (SOPs) (latest versions) are as follows;
 - 1. SAFE OSCE-001-01, Development of Safety & Security Management Plan (SSMP) and Safety & Security Certification Plan (SSCP).
 - 2. SAFE OSCE-002-01, Developing a Preliminary Hazard Analysis (PHAs) and Operational Hazard Analysis (OHAs).
 - 3. SAFE OSCE-003-01, Development of Design Criteria
 - 4. SAFE OSCE-004-01, Development of Certifiable Elements and Items List (CEL and CILs).
 - 5. SAFE OSCE-005-01, Verification of Operational Readiness.
 - 6. SAFE OSCE-006-00, Developing Temporary Use Notice (TUN) Development
 - 7. SAFE OSCE-007-00, Safety, and Security Certification Review Committee Voting Process
- G. WMATA SAFE SSC Training Program for all WMATA and contractor PMs and selected supporting staff.
- H. WMATA Manual of Design Criteria (latest version).

I. Key Acronyms:

1. CEL Certifiable Elements List
2. CIL Certifiable Items List
3. CSCC Construction Specification Conformance Checklists
4. DCCC Design Criteria Conformance Checklists
5. FTA Federal Transit Administration
6. MOV Means of Verification
7. OSCE Office of Safety Certification and Engineering
8. PHA Preliminary Hazard Analyses
9. PM Project Manager
10. PMO Project Management Oversight
11. PTASP Public Transportation Agency Safety Plan
12. SAFE Department of Safety
13. SSC Safety and Security Certification
14. SCRC WMATA's Safety Certification Review Committee
15. SCWG Safety Certification Working Group
16. SEPP Security Emergency Preparedness Plan
17. SOP Standard Operating Procedures
18. SSCP Safety and Security Certification Plan
19. SSCPP WMATA Safety and Security Certification Program Plan
20. SSI Security Sensitive Information
21. SSMP Safety and Security Management Plan
22. TSI Transportation Safety Institute
23. TSSP Transit Safety and Security Program
24. TUN Temporary Use Notices
25. TVA Threat and Vulnerability Assessment
26. TVCC Testing Validation Conformance Checklists
27. WMSC Washington Metropolitan Safety Commission

1.03 GENERAL

- A. The WMATA and contractor PMs are responsible for supporting WMATA's SSC Program as outlined in the SAFE's SSCPP and supporting SOPs. The SSC program's purpose is to ensure that:
1. The design, construction/installation, testing, and commissioning of all critical safety and security elements (civil, facilities, structural, equipment procurements, and systems) have been verified for conformance with set safety and security requirements to demonstrate their readiness for operational use.
 2. WMATA rail, bus, facilities, structures, and systems are operationally safe and secure for customers, employees, contractors, and the general public.
 3. WMATA and contractor PMs establish and utilize a management system to execute the Safety and Security Certification Program.
 4. A common ground of understanding is established among key project team members regarding specific responsibilities and the execution of the SSC program.
- B. The overall SSC objectives are to achieve acceptable risk levels through systematic hazard analysis and management approach, criteria adherence, design, construction/installation and testing certification and review, and formal contract acceptance. These objectives are to conform to all Federal and Commonwealth requirements through documentation and verification that:
1. System safety hazards are identified, assessed, and mitigated to acceptable and manageable risk levels.
 2. Security vulnerabilities are identified, assessed, and documented action is taken to resolve identified unwarranted security risks.
 3. Appropriate codes, guidelines, and standards have been reviewed to provide a basis for safety and security considerations in the final design documents.
 4. Facilities, systems, and equipment have been designed, constructed, inspected, and tested per applicable codes and standards.

1.04 SUBMITTALS

- A. Submit the following documents for approval per Section 01330, SUBMITTAL PROCEDURES, as well as following the WMATA SSCPP (latest version) and associated SOPs as identified in the reference documents above:
1. Project-specific **Safety and Security Certification Plan (SSCP)** within 120 days of NTP.
 - a. Projects valued at greater than \$100 million.
 - b. The SSCP content requirements are outlined in **SOP SAFE OSCE-001-01, Development of SSMP and SSCP**.
 2. **Certifiable Element List (CEL)** with Sub-elements identified within 30 days of NTP.
 - a. Instructions are in **SOP SAFE OSCE-004-01, Development of Certifiable Elements and Items List (CEL and CILs)**.
 3. **Preliminary Hazard Analysis (PHAs)** within 120 days of NTP.

- a. Format and instructions are outlined in **SOP SAFE OSCE-002-01, Developing a PHA and OHA.**
4. **Threat and Vulnerability Assessment (TVA).**
- a. Metro Transit Police Department (MTPD) will validate the requirement.
 - b. If required, perform and deliver the TVA within 180 days of NTP per WMATA's Security Sensitive Information (SSI) Program.
5. **Certifiable Items Lists (CILs)**
- CIL format and instructions are outlined in **SOP SAFE OSCE-004-01, Development of Certifiable Elements and Items List (CEL and CILs).**
- a. **CIL component Design Criteria Conformance Checklist (DCCC)** within 180 days of NTP.
 - b. **CIL component Construction Specification Conformance Checklist (CSCC)** within 60 days of final design approval and published 100% specifications for construction/installation and testing.
 - c. **CIL component Testing Validation Conformance Checklist (TVCC)** within 30 days of system testing plans and procedures approval dates.
 - d. During the CIL verification process by the contractor and SAFE SSC Team, the contractor will provide updated CILs every 30 days to account for new means of verification (MOV) annotated on the CILs by the contractor. The SCWG meetings provide details on these requirements.
6. **Adjusted Submittal Delivery Dates.** For those projects/contracts having short durations, the submittal delivery time frames are adjusted to fit the SSC process needs and project schedule with SCWG approval.
7. **Design, Construction/installation, and Testing Change Orders Approvals.** The affected CILs, PHAs, and TVA will be reviewed, updated as needed, and submitted to the SCWG for approval to reflect any change that affects safety and security.

1.05 QUALITY

- A. The Contractor's SSC representative shall have SSC knowledge by completing a recognized SSC training course provided by the Federal Transportation Administration (FTA), Transportation Safety Institute (TSI), or past WMATA SAFE SSC training. Quality control experience or having SSC exposure on past projects can also apply. To validate this requirement, the contractor shall provide one or more of the following:
 - 1. FTA/TSI Transit Safety and Security Program (TSSP) Certificate.
 - 2. A training certificate from one of the FTA/TSI SSC courses is listed below in paragraph C.
 - 3. A listing of past SSC project experience.
 - 4. Quality Assurance/Quality Control (QA/QC) experience.
 - 5. Past WMATA SSC training within the last five (5) years.
- B. Preferred qualification – a transit safety professional with the FTA/TSI TSSP certificate or who has attended an FTA/TSI SSC-related training course from one of the following courses:

1. TSI, FT00551-V, Safety, Security, and Emergency Management Considerations for Capital Improvements Projects (FTACP)
2. TSI, FT00538, Transit System Safety and Security Design Review (TSSS-DR)
3. TSI, FT00543-V, Rail System Safety (RSS)
4. TSI, FT00433-V, Transit Bus System Safety (BSS)
5. TSI, FT00432, Transit System Security Course (TSS)

1.06 SECURITY AND SAFETY CERTIFICATION PROCESS

- A. The WMATA and contractor PMs and designated SSC representatives will participate in the WMATA SSC Program per the SSCPP (paragraph 3.0 Safety and Security Certification Process) and associated SOPs at Attachment E for the contract duration. They will manage and implement the following SSC 10-steps:
 1. Identify Certifiable Elements
 2. Develop Safety and Security Design Criteria
 3. Develop and Complete Design Criteria Conformance Checklist
 4. Perform Construction Specification Conformance
 5. Identify Additional Safety and Security Test Requirements
 6. Perform Testing and Validation in Support of the SSC Program
 7. Manage Integrated Tests for the SSC Program
 8. Manage "Open Items" in the SSC Program
 9. Verify Operational Readiness
 10. Conduct Final Determination of Project Readiness and Issue Safety and Security Certification
- B. WMATA SAFE SSC Team will provide oversight implementation guidance and verify compliance with all SSC requirements outlined in the SSCPP paragraph 2.0 Program Management, Organization, and Responsibilities.
- C. WMATA PMs shall manage and oversee compliance with the project SSC program and follow the responsibilities outlined in the SSCPP paragraph 2.0 Program Management, Organization, and Responsibilities. and associated SOPs requirements.
- D. Contractor PMs and their SSC representatives shall follow the following general responsibilities and the more comprehensive duties outlined in the SSCPP Section 2.0 Program Management, Organization, and Responsibilities.
 1. Actively supports and participates in the Project SSC Program process outlined in SSCPP and attends the SCWG meetings.
 2. Attends the WMATA SAFE SSC training session at the earliest possible opportunity.
 3. Ensures all SSC-related submittals noted in paragraph 1.04 above are submitted, reviewed, and validated by the SCWG before final submittal approval.
 4. Provides the SAFE SSC Team access to all design, construction/installation, and testing submittals via the project document management software system for the SSC CIL verification process.

5. Annotates the Means of Verification (MOV) on the CILs where the safety/security and emergency management design criteria and construction/installation and testing reports submittals are located for verification purposes.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CONTRACTOR SSC PROGRAM REPRESENTATIVE

- A. The contractor's PMs shall appoint an SSC Program Representative with the qualifications noted in this specification to lead and coordinate the SSC process and activities.

3.02 SSC TRAINING PROGRAM

- A. WMATA and contractor project PMs and support staff must attend the WMATA SAFE SSC training program within 60 days after NTP is given to reinforce SSCPP requirements and solidify SSC responsibilities.

3.03 SAFETY AND SECURITY CERTIFICATION WORKING GROUP (SCWG)

- A. SCWG meetings are established by the WMATA SAFE SSC Team and held monthly or as needed once the project NTP is issued. Once the project kick-off meeting occurs, the first SCWG meeting is scheduled within two (2) weeks.
- B. General guidance, attendees, and SCWG responsibilities and activities are found in the SSCPP paragraph 2.0, "*Program Management, Organization, and Responsibilities.*"

3.04 SSC DOCUMENT CONFIGURATION MANAGEMENT

- A. Prepare update, and complete all submittal document requirements as listed in paragraph 1.04 throughout the performance of the contract.
- C. Establish an SSC documentation configuration management folder in the project document management system. The SSC documents shall be consolidated and become a project closeout requirement provided by the noted responsible party. See Section 7.1, SSCPP, for a listing of required documentation and responsible party.

END OF SECTION

SECTION 01 11 60 - IDENTIFICATION AND SECURITY

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes identification and security requirements for work on Authority Property.

1.02 DEFINITIONS

- A. Authority Property: Includes the Authority's Rail and Bus Operating System and Authority administrative facilities, whether under construction or being rehabilitated.

1.03 SUBMITTALS

- A. Forms necessary to initiate background check process, including color copy of the front and back of Design-Builder personnel's Driver License or other accepted form of identification.

1.04 PRE-EMPLOYMENT CRIMINAL BACKGROUND CHECK

- A. As a prerequisite to eligibility for a WMATA-issued identification and access badge ("One Badge"), access to WMATA's customers, property, or confidential information, and in consideration for this Contract, the Design Builder shall have the sole responsibility for, and shall assure, adequate criminal background screenings on a routine basis of all of its personnel who are or will be working on WMATA's premises (whether they receive a One Badge or not) or otherwise have access to WMATA's customers, property, or confidential information.
- B. Design Builder shall implement, not later than notice to proceed, a criminal background check screening of the Design-Builder's personnel that shall take into consideration (1) the nature of the services or work being performed under the contract with particular regard for the individual's access to, and interaction with, WMATA's customers, property, and confidential information; (2) the nature or gravity of the offense or conduct resulting in a criminal conviction; and (3) the time that has lapsed since the conviction and/or completion of the sentence.
- C. The Design Builder shall contract with, or otherwise engage, a reputable third-party vendor to conduct the required criminal background screenings, and shall provide the vendor with a copy of its criminal background check screening policies and procedures.
- D. The Design Builder shall not place any person on or engage any person under this Contract, unless that person passes the Design-Builder's criminal background screening. At the end of each calendar quarter, the Design Builder shall certify to the Arlington County Project Officer and WMATA Representative on a form provided, its compliance with this criminal background screening requirement and confirm that all persons required to be screened passed the Design-Builder's criminal background screening before working on this Contract. For the sole purpose of monitoring the Design Builder's compliance, WMATA reserves the right to request additional documents or perform its own criminal background screening of Design-Builder's personnel. The WMATA will inform the Design-Builder, in writing, of any proposed action within a reasonable time before such action is taken.
- E. The Design Builder shall indemnify and hold Arlington County and WMATA harmless from any and all claims, demands, damages, costs and expenses, including attorneys' fees and other costs and expenses associated with any claims, demands, requests for relief, and/or other liabilities arising out of or resulting from the Design-Builder's criminal background screening obligations and processes.

- F. The Design Builder will include this requirement in all subcontracts under this Contract, and receive certifications from their subcontractors to ensure that its subcontractors' personnel who are or will be working on WMATA's premises (whether they receive a One Badge or not) or otherwise have access to WMATA's customers, property, or confidential information undergo the required criminal background checks.

1.05 IDENTIFICATION AND SECURITY CHECKS

- A. All employees of the Design Builder and its Subcontractors working on WMATA projects shall prominently display an identification badge issued by the Authority.
1. Maintain an up-to-date list of all workers badging status, to include badge number, worker for name, badge expiration and company.
- B. Design Builder Photo ID Badges: Individuals requiring the Design Builder photo ID badges are subject to the following identification and security checks
1. Provide valid and current photo identification, such as a State-issued Driver's License, State-issued Identification Card, U.S. Passport, or identification from the Immigration and Naturalization Service, such as a Permit to Work or a Permanent Residence Card (Green Card).
 2. The individual's identification may be matched against the FBI Watch List and security clearance.
 3. The photo identification will be matched against the Design Builder's list of employees authorized to work on a particular job.

1.06 NON-CONFORMANCE

- A. In the event any employee of the Design-Builder or its Subcontractors fails to adhere to the requirements of this Section, the employee or Subcontractor will be removed from the job until non-conformance is corrected. Such removal will not be grounds for any time extension or additional compensation.

1.07 ADMINISTRATION

- A. Design Builder Photo ID Badge:
1. A Design Builder Photo ID badge will be required if the individual will be present on Authority Property. Design-Builder shall consult with the Authority to determine specific procedure for obtaining a badge.
 2. Design Builder Photo ID badge takes approximately 14 Days to obtain unless personnel have lived outside of the United States within the last year, in which case the background checking process will require additional time to complete.
 3. It will be the Design Builder's responsibility to immediately notify the WMATA Representative if a worker loses his or her Design Builder Photo ID badge. A fee will be charged for each lost badge.
 4. All Design Builder Photo ID badges shall be returned to the WMATA Representative when they are no longer needed.
 5. Design Builder Photo ID badges shall be renewed on an annual basis.

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 14 10 - ACCESS TO SITE

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies requirements for gaining access to Site and describes work hours the Design-Builder will be allowed in WMATA Trackway and Operating Facilities.

1.02 DEFINITIONS

- A. Non-Revenue Hours of Work – When the Authority is not operating revenue service trains the track may be available to the Design Builder, upon request and approval.
- B. Revenue Service Adjustment (RSA) Hours of Work – There are two service conditions:
1. Single tracking when a single track is made available to the Design-Builder to work while the Authority operates trains in both directions on the opposite track.
 2. Shutdowns when both tracks of a section of line are made available to the Design-Builder to work.

1.03 IDENTIFICATION CARDS

- A. The Contractor and its Subcontractors working within the Crystal City Metrorail Station facility per Section B below shall provide their personnel with WMATA Contractor Identification Badges showing the employer's name and the employee's name, number, and photo I.D. These badges shall be displayed in a prominent manner on each person while engaged on the Work. Access to the Site shall be granted only to properly accredited representatives of the Contractor and its Subcontractors.
- B. The Contractor and Subcontractor requiring entry into the rail revenue operating system, including rail maintenance yards, for performance of the Work shall provide such employees requiring entry with photo identification cards issued by the Authority with a Roadway Worker Protection (RWP) training endorsement. RWP training, as administered by the Authority, will be required for the Contractor and Subcontractor employees prior to working in the rail revenue operating system and rail maintenance yards. Contractor's Safety Superintendent shall schedule the RWP training through the WMATA Representative.

Workers will be required to take WMATA training and pass the course for Roadway Worker Protection under the following conditions:

1. The employee is working on the WMATA trackbed outside of an Authorized Construction Site or;
2. The employee's work location is approximate to the WMATA trackbed such that the work has the potential to encroach upon the dynamic envelop of a train and/or track borne equipment.

Workers will not be required to take WMATA training and pass the course for Roadway Worker Protection under the following conditions:

1. The employee is working within an Authorized Construction Site; or

2. A barrier is installed between the employee's work location, that is proximate to the WMATA trackbed, such that the barrier would prevent the work from encroaching upon the dynamic envelop of a train and/or track borne equipment.
 3. The employee is working on the platform, not beyond the edge of the tactile strip ("bumpy tiles") in the direction of the roadway and platform end gates, not using ladders, scaffold or equipment that has the potential to foul the roadway, and must be visibly differentiated from other personnel that are RWP trained (e.g. different color vest)
- C. The Contractor shall obtain and be responsible for administering the use of WMATA contractor identification badges. The WMATA contractor identification badges are not valid for transportation on Metrobus or Metrorail and identification badges will be valid up to a maximum of one year. Should the Contractor's and Subcontractor's employees not have valid WMATA contractor identification badges, they will be dismissed from the Site.

1.04 HOURS OF WORK

- A. Work within WMATA trackway, on station platforms and within WMATA operating facilities affecting revenue service shall be carried out during non-revenue hours and/or Revenue Service Adjustment (RSA) hours and under the oversight of WMATA escorts, unless otherwise requested and pre-approved.
- B. Coordinate, schedule and receive approval for all work with the WMATA Representative to ensure that the Design-Builder's activities do not interfere with the operation of or access to the Authority's facilities.
- C. Typical working hours not requiring access to track or other Authority facilities that require escorts for access are 8AM to 2PM.

Table 01 14 10 - 01

Track Rights NOT Required for Non-Roadway Work						
Work Hour Category	Night of:	Hours Available ¹	Expected Access to Site	Off Site Time	Expected Work Window	Description
Non-Revenue Weekday	Sunday	Access for Non-Roadway Work to be allowed 24/7				Work NOT in the Roadway but within the WMATA facility. Work must be conducted following all WMATA safety standards and SOP's.
	Monday - Thursday					
Non-Revenue Weekends	Friday					
	Saturday					

¹ Hours subject to change at the Authority's discretion.

Table 01 14 10 - 02

Track Rights Required for Non-Revenue Hours of Work						
Work Hour Category	Night of:	Hours Available Non-Revenue ¹	Expected Access to Site	Off Site Time	Expected Work Window ²	Description
Non-Revenue Weekday	Sunday	01:30 (Mon) to 03:30 (Mon) (2 hrs)	Monday 01:30	Monday 03:30	2 hours	Work in the Roadway requiring track rights and/or lock-out/tag-out procedures as required by WMATA safety standards and SOP's.
	Monday - Thursday	01:30 to 03:30 hrs) (2	Tuesday- Thursday 01:30	Tuesday- Friday 03:30	2 hours	
Non-Revenue Weekends	Friday	01:00 (Sat) to 05:00 (Sat) (4 hrs)	Saturday 01:00	Saturday 05:00	4 hours	
	Saturday	01:00 (Sun) to 05:00 (Sun) (4 hrs)	Sunday 01:00	Sunday 05:00	4 hours	

¹ Hours subject to change at the Authority's discretion.

² With "Supervisory" outage per Design-Builders Safety Plan. Red Tag outage reduces time by 50%.

Table 01 14 10 - 03

Scheduled RSA Events for Non-Revenue Hours of Work						
Work Hour Category	Night of:	Hours Available Non-Revenue ¹	Expected Access to Site	Off Site Time	Expected Work Window ²	Description
Weekend Shutdowns	Friday-Monday	23:00 (Fri) to 04:00 (Mon) (53 hrs)	Friday 23:00	Monday 04:00	53 hours	Station Investigations and Construction of Project

¹ Hours subject to change at the Authority's discretion.

² With "Supervisory" outage per Design-Builders Safety Plan. Red Tag outage reduces time by 5 hours.

Table 01 14 10 - 04

RSA Events to be considered by WMATA upon Request for Non-Revenue Hours of Work						
Work Hour Category	Night of:	Hours Available Non-Revenue ¹	Expected Access to Site	Off Site Time	Expected Work Window ²	Description
2-day Weekend Single Tracking Event	Friday-Monday	23:00 (Fri) to 04:00 (Mon) (53 hrs)	Friday 23:00	Monday 04:00	53 hours	Work in the Roadway requiring track rights and/or lock-out/tag-out procedures as required by WMATA safety standards and SOP's.
3-day Weekend Single Tracking Event	Friday-Tuesday	23:00 (Fri) to 04:00 (Tues) (77 hrs)	Friday 23:00	Monday 04:00	77 hours	
2-day Weekend Shutdown	Friday-Monday	03:00 (Sat) to 04:00 (Mon) (49 hrs)	Saturday 03:00	Monday 04:00	49 hours	
3-day Weekend Shutdown	Friday-Tuesday	03:00 (Sat) to 04:00 (Tues) (73 hrs)	Saturday 03:00	Tuesday 04:00	73 hours	

¹ Hours subject to change at the Authority's discretion.

² With "Supervisory" outage per Design-Builders Safety Plan. Red Tag outage reduces time by 5 hours.

D. There are Federal Holidays that occur on Mondays throughout the year creating a 3-day weekend. In addition to the Work Hours indicated in Article 1.04G herein, on holiday weekends listed below, single track RSAs may be permitted between 2200 Friday and 0400 Tuesday and complete shutdown RSAs may be permitted between 0300 Saturday and 0400 Tuesday.

1. Martin Luther King Day
2. President's Day
3. Memorial Day
4. Columbus Day
5. Labor Day

- E. RSA's will not be permitted during the following periods in any calendar year:
1. March 12 through April 21
 2. The first Saturday of June (Race for the Cure)
 3. The week containing July 4 including the preceding and succeeding weekends.
 4. The 4th Sunday of October (Marine Corps Marathon)
 5. Thanksgiving eve through the following Monday
 6. Christmas eve and Christmas day
 7. New Year's Eve and New Year's day
- F. Many times, during a calendar year there are large events scheduled in the Washington DC area that require special attention by WMATA. These events are typically scheduled no sooner than 90 Days in advance of their occurrence. The Design-Builder should plan for no more than three such events in any calendar year. WMATA will notify the Design-Builder of the scheduling of these events as soon as they become known. If the event conflicts with a scheduled RSA, then the Design-Builder RSA's will need to be advanced or delayed 1 week unless there is conflict with the black-out periods listed above.
- G. There shall be no requests for early endings of the working days on nights of regularly scheduled sporting events such as baseball, basketball, hockey, or soccer.
- H. Emergencies, excluding Acts of God, arise during the course of Metrorail operations that could cause the cancellation of a scheduled RSA. Anticipate no more than four cancellations within a calendar year. If an emergency occurs, then the Design-Builder RSA's will need to be delayed 1 week unless that conflicts with the black-out periods listed above.

1.05 TRACKWAY AND SAFETY ACCESS

A. Material and Equipment Access:

Material and equipment access are via the roadway. If the Contractor needs roadway access for equipment and material the Contractor shall coordinate with WMATA.

B. WMATA's "Dynamic Envelope:"

All materials and equipment provided under this contract to be transported to the project site (shaft and/or station) must fit within the WMATA dynamic envelope per the WMATA Design Criteria. This includes equipment manufactured to be placed on its side, manufactured in smaller components to be reassembled on site, etc. Equipment shall not be transported or handled in any way that violates the manufacturer's warranty. These Dynamic Height and Width restrictions include the dimensions of a standard flat car being used for transport of the materials/equipment.

- C. The Design-Builder shall engineer, install, maintain, and finally remove temporary barriers separating WMATA roadway and platform areas from work areas requiring revenue and dayshift work activities. Barriers are to protect and demarcate personnel and material from affecting the roadway. These barriers must be "extraordinary" engineered physical barriers between tracks and "buffer" zones between tracks. These barriers must be designed and stamped by a Professional Engineer licensed in the jurisdiction where the barrier will be constructed/installed. Due to the risk

of making third rail contact by workers or materials in shafts, Red Tag outages are required. In lieu of Red-Tags, a supervisory outage may be used if SAFE issued rubber-mats are used over the 3rd rail for impact. These shields must be designed and stamped by a Professional Engineer licensed in the jurisdiction where the barrier/shielding will be constructed/installed.

- D. The Design-Builder shall plan for all tools, materials, and equipment needed to complete the work to be delivered directly to the worksite(s) prior to the commencement of the work.

1.06 WORK TRAINS

- A. All Design-Builder-provided rail mounted vehicles/cars must be inspected by WMATA Track and Structures prior to being permitted to operate on the system. The Design-Builder shall ensure the flatcar is fully loaded, secured, and ready to travel to the jobsite a minimum of 2 hours before the Hours of work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 18 00 - PROJECT UTILITY INTERFACE

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the Design-Builder's responsibilities regarding interface with Utility companies and agencies.

1.02 SUBMITTALS

- A. Submit sets of drawings and specifications to those Utilities and agencies affected by the design as required. All transmittals and requests to agencies and Utilities for approvals, reimbursable estimates, and other data shall indicate the submittal stage. Provide the Arlington County Project Officer and WMATA Representative with an electronic copy of all transmittal letters and other communications and replies thereto as each is sent to or received from a Utility or agency (submitted through e-Builder and PROCORE) The Utilities and agencies noted below shall be provided with the following review submittals. Comply with the requirements of each Utility and agency:
1. Copies of each of the composite utility plans,
 2. Copies of all pertinent Sections of the specifications, and
 3. Copies of index sheets, key plans, and general information drawings as appropriate. Prepare key (location) plans as necessary to cover all the disciplines required to do the Work. Do not prepare individual key plans for each discipline.
- B. Complete list of affected Utilities and agencies to the Arlington County Project Officer and WMATA Representative:
1. Confirmation of approval by the affected Utility or agency of the treatment, design, and standards must accompany the submittal to the WMATA Representative of the Design Drawings and Design.
- C. Shop Drawings for utility connections and special facilities during construction.

1.03 UTILITIES AND AGENCIES

- A. The Design-Builder is responsible for coordination, treatment, and design of all utilities or properties owned or controlled by Utilities or agencies. An active effort shall be made by the Design-Builder as early in the design as possible to coordinate with all affected Utilities and agencies to determine their current standards. Prepare a new drawing(s) reflecting the latest standards, codes and utility requirements.
- B. Utility fees shall be paid for by the Design-Builder.
- C. The Utilities and agencies listed hereinafter may not be all inclusive. Although not a comprehensive list, the design-builder is required to coordinate with all Utilities, Agencies, and any other entity with underground or overhead facilities in or near the project site as required to complete the contract.
- D. Recommend additional agencies/utility companies as appropriate. Determine all affected Utilities including but not limited to the following agencies or their successor agencies and submit complete list to the WMATA Representative:

VIRGINIA

1. Arlington County, VA
 - a) Washington Gas (gas)
 - b) Dominion Virginia Power (electric)
 - c) Verizon & Verizon FIOS (telephone/cable)
 - d) Comcast/Xfinity (telephone/cable)
 - e) Cox Cable (telephone/cable)
 - f) RCN (telephone/cable)
 - g) Arlington Water (water and sewer)
 - h) Virginia Department of Transportation (VDOT)
 - i) Plantation Pipeline & Colonial Pipeline (gas)

- D. Other identified utility owner (cable, fuel lines, etc.) whose facility will be affected by the construction.

PART 2 – PRODUCTS

2.01 APPROVED PRODUCTS

- A. All products to be utilized on any utility shall be as approved by that Utility.

PART 3 – EXECUTION

3.01 DESIGN, CONSTRUCTION, AND MAINTENANCE OF UTILITY FACILITIES

- A. All work performed by the Design-Builder on any utility, if any, shall be performed in accordance with the requirements of that Utility and the full knowledge of the WMATA Representative.
- B. Indicate in the Design Drawings where Utilities will perform design, construction, and maintenance of their facilities in relation to this Contract. Provide the engineering design as specified for facilities owned by Utilities including service connections, facility modifications, and relocations as applicable.
- C. Provide the Utilities with detailed Shop Drawings for utility connections and special facilities during construction.

END OF SECTION

SECTION 01 31 20 - PROJECT MEETINGS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies administrative and procedural requirements for Project involving or concerning WMATA meetings.

1.02 SYSTEMS INTEGRATION PROGRESS MEETINGS

- A. Progress Meetings shall be held by the Design-Builder monthly in the Washington Metropolitan Area starting 10 Days after receipt of the Design-Builder written responses to Arlington County and WMATA's design review comments on the intermediate Systems Integration Design. The purpose of these meetings will be to clarify the comments, update Authority personnel on the systems integration issues, resolve interface definitions or systems integration issues, and exchange ideas and information. Meeting intervals can be revised by the WMATA Representative, if deemed appropriate.
- B. These meetings shall be attended by the Design-Builder's Key Staff, those Subcontractors, Suppliers, or other entities critical to the resolution of any open issues, the Arlington County Contracting Officer Representative, and other representatives of the Authority.
- C. The agenda for the progress meetings shall be similar to the progress review meeting agenda and shall include all unresolved issues raised in previous systems integration progress meetings.
- D. All interface problems shall be identified at the earliest possible opportunity. Provide a list of problem interfaces along with an assessment of the project impact and potential resolutions at each progress meeting.
- E. Record meeting minutes and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- F. Provide two (2) business days for comment on minutes before closing meeting minute report.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the general requirements and procedures for preparing and submitting design and construction documents to the Authority and Jurisdictional Authorities for approval or for information. The submittals shall consist of, but not be limited to design drawings, computations, and specifications; Shop Drawings; Working Drawings; product data; documents, letters, certifications and reports; permit applications and Jurisdictional Authority approval documents; and other submittals.

1.02 DEFINITIONS

- A. Schedule of Required Submittals: A compendium of all required design and construction related submittals identified throughout the Contract Documents.
- B. Contract Document Submittal Log: A document indicating the status of all Required Submittals listed in the Schedule of Required Submittals.
- C. For Information: Submittals indicated within the Technical Requirements as “For Information” are prepared and submitted by the Design-Builder to the Authority for information only. The Authority may provide comments on Submittals for Information, but Authority’s Approval is not required.

1.03 SUBMITTAL SCHEDULE

- A. Coordinate the schedule for design submittals with the Project Schedule. The schedule for design submittals shall reflect the time required for designing, reviewing, ordering, manufacturing, fabricating, and delivery, including additional time required for re-submittals.
- B. Provide a preliminary Schedule of Required Submittals, as described in Section 00 72 00, SUBMITTALS, within 14 Days after the effective date of Notice to Proceed (NTP) for the Authority’s review. The preliminary Schedule of Required Submittals shall be updated through discussions with the Authority during weekly progress meetings or through special meetings subsequent to initial Authority approval.
- C. Submit a final Schedule of Required Submittals within 180 Days after the effective date of NTP.
- D. Submit a Contract Document Submittal Log, as described in Section 00 72 00, SUBMITTALS, within 30 Days after the effective date of NTP. The Contract Document Submittal Log, created in MS Excel or MS Access, shall consist of all submittals required by the Contract Documents and Issued for Construction Specifications. Populate the Contract Document Submittal Log with submittal data as the design and construction progress. The Contract Document Submittal Log shall list all versions of a submittal, however only one version of a submittal may be in effect at any one time.
- E. Submittals made shall be arranged and maintained in a tabular format by specification Section as well as in chronological order by the dates required for construction. The log shall include:
 - 1. Scheduled date for initial Submittal, review, and “need” date for acceptance in order to fabricate and install, corresponding to the Project Schedule activity.
 - 2. Contract number, specification Section number and title

3. Name of Subcontractor
 4. Type of Submittal (Shop Drawings, product data, samples, or other), description of the item, name of manufacturer, trade name, and model number
 5. Highlight submittals that are on the critical path and require expedited review to meet the schedule. Indicate lead time to the date of fabrication and installation.
 6. State if submitted for approval or information.
 7. If a Submittal is a safety critical item based on the approved Certifiable Items List (CIL), include the "Item" number and "Section" (paragraph) number, as shown on the Certifiable Items List.
 8. Re-submittals: Reason for change
 9. Tested/Inspected By: Identify the entity performing the test
- F. The Contract Document Submittal Log shall be updated and submitted on a monthly basis.

1.04 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Submit one electronic copy in the format specified, unless noted otherwise, through the Authority's Project Management Software System (PMSS). The WMATA Representative will return one electronic copy through the PMSS.
- B. The WMATA Representative will discard submittals received from sources other than the Design-Builder.
- C. Prepare separate submittals for each item in a specification Section. Group them in the order listed, paragraph by paragraph, and package them together.
- D. Transmit submittals of related parts of the Work concurrently such that processing will not be delayed for coordination. Incomplete submittals will be returned to the Design-Builder with no action taken by the Authority.
- E. For Design Drawings submittals, include title block in accordance with the WMATA CAD Manual. For Design Specification submittals:
 1. Indicate Project name and Contract number and the date of submission.
 2. Indicate name of firm or entity that prepared each submittal.
- F. For all other submittals, place a permanent label or title block on each submittal item for identification.
 1. Indicate Project name and Contract number, the date of submission, reference to the specification Section article, and drawing number and detail to which the submittal applies.
 2. Indicate name of firm or entity that prepared each submittal.
 3. Provide a blank space approximately 5 by 5 inches, in the lower right corner of each drawing just above the title block, to record the Design-Builder's review and approval markings and action taken by the WMATA Representative.
- G. All submittals shall be accompanied with a transmittal form containing the following minimum information.

1. Project name and Contract number, the date of submission, Subcontractor, Supplier, manufacturer name, and submittal number
2. Submittal purpose and description
3. Reference to the specification Section, drawing number, and title
4. Reference applicable standards, such as ASTM or Federal Specification numbers
5. Location(s) where product is to be installed, as appropriate
6. Identification of deviations from the Issued for Construction Drawings and Specifications
7. Notation that Submittal is a safety critical item, if identified on the "Certifiable Items List"

1.05 DESIGN DOCUMENTS

- A. All Design Documents shall be submitted for the Authority's review at the progressive completion levels designated by the Authority. This includes design drawings, supporting calculations, design reports based on geotechnical data and field surveys, Jurisdictional Authority correspondence, private and public utility company correspondence, and any other pertinent design basis information.
- B. Submit Design Drawings in AutoCAD and bookmarked-by-discipline Adobe (.PDF) formats that can be edited (without seals) and plotted either as full-size or half-size drawings that are scalable. Submit Adobe (.PDF) of Issued for Construction Drawings sealed and signed by a professional engineer or architect, as applicable, registered in the jurisdiction where the work will be performed for official record.
- C. Submit Design Calculations and Reports in MS Word and bookmarked-by-discipline Adobe (.PDF) formats.
- D. Submit Design Specifications in MS Word and bookmarked-by-Section Adobe (.PDF) formats. Submit Adobe (.PDF) of Issued for Construction Specifications sealed and signed by a professional engineer or architect, as applicable, registered in the jurisdiction where the work will be performed for official record.

1.06 MEETING MINUTES

- A. Prepare meeting minutes that are the responsibility of the Design-Builder immediately after each meeting. Submit draft copy to WMATA Representative for review within 5 Days in MS Word format.
- B. Submit final meeting minutes in Adobe (.PDF) format 3 Days after receipt of Authority review.

1.07 SHOP DRAWINGS

- A. General:
 1. Submit Shop Drawings in AutoCAD and Adobe (.PDF) formats.
 2. Shop Drawings shall indicate all pertinent features of the products and the method of fabrication, connection, erection, or assembly with respect to the Work.
 3. The first drawings submitted by Design-Builder, Subcontractor, or vendor will be reviewed for conformance with this Section. Once accepted, use the drawing format as a standard for subsequent drawings.

- B. Dimensioning: Follow applicable dimensioning and tolerance practices as specified in ANSI/ASME Y14.5.
1. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 2. Provide sufficient dimensions on drawings so that size, shape, and location may be determined without calculation.
 3. Show each dimension clearly so that only one interpretation is possible. Show each dimension for a feature once.
 4. Text must be legible on 11 by 17-inch prints.
 5. Include on the Shop Drawings details necessary for the installation, maintenance, and repair of all equipment provided.

1.08 WORKING DRAWINGS

- A. Submit Working Drawings in AutoCAD and Adobe (.PDF) formats.
- B. Working Drawings indicate the Design-Builder's plan for temporary structures that will not become part of the completed Project.
- C. Working Drawings and calculations shall be signed and sealed by a professional engineer registered in the jurisdiction where the work will be performed and shall convey, or be accompanied by information sufficient to completely explain the structure, machine, or system described and its intended manner of use.

1.09 PRODUCT DATA

- A. Submit product data in Adobe (.PDF) format.
- B. If information must be specially prepared for a submittal because standard published data is not suitable for use, submit as Shop Drawings, not as product data.
- C. Modify manufacturers' standard drawings, catalog cuts, brochures, diagrams, schedules, performance charts, illustrations, calculations, printed installation, erection, application, and placing instructions, and other descriptive data to delete information that is not applicable to the Contract. Indicate dimensions, clearances, performance characteristics, capacities, wiring and piping diagrams, and controls. Supplement standard information with additional information applicable to this Contract.
- D. Submit product data concurrent with samples.

1.10 SAMPLES

- A. Submit samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittals and actual components as delivered and installed.

- B. Maintain sets of accepted samples at the Site, available for quality control comparisons throughout the course of construction activity. Sample sets may be used to determine conformance of construction associated with each set.
 - 1. Samples that may be incorporated into the Work are indicated in individual specification Sections. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of Design-Builder.
- C. Samples for Verification: Submit full-size units or samples of a size indicated, physically identical with material or the product proposed for use and that shows a full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
- D. Number of Samples: Submit five (5) sets of Samples to the County QAM, who will review for completeness and provide to WMATA representative. The WMATA Representative will retain three Sample sets; the remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
 - 1. Submit a single sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
- E. If variations in color, pattern, texture, or other characteristics are inherent in the material or product represented by a sample, submit at least three (3) sets of paired units that show approximate limits of variations.

1.11 CERTIFICATES AND CERTIFICATIONS

- A. Submit original certificates and certifications in MS Word and Adobe (.PDF) formats.
- B. Provide certificates and certifications that demonstrate proof of compliance with Contract specification requirements for products, materials, equipment, and systems.
- C. Authority Approval of a certification shall not be construed as relieving the Design-Builder from furnishing products that meet the specified design intent.

1.12 REPORTS

- A. Submit original reports, signed and sealed by a professional engineer in the jurisdiction that the Work is to be constructed, and any related drawings in MS Word, AutoCAD and Adobe (.PDF) formats.
- B. The Design-Builder shall provide reports that demonstrate proof of compliance with Contract specification requirements. The reports include manufactured products, materials, research, equipment, systems, and test reporting in the field or laboratory.
- C. Authority Approval of submitted reports shall not be construed as relieving the Design-Builder from furnishing products that meet the specified design intent.

1.13 DATA

- A. Submit data and any related drawings in MS Word, AutoCAD and PDF formats.
- B. The Design-Builder shall provide written and graphic information including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations that

demonstrate proof of compliance with Contract specification requirements. Provide the name and version of software used for calculations.

- C. Authority Approval of submitted data shall not be construed as relieving the Design-Builder from furnishing products that meet the specified design intent.

1.14 AS-BUILT DOCUMENTS

- A. The Design-Builder shall maintain a record set of As-Built Drawings and Specifications annotated to show all changes incorporated as Work progresses.
- B. Submit As-Built Drawings in AutoCAD and bookmarked-by-discipline Adobe (.PDF) formats that can be plotted either as full-size or half-size drawings that are scalable.
- C. Before the scheduled date of Substantial Completion, the Design-Builder shall submit approved as-built documents for the completed Work as specified in Section 01 77 50, CLOSEOUT.

1.15 DESIGN-BUILDER'S REVIEW

- A. Prepare written responses to Arlington County and WMATA's comments on the Design-Builder's Design Drawings and Design Specifications using the Design Review Form provided by the Authority and submit to Arlington County and WMATA within 5 Days of receiving the comments. Responses to Authority comments that are not agreed to by the Design-Builder shall be resolved in a Design Review Meeting. Resolution between the Design-Builder and the Authority of responses to comments in writing on the Design Review Form is required prior to incorporating comments in the subsequent design submittal.
- B. Review each submittal, including all those provided by Subcontractors and Suppliers of any tier, check for coordination with other Work and for compliance with the Issued for Construction Drawings and Issued for Construction Specifications. Note inconsistencies with Contract Documents and Issued for Construction Drawings and Issued for Construction Specifications. Submittals shall bear the Design-Builder's approval stamp and initials of the reviewer before submitting to the Authority.
- C. Each submittal transmittal form shall be signed by the Authorized representative of the Design-Builder with a statement, "Having checked this submission, we certify that it conforms to the requirements of the Contract in all respects, except as otherwise indicated".
- D. Do not start work where submittals are required until submittal review is completed by the Authority and Approval, if required, has been received.
- E. Identify approval methods of the various jurisdictional authorities and obtain their approvals as required.

1.16 AUTHORITY'S REVIEW

- A. Design Review
 - 1. The WMATA Representative is responsible for receiving all Project design submittals from the Design-Builder and distributing to the appropriate Authority reviewers.
 - 2. For each design submittal, the Authority will provide written review comments on Design Review Forms or marked up drawings to the Design-Builder for incorporation into the design documents. Submittals will be reviewed in accordance with the specified design submittal review schedule.

3. The Authority will review the Design-Builder's responses to comments within 5 Days after receiving the responses. If, in the opinion of the Authority, comments are not resolved, the Authority will arrange a Design Review Meeting with the Design-Builder to discuss and resolve all unresolved comment responses within 21 Days of receiving the responses.
- B. The WMATA Representative shall receive construction submittals from the Design-Builder and will distribute them within the Authority for review.
1. Shop Drawings, samples, and other submission reviews by the Authority will not include checking of dimensions for potential conflicts.
 2. Approval by the Authority of a specific item will not indicate Approval of an assembly of which the item is a component.
 3. Incomplete submittals will be returned for resubmission without review.
- C. Submittals that are reviewed by the Authority will be returned to the Design-Builder with one of the following approval codes:
1. Approved Without Condition or Comment.
 2. Approved as Noted, Resubmittal Not Required. The Design-Builder shall comply with changes, conditions, or comments on the submittal.
 3. Disapproved. The entire submittal is disapproved and shall be resubmitted.
 4. Rejected not in accordance with requirements.

1.17 RESUBMISSIONS, DISTRIBUTION, AND USE

- A. Make resubmissions in the same form and number of copies as initial submittal. Note the date and content of previous submittal. Clearly indicate the extent of revision.
- B. Furnish copies of final submittals to manufacturers, Subcontractors, Suppliers, fabricators, installers, Jurisdictional Authorities, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- C. Retain complete copies of submittals on Site.

1.18 RFI ADMINISTRATIVE REQUIREMENTS

- A. Submit one electronic copy on the RFI form provided by the Authority, through the Authority's Project Management Software System (PMSS). The WMATA Representative will return one electronic copy through the PMSS.
- B. Allow seven (7) Days for the review of each RFI.
- C. The WMATA Representative will discard RFIs received from sources other than the Design-Builder.
- D. All submittals shall be accompanied with a transmittal form containing the following minimum information.
 1. Project name and Contract number, the date of submission, and RFI number
 2. Clear statement of the question to be addressed by the Authority

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

3. Reference to the specification Section, drawing number, and title that is the subject of the RFI

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 41 00 - REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes information required for conformance to regulatory requirements, such as building codes, mechanical codes, electrical codes, ADAAG regulations, or other regulations applicable to the Project.

1.02 GENERAL

- A. Meet or exceed the WMATA Manual of Design Criteria, WMATA Standard Specifications, and the Technical Requirements relevant for each element of the Work as these represent the standards to be used for design and construction. Comply with all Federal, state, and local laws and regulations that control the design and construction of the Project, and meet or exceed the laws and standards relevant for each element of the Work to be installed if they are more stringent than the WMATA Manual of Design Criteria and WMATA Standard Specifications and the Technical Requirements.

1.03 THE JURISDICTIONAL AUTHORITIES, RAILROADS, UTILITIES, AND MISCELLANEOUS AGENCIES

- A. Coordinate with the following entities as appropriate and relevant to the Project. The departments and agencies listed hereinafter may not be all inclusive. Although not a comprehensive list, the design-builder is required to coordinate with all Utilities, Agencies, and any other entity with jurisdiction in or near the project site as required to complete the contract.
- B. Recommend additional agencies and departments as appropriate.
- C. Coordinate with the following entities as appropriate and relevant to the Project.
- D. The Design-Builder is alerted to the need for coordination with projects located on or near the sites and/or agencies having jurisdiction on or near the project sites as follows, which include but are not limited to:
- E. Federal agencies
1. Environmental Protection Agency (EPA)
 2. Federal Aviation Administration (FAA)
 3. Federal Highway Administration (FHWA)
 4. Federal Transit Administration (FTA)
 5. General Services Administration (GSA)
 6. Department of the Interior:
 - a. National Park Service (NPS), National Capital Region
 7. Occupational Safety and Health Administration (OSHA)
 8. U.S. Army, Corps of Engineers (COE):
 - a. Washington Aqueduct Division
 - b. Baltimore District
 - c. Norfolk

9. U.S. Coast Guard (USCG)
10. U.S. Navy, Naval Facilities Engineering Command (NAVFAC)
11. Architectural and Transportation Barriers Compliance Board (ATBCB):
 - a. American with Disabilities Act Accessibility Guidelines (ADAAG)
12. Federal Emergency Management Agency (FEMA)
13. U.S. Army Engineer District
14. Department of Defense (DOD)
15. USDA Natural Resources Conservation Service
16. US Fish and Wildlife Service

G. Virginia

1. Virginia (Northern) Planning District Commission
2. Virginia (Northern) Park Authority
3. Virginia (Northern) Transportation Commission
4. Virginia State Highway Commissioner
5. Virginia Department of Transportation (VDOT)
6. Virginia Department of Motor Vehicles
7. Virginia Department of Environmental Quality (DEQ)
8. Virginia Department of General Services
9. Virginia Department of Health
10. Virginia Department of Conservation and Recreation (DCR)
11. Metropolitan Washington Airports Authority (MWAA)

H. Arlington County

1. Department of Public Works:
 - a. Utilities Department
2. Arlington County Department of Environmental Services
3. Arlington County Fire Department
4. Arlington County Sheriff and Police Department
5. Arlington County Zoning Department
6. Highway Facilities
7. Fire Prevention Code
8. Arlington County Permit Office
9. Arlington County Fire Prevention Office
10. US National Park Service (NPS)

N. Utilities: See Section 01 18 00, PROJECT UTILITY SOURCES.

O. Miscellaneous agencies:

1. Metropolitan Washington Council of Governments
2. Washington Metrorail Safety Commission

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 42 00 - REFERENCES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section lists the reference standards cited in the Contract Documents, the organizations or Jurisdictional Authorities whose standards are cited, and common acronyms used in the Contract Documents.
- B. When reference is made to codes, regulations, reference standards, and specifications, the Work shall conform to the current edition as of the date of Award, unless it is superseded by Jurisdictional Authorities.

1.02 ABBREVIATIONS AND ACRONYMS

AA	Aluminum Association
AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABMA	American Bearing Manufactures Association
ABS	Acrylonitrile-Butadiene-Styrene
ac	Alternating Current
ACGIH	American Conference of Governmental Industrial Hygienists
ACI	American Concrete Institute
A/D	Analog to Digital
ADA	Americans with Disabilities Act
ADAAG	Americans with Disabilities Act Accessibility Guidelines
AHA	American Hardboard Association
AHDGA	American Hot Dip Galvanized Association, Inc
AHJ	Authority Having Jurisdiction
AEIC	Association of Edison Illuminating Companies
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute (synonymous with USASI-ASA)
API	American Petroleum Institute
AREMA	American Railway Engineering and Maintenance of Way Association
ARI	Air Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASNT	American Society of Nondestructive Testing
ASTM	ASTM International
ATBCB	Architectural and Transportation Barriers Compliance Board
AT&T	American Telephone and Telegraph Company
ATS	Automatic Transfer Switch
AWG	American Wire Gauge (synonymous with Brown and Sharpe)
AWI	Architectural Woodwork Institute
AWWA	American Water Works Association
AWS	American Welding Society
AWPA	American Wood Preservers' Association
BHMA	Building Hardware Manufactures Association
BIA	Brick Institute of America
BLS	Bureau of Labor Statistics
BOCA	Building Officials and Code Administrators International

BTU	British Thermal Unit
BTUH	British Thermal Units Per Hour
C	Celsius (Centigrade)
CAGI	Compressed Air and Gas Institute
CE	US Army, Corps of Engineers
cfm	Cubic Feet Per Minute
CISPI	Cast Iron Soil Pipe Institute
CMU	Concrete Masonry Unit
CO	Contracting Officer
COR	Contracting Officer Representative
CQCS	Contractor's Quality Control System
CRSI	Concrete Reinforcing Steel Institute
CSP	Concrete Surface Profile
CTI	Cooling Tower Institute
dBA	A weighted Decibel(s)
dc	Direct Current
DFT	Dry Film Thickness
DHI	Door and Hardware Institute
DILM	Ductile Iron Pipe, Cement-Lined and Coated, Mechanical Joint
DILP	Ductile Iron Pipe, Cement-Lined and Coated, Push-On-Joint
DPDT	Double Pole, Double Throw
DPST	Double Pole, Single Throw
DTS	Data Transmission System
DWG	Drawing
EIA	Electronic Industries Association
EPA	Environmental Protection Agency
EPDM	Ethylene Propylene Diene Monomer
EPR	Ethylene-Propylene-Rubber
F	Fahrenheit
FAA	Federal Aviation Administration
FAT	Factory Acceptance Test
FCCCR	Foundation for Cross-Connection Control Research of the University of Southern California Engineering Center
FHWA	Federal Highway Administration
FIT	Field Installation Test
FM	Factory Mutual Insurance – FM Global
FS	Federal Specifications
FED STD	Federal Standard
FO	Fiber-Optic
ft	Feet
FTA	Federal Transit Administration (formerly UMTA)
FWD	Forward
GPH	Gallons Per Hour
HOA	HAND/OFF/AUTOMATIC
HP	Horsepower
HRWR	High-Range Water Reducer
HR	Hour
HSB	Hot Stand-By (redundant PLC)
HVAC	Heating, Ventilating and Air Conditioning
IACS	Industrial Automation and Control System
IBC	International Building Code
ICA	Instrumentation, Controls, and Automation
ICC	International Code Council

ICEA	Insulated Cable Engineers Association
ICI	Industrial Coatings International
ICS	Industrial Control System
ID	Inside Diameter
IDIQ	Indefinite Delivery/Indefinite Quantity
IEC	International Electrotechnical Commission
IED	Intelligent Electronic Device
IEEE	Institute of Electrical and Electronic Engineers
IESNA	Illuminating Engineering Society of North America
IFB	Invitation for Bids
IFC	Issued for Construction
IO, I/O	Input / Output module(s)
IPC	Illustrated Parts Catalog
IPS	Iron Pipe Size
ISA	International Society of Automation
ISO	International Organization for Standardization
kHz	Kilo Hertz
kV	Kilovolts
kVA	Kilovolts-amperes
kW	Kilowatts
LED	Light Emitting Diode
LV	Low Voltage (below 1000V)
mV	1,000 volts
mVA	1,000 volts-amperes
MAT	Material
MATOC	Multiple Award Task Order Contract
MCC	Motor Control Center
MCM	1,000 Circular Mils
MCP	Motor Circuit Protector
METRO	Logo for the Washington Metropolitan Area Transit Authority
MS	Military Specification
MSG	Manufacturers' Standard Gauge
MIL STD	Military Standard
MODC	Manual of Design Criteria
MSHA	Mine Safety and Health Administration
MSS	Manufacturer's Standardization Society of the Valve and Fitting Industry
MTPD	Metro Transit Police Department
NAAMM	National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NAVFAC	USN, Naval Facilities Engineering Command
NBGQA	National Building Granite Quarries Association
NBS	National Bureau of Standards
NC	Normally Closed
NCMA	National Concrete Masonry Association
NDT	Non-Destructive Testing
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NETA	International Electrical Testing Association
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NIST	National Institute of Standards and Technology

NO	Normally Open
NPS	National Park Service
NTP	Notice to Proceed or Network Time Protocol, depending on the context in which it occurs
NTIS	National Technical Information Service
O&M	Operation and Maintenance
O.C.	On Center
OCCB	Operations Control Center Building
OD	Outside Diameter
OEM	Original Equipment Manufacturer
OIT	Operator Interface Terminal
ORD	Operations Readiness Date
OS	Operating System (for computing device)
OS&Y	Outside Stem and Yoke
OSHA	US Department of Labor, Occupational Safety and Health Administration
P&ID	Piping and Instrumentation Diagram
PAC	Programmable Automation Controller
PCI	Pre-Stressed Concrete Institute
PDI	Plumbing and Drainage Institute
PE	Polyethylene
PEI	Porcelain Enamel Institute
PEI	Petroleum Equipment Institute
PPHM	Parts Per Hundred Million
PPM	Parts Per Million
pcf	Pounds Per Cubic Foot
psf	Pounds Per Square Foot
psi	Pounds Per Square Inch
Psig	Pounds Per Square Inch Gauge
Pv	Velocity Pressure
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
REV	Reverse
RFP	Request for Proposal
RIO	Remote I/O (Inputs/Outputs)
Rms	Root Mean Square
ROCC	Rail Operations Control Center
ROD	Revenue Operation Date
rpm	Revolutions Per Minute
RQD	Rock Quality Designation
RTRC	Reinforced Thermosetting Resin Conduit
RTU	Remote Terminal Unit
RVSS	Reduced Voltage Soft Starter
SDI	Steel Deck Institute or Steel Door Institute, depending upon context in which it occurs
SMACNA	Sheet Metal and Air-Conditioning Contractors National Association
S1S	Smooth One Side
S2S	Smooth Both Sides
SAT	Site Acceptance Test
SCADA	Supervisory Control and Data Acquisition
Sf	Square Feet
SIT	System Integration Test
SJI	Steel Joist Institute

SMACNA	Sheet Metal and Air-Conditioning National Association
SPDT	Single Pole, Double Throw
SPST	Single Pole, Single Throw
SS	Stainless Steel or Soft (el. Motor) Starter, depending upon the context in which it occurs
SSPC	Steel Structures Painting Council
TCA	Tile Council of America
TCP/IP	Transmission Control Protocol/Internet Protocol
TGA	Thermogravimetric Analysis
TIA	Telecommunication Industry Association
TVF	Tunnel ventilation Fan
TVS	Tunnel Ventilation System
UFAS	Uniform Federal Accessibility Standards (superseded by ADAAG)
UL	Underwriters Laboratories, Incorporated
UMTA	Urban Mass Transit Administration (currently FTA)
UPS	Unit Price Schedule or Uninterruptible Power System, depending upon context in which it occurs
USBR	US Bureau of Reclamation
USCS	US Commercial Standard
USDOT	US Department of Transportation
USPS	US Product Standard
USSG	United States Standard Gauge
VOC	Volatile Organic Compound
VUSBC	Virginia Uniform Statewide Building Code
WMATA	Washington Metropolitan Area Transit Authority
WMSC	Washington Metrorail Safety Commission
XLPE	Cross-Linked Polyethylene

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 47 00 - QUALITY MANAGEMENT SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the Design-Builder's requirements to formalize a system that documents the structure, responsibilities, and procedures required to achieve effective quality management of the Work throughout the duration of the Contract.
- B. The Quality Management System shall be consistent with ISO 9001 standard. The Design-Builder is not required to be ISO certified, however, certain Suppliers and manufacturers shall be certified as required in these specifications.
- C. The Quality Management System shall include a Quality Plan, Design Control Plan, Construction Quality Plan, Inspection and Test Plans and corresponding procedures and forms necessary to establish, document, maintain, and execute work that conforms to the Contract Documents.
- D. Inspection and Testing shall be performed by qualified staff and laboratories as specified herein.
- E. Arlington County will hire an independent Quality Assurance Manager (County QAM) which will serve as primary quality oversight for the project in coordination with the Authority. This shall include special inspections.

1.02 REFERENCES

- A. Federal Transit Administration (FTA)
 - 1. FTA-PA-27-5194-12.1, Quality Management System Guidelines
- B. International Organization for Standardization (ISO)
 - 1. ISO 9001 – Quality Management Systems
 - 2. ISO 10013 – Guidelines for Quality Management System Documentation
- C. U.S. national standards maintained by the U.S. National Institute of Standards and Technology (NIST) and the U.S. Naval Observatory.

1.03 SUBMITTALS

- A. Make submittals in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, and as noted below. Submit plans, procedures, audit schedules and certifications for Approval. Remaining submittals are for information.
- B. Design Control Plan: As specified in Section 01 11 20, DESIGN AND PROGRAM REQUIREMENTS.
- C. Quality Plan: Contract-specific Quality Plan modeled after ISO 9001 within 30 Days of NTP and with each revision. As a minimum, the following quality elements shall be included in the Quality Plan.
 - 1. Management Responsibility

2. Document Control
 3. Subcontracting and Purchasing
 4. Product Identification and Traceability
 5. Inspection and Testing
 6. Test Program Plan of Technical Requirements Section 1.
 7. Inspection Measuring and Test Equipment
 8. Inspection and Test Status
 9. Nonconformance
 10. Corrective Action
 11. Quality Records
 12. Quality Audits
 13. Training
- D. Quality Procedures: Procedures for each of the quality elements in the Quality Plan within 180 Days of NTP.
- E. Inspection and Test Plans/Specific: Submit Work task or component specific Inspection and Test Plans a minimum 60 Days in advance of when the covered work is scheduled to begin.
- F. Quality Reports: Submit the following reports in accordance with the approved Quality Plan and Quality Procedures.
1. Design Status Reports: Monthly.
 2. Daily Quality Reports: Daily.
 3. Test Status Report: Monthly.
 4. Review and Disposition of Nonconforming Product: With each occurrence.
 5. Summary of Management Reviews: Monthly during the first 6 months after NTP and not less than quarterly thereafter.
 6. Proposed audit schedule to be determined by design-builder and County QAM.
 7. Report of audit results and completion of corrective actions within 30 Days of the completion of an Audit.
 8. Quality Compliance Certification with each Monthly Progress Report

1.04 QUALITY MANAGEMENT SYSTEM REQUIREMENTS

- A. Quality Management System
1. The Quality Management System shall be updated to improve the system as necessary throughout the Period of Performance of the Contract to reflect changes determined to be necessary by Design-Builder management review, Design-Builder internal audit, and

Authority audit. Each update of the Quality Management System requires QAM and Authority Approval.

2. During the Period of Performance, exercise positive control over all of the Work, including that of subconsultants, Subcontractors, fabricators, manufacturers, installers, and Suppliers in accordance with the Quality Plan and Quality Procedures described within the approved Design-Builder Quality Management System.
3. The execution of the Quality Management System shall be subject to Authority audit throughout the Period of Performance of the Contract, in coordination with the Arlington County QAM.

B. Quality Plan

1. The Quality Plan shall include the signatures of the Officer(s) responsible for the Design-Build entity indicating their approval of the Quality Management System.
2. Quality Manager
 - a. Shall have the qualifications specified in Section 01 11 10, DESIGN-BUILDER KEY STAFF.
 - b. Shall perform as the Design-Builder's Management Representative.
 - c. Is responsible for implementing the Quality Management System and shall have the authority to stop the Work.
3. Document Control: Current version of all documents shall be managed in the Authority's Project Management Software System (PMSS). The database shall be kept current throughout the Period of Performance of the Contract.
4. Subcontracting and Purchasing
 - a. Purchased material, equipment, and services shall be controlled to ensure that they are properly integrated into the Work.
 - b. Assure that Design-Builder's subconsultants, Suppliers, and Subcontractors satisfactorily demonstrate and document an adequate system for managing quality to the Design-Builder.
 - c. Provide adequate surveillance of subconsultants, Subcontractors, and Suppliers to assure conformance with the Quality Management System and specification requirements. This surveillance shall include inspection and audit of off-Site activities of Design-Builder's subconsultants, Subcontractors, and Suppliers.
5. Product Identification and Traceability: The Design-Builder's Quality Management System shall include provisions to identify and provide traceability of products and materials where appropriate and as required in the Issued for Construction Specifications.
6. Inspection and Testing/General
 - a. Establish an Inspection and Test Plan that conforms to the Quality Management System and the Issued for Construction Specifications and that allows for tracking of actual performance of inspections and tests.
 - b. The Inspection and Test Plan shall incorporate elements of the Authority furnished Inspection Guidelines, Part 2, as needed to meet the requirements of the Quality Plan.

- c. Testing laboratories shall be certified as required by the Issued for Construction Specifications.
 - d. The Inspection and Test Plan shall be designed to ensure that testing is performed to demonstrate that components and systems perform satisfactorily in service. Testing shall be performed by qualified and experienced personnel and using certified in accordance with approved test procedures. Tests shall incorporate acceptance limits defined by industry codes and standards or by the Issued for Construction Specifications; the more restrictive standard shall take precedence. All test results shall be documented and submitted to the County QAM.
 - e. Provide the County QAM 48-hours' notice of tests except when greater notice is required in these specifications.
 - f. Include instructions necessary to implement source inspections; receiving inspections; inspection of work in progress; hold point inspections, and completion inspections.
 - g. Forms for recording test results and authorized approval signatures shall be used for all tests. Each test form shall identify the applicable specification Section, Article, and Paragraph.
 - h. Subcontractors testing their own work shall be supervised and managed by the Design-Builder. The responsibility for testing and Subcontractor performance remains with the Design-Builder.
 - i. If tests or certifications conducted by the County QAM disclose that work is not in conformance with the Issued for Construction Specifications, then the County QAM will advise the Design-Builder as to the particular defects to be remedied. Upon correction of the defects, provide written notification to the County QAM, and additional testing or certification shall be conducted as necessary to result in a proven and certified system(s). Further, in the case of such non-conformance with the Issued for Construction Drawings and Issued for Construction Specifications, provide details on the preventive action taken to avoid such non-conformance for remaining installations.
7. Inspection, Measuring, and Test Equipment: Ensure that test equipment used meets the specified requirements, and that the equipment and instruments are controlled, maintained, and calibrated by a nationally recognized certification entity/agency. Devices used to calibrate measuring and test equipment or other measurement standards shall be traceable to one or more of the following:
- a. U.S. national standards maintained by the U.S. National Institute of Standards and Technology (NIST) and the U.S. Naval Observatory.
 - b. Fundamental or natural physical constants with values assigned or accepted by the U.S. NIST.
 - c. National standards of other countries, which are correlated, with U.S. national standards.
 - d. Comparison to consensus standards.
8. Inspection and Test Status: Require inspection and test schedules for the County QAM's use in scheduling test witnessing and other quality assurance functions.
9. Review and Disposition of Nonconforming Product: The authority within the Design-Builder organization to review and provide disposition of nonconforming products shall be identified. The disposition of product that does not conform to Issued for Construction

Drawings and Issued for Construction Specifications shall be subject to approval by the County QAM.

10. Corrective Action: Corrective action shall be established, documented, and maintained. These include the investigation of the root cause of nonconforming work and the corrective action needed to prevent recurrence, and analysis to detect and eliminate potential causes of nonconforming work.

11. Control of Quality Records

- a. Quality records document results achieved (e.g. test data sheets, test reports, electronic test data, mill certifications, measurement verification sheets, batch tickets) or provide evidence of activities performed (e.g. inspection reports, photos or videos, checklists with sign-offs).
- b. Establish and implement measures to identify, collect, index, file, and store. These procedures shall include a database to track and maintain control over all Quality Records generated by the Contract Work.
- c. Quality records shall be legible, reproducible, identifiable with the item involved, and contain the date of origination and identity of the originator, verifier, and responsible supervisor.
- d. Quality records generated by Subcontractors, Suppliers, fabricators, and test laboratories shall be traceable to the product being supplied or fabricated and shall be provided in advance of shipment or shall be shipped with the product.
- e. Retain quality records for the duration required to meet statutory requirements.

12. Quality Audits

- a. Management reviews conducted by Design-Builder:
 - 1) Management reviews shall occur monthly during the first 6 months of the Contract and not less than quarterly thereafter.
 - 2) Written summaries of findings and major corrective actions shall be provided to the County QAM within 5 Days of completion of each review.
- b. Internal quality audits conducted by Design-Builder:
 - 1) Internal audits shall be performed at least quarterly.
 - 2) Deficiencies in the Quality Management System, the causes of deficiencies in the Quality Management System, and the status of corrective action and preventive action, when appropriate shall be recorded in the audit results.
 - 3) Audit results shall be provided to the County QAM and the WMATA Representative within 14 Days of the audit with a plan for corrective and preventative action.
 - 4) Provide notification of completed corrective and preventative action.

13. Training: Establish, maintain and provide the training needs for all personnel performing activities affecting quality.

C. Design Control Plan

1. The Design-Builder's design process shall translate the Authority's needs and requirements into an acceptable design.
2. Design control shall be defined by the Design Control Plan as described in Section 01 11 20, DESIGN AND PROGRAM REQUIREMENTS.
3. Configuration management shall be defined by a Configuration Management Plan developed as a part of the Design Control Plan.

D. Inspection and Test Plans/Specific

1. As a minimum, Inspection Plans shall include the following information:
 - a. A matrix of all inspections required by the Issued for Construction Specifications to be performed by Design-Builder, Suppliers, or Subcontractors and their frequency.
 - b. Established hold points that require work stoppage until Authority action relative to that work activity is complete.
 - c. Established witness points that identify when Authority and/or County QAM notification is required for a Design-Builder work activity.
 - d. Checklists to be utilized.
2. As a minimum, the Test Plans shall include the following information:
 - a. A matrix of all tests required by the Issued for Construction Specifications to be performed by Design-Builder, Suppliers, or Subcontractors.
 - b. Samples of test reports: the test reports shall meet the minimum requirements called for in the applicable test standards specified in the Issued for Construction Specifications.
 - c. Provisions for coordinating onsite and offsite testing.
 - d. Provisions for meeting the County QAM notification criteria for planned tests and inspections specified to be witnessed by the County QAM. Provide the County QAM a minimum of 48 hours advance notice.
 - e. Description of test
 - f. Specification Section, Article, and Paragraph related to each test
 - g. Type of test
 - h. Applicable standard
 - i. Test frequency
 - j. Responsibility for test performance
 - k. Completion status
 - l. Means of tracking and recording corrective actions being taken to assure compliance with the Issued for Construction Specifications.
 - m. Means for recording test results.

E. QUALITY REPORTS

1. Design Status Report
 - a. Design status report shall track and report the status of design products for County QAM review. The report shall be revised, updated, and submitted for approval at least monthly.
 - b. The design status report shall be consistent with and follow from the Design Control Plan and shall specifically track all design and design verification activities included in the approved Design Control Plan.
 - c. The design status report shall be in a format that allows the Design-Builder and the County QAM to reasonably understand the means by which the design of the Project is being completed. It shall provide planned versus actual schedule performance and shall be accurate and useful as a means for project personnel to understand how the Design is proceeding throughout the term.
 - d. The Design Status Report shall include subcontracted design work, if appropriate.
2. Daily Quality Reports: Daily quality reports shall summarize the construction activities to the Authority, record the inspections and tests completed and the results, and record deficiencies identified, during the previous 24 hours of work. These reports shall be provided to the County QAM daily, uploaded into Procure.
3. Test Status Report: Track and report the status of testing. Revisions, updates, and additions the test status report shall be submitted to County QAM at least monthly.

1.05 QAM QUALITY OVERSIGHT

- A. The principal role of the County QAM in the implementation of the Design-Build Quality Program will be oversight of the effectiveness of the Design-Builder's Quality Management System including quality control and quality assurance activities. WMATA Quality Personnel will coordinate activities with the QAM. WMATA will inform the County QAM of any additional quality inspections deemed required and as such reserves the right to conduct inspection of all phases of design and construction by Authority field staff. Deficiencies discovered will be brought to the immediate attention to the Arlington County QAM including written follow-up notification.
- B. When the County determines that the approved Quality Management System or plans, or any portion or feature thereof, are not controlling work sufficiently for the Work to conform to Contract Documents, Issued for Construction Drawings and Issued for Construction Specifications, the Authority will inform the County QAM, in writing. The County QAM will direct the Design-Builder to take appropriate action to correct such deficiencies. The WMATA Representative may stop the Work activities if the Quality Management System is not functioning properly due to lack of Design-Builder's staff or for any other Contract non-compliance.
- C. Notwithstanding the above, County QAM inspection, testing, or other actions shall not constitute Acceptance of work, nor shall it relieve the Design-Builder of its contractual responsibilities.

1.06 AUTHORITY AUDITS OF THE DESIGN-BUILDER'S QUALITY MANAGEMENT SYSTEM

- A. At its sole discretion, the Authority may conduct audits, tests, and inspections in addition to those performed by the Design-Builder or the County QAM.

- B. There will be an ongoing review and evaluation of implementation of the Design-Builder's Quality Management System by the County QAM and reports submitted to WMATA to verify that the Design-Builder is effectively controlling the quality of design and construction.
- C. Audits include audits of fabricators, Subcontractors, subconsultants, Suppliers, and third-party audits (i.e., ISO audits, trade organization certification audits, and audits required to maintain laboratory or testing accreditation).
- D. If the implementation of the Design-Builder's Quality Management System is determined to be ineffective by the Authority, the Authority, at its sole discretion, may request/require appropriate action from the County QAM. for any and all work it deems to be deficient or non-conforming to the Contract Documents, Issued for Construction Drawings and Issued for Construction Specifications. The Design-Builder will be expected to make whatever changes are necessary in the organization or in the Quality Management System to provide effective control of the quality of the Work.
- E. The County QAM will perform audits to verify that the Design-Builder is effectively controlling the quality of the Work. The basis for the audits will be the Quality Management System and the Issued for Construction Drawings and Issued for Construction Specifications, these reports will be submitted to WMATA for review and acceptance.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 51 00 - TEMPORARY UTILITIES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies requirements for temporary utilities for use during construction.
- B. Temporary utilities required include but are not limited to:
 - 1. Water service and distribution.
 - 2. Temporary electric power and light.
 - 3. Telephone service.
 - 4. Storm and sanitary sewer.

1.02 REFERENCES

- A. American National Standards Institute (ANSI)
 - 1. ANSI-A10 Series standards for Safety Requirements for Construction and Demolition
- B. National Electrical Contractors Association (NECA)
 - 1. NECA Electrical Design Library, Temporary Electrical Facilities
- C. National Electrical Manufacturers Association (NEMA)
- D. National Fire Protection Association (NFPA)
 - 1. NFPA 70, National Electrical Code
 - 2. NFPA 241, Standard for Safeguarding Construction, Alteration, and Demolition Operations
- E. Occupational Safety and Health Administration (OSHA)
- F. Underwriters Laboratories (UL)

1.03 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, and with additional requirements as specified for each.
 - 1. Reports for tests, inspections, meter readings, and similar procedures performed for temporary utilities.
 - 2. Indicate the schedule for implementation and termination of each temporary utility as appropriate to the Authority as described in Section 01 32 20, CONTRACT PROGRESS REPORTING.

1.04 QUALITY ASSURANCE

- A. Comply with industry standards and applicable laws and regulations of Jurisdictional Authorities including but not limited to:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.

3. Utility company regulations.
 4. Police, Fire Department, and Rescue Squad rules.
 5. Environmental protection regulations.
- B. Comply with NFPA Code 241, ANSI-A10, and NECA Electrical Design Library, Temporary Electrical Facilities. For electrical service, comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.
- C. Arrange for the inspection and testing of each temporary utility before use, and coordinate all requirements for certifications and permits. The WMATA Representative shall be notified sufficiently in advance, but with no less than 24 hours' notice, so as to be present at all planned inspections and onsite activities.

1.05 PROJECT CONDITIONS

- A. Incorporate into the Project Schedule dates for implementation and termination of each temporary utility. At the earliest practicable time and when acceptable to the Authority, change over from use of temporary service to use of the permanent service.
- B. Keep temporary services and facilities clean and neat in appearance. Temporary utilities shall operate in a safe and efficient manner. Take all necessary fire prevention measures and shall ensure that utilities are not overloaded or permitted to interfere with progress of the Work. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the Site.
- C. Determine temporary utility services requirements and shall make arrangements with utility companies and governmental agencies to obtain such services.
- D. Provide temporary electrical service of sufficient capacity to serve the temporary requirements during the life of the Contract. The source of temporary power for testing may be the temporary service, portable generator, or other approved system, which will deliver power at the voltage and other characteristics required to accomplish testing as specified. Circuits and construction for temporary systems shall suit the needs of the Work and comply with NEC and the codes and regulations of the Jurisdictional Authorities.
- E. Temporary services shall be furnished, installed, connected, and maintained by the Design-Builder as approved by the WMATA Representative. Prior to completion of the Work, the Design-Builder shall remove all temporary services and restore affected areas as approved.
- F. Shop drawings for all temporary utility and electrical services shall be submitted for approval. Power supply shall be of such quantity and type required to perform the Work. Maximum primary voltage shall be 600 volts, unless otherwise approved. Lighting equipment shall be of the type and quantity needed to provide illumination of all project areas. Materials for and installation of temporary services shall comply with OSHA requirements.

1.06 ACCESS TO FIRE HYDRANTS AND FIRE ALARM BOXES

- A. Whenever the Work is being carried out, free access must be given to each fire hydrant, fire alarm box and standpipe; when required, hydrants shall be extended by suitable tubes or piping to an accessible point as approved and to the satisfaction of the jurisdictional fire department. Obstructions shall not be piled at any time or placed within 10 feet of any fire hydrant or fire alarm box and, where materials are placed in the vicinity of a fire hydrant or fire alarm box and to such height as to prevent the same from being readily seen, the position of such hydrants or fire alarm boxes shall be indicated by suitable signs and lights, both day and night.

- B. Safeguard, maintain, and protect the wires, cables, ducts, manholes, posts, and poles, signals, and alarm boxes of fire departments. Do not cause interruption to the fire department fire alarm telegraph service, and in case of accident, shall promptly notify the fire department. No fire department wire, cable, duct, manhole, post or pole, signal, or fire alarm box shall be disturbed, except in the presence of a representative of the Arlington County Fire Marshall. In case such wire, cable, duct, manhole, post or pole, signal, or fire alarm box is disturbed, the Design-Builder shall immediately notify the WMATA Representative, and it shall be restored immediately to its original condition.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 55 00 - MAINTENANCE OF TRAFFIC, ACCESS, AND PARKING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes requirements for maintenance of existing pedestrian and vehicular traffic onsite and offsite; construction sequence, and staging; maintaining access to and from the Site including construction areas, haul routes, and temporary roads with traffic control; and for Design-Builder parking.

1.02 REFERENCES

- A. Manual of Uniform Traffic Control Devices (MUTCD)

1.03 SUBMITTALS

1.04 MAINTENANCE OF TRAFFIC

- A. Except as otherwise approved by Arlington County and WMATA, design-builder shall maintain access to all emergency egress facilities.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 56 00 - TEMPORARY BARRIERS AND ENCLOSURES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes requirements for temporary barriers and enclosures. This Section also includes facilities for the protection of occupants entering or exiting spaces during construction.

1.02 GENERAL

- A. Wherever necessary, shown or specified, erect and maintain signs, fences, barricades, and pedestrian bridges for the protection of public travel, the work site, adjoining property and adjoining public places.
- B. Take positive measures to prevent entry into the Site of the Work and storage areas by children, animals, and unauthorized adults and vehicles.
- C. Appropriate warning signs and instructional safety signs as specified in Section 01 58 00, PROJECT SIGNS, shall be conspicuously posted in all areas involving construction activities. Furnish signs and attach to, as applicable, the protective devices enclosing the Design-Builder's work, access, operating, and platform storage and site storage/laydown areas as applicable; pedestrian sidewalks, streets, and parking lots adjacent to the work area; and openings. The storage/laydown areas as designated by the Authority, if any, and as specified in Section 01 52 00, TEMPORARY CONSTRUCTION FACILITIES, shall be fenced and signage shall be provided to prevent unauthorized entry. Stored materials shall be bundled or tied down by the Design-Builder.
- D. Protective devices shall be in accordance with codes and regulations of Jurisdictional Authorities.
- E. All work pertaining to this Section shall meet ADAAG requirements.

1.03 SUBMITTALS

- A. Submit the following Shop Drawings in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
 - 1. Location and fence material of fencing for pedestrian access areas.

1.04 TEMPORARY FENCES

- A. Provide temporary fencing within the construction area to fence off pedestrian sidewalks, streets and parking areas from operating, access and work areas and Site storage/laydown areas.
- B. Temporary fences shall be substantially constructed in a neat appearance.
- C. Working Area Wooden Fencing
 - 1. Provide 6-foot high temporary working area wooden fencing as shown or as directed and as specified. Working area wooden fencing shall serve two purposes: to protect pedestrian access areas from hazardous construction activities, and to enclose the Design-Builder's work, access, storage, and operating areas.

2. The location of fence for pedestrian access areas adjacent to the Work area and for enclosing Design-Builder's work areas shall be as specified and consistent with the Design-Builder's approved Working Drawings for maintenance of traffic plans.

D. Working Area Chain-link Fencing

1. Provide 6-foot high temporary working area chain-link fencing as specified to fence off storage area from operating areas, and if necessary, to fence off pedestrian access areas.
2. The location of fence for pedestrian access areas adjacent to the Work area and to the storage areas shall be as specified and consistent with the Design-Builder's approved Working Drawings for maintenance of traffic plans.

1.05 TREE AND PLANT PROTECTION

- A. Protect trees and plants not slated to be removed or replaced from construction activities.

1.06 PROTECTION OF UTILITIES

- A. Protect existing utilities.

1.07 PROTECTION OF EXISTING STRUCTURES AND IMPROVEMENTS

- A. Protect Existing Structures and Improvements.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Barricades shall be substantial in character, neat in appearance, and of approved size and arrangement.
- B. Barricade materials shall be as approved. Lumber for barriers as applicable and working area wooden fencing shall be exterior grade, treated to be fire-retardant, pressure impregnated with resin salt as approved. Exterior latex paint for barriers and working area wooden fencing shall be as specified in WMATA Standard Specification Section 09 91 99, FIELD PAINTING. Color shall be as approved by the WMATA Representative. Provide necessary fencing hardware, locks, gates and all other incidentals as approved.
- C. All chain-link fencing shall be anti-climbing type, with plastic inserts, barbed wire (where indicated), and as specified in WMATA Standard Specification Section 32 31 00, FENCING.
- D. WARNING SIGNAGE SHALL BE AS SPECIFIED IN SECTION 01 58 00, PROJECT SIGNS.
- E. Structural lumber for decking shall be as specified in Section 01 53 00, TEMPORARY DECKING.
- F. At the Authority's or Arlington County's request the Design builder shall post signage on temporary fences and barricade structures, provided the Authority or Arlington County provides Design-Builder with image files needed to create the signs.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. As removal of pavement and sidewalk progresses as applicable and furnish and install barricades in accordance with requirements of the Jurisdictional Authorities. During the prosecution of the Work, barricade or close openings in floors, walls, and other parts of the structures while such openings are not in regular use as applicable. Barricade or close such openings before Acceptance of the Work. Barricades shall be anchored to the ground on all sides of openings. Work involving electrical systems or equipment in or near the area to which personnel or the public have access shall be isolated using barricades.
- B. Flashing yellow lights shall be mounted and maintained on barricades at maximum intervals of 25 feet.
- C. Fabricate and erect in accordance with local requirements pedestrian barriers as applicable and working area wooden fencing with a stud framework and a covering of tightly fitted plywood sheets. Paint with two coats of exterior latex paint. Install hardware, locks, gates, and all other incidentals. Furnish and install wooden fence along sides of decked areas for pedestrian walkways as applicable where such walkways are adjacent to open areas, staging/storage areas, and other areas used by the Design-Builder.
- D. Erect chain-link fencing consisting of a post-and-rail framework with chain-link fabric; install hardware, locks, gates, and all other incidentals; and insert plastic inserts into the chain link fence.
- E. Along sides of areas for pedestrian walkways as applicable, where such walkways are adjacent to vehicular traffic, install concrete barriers as shown on approved maintenance of traffic plan.
- F. Erect, fabricate, attach, and maintain safety warning and other signs.
- G. Protect existing vegetation, structures, utilities, and improvements.
- H. Provide maintenance for all barricades, barriers, temporary fences, pedestrian bridges, signage, and existing vegetation, structures, utilities, and improvements protection as applicable for the duration of the Contract. Immediately prior to completion of the Contract, completely remove the items and restore the area.

END OF SECTION

SECTION 01 57 00 - TEMPORARY CONTROLS

PART 1 – GENERAL

1.01 SITE SECURITY

- A. Design-Builder shall ensure the site is secured to Arlington County and WMATA's satisfaction.

END OF SECTION

SECTION 01 58 00 - PROJECT SIGNS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes the requirements for Project signs that will be required at the Site during the construction of the Project.

1.02 PROJECT IDENTIFICATION SIGNS

- A. Furnish Project identification signs in the locations at the Sites selected by Arlington County.
- B. Sign size, content, lettering, and format for the large permanent-mount sign shall be as directed by Arlington County and shall be shown on the Design-Builder's Working Drawings.
- C. Signs shall be installed 20 days prior to the start of construction, shall be maintained during the Work, and shall be removed upon the completion of the Project.

1.03 WARNING SIGNS AND INSTRUCTIONAL SAFETY SIGNS

- A. Provide "No Trespassing" signs, load limit on decking, and other warning and instructional safety aluminum signs with minimum 2-inch high Helvetica Medium style lettering and mount at locations on fencing/barriers/barricades/pedestrian bridges and on other areas as directed. Sign panel size and thickness shall be as directed. Mount the signs with stainless-steel cap screws with hex nuts and lock washers. This Section includes the requirements for Project signs that will be required at the Site during the construction of the Project.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 61 00 - BASIC PRODUCT REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements governing the Design-Builder's selection of products for use in construction of the Project.
- B. Administrative procedures for handling requests for substitutions made after award of the Contract are included under Section 01 63 00, PRODUCT SUBSTITUTION PROCEDURES.

1.02 DEFINITIONS

- A. As used herein, the term brand name includes identification of products by make and model. If items called for in the Contract Documents have been identified by a brand name or equal description, such identification is intended to be descriptive, but not restrictive, and is to indicate the quality and characteristics of products that will be satisfactory. Design Specifications identifying equal products including products of the brand name manufacturer other than the one described by brand name as specified in Section 01 63 00, PRODUCT SUBSTITUTION PROCEDURES, will be considered if such products are clearly identified and are determined by the Designer and the Authority to meet fully the salient characteristics of the products specified in the Contract Documents.

1.03 SUBMITTALS

- A. Submit for review an initial product list with the Intermediate Design in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. A written explanation for omissions of data and for known variations from Contract requirements shall be included.
- B. Submit for review and Approval a completed product list including a written explanation for omissions of data and for variations from Contract requirements to the Arlington County Project Officer within 30 Days after date of commencement of the construction work. Arlington County Project Officer will coordinate with WMATA representative. WMATA will notify the Arlington County Project Officer and Design-Builder of acceptance or rejection of the documentation within 21 Days of receipt of the submittal.
- C. Authority Acceptance of the product list does not constitute a waiver of the requirement that products comply with the Contract Documents and the Design Drawings and Design Specifications.

1.04 QUALITY ASSURANCE

- A. Provide products of the same kind from a single source.
- B. Except for required labels and operating data, the manufacturer's or producer's nameplates or trademarks shall not be attached or imprinted on exposed surfaces.
 - 1. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.
 - 2. Equipment Nameplates: Provide a permanent nameplate on each item of service connected or power-operated equipment. The nameplate shall contain the following information and other essential operating data:

- a. Name of product and manufacturer
- b. Model and serial number
- c. Capacity
- d. Speed
- e. Ratings

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. All products shall be delivered, stored, and handled in accordance with the manufacturer's recommendations to prevent damage, deterioration, loss, or invalidation of the manufacturer's warranty.
- B. Schedule delivery to minimize long-term storage at the Site and to prevent overcrowding of construction storage and staging areas.
- C. Coordinate the time of delivery with the installation schedule to ensure that hazardous, easily damaged, or those items sensitive to deterioration, theft, and other losses are stored for a minimum holding period.
- D. Products shall be delivered to the Site in the manufacturer's original sealed container or other appropriate packaging, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- E. Products shall be inspected upon delivery by the Design-Builder to ensure compliance with the Design Drawings and Design Specifications, and to ensure that products are undamaged and properly protected. Documentation noting the time, date, and manner of delivery shall be maintained by the Design-Builder. A statement attesting to the inspection of the products at time of delivery shall be included in the documentation signed by the Design-Builder's authorized representative.
- F. Products shall be stored at the Site in a manner that will facilitate inspection and measurement of quantity or counting of units. Heavy materials shall be stored in a manner that will not damage supporting construction. Products subject to damage by the elements shall be stored under cover in weather-tight enclosures with ventilation adequate to prevent condensation. Temperature and humidity shall be maintained within range required by manufacturer's instructions.

PART 2 – PRODUCTS

2.01 PRODUCT SELECTION

- A. Provide products that comply with the Issued for Construction Drawings and Issued for Construction Specifications. All products to be installed in the Work shall be undamaged and, unless otherwise permitted, unused at the time of installation. Products shall include all accessories, trim, finish, safety guards, and other devices and details needed for a complete installation and suitable for the intended use.
- B. Unless otherwise specified, provide standard products of the type that have been produced and used successfully in similar situations on other Authority projects of a similar nature.
- C. Procedures governing product selection include:

1. Where only a single product or manufacturer is named and the notation “no substitution is permitted” is included in the specification, provide the product indicated. No substitutions will be permitted.
2. Where two or more products or manufacturers are named followed by the notation “no substitutions are permitted” is included in the specification, provide one of the products indicated. No substitutions will be permitted.
3. Where the Issued for Construction Drawings and Issued for Construction Specifications list products or manufacturers that are available and acceptable for incorporation into the Work, accompanied by the term ...or equal or ...or approved equal, the Design-Builder may propose any available product that complies with Contract requirements. Comply with the requirement of Section 01 63 00, PRODUCT SUBSTITUTION PROCEDURES, to obtain approval for use of an unnamed product.
4. Where the Issued for Construction Drawings and Issued for Construction Specifications list the salient features that explicitly describe a product or assembly and a brand name is not included, provide a product or assembly that provides the listed features and otherwise complies with the Contract requirements.
5. Where the Issued for Construction Drawings and Issued for Construction Specifications explicitly require compliance with performance requirements, and the product complies with those requirements based on the manufacturer’s recommended use of the product for the application indicated in the Design Drawings and Design Specifications (as evidenced in published product literature, or by the manufacturer’s certification of performance), the Design-Builder may submit the product for incorporation into the Work.
6. Where the Issued for Construction Drawings and Issued for Construction Specifications require only compliance with an imposed code, standard, or regulation, the Design-Builder may select a product that complies with the standards, codes, or regulations specified.
7. Visual Matching: Where specifications require matching an established item, the Authority’s decision will be final on whether a proposed product matches satisfactorily. Where no product is available that adequately matches adjacent products or complies with the other specified requirements, comply with provisions of Section 01 63 00, PRODUCT SUBSTITUTION PROCEDURES, for selection of an alternate product.
8. Where specified product requirements include the phrase ...as selected from manufacturer’s standard colors, patterns, textures..., select a manufacturer that provides a range of colors in a product that meets all other Design Drawings and Design Specifications requirements. In this situation, standard shall imply regularly or routinely produced.

PART 3 – EXECUTION

3.01 PRODUCT LIST

- A. Prepare a product list in tabular form acceptable to the Arlington County Project Officer and WMATA showing products specified in the Design Drawings and Design Specifications. Coordinate the timing of delivery of products on the product list with the Design-Builder’s Project Schedule as specified in Section 01 32 20, CONTRACT PROGRESS REPORTING, and Contract Document Submittal Log as specified in Section 01 33 00, SUBMITTAL PROCEDURES. At a minimum, provide the following information for each product:
 1. Related specification Section number.
 2. Generic name used in the Design Drawings and Design Specifications.

3. Proprietary name, model number, and similar designation.
 4. Manufacturer's name and address.
 5. Supplier's name and address.
 6. Installer's name and address.
 7. Projected delivery date and length of delivery period.
- B. Within 21 Days of receipt of product list submittals, WMATA Representative will notify the Arlington County Project Officer and Design-Builder of Authority acceptance or rejection of the product list. If rejected, product list shall be corrected by the Design-Builder and resubmitted for review.

3.02 INSTALLATION OF PRODUCTS

- A. Comply with the manufacturer's instructions and recommendations for installation of all products installed under this Contract unless otherwise specified. Products shall be accurately located, aligned with other elements of the Work, and securely installed in place. All exposed surfaces shall be clean as specified in Section 01 74 00, CLEANING, and protected as necessary to prevent damage and deterioration as specified in Section 01 72 30, PROTECTION OF ADJACENT CONSTRUCTION.

END OF SECTION

SECTION 01 63 00 - PRODUCT SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for handling requests for substitutions made after award of the Contract.
- B. Other requirements governing the Design-Builder's selection of products and product options are included under Section 01 61 00, BASIC PRODUCT REQUIREMENTS.

1.02 DEFINITIONS

- A. Definitions used in the Section are not intended to change the meaning of other terms used in the approved Issued for Construction Drawings and Issued for Construction Specifications.
- B. Design-Builder requests for changes in products, materials, equipment, and methods of construction as required or specified by Contract Documents or in approved Issued for Construction Drawings and Issued for Construction Specifications are considered requests for substitutions. The following are not considered substitutions:
 - 1. Revisions to Contract Documents or approved Issued for Construction Drawings and Issued for Construction Specifications requested by the Authority.
 - 2. Specified options of products and construction methods included in Contract Documents or in approved Issued for Construction Drawings and Issued for Construction Specifications. Note that products submitted under an or equal or not limited to provision are considered to be substitutions as specified in Section 00 21 00, SUPPLEMENTARY INSTRUCTIONS TO PROPOSERS.
 - 3. The Design-Builder's determination of and compliance with governing regulations and orders issued by governing authorities.

1.03 SUBMITTALS

- A. Requests for substitution from the Design-Builder during design work will be considered by the Authority. Requests for substitution from the Design-Builder during construction will be considered by the Authority if received with adequate time to allow for Authority review and Approval without delaying the Project Schedule. Requests received that may delay the Project Schedule will be considered or rejected at the sole discretion of the Authority.
 - 1. Submit one electronic copy in Adobe (.PDF) file format of the Brand Name or Equal Form, Section 00 43 30, BRAND NAME OR EQUAL FORM, for each request for substitution to Arlington County Project Officer and the WMATA Representative for consideration of the form and in accordance with procedures required for Change Order proposals as specified by the Arlington County Project Officer. Submission of a change order shall be made only when such changes are deemed appropriate by the Arlington County Project Officer and WMATA Representative.
 - 2. In each substitution request, identify the product and fabrication or installation method to be replaced. The related Technical Requirement, WMATA Standard Specification Section, Standard or RFP Drawing numbers, or approved Issued for Construction Drawing numbers shall be referenced in the submittal. Complete documentation showing compliance with the

requirements for substitutions shall also be submitted including the following information as appropriate:

- a. Product Data, including drawings, fabrication, and installation procedures.
 - b. Samples, where samples of the specified product are requested.
 - c. A detailed comparison of significant qualities/salient features of the proposed substitution with those of the material or work specified. Significant qualities shall include elements such as size, weight, durability, performance, visual effect, code compliance, maintenance requirements, energy usage, and environmental considerations.
 - d. Coordination information, including a list of changes or modifications made necessary to other parts of the Work and to construction performed by the Authority or separate contractors.
 - e. A statement indicating the substitution's effect on the Design-Builder's Construction Schedule. Indicate the effect of the proposed substitution on overall Period of Performance.
 - f. Cost comparison between the product specified and the requested substitution, including a proposal of the net change, if any in the Contract Price.
 - g. Certification by the Design-Builder that the substitution proposed is equal to or better in every respect to that required under the Contract, and that the product will perform as intended. Include a waiver of rights to additional payment or time that may subsequently become necessary should the product fail to perform adequately, or because of changes to other work were required as a consequence of the substitution.
 - h. Failure by the Design-Builder to include the above requirements in the submittal may be cause for rejection of the submittal in its entirety.
- B. If deemed necessary and within 14 Days of receipt of the submittal, the WMATA Representative may request additional information or documentation that, in its sole judgment is required for the evaluation of the substitution request. Within 21 Days of receipt of the original substitution request or of requested additional information or documentation, the Design-Builder will be notified of acceptance or rejection of the proposed substitution. If a decision on the use of a proposed substitute cannot be made or obtained within the time allocated, the product specified by name in the Contract Documents or approved Issued for Construction Drawings and Issued for Construction Specifications shall be used.

1.04 SUBSTITUTION PROCEDURE

- A. The Design-Builder's request for substitution may be rejected by the WMATA Representative if the substitution would involve:
1. Extensive revisions to Contract Documents.
 2. A proposed change not in keeping with the general intent of Contract Documents.
 3. An untimely request, not fully documented when submitted.
 4. A request that is directly related to an or equal clause or similar language in the Contract Documents.

5. A product or method of construction that could not be provided within the Period of Performance.
 6. A product or method of construction that could not be approved by a governing authority.
 7. Additional responsibilities or expense to the Authority (including additional expenses for redesign and evaluation services, increased cost of related construction, and other similar considerations) that outweighs any advantage that is being offered to the Authority as a result of the substitution.
 8. A method of construction that cannot be provided in a manner that is compatible with other materials, the product cannot be coordinated with other materials, and a warranty cannot be provided for the product in accordance with the requirements of the Contract even though the Design-Builder expresses a willingness to certify that the apparent deficiencies can be corrected.
- B. Neither the Design-Builder's submittal nor the Authority's review or Approval of Shop Drawings, product data, or samples that relate to a substitution constitutes an Approval of the requested substitution. Submission of Shop Drawing, product data, or sample submittals does not relieve the Design-Builder from fulfilling Contract requirements for substitutions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 71 10 - ACCEPTANCE OF CONDITIONS

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies basic requirements for determining acceptable conditions for installation.

1.02 SUBMITTALS

- A. One electronic copy of the preconstruction inspection records.

1.03 PRECONSTRUCTION INSPECTION REQUIREMENTS

- A. Prior to beginning construction work, the Design-Builder shall inform the Authority of buildings or structures on which it intends to perform work or which performance of the Project Work will affect.
- B. Conditional inspection of buildings or structures in the immediate vicinity of the Project, which may reasonably be expected to be affected by the Work, will be performed jointly by the Authority and the Design-Builder. This inspection will be conducted prior to the commencement of construction work to determine pre-existing conditions. After this inspection, the Authority will not assume any responsibility for damages arising from the Work performed and it shall be the responsibility of the Design-Builder to correct all damages caused by performance of the Contract Work.
- C. Examine substrates, areas, and conditions, with Authority personnel present, for compliance with requirements for installed tolerance and other conditions affecting performance. Record observations from the required preconstruction inspection.
- D. Where a written inspection report requires listing conditions detrimental to performance of the Work, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.

1.04 EXAMINATION

- A. General: Verify dimensions shown on existing work and dimensions required for work that is to connect with work not in place in accordance with Section 01 72 10, LAYOUT OF WORK AND FIELD ENGINEERING.
- B. Existing Conditions
 - 1. The existence and location of Site improvements, above and below-ground utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of above and below-ground utilities, mechanical and electrical systems, and other construction affecting the Work. Verify the location and point of connection of utility services.

2. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water service pipes, and electrical services.
 3. Furnish location data for work related to the Project that must be performed by public utilities serving the Project Site.
- C. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- D. Examine rough-in for mechanical and electrical systems to verify actual location of connections before equipment and fixture installation.
- E. Examine new and existing facilities for suitable conditions where products and systems are to be installed.

1.05 ACCEPTANCE OF CONDITIONS

- A. Examine substrates, areas, and conditions, with contract personnel present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine new and existing facilities for suitable conditions where products and systems are to be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Proceeding with work indicates acceptance of surfaces and conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 72 10 - LAYOUT OF WORK AND FIELD ENGINEERING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes general procedural requirements for layout of work and field engineering including, examination, preparation, construction layout, installation, survey personnel, equipment and calibration requirements, survey standards, surveys procedures, and formats for figures and reports.

1.02 RELATED SECTIONS

- A. Section 01 71 10 – ACCEPTANCE OF CONDITIONS

1.03 REFERENCES

- A. DIN (Deutsches Institut für Normung) 18723 – Specification for Theodolite Accuracy
- B. Federal Geodetic Control Committee (FGCC):
 - 1. Standards and Specifications for Geodetic Control Networks
- C. National Oceanic and Atmospheric Administration (NOAA):
 - 1. Manual National Ocean Survey (NOS), National Geodetic Survey (NGS) 3 Geodetic Leveling
- D. National Society of Professional Surveyors (NSPS)
 - 1. American Congress on Surveying and Mapping (ACSM).

1.04 SUBMITTALS

- A. Survey personnel qualification data: Resumé and proof of certification or registration for all project surveyors. Resumés shall include information to demonstrate their capabilities and experience. Include lists of three completed projects with owner, project names, project duration, project description, project addresses, and phone numbers for the Survey Manager and survey crew chiefs.
- B. Survey equipment: List of equipment and instruments to be used on the Project and include manufacturer specifications, date of purchase and last date of service for all instruments. Notify the WMATA Representative when changes to equipment are made and submit an updated list of equipment and instruments.
- C. Electronic distance measuring instruments: All measurements, computations, and results from the required calibration exercise.
- D. Procedures for Control Surveys, Structural As-built Surveys, Movement Detection Surveys, Early Alignment As-built Surveys, and Hi-Lo Surveys, Post Construction Alignment As-built Surveys and Final Trackway Monumentation Surveys.
- E. Horizontal and vertical trackway alignment revisions with supporting calculations and data.
- F. Supporting documents, calculations, and data for required remedial actions.

- G. Numbering sequence for trackway vertical control monumentation.
- H. Log of layout control work. Record deviations from required lines and levels.
- I. Survey data reduction and calculations for Price Schedule items of work.
- J. Post construction Monument Record Sheets.

1.05 QUALITY ASSURANCE

- A. Verify and maintain records to document personnel certification; equipment maintenance, calibration, and adjustment; and use of required procedures for field work and office computations. These records shall be maintained by the surveyor in responsible charge of the Work. Verification of compliance shall be included in the Design-Builder's overall Quality Assurance program and provided to the WMATA Representative quarterly or upon request.
- B. Survey Personnel
 - 1. Ensure that all personnel are qualified to perform the Work.
 - 2. Provide a Survey Manager to plan, execute, and verify all survey work (or survey work as established by the WMATA Representative).
 - 3. All personnel performing or assisting in survey activities, including construction layout, shall be Certified Survey Technicians (CST) by and through the National Society of Professional Surveyors (NSPS) - American Congress on Surveying and Mapping (ACSM).
 - a. Each member of the Design-Builder's survey staff shall be certified in one or more of the Certified Survey Technician levels when assigned to a WMATA project. There are four levels of certification in the CST program. Certification is by experience and examination. Refer to NSPS Figure 1.05-1 for the levels of the CST Program.
 - b. The Authority will accept registration as a Land Surveyor or Property Line Surveyor, in Virginia, Maryland, or the District of Columbia in lieu of CST certification.
 - c. Survey consultants hired by the Design-Builder to provide survey services are bound by the same CST requirements contained in the D1 Specs.
 - d. Surveyors working under the direction of a Licensed Surveyor or Property Line Surveyor are not exempt from the CST requirement.
 - e. Use of craft personnel as substitute for temporary survey staff is not acceptable unless they are a Certified Survey Technician.
 - f. With concurrence by the WMATA Representative and WMATA Quality Assurance Manager, a Design-Builder's surveyor without CST certification may temporarily work on a WMATA contract prior to taking the CST exam, if the surveyor:
 - 1) Fulfills the minimum education and or experience requirements for the position held as described in the CST Program Book.
 - 2) Submits a copy of the CST application to the WMATA Representative along with other documentation of education and or work experience.
 - 3) Is scheduled to take the next available CST exam.
 - 4) Requests in writing, a temporary waiver of the CST requirement pending the outcome of the results of the CST exam with the understanding that failure to pass the CST exam will result in said surveyor's removal from the WMATA Contract.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

- A. The Authority has established, or will establish, such general reference points including horizontal control points and vertical benchmarks as will enable the Design-Builder to proceed with the Work. If the Design-Builder finds that previously established reference points have been destroyed or displaced, or that none have been established, it shall promptly notify the WMATA Representative.
- B. The Design-Builder shall lay out its work from reference points established by previous construction or from established reference points shown in the approved design documents, if applicable, and shall be responsible for all measurements in connection therewith. The Design-Builder shall furnish stakes, templates, platforms, equipment, tools, materials, and labor as may be required in laying out any part of the Work from the reference points established by previous construction or by the Authority. The Design-Builder will be held responsible for the execution of the Work to such lines and grades as directed.
- C. Protect and preserve the established reference points and shall make no changes in locations without approval by the Authority. Reference points lost, disturbed by construction, destroyed, or which require shifting because of necessary changes in grades or locations shall, subject to prior approval, be replaced and accurately located at the Design-Builder's expense by a registered surveyor in the area where the Work is to be performed or a qualified certified survey technician (CST Level IV). Reference points replaced by the Design-Builder's surveyor shall be done in accordance with the FGCC Standards and Specifications for Geodetic Control Networks using First Order, Class 1 specifications for horizontal control work and Second Order, Class 1 specifications for vertical control work.
- D. For the purpose of this Section, the Design-Builder shall provide competent engineering services as necessary to execute the Work. It shall verify the dimensions shown before undertaking construction work and shall be responsible for the accuracy of the finished Work.

3.02 EXAMINATION

- A. General: Dimensions shown on existing work and dimensions required for work that is to connect with work not in place shall be verified by the Design-Builder by actual measurement of the existing work. Discrepancies between the approved design documents and the existing conditions shall be referred to the WMATA Representative before work affected thereby has been performed.
 - 1. The Design-Builder shall compare drawings and verify the dimensions before laying out the Work and shall be responsible for errors which might have been avoided thereby.
 - 2. Dimensions and descriptions given on the approved design documents for adjacent work shall be verified by the Design-Builder. It is the responsibility of the Design-Builder to verify all as-built conditions and interface information by actual field measurement.
- B. Existing Conditions: The existence and location of site improvements, utilities, both underground and above ground, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work. Call Miss Utility at 1-(800) 257-7777 before beginning any excavation or demolition project.

1. Before construction, verify the location and points of connection of utility services and the locations and invert elevations at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project Site.
- C. Acceptance of Conditions: In accordance with Section 01 77 50, CLOSEOUT.

3.03 PREPARATION

- A. Existing Utility Information: Furnish information to local Utility and the Arlington County Project Officer that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate and obtain approval from authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Authority or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
1. Notify the WMATA Representative and Utility representative not less than five working days in advance of proposed utility interruptions.
 2. Do not proceed with utility interruptions without written permission from the Utility and the Authority.
- C. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Design Drawings.
- E. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the approved design documents, submit a Request for Information to the WMATA Representative. Include a detailed description of the problem encountered, together with recommendations for changing the approved design documents.

3.04 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on the Issue for Construction Drawings. If discrepancies are discovered, notify WMATA Representative promptly.
- B. General: Engage qualified Certified Survey Technician(s) to lay out the Work using accepted surveying practices.
1. Establish benchmarks and control points to set lines and levels at each stage of construction and elsewhere as needed to locate each element of the Project.
 2. Establish dimensions within tolerances indicated. Do not scale Issue for Construction Drawings to obtain required dimensions.
 3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level, and plumb, of every major element as the Work progresses.

5. Notify the Arlington County Contracting Officer Representative and WMATA representative when deviations from required lines and levels exceed allowable tolerances.
 6. Close Site surveys with an error of closure equal to or less than the standard established or referenced herein.
- C. The tolerances generally applicable in setting survey stakes or marks shall be as set forth below. These tolerances shall not supersede stricter tolerances required by the Issue for Construction Drawings or Specifications and shall not otherwise relieve the Design-Builder of responsibility for measurements in compliance therewith. The tolerances listed below are not to be used for setting or re-establishing primary and secondary control markers or final alignment monumentation.
1. Tolerances: Tolerances in setting survey stakes or markers shall not exceed the following: those items below that apply to this project

Horizontal Survey Stakes or Markers	Distance	Tangent
Horizontal marks on hubs on centerline and offset centerlines.	1:35,000	0.02 ft.
Intermediate stakes or hubs on centerlines and offset centerlines.	1:35,000	0.02 ft.
Rough excavation and embankment for roads and other work not otherwise provided.	1:10,000	0.50 ft.
Trimming of excavation and embankment unless otherwise provided.	1:10,000	0.50 ft.
Structures-Building construction.	1:35,000	0.02 ft.
Trimming or preparation of earth subgrade for trackbeds, roadways, and concrete pipes.	1:20,000	0.04 ft.
Trackbed and roadway sub-base and base, steel pipe and other work not otherwise provided for.	1:20,000	0.04 ft.
Track invert and roadway surfacing, steel reinforcement, concrete pipe and other formed concrete.	1:35,000	0.02 ft.

Vertical Grade Stakes or Markers	Elevation (Plus/Minus)
Rough excavation and embankment for roads and other work not otherwise provided.	0.20 ft.
Trimming of excavation and embankment unless otherwise provided.	0.20 ft.
Structures-Building construction.	0.01 ft.
Trimming or preparation of earth sub-grade for trackbeds, roadways, concrete pipe and other concrete structures.	0.05 ft.
Trackbed and roadway sub-base and base, steel pipe and other work not otherwise provided for.	0.05 ft.
Track invert and roadway surfacing, steel reinforcement, concrete pipe and other formed concrete.	0.02 ft. (Track invert only minus 0.00 ft. high, plus 0.04 ft. low)
Equipment Installation.	As required by manufacturer.

- D. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- E. Building Lines and Levels: Locate and lay out control lines and grades for structures, building foundations, column grids, and floor grades, including those required for mechanical and electrical work. Transfer survey reference line markings and elevations for use with control lines and grades. Level foundations and piers from two or more locations.

- F. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available to the WMATA Representative upon request.

3.05 FIELD ENGINEERING

- G. Identification: Authority will provide and identify existing benchmarks and control points to be used for the duration of the Contract.
- H. Reference Points: Locate existing and verify by field traverse permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent primary benchmarks, deep benchmarks, and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval by the WMATA Representative. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to the WMATA Representative before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- I. Benchmarks: Establish and maintain permanent secondary control points on Project Site, referenced to data established by survey control points. Comply with WMATA Standard Drawing for Survey Monuments.
1. Record benchmark locations, with horizontal and vertical data, on record copy of Issued for Construction Drawings.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.06 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level unless otherwise specified.
- B. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for uniform spacing.
- C. The Design-Builder's surveys are a part of the Work and may be checked by the Authority at any time. The Design-Builder shall be responsible for lines, grades, or measurements which do not comply with specified or proper tolerances, or which are otherwise defective, and for any resultant defects in the Work. The Design-Builder will be required to conduct re-surveys or check surveys to correct errors indicated by review of the Work.

3.07 SURVEY EQUIPMENT AND CALIBRATION REQUIREMENTS

- A. Survey Equipment: All electronic distance measuring instruments (or total station theodolites) shall be checked by the Design-Builder against a National Geodetic Survey (NGS) range of known distances at least once every 6 months.

1. All distance measurements shall be computed using the procedures in NOS NGS-10, Use of Calibration Base Lines. The actual measurements shall be recorded, atmospheric corrections applied, and then adjusted by least squares to compute a constant, as well as, a relative correction factor (scale correction).
2. National Geodetic Survey has established specific calibration baselines for the purpose of comparing survey equipment to known monumentation to verify the instruments vertical angles, horizontal angles, and difference in elevation for compliance with the manufacturer's specifications. Verification of angle measurement and difference in elevation shall only be done by the Design-Builder if all other methods of verification acceptable to the Authority have been exhausted.
3. Bring each electronic distance meter (EDM) or total station theodolite to the Corbin, VA Geo-magnetic observatory (phone 703-373-7605) or similar NGS facility and compare their instrument(s) to known NGS values whenever there is any question as to the correct operation, accuracy and functionality of the Design-Builder's survey equipment. Minimally, this will be done every 6 months or after a damaged instrument has been repaired and before it is put back in service. The Design-Builder shall supply the WMATA Representative with all appropriate documentation from this exercise.
4. All total station distance measuring devices and prisms shall be serviced every 6 months and checked frequently over lines of known distances. Generally, this exercise shall be conducted in the spring and fall.
5. Results of this calibration exercise shall be forwarded to the Authority. Correction factors shall be posted in the Design-Builder's office computing area and applied as required to maintain the desired accuracy.
6. Adjustment and certification documents from a supplier or manufacturer are not allowed as a substitution for the distance calibration exercise at a NGS or similar facility.
7. Records of instrument calibration and adjustment shall be maintained as a part of the Design-Builder's quality control program.
8. Use of the NGS baseline for checking distances is not intended to take the place of normal maintenance, cleaning, and adjustment of the Design-Builder's instruments.
9. Every 6 months, or whenever the difference between direct and reverse readings of the theodolite depart from 180 degrees by more than 30 seconds, the instrument shall be adjusted for collimation error. Readjustment of the crosshairs and level bubble shall be done whenever their mis-adjustments affect the instrument reading by the amount of the least count.
10. Instruments found to be in disrepair or out of adjustment shall be removed and repaired or replaced.
11. All steel tapes shall be compared with the Design-Builder's EDM at least every 6 months. The Design-Builder shall number all tapes and measuring chains, record comparisons, compute correction factors, and forward to the Authority upon request or whenever equipment is changed. In addition, tape correction information shall be posted in the Design-Builder's office computing area and applied as required to maintain the desired accuracy.
12. Provide and maintain the ability in-house to check and adjust all tribrachs for eccentricity. Adjustment checks shall be made weekly or as necessary. A record of adjustments to all tribrachs shall be kept current and made available to the Authority monthly or upon request. Each tribrach shall be numbered and tagged with the date of the last adjustment.

3.08 SURVEY STANDARDS

- A. Maintain accuracy standards for all control surveys performed under the terms of this Contract in accordance with the following table:

Primary horizontal control surveys	First order
Primary vertical control surveys	Second order, Class I
Secondary horizontal control surveys	Second order, Class I
Secondary vertical control surveys	Second order, Class II

1. Primary control is defined as the original control provided to the Design-Builder at the start of the Contract. Secondary control is defined as the control established and used by the Design-Builder during construction. All secondary control traverse stations shall be set with permanent markers.
2. Control surveys and computations including surveys of main control lines to determine alignment of major structure components shall be performed in accordance with Second Order Class I requirements.
3. Unless specified, the Design-Builder will not be required to perform First-Order survey work unless Design-Builder destroys primary control points included in the Contract Documents or set by WMATA after Contract NTP. GPS shall not be used by the Design-Builder to re-establish destroyed primary control unless approved by the WMATA Representative.
4. The Design-Builder should expect all primary or secondary horizontal control traverses they perform to meet a 1:50,000 distance accuracy closure. All vertical control traverses shall have a closure accuracy that does not fall below that specified for Second Order, Class II surveys.
5. Survey procedures and accuracy are a function of the types of survey that is being performed. The Design-Builder is responsible for ensuring the use of proper procedures to maintain accuracy requirements contained in the Contract.
6. Use the closed traverse method in setting controls by starting at and ending at known or previously established traverse stations and benchmarks.
7. All distances over 100 feet shall be measured by the use of electronic distance measuring instrument (EDMI). Critical distances under 100 feet shall be checked with a distance meter.

B. Horizontal Traverse

1. Conventional traverse work shall be performed in accordance with the requirements defined in the FGCC Standards and Specifications for Geodetic Control Networks, Federal Geodetic Control Committee.
2. All survey field data shall be provided to the Authority upon request in a Star*Net digital input file format.
 - a. All reduced horizontal traverse measurements shall be provided in a set reduction report in an ASCII text file format which clearly lists the following data:
 - 1) Individual observations in an orderly format along with the mean angle from each direct and reverse observation.
 - 2) Horizontal angle mean, vertical angle mean and slope distance mean for each set of observations.
 - 3) Standard deviation of the observations, and maximum, minimum, range and collimation error for each set of observations. Refer to Figure 3.08-1 for a sample set reduction report.

3. Accuracy requirements:

a. First Order control surveys:

- 1) Horizontal and vertical angle circle reading observation accuracy (standard deviation) of 0.5 seconds (DIN 18723) and read to 0.1 of a second.
- 2) Occupied station centering (eccentricity) accuracy of 1 mm.
- 3) Electronic distances measuring accuracy (standard deviation) of 1 mm plus or minus 1 ppm and read to 0.001 feet.

b. Second Order control surveys:

- 1) Horizontal and vertical angle circle reading observation accuracy (standard deviation) of 1.0 second (DIN 18723) and read to 1.0 second or less if possible.
- 2) Occupied station centering (eccentricity) accuracy of 1 mm.
- 3) Electronic distances measuring accuracy (standard deviation) of 2 mm plus or minus 2 ppm and read to 0.001 feet.
- 4) All horizontal traverse adjustments shall be performed using a minimally constrained Least Squares adjustment method which will produce the following output:
 - a. Summary of unadjusted input observations
 - b. Statistical summary
 - c. Chi Square test
 - d. Adjusted observations and residuals
 - e. Residual summary
 - f. Adjusted bearings and horizontal distances (grid and ground)
 - g. Horizontal unadjusted traverse closures
 - h. Adjusted coordinates
 - i. Convergence angles and grid factors at stations
 - j. Standard deviations, error propagation and error ellipses
- 5) All horizontal traverse adjustment results shall be provided to the Authority upon request.

C. Vertical Traverse

3. Differential leveling shall be performed in accordance with the requirements for Second-Order, Class I geodetic leveling surveys as defined in the Standards and Specifications for Geodetic Control Networks, Federal Geodetic Control Committee (FGCC), and NOAA Manual NOS NGS 3 Geodetic Leveling, National Geodetic Survey (NGS).
 - a. The survey Subcontractor shall provide documentation of staff calibration, which includes certificates for expansion coefficient and length calibration.
4. All reduced vertical traverse data shall be provided to the Authority upon request in a Star*Net-Lev digital input file format.
 - a. All vertical traverse data shall be provided as a data reduction report in an ASCII text file format, which clearly lists the following data:
 - 1) Individual observations with the point identifier,
 - 2) Distance from instrument to staff (rod) for each observation,

- 3) Backsight staff (rod) reading and foresight staff (rod) reading,
 - 4) Number of measurements taken and standard deviation per staff (rod) reading.
 - 5) Cumulative station differences.
5. Accuracy Requirements:
- a. Differential leveling observation accuracy (standard deviation) of 0.4 mm and read to 0.0001 feet.
6. The Design-Builder may use electronic digital levels and bar coded leveling staffs. The use of leveling staffs with ground plate (turning turtle) is required.
7. Use calibrated invar staffs (level rods) for all control work including final vertical monumentation installation.
8. Use semi-precise level rods or equal equipment for level work.
9. All vertical traverse adjustments shall be performed using a minimally constrained Least Squares adjustment method after a vertical traverse meets the minimum closure requirements referenced herein.
10. All vertical traverse adjustment results shall be provided to the Authority upon request.

3.09 SURVEYS AND PROCEDURES

A. Control Surveys

1. Verify Project primary control monumentation and provide adjustment computations to the Arlington County Project Officer.
2. Replace primary control monuments that have been destroyed or damaged and provide adjustment computations to the WMATA Representative.
 - a. Provide Monument Record Sheets to the WMATA Representative.
3. Establish secondary control monumentation along the Authority's construction project and provide adjustment computations to the WMATA Representative.
 - a. Horizontal and vertical control discs shall be installed in accordance with WMATA Standards.
 - b. Horizontal and vertical control discs set on direct fixation trackways shall be recessed to protect them from disturbance.
 - c. Provide Monument Record Sheets to the WMATA Representative.

B. Structural As-Builts

1. General Requirements: Structural as-builts are required to check for out-of-tolerance construction, which may impact other structures or compromise train clearances along the trackway.
 - a. All methods, equipment and procedures used by the Design-Builder to perform structural checks shall be approved by the Arlington County Project Officer and WMATA representative prior to commencement of the Work.
 - b. This survey data must be analyzed by the Design-Builder and the Authority for compliance with construction and rail tolerances.
 - c. This survey data must be analyzed by the Design-Builder and the Authority to determine what remedial action, if any, may be required to address out-of-tolerance construction and the impact of structural misalignment on the final placement of other structures and rail.

- 1) If the survey data reveals out-of-tolerance construction, which will impact the placement of other structures along the trackway, the Design-Builder shall take appropriate remedial action to comply with the Issued for Construction Drawings and Specifications.
 - a. If minimally out-of-tolerance, perform horizontal and vertical alignment revisions to minimize the impact of the misalignment on the future placement of adjoining structures and rail along the trackway.
 - b. If significantly out-of-tolerance and an acceptable alignment revision cannot be used to compensate for out-of-tolerance construction, then demolish and remove the structure and re-install.
 - 2) All alignment revisions and remedial actions shall be approved by the WMATA Representative prior to commencement of the Work.
2. Verify existing primary horizontal and vertical controls and re-establish, if destroyed or disturbed, and provide adjustment computations to the WMATA Representative.
 3. Provide Monument Record Sheets to the Arlington County Project Officer for submission to WMATA.
 4. Establish a secondary horizontal and vertical control system on the Authority's structures and reference to the approved project primary horizontal and vertical control system. The secondary control system established on or within trackway structures shall be used for detailed cross sections, Hi-Lo surveys and placement of final trackway monumentation. The secondary control system shall be adequately referenced so it can be readily recovered. Horizontal and vertical control discs shall be installed in accordance with WMATA standard.
 - a. Horizontal and vertical control discs set on direct fixation trackways shall be recessed to protect them from disturbance.
 - b. Provide Monument Record Sheets to the WMATA Representative.
 5. Verify structural concrete placement for compliance with Issued for Construction Drawings and Specifications and provide the final results to the WMATA Representative when requested.
- C. Post Construction Alignment As-built Surveys
1. General Requirements: Post construction alignment as-built surveys are required to check trackway structures for compliance with Issue for Construction Drawings and Specifications and to check for out-of-tolerance construction, which may impact train clearance tolerances.
 2. All methods, equipment, and procedures used by the Design-Builder to perform post construction alignment as-built surveys shall be approved by the WMATA Representative prior to commencement of the Work.
 - a. This survey data must be analyzed by the Design-Builder and the Authority for compliance with construction and rail tolerances.
 - b. This survey data must be analyzed by the Design-Builder and the Authority to determine what remedial action, if any, may be required to address out-of-tolerance construction and the impact of structural misalignment on the final placement of the rail.
 - 1) If the survey data reveals out-of-tolerance construction, which will impact the placement of other structures along the trackway, the Design-Builder shall take appropriate remedial action to comply with the plans and specifications.

- a. If minimally out-of-tolerance, perform horizontal and vertical alignment revisions to minimize the impact of the misalignment on the future placement of adjoining structures and rail along the trackway.
 - b. If significantly out-of-tolerance and an acceptable alignment revision cannot be used to compensate for out-of-tolerance construction, then demolish and remove the structure and re-install.
- 2) All alignment revisions and remedial actions shall be approved by the Arlington WMATA Representative prior to commencement of the Work.
3. Verify existing primary horizontal and vertical controls and re-establish, if destroyed or disturbed, and provide adjustment computations to the WMATA Representative for approval. Provide Monument Record Sheets to the WMATA Representative.
4. Establish a secondary horizontal and vertical control system on the Authority's structures and reference to the approved project primary horizontal and vertical control system. The secondary control system established on or within trackway structures shall be used for detailed as-built cross sections, hi-lo surveys, and placement of final trackway monumentation. The secondary control system shall be adequately referenced so it can be readily recovered.
 - a. Horizontal and vertical control discs shall be installed in accordance with WMATA Standards.
 - b. Horizontal and vertical control discs set on direct fixation trackways shall be recessed to protect them from disturbance.
 - c. Provide Monument Record Sheets to the Arlington County Project Officer for record to WMATA.
5. Provide a report to the Arlington County Project Officer comparing the as-built location of the structure to the plan location as well as the theoretical dynamic outline of the train along the tunnels, retained areas, and aerial structures.
 - a. These cross sections must show computed clearances between the as-built location of the structure as well as the theoretical dynamic outline of the train.
 - b. This data must be analyzed by the Design-Builder and the Authority for compliance with construction and train clearance tolerances.
 - c. This data must be analyzed by the Design-Builder and the Authority to determine what remedial action, if any, may be required to address out-of-tolerance construction and the impact of structural misalignment on the final placement of the tracks.
6. Install and reference all permanent, secondary, and final monumentation required for construction, trackwork, and other systemwide facilities.
 - a. Provide Monument Record Sheets to the WMATA Representative.
7. Coordinate the post construction alignment as-built survey work with the WMATA Representative.

3.10 FIGURES AND REPORT FORMATS

Figure 1.05-1

Levels of the Certified Survey Technician Program

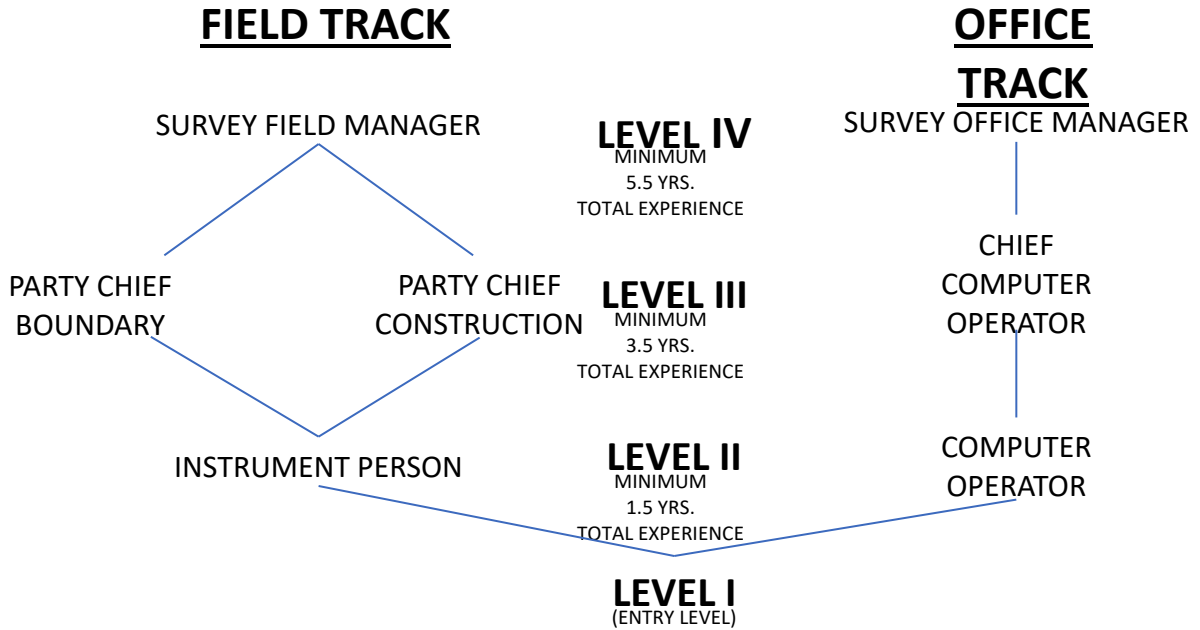


Figure 3.08-1

TRAVERSE SET REDUCTION

PR: METRO2.PRJ DT: 05/01/01 ID: METRO CENTER NM: TRAVERSE

Occupied Station: Pt. No. 101, A-101 METRO B/D
Backsight: Pt. No. 100, A-100 METRO B/D
Foresight: Pt. No. 102, A-102 METRO B/D

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

HORIZONTAL ANGLE REDUCTION

Set Rejection Criterion: Deviation from Mean greater than 3 inches

Set No.	Face	Backsight	Foresight	Horiz. Angle	Mean Dev.
1	1	0-00-00.0	191-05-13.0		
	2	180-00-01.0	11-05-12.4		
	Mean	0-00-00.50	191-05-12.70	191-05-12.20	0-00-01.03
2	1	359-59-59.6	191-05-14.0		
	2	180-00-01.0	11-05-12.1		
	Mean	0-00-00.30	191-05-13.05	191-05-12.75	0-00-00.48
3	1	359-59-59.5	191-05-13.0		
	2	179-59-59.8	11-05-12.2		
	Mean	359-59-59.65	191-05-12.60	191-05-12.95	0-00-00.27
4	1	359-59-57.2	191-05-13.1		
	2	179-59-59.7	11-05-13.8		
	Mean	359-59-58.45	191-05-13.45	191-05-15.00	- 0-00-01.78

Mean Horiz. Angle: 191-05-13.23

Std. Deviation (obs): 0-00-01.23

Std. Deviation (mean): 0-00-00.61

Maximum: 191-05-15.00

Minimum: 191-05-12.20

Range: 0-00-02.80

Collimation Error: 0-00-02.5

BACKSIGHT ZENITH/SLOPE DISTANCE REDUCTION

Zenith Rejection Criterion: Deviation from Mean greater than 5 inches

Slope Distance Rejection Criterion: Deviation from Mean greater than 0.01 feet

Set No.	Face	Zenith	Mean Dev.	Slope Distance	Mean Dev.
5	1	90-27-40.6		215.316	
	2	269-32-20.3		215.316	
	Mean	90-27-40.15	0-00-00.08	215.316	0.00
6	1	90-27-41.7		215.316	
	2	269-32-20.5		215.316	
	Mean	90-27-40.60	0-00-00.53	215.316	0.00
7	1	90-27-40.4		215.316	
	2	269-32-21.5		215.316	
	Mean	90-27-39.45	0-00-00.61	215.316	0.00

Mean Zenith Angle: 90-27-40.07

Std. Deviation (obs): 0-00-00.57

Std. Deviation (mean): 0-00-00.33

Maximum: 90-27-40.60

Minimum: 90-27-39.45

Mean Slope Distance : 215.316

Std. Deviation (obs): 0.000

Std. Deviation (mean): 0.000

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

Range: 0-00-01.15
Collimation Error: 0-00-02.2

FORESIGHT ZENITH/SLOPE DISTANCE REDUCTION

Zenith Rejection Criterion: Deviation from Mean greater than 5 inches
Slope Distance Rejection Criterion: Deviation from Mean greater than 0.01 feet

Set No.	Face	Zenith	Mean Dev.	Slope Distance	Mean Dev.
5	1	89-29-50.9		275.692	
	2	270-30-10.5		275.691	
	Mean	89-29-50.20	0-00-01.01	275.692	0.00
6	1	89-29-52.1		275.692	
	2	270-30-09.3		275.691	
	Mean	89-29-51.40	0-00-00.18	275.692	0.00
7	1	89-29-52.6		275.692	
	2	270-30-08.5		275.691	
	Mean	89-29-52.05	0-00-00.83	275.692	0.00

END OF SECTION

SECTION 01 72 30 - PROTECTION OF ADJACENT CONSTRUCTION

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the appropriate methods for protection of adjacent construction when performing installations and improvements in and around existing facilities.

1.02 PROTECTION OF EXISTING SURFACES

- A. Existing surfaces shall be carefully protected during construction operations under this Contract to avoid damaging existing surfaces.
 - 1. Existing surfaces shall be protected by the Design-Builder from all possible damages including chipping, staining, and corroding during performance of the Work.
 - 2. If damage occurs, the Design-Builder shall repair or replace to match original undisturbed conditions.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 73 10 - CUTTING AND PATCHING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section specifies the appropriate methods for performing cutting and patching when installations occur in existing facilities or for improvements including selective demolition, salvaging of materials and equipment, and restoring of pavement and other surfaces and improved areas from damage caused by the Design-Builder's operations.

1.02 SUBMITTALS

- A. Written Request: Submit a written request for approval by the Arlington County Project Officer and WMATA where impacted prior to cutting and patching. A written request is required for any cutting or alteration, which affects:
1. The work of the Authority or any separate contractor,
 2. The structural value or integrity of any element of the Project,
 3. The integrity or effectiveness of weather exposed or moisture-resistant elements or systems,
 4. Building aesthetic qualities for exterior areas or in occupied spaces, or
 5. The efficiency, operation life, maintenance, or safety of operational systems.
- B. Cutting and Patching Proposal: Include in written request the following:
1. Describe the extent of cutting and patching required. Show how it will be performed and indicate why it cannot be avoided.
 2. Describe anticipated results in terms of changes to existing construction. Include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
 3. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.
- C. Structural Elements: Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure to satisfy requirements.
- D. Should conditions of work or schedule indicate change of materials or methods, submit written recommendations to the WMATA Representative, including:
1. Conditions indicating change,
 2. Recommendations for alternative materials or methods, and
 3. Resubmittal as required for substitution.
- E. Approval by the WMATA Representative to proceed with cutting and patching work does not waive the Authority's right to later require complete removal and replacement of any part of the Work found to be unsatisfactory.

1.03 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load carrying capacity or load deflection ratio. Obtain prior approval from the WMATA Representative of the cutting and patching procedures proposed.
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operational life or safety. Obtain prior approval from the WMATA Representative of the cutting and patching procedures proposed.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the WMATA Representative's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching.
 - 1. If possible, retain the original installer or fabricator to cut and patch exposed Work. If it is impossible to engage the original installer or fabricator, engage another recognized experienced and specialized firm.
 - 2. Remove and replace construction cut and patched in a visually unsatisfactory manner.

1.04 EMBEDDED ITEMS

- A. When reinforcing steel, conduit or other items embedded in the concrete are encountered in a drilling or coring operation, the operation shall be stopped and the WMATA Representative immediately notified. Determine whether the embedded item may be cut through and if determined to be permissible, obtain WMATA Representative's concurrence before doing so. If it is not permissible to cut through the embedded item, holes shall be drilled in another location and the original holes patched as directed by WMATA Representative.

1.05 PAVEMENT AND IMPROVED AREAS RESTORATION

- A. As applicable, secure permits from the Jurisdictional Authority for all pavement restoration within the limits of said Jurisdictional Authority. Submit Working Drawings of such pavement restoration prepared in accordance with the requirements of the Issued for Construction Drawings, Issued for Construction Specifications, and the Jurisdictional Authority to the Jurisdictional Authority for approval.
- B. During construction operations on this Contract, certain areas currently grassed, landscaped, or otherwise improved may be disturbed or damaged. Restore such areas as specified in Section 00 73 60, Protection of Existing Vegetation, Structures, Utilities and Improvements.
- C. Existing surfaces marred or damaged by operations under this Contract shall be repaired or replaced by the Design-Builder to the condition prior to being marred or damaged as approved by the WMATA Representative.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. General: Use materials identical to existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible if identical materials are unavailable or cannot be used, use materials whose installed performance will equal or surpass that of existing materials.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed before cutting. If unsafe or unsatisfactory conditions are encountered, take corrective action before proceeding.
- B. After uncovering work, inspect conditions affecting installation of new products. Report unsatisfactory or questionable conditions to the WMATA Representative in writing, and do not proceed with the Work until the WMATA Representative has provided further instruction.

3.02 PREPARATION PRIOR TO CUTTING AND PATCHING

- A. Temporary Support: Provide shoring, bracing, and support as required to maintain structural integrity of the affected portion of the Work.
- B. Protection: Protect existing equipment during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

3.03 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or elements adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
 - 1. In general, where cutting is required, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
 - 4. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated, or abandoned. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after bypassing and cutting.
- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
- D. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 - 1. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

2. Where removal of walls or partitions extends from one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
3. Where patching occurs within a smooth painted surface, apply a primer and second coat over the patched area and extend the final coat over the entire unbroken area containing the patch.
4. Patch, repair, or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

3.04 CLEANING

- A. General: Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Completely remove paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

END OF SECTION

SECTION 01 74 00 - CLEANING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes specifications for furnishing all labor, materials, equipment, and services, and performing all operations necessary for, and properly incidental to, cleanup during construction and final cleaning of the facilities and site prior to Acceptance by the Authority.

1.02 RELATED SECTIONS

- A. Division 16, Electrical, for conduit cleaning.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 CLEANUP DURING CONSTRUCTION

- A. Keep the entire Site in a neat and orderly condition at all times during construction. Conduct a general cleanup of the Site daily as a part of the Work. Provide daily cleanup and disposal service for removal of waste and rubbish from the jobsite. Clean material as necessary prior to incorporating into the Work.
- B. Dispose and recycle waste, trash, and debris in a safe, acceptable manner, in accordance with applicable laws and ordinances and as prescribed by Jurisdictional Authorities. Bury no waste material and debris on the Site. Burning of trash and debris on the Site is prohibited.
- C. Provide daily litter pickup within Project limits. Provide adequate number of trash receptacles for worker's lunches, cigarette butts, and other miscellaneous garbage.

3.02 FINAL CLEANING OF FACILITIES

- A. Prior to final inspection by the Arlington County Project Officer, and after all construction work is essentially complete, thoroughly clean facilities utilizing professional facility cleaners. WMATA shall be included in any all acceptance of WMATA permanent facilities.
- B. Items to be cleaned include, but are not limited to, all glass, doors, opening frames, grilles, trim, exposed non-ferrous metal surfaces, floor coverings, light fixtures and plates, plumbing fixtures and trim, and all finish surfaces throughout the construction.
- C. Vacuum-clean where appropriate and remove all spots, smears, dust, debris, hand prints, and defacements of every sort, including those of vandals. Use commercial cleaning compounds where necessary.
- D. Follow the recommendations of the manufacturers of the materials and items to be cleaned for all cleaning, polishing, and treatment such as waxing or sealing.

3.03 FINAL SITE CLEANUP

- A. Prior to final inspection, thoroughly clean the entire Site so it is in a neat, acceptable condition. Remove from the entire Site all construction equipment and facilities, construction waste and

unused materials, dunnage, loose rock and stones, excess earth, and debris of any description resulting from the Work.

- B. Hose down and scrub clean where necessary all pavement and paved walks.
- C. Thoroughly remove mortar droppings from concrete slabs and pavement. Hose down and scrub clean all concrete flatwork and exposed vertical surfaces of concrete and masonry. Clean all rail surfaces, special trackwork, track drains, handholes, and manholes.
- D. All drainage systems shall be free and clear. All drainage systems and sewers shall be pressure cleaned and inspected, and all catch basins and sumps shall be cleaned.
- E. All conduits shall be cleaned and openings protected as specified in Division 16, Electrical.
- F. All spare material shall be delivered to the Authority.

END OF SECTION

SECTION 01 77 50 - CLOSEOUT

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes specifications for performing all operations necessary for and incidental to closing out the Contract and assisting in the Authority's final inspection.
- B. This Section includes procedures for closeout submittals including the following:
 - 1. Operation and maintenance manuals;
 - 2. As-Built Drawings and Specifications;
 - 3. Spare parts list, delivery information, and distribution of spare parts;
 - 4. Configuration management system;
 - 5. Training manual, lesson plans, and student's training manual and electronic media of such, as applicable;
 - 6. Survey record log;
 - 7. Correspondence file;
 - 8. Releases;
 - 9. Vouchers;
 - 10. Records for design, inspection, testing or other quality elements;
 - 11. Request for final payment;
 - 12. Certifications, affidavits, and warranties and guarantees; and
 - 13. Correction of deficiencies submittals as applicable.
- C. This Section establishes required actions by the Design-Builder for facility systems and subsystems commissioning that include the preparation of an asset database, the preparation of preventive maintenance instructions, and labeling and packaging of spare parts.

1.02 NOT USED

1.03 CLOSEOUT SCHEDULE AND PROCEDURE

- A. Changes from Original Conditions:
 - 1. Upon completion of the Work and prior to Substantial Completion, the Design-Builder shall examine each property to determine changes from the original conditions established by the preconstruction inspection, and Section 01 71 10, ACCEPTANCE OF CONDITIONS, and shall furnish a written description to the WMATA Representative of measures taken to correct damage that may have resulted from performance of this Contract, and shall obtain a written release from each owner accepting condition of the building or structure, corrections, or both, thereby relinquishing any claim against the Design-Builder. In the event any owner refuses to furnish a release of claims, the Design-Builder shall notify the WMATA Representative in writing.
 - 2. The Authority will not assume responsibility for alleged damages arising from the Work performed under this Contract.

B. Requirements Preparatory to Final Inspection by the Authority:

1. Notify the Arlington County Project Officer to perform a preliminary final inspection for the purpose of determining the state of completion of the Work. Notify the WMATA Representative at least 14 Days in advance of requested inspection. The Arlington County QAM will perform the inspection within 3 working days of the requested date. From the information gathered from this inspection, the Arlington County Project Officer, in coordination with WMATA, will prepare a Punch List of work to be performed, corrected, or completed before the Work will be accepted. All work on the Punch List shall be completed by the Design-Builder prior to final inspection.
2. Temporary facilities, except as may be required during Punch List work, shall be removed from the Site.
3. Clean the Site and all applicable appurtenances and improvements as specified in Section 01 74 00, CLEANING.
4. Properly mount operating instructions for equipment and post as specified or required.

C. Final Inspection by the Authority:

1. After all requirements preparatory to the final inspection have been completed as hereinbefore specified, notify the Arlington County Project Officer to perform the final inspection. Arlington County Project Officer will in turn inform WMATA. Notice shall be given at least 14 Days in advance of the time the Work will be available for final inspection. The Arlington County Project Officer, with supporting WMATA staff will perform the inspection within 3 working days of the requested date.
2. Design-Builder or its principal superintendent, authorized to act on behalf of the Design-Builder, shall accompany the Arlington County Project Officer and WMATA on the final inspection, as well as any principal Subcontractors that the Arlington County Project Officer may request to be present.
3. If the Work has been completed in accordance with the Contract and Issued for Construction Documents, and no further corrective measures are required, the Arlington County Project Officer, with WMATA concurrence, will accept the Work and will issue a Certificate of Completion as evidence of acceptance.
4. If the Work has been substantially completed in accordance with the Contract and "Issued for Construction" Documents, and the Work can be used for its intended purpose with only minor corrective measures required, the Arlington County Project Officer and WMATA Project Representative will conditionally accept the Work and will issue a Certificate of Substantial Completion based upon the Design-Builder's assurance that corrective measures will be completed within the shortest practicable time. A fixed schedule for such corrective measures shall be submitted to the Arlington County Project Officer and reviewed by WMATA for approval.
5. If the Work has not been substantially completed in accordance with the Contract and Issued for Construction Documents, and several or many corrective measures are still required, the Arlington County Project Officer will not issue a Certificate of Substantial Completion. Instead, a new Punch List will be prepared based on the information gathered from the final inspection, and the Design-Builder will be required to complete this work and then call for another final inspection, following the procedure outlined above.

D. Asset and Parts Database:

1. Prepare a database listing each system and subsystem asset with attribute data as identified on the Asset Data Induction Spreadsheet to include, but not limited to, the asset name, asset location, manufacturer name and contact information, model number, serial number, expected useful life, warranty period with start and end date, digital link to warranty

documentation and Operation and Maintenance Manual in the project's Procore site, spare parts provided for the asset, and special tools required to perform asset maintenance.

2. The asset data induction template is included and located in Asset Item Induction Spreadsheet (to be provided by WMATA) for the Design-Builder's guidance in preparing the asset database.

E. Preventive Maintenance Instructions:

1. Prepare preventive maintenance instructions for each asset, including asset name, asset location, manufacturer name, model number, serial number, maintenance instructions for each asset and each scheduled maintenance based on requirements of the associated Operations and Maintenance Manual, and identification of special test equipment required to test the asset subsequent to performing maintenance.
2. Sample preventive maintenance instructions (to be provided by WMATA) for the Design-Builder's guidance in preparing the preventive maintenance instructions.

1.04 SUBMITTALS

- A. Make all submittals in accordance with Section 01 33 00, SUBMITTAL PROCEDURES and as specified below.

B. Operation and Maintenance:

1. Furnish manuals for individual equipment as well as systems as required by the Contract Documents. Systems consist of a set of equipment (multiple equipment) working together to perform a function. Data copy included from standard catalogs shall be edited to reflect only conditions pertinent to this Contract.
2. Data copy shall be suitable for dry-copy reproduction on standard office copy machines.
3. Hard copy manuals shall be prepared using the following materials:
 - a. Binder:
 - 1) One of the following:
 - a. Loose-leaf; three-ring with elliptical rings; stiff cover with covering resistant to oil, water, and wear; reinforced hinges; label holder on spine; mechanical device to open, close and lock rings; and sheet lifters. Size for 8-1/2-inch by 11-inch paper, 3-inch maximum capacity.
 - b. Loose-leaf three-post binder conforming to FS UU-B-320, Type II, Class 2, with covering resistant to oil, water, and wear; label holder on spine; size for 8-1/2-inch by 11-inch paper; capacity as required, 4-inch maximum thickness.
 - 2) When the assembled data exceeds the capacity of one binder, provide additional binders as necessary.
 - b. Pages:
 - 1) Originals: White, 60-pound bond with plastic-reinforced binding edge.
 - 2) Catalog data: Offset-printed copy on white paper, with plastic-reinforced edge.
 - 3) Standard: 8-1/2 inches by 11 inches.
 - 4) Fold-out: 11 inches by 8-1/2 inches for binding portion of page plus 7-1/2 inches for each additional portion of folded page; title and page number visible without unfolding. Provide a filler at the binding edge of fold-out pages, equal in thickness to the folded portion.

- 5) Holes punched for standard three-ring binder.
 - 6) Consecutively numbered.
4. Electronic Copies shall accompany the paper copies of all submittals of all manuals. These electronic copies shall be submitted in an editable, non-copyrighted Microsoft Office format. There shall be two electronic copies per submitted manual delivered one each to the programs office and to the applicable training department.
 5. Manuals shall include the following data:
 - a. Table of contents.
 - b. Design-Builder's name, address and telephone number, with similar data for its 24-hour service organization.
 - c. Manufacturer's name, address and telephone number, with similar data for its local representative, distributor, and service agency.
 - d. Catalog, model, and serial number of equipment installed. Include WMATA unit numbers where applicable.
 - e. Description of equipment.
 - f. Detailed Theory of Operation of each system and subsystem to LRU. Theory of operation to include Sequence of Operation.
 - g. Troubleshooting and Diagnostic Procedures for each piece of equipment delivered to LRU
 - h. Block Diagrams and Schematics of equipment as installed. For Mechanical systems provide a Piping and Instrumentation Diagram (P&ID) which shows the piping/ducting and related components of a physical process flow.
 - i. Software administrative procedures for data input, failure diagnosis and system restoration
 - j. Statement of warranty as specified.
 - k. Description of modification, servicing and repairs performed prior to start of warranty.
 - l. Dates warranty begins and expires.
 - m. Standard starting, stopping and operating procedures.
 - n. Emergency and special operating procedures.
 - o. Routine maintenance procedures.
 - p. Preventative Maintenance (PM) schedule (monthly and annually) which includes Servicing and lubrication schedule. Standard format for PM procedure/schedule to be provided by WMATA.
 - q. Manufacturer's printed operating and maintenance instructions, manufacturer's parts list, illustrations, and diagrams.
 - r. O&M data.
 - s. One copy of each wiring diagram to identify all wire IDs/labels including field connections.
 - t. List of spare parts, prices and recommended stock quantities for routine maintenance of the equipment for 1 year and list of spare parts that are considered critical and for which extended time frames for acquisition would create undesirable down-time for equipment.

- u. List of special tools required to perform inspection, adjustment, maintenance, and repair. Special tools are those developed to perform a unique function related to the particular equipment and not available from commercial sources.
 - v. Copy of each approved Shop Drawing of equipment and system. Include drawings which show outline dimensions, weights, and assembly data. Do not include drawings which show manufacturing details.
6. Manuals submittal schedule:
- a. Four copies of sample formats and outlines of contents in draft form 120 Days prior to the time scheduled for operation inspection, testing, or acceptance of the equipment.
 - b. Four copies of complete manual in final form 45 Days prior to the time scheduled for operation inspection, testing, or acceptance of the equipment.
 - c. Four bound sets and electronic media of approved manual before the time scheduled for operation inspection, testing, or acceptance of the equipment.
 - 1) Electronic copy files shall be in latest version of Adobe (.PDF) file format. Files shall be submitted in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.
 - 2) Shop Drawings submitted with manuals shall be in AutoCAD (.DWG) file format. Line work shall be shown on designated layers in accordance with standard CAD layering guidelines as specified in the WMATA CAD Manual. Images shall be clear, sharp, and readily legible.
 - 3) The Authority reserves the right to have any images, illustrations, diagrams, and drawings resubmitted until the WMATA Representative approves their legibility.
 - d. In addition to the other requirements of this Section, if manufacturer's hardcopy illustrations, diagrams, and drawings are also used in the preparation of Operation and Maintenance manual illustrations, diagrams, and drawings, they shall also be furnished in Adobe (.PDF) file formats.
7. If operation and maintenance training is included in the Contract, provide to each trainee, hard and electronic copies of approved operation and maintenance manuals for this purpose as specified in Section 01 82 00, DEMONSTRATION AND TRAINING.
- C. As-Built Drawings and Specifications:
- 1. General:
 - a. As-Built drawings shall include Shop Drawings, Working Drawings, and field prepared drawings.
 - b. Maintain a hard copy drawing and specification record of as-built conditions on a set of Issued for Construction Drawings and Specifications as the Work progresses. The Issued for Construction Drawings and Specifications shall be kept current with all Modifications issued by the Authority. The hard copy drawing and specification record shall be maintained at the Design-Builder's field office. Periodic review of the completeness of the hard copy record will be conducted by the Authority as deemed necessary to ensure the record is kept up to date.
 - 2. As-Built Drawings:
 - a. Draft Deliverable: Submit to the Authority, for review and comment, separate sets of draft As-Built Drawings in both an AutoCAD (.DWG) file format and an Adobe (.PDF) file format (.PDF files shall be capable of printing full-size drawings.), in print quality black and white, with all fonts embedded. The latest versions of both file formats shall be used. All line work shall be shown in accordance with the WMATA CAD Manual. Images shall be clear, sharp, and readily legible. The Authority reserves the right to

have drawing(s) resubmitted until the WMATA Representative accepts the legibility of the drawing contained in the file. Submit one set of full-size and two sets of half-size black ink on white paper copies of draft As-Built Drawings for review and comment by the Authority in accordance with Section 01 33 00, SUBMITTAL PROCEDURES.

- b. Upon return of one set of full-size black ink on white paper copy of the draft As-Built Drawings with Authority comments, incorporate additions and corrections resulting from Authority review comments. Design-Builder shall direct specific attention, by annotation on resubmitted As-Built Drawings, to revisions other than the corrections requested by the WMATA Representative on previous submittals.
- c. Final Deliverable: By the date scheduled for receipt of final approved As-Built Drawing deliverables in the Contract Schedule, separate sets of As-Built Drawings in both an AutoCAD (.DWG) file format and an Adobe (.PDF) file format, in print quality black and white, with all fonts embedded. Submit one set of full-size and two sets of half-size black ink on white paper copies, produced from the Adobe file, to the WMATA Representative for review and Approval. If this submittal is found to be incomplete it will be returned to the Design-Builder with comments for re-submittal.
- d. The completed As-Built Drawings do not require the signature of the Engineer or Architect of Record. Each completed As-Built Drawing produced in Adobe (.PDF) electronic format shall have the signature of an officer of the Design-Builder's organization, certifying compliance with as-built conditions, using a stamp as follows:

AS-BUILT
I CERTIFY THAT THIS DRAWING
ACCURATELY DEPICTS THE WORK
CONSTRUCTED AS OF

(date)

(an officer of the Design-Builder)

Design-Builder's Name

3. As-Built Specifications:

- a. By the date scheduled for receipt of final approved As-Built Specification deliverables in the Contract Schedule, submit As-Built Specifications in both latest version of Word (.DOCX) file format and an Adobe (.PDF) file format, in print quality black and white. Submit two bound sets of black ink on white paper copies produced from the Adobe (.PDF) format to the WMATA Representative for review and acceptance in accordance with Section 01 33 00, SUBMITTAL PROCEDURES. The Word file format (.DOCX) does not require the professional seal or signature of the Engineer or Architect of Record. The Adobe (.PDF) file format will require the professional seal and signature of the Engineer or Architect of Record for all disciplines on the cover page. If this submittal is found to be incomplete it will be returned to the Design-Builder with comments for re-submittal.

D. As-Built Project Schedule:

- 1. Submit one electronic copy of the approved As-Built Project Schedule as required.

E. Spare Parts:

- 1. This Contract includes the requirement for spare parts, either specifically identified in the price schedule or to be identified later during the term of the Contract. Ensure that all spare parts required by this Contract are provided and delivered in accordance with the following paragraphs.

2. Submit to the Authority the one electronic copy of the list of required spare parts either specifically identified in the unit price schedule or later identified by the Authority in accordance with the Issued for Construction Specifications. The list provided by the Design-Builder shall include part name, model number, part number, serial number, stock number, component name, location for use, manufacturer's name and contact information, unit cost, quantity, available packaging, special storage and handling instructions, replacement schedule, and anticipated annual usage. In addition, the spare parts listing shall include the following additional information as appropriate:
 - a. Group the list by system and subsystem for inventory system identification. Include order and procurement information for subassemblies and components.
 - b. Correlate the required quantities with the reliability requirements and lead time considering the following classifications:
 - 1) Wear: Components which may be expected to require regular replacement under normal maintenance schedule and operations, such as mechanical parts subject to continuous operation within projected mean time between failure levels.
 - 2) Consumables or expendables: Components which are consumed, used up, destroyed, or upon failure, are otherwise made unusable for their intended purpose and are economically unrecoverable except for inherent scrap value.
 - 3) Recoverable or repairable: Components, which upon failure are capable of being repaired or remanufactured to a serviceable, operational condition and maintained available for use within their initial intended purpose. Such items shall be accounted for via appropriate asset records.
 - 4) Long lead: Components, which are not available on short notice from commercial distributors or within 48 hours from the manufacturer, such as specially made or selected components.
 - 5) Cross referencing: Where replacement components are common to more than one system or subsystem, include a cross reference and indexing system in the replacement components list.
 - 6) Non-unique parts: In all components lists, items which are not unique to the system and have been manufactured by others shall be identified by the manufacturer's name and part number, as well as by the Design-Builder's component number, if any.
3. Within 30 Days after the Design-Builder submits the required spare parts listing, the Authority will provide the Design-Builder with shipping instructions and with WMATA stock numbers for each item the Design-Builder is required to furnish. Spare parts shall be packaged such that parts for a particular asset or a particular facility are grouped together. The Design-Builder shall ship, within a 25-mile radius of the Project, the required parts to the designated points specified by the Authority and shall include the Contract number, manufacturer part number, quantity, unit price, and WMATA part number on the shipping document.
4. The identification of the individual manufacturer's part numbers shall be cross referenced to the assigned WMATA stock numbers by including a column with appropriate heading adjacent to the manufacturer's part numbers in any parts manual or listing provided in accordance with Article A.E.2 above.
5. Parts furnished in accordance with this provision shall not be used to satisfy replacement needs under any warranty provision of this Contract.
6. Spare parts shall be the same in all respects as their counterparts furnished as part of the assembled equipment to be delivered under the terms of this Contract.

7. Unless otherwise specified in this Contract, the spare parts shall be delivered at the same time as the counterpart equipment delivery. The spare parts shall be properly packaged or crated so as to prevent damage during shipment and long-term storage. The spare parts shall be labeled in accordance with the instructions contained in Article A.E.3 above.
- F. Asset Database:
1. Contractor shall provide asset and item information (to be finalized post contract award) in accordance with WMATA specifications.
 2. Asset data submitted by Design-Builder to be reviewed by WMATA and returned to Design-Builder for correction/clarification if applicable.
 3. Supplied templates are dynamic and may be subject to change dependent on project needs.
 4. Contractor shall submit all item data for the entire program in the format supplied (See Asset Item Induction Spreadsheet, to be provided by WMATA) for the items as provided by the COTR.
- G. Preventive Maintenance Instructions (PMI)
1. Submit equipment PMI (summarized O&M) in a format to be provided by the Contracting Officer.
- H. Releases and Vouchers:
1. As applicable, submit one original hard copy and electronic media, in Adobe (.PDF) file format, of releases and vouchers.
- I. Records for Design, Inspection, Testing and Other Quality Elements:
1. Submit one original hard copy and electronic media, in Adobe (.PDF) file format, of records for design, inspection, testing or other quality elements as more fully specified in Section 01 47 00, QUALITY MANAGEMENT SYSTEM.
- J. Correction of Deficiencies Submittals:
1. As applicable, submit original hard copy and electronic media, in Adobe (.PDF) file format, of Schedule of Deficiency Corrections, Recommendation for Corrective Actions, together with supporting information, Data and Reports applicable to any correction, and a Technical and Cost Proposal to amend the Contract to permit acceptance of the affected materials, equipment, systems, or subsystems as specified in Section 00 75 80, CORRECTION OF DEFICIENCIES.
- K. Certifications, Affidavits, and Warranties and Guarantees:
1. Required Affidavits, Certificates, Written Descriptions and Releases and Warranties and Guarantees provided by the Design-Builder; i.e., Certificates of Acceptance and Compliance, of System Safety and Security, of Substantial Completion, and of Final Payment; Written Description of measures taken to correct damage that may have resulted from performance of this Contract; Written Releases; Design-Builder's executed Affidavit of Payment of All Applicable Taxes and License Fees in connection with the Contract and Affidavit of Payment of Debts and Claims; Consent of Surety Company to Final Payment; Warranties and Guarantees as specified in Section 00 75 70, WARRANTY/GUARANTEES OF CONSTRUCTION, and Section 00 75 80, CORRECTION OF DEFICIENCIES, and various Sections of the specifications as applicable: Submit the original hard copy and one electronic copy in Adobe (.PDF) file format.

Washington Metropolitan Area Transit Authority
RFP PROJECT NUMBER/CA

Contract No. PROJECT NUMBER
Date: Issue Date

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 82 00 - DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.01 SUMMARY

- A. This Section includes the general requirements for operation and maintenance training for equipment and systems provided by the Design-Builder and the general requirements for a Project performance demonstration.

1.02 SUBMITTALS

- A. Submit in accordance with Section 01 33 00, SUBMITTAL PROCEDURES, the following at the times stated:
1. Training plan preliminary submittal: One electronic copy and one printed paper copy not later than 60 Days after commencement of construction work. Submittal shall include at a minimum:
 - a. Instructional outline: A complete, accurate, and detailed listing of topics to be addressed in the instructional program using the specified content list.
 - b. Specimens of instructional material to be used.
 - c. Descriptions of audio-visual material and equipment to be used.
 2. Training plan intermediate submittal: One electronic copy and one printed paper copy not later than 60 Days after approval of preliminary submittal.
 - a. All material submitted for preliminary submittal incorporating or resolving comments.
 - b. Complete instructional plans including audio-visual aids and descriptions of instructional techniques and procedures.
 3. Training plan final submittal: One electronic copy and one printed paper copy not later than 30 Days prior to scheduled date for operation inspection, testing, or acceptance of the equipment.
 - a. All material submitted for intermediate submittal incorporating or resolving comments.
 4. Training contract closeout submittal: As specified in Section 01 77 50, CLOSEOUT.
 5. Training instructor's qualifications.
 6. A complete set of all training manuals, handouts, aides and presentations, for instructor and student, shall be provided at the end of the vendor's first training class to each of the audience's training groups (two sets when there are two supporting training groups, etc.) in an approved, editable electronic format, and free from copyright restrictions.
 7. Printed copies of each student guide and student-learning materials (schematics, books of plans, etc., as determined useful) shall be prepared and bound by equipment's training provider. Provide one printed copy for each student to use during training and to keep after class completion
 8. Printed copies of the instructor's guide, student guide, presentation, and all supplemental training materials for each of the audience group's training instructors (not to exceed five copies), free from copyright restrictions, shall be provided at the end of the first vendor training session.
 9. Performance demonstration plan and procedures: submit for Approval as part of the final design review package but no later than 90 Days prior to first performance demonstration.
 10. Provide video documentation of demonstration and training classes.

1.03 OPERATION AND MAINTENANCE TRAINING

A. General:

1. Where specified, develop and conduct a program to train selected Authority personnel in the operation and maintenance of equipment and systems furnished.
2. Furnish instructors, instructional materials, and audio-visual aids and equipment.
3. The Authority will furnish physical facilities.

B. Operations training:

1. Operations training shall be tailored specifically to the WMATA equipment being purchased and training shall be designed to teach all trainees the functional use of all of the major modes of equipment operation.
2. The training shall be sufficient in quality and scope to bring personnel to a level of operating proficiency such that vendor support is not needed during routine equipment operation in any mode or capacity.

C. Maintenance training:

1. Maintenance training shall be tailored specifically to the WMATA equipment being purchased and shall be designed to develop the knowledge and skills required to maintain and repair all item(s) delivered under the Contract. Maintenance training shall address the detailed theory of operation, maintenance, testing, repair, overhaul, replacement, alignment, and troubleshooting of the delivered equipment (hardware and software).

D. Other Training:

1. Preventive Maintenance Instructions (PMI):
 - a. The Operations and Maintenance (O&M) Manual provided for contractually furnished or installed equipment shall include a "Preventive Maintenance Instruction" (PMI) section, to ensure the continued safe and reliable operation of the specific system or equipment. Training on these procedures shall be included in the Design-Builder-provided maintainer training curriculum. If a section contains more than one PMI procedure then the section shall begin with a Table of Contents.
 - b. PMI procedures shall be written in language easily understood by every maintainer skill level of the responsible WMATA maintenance discipline. Prior to acceptance, clarity and effectiveness of each PMI procedure shall be demonstrated in coordination with the maintenance discipline using the recommended minimum number of the lowest skill level maintainers. The maintenance team or individual must be able to understand and successfully perform the draft PMI without coaching from Design-Builders or engineers. Each procedure shall be formatted similar to standard PMI formatting as currently approved by the WMATA maintenance discipline responsible for future maintenance of the equipment, including a standard approval signature cover sheet. Sample PMI's, as formatting examples, may be obtained from the appropriate maintenance discipline after contract award. Each procedure shall contain:
 - 1) A recommended performance frequency (interval) that is adjusted to the installed environment and expected level of use.
 - 2) The maintenance crew size and average time for performance of the PMI
 - 3) The system-specific and/or equipment-specific objectives of the PMI
 - 4) Lists of:
 - a) Prerequisites
 - b) Required reference documents
 - c) Industry standards or regulations governing the performance of the maintenance action
 - d) Necessary tools and test equipment

- 5) Definitions and graphics, as much as practical to clarify the instructions
- 6) Warnings, Cautions, and Safety Notices, plentifully and prominently interspersed to prevent injury, damage, or unsafe operating conditions before any procedure step to which they apply
- 7) Data sheets and checklists, for data collection regarding conditions that are measured and to ensure that important steps are not skipped
- 8) Step-by-step instructions:
 - a) to verify and document that the tested mechanism or circuit or subsystem functions within design parameters;
 - b) for types of solvents, cleansers, and lubricants with intervals for lubrication and cleaning of mechanisms to prevent or minimize grime, corrosion, and wear;
 - c) to verify the adjustment of the system, equipment, or circuit which will allow it to operate properly (safely, reliably, and without causing excessive wear) until the next scheduled PMI;
 - d) to verify the integrity of all fasteners, couplings, electrical connections, etc. which may fail or loosen between scheduled maintenance intervals;
 - e) to document the measured condition of the equipment or circuit, to be used for abatement of deterioration, future failure analysis, and in case of catastrophe.
- 9) Step-by-step detailed adjustment instructions for any mechanism or circuit found to be out-of-adjustment

E. Training Plan:

1. Training plan shall contain an organized summary of the events, and associated times, necessary for the completion of all materials necessary to successfully perform the required training. The plan shall be submitted to the applicable end user's training group(s) (TTDC, TSMT, or ROQT currently) within a Contract specified period after NTP has been issued. The training plan must address all deliverables using a timeline that includes periods for review, feedback, resubmission, approval, and delivery accomplishing all by a Contract-determined date related to the equipment being placed into service. The training plan shall include the following:
 - a. Course list including course title, duration, audience, audience size, and purpose
 - b. Instructor qualifications: A description of the instructor's qualifications for each class must be submitted to the end user's training group(s) (TTDC, TSMT, or ROQT currently) for approval as part of the training plan. The description (resume, curriculum vitae, or other description of instructional qualifications) shall document a thorough knowledge of the subject equipment, an understanding of the adult learning process, and demonstrated experience in vocational instruction.
 - c. Audience qualifications and prerequisites: For the purpose of course development and presentation, vendors shall assume all WMATA students are high school graduates (or equivalent)
 - d. Instruction and testing methods to be utilized
 - e. Summary of the strategies to be employed in the accomplishment of the training
 - f. Proposed schedule of delivery of materials and training

F. Instructor's Guide:

1. The instructor's guide for each course shall contain all the information and direction necessary for the instructor to make an effective presentation. The instructor's guides shall include adequate guidelines to conduct a comprehensive training program. Individual lessons within the course shall be organized as separate blocks (or modules), which may be taught as a unit. In some instances, the same standard operating procedures could be used for train operators, transportation supervisors, and central control supervisors. The instructor's guide shall contain, at a minimum:
 - a. Program overview stating the overall program goals
 - b. Training syllabus
 - c. Lesson plans arranged as a session by session outline containing the following:

- 1) Overview of each lesson
 - 2) Outline of major topics to be covered including timelines for each course, lesson, and topic
 - 3) Outline of learning objectives for each major topic
 - 4) Information regarding important subjects and terms to be emphasized during each section of the training
 - 5) References to the associated Student Guide pages and presentation slides
 - d. Suggested instructional methods/learning activities
 - e. Required equipment or resources needed for effective instruction
 - f. Test question pool(s) with each question referenced to the respective learning objective(s) and student guide or other instructional materials
2. A guide (FAQ) providing questions/problems and answers as related to course content
- G. Student's Guides:
1. Student guides for each course that shall contain all the information and direction necessary the student to interact effectively in the learning environment. The student guides shall be written in a fully developed prose format, developed in the same modular format as the instructor's guides. The student's guides should contain, at a minimum:
 - a. Program overview/introduction
 - b. Statement of overall program goals
 - c. All major topics to be covered
 - d. Student learning objectives associated with each of the major topics stated in quantifiable terms
 - e. All illustrations, block diagrams, charts, schematics, wiring diagrams, logic flow diagrams, troubleshooting guides, graphics, and visual aids that may be used during course presentation to enhance presentation content and provide a seamless facilitation of instruction
 - f. Supplemental materials that may be necessary to facilitate theoretical discussions
- H. Training Presentations:
1. Training Presentations shall be matched to the instructor guides and student guides and shall facilitate seamless, effective communication of the course information to the target audience.
 2. Training Presentation format(s) shall be agreed upon by the target audience's training group(s) (TTDC, TSMT, ROQT, currently).
- I. Training Aides:
1. Dependent upon the equipment and/or system(s), a functional mockup or a functional representation may be required. These may be in the form of animated illustrations, animated schematics, model(s) of the equipment, actual device(s), interactive video training, or any accepted media format as determined by the audience's training group.
 2. All mockups become the property of audience's training group after completion of the final scheduled training class. Supplemental materials shall be demonstrated as fully operable during the first training class. All necessary repairs to the supplemental materials are the responsibility of the vendor for the duration of vendor training sessions.
- J. OEM Operator's Manual(s) describing the equipment's or system's operation in each mode and capacity of use.
1. OEM Technical Manuals describing the detailed theory of operation, maintenance, testing, repair, overhaul, replacement, alignment, and troubleshooting shall be delivered to the appropriate training groups.

1.04 MATERIALS AND INSTRUCTION

- A. Training materials shall be provided and approved by audience's training groups (TTDC, TSMT or ROQT) prior to the final acceptance of training schedule or training date(s).
- B. Training materials updates are required when, in the scope of the Contract, changes or Modifications are made that affect the operation or maintenance of the contracted item(s).
- C. Instruction shall include material covered in the operation and maintenance manuals as well as the following:
 - 1. Detailed theory of operation to one level below LRU
 - 2. Practical aspects of operation
 - 3. Description of system, equipment, and components
 - 4. Functional characteristics of system, equipment, and components
 - 5. Emergency operating procedures
 - 6. Location, removal, and reinstallation of components
 - 7. Maintenance procedures
 - 8. Servicing intervals and schedules
 - 9. Block diagrams of equipment hardware and software functionality as installed
 - 10. Schematics of equipment hardware as installed
 - 11. Diagnosis and problem solving (troubleshooting)
 - 12. Repair
 - 13. Overhaul
- D. Daily class duration shall be a nominal 7-1/2-hour shift, with advantageous combinations of theoretical/classroom instruction and hands-on practice, utilizing operational equipment, presentations, mockups, and test equipment as applicable. For on-the-job training (OJT) at work locations as applicable, training shall include participation in installation activities, fault diagnosis, and equipment alignment / adjustment exercises.
- E. Operating and maintenance training shall be completed prior to the time scheduled for operation inspection, testing, or acceptance of the equipment. In addition to the retainage specified in Section 00 74 40, METHOD OF PAYMENT, payment will be withheld until training is complete and accepted.
- F. Furnish to applicable training group, a minimum of four O&M Manuals as described in Section 01 77 50, CLOSEOUT, for each piece of equipment and system, unless otherwise specified, and a minimum of one editable, non-copyrighted electronic copy in a Microsoft Office format, as specified.

1.05 PROJECT PERFORMANCE DEMONSTRATION

- A. Integrated system testing shall culminate in a project performance demonstration that shall simulate all operations and shall exercise all systems and system elements. Prepare performance demonstration plan and procedures. Include testing of anticipated normal and abnormal operations, in addition to simulations of emergency operations. Performance demonstration plan shall delineate the following:
 - 1. Tests to be performed

2. Date and time when each test is to be performed
 3. An outline of the test parameters
 4. Pass/fail criteria, which must be quantified and measurable
- B. The project performance demonstration shall include those static and dynamic tests used to demonstrate that the Design-Builder designed the systems and subsystems according to the specification and the performance specified, and shall include:
1. All necessary functional and performance testing conducted during construction and manufacture of the system elements; and
 2. Operational tests, which include integrated testing of system interfaces to assure that the Project as a whole is capable of operating as specified.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION