Serial Number: RFP-FQ16146/NAC
Date of Issue: January 5, 2018
Original Proposal Due Date: February 3, 2017
Revised Proposal Due Date: February 2, 2018

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
600 FIFTH STREET, N.W.
WASHINGTON, DC 20001

January 5, 2018
AMENDMENT NO. 8
REQUEST FOR PROPOSALS
FOR
POTOMAC YARD METRORAIL STATION
FQ16146/NAC

TO WHOM IT MAY CONCERN:

The Request For Proposals and Proposal Documents accompanying RFP FQ16146/NAC requesting Proposals for the above project are hereby changed in part as listed below.

I. GENERAL INFORMATION

This amendment modifies specifications and WMATA's Safety & Security Certification Plan (SSCP).

II. CHANGES TO DOCUMENTS

The Request For Proposals and Proposal Documents accompanying solicitation RFP/FQ16146/NAC are hereby changed in part as follows:

1. **VOLUME 1 – DIVISIONS 0 AND 1**
Delete the following pages and in lieu thereof substitute the accompanying pages:

DELETE	SUBSTITUTE	DESCRIPTION
00 80 00-13	00 80 00-13	Revised
00 43 40-2, 3 and -4	00 43 40-2, 3 and -4	Revised
01 11 20-2	01 11 20-2	Revised
01 11 50-3	01 11 50-3	Revised
01 14 10-2	01 14 10-2	Revised
01 25 00	01 25 00	Revised
01 32 20-2 through 9	01 32 20-2 through 9	Revised
01 74 00-2	01 74 00-2	Revised
01 77 50-5 through 9	01 77 50-5 through 9	Revised

2. VOLUME 2 – PROJECT TECHNICAL SPECIFICATIONS:
Delete the following pages and in lieu thereof substitute the accompanying pages:

DELETE	SUBSTITUTE	DESCRIPTION
05 12 13	05 12 13	Revised
08 44 13-10	08 44 13-10	Revised

3. VOLUME 7 – WMATA SAFETY AND SECURITY PLANS AND DOCUMENTS

Delete the following documents and in lieu thereof substitute the accompanying documents:

DELETE	SUBSTITUTE	DESCRIPTION
2012 WMATA SSCP	2015 WMATA SSCP	Replaced

4. ACKNOWLEDGEMENT

Offerors are required to acknowledge receipt of this amendment on the Technical and Price Proposal Forms (Pages 00 41 20-1 and 00 41 30-1) in the space provided. Failure to acknowledge all amendments may cause the bid to be considered not responsive to the invitation, which would require rejection of the Proposal.

_____

Norie A. Calvert
Contracting Officer

Enclosures

* * * * *

	21	Permitting Allowance	18	1	Allow	$50,000	$50,000	
	22	Utility Allowance	19	1	Allow	$250,000	$250,000	
#	23	Traction Power Conduit & Duct Bank	20	1	Allow	$1,100,000	$1,100,000	#
						Total Base Price	**$_____**	

Elevator Proposal Schedule

(Proposer shall provide pricing for both types. Owner will select one type for incorporation in the project).

Item #	Description	Note #	Est. Qty.	Unit	Unit Price	Total Amount
1	Hydraulic Elevators			LS	$_____	$_____
2	Gearless Traction Elevators			LS	$_____	$_____

Notes to Proposers

(1) The Mobilization costs shall include the premium costs for payment and performance bonds. The remaining mobilization costs shall be paid in six equal installments over the first six payment requests.

(2) Contractor shall provide a quotation for all cost elements that make up General Conditions. General Conditions costs shall not be included with any other cost elements proposed under items 1 and 3 through 24 above.

(3) Contractor shall provide a quotation for all work below station platform level, which includes, but is not limited to:

- earthwork
- retaining walls
- demolition
- grading and drainage
- stormwater management
- erosion and sediment control
- pavement, striping
- signage
- utilities
- perimeter fence
- treatment of contaminated water
- track work

All soil shall be assumed to be contaminated with arsenic above background concentrations. Quote shall include the cost of characterization, removal, transportation, and disposal.

(4) DELETED

(5) DELETED

•

(6) Contractor shall provide a quotation for the demolition and restoration of the Potomac Greens Drive traffic circle, the demolition and restoration of Old Town Greens tot lots and tennis courts removed for construction access and temporary relocation of tot lot. Old Town Greens tot lot shall be relocated to a site within Old Town Greens HOA.

(7) Contractor shall provide a quotation for all station structure work at and above the platform level, including platforms, mezzanines, and vertical transportation.

(8) Contractor shall provide a quotation for station finishes, which include, but are not limited to:

- paver tiles
- kiosks
- light fixtures
- platform edge
- platform lighting
- bathrooms
- benches

(9) Contractor shall provide a quotation for all costs related to the construction of off-site AC room and access road as well as all electrical equipment, ductbanks, conduit, and connections. Equipment costs include, but are not limited to design, installation, testing, and commissioning.

(10) DELETED.

(11) Contractor shall provide a quotation for the north pedestrian bridge and Entry Pavilion, connecting to the future North Potomac Yard development.

(12) Traction Power, Automatic Train Control, and Communications: Contactor shall provide a quotation for equipment costs which include, but are not limited to design, supply, installation, and testing.

(13) Hazardous Waste: The contractor shall provide a quotation for the removal and disposal of hazardous waste from the site. For inclusion in this category, soil must fail the toxicity characteristic leaching procedure. Soil in this category shall be assumed to be contaminated with other constituents, including, but not limited to, arsenic, petroleum, and benzene, toluene, ethyl benzene, and xylenes (BTEX). Quote shall include the cost of characterization, removal, transportation, and disposal.

(14) PCB-Contaminated Soil: The contractor shall provide a quotation for the removal and disposal of PCB-contaminated soil from the site. For inclusion in this category, concentration of PCBs shall exceed 1 mg/kg. Soil in this category shall be assumed to be contaminated with other constituents, including, but not limited to, arsenic, petroleum, and BTEX. Quote shall include the cost of characterization, removal, transportation, and disposal.

(15) Petroleum Contaminated Soil 1: The contractor shall provide a quotation for the removal and disposal of petroleum-contaminated soil from the site. For inclusion in this category, soils shall have a concentration of petroleum hydrocarbons (TPH) equal to or greater than 500 mg/kg, and/or of BTEX equal to or greater than 10 mg/kg. Soils in this category shall be assumed to be contaminated with arsenic above background. Quote shall include the cost of characterization, removal, transportation, and disposal.

(16) Petroleum Contaminated Soil 2: The contractor shall provide a quotation for the removal and disposal of petroleum-contaminated soil from the site. For inclusion in this category, soils shall have a concentration of petroleum hydrocarbons (TPH) equal to or greater than 50 mg/kg, and less than 500 mg/kg, and total BTEX less than 10 mg/kg. Soils in this category shall be assumed to be contaminated with arsenic above background. Quote shall include the cost of characterization, removal, transportation, and disposal.

(17) NOT USED

(18) The City of Alexandria shall waive all fees associated with obtaining City of Alexandria Permits. Fee schedules for all other permits required for the Potomac Yard Station, including, but not limited to, National Park Service, Virginia Department of Transportation, Corps of Engineers, and any other State or Federal permit required shall be the responsibility of the Design Builder.

Contractor shall provide a quotation for an allowance to cover costs associated with permit fees for any permit fees not expressly waived by the City of Alexandria.

(19) Contractor shall provide an invoice for an allowance applicable to the cost incurred by the Design Builder which is paid directly to the utility companies for fees. Allowance will cover Design Builder costs such as tap and connection fees, applications, and inspections fees. Other utility cost including, but not limited to, design and utility installation do not apply to this allowance and shall be included in the Site Work Bid Item in the Design Builder's proposal.

(20) Allowance will cover Contractor costs to provide buried traction power conduit and duct banks in cases where existing facilities do not provide adequate capacity for new cabling. Costs covered under allowance include, but are not limited to, design engineering, maintenance of traffic, demolition, material procurement, installation and testing.

A. The Design-Builder understands that if it fails to complete portions of or all of the Work as described in Supplementary Conditions Section 00 82 04, PROJECT SCHEDULE, the Authority will suffer damages, which have been estimated and are as specified below:

Milestone 1: Development Special Use Permit (DSUP) submittal to City of Alexandria. **$0**

Milestone 2: DSUP approval by City of Alexandria. **$0**

Milestone 3: Construction Access and Trailers: **$375 per cd**

Milestone 4: Approvals and Permits: **$636.00 per cd**

Milestone 5: Complete Communication & IT Rooms and Systems Facilities: **$2,493 per cd**

Milestone 6:: WMATA IT Complete Communications, & IT Room Equipment Installation **$0**

Milestone 7**:** Complete Prep for Double Cross-Over Install. & Track Cut-Over: **$0**

Milestone 8: Readiness for Installation of Fare Collection Equipment: **$1,630 per cd**

Milestone 9: Final Station Completion: **$2,772 per cd**

B. See Section 00 72 04, PERIOD OF PERFORMANCE AND/OR PROJECT SCHEDULE, for Project Milestone(s).

00 88 09 PARTNERING – NOT USED

Modify Section 00 70 00, GENERAL CONDITIONS, to add the following Section: PARTNERING WILL NOT BE USED FOR THIS CONTRACT

00 89 04 LIVING WAGE: ADD THE FOLLOWING SECTION 00 79 04 LIVING WAGE:

A. This Contract is subject to the Authority's Living Wage Policy and implementing regulations. The Living Wage provision is required in all contracts for services (including construction) awarded in an amount that exceeds $100,000 in a 12-month period.

1. The Authority Living Wage Rate is $13.85 per hour, and may be reduced by the Design-Builder's per-employee cost for health insurance.

2. The Design-Builder shall:

a. Pay, at a minimum, the Authority Living Wage Rate, effective during the time the Work is performed, to all employees who perform Work under this Contract, except as otherwise provided in paragraph (4) below;

b. Include the Living Wage clause in all Subcontracts that exceed $15,000 in a 12-month period awarded under this Contract;

c. Maintain payroll records, in accordance with the retention and examination of records requirements in the General Conditions, and include or cause to be included, the substance of this Section, including this Paragraph c, in its Subcontracts covered by the Living Wage requirement at all tiers; and

d. Submit records with each monthly invoice supporting payment of the Living Wage Rate.

3. The Design-Builder shall not split or subdivide a Contract, pay an employee through a third party, or treat an employee as a Subcontractor or independent contractor to avoid compliance with the Living Wage provisions.

4. Exemptions to the Living Wage provisions include:

C. 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 Contracting Officer Representative of potential conflicts as soon as practicable but no later than within [30] Days of NTP. 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 geotechnical investigations and coordinate with the Jurisdictional Authorities as needed for the development of the final design and for obtaining all necessary permits.

G. 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.

H. ADAAG Design and Construction Compliance

1. Design and construct the Work in accordance with ADAAG regulations and Federal Transit Agency 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. Exceptions to ADAAG regulations and FTA requirements: NOT APPLICABLE

4. 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. Refer to Attachment to this Section: Federal Transit Administration (FTA): Key and New Rail Station Checklist.

I. This Project has a goal to obtain LEED Silver certification at its completion in accordance with the
LEED Reference Guide for New Construction and Major Renovation. The project scope for
purposes of LEED Certification shall be limited only to the enclosed portions of the station. WMATA is responsible for obtaining USGBC concurrence in that definition.

J. 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. 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.

K. Indicate on Design Drawings work to be carried out By Others such as by the Authority, Utilities, Jurisdictional Agencies, and other WMATA contracts.

L. 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 Contracting Officer Representative.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.01 CERTIFICATION PROGRAM REPRESENTATIVE

A. Appoint a Certification Program Representative with the qualifications noted in this Section to lead and coordinate the certification process.

3.02 SAFETY AND CERTIFICATION PROGRAM WORKSHOPS

A. Conduct Safety and Security workshops on a monthly basis for the duration of the Contract.

3.03 CIL AND FINAL REPORT

A. Prepare, update and complete CIL throughout the Project Schedule of the Contract and prepare final CIL and Certification Report prior to Acceptance of the Project.

PART 4 – MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. Compensation in the amount of one percent (1.0%) of the base bid of the contract shall be retained until the verification documentation, defined in 1.04 above, has been received and approved.

END OF SECTION

listed below, single track RSAs will be permitted between 2200 Friday and 0400 Tuesday and complete shutdown RSAs will 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

G. The Hours of Work associated with non-revenue and RSAs and the frequency that these Hours of Work will be available to the Design-Builder are noted below. Also included are specific dates for the first year of construction which shall be incorporated into the Project Schedule by the Design-Builder as required work dates.

1. Non-revenue (0100 to 0400) – 2 of 5 weeknights
2. 2-day weekend single tracking (2200 Friday to 0400 Monday) - 1 time per mo.
3. 3-day weekend single tracking (2200 Friday to 0400 Tuesday) - 1 time per mo.
4. # 2-day weekend shutdown (0300 Saturday to 0400 Monday) - 4 times per yr. #
5. 3-day weekend shutdown (0300 Saturday to 0400 Tuesday) - 2 times per yr.
6. A double track outage will be granted for up to two consecutive weeks between National Airport and Braddock Road stations, commencing no sooner than 6:00 AM Saturday July 10, 2021 and ending no later than 12:01 AM on September 7, 2021. Examples of a two week outage are as follows:
   a. Start 6:00 AM 07/10/21 end 12:01 AM 07/26/21
   b. Start 6:00 AM 08/21/21 and 12:01 AM 09/07/21

H. RSAs 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

I. 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. Plan 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 RSAs will

SECTION 01 25 00

CONTRACT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. This Section specifies procedures for making Contract Modifications.

1.02 GENERAL

A. Out-of-Scope Items: Specific approval must be received from the Contracting Officer Representative prior to doing work, which may be considered to be outside the Scope of Work and for which additional reimbursement may be requested in accordance with the General Conditions.

B. Requests for additional work may be initiated by the Authority. Claims for an increase in Contract Price shall be thoroughly documented as specified in the General Conditions and directed to the Contracting Officer Representative who, upon Approval, will issue a Modification stating the amount of the increase in fee. Once directed, the design-builder will proceed with the work of the change order in a timely fashion. Any impacts to the work resulting from the design-builder not proceeding in a timely fashion are not the responsibility of the authority.

C. Should the Design-Builder be excused from the provision of certain services identified in this Scope of Work, the Design-Builder will be requested to give a credit to the Authority. The offer for the credit shall be documented and directed to the Contracting Officer Representative who, upon Approval at the appropriate level, will issue a modification.

D. Should the Authority approve design modifications that result in the Design-Builder being excused from certain services identified in this Scope of Work, the Design-Builder will be requested to give a credit to the Authority. The offer for the credit shall be documented and directed to the Contracting Officer Representative who, upon Approval at the appropriate level, will issue a modification.

1.03 TIME AND MATERIALS WORK FOR THE CONSTRUCTION EFFORT

A. In the event equitable adjustment cannot be agreed to in a timely manner, the Authority reserves the right to order work on a time and materials basis as specified in the General Conditions. When work is ordered under this Section, notwithstanding the provisions of other Sections, compensation for the work shall be determined as hereinafter provided and shall constitute the total compensation to be paid for the changes to the Work. The methods, labor, materials, and equipment used in the performance of such work shall be subject to the Approval of the Authority.

B. Work performed by or for the Design-Builder: labor, materials, services, and equipment shall be furnished by the Design-Builder or by a Subcontractor or by others on behalf of the Design-Builder. The Design-Builder will be paid therefor as hereinafter provided, except where agreement has been reached to pay in accordance with Article 1.03C. below.

1. Labor: The cost of labor used in performing the work, whether the employer is the Design-Builder, Subcontractor, or other forces, will be the sum of the following:

   a. The gross actual wages paid including income tax withholding but not including any employer payments to or on behalf of workmen for health and welfare, pension, vacation, insurance, and similar purposes.

   b. To the actual gross wages, as defined in Article 1.03B.1.a above, will be applied a percentage based upon current applicable labor rates concerning payments made to or on behalf of workmen other than actual wages, which percentage shall constitute full compensation for all payments other than actual gross wages as defined in Article 1.03B.1.a above and subsistence and travel allowance as specified in Article 1.03B.1.c below. The

Design-Builder shall compute a separate percentage for each craft or a composite percentage for all crafts, if so approved by the Authority. All computed percentages shall be submitted to the Contracting Officer Representative for Approval within 30 Days after start of construction work or as directed by the Contracting Officer Representative prior to time and materials work being performed.

c. Subsistence and travel allowance paid to such workmen if required by collective bargaining agreements. The charges for labor shall include all classifications through foremen when engaged in the actual and direct performance of the Work. They shall not include charges for such overhead personnel as assistant superintendents, superintendents, office personnel, timekeepers, and maintenance mechanics.

2. Materials: The cost of materials required for the accomplishment of the Work will be delivered cost to the purchaser, whether Design-Builder, Subcontractor, or other forces, from the Supplier thereof, except as the following are applicable:

   a. If a cash or trade discount by the actual supplier is offered or available to the purchaser, it shall be credited to the Authority notwithstanding the fact that such discount may not have been taken.

   b. If materials are procured by the purchaser by any method, which is not a direct purchase from and a direct billing by the actual supplier to such purchaser, the cost of such materials, including handling, shall be deemed to be the price to the actual Supplier as determined by the Contracting Officer Representative.

   c. If the materials are obtained from a supply or source owned wholly or in part by the purchaser, payment therefor will not exceed the price paid by the purchaser for similar materials furnished from said source on Contract items or the current wholesale price for such materials delivered to the job Site, whichever price is lower.

   d. The cost of such materials shall not exceed the lowest current wholesale price at which such materials are available in the quantities concerned, delivered to the job Site, less any discount as provided in Article 1.03B.2.a above.

   e. If the Design-Builder does not furnish satisfactory evidence of the cost of such materials from the actual supplier thereof, the cost shall then be determined in accordance with Article 1.03B.2.d above.

   f. The Design-Builder shall not be compensated for indirect costs and profit on Authority-furnished materials.

3. Equipment: The Design-Builder will be paid for the use of equipment in accordance with the Contract. The Design-Builder shall furnish all data, which might assist the Authority in the establishment of such rates.

   a. Operators of equipment will be paid under Article 1.03B.1 above.

   b. Small tools (defined as equipment less than $2,000 in acquisition costs) are computed at a maximum of 5 percent of direct base labor wages.

4. Subcontracts: The cost for Subcontract work at any tier will be the actual cost to the Design-Builder/Subcontractor for work performed by a Subcontractor as computed in accordance with Articles 1.03B.1 through 1.03B.3 above. For the purposes of this Article, Subcontractor is defined as an individual, partnership, corporation, association, joint venture, or any combination thereof, who contracts with the Design-Builder to perform work or labor or render service on or about the work. The term Subcontractor shall not include those who supply materials only. When work paid for on a time and materials basis is performed by forces other than the Design-Builder's organization, the Design-Builder shall reach agreement with such other forces as to the

distribution of the payment made by the Authority for such work, and no additional payment therefore will be made by the Authority by reason of performance of the Work by a Subcontractor or by others.

5. To the totals, completed as indicated in Articles 1.03B.1 through 1.03B.4, shall be added field office overhead as follows:

   a. If the costs determined above do not exceed $100,000 and the adjustment in time for Contract performance is 10 Days or less, the markup shall be computed in accordance with Article 1.04 below.

   b. In all other cases, the most recent audited daily field office overhead rate will be used.

6. Home Office General and Administrative (G&A) costs will be determined using the most recent audited rate at the time the work was accomplished. A fixed rate of 3 percent will be used in the absence of an audited rate.

7. Profit will be negotiated as provided in Article 1.07 below.

8. A percentage for Design-Builder's bond, not to exceed 1 percent, may be added.

C. Special items of work: If the Contracting Officer Representative and the Design-Builder, by agreement, determine that either: an item of time and materials work does not represent a significant portion of the total Contract Price, or such item of work cannot be performed by the forces of the Design-Builder or the forces of any of its Subcontractors, or it is not in accordance with the established practice of the industry involved to keep the records, which the procedure outlined in Article 1.03B above would require, charges for such special time and materials work item may be made on the basis of invoices for such work without complete itemization of labor, materials, and equipment rental costs. To such invoiced price, less a credit to the Authority for any cash or trade discount offered or available, whether or not such discount may have been taken, will be added a negotiated amount not to exceed 5 percent of the discounted price, in lieu of the negotiated lump sum not to exceed the percentages provided for in Article 1.03B above.

D. Records: The Design-Builder shall maintain its separate records in such a manner as to provide a clear distinction between the direct costs of work paid for on a time and materials basis and the cost of other operations.

1. The Design-Builder shall prepare, and furnish to the Contracting Officer Representative one electronic copy of report sheets of each day's work paid for on a time and materials basis the day after such work was performed. The daily report sheet shall itemize the materials used, and shall cover the direct cost of labor and the charges for equipment rental, whether furnished by the Design-Builder, Subcontractor, or other forces, except for charges described in Article 1.03C above. The daily report sheet shall provide names or identifications and classifications of workmen, the hours worked, and the size, type, and identification number of equipment, and hours operated.

2. Material charges shall be substantiated by valid copies of vendor's invoices. Such invoices shall be submitted with the daily report sheets, or if not available, they shall be submitted with subsequent daily report sheets. Should said vendor's invoices not be submitted within 60 Days after the date of delivery of the material or 15 Days after acceptance of the Work, whichever comes first, the Authority reserves the right to establish the cost of such materials at the lowest current wholesale prices at which such materials are available in the quantities concerned delivered to the location of the Work less any discounts provided in Article 1.03B.2.a above.

3. Said daily report sheets shall be signed by the Design-Builder or its authorized agent.

4. The Contracting Officer Representative will compare the Authority's records with the Design-Builder's daily report sheets, make any necessary adjustment, and compile the costs of work paid for on a time and materials basis on daily time and materials work report forms furnished by

the Authority. When these daily reports are agreed upon and signed by both parties, they shall become the basis of payment for the work performed, but shall not preclude subsequent adjustment based on a later audit. The use of any specific Authority form, such as the Daily Report – Labor, Materials, & Equipment Form C-113, to segregate change order costs does not, in and of itself, invoke the provisions of this Article 1.03 or other provision of this Contract.

E. Payment: Payment as provided in Articles 1.03B and 1.03C above shall constitute full compensation to the Design-Builder for performance of work paid for on a time and materials basis and no additional compensation will be allowed therefore.

F. Design: Design efforts associated with contract modifications as defined above shall not exceed a dollar amount equal to 15% of the construction cost associated with the contract modification.

1.04 EQUITABLE ADJUSTMENT FOR MINOR CONTRACT MODIFICATIONS FOR THE CONSTRUCTION EFFORT

A. When the Authority and Design-Builder agree to an additive or deductive amount for a Modification to this Contract made pursuant to this Contract when the fair and reasonable price in aggregate amount does not exceed $100,000, and further agree to an adjustment in the time for Project Schedule resulting from said Modification, which increases or decreases the completion date 10 or less Days, the equitable adjustment in Contract amount shall consist of the sum of the following:

1. Direct labor, material, and equipment costs as agreed to by the Authority and Design-Builder (small tools, defined as equipment less than $2,000 in acquisition costs, are included in equipment costs and computed at a maximum of 5 percent of direct base labor wages.)

2. Job Office Overhead costs, the sum of which shall be limited to a maximum of 10 percent of direct labor costs, including fringe benefits, but excluding FICA, FUTA, and State Unemployment Insurance (SUI); a maximum of 10 percent of direct material costs; a maximum of 5 percent of direct equipment costs (including small tools); and a maximum of 5 percent of Subcontract costs.

3. Home Office General and Administrative (G&A) costs are computed using the most recent audited rate or a fixed rate of 3 percent in the absence of an audited rate.

4. Profit will be determined in accordance with the guidelines specified in Article 1.06 below.

B. In using the above rates, the following shall apply:

1. Payroll Tax (FICA, FUTA, and SUI) amounts are added immediately after direct and indirect costs are totaled.

2. Subcontractors' indirect costs and profit shall be computed in the same manner as above.

3. Indirect costs shall not be duplicated in direct costs.

4. When the Project Schedule is increased, the change in Contract amount for direct and indirect costs computed by application of the above rates includes costs of impact and extended performance due to the time extension and no further consideration of costs arising from the specific Modification and cited pending change orders (PCOs) will be given. The Design-Builder shall <u>not</u> receive both a percentage and a daily rate markup for job office overhead costs when a time extension to the Project Schedule is recognized.

5. Bond costs will be allowed at actual cost without markup.

C. Equipment rates shall be determined from prior Authority audits. In the absence of audited rates for equipment owned or controlled by the Design-Builder, hourly rates shall be computed in the same fashion as described in Article 1.07D.

1.05 COST OR PRICING DATA

A. The Design-Builder shall submit to the Contracting Officer Representative, either actually or by specific identification in writing an electronic copy of cost or pricing data under the conditions described in this Paragraph and certify that, to the best of the Design-Builder's knowledge and belief, the cost or pricing data submitted is accurate, complete, and current as of the date of execution, which date shall be as close as possible to the date of agreement on the negotiated price of the Contract Modification. The cost or pricing data shall be submitted at the time the Design-Builder submits its proposal for the pricing of any Modification to this Contract, whether or not cost or pricing data was required in connection with the initial pricing of the Contract, when the Modification involves aggregate increases or decreases in costs plus applicable profits expected to exceed $100,000, or less at the discretion of the Authority Representative.

B. The submittal of certified cost or pricing data will not be required if the price is based on adequate price competition, established catalog or market prices of commercial items sold in substantial quantities to the general public, or prices set by law or regulation. The Design-Builder agrees that the terms "adequate price competition" and "established catalog or market prices of commercial items sold in substantial quantities to the general public" will be determined by the Authority in accordance with the guidelines as set forth in Subpart 15.8 of the Federal Acquisition Regulations (48 CFR 15.8).

C. Cost or pricing data consists of all facts existing up to the time of agreement on price, which prudent buyers and sellers would reasonably expect to have a significant effect on the price negotiations for the Modification. The definition of cost or pricing data embraces more than historical accounting data; it also includes, where applicable, such factors as Subcontractor, Supplier, and vendor quotations, nonrecurring costs, changes in construction methods, unit cost trends such as those associated with labor efficiency and any management decisions which could reasonably be expected to have a significant bearing on costs under the proposed Modification and the Contract Work. Cost or pricing data consists of all facts, which can reasonably be expected to contribute to sound estimates of future costs as well as to the validity of costs already incurred. Cost or pricing data, being factual, is that type of information, which can be verified. Because the certificate pertains to cost or pricing data, it does not make representations as to the accuracy of the Design-Builder's judgment on the estimated portion of future costs or projections. The certificate does, however, apply to the data upon which the Design-Builder's judgment is based.

1.06 CONTRACT MODIFICATIONS, REQUIREMENTS FOR PROPOSALS, PRICE BREAKDOWN, NEGOTIATION OF PROFIT

A. The Design-Builder, in connection with any proposal it makes for a Contract Modification as specified in Section 00 75 00, ACCOUNTING AND RECORD KEEPING, shall furnish a price breakdown, itemized as required by the Contracting Officer Representative. Unless otherwise directed, the breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, Subcontract, and overhead costs, as well as profit, and shall cover all work involved in the Modification, whether such work was deleted, added, or changed. Any amount claimed for Subcontracts shall be supported by a similar price breakdown. In addition, if the proposal includes a time extension, a justification therefore shall also be furnished. The original and one electronic copy of the proposal, together with the price breakdown and time extension justification, shall be furnished by the date specified by the Contracting Officer Representative.

B. Where profit is negotiated as an element of price, with either the Design-Builder or Subcontractor, a reasonable profit will be negotiated for each Modification by using the following procedure as a guide:

1. Breakdown:

Factor	Rate	Weight	Value
Degree of risk	20		
Relative difficulty of work	15		
Size of job	15		
Project Schedule	15		
Design-Builder's investment	5		
Assistance by Authority	5		
Subcontracting	25		
TOTAL	100%		

2. Based on the circumstances of each Modification, each of the above factors shall be weighted from 0.03 to 0.12 as indicated below. The value shall be obtained by multiplying the rate by the weight. From the value column when totaled the fair and reasonable profit can be determined under the circumstances of the particular Modification.

   a. Degree of risk: Where the modified work involves no risk or the degree of risk is very small, the weighting should be 0.03. As the degree of risk increases, the weighting should be increased up to a maximum of 0.12. Lump sum items will have generally a higher weighted value than unit price items for which quantities are provided. Other things to consider: The portion of the Work to be done by Subcontractors, nature of work, where work is to be performed, reasonableness of negotiated costs, amount of labor included in costs, and whether the negotiation is before or after performance of work.

   b. Relative difficulty of work: If the modified work is most difficult and complex, the weighting should be 0.12 and should be proportionately reduced to 0.03 on the simplest of jobs. This factor is tied in to some extent with the degree of risk. Things to consider: The nature of the Work, by whom it is to be done, the location, and the time schedule.

   c. Size of job: All modified work not in excess of $100,000 shall be weighted at 0.12. Work estimated between $100,000 and $5,000,000 shall be proportionately weighted from 0.12 to 0.05. Work from $5,000,000 to $10,000,000 shall be weighted at 0.04, and work in excess of $10,000,000 at 0.03.

   d. Period of performance: Modifications providing for an extension of time in excess of 30 Days shall be weighted at 0.12. Jobs of lesser duration shall be proportionately weighted to a minimum of 0.03 for jobs not to exceed 1 Day. No weight will be granted for this factor where there is no extension of the Project Schedule or interim dates due to work under this Modification.

   e. Design-Builder's investment: Should be weighted from 0.03 to 0.12 on the basis of below average, average, and above average. Things to consider: Amount of Subcontracting, mobilization payment item, Authority-furnished property, and method of making progress payments.

f. Assistance by Authority: Should be weighted from 0.12 to 0.03 on the basis of average to above average. Things to consider: Use of Authority-owned property, equipment and facilities, and expediting assistance.

g. Subcontracting: Should be weighted inversely proportional to the amount of Subcontracting. Where 80 percent or more of the Work is to be Subcontracted, the weighting should to be 0.03, and such weighting proportionately increased to 0.12 where all the work is performed by the Design-Builder's own forces.

3. When considered necessary because of very unusual circumstances or local conditions, the range of weight may be increased to an upper limit of 0.15 if supported by adequate justification and Approved by the Authority.

4. When negotiations between the Contracting Officer or the Contracting Officer Representative and the Design-Builder are joined to determine an equitable adjustment for a Modification of this Contract, the Design-Builder shall encourage involved Subcontractor(s) to be present and to present their cost data and to participate in the resolution of a fair and equitable adjustment. In any event, if after reasonable effort, a negotiated settlement cannot be reached between the Contracting Officer or the Contracting Officer Representative and the Design-Builder and the Subcontractor(s) involved, then at the request of the Subcontractor(s) concerned, the Contracting Officer or the Contracting Officer Representative may process Part 1 of a two-part Modification to cover the direct costs only, as agreed upon or, if not agreed upon, as determined unilaterally by the Contracting Officer or the Contracting Officer Representative. Subcontractors(s) requests for a Part 1 Modification shall be submitted to the Design-Builder, and the Design-Builder shall forward such requests promptly to the Contracting Officer Representative. Any payments received by the Design-Builder under this procedure shall be passed along within 10 Days thereafter to the Subcontractor concerned.

C. Change orders: When the Contracting Officer directs a change in accordance with the provisions of this Contract, the Design-Builder shall identify in its proposal for equitable adjustment the network activities that precede and follow the change order work activities. If the change order work activities are performed concurrently with existing network activities, those concurrent network activities shall be identified. If the change order work activities restrain network activities, those restraints shall be identified.

1.07 PAYMENT FOR USE OF EQUIPMENT

A. The following methods of determination of equipment costs shall apply to all adjustments to Contract Prices arising under the provisions of the Contract except for Section 00727, TERMINATION FOR CONVENIENCE OF THE AUTHORITY, provisions thereunder.

B. Allowable ownership and operating expense for construction plant and equipment in sound workable condition, owned by the Design-Builder, Joint Venture, Partnership, organizations under common control, and any equipment under lease purchase or sale-lease back agreements, will be paid for at hourly rates applicable to the Project Schedule, published in the Rental Rate Blue Book for Construction Equipment (Blue Book) by PRIMEDIA Information, Inc., by applying the following formula: the Regular Hourly Rate shall be 75 percent of the sum of the monthly rate (area adjustment map not used) divided by 176 and the estimated operating cost per hour. Regular Hourly Rate shall be full compensation for equipment ownership and operating expenses and shall include the cost of fuel, oil, lubricants, supplies, spare parts, repairs and maintenance, major overhauls, mechanics and servicing labor, depreciation, storage, insurance, interest, taxes, record keeping, and all incidentals. The cost of equipment operators is not included. For forward pricing, the Blue Book rates in effect at the time of negotiations shall apply. For retrospective pricing, the Blue Book rates in effect at the time the work was performed shall apply. Manufacturers ratings and manufacturer-approved modifications shall be used to classify equipment for the determination of the Regular Hourly Rate. The hourly rates are calculated as shown in the following example:

	Regular Hourly Rate	**Multi-shift Hourly Rate**	**Standby Hourly Rate**
Monthly Rental Cost	$6,070.00	$6,070.00	$6,070.00
Divided by Hours	176	176	176
Hourly Rental Cost	$34.49	$34.49	$34.49
Hourly Operating Cost	18.20	18.20	18.20
Subtotal	52.69	52.69	52.69
Adjustment	75%	75%	75%
Regular Hourly Rate	39.52	39.52	39.52
Status	100%	60%	40%
Payment Rate	$39.52	$23.71	$15.81

1. For Design-Builder owned equipment as identified in Article 1.07B, the first 8 hours, or fraction thereof, usage in any one day shall be paid for at the Regular Hourly Rate, and any additional time in excess of 8 hours, shall be considered to be an additional shift, or fraction thereof, and shall be paid for at 60 percent of the Regular Hourly Rate. Standby time, if authorized by the Contracting Officer Representative, will be paid for at 40 percent of the Regular Hourly Rate. Standby time shall be limited to the regular 8-hour shift and shall not exceed 40 hours in a week. Any usage time less than 30 minutes shall be considered to be 1/2 hour.

2. For third-party rented equipment, the Authority will accept rental rates actually paid and substantiated by certified reproduced copies of invoices or bills. Such invoices or bills shall indicate the amount of operating expenses and operator wages and fringes, if any, included in the rental rate. In no case shall the bare rental rate per hour (operating expense, and operator wages and fringes not included) exceed the appropriate Regular Hourly Rate. Where required, the operating costs per hour will be agreed upon between the Design-Builder and the Authority using operating costs per hour from the Blue Book for the same or similar equipment

3. When approved by the Contracting Officer Representative, use of equipment not listed in the Blue Book will be permitted. An equitable hourly rate for such equipment will be established by the Contracting Officer Representative based on Design-Builder furnished cost data and basic information concerning the equipment. Information required to determine rates includes, but is not limited to, manufacturer, year, size, model, serial number, capacity, and weight. This information shall be furnished to the Contracting Officer Representative prior to the use of the equipment. Authority shall be granted audit access to verify information related to or pursuant to this Section.

4. The Regular Hourly Rate does not include “move-in” and “move-out” costs.

5. These equipment rates shall apply to equipment in sound workable condition. The equipment shall be of approved size and capacity to provide normal output or production required for the work to be done. Equipment not meeting these requirements may be used only with the Contracting Officer Representative's approval and at agreed, reduced rates. Usage time or standby time will not be allowed while equipment is inoperative due to breakdown, and such equipment shall be removed from the jobsite at the direction of the Contracting Officer Representative.

C. Items of equipment with an acquisition cost of $2,000 or less shall be considered as small tools.

D. Equipment costs that are paid under the equipment use rate shall not be duplicated in the Design-Builder's other direct or indirect costs.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

4. Late Finish Report: This report shall contain all activities as shown on the graphic network diagram listed in chronological order of the late finish date.

E. Contracting Officer Representative will review and return the Contractor's schedule submittal with comments according to the following schedule from the date of receipt:

Initial 180-Day Schedule	7 Days
90-Day Schedule	7 Days
Project Schedule	21 Days
Three-Week Work Plan	1 Day

1. The Design-Builder shall make all corrections to the schedule requested by the Contracting Officer Representative and resubmit the schedule for approval. If the Design-Builder does not agree with the Contracting Officer Representative's comments, the Design-Builder shall provide written notice of disagreement within 5 Days from the receipt of the Contracting Officer Representative's comments for the Project Schedule. Contracting Officer Representative's comments to the Initial 180-Day Schedule, Project Schedule, 90-Day Schedule, and Three-Week Work Plans with which the Design-Builder disagrees shall be resolved in a meeting held for that purpose.

F. Resubmittals shall conform to the same requirements as original submittals.

1.04 MONTHLY PROGRESS REPORTS

A. The Monthly Progress Reports shall include a narrative report, schedules, a Quality Compliance Certification and construction photographs as follows:

1. A narrative description of work accomplished, work activities planned for the upcoming reporting period, problem areas and actions intended by the Design-Builder to mitigate the problem areas, work that is being performed out of sequence with accepted schedules, status of change orders, notices of potential Claims, status of submittals, and status of Design-Builder procurement items. Proposed minor logic changes shall be listed and described in the narrative. Include narrative of design progress each month until design is complete and Approved.

2. Schedules including the Initial 180-day Schedule, or the Project Schedule, or the Monthly Update of the Project Schedule as appropriate; 90-Day Schedule; and a Three-Week Work Plan. Schedules shall clearly identify the critical path(s).

3. Cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish, and actual finish on a monthly and cumulative basis.

4. Quality Compliance Certification as specified in Section 01 47 00, QUALITY MANAGEMENT SYSTEM.

5. A complete list of scheduled submittal dates for each design review submittal and design completion.

6. A summary of meetings or conferences held or attended during the report period.

7. A compilation of all certified payroll "statements of compliance" for each subcontractor on the Project, performing or non-performing, during each week of the time period covered in the monthly progress report. See Section 00 76 07 Davis-Bacon and Copeland Anti-Kickback Acts for more information.

B. A listing of actions or decisions required of the Authority with an indication of the date by which such action or decision is required to avoid any adverse impact on the schedule.

1. Utility/Jurisdictional Authority coordination and approvals report. Include telephone conversations and dates of contact made with each Utility/Jurisdictional Authority.

2. Construction photographs, as described in Section 01 32 10, CONSTRUCTION PHOTOGRAPHS.

1.05 INITIAL 180-DAY SCHEDULE

A. A cost loaded schedule covering the first 180-Days Days of the Contract shall be submitted within 20 working days following the date of the Notice of Award. The Initial 180-Day Schedule is the Design-Builder's plan for planning, managing, executing, and for recording completed work during the first 180-Days of the Project. All approved activities in the Initial 180-Day Schedule shall be incorporated into the Project Schedule.

B. The schedule shall be time-scaled and may be submitted in either bar chart or Critical Path Method (CPM) format. The Initial 180-Day Schedule shall include the same requirements as the Project Schedule with the exception of information that is not reasonably available in the first 180-Days.

C. Work items defined in the schedule shall not exceed 20 working days duration.

D. The initial submittal shall be accompanied by a written narrative that describes the schedule and the approach to the Work that the Design-Builder intends to employ during the initial 180-Day period of the Contract.

E. The Initial 180-Day Schedule will be used to process progress payments for the 180-Day period following NTP until the Project Schedule is Approved.

1.06 PROJECT SCHEDULE

A. A cost loaded, calendar time-scaled CPM network diagram schedule covering the complete Project Schedule of the Project shall be submitted within 150 Days following the date of the Notice to Proceed. A Project Schedule, acceptable to the Contracting Officer Representative, shall be in place prior to the [sixth] progress payment request being submitted. The original logic of the Initial 180-Day Schedule shall be incorporated into the Project Schedule unless identified changes are submitted and approved by the Contracting Officer Representative.

B. The schedule must meet all of the dates listed under Special Conditions Section 00 82 04, PROJECT SCHEDULE.

C. The Project Schedule shall be prepared utilizing the Precedence Diagram Method (PDM) of CPM scheduling technique.

D. The Project Schedule shall show clearly the sequence and interdependence of activities and shall list specifically:

1. Interim milestone completion dates as specified and staging of the Work shall be prominently identified.

2. Design development and Authority review of design submittals.

3. Acquisition of permits, and Jurisdictional Authority and Utility approvals.

4. Submittals and Authority review of submittals.

5. Procurement, fabrication, delivery, installation, and testing of major materials and equipment.

6. Delivery of Authority-furnished equipment, if any.

7. Interfacing, coordination, and dependencies with preceding, concurrent, and follow-on contractors.

8. Work to be performed by other agencies, which affect the schedule.

9. Manpower, material, and equipment restrictions, if any.

10. Inspection of the Work including Punch List and Acceptance.

11. The progressive delivery of As-Built Documents as major sections of the work are completed; for example completion of foundation piling or completion of underground utility work.

12. Resources necessary to accomplish the Work for that activity including, but not limited to, specific equipment, manpower, and material requirements.

13. The costs of the work for each activity.

14. The graphic network diagram shall be composed of two parts, a Table of Activity Data and a time-scaled graphic network diagram, and shall include the following:

    a. A Table of Activity Data in columnar format with the pertinent data for each activity in the row corresponding to that activity's placement of schedule. The minimum required data are:

        (1) Activity ID,

        (2) Activity Description,

        (3) Early Start date,

        (4) Early Finish date,

        (5) Late Start date,

        (6) Late Finish date,

        (7) Total Float,

        (8) Planned Duration,

        (9) the monetary value in whole dollars for that activity, labor-days applicable to each activity, and all lag/lead time.

    b. The Contracting Officer Representative may require additional data such as total shifts or other resource data.

    c. An activity numbering system will be utilized, which assigns a unique activity identification number to each activity. No two activities shall bear the same activity number or description.

    d. Activity descriptions shall be brief but shall convey the scope of the work described. Unusual abbreviations shall be explained in a legend. If an activity includes work to be done by a Disadvantaged Business Enterprise (DBE), that fact shall be identified in the activity description by inclusion of an appropriate parenthetical entry (e.g., Install West Footing Reinforcing Steel (DBE1)) with DBE properly identified in the legend.

e. Percentages shall generally not be used in activity descriptions e.g., Pour West Footing (0 to 50 percent) is not acceptable.

f. A time-scaled graphic network diagram showing logical relationships and constraints formatted in accordance with the following requirements:

(1) A bar (node) representing the duration of each work activity scaled to the planned duration with arrows (relationship lines) defining predecessor and successor relationships. Each bar shall contain the following information positioned above, below, or adjacent to it in a consistent and legible manner:

(a) activity description;

(b) abbreviated start and finish dates (the day of the month in which the event occurs),

(c) and the activity duration.

(2) Lag time in whole Project units (e.g. working days) shall be displayed on each relationship line where it occurs. The use of lag must be minimized and restricted to only those situations where it is not possible to properly define the start or finish of an activity by the use of a normal Finish-to-Start, Start-to-Finish, Start-to-Start, or Finish-to-Finish relationship. Negative lag shall not be used.

15. Monetary value of each activity indicated in the Schedule shall be identified in the Table of Activity Data following the description. The allocation of monetary values assigned to activities shall be subject to approval and shall contain, as close as can reasonably be determined, all labor, equipment, material, and Subcontractor cost plus its proportional share of all indirect costs. The total of all values allocated to the individual work activities shall equal the total Contract value. Should the Design-Builder intend to deliver materials and receive payment under the delivered Materials on Site (MOS) provision of the Contract, with the approval of the Contracting Officer Representative, the following shall be incorporated into the schedule:

a. A MOS delivery activity shall be incorporated into the schedule in logical sequence with the associated installation activity. The cost allocated to the installation activity shall be reduced by the approved MOS activity amount. The activity description shall contain the MOS designation and an MOS activity code shall be assigned.

b. The monetary value assigned to that MOS activity shall be arrived at by considering only those materials the monetary values of which are to be excluded from the monetary values of the installation activities to which they relate. The monetary value of the delivery activity shall equal the projected invoiced values of materials, as restricted above and in other relevant provisions of the Contract, to be delivered to the Site. The Design-Builder shall submit a separate, detailed breakdown of the projected total of all MOS activities.

E. Individual schedule activities shall not exceed 20 working days duration, except certain procurement, delivery, or MOS activities, which may exceed 20 working days with the approval of the Contracting Officer Representative. Activities exceeding 20 working days duration shall be subdivided.

F. Schedule activities shall be sufficiently described to include what is to be accomplished and of the activity sequence (i.e. group activities by category of work, work area, and responsibility). Activity durations shall be expressed in whole days. Work that is to be performed by Subcontract shall be clearly defined.

G. The schedule diagram shall indicate a clearly defined critical path, which shall be prominently distinguished.

H. A written narrative shall accompany the schedule submittal describing the Design-Builder's approach and methods for completion of the Work. The narrative shall be adequate for the Contracting Officer Representative to understand the schedule and specifically identify the use of lag time.

1. The supporting narrative shall include the following:

a. A realistic approach to meeting the Contract completion date required by the Contract.

b. A discussion of the critical path and the most critical activities in meeting the required completion dates.

c. A listing of holidays and special non-working days planned during the Contract duration.

d. A separate tabulation of estimated monthly and cumulative planned earnings. The monetary values shall be generally consistent with the proposal item breakdown.

I. Submit the calendar(s) used to calculate the Project Schedule, including: (i) the proposed number of working days per week; (ii) the planned number of shifts per day; (iii) the number of hours per shift; and (iv) all non-working days.

J. In addition to the Project Schedule, the Design-Builder shall submit for approval a summarized Project Schedule depicting the entire Project Schedule in graphical, time-scaled format that clearly identifies the Design-Builder's work areas, activities, and planned logic for completion of the Work. The summarized Project Schedule shall consist of hammocked activities or otherwise summary bars of logically-grouped activities, of approximately 300 to 500 activities total.

K. A schedule showing the work completed in less than the Project Schedule, which is found practical and Approved by the Authority, shall be considered to have float. The float shall be the time between the scheduled completion of the Work and the Contract completion date. Float shall not be for the exclusive benefit of either the Authority or the Design-Builder. Float shall be a resource available to both parties.

L. A schedule found to be impractical by the Contracting Officer Representative for any reason shall be revised by the Design-Builder and resubmitted.

M. Upon Approval by the Authority, the Project Schedule shall be the baseline schedule used to monitor progress.

1.07 MONTHLY UPDATES OF THE PROJECT SCHEDULE

A. At least once each month, the Design-Builder shall submit an updated Project Schedule showing the progress of the Work to date and anticipated activities to be worked on.

B. The Project Schedule shall not be revised to include additional activities, deleted activities, revised activity durations, revised network logic, or any other changes to the schedule, without approval of the Contracting Officer Representative. Only actual progress, completion dates, and anticipated future progress shall be incorporated in a schedule update.

C. If according to the current updated Project Schedule, the Design-Builder is 60 or more working days behind the Contract completion date of any milestone, or the schedule contains 60 or more working days of negative float, considering all granted time extensions, the Design-Builder shall submit a Recovery Schedule, showing a practical plan to complete the work within the Contract time. The Design-Builder shall execute some or all of the following remedial actions: (i) increase construction labor in such quantities and crafts as necessary to eliminate the backlog of work; (ii) increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment

or any combination to eliminate the backlog of work. The Authority may withhold progress payments until a revised schedule, acceptable to the Contracting Officer Representative, is submitted by the Design-Builder.

D. Any revisions to the planned sequence, activity durations, interdependency of activities and any other change to the schedule shall be submitted separately for review. Written notification and explanation for the proposed changes and separately revised Project Schedule and narrative reports shall accompany the submittal. Changes shall not be incorporated into the current schedule until the submittal has been accepted by the Contracting Officer Representative. The baseline Project Schedule, i.e., the current schedule excluding schedule changes, shall be submitted along with the proposed schedule changes for the Contracting Officer Representative's review and approval.

E. Maintain the As-Built Project Schedule data according to the field records and submit to the Contracting Officer Representative on a monthly basis. In addition, retain all monthly schedule updates until the Work has been Accepted.

F. After all Contract work items are complete, and as a condition of Final Payment, the Design-Builder shall submit three copies of an As-Built Project Schedule showing actual start and finish dates for all work activities and milestones, based on the accepted monthly updates. The schedule submittals shall be in tabular and in time-scaled PDM plot formats. See Section 00 74 04, METHOD OF PAYMENT, for additional retainage to be withheld until the As-Built Project Schedule is delivered to the Contracting Officer Representative, is reviewed, and is determined to be complete and accurate.

1.08 90-DAY SCHEDULE

A. A schedule depicting activities occurring in the upcoming 90-Day period in greater detail than specified in the Initial 180-Day and Project Schedules. The logic shall follow the logic of the approved Project Schedule.

B. The schedule shall be time scaled and may be submitted in either bar chart or Critical Path Method (CPM) format.

C. Activities shall be 10 Days or less duration with particular focus on design, procurement, and associated activities to be performed in this time frame.

D. The 90-Day Schedule shall be updated and submitted monthly for review and approval by the Contracting-Officer Representative.

1.09 THREE WEEK WORK PLAN

A. A schedule in a calendar time-scaled bar chart format depicting the Design-Builder's intended work activities for the upcoming 3-week period shall be submitted on a weekly basis due on the first working day of each week. Each activity having 1 day duration shall be prominently noted.

B. Deviations, including but not limited to sequences of work, timing, and durations of activities from the Initial 180-Day or Project Schedules shall be noted and explained in writing.

C. The form of submittal may be formatted smaller than specified in Article 1.03 herein; however, the format shall not be less than 8-1/2 by 11 inches in size.

1.10 MONTHLY DESIGN PROGRESS REPORT

A. A description of design progress in the previous month, and a look ahead to the completion of design work.

B. Identify all design submittals issued to the Authority and the status of the submittals.

C. Identify all design submittals to be issued to the Authority for review or approval within the next 60 Days.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION

3.01 GENERAL

A. Schedules shall represent a practical plan to complete the Work within the Project Schedule, and shall convey the Design-Builder's intent in the manner of prosecution and progress of the Work.

B. The scheduling and executing of the Project Work in accordance with the schedule are the responsibility of the Design-Builder.

C. The submittal of schedules shall be understood to be the Design-Builder's representation that the schedule meets the requirements of the Contract Documents and that the Work will be executed in the sequence and duration Indicated in the schedule.

D. All schedule submittals are subject to review and acceptance by the Contracting Officer Representative. The Authority retains the right to withhold progress payments until the Design-Builder submits a schedule, payment schedule, and updates acceptable to the Contracting Officer Representative.

E. The approved Project Schedule will be used as the basis for progress payments to the Design-Builder. Payments will be made by the Contracting Officer Representative only for activities that are 100 percent complete.

3.02 PAYMENT

A. Submittal Monthly Progress Report at least 5 working days prior to the submittal of a progress payment request. No progress payment request will be processed if there is not an agreed update in place.

3.03 PROJECT SCHEDULER

A. To prepare the Project schedules, the Design-Builder shall engage the services of a full time scheduler who is skilled in the time and cost application of scheduling using PDM network techniques for heavy construction projects.

B. The Design-Builder's scheduler may or may not be an independent consultant; however, the scheduler shall be available to the Design-Builder and Contracting Officer Representative to address schedule questions and shall attend all Periodic Progress Review and Schedule meetings convened by the Contracting Officer Representative.

C. In the event that the Project scheduler is not found to be competent or to have sufficient relevant experience, WMATA will request that the Project scheduler be removed from the Project pursuant to Section 00 70 09, PROJECT MANAGEMENT AND SUPERINTENDENCE AND KEY STAFF. In that event, the Design-Builder shall submit a new candidate for consideration within 10 Days.

3.04 REQUESTS FOR TIME EXTENSIONS

A. The Design-Builder is responsible for submitting a written request for any extensions of Project Schedule within the time specified by the Contract. Requests not submitted in writing, without the required documentation, and not submitted within 30 Days will not be considered.

B. The request shall include documentation with written justification for the extension of time, supporting evidence, and specific references to the Contract for which the basis of the request is being made.

C. The request shall also include a calendar time-scaled CPM network schedule analysis and reports specified in Article 1.06 herein, depicting the time impact basis of the request with the affected areas prominently highlighted. The Project Schedule to be used in determining the time extension request shall be the current and accepted schedule at the time of the event.

D. If the Contracting Officer Representative finds that the Design-Builder is entitled to an extension of time of any completion date under the provisions of the Contract, the Contracting Officer Representative's determination of the total number of days extension will be based upon the current analysis of the currently approved Project Schedule and upon data relevant to the extension. Extensions of time for performance under any and all of the provisions of the Contract will be granted only to the extent that equitable time adjustments for the activity or activities affected exceed the total float along the paths involved of the most critical path to Project completion.

E. The Design-Builder shall submit a CPM fragnet with enough detail to depict the causes, duration, and logic relationship and impact of the current schedule activities. The quantum of delay impact on Contract completion or interim milestone(s} must be determined for time extension.

F. Critical delays, i.e., delay, which may affect the activities on the current critical path, will be contemporaneously discussed and mutually agreed by all the parties involved. In case the quantum of delays or impact cannot be resolved, the background, issues, work performed, as well as start and finish dates of delays shall be well-documented in chronological order. The Contracting Officer Representative's determination of merit for time extension(s) will be awarded after the Contracting Officer Representative finds entitlement to the Design-Builder's request and only after the alleged delays are demonstrated to impact the most critical path(s). Data furnished by the Design-Builder will be used as a basis in the findings of the Contracting Officer Representative.

G. A complete As-Built Schedule, which has enough detail to depict delay and demonstrate cause-effect delay impact, shall be submitted at the end of the Project.

END OF SECTION

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.

PART 4 – MEASUREMENT AND PAYMENT

4.01 PAYMENT

A. Compensation in the amount of one-tenth of one percent (.1%) of the base bid of the contract shall be retained until the work and premises are cleaned to a state satisfactory to the Authority Representative.

END OF SECTION

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.

7. 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 Contracting Officer 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.

8. 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.

9. Furnish additional operation and maintenance manuals required for LEED Silver Certification in accordance with the quantity and documentation requirements for LEED for New Construction and Major Renovation.

10. In addition to the retainage specified in Section 00 74 04, METHOD OF PAYMENT, $150,000 will be withheld until one (1) compiled copy of ALL required and approved O&M manuals for the Project has been delivered to the Authority Representative. This electronic compilation of O&M Manuals shall be submitted in PDF file format on a CD-ROM/DVD disk.

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.

c. In addition to the retainage specified in Section 00 74 04, METHOD OF PAYMENT, $500,000 will be withheld until final approved As-Built Contract Record Drawings, As-Built Contract Specifications and As-Built Electronic Media Drawing Files are delivered to the Authority Representative.

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 Contracting Officer 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 Contracting Officer 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 Contracting Officer 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 Contracting Officer 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.

   b. The Authority's Standard Specifications are not to be edited, however specifications prepared by the Design Builder as part of the development of the Issued for Construction Specifications shall be edited to be Project specific.

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 1.04E.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 1.04E.3 above.

F. Asset Database

G. Preventive Maintenance Instructions

H. Survey Field Notes in accordance with Section 01 33 00, SUBMITTAL PROCEDURES:

1. As applicable, submit electronic media of the following as specified in Section 01 72 10, LAYOUT OF WORK AND FIELD ENGINEERING:

a. Survey Record Log.

I. Releases and Vouchers:

1. As applicable, submit one original hard copy and electronic media, in Adobe (.PDF) file format, of releases and vouchers.

J. 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.

K. Request for Final Payment:

1. Submit one original hard copy and electronic media, in Adobe (.PDF) file format, of final payment request. Final Settlement will be made in accordance with Section 00 74 04, METHOD OF PAYMENT.

L. 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 08, CORRECTION OF DEFICIENCIES.

M. 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, Certification that all facilities were constructed in conformance with ADAAG regulations (Form attached at end of Section), 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 07, WARRANTY/GUARANTEE OF CONSTRUCTION, and Section 00 75 08, 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.

N. LEED Silver Certification:

1. At completion of construction and prior to the Contract closeout period, the Design-Builder shall deliver to WMATA, the LEED Silver Report and Plaque certifying that the Project has been designed and constructed employing sustainable materials and methods pursuant to the U.S. Green Building Council's LEED Certification process.

PART 2 – PRODUCTS (not used)

PART 3 – EXECUTION (not used)

END OF SECTION

SECTION 05 12 13

ARCHITECTURALLY EXPOSED STRUCTURAL STEEL FRAMING (AESS)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Structural steel framing and assemblies exposed to view, designated on the drawings as “Architecturally Exposed Structural Steel” or “AESS” include the following:
   a. Entrance pavilions.
   b. Platform canopies.
   c. Platform shelters.
   d. Windscreens.
   e. Curtain walls.
   f. Mezzanine vaults.
   g. Pedestrian bridges.
   h. Unitized louver framing. and
   i. Elevator support/bracing.

B. Related Requirements:

1. Section 05 12 00 "Structural Steel Framing" for additional requirements applicable to AESS.
2. Section 05 50 00 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
3. Section 09 9600 “High-Performance Coatings” for primers and coatings used at AESS.

1.3 DEFINITIONS

A. AESS: Structural steel designated as "architecturally exposed structural steel" or "AESS" in the Contract Documents as defined in AISC 303, Section 10.

B. Category 4 AESS: AESS that is within 96 inches vertically and 36 inches horizontally of a walking surface and that is visible to a person standing on that walking surface.

C. Category 3 AESS: AESS that is within 20 feet vertically and horizontally of a walking surface and that is visible to a person standing on that walking surface.

D. Category 2 AESS: AESS that is further than 20 feet vertically and horizontally of a walking surface and that is visible to a person standing on that walking surface.

1.4 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Shop Drawings: Show fabrication of AESS components. Shop Drawings for structural steel may be used for AESS provided items of AESS are specifically identified and requirements below are met for AESS.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain. Indicate grinding, finish, and profile of welds.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections. Indicate orientation of bolt heads.
5. Indicate exposed surfaces and edges and surface preparation being used.
6. Indicate special tolerances and erection requirements.

B. Samples: Submit Samples of AESS to set quality standards for exposed welds.

1. Two steel plates, 3/8 by 8 by 4 inches , with long edges joined by a groove weld and with weld ground smooth.
2. Steel plate, 3/8 by 8 by 8 inches , with one end of a short length of rectangular steel tube, 4 by 6 by 3/8 inches , welded to plate with a continuous fillet weld and with weld ground smooth and blended.
3. Round steel tube or pipe, minimum 8 inches in diameter, with end of another round steel tube or pipe, approximately 4 inches in diameter, welded to its side at a 45-degree angle with a continuous fillet weld and with weld ground smooth and blended.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and fabricator.

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

1.8 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with codes, laws and regulations of the authorities having jurisdiction (AHJ). Refer to Section 01 41 00 "Regulatory Requirements" for additional information.

B. Reference Standards and Specifications:

1. Architecturally Exposed Structural Steel provisions of Section 10, Code of Standard Practice, AISC 303

C. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD, or is accredited by the IAS Fabricator Inspection Program for Structural Steel (AC172).

D. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE or Category CSE.

E. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement P1 for Enclosed Conditions, Endorsement P2 for Covered Conditions, and Endorsement P3 for Exposed Exterior Conditions or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

F. Mockups: Build mockups of AESS to set quality standards for fabrication and installation.

1. Build mockup of typical portion of AESS as shown on Drawings.
2. DELETED
3. Coordinate high-performance coatings requirements with Section 09 96 00 "High-Performance Coatings."
4. DELETED
5. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Use special care in handling to prevent twisting, warping, nicking, and other damage. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. General:

1. Load, transport, unload, and store structural materials so as to keep them clean and free from damage.
2. Store material on platforms, skids or other supports above the ground and ensure proper drainage and protection from corrosion.
3. Deliver structural steel to the site in such quantities and at such times to ensure continuity of installation.

C. Steelwork:

1. When handling and shipping steelwork, prevent bending, scraping or overstressing members. Keep steel members off ground by using pallets, blocking, or other supports. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Repair or replace damaged materials or structures.
2. Block projecting parts likely to be bent or damaged during handling with wood or other approved material.
3. Replace pieces bent or damaged unless the repair is approved by the Owner.

D. Bolts and Nuts:

1. Ship small parts such as bolts, nuts, washers, pins, fillers and small connecting plates or angles in boxes, crates or barrels, properly identified for correct use on project.
2. Pack separately bolts of each length and diameter and loose nuts or washers of each size.
3. Store fasteners in a protected place.

E. Welding Rods and Electrode Wire: Deliver SMAW welding rods to fabrication shop and jobsite in hermetically sealed metal containers. Store rods in sealed container or in a rod oven maintained at 250 degrees F. Comply with AWS D1.1 Section 5 for handling of rods and electrode wire.

F. Paint: Have paint materials delivered in manufacturer's original sealed containers, bearing manufacturer's label and name, specification identification number where applicable as well as month and year of manufacture.

G. Promptly remove materials or fabricated components that do not comply with contract requirements. Replace with new materials.

1.10 FIELD CONDITIONS

A. Field Measurements: Where AESS is indicated to fit against other construction, verify actual dimensions by field measurements before fabrication.

B. Environmental Requirements:

1. Shop Welding:
   a. When welding during cold weather, avoid chilling weld metal within zone of welding influence
   b. When temperature where steel is stored is more than 20°F below that of welding shop, move steel to be welded into shop sufficiently in advance of welding to allow it to attain shop temperature prior to welding.
   c. Steel shall be free of moisture.
   d. Comply with preheat requirements of AWS D1.1.
2. Field Welding:
   a. Steel surfaces to be welded shall be dry, and free from mill scale, dirt, oil, paint, and other contaminants.
   # b. Gas-shielded welding processes shall not be used when the weld is subject to # wind speed above 3 MPH. Field welding to be completed in accordance exclusively with AWS D1.1.
3. Painting:
   a. Apply paint when temperature of steel and paint is above minimum recommended temperature of paint manufacturer and temperature is forecasted to remain above the minimum recommended temperature until paint has dried.
   b. Painting steel at a temperature, which can cause blistering, porosity or conditions otherwise detrimental to life of paint, is prohibited. When paint is applied in hot weather or thinned in cold weather, ensure that specified thickness of paint coating is obtained.
   c. Priming and painting of the structural steel shall be in accordance with the product manufacturer's specifications.
   d. Steel pieces shall not be marked with any substance (e.g., wax crayon) which will telegraph through the specified paint or coating system. Comply with paint manufacturer's requirements.

e. Assembly marks will be located out of sight. Bleed through markers/paint stickers shall be utilized in nonvisible areas. Scanning tags will be placed in nonvisible locations. The locations of all tags will be noted on the approval drawings for comment by the design team.

PART 2 - PRODUCTS

2.1 STEEL

A. Structural Steel: As specified in Section 05 12 00, "Structural Steel Framing."

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F1852, Type 1, round-head assemblies, consisting of steel structural bolts with splined ends, heavy-hex carbon-steel nuts, and hardened carbon-steel washers.

1. Finish: Mechanically deposited zinc coating.

2. DELETED

2.3 FILLER

A. Filler: Polyester filler intended for use in repairing dents in automobile bodies.

2.4 PRIMER

A. DELETED

B. Primer: SSPC-Paint 25, zinc oxide, alkyd, linseed oil primer.

C. DELETED

D. DELETED

E. DELETED

F. Etching Cleaner for Galvanized Metal: MPI#25.

G. Galvanizing Repair Paint: ASTM A780.

H. Shop Primer for Galvanized Steel: In accordance with Section 09 96 00 "High-Performance Coatings."

2.5 FABRICATION

A. Shop fabricate and assemble AESS to the maximum extent possible. Locate field joints at concealed locations if possible. Detail assemblies to minimize handling and to expedite erection.

B. In addition to special care used to handle and fabricate AESS, comply with the following:

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, and roughness.
2. Grind sheared, punched, and flame-cut edges of Category 4 AESS to remove burrs and provide smooth surfaces and edges.
3. Fabricate Category 4 AESS with exposed surfaces free of mill marks, including rolled trade names and stamped or raised identification.
4. Fabricate Category 3 and Category 4 AESS with exposed surfaces free of seams to maximum extent possible.
5. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.
6. Fabricate with piece marks fully hidden in the completed structure or made with media that permits full removal after erection.
7. Fabricate Category 4 AESS to the tolerances specified in AISC 303 for steel that is designated AESS.
8. Fabricate Category 2 and Category 3 AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.
9. Seal-weld open ends of hollow structural sections with 3/8-inch closure plates for Category 4 AESS.

C. Curved Members: Fabricate indicated members to curved shape by rolling to final shape in fabrication shop.

1. Distortion of webs, stems, outstanding flanges, and legs of angles shall not be visible from a distance of 20 feet under any lighting conditions.
2. Tolerances for walls of hollow steel sections after rolling shall be approximately 1/2 inch .

D. Coping, Blocking, and Joint Gaps: Maintain uniform gaps of 1/8 inch with a tolerance of 1/32 inch for Category 4 AESS.

E. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

F. Cleaning Corrosion-Resisting Structural Steel: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, Pretensioned, or Slip critical in accordance with engineered shop drawings and with Section 05 12 00 “Structural Steel Framing.”

B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work, and comply with the following:

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding specified tolerances.
2. Use weld sizes, fabrication sequence, and equipment for AESS that limit distortions to allowable tolerances.
3. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where Category 4 AESS is exposed to weather.
4. Provide continuous welds of uniform size and profile where Category 4 AESS is welded.
5. Grind butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus zero inch for Category 3 and Category 4 AESS.
6. Make butt and groove welds flush to adjacent surfaces within tolerance of plus 1/16 inch, minus zero inch for Category 3 and Category 4 AESS. Do not grind unless required for clearances or for fitting other components, or unless directed to correct unacceptable work.
7. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 3 and Category 4 AESS.
8. At locations where welding on the far side of an exposed connection of Category 3 and Category 4 AESS occurs, grind distortions and marking of the steel to a smooth profile aligned with adjacent material.
9. Make fillet welds for Category 3 and Category 4 AESS oversize and grind to uniform profile with smooth face and transition.
10. Make fillet welds for Category 3 and Category 4 AESS of uniform size and profile with exposed face smooth and slightly concave. Do not grind unless directed to correct unacceptable work.

2.7 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A123.

1. Do not quench or apply post-galvanizing treatments that might interfere with paint adhesion.
2. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
3. # Galvanize lintels, shelf angles, plates, and related items attached to structural-steel frame and located in exterior walls. #

2.8 SHOP PRIMING

A. Shop prime steel ferrous and galvanized surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches .
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. DELETED

B. Surface Preparation: Comply with Section 09 96 00 “High-Performance Coatings.”

1. DELETED

2. DELETED
3. DELETED
4. DELETED
5. DELETED
6. DELETED
7. DELETED
8. DELETED
9. DELETED

C. DELETED

D. Priming: Immediately after surface preparation, apply primer according to Section 09 96 00 "High-Performance Coatings," manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
2. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Examine AESS for twists, kinks, warping, gouges, and other imperfections before erecting.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep AESS secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

1. If possible, locate welded tabs for attaching temporary bracing and safety cabling where they will be concealed from view in the completed Work.
2. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set AESS accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

1. Erect Category 4 AESS to the tolerances specified in AISC 303 for steel that complies with description of AESS as defined in this Section.

2. Erect Category 2 and Category 3 AESS to the tolerances specified in AISC 303 for steel that is not designated AESS.

B. Do not use thermal cutting during erection unless approved by the Owner and Architect. Finish thermally cut sections within smoothness limits in AWS D1.1. Demonstrate thermal cutting and finishing on mockups and obtain Owner's approval prior to using this technique on-site.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Snug tightened, Pretensioned, or Slip critical in accordance with Section 05 12 00 and approved shop drawings.

2. Orient bolt heads in same direction for each connection and to maximum extent possible in same direction for similar connections as approved on shop drawings.

B. Weld Connections: Comply with requirements in "Weld Connections" Paragraph in "Shop Connections" Article.

1. Remove backing bars or runoff tabs; back-gouge and grind steel smooth for Category 3 and Category 4 AESS.
2. Remove erection bolts in Category 3 and Category 4 AESS, fill holes, and grind smooth.
3. Fill weld access holes in Category 3 and Category 4 AESS and grind smooth.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect AESS as specified in Section 05 12 00 "Structural Steel Framing." The testing agency is not responsible for enforcing requirements relating to aesthetic effect.

B. The Authority and Architect will observe AESS in place to determine acceptability relating to aesthetic effect.

3.6 REPAIRS AND PROTECTION

A. Remove welded tabs that were used for attaching temporary bracing and safety cabling and that are exposed to view in the completed Work. Grind steel smooth.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

C. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

D. DELETED

E. Touchup Priming: Cleaning and touchup priming are specified in Section 09 96 00 "High-Performance Coatings."

END OF SECTION

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. # Provisions for field replacement of glazing from interior. #
   6. Provisions for safety railings mounted on interior face of mullions.
   7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Fabricate components to resist water penetration as follows:
   1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
   2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Curtain-Wall Framing: Fabricate components for assembly using manufacturer's standard assembly method.

F. Factory-Assembled Frame Units:
   1. Rigidly secure nonmovement joints.
   2. Prepare surfaces that are in contact structural sealant according to sealant manufacturer's written instructions to ensure compatibility and adhesion.
   3. Preparation includes, but is not limited to, cleaning and priming surfaces.
   4. Seal joints watertight unless otherwise indicated.
   5. Install glazing to comply with requirements in Section 08 80 00 "Glazing."

G. After fabrication, clearly mark components to identify their locations in Project according to Shop Drawings.

2.10 ALUMINUM FINISHES

A. Anodized Finishes:
   1. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.7 mils or thicker.
   2. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.7 mils or thicker.
      a. Color: As selected by Architect from full range of industry colors and color densities.

B. Baked-Enamel or Powder-Coat Finish: AAMA 2603 except with a minimum dry film thickness of 1.5 mils. Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.

Washington Metropolitan Area Transit Authority

SAFETY & SECURITY CERTIFICATION PLAN

March 2015

REVISION HISTORY

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July 2003	0	Initial Issue
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PREFACE

System safety and security play important roles in achieving and maintaining the Washington Metropolitan Area Transit Authority (WMATA) mission to provide exceptional service in a safe and secure operating environment. WMATA has implemented a Safety and Security Certification Plan (SSCP) to help in the achievement of this mission.

The goal of safety and security certification is to ensure that Metrorail extensions, new and rehabilitated facilities and vehicles; and new and rehabilitated Metrobus facilities and equipment are operationally safe and secure for customers, employees, and the general public. To this end, the SSCP establishes a formal verification process to ensure that safety and security requirements are incorporated into design, construction/ installation, procurement and testing activities; training programs; and operations and maintenance procedures.

This document identifies the management responsibilities and the technical process for the implementation of the SSCP. Only with the effective coordination and a team approach can the SSCP successfully fulfill its goals and objectives within WMATA.

CONCURRENCES AND APPROVAL

This Safety and Security Certification Plan is submitted by the Executive Safety Committee for approval.

3/30/2015

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3.30.2015

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1 INTRODUCTION

1.1 Authority

The Federal Transit Administration (FTA), through 49 CFR Part 659 – Rail Fixed Guideway Systems, State Safety Oversight requires rail safety oversight of the Metrorail system, a Washington Metropolitan Area Transit Authority (WMATA) rail fixed guideway system operating in the State of Maryland, the Commonwealth of Virginia and the District of Columbia. The Tri-State Oversight Committee (TOC) is the organization responsible for promulgating System Safety Program Standards and Procedures for, and providing rail safety oversight of, the WMATA Metrorail system.

TOC requires WMATA to prepare a System Safety Program Plan (SSPP) conforming to standards as defined in the TOC Procedures Manual for State Safety Oversight of the WMATA Metrorail System. The TOC Procedures Manual also requires the development and implementation of a Safety and Security Certification Plan (SSCP) for the Metrorail system. FTA Circular 5800.1, Safety and Security Management Guidance for Major Capital Projects also requires the development of an SSCP for major capital projects covered by 49 CFR Part 633. This SSCP fulfills the TOC, FTA Circular, and WMATA SSPP requirements and establishes the process for verifying the incorporation of essential safety and security requirements into all new and rehabilitated WMATA alignments, facilities, systems and equipment.

1.2 Background

The SSCP presents a comprehensive approach to ensuring the safety and security of future extensions, capital improvements, and the integration of new and rehabilitated facilities, systems and equipment. The SSCP is modeled after the FTA Handbook for Transit Safety and Security Certification (Reference 1.7.5), tempered with the experience gathered from other transit safety and security certification programs and the unique requirements of WMATA and its tri-state operations.

The key documents that form the baseline for safety and security certification include:

- WMATA System Safety Program Plan;
- WMATA Security and Emergency Preparedness Plan;
- WMATA design development drawings, standard drawings, standard specifications, design criteria manuals and directive drawings, which determine the safety and security requirements to be reflected in the contract specifications;
- Metrorail Safety Rules and Procedures Handbook (MSRPH) and other applicable WMATA operating rules and procedures;
- National Fire Protection Association (NFPA), American Railway Engineering and Maintenance of Way Association (AREMA), the transit industry, and other applicable codes and standards; and
- Contractual documents and specifications, which define the safety and security features of facilities, systems, and equipment.

1.3 Purpose

The purpose of the SSCP is to ensure that:

- Design and operating hazards and security vulnerabilities are identified, evaluated and properly controlled or mitigated, prior to the commencement of passenger service;
- All critical system elements are evaluated for compliance with the identified safety and security requirements during the design, construction/installation, testing, and start-up phases of a project; and
- WMATA bus and rail systems are operationally safe and secure for customers, employees, emergency personnel and the general public, prior to entering, or re-entering after modification, revenue service or use by WMATA personnel.

1.4 Goals and Objectives

WMATA will self-certify that system extensions and new and rehabilitated facilities, systems and equipment are as safe and secure as reasonably possible, within available resources, for use by passengers, employees, contractors, emergency responders, and the general public. For this reason, the goal of the SSCP is to achieve and demonstrate an acceptable level of risk through:

- Systematic approach to hazard and threat/vulnerability management;
- Compliance with safety and security codes, standards, and industry practices;
- Safety and security criteria adherence and specification compliance; and
- Design, construction/installation, testing, and start-up phase verification and review.

Specific program objectives that support the above goals include:

- Potential safety hazards are evaluated and resolved at the earliest possible phase of the project, with resolutions tracked and documented;
- Potential security issues are assessed and resolved at the earliest phase of a project, as possible, with actions taken tracked and documented;
- Appropriate codes, guidelines and standards are reviewed and applied so as to provide a basis for safety and security considerations in the design criteria;
- Facilities, systems, and equipment are designed, constructed, built, inspected and tested in accordance with design criteria and specifications;
- Necessary changes are made to system safety plans, system security plans, operating and maintenance plans and procedures, rulebook, and training programs;
- Personnel are trained and certified to operate and maintain the facilities, systems, and equipment; and
- Emergency response agencies are familiar with, received initial training and refresher training with the inherent hazards of WMATA operations and response to WMATA emergencies.

1.5 Scope

This SSCP is applicable to all new rail extensions, rail and bus rolling stock, systems, and facilities. Rehabilitation and modification projects are included in the certification plan if it affects safety or security critical systems. The WMATA SAFE staff and Project Manager evaluate and determine the level of certification for each project; which shall be made available to the Safety and Security Certification

Review Committee (SCRC).

Major rail capital projects over $100 million, which are funded by the FTA, shall meet the required project certification activities, as described in the projects' Safety and Security Management Plans (SSMPs). FTA may also require a project-specific plan for other capital projects. The development of the project-specific appendices to this plan will be based on this plan.

The SSCP addresses three separate, but overlapping functional areas:

- System Safety and Security;
- Fire/Life Safety; and
- Occupational Safety.

The scope of the SSCP encompasses the equipment, operating and maintenance plans, facilities, and procedures for the following:

- System Elements - includes the passenger vehicles, third rail, train control system, voice & data communications, CCTV cameras and recorders, intrusion detection system, traction power substations, track, automatic fare collection equipment, supervisory control, fire protection and suppression systems, auxiliary vehicles and equipment, and buses.
- Fixed Facilities - includes rail stations, parking garages and parking lots, bus stops, pedestrian overpasses and bridges, rail and bus yards and shops, structures, and the central control facility. Equipment installed in stations and shops (such as Kiosk, HVAC, escalators, elevators, and lighting) is considered part of the facility. Similarly, equipment installed along the guideway (such as tunnel lighting, emergency access/exits, Emergency Trip Stations (ETS), pump, and fans) is considered part of the facility.
- Testing – includes contractual, integrated, and pre-operational tests.
- Safety, Security, System Assurance, Operational, Maintenance Plans and Procedures - includes items such as Emergency Preparedness Plan, Snow Emergency Plan, Operations and Maintenance Training Programs, Employee Qualification, Emergency Responder Training, Rule Book, Standard Operating Procedures, Quality Assurance/Quality Control Plans (including integrated testing and pre-revenue service), and Operations Administrative Procedures.

1.6 Revisions

The SSCP is reviewed by the Department of Safety and Environmental Management (SAFE) at least triennially and amended or revised, as required, to reflect process changes as determined by audit activities. Proposed revisions are reviewed by members of the SCRC and submitted to the Executive Safety Committee (ESC).

1.7 Reference Documents

The following documents were used either in the preparation of the SSCP, or are references for related information:

- WMATA, System Safety Program Plan, January 2014
- WMATA, Safety Rules and Procedures Handbook, July 2012

- Tri-State Oversight Committee Program Standard for State Safety Oversight of the WMATA Metrorail System, September 2012
- 49 CFR Part 659 Rail Fixed Guideway Systems, State Safety Oversight, Federal Transit Administration
- FTA Office of Safety & Security, Handbook for Transit Safety and Security Certification, November 2002
- Mil-Std-882D. Standard Practice for System Safety, U.S. Department of Defense, February 2000
- Mil-Std-882C. System Safety Program Requirements, U.S. Department of Defense, January 1993

1.8 Acronyms

Acronyms applicable to this Plan are presented below:

AGM	Assistant General Manager
BMNT	Office of Bus Maintenance
BUS	Department of Bus Services
CENI	Office of Chief Engineer, Infrastructure
CENV	Office of Chief Engineer, Vehicles
CFR	Code of Federal Regulations
CMNT	Office of Rail Car Maintenance
COG	Metropolitan Washington Council of Governments
CPDO	Office of Capital Program Delivery
CSO	Chief Safety Officer
COUN	Office of General Counsel
ELES	Office of Elevator and Escalator Services
ESC	Executive Safety Committee
FTA	Federal Transit Administration
IRPG	Office of Infrastructure Renewal Programs
IT	Department of Information Technology
MCAP	Office of Major Capital Projects
Mil-Std	Military Standard
MTPD	Metro Transit Police Department
NFPA	National Fire Protection Association
OEM	Office of Emergency Management
PRMT	Office of Procurement and Materials
QAAW	Office of Quality Assurance and Warranty

RTRA	Office of Rail Transportation
RTTO	Office of Train Operations
SAFE	Department of Safety and Environmental Management
SMNT	Office of System Maintenance
SRPG	System Renewal Program
SSMP	Safety and Security Management Plan
SSPP	System Safety Program Plan
SSCP	Safety & Security Certification Plan
SCRC	Safety & Security Certification Review Committee
TIES	Department of Transit Infrastructure and Engineering Services
TOC	Tri-State Oversight Committee
TRST	Office of Track and Structures
WMATA	Washington Metropolitan Area Transit Authority

2 PROGRAM MANAGEMENT, ORGANIZATION, AND RESPONSIBILITIES

2.1 Organizational Management Structure

The WMATA SSCP is managed by a coordinated effort of WMATA staff. SSCP implementation is the responsibility of all project staff, including contractors. The SCRC oversees the effectiveness of the SSCP, all SCRC Members must be WMATA employees.

2.2 Organizational Responsibilities

2.2.1 Department of Safety and Environmental Management

The Department of Safety and Environmental Management (SAFE), is responsible for managing and monitoring implementation of the SSCP on a day-by-day basis, and for verifying completion of all tasks that address safety and security critical elements. Other responsibilities include:

- Reviewing and updating, as required, the SSCP;
- Chairing the SCRC;
- Identifying and defining the certifiable elements, items, and safety and security requirements;
- Developing the compliance checklists;
- Reviewing verification documentation for each certifiable element to ensure compliance with the identified safety and security requirements;
- Advising the SCRC of documentation discrepancies or completeness that require resolution;
- Determining the hazard severity, probability, and hazard risk index of identified hazards;
- Establishing a hazard/threat log to track all identified safety hazards and security vulnerabilities to resolution;
- Reporting progress of the Safety and Security Certification effort to the SCRC;
- Preparing for issuance Certificates of Compliance for each certifiable element and the system as a whole;
- Reviewing the Safety and Security Certification process;
- Recommending revisions to the SSCP;
- Providing a final Safety and Security Certification Report for each project that has undergone safety and security certification through the SCRC; and
- Transmitting a final Safety and Security Certification Verification Report for each Metrorail project to TOC.

2.2.2 Metro Transit Police Department (MTPD)

The MTPD and the OEM unit within the MTPD, works with project managers to ensure:

- Security requirements are incorporated in project contracts and specifications;
- Development of the security aspects in compliance checklists;

- Security verification documentation supports compliance with the security requirements; and
- An appropriate security risk index is assigned to an identified vulnerability or threat, based on severity and probability.

2.2.3 Office of Chief Engineer, Infrastructure (CENI)

The Chief Engineer, Infrastructure (CENI) reports to the AGM/TIES and is delegated the responsibility for the acquisition, construction and for completing the safety and security certification process (with SAFE) for new facilities, and systems. This responsibility includes the research, planning, design, engineering, construction, manufacturing and testing of all new facilities and systems. CENI is responsible for the safe delivery of infrastructure renewal projects, managing adjacent construction and managing joint development projects. In addition, CENI is responsible for maintaining, updating and publishing the WMATA *Emergency Response Maps*. The Chief Engineer has established procedures to ensure CENI's compliance with applicable safety requirements for all projects assigned to CENI. CENI staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. Additional safety and security program responsibilities include:

- Participation as active members of the SCRC;
- Assisting in the identification of safety and security certifiable elements, items and requirements;
- Assisting in the development of safety and security compliance checklists;
- Assurance that the project management organization (internal and consultants) incorporate safety and security requirements into the project design criteria and specifications;
- Assurance that project staff and/or the contractor(s) develops an adequate project document record keeping and submittal system to facilitate the verification process;
- Assurance that the contractor meets the identified safety and security specification requirements, under their control; and
- Assurance of the successful completion of all safety/security related specification and integration test program activities.

2.2.4 Office of Major Capital Projects (MCAP)

The Director of MCAP reports to the AGM/TIES and is responsible for ensuring that proper capital investments are made to support the safe operations of the Metro system. Under direction of Office Director, MCAP is responsible for engineering, design and construction of bus garages, parking structures, MTPD substations, yards, maintenance bays, shops, and other facilities to support Metro System operations. MCAP staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. Additional safety and security program responsibilities include:

- Participation as active members of the SCRC;
- Assisting in the identification of safety and security certifiable elements, items and requirements;
- Assisting in the development of safety and security compliance checklists;

- Assurance that the project management organization (internal and consultants) incorporate safety and security requirements into the project design criteria and specifications;
- Assurance that project staff and/or the contractor(s) develops an adequate project document record keeping and submittal system to facilitate the verification process;
- Assurance that the contractor meets the identified safety and security specification requirements, under their control; and
- Assurance of the successful completion of all safety/security related specification and integration test program activities.

2.2.5 Office of Capital Program Delivery (CPDO)

The Senior Director of CPDO reports to the AGM/TIES and is responsible for streamlining internal processes within key groups and facilitating communication between logical internal and external partners. The CPDO office includes the offices of Infrastructure Renewal Programs (IRPG), System Renewal Program (SRPG), and Track Allocation and Support Services (TASS). CPDO staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. CPDO staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. Additional safety and security program responsibilities include:

- Participation as active members of the SCRC;
- Assisting in the identification of safety and security certifiable elements, items and requirements;
- Assisting in the development of safety and security compliance checklists;
- Assurance that the project management organization (internal and consultants) incorporate safety and security requirements into the project design criteria and specifications;
- Assurance that project staff and/or the contractor(s) develops an adequate project document record keeping and submittal system to facilitate the verification process;
- Assurance that the contractor meets the identified safety and security specification requirements, under their control; and
- Assurance of the successful completion of all safety/security related specification and integration test program activities.

2.2.6 Office of Chief Engineer Vehicles (CENV)

The Chief Engineer, Vehicles (CENV) reports to the AGM/TIES. CENV is responsible for operations and maintenance needs of rail car vehicles. CENV provides technical support to procurement of vehicles and contractor selection for rail car vehicles. CENV Program Management leads and coordinates with METRO vehicle stake holders (e.g. CMNT, PRMT, QAAW, SAFE, COUN, RTTO and RTRA) the delivery and acceptance of railcars which meet the specification requirements outlined in the vehicle procurement requirements and that the project remains legally compliant. Rail car system configurations are coordinated with respective departments for quality, maintenance, operators' use and safety to ensure that stakeholder's needs are incorporated and that the highest level of performance and service are delivered to WMATA customers.

CENV develops and maintains configuration controlled specifications and historical databases for rail car vehicles and configuration-controlled documents for rail car maintenance personnel. CENV staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. Additional safety and security program responsibilities include:

- Participation as active members of the SCRC;
- Assisting in the identification of safety and security certifiable elements, items and requirements;
- Assisting in the development of safety and security compliance checklists;
- Assurance that the project management organization (internal and consultants) incorporate safety and security requirements into the project design criteria and specifications;
- Assurance that project staff and/or the contractor(s) develops an adequate project document record keeping and submittal system to facilitate the verification process;
- Assurance that the contractor meets the identified safety and security specification requirements, under their control; and
- Assurance of the successful completion of all safety/security related specification and integration test program activities.

2.2.7 Office of Bus Maintenance (BMNT)

The Office of Bus Maintenance is located within the department of Bus Services. The Managing Director of Bus Maintenance (BMNT) reports directly to the AGM-Bus, and is responsible for the acquisition, engineering, design, and maintenance activities of buses and motor vehicles, including training of maintenance staff. The Managing Director of Bus Maintenance implements the SSCP related to transit bus related projects subject to certification. BMNT staffs are charged with the responsibility for implementing the SSCP for each project when safety and security certification is required. Additional safety and security program responsibilities include:

- Participation as active members of the SCRC;
- Assisting in the identification of safety and security certifiable elements, items and requirements;
- Assisting in the development of safety and security compliance checklists;
- Assurance that the project management organization (internal and consultants) incorporate safety and security requirements into the project design criteria and specifications;
- Assurance that project staff and/or the contractor(s) develops an adequate project document record keeping and submittal system to facilitate the verification process;
- Assurance that the contractor meets the identified safety and security specification requirements, under their control; and
- Assurance of the successful completion of all safety/security related specification and integration test program activities.

2.2.8 Other WMATA Offices

SAFE, the Office of Engineering and Capital Projects, and Metro Transit Police are principally involved in the safety and security certification process. However, depending on the scope of a project other WMATA internal offices may be required to participate in the certification process.

2.2.9 Safety and Security Certification Review Committee (SCRC)

The SCRC was established as a subcommittee of the Executive Safety Committee (ESC) under WMATA Policy/Instruction No.10-2/2. The SCRC is responsible for overseeing SSCP implementation and for ensuring that certifiable levels of operational safety and security items (i.e. system, subsystem, and programs) are completed and verified. The SCRC is accountable to the ESC for the overall conduct and implementation of the SSCP and approval of the certification documentation, in accordance with the WMATA SSCP. As such SCRC voting members must be WMATA employees. The SCRC is responsible for the following:

- Reviewing the SSCP to ensure it meets project safety and security requirements;
- At its discretion, establishing project specific working groups responsible for implementing the safety and security certification process;
- Ensuring the safety certification process begins in the planning and design phases and continues through the testing and start-up phases of the project (as applicable);
- Ensuring certification checklists are prepared and completed in a timely manner;
- Resolving issues of verification documentation discrepancies and incompleteness (evidence of compliance with safety and security requirements);
- Approving mitigation/control measures for open issues, based on the recommendation of project staff, consultant/contractor, and SAFE. If consensus cannot be reached, the issue is submitted to the ESC for final resolution;
- Assigning responsibilities for implementation of mitigation/control measures for the open issue(s);
- Defining additional safety/security-related tests and analysis, as required;
- Determining whether to accept the existence of specific conditions or require corrective actions, including the specific method to mitigate and control the conditions, based on recommendations;
- Evaluating proposed hazard/threat resolution methodologies and evidence of compliance to safety/security requirements;
- Providing recommendations to the ESC regarding certification of projects; and
- Approving the final verification report for each project.

The Chief Safety Officer (CSO) or designee serves as chairperson of the SCRC and is responsible for preparing all committee materials, documents, agenda, and issuance of meeting minutes.

Note: SCRC representative designees have the same decision-making authority as the primary representative.

As conditions require, subcommittees may be formed for specific purposes, using special expertise to

resolve a hazardous condition or vulnerability. Other WMATA staff may be requested to provide their expert input on specific agenda items. Personnel from the following organizations may also be requested to provide information, assistance, and advice:

- Local and State Police and Fire Departments;
- Engineering Design and Construction Consultants, to include resident engineers; and
- Metropolitan Washington Council of Governments (COG).

The SCRC meets monthly, to assess the status of the certification effort of each project's SSCP. The SCRC may meet more frequently to resolve outstanding safety and security issues, as they arise, and to approve Certificates of Compliance, as they are completed, or less frequently if no committee business is pending.

SCRC actions are based on a consensus process involving all Committee members. In the event the SCRC is unsuccessful in resolving an issue, the Committee Chairperson summarizing the points of view prepares a written report. The report is submitted to the Executive Safety Committee for review and resolution. The final action taken will be noted in the SCRC minutes and the Open Items List.

2.2.10 Executive Safety Committee

The ESC is comprised of senior and executive management staff responsible for the oversight of several safety subcommittees, of which the SCRC is one. The ESC performs an executive management review of the SSCP. The ESC is also responsible for issuing the Project System Safety Certificate for each project, as recommended by the SCRC. The ESC is also responsible for resolving issues that cannot be resolved by the SCRC.

2.2.11 Passenger Rail Safety Subcommittee

The Passenger Rail Safety Subcommittee reports to the Metropolitan Washington Council of Governments (COG) Fire Chiefs' Committee. It is a standing subcommittee whose purpose is to provide a liaison between WMATA and fire/rescue agencies. The Subcommittee is comprised of representatives from the six major fire jurisdictions and the Department of Safety and Environmental Management. The responsibilities of the Subcommittee are to:

- Provide recommendations on Metro-related fire emergency equipment;
- Develop, update and maintain emergency procedures affecting WMATA;
- Review and recommend fire/life safety criteria changes as necessary for equipment and facilities during the design phase;
- Review and revise as necessary, Policy Agreements;
- Advise the Fire Chiefs' Committee on safety problem areas; and
- Provide liaison for fire service training.

The Subcommittee is informed of proposed facilities and systems and of design changes that may affect rescue procedures and fire protection and life safety features, before they are implemented by WMATA. WMATA and COG staffs also provide technical and logistical support to the SCRC.

3 SAFETY AND SECURITY CERTIFICATION PROCESS

Prior to any project starting the Safety and Security Certification Process the project must be assessed by SAFE certification staff with the support of the WMATA project manager assigned to the project (attachment 8) to establish the level of Certification to be performed.

3.1 Steps in the Safety and Security Certification Process

The Safety and Security Certification Process begins with system planning and design, and continues into the start of revenue service. It is imperative that the Safety and Security Certification process is completed and all Category I and II hazards associated with the use of a new or rehabilitated system or facility are eliminated or effectively mitigated prior to the start of in-service use. Certification of all non-operational certifiable elements for any new or rehabilitated rail line segment or rail related system or opening of a rail related facility must be fully completed prior to entering the pre-revenue demonstration phase of the project. The pre-revenue demonstration phase must be started a minimum of 30 days in advance of the anticipated opening date. This timeframe is required to allow the operating department and the TOC to conduct an operations readiness review of the system or facility being placed into service. When establishing an opening date for the rail line segment, system, passenger vehicle use, or facility, this timeframe must be considered. Non-rail related facilities or systems are not permitted to be placed into service prior to the issuance of the System Safety and Security Certificate.

The steps required to attain System Safety and Security Certification are discussed in the subsequent sections:

Step 1 Identify Certifiable Elements;

Step 2 Develop Safety and Security design criteria;

Step 3 Develop design criteria compliance checklist and review for compliance with design criteria;

Step 4 Develop specification compliance checklist and review for compliance with construction specifications;

Step 5 Manage Test Requirements and Conduct Tests;

Step 6 Develop Operational Checklist and Verify Compliance with Operational Requirements;

Step 7 Manage "Open Items" and Safety Critical Items List (SCIL);

Step 8 Verify operational readiness;

Step 9 Issue Certificates of Compliance;

Step 10 Issue System Safety Certificate of Compliance; and

Step 11 Issue Safety and Security Verification Report and Final Project Close-out.

The above listed steps are performed for new extensions, systems, rolling stock, and facilities. The certification process for rehabilitated and modified systems, rolling stock, and facilities is tailored to the scope of the project and its safety/security affect, if any, on the current operating environment, including the operational elements. (See Section 3.3) The matrix below (Table 2) provides a list of the activities to be performed and the organizational elements available during each phase of the project, and designates responsibility for each task.

Table 1: SSCP Responsibilities Matrix Key

Safety and Security Responsibility Matrix							
TASK	Task Type	PE	FD	CONST	IN TST	COM	OPS
Develop Safety and Security Policy Statement	MGT	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Establish Designated Function (DF) for Safety and Security throughout the project	MGT	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Develop Safety and Security Management Plan	MGT	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Establish Safety and Security Committees	SAFE	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Create Safety and Security Responsibilities Matrix	SAFE	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Develop SSCP	MGT/ENG	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Develop and Implement Hazard and Vulnerability Resolution and Tracking System	CTR	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Prepare Preliminary Hazard and Vulnerability List	CTR	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Identify Safety and Security Certifiable Elements	CTR / SAFE	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Establish Safety and Security Certifiable Items List	CTR / SAFE	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Establish Safety and Security Configuration Management	CTR	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Create Safety and Security Certification Project Folders	CTR	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Perform Preliminary Hazard Analysis and Threat and Vulnerability Analysis	CTR	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Prepare Safety and Security Design Criteria	ENG	✓	▸▸	▸▸	▸▸	▸▸	▸▸
Perform Safety and Security Review of Preliminary Operations and Maintenance Procedures	MGT / SAFE		✓				
Perform Safety and Security Design Reviews & Additional Hazard and Vulnerability Analysis	ENG/MGT		✓	▸▸	▸▸	▸▸	▸▸
Develop Design Criteria Conformance Checklists	CTR	✓	▸▸				
Complete Design Criteria Conformance Checklists	CTR		✓				
Develop Test and Evaluation Requirements	CT		✓	▸▸	▸▸	▸▸	▸▸
Develop Specification Conformance Checklists	CTR		✓	▸▸			
Complete Specification Conformance Checklists	CTR			✓			
Issue Notices and Occupancy Permits	SCRC			✓	▸▸	▸▸	
Issue Certificates & Complete Folders	SCRC			✓	▸▸	▸▸	
Complete Integrated Tests	CTR			✓	▸▸	▸▸	
Review of Engineering Change Orders & Waivers	MGT/ENG SAFE			✓	▸▸	▸▸	▸▸
Complete Operational Readiness Review	MGT/ENG					✓	
Perform Final Safety and Security Compliance Assessment	MGT/ENG SAFE					✓	
Issue Final Safety and Security Certification	SAFE					✓	
Issue Final Safety and Security Verification Report	SAFE						✓

MGT = Management
ENG = Engineering
CTR = Contractors
SAFE = Department of Safety and Environmental Management

PE = Preliminary Engineering
FD = Final Design
CONST = Construction
MTPD = Metro Transit Police Dept.

IN TEST = Integrated Testing
COM = Commissioning
OPS = Operations

Checks (✓) indicate the initiation of the activity, and shaded arrows (▸▸) indicate on-going performance.

3.1.1 Step 1 - Identify Certifiable Elements

The certification process begins with the identification of individual elements that are critical to the safety and security of WMATA customers, employees, emergency responders, or general public. These are referred to as "Certifiable Elements". Certifiable elements are typically defined by contract and/or specifications. These elements are broken down into four major categories: facilities/equipment, systems, integrated test requirements, and operational requirements (passenger vehicles, passenger stations, maintenance facility, training, etc.) as shown in Figure 1. A log of the certifiable elements is maintained and is referred to as the Certifiable Elements List (CEL). Many of the major certifiable elements on the CEL are composed of numerous sub-elements (equipment and subsystems) that also require certification to complete the certification process of a major certifiable element. For example, each traction power substation requires individual certification and each is tracked as a sub-element of the major element "Traction Power". Similarly, each passenger vehicle in the fleet needs to be certified before the fleet as a whole is certified.

The certifiable elements are composed of numerous items. These items make-up the whole of the major element and require safety or security verification before the major element is considered safe and secure for use. This is known as the Certifiable Items List (CIL). Specific certifiable items on the list are dependent on the project. For each of the certifiable items, the safety and security requirements are listed. The CIL and corresponding safety and security requirements are developed jointly by SAFE, MTPD and Project Management staff through hazard analyses and threat and vulnerability assessments.

The CEL and CIL may be modified by SCRC, as needed, in order to meet the SSCP requirements.

Figure 2 illustrates the process for tracking the certifiable elements, when elements are identified during the design phase and tracked throughout the project and certification process.

Figure 1: Certifiable Elements List Development

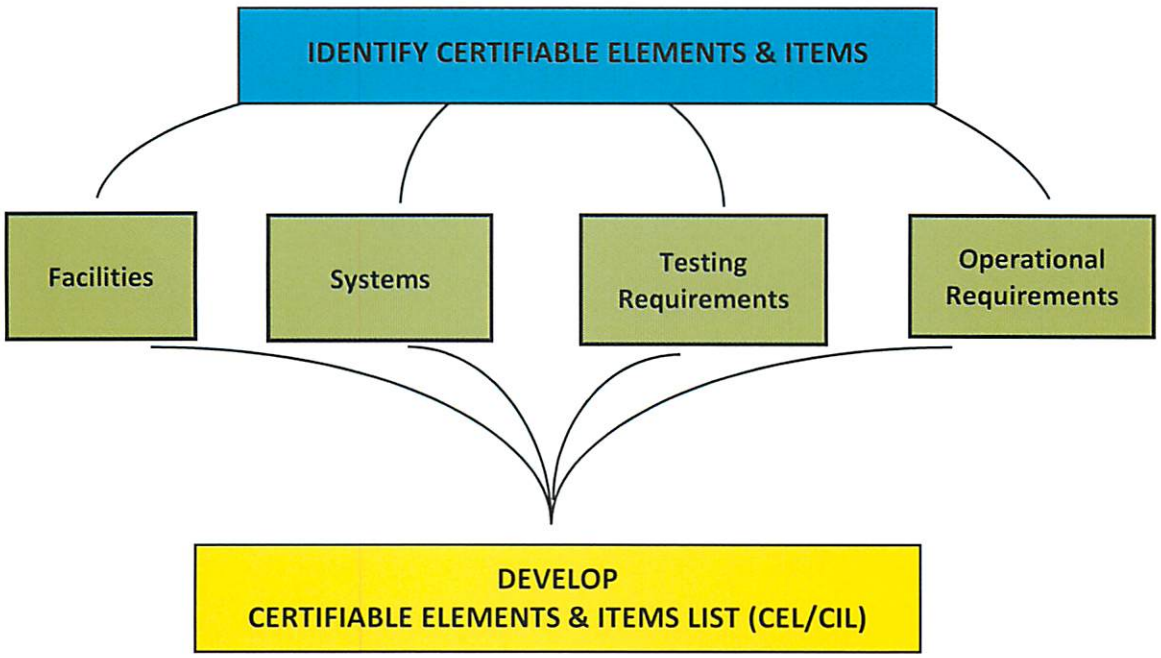
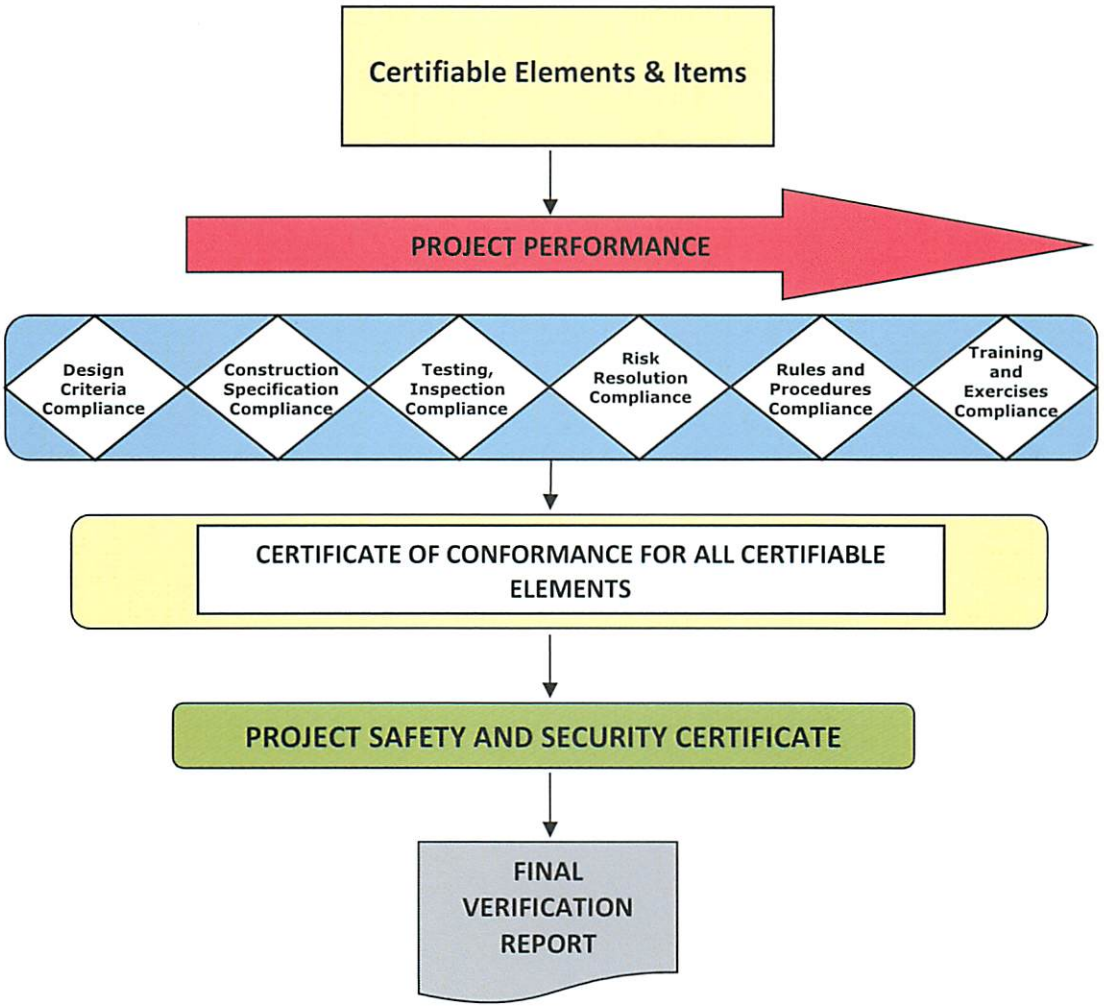


Figure 2: Certifiable Elements and the Certification Process



3.1.2 Step 2 - Develop Safety and Security Design Criteria

Suitable guidelines and controls are needed to guide project designs so that the safety and security aspects of each certifiable item are addressed. These guidelines and controls form specific criteria that are used to govern project design. Safety and security design criteria are generated from:

- Technical specifications from previous contracts;
- Agency design and performance criteria;
- Transit agency "lessons learned" from operating experience;
- The results of the preliminary hazard analysis (PHA);
- The results of the threat and vulnerability assessment (TVA);
- Transit industry safety and security practice and reports; and
- Applicable safety and security codes, standards, and regulations defined by Federal, State, and local agencies and standards boards and organizations.

Architectural and engineering design criteria and standards for the design, construction, reconstruction, maintenance, and operation of the Metro Rail and Metro Bus systems are established, maintained, and promulgated by the WMATA Design Control Board (DCB). The DCB is comprised of senior level representatives from Engineering and Capital Projects, Operations, Safety, and Metro Transit Police. The DCB updates the design criteria and standards, as warranted.

Safety and Security requirements are included in the following WMATA documents: Manual of Design Criteria, Design Drawings, Standard Drawings Technical Specifications and Scope of Work (SOW). Additional requirements are included from applicable local and state codes, hazard and vulnerability assessments and industry standards. These criteria define how the certifiable items' safety and security aspects are addressed in the completed project and how their requirements become manifested into the final design drawings and specifications.

3.1.3 Step 3 – Develop Certified Elements/Items Checklist (CEL/CIL) to Review Compliance with the Design Criteria

Safety and Security are addressed during project design through the identification of safety and security design criteria for each certifiable element. Safety and security design criteria are intended to provide guidance to the project design team to support the definition of systems, sub-systems and components, the development of performance requirements, and the final specification of the engineered system (Figure 3). WMATA SAFE ensures that Safety and Security Certification is referenced in all their project contracts and specific documentation is included in the procurement package for design/construction services. [Reference request for proposals (RFP) Section 01115]

A compliance checklist (see Attachment 1) is used to verify that the safety and security-related criteria requirements are reflected in the contract design documents from the preliminary to final design review stage. The checklist documents that:

- Design documentation contains the safety and security-related requirements identified in the criteria;
- Designs meet safety code and regulatory compliance;
- Designs reflect transit industry safety and security standards and practices; and

- Safety and security-related design comments were addressed and successfully resolved.

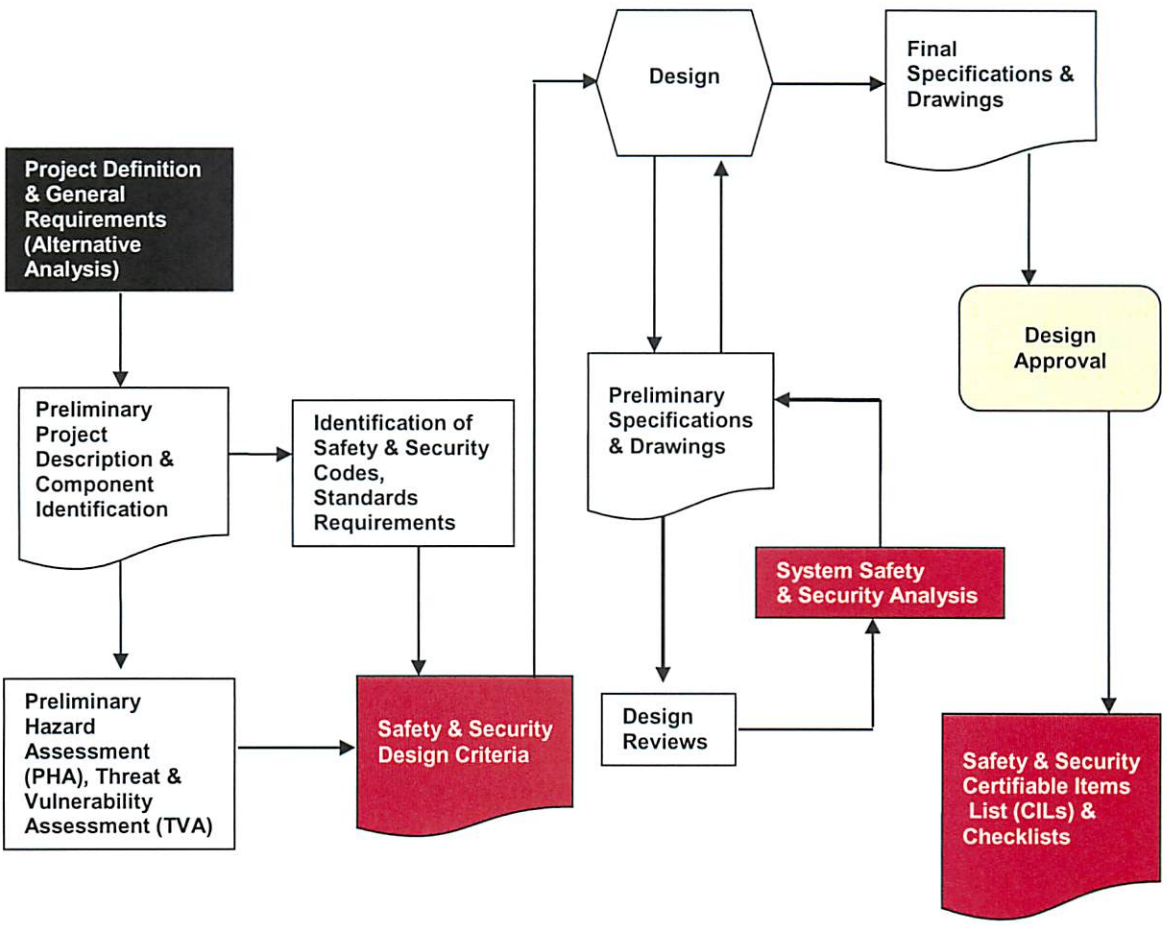
The SSCP is used to effectively manage the certification process, the criteria, code, and other requirements that are integrated on a single Design/Construction/Test Compliance checklist. These are combined under each element in constructing a CIL. This approach enables the use of a single checklist; and maintains a safety/security requirements continuity link as the project moves from the design phase to the specification/construction/installation/test phase.

SAFE is responsible for the management/initial development of the checklist; further development of the checklist by contractors depends on the specific RFP that the contract is based on. The checklist is then sent forward to Engineering and Capital Projects staff or the Chief Mechanical Officer, for rolling stock related projects. Modifications affecting existing track and elevators and escalators, are sent to TRST and ELES, respectively. The checklists are also sent to MTPD for security related systems. Project staff may recommend that:

- Items that are not certifiable be eliminated;
- Items that are not safety or security related be eliminated;
- Requirements considered to be safety or security critical are incorporated;
- Information to clarify the specific requirement and/or reference for an item be included; and
- Accepted industry practices are incorporated.

SAFE ensures that changes to the checklists are incorporated, if any, and assigns it to the appropriate Project Manager/Design Team Leader for completion. The Project Manager/Design Team Leader is responsible for having the appropriate design team member affirm that the design conforms to the referenced, pre-established codes, standards, and criteria and that these have been properly incorporated into the specifications and drawings. The design team members complete the Design portion of the checklist by identifying the specification sections and drawings, and other verification documentation and by signature. As the checklists are completed, SAFE reviews the documentation to ensure it supports the compliance with the criteria, codes, and standards. Any unresolved issues are tracked to resolution.

Figure 3: Safety and Security Design Criteria and Project Specifications



3.1.4 Step 4 – Perform Construction Specification Conformance

Specification compliance is performed to establish a formal process to verify that safety and security-related specification and contract document requirements are satisfied during the construction, installation, and testing phases of the project.

Many of the safety and security requirements in the specifications take the form of specific deliverables, such as manuals, hazard analyses, reports, approved contract submittals, factory test procedures and results, and inspection reports. However, other safety requirements may not take the form of specific contractor or in-house deliverable documents, but still require verification. Compliance with these types of safety and security-related requirements are subject to verification during audits, inspections and tests.

Prior to moving from the design phase to the construction phase, SAFE, in coordination with WMATA Project staff, develops the Construction and Test portions of the checklist within the Design/Construction/Test Compliance checklist (see Attachment 1). The safety and security requirements are derived from the contract documents, codes, and standards. Contractor and manufacturer conducted tests that verify safety or security functionality or performance requirements are included on the checklist. When consensus is reached on this section of the checklist, the checklist is given to WMATA project staff for completion. The assigned Project Manager is responsible for completing the Construction/Test portion of the checklist.

As this section of the checklist is completed, project staff prepares a binder that is used to assemble and organize the required verification documentation. Verification documentation includes:

- Inspection reports;
- Mill certificates;
- Photos;
- Visual Inspection Reports;
- Test reports; and
- Witnessing safety/security critical tests.

Drawings sets and other large volume documentation are only referenced.

A Visual Inspection Report (Attachment 2) may be used to verify safety and security requirements that cannot be verified with other documentation. The completed and signed Visual Inspection Report form, including comments to demonstrate compliance, is referenced on the Compliance Checklist and becomes part of the certification documentation. Each item being verified by a Visual Inspection Report shall have its own report, or each item shall be specially called out on a Visual Inspection Report being used to document multiple items. Photographic evidence will be presented with each Visual Inspection Report, unless item is unable to be photographed. The Visual Inspection Report shall not be used to verify items in a general multi – element or multi – segmental approach (i.e. "the entire track is installed").

Checklists are updated when subsequently approved engineering changes impact safety or security.

As certification activities advance, SAFE monitors progress on the various checklists. This step is to ensure that the documentation effort is keeping pace with the project schedule. Any items that are lagging in the certification documentation or experience problems achieving certification are tracked and discussed at the SCRC meetings for resolution.

After completing the Construction and Test portions of the checklist, the Project Manager submits the checklist to SAFE for review. Throughout the process SAFE reviews the documentation to ensure that it supports the identified requirements. As a component of the review process, walk-through inspections of completed facilities, stations, vehicle rights-of-way, and vehicles are performed to determine that safety, security, and fire/life safety requirements have been incorporated into the construction/ installation of the project and that new, previously unidentified hazards are not present.

3.1.5 Step 5 – Identify Additional Safety and Security Test Requirements

3.1.5.1 General

During the construction and start-up phases, many contractual and integrated tests are conducted for the purpose of verifying proper operation of equipment being furnished and constructed for the project. These tests are reviewed for safety and security considerations and test procedures approved before any test results are considered as meeting the test requirements. The test results are then verified per the procedures. The test plan, procedures, and test results are part of the Safety and Security Certification documentation package and are subject to review.

The need for additional tests may arise for various reasons throughout the project. SCRC reviews and determines the need and, if warranted, requests that the additional tests be conducted. The added tests are included in the Design/Construction/Test Compliance Checklist and their results documented.

SAFE and/or MTPD may observe safety/security critical tests, including but not limited to, first article inspections, mock-up reviews, qualification tests, performance tests, and acceptance tests. Testing of fire/life safety systems is coordinated with the jurisdictional Fire Marshal. Similarly TOC may wish to witness specific safety critical tests. Prior to or just after the start of each project, the Tri-State Oversight Committee will be requested to submit a list of those tests to WMATA. TOC will be provided a test schedule and be notified of the tests with sufficient time to permit attendance.

3.1.5.2 Test Required by Technical Specifications

Contractor testing, as required by the contract technical specifications, verifies the functionality of the involved system or equipment. Contractor testing is subject to certification. Contractor testing is tracked and verified on the Design/Construction/Test Compliance checklist. Typical specification tests include qualification, manufacturing, performance, and acceptance tests such as sprinkler systems, alarms, emergency management panels, fire management panels, and camera systems.

3.1.5.3 Integrated Tests and Pre-Operational Testing

WMATA specified tests may include integrated and pre-operational demonstration tests. Many of these tests are incorporated in the contract documents. Others are not necessarily required by contract specifications, but are required as part of an overall Test Plan. These tests are developed to verify the compatibly and safety/security functionality of equipment and systems. Non-contractual integrated and pre-operational demonstration tests are entered on the Design/Construction/Test Compliance checklist for tracking purposes. The Project Manager is responsible for the development and implementation of the integrated and pre-operational test demonstration plans, including test procedures related to each test, and the logging of all test documentation. SAFE assists in the development and/or reviews the development of the test plans and procedures.

Prior to conducting an integrated test, a number of safety and security specification compliance

requirements completed and/or issues resolved. Requirements and issues are dependent on the type and nature of the test. The Project Manager notifies SAFE of the intent to conduct an integrated test. SAFE, in collaboration with the Project Manager, determines the current level of verification for each element involved in the test. If the safety/security certification of the elements required for the test is not complete, SAFE issues a Temporary Use Notice (TUN), see Attachment 3. The TUN is forwarded to the engineer responsible for the particular element involved in the test. Only signatures for those elements that have not been issued a Certificate of Compliance are obtained. Any operation or test restriction is noted on the permit and the test procedure.

3.1.6 Step 6 – Develop Operational CIL and Verify Compliance with Operational Requirements

The safety and security-related plans and procedures, including training programs, are certified to assure that the major operations, maintenance, security, and safety programs, procedures, and plans have been developed and modified as necessary to meet the system safety and security program requirements, and are in place prior to revenue service. In addition, the personnel who operate, maintain, provide security, and respond to emergency situations must have an in-depth knowledge of these plans, procedures, and programs prior to beginning revenue service.

The Safety and Security Certification process provides verification that:

- Rules, procedures, and manuals meet code and regulatory requirements, if applicable;
- Operations, maintenance, and emergency rules, procedures, and plans have been developed, modified, reviewed, and implemented;
- Manuals, showing how to operate and maintain system equipment and facilities, have been developed, reviewed, approved, and accepted by the project team;
- Training programs have been developed and incorporate information regarding safety features of the system for normal, abnormal and emergency conditions;
- Training adequately addresses the operation and maintenance of safety and security critical systems and equipment;
- Safety/security related training for operations and maintenance personnel has been delivered, and successfully completed by all affected WMATA personnel; and
- Emergency training has been developed, performed, and completed by all personnel, including fire, police, and emergency medical services personnel.

  Verification of these activities includes documentation of their completion and signatures of the appropriate officials or employees responsible for them. Operating and maintenance procedures and plans are judged as meeting the verification requirements or are recommended for modification. SAFE collects and maintains the required documentation.

3.1.7 Step 7 - Manage Open Items List and Safety Critical Items List (SCIL)

During the completion of the Compliance Checklists, instances of non-compliance with a safety or security requirement are noted. If the issue cannot be resolved at the project staff level, they are forwarded to the SCRC for resolution. Open items may be resolved by any of the following actions:

- Correction;

- Mitigation through physical modification, revised specifications or revised operating procedure;
- Deferral of corrections, with operational or use restrictions imposed; and
- Retention, as is, with supporting rationale.

In those cases where it is impractical to resolve the open item by meeting the original requirement, the SCRC will develop an acceptable resolution, including placing the item into service as-is, and provide documentation for resolution and acceptance.

If an open item is classified as a Category I (Catastrophic) or a Category II (Serious) hazard, it is transferred to a Safety Critical Items List (SCIL), (see Attachment 4). This includes those Category I and II open items identified through analyses or field reporting. All items on the SCIL are tracked to closure. When it is determined that an open item cannot be resolved to meet the safety requirement for issuance of a System Safety and Security Certificate, the SCRC will determine an acceptable resolution, notify the Executive Safety Committee Chair, and formally document the decision as part of the verification for the certifiable element. SAFE will coordinate the decision by issuing a document verifying closure or proposing an acceptable resolution for the open item. This process will ensure that the safety and security designed into the system are realized in the delivered, tested, and verified project.

3.1.8 Step 8 - Verify Operational Readiness

WMATA staff performs pre-revenue demonstration tests prior to the revenue service start date to verify the functional capability and operational readiness of the system. During the pre-revenue phase of the system, the procedures and plans are tested for effectiveness under simulated operating conditions for normal, abnormal, and emergency situations.

In addition, a final "walk-through inspection" of completed facilities and systems is performed.

3.1.8.1 Emergency Drills

Prior to start of revenue service, simulated emergency drills are performed at selected sites and coordinated by the Office of Emergency Management (OEM). The drills will test the effectiveness of emergency response and procedures and assure that outside emergency response personnel are prepared to adequately respond to WMATA emergencies. The drills are developed and conducted to:

- Familiarize emergency responders with WMATA operations and inherent hazards;
- Familiarize and train response personnel in emergency response plans and procedures;
- Evaluate and identify improvements to response plans and procedures before a real emergency occurs; and
- Maintain an adequate level of preparation for a possible emergency.

3.1.9 Step 9 – Review and Issue Safety and Security Certificates of Compliance

When a certifiable element or sub-element is ready for certification, a Certificate of Compliance is issued to document that all relevant safety and security requirements have been fulfilled. The following describes, in sequential order, the process for approving the Certificates of Compliance (Attachment 6).

Upon completion of the certification checklist for the certifiable element, the responsible project manager or engineer forwards the checklist, along with the supporting documentation to SAFE. The CSO

initiates a review of the checklist for completeness and reviews the supporting documentation. If the documentation adequately supports fulfillment of the safety and security requirements, the CSO prepares a certification package and forwards a recommendation regarding certification to the SCRC with restrictions, conditions, or approved temporary measures, as applicable.

The SCRC convenes to evaluate the evidence and resolves any exceptions to the requirements, open items or other issues related to issuance of the certificate. If the SCRC is satisfied that the requirements for the certifiable element or sub-element have been fulfilled, the appropriate project and WMATA staff signs a Certificate of Compliance, along with any restrictions, exceptions, conditions, or approved temporary measures.

The original, signed Certificate of Compliance and verification package are logged and filed in the Certification file. When removal of restrictions attached to a Certificate is appropriate, an addendum to the Certificate of Compliance is prepared. To become effective, the addendum is signed by the same levels of authority as that on the original Certificate.

3.1.9.1 Temporary Use Notice (TUN)

At times, it may be necessary to temporarily use a facility or system for purposes other than testing when it has not been certified. Such circumstances include, but are not limited to, the movement of a rail passenger car from one facility to another under its own power, or the use of a facility or system for training purposes. A Temporary Use Notice (TUN) must be issued for that facility or system prior to use: By WMATA staff:

- When the facility or system is under the control of the contractor/vendor; and the facility/system is to be used by other; and
- On any portion of the current WMATA system.

The TUN is forwarded to each party involved in the temporary use, including the Project Manager and SAFE, for signature. All restrictions noted on the TUN must be followed or the TUN will be considered violated and the facility or system must be taken out of revenue service. The TUN expires upon completion of the open certification items and will be superseded by a Certificate of Compliance.

3.1.10 Step 10 - Issue System Safety and Security Certificate

The System Safety and Security Certificate of Compliance (Attachment 7) provides formal notification that the applicable portion of the operating system is safe and secure for revenue service. Prior to complete integration into revenue service, the CSO prepares the System Safety and Security Certificate of Compliance for the project. The SCRC confirms the service readiness of the capital project for use in WMATA operations and/or revenue service, and the Certificate is distributed for signature. The original, signed copy is retained in the Certification file for the project. Deferred work, approved temporary measures, and operational restrictions that remain in effect, if any, are highlighted under the "Restrictions" section of the certificate. The restrictions and approved temporary measures are tracked until finally resolved and approved by the SCRC.

The Safety and Security Certification process for all physical, non-operational elements of a rail extension or rail related system or facility must be completed and all Category I and Category II hazards eliminated or effectively controlled prior to the start of the pre-revenue demonstration phase of the project. Additionally, the pre-revenue demonstration phase must begin at least 30 days prior to the start of revenue service in order to satisfactorily demonstrate operational readiness. When determining the

revenue service/use start date for the new or rehabilitated line segment, system, or facility, sufficient time must be allocated in the project schedule for a readiness review by TOC and for the issuance of the System Safety and Security Certificate.

3.1.10.1 Issue Safety and Security Certification Verification Report

Within 60 days after the start of revenue service, SAFE prepares a Safety and Security Certification Verification Report for the project. The report summarizes the safety and security certification effort and the readiness of the line segment, facility, or system to be placed into service; an annotated matrix of the Critical Items List indicating the status (open/closed) of each item; Open Items List; and recommended actions and schedule for permanently closing out all open items, restrictions, and approved temporary measures. The report includes copies of the certification checklists, Certificates of Compliance for each certifiable element, and the System Safety and Security Certification document. A copy of the report for rail projects is submitted to the TOC.

3.1.10.2 Follow-up and Closeout

Typically there are contingencies in place when the system/facility enters into revenue service. The SCRC tracks these items and any others to closure, with the support of SAFE, ensuring the documentation is complete and accurate.

3.2 Design-Build Projects SSCPs

The FTA funded design-build rail projects valued over $100 million require project specific SSCPs. Other projects that contain safety/security critical elements may require a project specific SSCP, as determined by the FTA or the WMATA Executive Safety Committee. Examples are infill rail stations, facility projects, rail car rehabilitation projects, and bus procurements. The SSCP is developed and executed by the design-build contractor, and reviewed and approved by SAFE in collaboration with the Project Manager. The design-build project SSCP is required to conform to the provisions contained in the FTA Handbook on Transit Safety and Security Certification guidelines, the requirements of 49 CFR Part 659 and the TOC, and the WMATA SSCP. Additionally, the plan must delineate the roles and responsibilities of WMATA and the Design-Builder's project staff in the design-build certification program. SAFE is responsible for reviewing the contractor's program to ensure that it is being implemented in accordance with the approved plan and within the required time frames.

SAFE collaborates with the appropriate Engineering, Capital Projects, and MTPD project staff to identify those projects that may require a project specific SSCP. While most projects (those under 100 million dollars) will not require a Certification Plan, SAFE intends on utilizing the safety certification process outlined within this document to ensure systems and equipment are safe for use. Projects may fall into one of four project categories, illustrated in Table 3.

Any project introduced into WMATA's Adopted Regional System (ARS) shall be assessed for the appropriate level of certification and will be safety and security certified in accordance with the WMATA Safety and Security Certification Plan (SSCP), WMATA System Safety Program Plan (SSPP) and all applicable Federal Transit Administration guidelines, Codes of Federal Regulation (CFR), and Circulars. External Entities building projects intended to be adopted into WMATA's ARS must comply with the Safety and Security Certification requirements or risk rejection of adoption by the Department of Safety and Environmental Management (SAFE).

Table 2: Examples of Projects Subject to Certification*

Project Categories				
Category 1	**Category 2**	**Category 3**	**SAFE Acceptance**	**N/A**
• Automatic Train Control • Automatic Train Protection • Compressed Natural Gas Facilities and Systems • Rail Operations Control Systems	• Traction Power Substation • Electro-Mechanical Equipment (Deemed Safety Critical or Security Sensitive by SAFE or MTPD) • Rail Car Vehicles • Bus Passenger Vehicle • High-Rail Equipment (HRE)	• Communication Systems • Fire Protection Systems • Fire/Intrusion Alarm Systems • AC Power Switchgear • Traction Power Equipment • Emergency Ventilation Systems • Maintenance Facility Equipment	• Station Enhancements • Parking Facilities • Kiss and Ride / Bus loop Renovations • Minor Facility/Station modifications that do not impact Fire/Life Safety Systems.	

The verification steps required for each of the project categories is as follows;

Category 1 – Design, construction, testing, training and manual/procedures/drawing updates verification steps are required

Category 2 – Specification, manufacturing/assembly, testing, training, and manual/procedures/drawing updates verification steps are required

Category 3 – Testing, training, and manual/procedures/drawing updates verification steps only are required.

SAFE Acceptance – Inspections conducted by WMATA SAFE Staff and/or designated Safety Certification Consultant to ensure the project under review has been built/installed in accordance with applicable codes and industry standards.

Not Applicable (N/A) – Project has been assessed by SAFE and it has been determined the project does not require Safety Certification.

*All Federal, State and Local codes and regulations apply as well as the applicable WMATA Design Criteria. The types of projects listed in the table 2 are only examples of projects that maybe selected for Safety Certification.

3.2.1 Project Specific SSCP Contents Minimum Requirements

The following is a list of bulleted items that at a minimum should be included within a project specific SSCP.

- Introduction- Project specific summary of the scope of work and background Information.

- Purpose- Purpose of the plan
- Responsibilities- Project management positions and their responsibilities in relation to the Safety and Security Certification Process
- Project's Scope of Work- A brief overview of the project's required scope, i.e., what will the project work on, do.
- Project Safety and Security Certification Working Group (and possible other project committees related to the process)- Committee or group created for the project for the purpose of administering and maintaining the project's SSCP and assuring that all participants assist and contribute to assuring certification processes are properly executed and the Certifiable Items List is appropriately populated toward the final safety and security certification and acceptance by the WMATA Safety Certification Review Committee (SCRC).
- References: Project Specific SSCP referenced documents
- Acronyms and Abbreviations: Project Specific SSCP's utilized acronyms and abbreviations
- Procedure: Description of how project items are identified as applicable for Safety and Security Certification, and how the certification of those selected items will be performed to sufficiently display the item is safe and secure for public use.
- Document Control: Description of how project documentation (specifically documentation related to the projects safety and security certification process) is going to be organized and maintained. In addition to descriptions and examples of project certification document certificate templates; certification process flow charts/figures, and a description of the process project contractor will utilize for the submission, review, and comment on certification documents such as an updated CIL and a revised SSCP. This includes an acceptable periodic timeframe for document submission in consideration of the fact that the projects safety and security certification process is expected to maintain a schedule in pace with that of the rest of the project. This should include a schedule for Safety and Security Certification within the project schedule. As well, it should include a description of how each element will be closed and how each of the forms for certification shall be used.

3.3 Rehabilitation and Modification System, Rolling Stock, and Facility Projects

Many facilities and systems, including rolling stock, require rehabilitation or modification due to their age and need for conformance with new requirements. These facilities and systems are subject to safety and security certification if the system or facility includes safety or security critical elements and/or has a safety/security impact on the current operating environment. However, certification is limited to the rehabilitated/modified sub-system itself, and to all systems and operational elements affected by the rehabilitation/modification. For example, an upgrade of a traction power substation transformer may require upgrading the rectifier, size of the cabling, switchgear, protective breakers, and the cabling to the third rail. In addition to verifying that those subsystems comply with the safety related specification and test requirements, the certification process also includes assurance that drawings, manuals, other safety critical maintenance documentation, maintenance procedures, and training have been revised to reflect the upgrade. As a result, the verification steps involved for a particular project are dependent on the type of project and its effect on other systems/subsystems. Rehabilitation/modification projects fall into one of four project categories, illustrated in Table 3.

Other projects, such as garage repair and Smart Trip Vending Machines are not subject to the certification process. However, projects not identified in Table #3, may be added; based on the scope and safety/security impact of the project, and on the recommendation of the SCRC to the ESC. Upon completion of the work, a Certificate of Compliance for Modification and or Rehabilitation Project (Attachment 5) is prepared and signed by all stake holders of the affected departments to include SAFE, the Project Manager, and Contractor/Operations.

3.3.1 Daily Certification to Ensure Operational Readiness for In-service Systems

Rehabilitation or modification work on safety critical rail operating systems, such as train control and track, may require the systems to be returned to revenue service at the end of the work shift or work period. To assure that the system may be returned for revenue service, a daily testing plan is developed to define the requirements for using the system in service per the requirements of the appropriate discipline engineering department head. Prior to the start of the work, the Project Manager is responsible to obtain approval of the daily testing plan from SAFE and appropriate maintenance and engineering department(s).

The daily testing plans and certifications are signed by the contractor employee performing the work, the Project Manager's designee, and SAFE. Daily testing and certifications are documented and maintained as part of the safety and security certification documentation.

4 HAZARD MANAGEMENT

4.1 Hazard Management Process

Hazard management is the formal process to systematically recognize, identify, evaluate, and resolve hazards associated with the design, construction, testing, start-up, and operation of the project for customers, employees, and the general public. Recognized hazards are identified and categorized as to their potential severity and probability of occurrence, and analyzed for potential impact. Those hazards are resolved by design, engineering control, procedure, warning device, or other method, so that they fall within the level of risk acceptable to WMATA management.

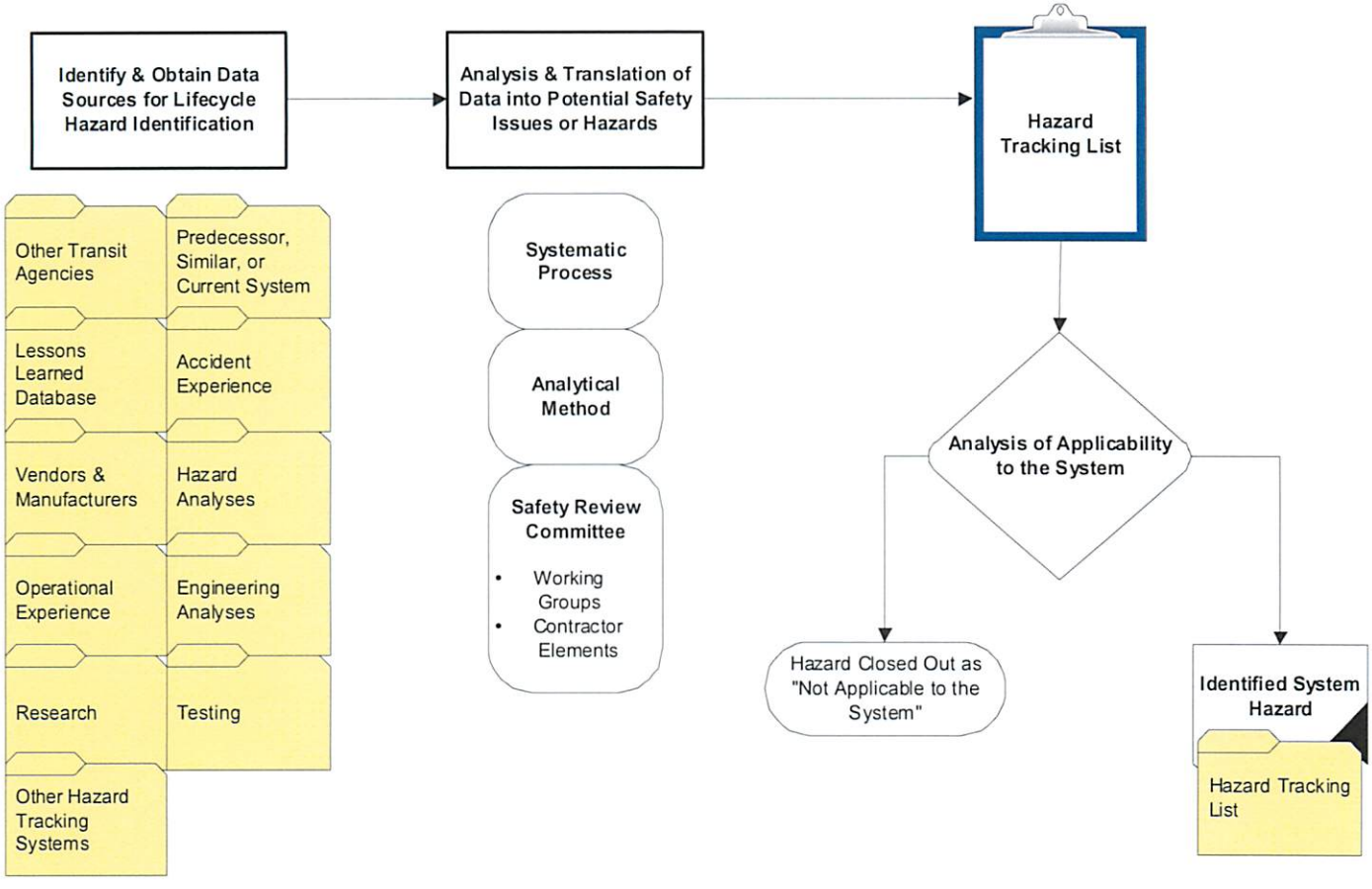
For capital projects, hazard management is most effective when applied during preliminary engineering and final design, but is used throughout each phase of a project, including start-up and operations. Hazard management is also used to evaluate the safety impacts of deviations from the baseline design, engineering/construction change orders and operationally approved temporary measures, and other modifications made during construction, testing, and project activation.

A Safety and Security Investigation Report (SSIR) (Attachment 9) is available for use by WMATA personnel to report hazards anywhere in the system including facilities, equipment, and operations (revenue and non-revenue).

Figure 4 illustrates the process used for identifying, resolving, and tracking safety hazards throughout all phases of project development activity. A more detailed description of the hazard management process is found in the WMATA System Safety Program Plan.

See next page for Figure 4- Safety Hazard Identification and Risk Acceptance Process

Figure 4: Safety Hazard Identification and Risk Acceptance Process



4.2 Hazard Identification and Resolution

System hazards are identified through specific hazard analyses, inspections, or reviews. A Preliminary Hazard Analysis (PHA) is performed during the preliminary and final engineering phases of the project to identify hazards and recommend possible countermeasures. The identified hazards are tracked to closure to ensure they have been adequately addressed through the safety certification process. SAFE is responsible for tracking all open items.

FTA has adapted category ratings for hazards. The most severe of these are:

- Category I (Catastrophic) – Defined as death or system loss; and
- Category II (Critical) – Defined as severe injury, severe occupational loss, or major system damage.

The goal of hazard management at WMATA is to verify that all identified Category I & II hazards are resolved or controlled to an acceptable level. The SCRC monitors the safety hazards from the identification stage to final resolution. The status of each Category I & II hazards are required to be resolved 30 days prior to the system, facility, or equipment is placed into service

Once the control measures are implemented, additional analyses may be required to ensure that the mitigation measures adopted to eliminate or minimize the risks are effective.

4.3 Requirements for Safety and Security Analysis

(Hazard and Vulnerability Categorization, Assessment, and Resolution)

All potential hazards and vulnerabilities identified during Preliminary Engineering (PE), Final Design (FD), Procurement, Construction and Installation, Inspection and Testing, Start-up and Integrated Testing phases will be evaluated for validity, categorized, assessed, and resolved as specified by Section 4.0. The project requirements for categorizing hazards and vulnerabilities based on their probability of occurrence and severity are shown below in Table 3-Aand4-B below.

Table 3-A: Hazard Categorization and Assessment

Probability of Occurrence of a Hazard			
Description	**Probability Level**	**Frequency For Specific Item(s) (Events/Hour)**	**Selected Frequency For Fleet Or Inventory (Multiple of single items)**
Frequent	A	Likely to occur frequently (Greater than 10^{-3})	Continuously experienced (10^{-2}). MTBE is less than 1000 operating hours
Probable	B	Will occur several times in the life of the item (10^{-5} to 10^{-3})	Will occur frequently in the system (10^{-3}) MTBE is equal to or greater than 1000 operating hours and less than 100,000 operating hours.
Occasional	C	Likely to Occur sometime in the life of an item (10^{-6} to 10^{-5})	Will occur several times (10^{-4}) MTBE is equal to or greater than 100,000 operating hours and less than 1,000,000 operating hours.
Remote	D	Unlikely but possible to occur in life of an item (10^{-7} to 10^{-6})	Unlikely but can be expected to occur (10^{-6}) MTBE is greater than 1,000,000 operating hours and less than 100,000,000 operating hours.
Improbable	E	So unlikely, it can be assumed occurrence may not be experienced (Less than 10^{-7})	Unlikely to occur, but possible (10^{-7}) MTBE is greater than 100,000,000 hours.

Table 4-B: Hazard Severity

Hazard Severity Categories		
DESCRIPTION	**CATEGORY**	**MISHAP DEFINITION**
CATASTROPHIC	I	Death or system loss
CRITICAL	II	Sever injury, occupational illness, or system damage
MARGINAL	III	Minor injury, occupational illness, or system damage
NEGLIGIBLE	IV	Less than minor injury, occupational illness, or system damage

WMATA has adopted a system for assessing the level of risk for each identified hazard to determine

what action(s) must be taken to correct or document the hazard risk. This risk assessment system has been incorporated into the formal system safety analysis which enables the ESC decision-makers to understand the amount of risk involved in accepting the hazard in relation to the cost (schedule, cost, operations) to reduce the hazard to an acceptable level.

The Risk Assessment Matrix (Table 3-C) identifies the Hazard Risk Index (HRI) based upon hazard severity category and probability and the criteria for defining further actions based upon that index.

Table 4-C: Risk Assessment Matrix

HAZARD FREQUENCY	SEVERITY CATEGORY 1	SEVERITY CATEGORY 2	SEVERITY CATEGORY 3	SEVERITY CATEGORY 4
Frequent (A)	1A	2A	3A	4A
Probable (B)	1B	2B	3B	4B
Occasional(C)	1C	2C	3C	4C
Remote (D)	1D	2D	3D	4D
Improbable (E)	1E	2E	3E	4E

Hazard Risk Index	Criteria by Index
1A, 1B, 1C, 2A, 2B, 3A	Unacceptable
1D, 2C, 2D, 3B, 3C	Undesirable – Management (ESC) decision
1E, 2E, 3D, 3E, 4A, 4B	Acceptable with ESC review
4C, 4D, 4E	Acceptable without review

Follow-up actions resulting from the Risk Assessment will be as follows:

- **Unacceptable:** The hazard must be mitigated in the most expedient manner possible before normal service may resume. Interim corrective action may be required to mitigate the hazard to an acceptable level while the permanent resolution is in development.
- **Undesirable:** A hazard at this level of risk must be mitigated unless a documented decision to manage the hazard until resources are available for full mitigation is issued by the CSO and forwarded to TOC [rail hazards only] for review and approval/disapproval.
- **Acceptable with review:** The CSO must determine if the hazard is adequately controlled or mitigated as is.
- **Acceptable without review:** The hazard does not need to be reviewed by the ESC and does not require further mitigation or control.

The Risk Assessment Process is used to prioritize hazardous conditions and focus available resources on the most serious hazards requiring resolution.

5 SECURITY RISK MANAGEMENT

For all Security related certification activities please refer to Metro Transit Police's System Security Emergency Plan (SSEP).

6 AUDITS

Each phase of the safety and security certification process, design through pre-revenue testing phase, is periodically reviewed to assure that the SSCP is being properly implemented and effective. The review is performed in accordance with the WMATA Internal Safety Audit Process (see Section 12.3 of the System Safety Program Plan).

Reviews of capital project elements include:

- Assurance that the Safety and Security Certificates of Compliance are supported by traceable documentation;
- Evidence that safety hazards and security vulnerabilities are tracked, analyzed and resolved in accordance with the WMATA System Safety Program Plan; and
- Overall assessment of the SSCP.

The review findings are included in the WMATA Annual Internal Safety Audit Report to TOC.

7 DOCUMENTATION

7.1 Verification Documentation

Backup documentation is critical to the success of the SSCP. Documentation provides a detailed trail of activities that demonstrate conformance with the safety and security for a project.

The documentation system promotes accountability, timeliness and accessibility. Accountability ensures that all certificates are completed accurately, signed by appropriate project staff, reviewed by the Safety and Security Review Certification Committee, and maintained in a secure manner. Timeliness ensures that each certifiable element is certified as safe and secure, prior to use. Accessibility allows quick verification that certificates are in place, and provides any other information required to support the certificates.

A master safety certification file resides within SAFE. The Project Safety and Security Certification file contains the following:

- Certifiable Elements and Items Lists;
- A summary sheet showing the certification status for the design, construction, testing, and pre-revenue phases of the project;
- Completed checklists for each certifiable element;
- Support documentation that may not be contained within the project files, such as Visual Inspection Reports;
- Test reports for safety critical systems;
- Integration test reports;

- Temporary Use Notices;
- Certificates of Compliance for all certifiable elements; and
- Original System Certificate of Compliance for the project.

7.2 Configuration Management

During the life of a project, it is not unusual for design and/or construction changes to be made to the system elements being certified. The SCRC monitors these changes for impact to the certification effort. If the impact changes the safety or security requirement or the required documentation, the safety/security requirement is re-verified. The Project Manager is responsible for obtaining the supporting documentation required as a result of the changes and assuring that changes to the design of equipment and facilities are documented in accordance Policy/Instruction 4.10/1, Configuration Management.

8 REPORTING REQUIREMENTS

8.1 Periodic Reporting

An important part of the safety certification process is briefing the ESC of the SSCP, including project certification effort status. Periodic reports are prepared by SAFE and submitted to the ESC. The frequency of the reports is dependent on certification activity levels, but quarterly at a minimum. The reports advise ESC of the:

- Safety and Security plan progress;
- Changes to project Certifiable Items Lists, if any;
- Significant problems encountered in the certification effort;
- Safety and Security Certificates of Compliance completed during the reporting period;
- Safety and Security Certificates expected to be issued in the next reporting period; and
- Certification Plan review findings and recommendations for improvement, if any.

The SAFE also prepares project certification progress reports for TOC and FTA, as requested.

8.2 Final Safety and Security Certification Report

A final Safety and Security Certification Report is prepared for each project falling under the SSCP (see Section 3.1.10). Reports for rail projects are transmitted to the TOC.

ATTACHMENTS

ATTACHMENT 1

SAFETY/SECURITY CERTIFIABLE ELEMENTS/ITEMS LIST (Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY/SECURITY CERTIFICATION ITEMS LIST (CIL)

Project: Certifiable Element: Revision: Checklist type: Master: Sub:	**Design / Construction / Test** **Compliance** **CIL**	SAFE Approval: Date: Page 1 of XX Engineering Approval: Date: Project Manager Date: Approval:

Item No.	Description	Design Criteria Specification Reference	Design Specification Reference			Construction Installation Verification			Test Verification			SAFE Verification			Comments
			Doc Ref.	Verified By	Date	Doc Ref.	Verified By	Date	Doc Ref.	Verified By	Date	Status	Verified By	Date	

Certification Checklist Guide	
Project Certifiable	The project for which the checklist was prepared.
Element Revision	The current revision number of the specific checklist.
Date	The date of issue for the checklist.
SAFE Approval	SAFE staff approving the checklist.
Engineering Approval	Engineering design staff approving the checklist (design criteria only).
Project Manager Approval	Signature of the appropriate managers indicating formal approval of the checklist completed with the specified element type, safety and security requirements, criteria and specification reference.
Item No. Description	Describes the safety or security requirements for the certifiable element as stated in the criteria, contract specification or as shown on the contract drawings.
DESIGN PHASE	
Doc Ref	Identifies the specification section, drawing number or document control center (DCC) file where the safety or security requirement has been incorporated.
Responsible Designer	The name of the design team member assigned the responsibility for the verification of the checklist and assuring the collection of necessary documentation, including: CDRL approvals, inspection reports, factory certifications, and so on.
Verified By / Date	Initials/name of the engineer who verified that the requirement has been incorporated in the contract documents, and the date.
CONSTRUCTION AND TEST PHASES	
Verified By	Name of individual who verified the test results, and/or that the requirement had been met.
Date	Date when verification or the test took place.
Doc Ref	Complete with the applicable Document Control Number and where located. The entry should identify which document control system is used if approval has been granted not to use WMATA's.
SAFE VERIFICATION	
Status	Completed by SAFE with one of the conditions listed at the bottom of the form: OPN, CLD, and CEX for each safety or security requirement. NA: Not applicable OPN: Activity or issue is not completed, documentation not identified, or other situation prevents completing the item. CLD: Activity has been completed and documentation is identified and formally filed. CEX: Activity where the safety or security requirement cannot be completely satisfied but it presents no potential for a catastrophic or critical (Category I or II) hazard and the ESC has been formally advised. This designation would also be used in the case of an approved temporary measure.
Verified By	When each checklist page has been completed by the responsible engineer or project management staff, and the documentation has been verified, then the page will be signed and dated by SAFE. When the entire checklist is completed, the checklist package with the documentation will be transmitted to the Chief safety Officer and the document control center.
Date	Date when the verification took place.

ATTACHMENT 2

VISUAL INSPECTION REPORT (Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

VISUAL INSPECTION REPORT

Certifiable Element: _____

Sub-element: _____

Safety/Security Requirement Item No.: _____

Safety/Security Requirement:

Comments:
This is to certify that conformance with the specified requirement was verified by visual inspection.

_____

WMATA Verification by Date

ATTACHMENT 3

TEMPORARY USE NOTICE (Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY AND SECURITY CERTIFICATION PLAN

TEMPORARY USE NOTICE

TUN No:

Certifiable Element/Sub-Elements:

Restrictions Noted:

Project Manager	Date	Facility/System Engineer/Manager	Date
Test Engineer (if applicable)	Date	Assistant Chief Safety Officer	Date

Chief Safety Officer Date

TEMPORARY USE PERMIT EXPIRES UPON ISSUANCE OF CERTIFICATE OF COMPLIANCE

ATTACHMENT 4

SAFETY CRITICAL ITEMS LIST (Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY AND SECURITY CERTIFICATION PLAN

SAFETY CRITICAL ITEMS LIST (SCIL)

Project: **Prepared By:** **Date:**

Certifiable Element: **Approved By:** **Date:**

Sub-Element: **Revision No:** **Date:**

Ref No.	Description	Potential Cause	Effect on System Subsystem	Effect on Other Systems Subsystems	Initial Risk Index	Control Measures	Residual Risk Index	Status

ATTACHENT 5

CERTIFICATE OF COMPLIANCE
REHABILITATION/MODIFICATION PROJECT

(Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY AND SECURITY CERTIFICATION PLAN

CERTIFIABLE ELEMENT
CERTIFICATE OF COMPLIANCE
REHABILITATION/MODIFICATION PROJECT

Certifiable Element/Sub-Element:

Restrictions Noted:

The Certifiable Element complies with all applicable safety and security requirements and may be placed into service.

Contractor Project QA/Safety Rep.	Date	Contractor Project Manager	Date
WMATA Project Manager	Date	Safety Officer	Date
Assistant Chief Safety Officer	Date		

ATTACHMENT 6

CERTIFIABLE ELEMENT
CERTIFICATE OF COMPLIANCE

(Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY AND SECURITY CERTIFICATION PLAN

CERTIFIABLE ELEMENT
CERTIFICATE OF COMPLIANCE

Certifiable Element/Sub-Element:

Restrictions Noted:

The Certifiable Element complies with all applicable safety and security requirements and may be used for passenger service.

Project Manager	**Date**	**Facilities/Systems Chief Engineer**	**Date**
AGM Rail/Bus Operations	**Date**	**Chief Metro Transit Police**	**Date**
Assistant Chief Safety Officer	**Date**	**Chief Safety Officer**	**Date**

ATTACHMENT 7

SYSTEM CERTIFICATE OF COMPLANCE

(Example)

WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY
SAFETY AND SECURITY CERTIFICATION PLAN

SYSTEM
CERTIFICATE OF COMPLIANCE

Restrictions Noted:

The System Certificate of Conformance signifies that all applicable safety and security requirements have been completed and the facility/system may be placed into service, with the noted restrictions.

WMATA Project Manager	Date	Chief Infrastructure Services Chief Engineer	Date
Rail/Bus Transportation	Date	AGM – TIES / AGM – BUS	Date
Deputy General Manager Administration	Date	Deputy General Manager Operations	Date
Metro Chief of Police	Date	Chief Safety Officer	Date

General Manager / CEO Date

ATTACHMENT 8

PROJECT ASSESSMENT FORM

(Example)

Department of Safety & Environmental Management (SAFE)
Safety & Security Certification - Project Assessment Form

Project Title:					**Date Assessed:**	
Certification Category:			**Safety Officer:**		**Assessed by:**	
Mode: ☐ Bus ☐ Rail ☐ Facility	Project Cost: ☐ ≥ $100 million ☐ < $100 million:	Funding Source: _____	Project Type: ☐ Design-Build ☐ Design-Bid- Build ☐ Rehabilitation/Modification	WMATA Design Criteria? ☐ Yes ☐ No	Type: ☐ MCAP ☐ IRPG ☐ JDAC ☐ Security	Certification Mandated: ☐ FTA ☐ WMATA Executive Safety Committee ☐ No
Unique characteristics (*if applicable*):						
Comments:						

WMATA SAFE (ACSO) Date

WMATA Project Manager Date

WMATA SAFE (Deputy Chief) Date

MTPD Certification Liaison Date
(Type: Security only)

ATTACHMENT 9

Safety and Security Investigation Report

(Example)

Safety and Security Investigation Report (SSIR)			
Identification			
Originator:	**Organization:**	**Date:**	**Report Number:**
Investigation Description *(Describe the investigation; ensure the applicable requirements, planned activities, procedures, specifications, drawing, standards, serial numbers, etc. are noted. Indicate who documented the investigation.)*			
Steps to Prevent Inadvertent Use of the Item or Process			
Corrective/Preventive Action and Disposition			
Planned Corrective/Preventive Action *(Describe for each cause what action(s) will be taken with the item or process including, as applicable, the completion dates, disposition of material, and responsible staff for each action. Describe, as applicable, what actions are needed to prevent recurrence of the identified investigation, such as process improvement, procedure revisions, training plan, etc., and include completion dates and responsible staff for each action.)*			
Independent verification required? Yes ☐ **No** ☐			
Person(s) Responsible for the Corrective/Preventive Action and Disposition *Name* *Date*		**Approval of Corrective/Preventive Action and Disposition** *Name* *Date*	
Closing the Investigation Report			
Action Completed *Name* *Date*		**Independent Verification Completed (if required)** *Name* *Date*	
Distribution:			
Initial ☐ Final ☐			