SUBMITTAL REGISTER

CONTRACT NO.
WON 1312011 (Am-0006)

TITLE AND LOCATION
FY15 MCON P-861 Facility Modifications for VMU, MWSD and CH53E

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAG# RAPH	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES			CONTRACTOR ACTION			APPROVING AUTHORITY				MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
							SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION		
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		05 50 13	SD-02 Shop Drawings															
			Access Doors	2.3														
			Expansion Joints	2.5														
			Angles and Plates	2.7														
			Fall Restraint System	2.9														
			SD-03 Product Data															
			Access Doors	2.3														
			Expansion Joints	2.5														
			Fall Restraint System	2.9														
			Structural Carbon Steel	2.1.1	L													
			Structural Tubing	2.1.2	L													
			Steel Pipe	2.1.3	L													
			Access Doors	2.3	L													
			Guard Posts (Bollards/Pipe	2.6	L													
			Guards)															
			Plates and Shapes	2.7	L													
			SD-04 Samples															
			Expansion Joints	2.5	G													
			SD-10 Operation and Maintenance															
			Data															
			Fall Restraint System	2.9														
			SD-11 Closeout Submittals															
			Structural Carbon Steel	2.1.1	L													
			Structural Tubing	2.1.2	L													
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		05 50 13	Guard Posts (Bollards/Pipe Guards)	2.6	L													
			Plates and Shapes	2.7	L													

SECTION 05 50 13

MISCELLANEOUS METAL FABRICATIONS
05/10

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ACI INTERNATIONAL (ACI)

ACI 355.2/355.2R	(2004) Qualifications of Post-Installed Mechanical Anchors in Concrete and Commentary

AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC)

AISC 303	(2010) Code of Standard Practice for Steel Buildings and Bridges

AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)

ASSE/SAFE A10.3	(2013) Operations - Safety Requirements for Powder Actuated Fastening Systems

AMERICAN WELDING SOCIETY (AWS)

AWS D1.1/D1.1M	(2010; Errata 2011) Structural Welding Code - Steel

ASME INTERNATIONAL (ASME)

ASME B18.2.1	(2012; Errata 2013) Square and Hex Bolts and Screws (Inch Series)
ASME B18.2.2	(2010) Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)
ASME B18.21.1	(2009) Washers: Helical Spring-Lock, Tooth Lock, and Plain Washers (Inch Series)
ASME B18.6.2	(1998; R 2010) Slotted Head Cap Screws, Square Head Set Screws, and Slotted Headless Set Screws: Inch Series
ASME B18.6.3	(2013) Machine Screws, Tapping Screws, and Machine Drive Screws (Inch Series)

ASTM INTERNATIONAL (ASTM)

ASTM A123/A123M	(2013) Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and

Steel Products

ASTM A153/A153M (2009) Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware

ASTM A307 (2012) Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength

ASTM A36/A36M (2012) Standard Specification for Carbon Structural Steel

ASTM A467/A467M (2007; R 2012) Standard Specification for Machine Coil Chain

ASTM A500/A500M (2013) Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

ASTM A53/A53M (2012) Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

ASTM A653/A653M (2013) Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

ASTM A666 (2010) Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate and Flat Bar

ASTM A780/A780M (2009) Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings

ASTM A924/A924M (2013) Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process

ASTM C1513 (2013) Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections

ASTM D1187/D1187M (1997; E 2011; R 2011) Asphalt-Base Emulsions for Use as Protective Coatings for Metal

ICC EVALUATION SERVICE, INC. (ICC-ES)

ICC-ES AC193 (2007) Acceptance Criteria for Mechanical Anchors in Concrete Elements

MASTER PAINTERS INSTITUTE (MPI)

MPI 79 (Oct 2009) Alkyd Anti-Corrosive Metal Primer

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1926.502	Fall Protection Systems Criteria and Practices

U.S. GREEN BUILDING COUNCIL (USGBC)

LEED GBDC	(2009) LEED Reference Guide for Green Building Design and Construction
LEED NC	(2009) Leadership in Energy and Environmental Design(tm) New Construction Rating System

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for Contractor Quality Control approval. Submittals with an "L" are for LEED review which shall be performed by the Contractor's LEED Coordinator and the LEED Administrator. Submit the following in accordance with Section 01 33 00 SUBMITTAL PROCEDURES and Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS as applicable:

SD-02 Shop Drawings

Access Doors, installation drawings
Expansion Joints, installation drawings (Am-0006)
Embedded Angles and Plates, installation drawings
Fall Restraint System, installation drawings (Am-0004)

Submit fabrication drawings showing layout(s), connections to structural system, and anchoring details as specified in AISC 303.

Submit templates, erection and installation drawings indicating thickness, type, grade, class of metal, and dimensions. Show construction details, reinforcement, anchorage, and installation with relation to the building construction.

SD-03 Product Data

Access Doors
Expansion Joints (Am-0006)
Fall Restraint System (Am-0004)

SD-03 Product Data (LEED NC)

Structural Carbon Steel; L; (LEED NC)
Structural Tubing; L; (LEED NC)
Steel Pipe; L; (LEED NC)
Access Doors; L; (LEED NC)
Guard Posts (Bollards/Pipe Guards); L; (LEED NC)
Plates and Shapes; L; (LEED NC)

Submit documentation indicating percentage of post-industrial and post-consumer recycled content per unit of product. Indicate dollar value of product.

SD-04 Samples

Expansion Joints; G (Am-0006)

Provide full size samples, minimum 4 inches long of each type, taken from manufacturer's stock, and be complete as required for installation in the structure. (Am-0006)

SD-10 Operation and Maintenance Data

Fall Restraint System (Am-0004)

SD-11 Closeout Submittals (LEED NC)

Structural Carbon Steel; L; (LEED NC)
Structural Tubing; L; (LEED NC)
Steel Pipe; L; (LEED NC)
Access Doors; L; (LEED NC)
Guard Posts (Bollards/Pipe Guards); L; (LEED NC)
Plates and Shapes; L; (LEED NC)

LEED documentation relative to recycled content materials credit in accordance with the LEED GBDC. Include in the LEED Documentation Notebook.

1.3 QUALIFICATION OF WELDERS

Qualify welders in accordance with AWS D1.1/D1.1M. Use procedures, materials, and equipment of the type required for the work.

1.4 DELIVERY, STORAGE, AND PROTECTION

Protect from corrosion, deformation, and other types of damage. Store items in an enclosed area free from contact with soil and weather. Remove and replace damaged items with new items.

PART 2 PRODUCTS

2.1 MATERIALS

2.1.1 Structural Carbon Steel

ASTM A36/A36M.

Structural carbon steel may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.1.2 Structural Tubing

ASTM A500/A500M.

Structural tubing may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.1.3 Steel Pipe

ASTM A53/A53M, Type E or S, Grade B.

Steel pipe may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.1.4 Anchor Bolts

ASTM A307. Where exposed, shall be of the same material, color, and finish as the metal to which applied.

2.1.4.1 Expansion Anchors

Expansion anchors shall be carbon steel threaded studs with integral tapered cone expanders and segmented expansion collars. Provide anchors with electroplated zinc coating, length identification markings, and required nuts and washers. Expansion anchors shall be evaluated in accordance with ACI 355.2/355.2R Category 1 or 2 and shall be tested in accordance with ICC-ES AC193 for all mandatory and optional tests. Provide anchors with the following properties:

a. Diameter: 5/8 inch

b. Embedment Length: 4 inches

c. Minimum Effective Area: 0.16 in^2

d. Minimum Yield Strength: 84.8 ksi

e. Minimum Tensile Strength: 106 ksi

f. Minimum Pullout Strength: 4000 lb

g. Uncracked Effectiveness Factor: 24

h. Cracked Effectiveness Factor: 17

2.1.4.2 Lag Screws and Bolts

ASME B18.2.1, type and grade best suited for the purpose.

2.1.4.3 Toggle Bolts

ASME B18.2.1.

2.1.4.4 Bolts, Nuts, Studs and Rivets

ASME B18.2.2 or ASTM A307.

2.1.4.5 Powder Actuated Fasteners

Follow safety provisions of ASSE/SAFE A10.3.

2.1.4.6 Screws

ASME B18.2.1, ASME B18.6.2, ASME B18.6.3 and ASTM C1513.

2.1.4.7 Washers

Provide plain washers to conform to ASME B18.21.1. Provide beveled

washers for American Standard beams and channels, square or rectangular, tapered in thickness, and smooth. Provide lock washers to conform to ASME B18.21.1.

2.2 FABRICATION FINISHES

2.2.1 Galvanizing

Hot-dip galvanize items specified to be zinc-coated, after fabrication where practicable. Galvanizing: ASTM A123/A123M, ASTM A153/A153M, ASTM A653/A653M or ASTM A924/A924M, G90, as applicable.

2.2.2 Galvanize

Anchor bolts, washers, and parts or devices necessary for proper installation, unless indicated otherwise.

2.2.3 Repair of Zinc-Coated Surfaces

Repair damaged surfaces with galvanizing repair method and paint conforming to ASTM A780/A780M or by application of stick or thick paste material specifically designed for repair of galvanizing, as approved by Contracting Officer. Clean areas to be repaired and remove slag from welds. Heat surfaces to which stick or paste material is applied, with a torch to a temperature sufficient to melt the metallics in stick or paste; spread molten material uniformly over surfaces to be coated and wipe off excess material.

2.3 ACCESS DOORS

Provide flush type access doors and panels unless otherwise indicated. Fabricate frames for access doors of steel not lighter than 16 gage with welded joints and anchorage for securing into construction. Provide access doors with a minimum of 14 by 20 inches and of not lighter than 16 gage steel, with stiffened edges and welded attachments. Provide access doors hinged to frame and with a flush-face, turn-screw-operated latch. Provide exposed metal surfaces with a shop applied prime coat.

Access doors may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.4 CORNER GUARDS AND SHIELDS

For jambs and sills of openings and edges of platforms provide steel shapes and plates anchored in masonry or concrete with welded steel straps or end-weld stud anchors. Form corner guards for use with glazed or ceramic tile finish on walls with 0.0625 inch thick corrosion-resisting steel with polished or satin finish, extend 5 feet above the top of cove base or to the top of the wainscot, whichever is less, and securely anchor to the supporting wall. Corner guards on exterior shall be galvanized.

2.5 EXPANSION JOINTS

Provide expansion joints constructed of extruded aluminum with anodized satin aluminum finish for walls and ceilings and with standard mill finish for floor covers and exterior covers. Provide flexible EPDM wall/roof expansion joints with black face as indicated. Furnish plates, backup angles, expansion filler strip, polyethylene vapor barriers, fire-rated

expansion material, watertight and acoustical expansion material, anchors, and all components for complete systems as indicated. (Am-0006)

2.6 GUARD POSTS (BOLLARDS/PIPE GUARDS)

Provide galvanized, extra strong weight steel pipe as specified in ASTM A53/A53M as indicated. Anchor posts in concrete as indicated and fill solidly with concrete.

Guard posts (bollars/pipe guards) may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.7 MISCELLANEOUS PLATES AND SHAPES

Provide for items that do not form a part of the structural steel framework, such as miscellaneous mountings and frames. Provide with connections and fasteners or welds as indicated. Construct to have at least 8 inches bearing on masonry at each end.

Provide angles and plates, ASTM A36/A36M, for embedment as indicated. Galvanize embedded items exposed to the elements according to ASTM A123/A123M.

Plates and shapes may contain post-industrial or post-consumer recycled content. See Section 01 33 29.00 20 SUSTAINABLE REQUIREMENTS for cumulative total recycled content requirements.

2.8 SAFETY CHAINS

Construct safety chains of galvanized steel, straight link type, 3/16 inch diameter, with at least twelve links per foot, and with snap hooks on each end. Test safety chain in accordance with ASTM A467/A467M, Class CS. Provide snap hooks of boat type. Provide galvanized 3/8 inch bolt with 3/4 inch eye diameter for attachment of chain, anchored as indicated. Supply two chains, 4 inches longer than the anchorage spacing, for each guarded area. Locate safety chain where indicated.

2.9 FALL RESTRAINT SYSTEM

2.9.1 Materials

a. All materials shall be new, and completed fall protection system shall be the product of one manufacturer or the manufacture's authorized installer regularly engaged in the design and production of such equipment.

b. Fall Arrest Systems and Components: All system connectors, cables and bolts shall be manufactured from stainless steel: ASTM A666, Type 316. All connectors shall comply with OSHA regulation 29 CFR 1926.502. Fabricated supports required for additional support shall be carbon steel with a corrosion resistant finish.

c. Material Control: All system components shall contain serial numbers, permanently stamped or engraved, identifying the specific job and system they are used for. These serial numbers shall be recorded in the system operation and maintenance manual.

2.9.2 Horizontal Lifeline Cable

Marine grade stainless steel wire rope with a minimum breaking strength of 10,000 pounds.

2.9.3 Force Limiting Anchorage Posts

Designed to limit load to 10kN in the event of a fall and absorb the energy integrally. The body of the anchorage is to deploy in the event of a fall pulling the fixings in shear and preventing damage to the roof system. Weather proof construction and designed for attachment to all major composite, built-up on site, standing seam and single ply membrane roofing. Attached by means of stitching screws, spilt clamps and toggle bolts with no need for fixing to purlins or structural steel.

2.9.4 Swaging

The cable shall be swaged in-line with the anchor point and have a slip indicator.

2.9.5 Shock Absorber

Load limiting in-line shock absorber to 3,000 pounds for multi-span systems and 4,500 pounds for single span systems. The shock absorber shall visually display deployment in the event a load such as a fall has occurred on the system.

2.9.6 End Anchors

316 stainless steel end anchors with minimum breaking strength of 10,000 pounds.

2.9.7 Transfastener/Trolley

316 stainless steel with a minimum tensile load of 3600 pounds. The transfastener shall allow for easy pass-thru of support points without disconnecting from the system.

2.9.8 Tension Indicator

The system shall include a tension indicator that will allow the user to physically inspect that the correct cable tension is achieved.

2.9.9 Fasteners

The Fall Arrest Systems shall be attached to the supporting structure with appropriate fasteners. The fasteners shall be designed to support a load on the system of 2 times the maximum design load without failure.

2.9.10 Other Components

Corner Assemblies, Turnbuckles and other components shall be 316 stainless steel. System components shall be of same material unless otherwise indicated. Exposed work shall be true to line and level with accurate angles, surfaces and with straight square edges. Coordinate anchorage system with supporting structure. Fabricate anchoring devices as recommended by the manufacturer to provide adequate support for intended use. Fabricate Joints in a manner to discourage water accumulation. Provide weep holes to drain any water, which could accumulate in the

exposed joints. (Am-0004)

PART 3 EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

Install items at locations indicated, according to manufacturer's instructions. Verify all measurements and take all field measurements necessary before fabrication. Exposed fastenings shall be compatible materials, shall generally match in color and finish, and harmonize with the material to which fastenings are applied. Include materials and parts necessary to complete each item, even though such work is not definitely shown or specified. Poor matching of holes for fasteners shall be cause for rejection. Conceal fastenings where practicable. Thickness of metal and details of assembly and supports shall provide strength and stiffness. Form joints exposed to the weather shall be formed to exclude water.

3.2 WORKMANSHIP

Provide miscellaneous metalwork that is well formed to shape and size, with sharp lines and angles and true curves. Drilling and punching shall produce clean true lines and surfaces. Provide continuous welding along the entire area of contact except where tack welding is permitted. Do not tack weld exposed connections of work in place and ground smooth. Provide a smooth finish on exposed surfaces of work in place and unless otherwise approved, flush exposed riveting. Mill joints where tight fits are required. Corner joints shall be coped or mitered, well formed, and in true alignment. Accurately set work to established lines and elevations and securely fastened in place. Install in accordance with manufacturer's installation instructions and approved drawings, cuts, and details.

3.3 ANCHORAGE, FASTENINGS, AND CONNECTIONS

Provide anchorage where necessary for fastening miscellaneous metal items securely in place. Include for anchorage not otherwise specified or indicated slotted inserts, expansion shields, and powder-driven fasteners, when approved for concrete; toggle bolts and through bolts for masonry; machine and carriage bolts for steel; through bolts, lag bolts, and screws for wood. Do not use wood plugs in any material. Provide non-ferrous attachments for non-ferrous metal. Make exposed fastenings of compatible materials, generally matching in color and finish, to which fastenings are applied. Conceal fastenings where practicable.

3.4 BUILT-IN WORK

Form for anchorage metal work built-in with concrete or masonry, or provide with suitable anchoring devices as indicated or as required. Furnish metal work in ample time for securing in place as the work progresses.

3.5 WELDING

Perform welding, welding inspection, and corrective welding, in accordance with AWS D1.1/D1.1M. Use continuous welds on all exposed connections. Grind visible welds smooth in the finished installation.

3.6 FINISHES

3.6.1 Dissimilar Materials

Where dissimilar metals are in contact, protect surfaces with a coat conforming to MPI 79 to prevent galvanic or corrosive action. Where aluminum is in contact with concrete, plaster, mortar, masonry, wood, or absorptive materials subject to wetting, protect with ASTM D1187/D1187M, asphalt-base emulsion.

3.6.2 Field Preparation

Remove rust preventive coating just prior to field erection, using a remover approved by the rust preventive manufacturer. Surfaces, when assembled, shall be free of rust, grease, dirt and other foreign matter.

3.6.3 Environmental Conditions

Do not clean or paint surface when damp or exposed to foggy or rainy weather, when metallic surface temperature is less than 5 degrees F above the dew point of the surrounding air, or when surface temperature is over 95 degrees F, unless approved by the Contracting Officer.

3.7 INSTALLATION OF GUARD POSTS (BOLLARDS/PIPE GUARDS)

Set pipe guards vertically in concrete piers. Construct piers of, and the hollow cores of the pipe filled with, concrete having a compressive strength of 3000 psi.

3.8 FALL RESTRAINT SYSTEM

Install as recommended by the manufacturer and shop drawings. (Am-0004)

3.9 EXPANSION JOINTS

Install in accordance with the manufacturer's recommendations to be watertight. (Am-0006)

-- End of Section --