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ADDENDUM #6
May 2, 2022

TO: **ALL MANDATORY Pre-Bid Meeting Attendees**
PROJECT NAME: **Contract 76 B.1-Biological Foul Air Mitigation System-Construction-Rebid**
BID REFERENCE #: **91359-003.0**
BID DUE/OPENING DATE: May 10, 2022 @ 3:30 p.m. Local Time

The purpose of this addendum is to clarify and/or modify the Bid Items, Drawings and/or Specifications for this project. All work affected is subject to all applicable terms and conditions of the Bidding and Contract Documents.

1. **RESPONSE TO QUESTIONS**

   Q1: Please clarify the milling depth for the areas to be milled and capped.

   A: Details regarding the milling specifications have been provided in ***Addendum #6, Attachment C*** and ***Addendum #6, Attachment D***.

2. **RESPONSE TO QUESTIONS provided by Jones & Henry Engineers, LTD in document 017-7725.001 (*Addendum #6, Attachment A)***

3. **ADDITION**
   As noted in Jones & Henry Engineers, LTD document 017-7725.001 (*Addendum #6, Attachment A*); Specification Section 13651 – Pre-Engineered Metal Building (*Addendum #6, Attachment B*) has been added to this project. The Contractor will be responsible for procuring and erecting the pre-engineered metal building for this project. The cost for the building must be reflected in each bidders' lump sum bid price for the project.

The Addendum can be viewed and downloaded from the City's website at https://www.kalamazoocity.org/bidopportunities.

In order for a bid to be responsive, this addendum must be returned, signed and dated, with your bid. If you have already submitted your bid, acknowledge receipt and acceptance of this addendum by signing in the place provided and returning it to the undersigned and it shall be incorporated in your bid. Please identify your return envelope with the bid reference number and project description.

Sincerely,

Michelle Emig
Purchasing Division Manager

c: Ryan Stoughton, Public Services
Chris Nelson, Public Services
James Cornell, Public Services
Prevailing Wage File

FIRM: _____ SIGNED: _____

NAME: _____ DATE: _____
(Type or Print)

ADDENDUM #6

Attachment A

Document 017-7725.001
Response to Questions

Contract 76 B.1-Biological Foul Air Mitigation System-Construction-Rebid

91359-003.0

Jones & Henry
ENGINEERS, LTD.

Fluid thinking®
4791 Campus Drive, Kalamazoo, MI 49008
Phone: 269.353.9650 JHEng.com

City of Kalamazoo
KWRP Biofiltration
017-7725.001

1. What type of ductile iron pipe does the city want on the project? Spec calls out for pressure class 350, I assume PC350. PC350 is not the city spec, city specs CL52.
    a. City of Kalamazoo's Standard Specifications for Water Main, current version takes precedence over anything stated in the J&H supplied Project Manual Specifications for Work associated with the City's Act 399 regulated infrastructure.

2. Since the last set of questions, I asked if a 5'x3.5' culvert would work for the air flows. I now find out that one of the suppliers is actually 5'x3' opening. Instead of us asking on so many different sizes to see if they work could you just give us what minimum SF cross-sectional surface area is required to meet your flows?
    a. The Basis of Design minimum underground foul air duct dimension is 60" x 30" rectangular or 46" diameter equivalent precast reinforced concrete box culvert or pipe, respectively. Contractor shall bear the responsibility to prove any proposed equivalent is capable of meeting all the requirements of the Design and Systems.

3. On Sheet C-5, what are the unidentified black circles on the 6" Drain Piping and 6" Culvert Drain Piping?
    a. These circles represent a typical directional sanitary lateral 6" clean-out directly downstream of a Rectorseal Clean Check 6" PVC Extendable Backwater Valve.

4. In the Addendum#1-Q4: **Is there a list of support grading, media, etc. for bidders to figure out labor costs?**A: Media volume is approximately 800 CY per biofilter. **Media will be delivered in flexible intermediate bulk containers (FIBCs) with a capacity of approximately 1 CY each**. Each FIBCmay have a full weight of up to 4,000 lbs. Please see ***Attachment C*** and ***Attachment D*** for additional information.
    a. Correction: FIBCs are not available from the manufacturers of the media. Envirogen will be delivering approx. 702 CY of organic and inorganic media in 2 cf & 1 cf plastic bags, respectively on shrink wrapped pallets. Individual bags will need to be placed within the individual biofilter chambers as per Envirogen's drawings. ****It is critical that all plastic debris and residue is removed from chamber during installation to prevent blockages and channeling during operations.**

6,440	BG	**MEDIA, INORGANIC** **(Bagged) Scorfil Biofilter/Humidification Media (1150 lbs/cy)** Density may vary due to mine source. Bag = 1cf 70 bags/pallet round to nearest pallet full 1 pallet = approx 3,000 lbs

6,256	BG	**MEDIA, ORGANIC** **(Bagged) Vamfil Biofilter Media** Ship in 2.0 cu. ft bags Ships 68 bags/pallet with a cap and UV resistant stretch film Pallet wt = approx 1860 lbs

5. Are any of the areas on this project classified as Class 1, Division 1 (C1D1) as defined by the National Electrical Code? If so, specifically which areas?
    a. There are no areas that are classified as Class 1, Division 1

6. Are any of the areas on this project classified as Class 1, Division 2 (C1D2) as defined by the National Electrical Code? If so, specifically which areas?
    a. Areas in the building and outside that are within 3feet of leakage sources such as fans, blowers, dampers, or ductwork, are classified as Class 1 Division 2.

7. The motor operated valves in blower building show a magnetic motor started (480V 3P) on print page E-4. These motorized valves are on the LP-30 panel schedule as 120 volt powered. We believe the symbols on print E-4 are in error.
    a. The operator voltage is 120V and therefore the operator symbol is incorrect on the plans and the PLC Riser for the motor operated valves and the butterfly dampers. The symbol should have no shaded quadrants in the square representing the valve operator.

8. Regarding the electrical manholes for this project. Page 16132-3 Section 2.02 of the specifications states that the contractor is to provide the electrical manholes. Note 4 on page C-5 of the prints states that they shall be provided by the City of Kalamazoo. Which of these is the controlling language?
    a. Please review Addendum 1.

9. Also wanted to inquire into any headway made on classification/division of areas. Knowing exactly what each room and area needs to be will significantly aid a more precise bid. For example, I noticed in addendum 3's provided Envirogen parts list that the VFD enclosures are only 4X. Yet the motor it serves is C1/D2 rated. Won't the VFD enclosure lie within the C1/D2 area if located as shown in print page E-4? If so, might we move the enclosure and associated conduits outside of the zone to save money on material?
    a. Yes the VFD should not be located in the Class 1 Division 2 envelopes at each leakage source associated with the blower.

10. The motor operated valves show a magnetic motor starter (480V 3P) on print page E-4. Are we not controlling the motorized valves via points in the Envirogen controller?
    a. Yes, the motor operated valves and butterfly dampers are controlled by the Envirogen controller. They are all 120V.

11. Lastly, NEMA 7 is only listed for indoor use. Do the ducts outside feeding the biofilters and carbon scrubbers warrant explosion proof fittings as well? If so, what style NEMA enclosure shall we plan to bid for install?
    a. Enclosures for the actuators would be NEMA 8.

12. We are questioning what NFPA classification this is. Technically NEMA doesn't classify locations but designs enclosures to perform in the areas that are classified by the NFPA or engineering staff. There are many other items besides the enclosures that will be in these areas. Because of the methane gas present we are presuming it will be a NEC Class 1 area within 3 feet of the ducting and blowers. Our question is, are you classifying it as Division 1 or 2?
    a. Within 3 feet of the blowers is classified as Class 1, Division 2

13. On drawing E-5. The devices shown in the Biofilter, are they actually in the Biofilter? If they are in the Biofilter what type of conduit is to be used to feed them?
    a. PIT and FIT devices on E-5, are not in the Biofilter per the notes "Located in separate irrigation lines and location in sump line". Specification 16121, Section 3.02F specifies rigid galvanized conduit. Underground rigid galvanized conduit can be coated with asphaltic paint per Specification 16130 Section 3.11.

14. On drawings E-2 and E-5. Are we able to attach the devices, lights, and conduit right to the outside of Biofilter and Scrubber walls?
    a. Lights, devices, and conduits can be mounted to the Biofilters and Carbon Scrubber walls. All devices shall be more than 3 feet from any leak sources (including but not limited to construction joints and cover connections) to be unclassified.

15. Addendum #3, the detail that shows the concrete pull box, show's a 36" round pull box. With the number of conduits shown on C-5 for the duct bank they won't fit in that detail shown. Please advise what size pull box you want to have?
    a. Internal diameter for MH-E-5 is 7 feet by 7 feet, internal diameter for MH-E-6 is 7 feet by 7 feet, internal diameter for MH-E-7 is 5 feet by 5 feet, and the internal diameter for MH-E-8 is 5 feet by 5 feet.

16. Would you be open to the bock culvert being a round pipe or elliptical pipe so that we can use standard structures for the T connections and 90 degree bend?
    a. The box culvert design was intended to accommodate the 100-year flood elevation and normal water level while minimizing the necessary fill volume needed for cover. Based on the required air flow, round pipe will not be acceptable. Elliptical pipe MAY be acceptable but would need to be submitted for review as an equal. A further design review will have to be conducted to determine the viability of elliptical pipe. Bidder would be required to submit data sheets and dimensional drawings to determine if elliptical pipe could be considered an equal.

17. Are you fine with just using mastic on the joints, or are you expecting the contractor to grout all joints on the inside of the structure?
    a. It is the intention of the design to provide airtight joints, mastic is acceptable provided the finished product has airtight joints.

18. The 8' DIA biofilter sump, does that need to be with Xypex?
    a. Yes the biofilter sump needs Xypex Bio-San C500.

19. What kind of hatch are you looking for to go into the flat top on the 8' DIA biofilter sump?
    a. A 4' x 4' aluminum floor hatch that is H-20 load rated by Bilco or equal

20. Can you confirm the material, make, and model of the dampers?
    a. Dampers are to be bid per the Control Damper Schedule on sheets PE-2 and PE-3.

21. Specification Section 13651 is attached (Addendum #6, Attachment B). Contractor shall now be responsible for procurement and erection of the Pre-Engineered Metal Building.

ADDENDUM #6

Attachment B

Specification Section 13651 – Pre-Engineered Metal Building

Contract 76 B.1-Biological Foul Air Mitigation System-Construction-Rebid

91359-003.0

SECTION 13651
PRE-ENGINEERED METAL BUILDING

PART 1 GENERAL

1.01 SCOPE

A. This Section includes the furnishing of all materials required to erect the following:

1. Structural building framing.
2. Insulated metal roof panels.
3. Insulated metal wall panels.
4. Gutters and Downspouts.
5. Framed openings for personnel doors, services doors, windows, louvers, and vents.

1.02 SUBMITTALS

A. Submittals shall be in accordance with all requirements of Project Specification Section 01300 and Project Specification Section 01410 and shall include:

1. Shop Drawings for Review:

a. Submit product data including, but not limited to, construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of the following metal building system components:

1) Structural-framing system.
2) Roof panels.
3) Wall panels.
4) Gutters and downspouts.
5) Trim and closures.
6) Accessories.
7) Shop coatings.

b. Submit drawings for the following metal building system components, including, but not limited to, plans, elevations, sections, details, and attachments to other Work.

1) For installed components indicated to comply with design loads, include structural analysis data signed and sealed by the professional engineer, licensed in the State of Michigan, responsible for their preparation. Provide all single and combination load reactions for all building columns.

2) Anchor-Bolt Plans shall include location, diameter, and projection of anchor bolts required to attach metal building to foundation.

3) Structural-Framing drawings shall show complete fabrication of primary and secondary framing. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross sections.

4) Roof and wall panel layout drawings shall show layout of panels on support framing, details of edge conditions, joints, panel profiles, corners, custom profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work.

2. Samples and Color Charts:

a. Physical samples, color charts and/or color chips, showing the full range of colors and profiles available for each type of the following products with factory-applied color finishes:

1) Roof panels.

2) Wall panels.

3) Trim and closures.

4) Gutters and downspouts.

3. Information for the Record:

a. Product Certificates, signed by manufacturers of metal building systems certifying that products furnished comply with requirements.

b. Letter of Design Certification, signed and sealed by the professional engineer shall include the following:

1) Name and location of Project.

2) Order number.

3) Name of manufacturer.

4) Name of Contractor.

5) Building dimensions, including width, length, height, and roof slope.

6) Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.

7) Governing building code and year of edition.

8) Design Loads, including but not limited to, gravity loads, wind and seismic design criteria and crane capacities.

c. Manufacturer Certificates, signed by manufacturers, certifying that they comply with requirements. Include evidence of manufacturing experience.

d. Warranties as specified herein.

e. Submit signed and sealed column reactions of all individual and combination loads. Column reaction submittal shall be approved by the Engineer prior to construction of the building foundation.

1.03 QUALITY ASSURANCE

A. Manufacturer shall be a firm experienced in manufacturing metal building systems similar to those indicated for this Project and with a record of successful in-service performance.

1. The design shall be performed by a Professional Engineer, licensed in the State of Michigan.

2. The preparation of shop drawings, testing program development, test result interpretation, and comprehensive engineering analysis shall be by a Licensed Professional Engineer, licensed in the State of Michigan.

3. Member of Metal Buildings Manufacturers Association (MBMA).

B. The design fabrication and erection shall be in accordance with the following standards:

1. AISC 360 – Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design.

2. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members.

1.04 PROJECT HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package roof and wall panels for protection during transportation and handling.

1.05 WARRANTIES

A. For the project, Substantial Completion shall be defined as the date at which time the Building Manufacturer, Building Erector, Owner, and Engineer sign off on the completion of the building punch list and issue a certificate of substantial completion.

1. As part of attaining Substantial Completion all support documents, as constructed documents, and approved operation and maintenance manuals shall be received by the Owner.

B. Special warranties specified shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

C. Warranty on Panels shall be executed by manufacturer for repair or replacement of roof and wall panels that fail in materials or workmanship within 20 years from date of Substantial Completion. Warranty shall include the labor required for the repair or replacement.

D. Warranty on Panel Finishes shall be executed by the manufacturer for repair of finish or replacement of metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period. Deterioration of finish includes, but is not limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

1. Warranty Period for Roof Panels shall be 20 years from date of Substantial Completion.

2. Warranty period for Wall Panels shall be 20 years from date of Substantial Completion.

D. Warranty on Standing-Seam Roof Panel shall be executed by manufacturer agreeing to repair or replace standing-seam roof panel assemblies that fail to remain weathertight within three years from date of Substantial Completion.

E. Warranty on ribbed metal wall panel shall be executed by Manufacturer agreeing to repair or replace ribbed metal wall panel assemblies that fail to remain watertight within three years from date of Substantial Completion.

PART 2 PRODUCTS

2.01 MAUFACTURER'S

A. Acceptable Manufacturers.

1. Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Nucor Buildings Group.

b. Owner approved equal.

2.02 PERFORMANCE REQUIREMENTS

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, roof and wall panels, insulation, and accessories complying with requirements specified and shown on the Drawings.

B. Metal Building System Design - Of size, spacing, slope, and spans indicated, and as follows:

1. Primary Frame Type - Provide the following:

a. Rigid Modular - Solid-member structural-framing system with interior columns where indicated on Drawings.

2. End-Wall Framing - Manufacturer's standard as follows:

a. Provide primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

3. Secondary Frame Type - Manufacturer's standard rafters and the following girts:

a. Bypass-framed girts. Refer to drawings for girt bypass distance.

4. Eave Height - as indicated on Drawings.

5. Bay Spacing - as indicated on Drawings.

6. Roof Slope - 1:12 rise to run.

7. Roof System - Manufacturer's standard insulated metal roof panels.

8. Exterior Wall System - Manufacturer's standard insulated metal wall panels.

C. Fire Resistance - Provide roof and wall panel assemblies with fire-resistance ratings indicated.

D. Structural Performance - Provide metal building systems capable of withstanding the effects of dead loads and the following loads and stresses within limits and under conditions indicated:

1. Design Loads Criteria:

a. 2015 Michigan Building Code and ASCE 7-10.

b. Building Category: III (per building code).

c. Ground Snow Load: 35 psf.

d. Snow Exposure Factor, Ce: 1.00.

e. Snow Importance Factor: 1.10.

f. Roof Live Load: 20 psf (non-reducible).

g. Collateral Load: 10 psf.

h. Basic Wind Speed: 120 mph.

i. Wind Exposure Category: C.

j. Seismic Use Group: III (per building code).

k. Seismic Site Class: D.

l. Seismic Importance Factor: 1.25.

m. 0.2 sec Spectral Response Acceleration: 0.0879g.

n. 1.0 sec Spectral Response Acceleration: 0.0499g.

o. Auxiliary loads: See drawings.

2. Wind Loads - Include horizontal and vertical loads induced by a basic wind speed corresponding to a 50-year mean-recurrence interval at Site to develop both stress and deflection calculations.

3. Seismic Loads - Include horizontal and vertical loads induced by the seismic accelerations at Site to develop both stress and deflection calculations.

4. Load Combinations - Design metal building systems to withstand the most critical effects of load factors and load combinations per MBNA's "Low Rise Building System Manual".

E. Engineer assemblies to withstand design loads with deflections no greater than the following:

1. Purlins and Rafter - Vertical deflection of 1/240 of the span.

2. Girts - Horizontal deflection of 1/180 of the span.

3. Frame Sway - Horizontal deflection of 1/240 of the eave height.

4. Metal Panels - Vertical deflection of 1/100 of span.

F. Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

G. Design and engineer metal building systems capable of withstanding the effects of earthquake motions determined according to the building code in effect for this Project or ASCE 7, "Minimum Design Loads for Buildings and Other Structures" - Section 9, "Earthquake Loads," whichever is more stringent.

H. Provide metal building roof and wall panel systems that allow for thermal movements by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects.

I. Provide roof and wall panel assemblies with permanent resistance to air leakage through assembly.

J. Water Penetration for Roof and Wall Panels - Provide roof and wall panel assemblies with no water penetration.

K. Wind-Uplift Resistance - Provide roof panel assemblies that meet requirements of UL 580 for Class 90 wind-uplift resistance:

L. Panel shall be class one as approved by Factory Mutual.

2.03 STRUCTURAL-FRAMING MATERIALS

A. Structural steel, including but not limited to, steel shapes, plates, bars, tubing, and pipe shall comply with the requirements of Project Specification Section 05500.

B. Fasteners, including but not limited to, non-high and high strength bolts, anchor rods, anchor bolts shall comply with the requirements of Project Specification Section 05500.

C. Welding shall be in accordance with the requirements of Project Specification Section 05500.

2.04 STRUCTURAL FRAMING

A. Manufacturer's standard structural primary framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

B. Rigid Modular Frames shall be I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns shall be fabricated from round steel pipe or tube, or shop-welded, built-up steel plates, where indicated on drawings.

C. Frame Configuration shall be single gable.

D. Exterior Column Type shall be tapered.

E. Rafter Type shall be tapered.

F. Manufacturer's standard secondary framing members, including, but not limited to, purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members shall be fabricated framing from cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet pre-painted with coil coating, unless otherwise indicated, and shall be as follows:

1. Purlins shall be C- or Z-shaped sections; fabricated from minimum 0.0598-inch-(16 gage) thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 45 to 50 degrees to flange and with minimum 2-1/2-inch-wide flanges.

    a. Depth - As required.

2. Girts shall be C- or Z-shaped sections; fabricated from minimum 0.0598-inch (16 gage) thick steel sheet, built-up steel plates, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 45 to 50 degrees to flange and with minimum 2-1/2-inch-wide flanges.

    a. Depth 12-inch maximum.

3. Base or Sill Angles shall be a minimum 3-by-2-by-0.0747-inch zinc-coated (galvanized) steel sheet. Angle shall be suitable attachment for the specific panel furnished.

4. Purlin and Girt Clips shall be formed from zinc-coated (galvanized) steel sheet.

5. Framing for Openings shall be channel shapes; fabricated from minimum 0.0598-inch (16 gage) thick, cold-formed, structural-steel sheet or structural-steel

shapes. Frame head and jamb of door openings, and head, jamb, and sill of other openings.

G. Canopy Framing shall be manufacturer's standard structural-framing system, designed to withstand required loads, fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide frames with attachment plates and splice members, factory drilled for field-bolted assembly.

H. Bracing shall be follows:

1. Rods - ASTM A36; ASTM A572, Grade D; or ASTM A529, Grade 50; 1/2-inch minimum diameter steel with turnbuckles and threaded ends.
2. Cable shall not be permitted.
3. Angles shall be fabricated from structural-steel shapes of size required to withstand design loads.
4. Rigid Portal Frames shall be fabricated from shop-welded, built-up steel plates or structural-steel shapes; of size required to withstand design loads.
5. Diaphragm Action of Panels shall not be permitted to resist wind forces through diaphragm action of roof and wall panels.

I. Bolts shall be shop-painted bolts unless structural-framing components are in direct contact with roof and wall panels. Provide zinc-plated bolts when structural-framing components are in direct contact with roof and wall panels.

2.05 INSULATED METAL ROOF PANELS

A. Standing Seam, Foamed-Insulation-Core Metal Roof Panels: Structural metal panels consisting of an exterior standing seam with an interior tongue and groove joint, coupled with a vapor seal in the standing seam, and provides superior resistance to air and moisture intrusion. Attached with concealed fasteners to the structure. Roof panels shall be as follows:

1. Profile: 2-Inch high standing seam and 1/8-inch deep Mesa profile with embossment on both interior and exterior faces.
2. Material: Aluminum-zinc alloy-coated steel (Galvalume), ASTM A792, Type AZ50 Coating or galvanized coated steel, ASTM A653, Type G90 zinc-coated.
3. Yield Strength: 50 ksi.
4. Metal Thickness exterior face: 0.027-inch (24 Gage) minimum.
5. Metal Thickness interior face: 0.021-inch (26 Gage) minimum.
6. Joint Type: As standard with manufacturer.
7. Panel Width: 30 inches to 42 inches.
8. Panel Thickness: 2 inches to 6 inches, as required to meet the thermal resistance R-value.

9. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent.
    a. Closed Cell Content: 90% or more as determined by ASTM D 6226.
    b. Compressive Strength: As required to meet structural performance. requirements and with a minimum of 22 psi as determined by ASTM D. 1621.
    c. Minimum Density: 2.0 pcf as determined by ASTM D 1622.
    d. Thermal Resistance (R-Value): **30** degrees F * hr * sq. ft./Btu as determined by ASTM C 518 at 75 degrees Fahrenheit mean temperature.
10. Provide corrosion resistance fasteners.

B. Roof panel accessories shall be components required for a complete roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, seam covers, battens, flashings, gutters, sealants, gaskets, fillers, closure strips, and similar items. Match materials and finishes of roof panels, unless otherwise indicated.
1. Closures at eave and ridge shall be fabricated of same metal as roof panels.
2. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.
3. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Provide corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.
4. Roof Curbs: Compatible with standing seam roof and approved by metal panel manufacture.

C. Apply the following coil coating to roof panels and accessories:
1. Fluoropolymer two-coat system (Kynar 500) shall be manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a total minimum dry film thickness of 1 mil and 30 percent reflective gloss when tested according to ASTM D 523.
    a. Provide coating field tested under normal range of weather conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214; and without fading in excess of five Hunter units.
2. Colors, textures, and glosses shall be selected by Owner from manufacturer's full range for these characteristics.

2.06 INSULATED METAL WALL PANELS

A. Insulated Metal Wall Panels with foam core: Structural metal panels consisting of exterior metal sheet and interior metal sheet with matching profiles. Factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed corrosion resistant fasteners. Comply with the following:

1. Profile of Main Wall: 1/8-Inch deep Mesa profile with embossment on both interior and exterior faces for main wall area and CF.
2. Profile of Wainscot Wall: STRIATED with 1/32-inch deep longitudinal striations profile with embossment on exterior face and light mesa profile with embossment on both interior faces.
3. Material - Aluminum-zinc alloy-coated steel (Galvalume), ASTM A792 Type AZ50 Coating or galvanized coated steel, ASTM A653, Type G90 zinc-coated.
4. Yield Strength - 50 ksi, minimum.
5. Metal Thickness exterior face: 0.027-inch (24 Gage) minimum.
6. Metal Thickness interior face: 0.027-inch (24 Gage) minimum
7. Panel Width: 30 inches to 42 inches.
8. Panel Thickness: 2 inches to 6 inches, as required to meet the thermal resistance R-value.
9. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent.
    a. Closed Cell Content: 90% or more as determined by ASTM D 6226.
    b. Compressive Strength: As required to meet structural performance. requirements and with a minimum of 22 psi as determined by ASTM D. 1621.
    c. Minimum Density: 2.0 pcf as determined by ASTM D 1622.
    d. Thermal Resistance (R-Value): **26** degrees F * hr * sq. ft./Btu as determined by ASTM C 518 at 75 degrees Fahrenheit mean temperature.

B. Wall panel accessories shall provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.

1. Flashing and Trim: Match material and finish of metal panels.
2. Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

3. Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Supply corrosion-resistant fasteners. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

4. Joint Sealers:

   a. Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards.

   b. Vertical Joint Gasket: Manufacturers standard EPDM gasket.

C. Apply the following coil coating to the wall panels.

1. Fluoropolymer Two-Coat System (Knyar 500) shall be manufacturer's standard two-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a total minimum dry film thickness of 1 mil and 30 percent reflective gloss when tested according to ASTM D 523

D. Provide coating field tested under normal range of weather conditions for a minimum of 20 years without significant peel, blister, flake, chip, crack, or check in finish; without chalking in excess of a chalk rating of 8 according to ASTM D 4214; and without fading in excess of five Hunter unit.

1. Colors, textures, and glosses shall be selected by Owner from manufacturer's full range for these characteristics.

2.07 TRIM PANELS

A. Fascia panels shall be the manufacturer’s standard panels.

B. Soffit panels shall be the manufacturer’s standard panels.

C. All other trim and accessory panel shall be the manufacturer’s standard panel.

2.08 GUTTERS AND DOWNSPOUTS

A. Gutters and downspouts shall be the manufacturer’s standard with material and finish to match the wall panels.

B. Gutters and downspouts shall be installed in accordance with the International Building Code Chapter 15 and the International Plumbing Code Chapter 11.

C. Color shall be selected by the Owner.

2.09 ACCESSORIES

A. Fasteners including self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners shall be designed to withstand design loads.

Provide fasteners with heads matching color of roof or wall sheets by means of plastic caps or factory-applied coating. Comply with the following:

1. Fasteners for roof and wall panels shall be self-drilling or self-tapping 410 stainless or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of panels.

B. Closure accessories shall include but not be limited to eaves, rakes, corners, bases, framed openings, ridges, fascia, fillers, soffit, trim, and flashing as may be standard with the manufacturer's metal building system.

1. Provide closure accessories as required to seal against weather and to provide finished appearance.

2. Closure accessories shall be 0.0179-inch thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet pre-painted with coil coating.

3. Finish flashing and trim with same finish system as adjacent roof or wall panels.

C. Louvers - Refer to Project Specification Division 15855.

D. Snow guards shall be prefabricated, noncorrosive units designed to be installed without penetrating roof panel, and complete with predrilled holes, clamps, or hooks for anchoring.

1. Metal-type guard shall be of aluminum or stainless-steel rods or bars held in place by supports clamped to vertical ribs of standing-seam roof.

2. Place over all personnel doors and where indicated on Drawings.

2.10 FABRICATION

A. Shop Coatings:

1. Aluminum:

a. Where anodizing is specified, provide Architectural Class I anodic coating, applied after fabrication.

b. Surfaces which will be in contact with concrete, masonry, or dissimilar metals shall receive a heavy coat of coal tar paint, Bitumastic Super Service Black, or equal.

2. Carbon Steel:

a. Steel fabrications wholly embedded in concrete or masonry and with a minimum of 2-inch of concrete cover shall be abrasive blasted in accordance with SSPC SP-6, but shall not be coated. Exposed portions of partially embedded steel shall be shop coated to a point 4-inch below the concrete surface.

b. Component shall be hot dip galvanized after fabrication in conformance with ASTM A123. Threaded parts and hardware shall be galvanized in

conformance with ASTM A153 or zinc-plated in conformance with ASTM B695.

c. Unless specified otherwise, non-galvanized fabrications shall be shop primed per Project Specification Section 09900 (provided separately).

3. Surfaces which will be inaccessible for field painting after installation shall receive two coats of primer.

4. Contractor shall ensure primer is compatible with specified field coatings.

5. Comply with NAAMM's "Metal Finishes Manual for Engineerural and Metal Products" for recommendations for applying and designating finishes.

B. General - Design components and field connections required for erection to permit easy assembly and disassembly.

1. Fabricate components in a manner that once assembled in the shop, they may be disassembled, repackaged, and reassembled in the field.

2. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

3. Fabricate framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Cold-formed members shall be free of cracks, tears, and ruptures.

C. Primary Framing - Shop-fabricate framing components to indicated size and section with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.

2. Join flanges to webs of built-up members by a continuous submerged arc-welding process.

3. Brace compression flange of primary framing by angles connected between frame web and purlin or girt web, so flange compressive strength is within allowable limits for any combination of loadings.

4. Weld clips to frames for attaching secondary framing members.

5. Shop Priming - Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary structural members with specified primer after fabrication.

D. Secondary Framing - Shop-fabricate framing components to indicate size and section by roll-forming or break-forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

1. Make shop connections by welding or by using non-high-strength bolts.

2. Shop Priming - Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime secondary structural members with specified primer after fabrication.

E. Factory Priming for Field-Painted Finish - Where field painting after installation is indicated, apply the specified air-dried primer immediately after cleaning and pretreating.

1. Prime primary, secondary, and end-wall steel framing members with specified primer to a minimum dry film thickness of 1 mil.

a. Prime secondary steel framing formed from metallic-coated steel sheet with red-oxide polyester paint, with a minimum dry film thickness of 0.5 mil on each side.

2. Prime galvanized members, after phosphoric acid pretreatment, with manufacturer's standard zinc dust, zinc-oxide primer.

F. Tolerances - Comply with MBMA's "Low Rise Building Systems Manual" - Chapter IV, Section 9, "Fabrication and Erection Tolerances".

2.11 SOURCE QUALITY CONTROL

A. Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable.

B. Variations in appearance of other components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

2.12 INSULATION MATERIALS

A. Insulation shall follow the requirements of the 2015 International Energy Conservation Code. Fiberglass blanket insulation with adhered flexible vapor retarder. Insulation shall comply with NAIMA standard 202.

1. Minimum R-Values:

a. Roofs: R-19 + R-11 LS (liner system).

b. Walls: R-13 + R-13 ci (continuos insulation).

2. Maximum Assembly U-Values:

a. Roofs: U-0.035.

b. Walls: U-0.052.

B. Vapor retarder shall be polypropylene-faced, scrim-reinforced kraft paper, with a permeance not greater than 0.02 perms.

C. Insulation shall be non-combustible with a flame-spread rating of 25 or less.

D. Retainer strips shall be 0.019-inch thick, formed, galvanized steel or PVC retainer clips colored to match insulation facing.

PART 3 EXECUTION

3.01 COORDINATION

A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundation walls and footings. Concrete, reinforcement, and formwork requirements are specified in Project Specification Section 03300.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations, which are specified in Project Specification Section 07800 (provided separately).

C. Coordinate all mechanical wall openings with mechanical construction drawings and mechanical contractor.

D. Building column reactions shall be submitted prior to construction of foundations.

PART 4 SPECIAL PROVISIONS

4.01 FABRICATOR APPROVAL

A. The fabricator of structural load bearing members and assemblies furnished under this Section, shall be registered and approved to fabricate these products without special inspections per the requirements of the current Building Code Section 1704. The approved fabricator shall submit evidence of such registration at the time that shop drawings are submitted. At the completion of production, the approved fabricator shall submit a certificate of compliance to the local building code official stating that the fabrication was performed in accordance with the Contract Documents and the approved shop drawings.

END OF SECTION

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ADDENDUM #6

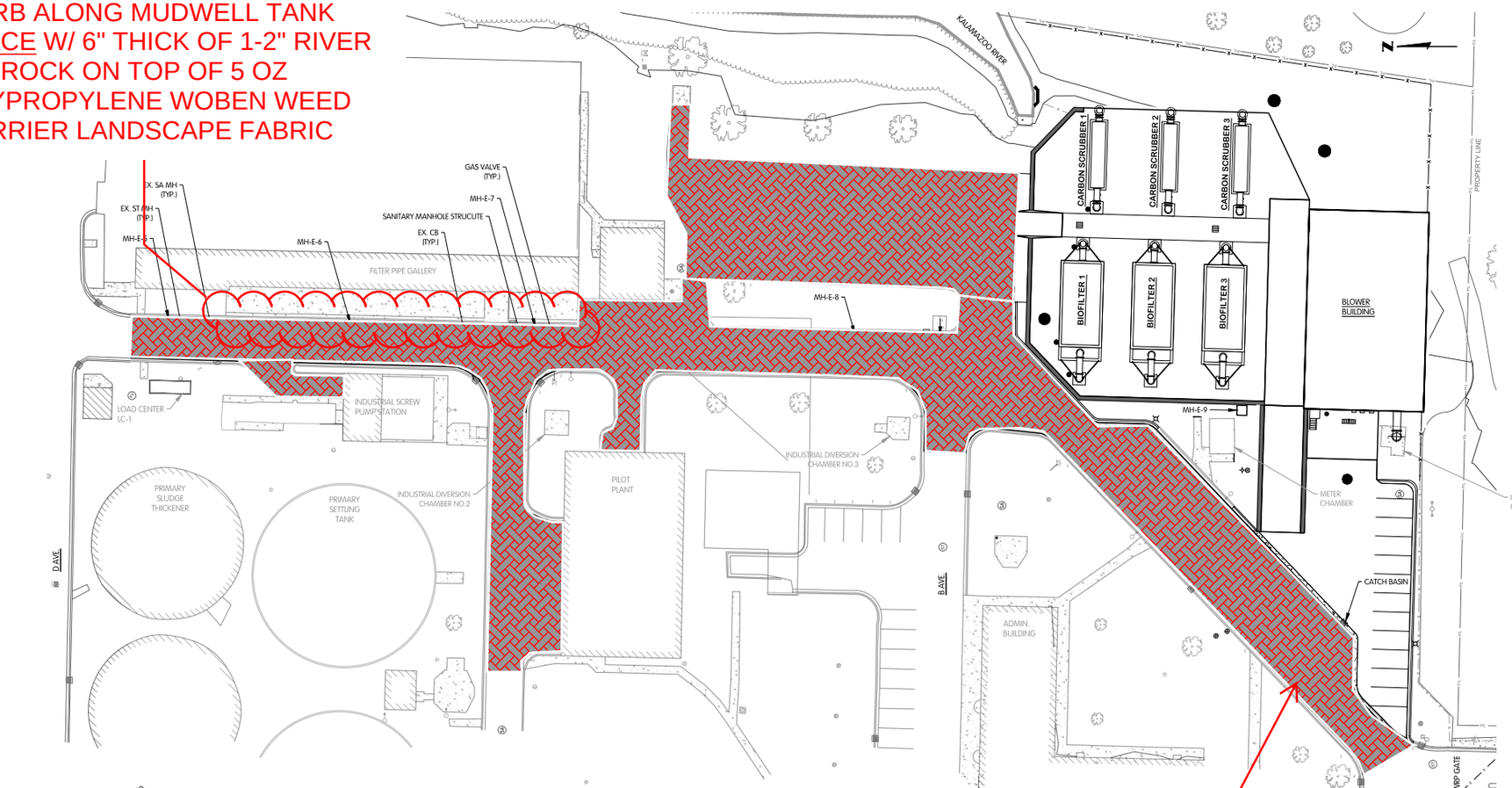
Attachment C

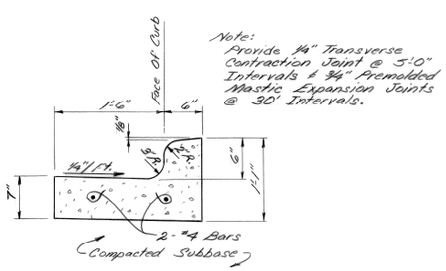
Approx. HMA Replacement Limits

Contract 76 B.1-Biological Foul Air Mitigation System-Construction-Rebid

91359-003.0

REMOVE EXISTING SIDEWALK BEHIND CURB ALONG MUDWELL TANK
REPLACE W/ 6" THICK OF 1-2" RIVER ROCK ON TOP OF 5 OZ POLYPROPYLENE WOBEN WEED BARRIER LANDSCAPE FABRIC





CURB & GUTTER DETAIL

APPROX. HMA REPLACEMENT LIMITS
REPLACE DAMAGED CURB
REPLACE DAMAGED EXISTING CB INLET CASTING
ADJUST CASTINGS AS NECESSARY
OWNER WILL RE-STRIPE PARKING AREAS

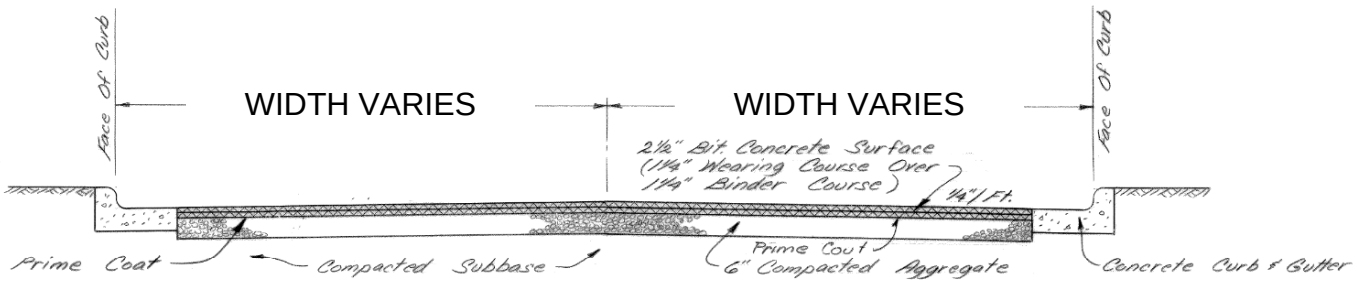
ADDENDUM #6

Attachment D

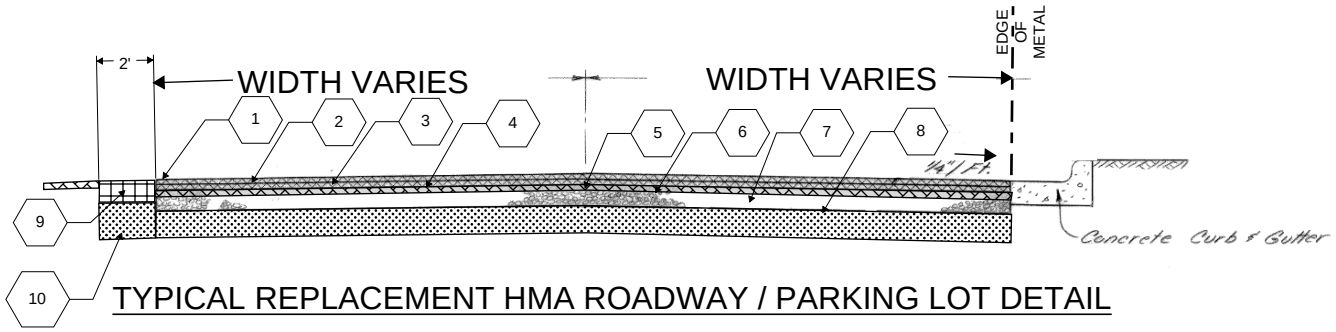
Typical Existing HMA Roadway / Parking Lot Detail

Contract 76 B.1-Biological Foul Air Mitigation System-Construction-Rebid

91359-003.0



TYPICAL EXISTING HMA ROADWAY / PARKING LOT DETAIL



TYPICAL REPLACEMENT HMA ROADWAY / PARKING LOT DETAIL

1 - 1 1/2" (165 LB/SQ YD) MDOT HMA 13A WEARING COURSE
2 - TACK COAT 0.05 GAL / SQ YD
3 - 1 1/2" (165 LB/SQ YD) MDOT HMA 13A LEVELING COURSE
4 - TACK COAT 0.05 GAL / SQ YD
5 - 2" (200 LB/SQ YD) MDOT 3C BASE COURSE
6 - TACK COAT 0.10 GAL / SQ YD
7 - 8" COMPACTED IN PLACE MDOT 21AA AGGREGATE BASE
8 - 12" COMPACTED IN PLACE MDOT CLASS II GRANULAR MATERIAL SUBBASE
9 - 8" COMPACTED IN PLACE MDOT 21AA AGGREGATE SHOULDER
10 - 17" COMPACTED IN PLACE MDOT CLASS II GRANULAR MATERIAL BASE