ADDENDUM

Public Building Commission of Chicago | Richard J. Daley Center | 50 West Washington Street, Room 200 | Chicago, Illinois 60602 | (312) 744-3090 | pbcchicago.com

ADDENDUM NO.: **03**

PROJECT NAME: **FPDCC Metal Buildings – McGinnis Field Station**

PROJECT NO.: **15070**

CONTRACT NO.: **C1613**

DATE OF ISSUE: **January 24, 2025**

NOTICE OF CHANGES, MODIFICATIONS, OR CLARIFICATIONS TO CONTRACT DOCUMENTS

The following changes, modifications, or clarifications are hereby incorporated and made an integral part of the Contract Documents. Unless clearly expressed otherwise by this Addendum, all terms and conditions defined in the original Contract Documents shall continue in full force and effect and shall have the same meaning in this Addendum. Issued Addenda represent responses/clarifications to various inquiries. Contractors shall be responsible for including all associated labor/material costs in its bid. Drawings/specifications corresponding to inquiry responses will be issued with the Issue for Construction Documents, upon issuance of building permit.

ITEM NO. 1: **CHANGE TO KEY DATES**

Change 1 **Bid Opening Due Date/Time** has been **rescheduled** from Wednesday, January 29, 2025 at 11:00am to **Thursday, February 6, 2025 at 10:00am.**

Change 2 **Pre-Award Meeting** has been **rescheduled** from Thursday, January 30, 2025 at 11:00am to **Monday, February 10, 2025 at 9:30am.**

ITEM NO. 2: **REVISIONS TO BOOK 1 – PBC INSTRUCTIONS TO BIDDERS** *(Updated Book 1 included as a link in this addendum)*

Change 1 **REVISED** Section III (J) as follows:

'J. Local Business Subcontracting Participation, Community Hiring, and Cook County Residency

1. {INTENTIONALLY OMITTED}
2. {INTENTIONALLY OMITTED}
3. {INTENTIONALLY OMITTED}
4. Pursuant to an ordinance passed by Cook County on March 12, 2014, County Residency Requirement, Sec. 34-190, adopted by the Forest Preserve District of Cook County (1-8-2(G)). It is the policy of the County, and by extension the Commission, that at least 50% of the project labor shall be performed by Cook County Residents.'

Change 2 **ADDED** Section III (U), as follows:

'U. Alternates – Commission Discretion

The Commission expressly reserves the right to accept or decline any alternates offered by Bidder. The Commission will notify the successful Bidder, in writing, whether any alternate(s) will be awarded.'

Change 3 **REVISED** Section IV (B), Master Bid Form

NOTE: Updated Fillable Master Bid Form (Excel version) is available from Cross Rhodes Print & Technologies Planroom, the PBC Current Opportunities Page, as well as the PBC Alert communication.

Change 4 **ADDED** Section IV (E), as follows:

E. ALTERNATES

ACCEPTED BY THE COMMISSION		ALTERNATE DESCRIPTION	PROPOSED ALTERNATE PRICE
Yes ☐	No ☐	#1: Electrical Service Open Trenching with Concrete Encasement	$

ITEM NO. 3: **REVISIONS TO BOOK 2 – PBC STANDARD TERMS AND CONDITIONS** *(updated Book 2 included as a link in this addendum)*

Change 1 **REVISED** Article 21, 21.03. Please refer to updated Pages 110 – 112 of updated Book 2 included as a link in this addendum.

ITEM NO. 4: **REVISIONS TO BOOK 3 – TECHNICAL SPECIFICATIONS/REPORTS**

Change 1 **Book 3 – Volume 1 – REVISED** Specification Section 00 01 02 – Table of Contents: Highlighted to indicate revised specification sections.

Change 2 **Book 3 – Volume 1 – REVISED** Specification Section 07 41 13 – Pre-Insulated Metal Roof Panels: Changed 2.2.B., Panel Design to coordinate and clarify panel characteristics.

Change 3 **Book 3 – Volume 1 – REVISED** Specification Section 07 42 13 – Pre-Insulated Metal Wall Panels: Changed 2.2.B., Panel Design to coordinate and clarify panel characteristics.

Change 4 **Book 3 – Volume 1 – REVISED** Specification Section 13 34 19 – Metal Building Systems: Revised Sections 2.5 and 2.6 to coordinate and clarify panel characteristics.

ITEM NO. 5: **REVISIONS TO DRAWINGS**

Change 1 **REVISED** Drawing M0.2, Schedules – Revised data in Air Handling Unit Schedule.

Change 2 **REVISED** Drawing M4.1, Temperature Controls – Revised notes: Controls Scope of Work.

Change 3 **REVISED** Drawing E0.2, Schedules-Electrical – Revised data in equipment schedule.

Change 4 **REVISED** Drawing E0.3, Schedules-Electrical – Revised to correct electrical panel schedule.

Change 5 **REVISED** Drawing P1.1A, CW Plumbing Plan – Metal Storage Building – Deleted key note 10.

Change 6 **REVISED** Drawing P2.0A, Plumbing Riser & Schedules – Metal Storage Building – Revised riser diagram.

Change 7 **DELETED** Drawing FP1.0A, Fire Protection Plan - Fire sprinkler system deleted from scope.

ITEM NO. 6: **REQUESTS FOR INFORMATION**

RFI-1.

Question: **In reference to Dwgs. C1.0 – Location Plan, E1.0 - Site Plan – Electrical, And E1.1 - Site Plan – Electrical, please confirm the following:**

1. **Furnishment and installation of U/G conduits and/or conductors from the "New Entrance Location Of New Electrical Service" to the "New Transformer Location" is not in the GC scope.**
2. **Furnishment and installation of the "New Housekeeping Pad" is not in the GC Scope.**
3. **Installation and anchorage of the COMED-furnished transformer is not in the GC Scope**
4. **In the aforementioned items, GC scope is limited to scheduling and coordination with COMED.**

Response: 1. The underground conductors from the New Entrance Location of Electrical Service to the New Transformer location is the responsibility of ComEd. These primary conductors are anticipated to be direct burial without raceways.

2. Drawing E1.1 shows a concrete pad for the ComEd transformer. This is a requirement of the contract.

3. The installation of the ComEd transformer is the responsibility of ComEd. The concrete pad is provided as part of this contract as stated in the response to Question 2 above.

4. Scheduling and coordination with ComEd is required in addition to the clarifications itemized in the response to Questions 1 – 3 above.

RFI-2.

Question: **How is the new transformer fed?**

Response: The transformer is fed via underground primary cable furnished and installed by ComEd.

RFI-3.

Question: **Please provide Division 03 and/or Division 09 specifications for the sealing of concrete floor slabs/walls as indicated on Sheet A1.0 Finish Note 01 and Sheet A4.0.**

Response: There are no specification sections for these products. Manufacturers and product numbers are included in the drawings.

RFI-4.
Question: **Spec 13 34 19, 2.5, A, 12 calls out 36" wide 4" thick roof panels. Spec 07 41 13, 2.2, B, 3 calls out 42" wide 5" thick roof panels. Which is correct?**
Response: Please refer to revised specification sections 07 41 13 and 13 34 19 included in this addendum for clarification / correction of roof panel characteristics.

RFI-5.
Question: **Spec 13 34 19, 2.6, A, 3 calls out 36" wide 4" thick wall panels. Spec 07 42 13, 2.2, B 3 calls out 42" wide 4" thick panels. Which is correct?**
Response: Please refer to revised specification sections 07 42 13 and 13 34 19 included in this addendum for clarification / correction of wall panel characteristics.

RFI-6.
Question: **This project has fire protection drawings attached calling for a 2" Fire protection riser and backflow fed from an above ground 100 gallon water storage tank (By Plumber) that is above ground floor. Is the fire sprinkler system required?**
Response: Sprinkler system scope has been deleted from the project. Please refer to Item 5. Change 7 above.

RFI-7.
Question: **Fire Protection Notes #1 states "…the existing FP water service in may be reused." Please confirm that there is an existing FP water service and its location.**
Response: There is not an existing FP water service. Sprinkler system scope has been deleted from project. Please refer to Item 5. Change 7 above.

RFI-8.
Question: **Fire Protection Notes #2 notwithstanding, please state the current nominal capacity, pressure, and flow rate for the existing water service from which the FP service will be fed.**
Response: There is not an existing FP water service. Sprinkler system scope has been deleted from project. Please refer to Item 5. Change 7 above.

RFI-9.
Question: **What are the Hours of Operation?**
Response: Please refer to Sheet G1.1 General Note P of the Contract Documents.

RFI-10.
Question: **Are trailers required or may we use the McGinnis Field Office?**
Response: Please refer to Specification Section 01 50 05, TEMPORARY FACILITIES AND CONTROLS - NEW CONSTRUCTION, SECTION 1.18 FIELD OFFICES.

RFI-11.
Question: **When does the coordination of utility shutdowns and new construction switchover occur?**
Response: Please refer to Sheet G1.1 General Notes L, N, and P of the Contract Documents.

RFI-12.
Question: **Is the City Residency requirement for City of Chicago residents or Cook County residents?**
Response: The requirement applies to Cook County residents. Bidders are advised to review the updated Cook County Residency Requirement found in Section III Instructions to Bidders Paragraph (J). Please refer to Book 2 Standard Terms aupdated and included in this addendum.

RFI-13.
Question: **Is this project Tax Exempt?**
Response: Yes. Please refer to Book 2, Standard Terms and Conditions – Article 21 COMPLIANCE WITH ALL LAWS, 21.09 Taxes.

This Addendum includes the following attached Specifications and/or Documents:

1. 00 01 02 – Table of Contents, dated 01.24.2025
2. 07 41 13 – Pre-Insulated Metal Roof Panels, dated 01.24.2025
3. 07 42 13 – Pre-Insulated Metal Wall Panels, dated 01.24.2025
4. 13 34 19 – Metal Building Systems, dated 01.24.2025
5. Link to Updated Book 1 – Instructions to Bidders
6. Link to Updated Book 2 – Standard Terms and Conditions
7. Link to Updated Master Bid Form (Excel Version)

This Addendum includes the following attached Drawings:

1. M0.2 – Schedules, dated 01.24.2025
2. M4.1 – Temperature Controls, dated 01.24.2025
3. E0.2 – Schedules-Electrical, dated 01.24.2025
4. E0.3 – Schedules-Electrical, dated 01.24.2025
5. P1.1A – CW Plumbing Plan – Metal Storage Building, dated 01.24.2025
6. P2.0A – Plumbing Riser & Schedules – Metal Storage Building, dated 01.24.2025

END OF ADDENDUM NO. 03

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SECTION 07 41 13

PRE-INSULATED METAL ROOF PANELS

PART 1 – GENERAL

1.1 Work Included

A. Pre-insulated Standing Seam Roof Panels where indicated on the drawings. Also included, are all necessary trims, fasteners and sealants as required for a weathertight installation. Panels shall be secured to the structure with concealed clips, mechanically closed single lock at the standing seam for weather tightness.
    1. Steel faced factory foamed-in-place profiled panels with compatible joinery.
    2. Sealants between panels and their intersection.
    3. Mechanically closed single lock standing seam at exterior side joint. Interior side joint is a single tongue and groove interlock.

1.2 Related Section

A. Section 07 62 00 – Sheet Metal Flashing and Trim
B. Section 07 92 00 – Joint Sealants

1.3 References

A. Fire Performance
    1. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials
B. Structural Performance
    1. ASTM E 1592 – Structural Performance of Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
    2. FM Approval Standard 4471 – Class 1 Exterior Roof Structure Performance
    3. UL 580 – Uplift Resistance of Roof Assemblies
    4. UL 1897 – Uplift Test for Roof Covering Systems
C. Vapor Barrier Performance
    1. ASTM E 1646 – Water Penetration of Exterior Metal Roof Panel Systems by Static Air Pressure Difference
    2. ASTM E 1680 – Rate of Air Leakage Through Exterior Metal Roof Panel Systems
D. Thermal Performance
    1. ASTM C 518 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
E. Metal Coatings
    1. ASTM E 18 – Test Methods for Rockwell Hardness of Metallic Finishes
    2. ASTM A 653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
    3. ASTM A 792 – Standard Specification for Steel Sheet, Aluminum-Zinc Alloy Coated Steel by the Hot-Dip Process
    4. ASTM A 924 – General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
F. Foam Properties
    1. ASTM D 1621 – Compressive Properties of Rigid Cellular Plastics
    2. ASTM D 1622 – Apparent Density of Rigid Cellular Plastics

3. ASTM D 1623 – Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
4. ASTM C 273 – Shear Properties of Sandwich Core Materials

1.4 Performance Requirements

A. Structural Tests
   1. FM Approval Standard 4471: The panel meets requirements for I-60 or I-90 windstorm classifications and a hailstorm classification of Class 1-SH.
   2. Underwriters Laboratory (UL) Uplift Tests for Roof Assemblies: UL Class 90 uplift in accordance with UL 580, 16 gauge support members at 7′-0″, maximum spacing. Uplift resistance of 166 psf at 5′-0″ and 140 psf at 7′-0″ in accordance with UL 1897, using 16 gauge support members.
   3. Static Air Pressure Difference: Conducted in accordance with ASTM E 1592 Structural Performance of Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.
B. Thermal Performance
   1. Testing in accordance with ASTM C 518, “Measurement of Steady State Thermal Transmission”, the panels shall provide a K-factor of .140 btu/sf/hr/deg. F at 75° F (24° C) mean temperature.
C. Vapor Barrier
   1. Water and Air Penetration: The panel assembly was tested in accordance with ASTM E 1646 Water Penetration of Exterior Metal Roof Panel Systems by Static Air Pressure Difference and ASTM E 1680 Rate of Air Leakage Through Exterior Metal Roof Panel Systems. Both tests were found in compliance with the test methods.
D. Fire
   1. FM Approval Standard 4471: The panel meets requirements of a Class 1A fire classification.
   2. Surface Burning Characteristics: The insulated core shall have been tested in accordance with ASTM E 84 and CAN/ULC S102 for surface burning characteristics. The core shall have a maximum flame spread of 25 and a maximum smoke developed rating of 450.

1.5 Quality Assurance

A. **Installer Qualifications:** Installed by a contractor with a minimum of five (5) years’ experience with this type of construction, and documentation indicating successful completion of contracts for projects of similar size, scope and materials.
B. **Manufacturer’s Qualifications**: The manufacturer shall have a minimum of ten (10) years’ experience in production of factory foamed-in-place insulated metal panels.

1.6 Submittals

A. Submit under provisions of Section 01 60 00.
B. Manufacturer’s data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Material type, metal thickness and finish.
   4. Installation methods.
C. Shop Drawings: Including elevations, fastening patterns, sections of each condition and details as required.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer’s full range of available colors and patterns.

E. Panel Sample: Submit 1’ (305 mm) high joint panel sample for each profile specified indicating the metal, texture and finish.
F. Manufacturer’s Certificates: Certify products meet or exceed specified requirements.

1.7 Substitutions

A. Materials, accessories and testing specified shall establish the minimum level of quality, performance, dimension and appearance required of any substitution.
B. No substitution will be considered unless a written request to the specifying architect is received for approval at least ten (10) days prior to the established bid date. Evidence shall be submitted to demonstrate equivalency to the products and performance levels specified. Laminated panels shall not be considered acceptable substitutes for the specified foamed-in-place panels.
    1. A complete description of the substitution including details referenced to the roof panel shown on the contract drawings.
    2. Independent test reports verifying compliance with specified performance requirements.
    3. A detailed listing of each specification item with which the substitution does not fully comply.
C. The manufacturer or roof panel contractor proposing the substitution shall pay the costs of any other subcontractor affected by the proposed substitution.

1.8 Warranty

A. Submit manufacturer’s written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
B. The installation contractor shall issue a separate one (1) year warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.9 Finish Warranty

A. Submit Manufacturer’s forty (40) year limited warranty on the exterior paint finish for adhesion to the metal substrate and thirty (30) year limited warranty on the exterior paint finish for chalk and fade.
Note to Specifier: No warranty is offered for the interior painted surface of the panel.

PART 2 – PRODUCTS

2.1 Acceptable Manufacturer:

A. CFR Roof Panels as manufactured by Metl-Span of Lewisville, TX, 75057, USA, Phone: (972) 221-6656, Fax: (972) 420-9382, Email: panel@metlspan.com Website: www.metlspan.com.
B. SR2 Standing Seam Roof Panels as manufactured by All Weather Insulated Panels (AWIP) of Vacaville, CA, 95688, USA, Phone: 888.970.2947, E-mail: sales@awipanels.com, Website: http://www.awipanels.com.
C. eco-FICIENT® Insulated BattenLok® Roof Panel as manufactured by MBCI, Phone: 877.713.6224, E-mail: info@mbci.com, Website: http://www.mbci.com

2.2 Panel Design

A. Panel – General Requirements: Metl-Span CFR Roof Panel – Roll-formed exterior and interior steel sheet faces chemically bonded to continuously foamed-in-place polyurethane core; laminated panels are not acceptable.
    1. Exterior Face: G-90 galvanized stucco embossed painted steel, minimum 22 gauge or AZ-50 Aluminum-Zinc stucco embossed, painted steel in 22ga.
    2. Interior Face: G-90 galvanized stucco embossed painted steel, minimum 26 gauge or AZ-50 Aluminum-Zinc stucco embossed painted steel, minimum 26ga, unless otherwise indicated.
    3. Longitudinal Joint Sealants: Field applied.
    4. Foam Core: Non-CFC, Non-VOC, Class I, polyurethane.
    5. Exterior Finish: One coat 70% polyvinylidene fluoride (PVDF) coil coating, nominal 0.7 mil (0.02 mm), over 0.2 mil (0.005 mm) primer; color as selected by Architect from manufacturer's standard colors; or a clear acrylic finish.
    6. Interior Finish: Once coat factory applied Polyester coil coating nominal 0.7 mil (0.02 mm) in Igloo White, over 0.2 mil (0.005 mm) primer.
B. Metl-Span CFR Roof Panel: The CFR insulated metal roof panel shall have a tongue and groove interlock at the base of the panel and a mechanically closed standing seam at the exterior surface of the panel. The CFR roof panel shall be attached to the structure with a clip and fasteners concealed within the side joint of the panel and the installation shall be completely from the exterior side of the building envelope. Exposed through fasteners into the ribs or flat areas of the panel from the exterior side are not acceptable. The roof panels shall be factory notched and swaged to facilitate endlapping of the panels, and the endlap extensions shall be factory cut and have all foam removed. Field notching, swaging and cutting of endlap extensions shall not be accepted. Endlaps shall also have factory installed backer plates to insure proper fit-up of the exterior faces for maximum water tightness.
    1. Exterior Profile: 2" high mechanically closed standing seam; with an 1/8" deep Mesa Wave profile between the seams
    2. Interior Profile: Mesa Wave Pattern, 1/8" deep or Light Mesa Wave Pattern, 1/16″ deep.
    3. Module Width: 36" or 42", Thickness: 5" (as required to achieve specified R-value).
    4. Foam core shall be continuously foamed-in-place min 92% closed cell structure, Non-CFC, Non-VOC polyurethane.
C. Flashing and trim shall be brake-formed sheet metal in the same thickness and finish to match the panels.

PART 3 – EXECUTION

3.1 Examination

A. Panel installer shall examine all structural steel before beginning installation to ensure that all supporting members are straight, level, plumb, properly braced and satisfactory for panel installation.
B. Proper alignment of the roof framing members is necessary to ensure proper fit up and performance of the roof assembly. Alignment tolerances required are specified below.
    1. Out of Square: The roof system can accommodate ¼" of saw tooth tolerance at the eave and end laps.
    2. Structural Length: The roof system can accommodate an overall +/- 2″ rake to rake tolerance or +/- 1″ at each rake.
    3. Structural Width: The roof system can accommodate an overall +/- 1″ eave to ridge tolerance, or +/- ½" at the eave, end lap and ridge.
    4. Vertical Alignment: The roof system can accommodate a vertical deviation from the nominal roof plane of +/- 1/8″ in any 5′ length, +/- ¼" in any 20′ length and +/- ½" over the entire roof area.
C. Do not begin installation until unsatisfactory conditions are corrected.

D. Start of installation shall signify structure and adjacent conditions as being proper and acceptable.

3.2 Delivery, Storage and Handling

A. Protect products of metal roof panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.
B. Deliver, unload, store, and erect insulated metal wall panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
C. Store in accordance with Manufacturer's written instruction.
D. Shield foam insulated metal wall panels from direct sunlight until installation.
E. Store products off the ground, with panels sloped for drainage and covered to protect factory finishes from damage. Stack bundles no more than two (2) high.

3.3 Installation

A. Installation of panels shall be made in accordance with manufacturer's recommended procedures, approved shop drawings, installation guide book and manufacturer's handbook of construction details.
B. Flashing and trim shall be installed true and in proper alignment. Sealant shall be installed where indicated, without skips and voids, to insure weather tightness and integrity of the vapor barrier.

3.4 Damaged Material

A. Replace damaged panels and other components of work that cannot be repaired by finish touch-up or similar minor repair.
B. The panel installer shall inspect and approve each completed wall area and shall be responsible for protection of completed work from damage by other trades.

3.5 Cleaning

A. Replace damaged panels and other components of work, which cannot be repaired by finish touch-up or similar minor repair.
B. Wipe finished surfaces clean of any filings caused by drilling or cutting to prevent rust staining.
C. Protective film on trim should be removed before exposure to sunlight.

END OF SECTION 07 41 13

SECTION 07 42 13

PRE-INSULATED METAL WALL PANELS

PART 1 – GENERAL

1.1 Work Included

A. Pre-insulated metal panel cladding where indicated on the drawings. Also included are all necessary trims, fasteners and sealants as required for a weathertight installation. Panels shall be secured to the structure with concealed clips and fasteners in the side joints.
   1. Steel faced factory foamed-in-place profiled panels with compatible joinery. Panels shall be designed for installation in a vertical orientation.
   2. Sealants between panels and their intersection.

1.2 Related Section

A. Section 07 60 00 – Sheet Metal Flashing and Trim
B. Section 07 92 00 – Joint Sealants

1.3 References

A. AAMA 501.1 – Standard Test Method for Exterior Windows, Curtain Walls and Doors for Water Penetration Using Dynamic Pressure.
B. ASTM A 653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
C. ASTM A 792 – Standard Specification for Steel Sheet, Aluminum-Zinc Alloy Coated Steel by the Hot-Dip Process
D. ASTM C 518 – Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
E. ASTM E 72 – Standard Test Methods of Conducting Strength Tests of Panels for Building Construction
F. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of Building Materials
G. ASTM E 283 – Standard Method for Determining the Rate of Air Leakage Through Exterior Window, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
H. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Wall by Uniform Static Air Pressure Difference
I. CAN/ULC S102 – Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.

1.4 Performance Requirements

A. Structural and Wind load Tests:
   1. The design load/deflection criteria shall be verified from tests per ASTM E72 “Chamber Method” using a 20 psf (.96 kPa) simulated wind load. A deflection limit of L/180 for exterior wall panels, L/120 for partition and liner walls and L/240 for ceiling panels shall apply.
   2. FM Approval Standard 4881, Standard for Class 1 Exterior Wall Systems. Wind pressures are calculated per FM Global Property Loss Prevention Data Sheet 1-28, ratings are established and support spacing is determined based on FM Approval Standard 4881 listings.

3. Large Missile Impact Test: Conducted in accordance with ASTM E1886 Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Impact Protective Systems and ASTM E1996 Windborne Debris in Hurricanes.

B. Thermal Performance:
   1. When tested in accordance with ASTM C518, “measurement of steady state thermal transmission”, the panels shall provide a K-factor of .14 btu/sf/hr./deg. F at a 75°F (24°C) mean temperature.

C. Vapor Barrier:
   1. Air Infiltration: Air infiltration shall not exceed .06 cfm per square foot of wall area when tested in accordance with ASTM E283 at a static pressure of 12 psf (.576 kPa)
   2. Static Water Penetration: There shall be no uncontrolled water penetration through the panel joints at a static pressure of 20 psf (.96 kPa) when tested in accordance with ASTM E331.
   3. Dynamic Water Penetration: There shall be no uncontrolled water penetration through the panel joints when subjected to a 95 mph (153 kph) slip stream air flow and application of water for a 15 minute period in accordance with AAMA501.1
   4. Condensation Resistance Factor: The minimum condensation resistance factor of the panel shall be 92 when tested in general accordance with AAMA 1503.1

D. Fire:
   1. Surface Burning Characteristics: The insulated core shall have been tested in accordance with ASTM E84 for surface burning characteristics. The core shall have a maximum flame spread of 25 and a smoke developed rating of 450.
   2. Factory Mutual Research Corporation (FMRC) Standard 4880, 50′ (15.24 m) High Corner Test for Unlimited Height Structures: The panel assembly shall not support a self-propagating fire which reaches any limits of the 50 foot (15.24 m) high corner test structure as evidenced by flaming or material damage of the ceiling of the assembly.

   3. National Fire Protection Association – Fire Propagation: The fire assembly shall meet the requirements of the standard for NFPA 285 Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies and NFPA 286 Fire Tests for Evaluating Contribution of Wall and Ceiling Finish to Roof Fire Growth. Heat potential shall be determined using NFPA 259 Test Method for Potential Heat of Building Materials.
   4. IBC Chapter 26: Panel performance under the above test methods, shall meet the requirements of IBC, Chapter on foam plastics.

E. Bond Strength:
   1. Fatigue Test: The panel shall withstand deflection cycling at L/180 to two million alternate cycles with no evidence of delamination, core cracking or permanent bowing.
   2. Freeze/Heat Cycling: The panel shall exhibit no delamination, surface blistering or permanent bowing when subjected to cyclic temperature extremes of -20°F (-28°C) to +180°F (+82°C) for twenty-one (21) eight hour cycles.
   3. Humidity Test: The panel shall exhibit no delamination or metal corrosion at interface when subjected to a 140°F (60°C) temperature and 100% relative humidity for a total of 1200 hours.
   4. Autoclave Test: The panel shall exhibit no delamination of the foam core from metal skins when exposed to 2 psi (.122 kg/sq. cm) pressure at a temperature of 212°F (100°C) for a total of 2 ½ hours.

1.5 Quality Assurance

A. **Installer Qualifications:** Installed by a contractor with a minimum of five (5) years’ experience with this type of construction, and documentation indicating successful completion of contracts for projects of similar size, scope and materials.

B. **Manufacturer's Qualifications**: The manufacturer shall have a minimum of ten (10) years' experience in production of factory foamed-in-place insulated metal panels.

1.6 Submittals

A. Submit under provisions of Section 01 60 00.
B. Manufacturer's data sheets on each product to be used, including:
    1. Preparation instructions and recommendations.
    2. Storage and handling requirements and recommendations.
    3. Material type, metal thickness and finish.
    4. Installation methods.
C. Shop Drawings: Including elevations, fastening patterns, sections of each condition and details as required.
D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
E. Panel Sample: Submit 1' (305 mm) high by full width sample panel for each profile specified indicating the metal, texture and finish.
F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.7 Substitutions

A. Materials, accessories and testing specified shall establish the minimum level of quality, performance, dimension and appearance required of any substitution.
B. No substitution will be considered unless a written request to the specifying architect is received for approval at least ten (10) days prior to the established bid date. Evidence shall be submitted to demonstrate equivalency to the products and performance levels specified. Laminated panels shall not be considered acceptable substitutes for the specified foamed-in-place panels.
    1. A complete description of the substitution including details referenced to the wall panels shown on the contract drawings.
    2. Independent test reports verifying compliance with specified performance requirements.
    3. A detailed listing of each specification item with which the substitution does not fully comply.
C. The manufacturer or wall panel contractor proposing the substitution shall pay the costs of any other subcontractor affected by the proposed substitution.

1.8 Warranty

A. Submit manufacturer's written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
B. The installation contractor shall issue a separate one (1) year warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.9 Finish Warranty

A. Submit Manufacturer's forty (40) year limited warranty on the exterior paint finish for adhesion to the metal substrate and thirty (30) year limited warranty on the exterior paint finish for chalk and fade.

PART 2 – PRODUCTS

2.1 Acceptable Manufacturer:

A. CF Fluted Insulated Metal Wall Panels as manufactured by Metl-Span of Lewisville, TX, 75057, USA, Phone: (972) 221-6656, Fax: (972) 420-9382, Email: panel@metlspan.com Website: www.metlspan.com.
B. Mesa DM40 Metal Wall Panels as manufactured by All Weather Insulated Panels (AWIP) of Vacaville, CA, 95688, USA, Phone: 888.970.2947, E-mail: sales@awipanels.com, Website: http://www.awipanels.com.
C. eco-FICIENT® Classic Metal Wall Panel as manufactured by MBCI, Phone: 877.713.6224, E-mail: info@mbci.com, Website: http://www.mbci.com

2.2 Panel Design

A. A. Panel – General Requirements: Roll-formed exterior and interior steel sheet faces chemically bonded to continuously foamed-in-place polyurethane core; laminated panels are not acceptable.
    1. Exterior Face: G-90 galvanized stucco embossed painted steel, minimum 22 gauge or AZ-50 Aluminum-Zinc stucco embossed painted steel, minimum Grade 33 in 22ga.
    2. Interior Face: G-90 galvanized stucco embossed painted steel, minimum 26 gauge or AZ-50 Aluminum-Zinc stucco embossed painted steel, minimum Grade 33 in 26ga.
    3. Foam Core: Non-CFC, Class I, polyurethane.
    4. Exterior Finish: Exterior face sheet shall be treated with a nominal 0.2 mil (5 microns) base primer, followed by a nominal 0.7 mil (17.5 microns) finish coat of full strength PVF2 fluoropolymer in manufacturer's standard colors.
    Note: Thick mil coatings for aggressive environments are available at extra cost. Siliconized Polyester is also available. Consult the factory for complete information.
    5. Interior Finish: The interior face sheet shall be a nominal 0.2 mil (5 microns) primer followed by a nominal 0.7 (17.5 microns) polyester coating in USDA compliant Igloo White.
B. Concealed fastener wall panels with offset double tongue and groove joinery and an extended metal shelf allowing fasteners to penetrate both metal faces with clips concealed in the side joint.
    1. Exterior Face Profile: Flute 1" wide, 3/8" deep
    2. Interior Face Profile: Mesa Wave Pattern, 1/8" deep
    3. Module Width: 36" or 42"
    4. Thickness: 4" (or as required to achieve specified R-value).
C. Foam core shall be continuously foamed-in-place, Non-CFC polyurethane.
D. Flashing and trim shall be brake-formed sheet metal in the same thickness and finish to match the panels.

PART 3 – EXECUTION

3.1 Examination

A. Panel installer shall examine all structural steel before beginning installation to insure that all supporting members are straight, level, plumb and satisfactory for panel installation.
    1. 0 to 1/4″ outward of the actual wall framing plane for members at 10′ or greater spacing.
    2. 0 to 1/8″ outward of the actual wall framing plane for members at 5′ to 10′ spacing.
    3. 0 to 1/16″ outward of the actual wall framing plane for members at less than 5′ spacing.
B. Do not begin installation until unsatisfactory conditions are corrected.
C. Beginning of installation shall signify the structure and adjacent conditions as being proper and acceptable.

D. Intermediate framing member (secondary structural supports) alignment tolerances required, as specified below:

3.2 Delivery, Storage and Handling

A. Protect products of metal roof panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage.
B. Deliver, unload, store, and erect insulated metal wall panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
C. Store in accordance with Manufacturer's written instruction.
D. Shield foam insulated metal wall panels from direct sunlight until installation.
E. Store products off the ground, with panels sloped for drainage and covered to protect factory finishes from damage. Stack bundles no more than two (2) high.

3.3 Installation

A. Installation of panels shall be made in accordance with manufacturer's recommended procedures, approved shop drawings, installation guide book and manufacturer's handbook of construction details.
B. Flashing and trim shall be installed true and in proper alignment. Sealant shall be installed where indicated, without skips and voids, to insure weather tightness and integrity of the vapor barrier.

3.4 Damaged Material

A. Replace damaged panels and other components of work that cannot be repaired by finish touch-up or similar minor repair.
B. The panel installer shall inspect and approve each completed wall area and shall be responsible for protection of completed work from damage by other trades.

3.5 Cleaning

A. Replace damaged panels and other components of work, which cannot be repaired by finish touch-up or similar minor repair.
B. Wipe finished surfaces clean of any filings caused by drilling or cutting to prevent rust staining.
C. Remove Protective film on trim before exposure to sunlight.

END OF SECTION 074213

SECTION 13 34 19

METAL BUILDING SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Metal Framing Components

B. Metal Wall Panels and Trim

C. Metal Roof Panels and Trim

D. Metal Building Accessories

1.2 RELATED SECTIONS

A. Section 07 41 13 – Insulated Metal Roof Panels.

B. Section 07 42 13 - Insulated Metal Wall Panels.

C. Section 08 11 00 - Painting: Steel Doors & Frames

D. Section 08 52 13 – Metal Clad Windows

1.3 REFERENCE STANDARDS

A. American Institute of Steel Construction (AISC):
   1. 360, Specification for Structural Steel Buildings.
   2. RCSC, Specification for Structural Joints Using High Strength Bolts.
   3. Design Guide 3, Serviceability Design Considerations for Steel Buildings

B. Association for Iron & Steel Technology (AISE):
   1. AISE 13 – Specifications for Design and Construction of Mill Buildings.

C. ASTM International (ASTM):
   1. A36 – Standard Specification for Carbon Structural Steel
   2. A123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
   3. A354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
   4. A475 – Specification for Zinc-Coated Steel Wire Strand
   5. A992 – Standard Specification for Structural Steel Shapes.
   6. A1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
   7. E96 / E96M – Standard Test Methods for Water Vapor Transmission of Materials.
   8. E108 - Spread-of Flame Testing: Class 1A Rating.
   9. E331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

10. E1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
11. E1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
12. E1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
13. E2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
14. F436 – Specification for Hardened Steel Washers
15. F1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
16. F3125 – Standard Specification for High Strength Structural Bolts

D. FM Global:
1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.

E. Metal Building Manufacturers Association (MBMA):
1. MBMA Metal Building Systems Manual

F. Underwriters Laboratories (UL):
1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies

1.4 DEFINITIONS

A. Metal Building System: A building system that will employ:
- Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed purlins for support of the roof cladding.
- Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed for support of the steel wall cladding.
- Three-plate, built-up rigid space frames and/or cold-formed ‘C’ or hot-rolled I-shaped post-and-beam framing to support the roof and wall secondary members.
- All systems (cladding, roof and wall secondary, lateral primary framing, and longitudinal bracing) work together to provide resistance to vertical and lateral loading demands.

B. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.

C. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).

D. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.

E. Building Length: Measured from outside to outside of endwall secondary structural member.

F. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.

G. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.

H. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.

I. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.

J. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.

K. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof, assumed to act on the horizontal projection of the roof.

L. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.

M. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.

1.5 DESIGN REQUIREMENTS

A. General
1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
2. Design structural mill sections and built-up plate sections in accordance with:
   a. (US) code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.
3. Cold-Formed steel structural members and panels will generally be designed in accordance with "Specifications for the Design of Cold-Formed Steel Structural Members", ANSI/AISI S-100.
4. Design weldments per the following:
   a. Structural Welding
      1) (US) Design per AWS D1.1, “Structural Welding Code – Steel”, Latest Edition.

B. Design Code:
1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:
   a. Governing Building Code: International Building Code (IBC).
   b. Year/Version: 2021.
   c. Occupancy Category: S-2 Low-Hazard Storage.

C. Design Loads:
1. Risk Category of Building - II
2. Dead Load – 5
3. Roof Live Load – 20.
4. Collateral Load – 5.
   a. Ground Snow Load – 25.
   b. Minimum Snow Load – 25.
5. Wind Load:
   a. Basic Wind Speed –90.
   b. Exposure Category– B.
6. Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents. See Architectural Plan for additional load requirements.

D. General Serviceability Limits:
1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
2. Vertical deflection limits apply for snow load (50-year mean-recurrence interval) plus collateral load, or the code required live load. The horizontal drift and deflections limits apply for the loads induced by a basic wind speed corresponding to a 10 year mean-recurrence interval.

1.6 SUBMITTALS

A. Submit under provisions of Section 01 60 00.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings: Provide complete erection drawings for the proper identification and assembly of all building components. Drawings will show anchor bolt settings, transverse cross-sections, sidewall, endwall and roof framing, flashing, and sheeting, and accessory installation details.

D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

E. Certifications: Shop drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by the manufacturer upon request.

F. Bill of Materials: Bills of material shall be furnished and shall include item weights.

G. Preventive Maintenance Manual.

H. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.

I. Submit certification verifying that the metal roof system has been tested and approved by Underwriter’s Laboratory as Class 90.

1.7 QUALITY ASSURANCE

A. Manufacturer / Fabricator Qualifications:
   1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years’ experience.

B. Weldments/Welder/Weld Inspection Qualifications:
   1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, “Structural Welding Code – Steel”, latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, “Structural Welding Code – Sheet Steel”, latest edition.

C. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.

D. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by the manufacturer upon request.

1.8 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements:
1. Store and handle materials in accordance with manufacturer's instructions.
2. Keep materials in manufacturer's original, unopened containers and packaging until installation.
3. Do not store materials directly on ground.
4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
5. Protect materials and finish during storage, handling, and installation to prevent damage.

C. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside the manufacturer's absolute limits.

D. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.

1.9 WARRANTY

A. Building System Warranty
1. Furnish manufacturer's standard warranty for the metal building system, excluding paint.
2. The manufacturer shall warrant the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment.
3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer's plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.

B. Standing Seam Roof Weathertightness Warranty
1. Furnish manufacturer's weathertightness warranty for a maximum of 20 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.

C. Roof and Wall Paint Finish Warranty
1. Paint Systems
a. Furnish manufacturer's standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units as set forth in ASTM-D-2244, and chalking in excess of 8 units as set forth in ASTM-D-4214.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Metal Building Manufacturer
a. ACI Building Systems; http://www.acibuildingsystems.com
b. OR EQUAL

2. Pre-Insulated Wall & Roof Panels
a. See Sections 07 41 13 and 07 42 13

2.2 MATERIALS

A. Primary Framing Steel:
1. Steel for hot rolled shapes must conform to the requirements of ASTM A36, A572 or A992, with minimum yield of 36 or 50 ksi, respectively.
2. Steel for built-up sections must conform to the requirements of ASTM A1011, A1018, A529, A572 or A36 as applicable, with minimum yield of 36, 50, or 55 ksi as indicated by the design requirements.
3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
4. Square and Rectangular Tube must conform to the requirements of ASTM A500 Grade B with a minimum yield strength of 46 ksi.
5. Steel for Cold-Formed sections must conform to the requirements of ASTM A1011 or A1039 Grade 55, or ASTM A653 Grade 55 with minimum yield strength of 55 ksi.
6. X-bracing will conform to ASTM A529 for rod bracing, ASTM A992 for angle bracing or ASTM A475 for cable bracing.

B. Secondary Framing Steel:
1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A1011 or ASTM A1039 Grade 55 for primed material or ASTM A653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.

C. Panels:
1. Roll-formed Galvalume®, pre-painted Galvalume® or Galvanized G90 Exterior-Side and G60 Interior-Side. In Canada, Galvanized panel will have a coating thickness of G90 on both sides.
2. Standing Seam Panels must have:
   a. (For US and Export) 50 percent minimum aluminum-zinc alloy- coating and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.
   b. (For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume® finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A792or ASTM A653 with a minimum yield of 50 ksi.
3. Through-fastened panels must have:
   a. (For US and Export) 50 percent minimum aluminum-zinc alloy coating and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.
   b. (For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A792 or ASTM A653 with a minimum yield of 50 ksi.
4. Panel Finish:
   a. SP Finish: Modified Siliconized Polyester paint system with a 25-year finish warranty.
   b. PVDF Finish: 70% PVDF paint system with a 30-year finish warranty.

D. Panel Fasteners:
1. For Galvalume® and Painted finished roof panels: Long Life Cast Zinc head.
2. For wall panels: Coated carbon steel.
3. Color of exposed fastener heads to match the wall and roof panel finish.
4. Concealed Fasteners: Self-drilling type, of size required.

E. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.

F. Roof Clips:
1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.

2. Short or Tall Fixed clips; shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height. Used for applications where only a moderate amount of thermal expansion and contraction in the roof panel is expected.
3. Short or Tall Sliding clips: shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction, depending on clip choice.
4. Super Tall Sliding clips: shall be 5 ½ inches (140mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction.

G. Sealant And Closures:
1. Sidelaps: Factory applied non-skinning Butyl mastic.
2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
3. Outside Closures: Closed-cell, plastic, or metal.
4. Inside Closures: Closed-cell, plastic, or metal.

2.3 PRIMARY FRAMING

A. Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.
1. Frame Design: Gable Symmetrical.

B. Rigid Frame Columns:
1. Tapered

C. Rigid Frame Rafters:
1. Straight/Uniform depth
2. Tapered

D. Endwall Frames / Roof Beams: Fabricated as mill-rolled sections or built-up "I" sections depending on design requirements. Fabricate endwall columns of cold-formed sections, mill-rolled sections, or built-up "I" sections depending on design requirements.

E. Finish: Red-Oxide or Gray Primer, or galvanized (pre coated galvanized cold-form, hot-dipped otherwise).

F. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM F3125 Grades A325 or A490 as required by design.

2.4 SECONDARY FRAMING

A. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections and “C” sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI S100. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will install through the purlin/girt webs, not purlin/girt flanges.

B. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
1. Depth: To be determined by design (8”, 9.5”, 10” or 12”)
2. Maximum Length: To be determined by design.
3. Finish: Gray Primer.

C. Girts: Horizontal structural members that support vertical panels.
   1. Depth: To be determined by design (8”, 9.5”, 10”, or 12”)
   2. Maximum Length: To be determined by design.
   3. Finish: Gray Primer.

D. Eave Struts: Equal flange, cold-formed "C" sections or “Z” purlins.
   1. Depth: To be determined by design (8”, 9.5”, 10” or 12”)
   2. Maximum Length: To be determined by design.
   3. Finish: Gray Primer.

E. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
   1. Formed base sill
   2. Base channel
      a. With flashing
   3. Base angle
      a. With flashing
   4. Base girt
      a. With flashing
   5. Finish: Gray Primer

2.5 ROOF PANELS

A. Metl-Span CFR Insulated Roof Panel: A mechanically seamed vertical rib standing seam roof sandwich panel with concealed clips. Installed directly over purlin. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
   1. Exterior panel gauge: 22 (Std.)
   3. Interior panel gauge: 26 (Std.)
   12. Size / Thermal Value: 36 inches or 42” wide X 5 inches thick (R-32.0)
   18. Color: As specified in Article 2.8 PANEL FINISHES
   19. Standard Finish
      a. Exterior: Embossed with Mesa Profile
      b. Interior: Deep Embossed with Mesa Profile

2.6 WALL PANELS

A. Metl-Span Light Mesa Insulated Panel: A through fastened wall sandwich panel with concealed fasteners,
   1. Exterior panel gauge: 26 (Std.)
   2. Interior panel gauge: 26 (Std.)
   3. Size / Thermal Value: 36 or 42 inches wide by 4 inches thick (R-35.0)
   4. Finish/Color: As specified in Article 2.8 PANEL FINISHES
   5. Standard Finish
      a. Exterior: Embossed with Light Mesa Profile

2.7 ACCESSORIES

A. Roof Line Trim:
   1. Basic Sculptured Trim Type: Low-Eave Gutter (on slope or horizontal) / Sculptured Rake Trim

B. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.

C. Framed Openings: Used to frame out: doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.

D. Walk Doors: Personnel entry doors.
1. Size: As noted on the Contract Drawings.
2. Accessories: As noted on the Contract Drawings

Roof Vents: Accessories used on the roof to allow air to pass through.
1. Gravity Ridge Vents: Can be used as single unit or continuous.
   a. Size: 9 inch by 10 foot (229x3048mm) with Damper & Lockerpull.

H. Pipe Flashings: Pipe flashing shall be of a one-piece construction and fabricated from an EPDM membrane and shall have an aluminum base that can be field conformed to any panel configuration. Pipe flashings shall be flexible for mounting on any roof slope. Service temperature ranges shall be from -30°F to +250°F. Three standard flashing sizes shall accommodate pipe sizes from 1/4" diameter up to 13" diameter.
1. Size: ¼" to 4" (6 to 102mm) Pipe
2. Size: 4" to 7" (102 to 178mm) Pipe
3. Size: 7" to 13" (178 to 330mm) Pipe

2.8 PANEL FINISHES

A. Insulated Roof panel:
1. Exterior panel:
   a. PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
      1) Color: Forest Green (FO)
2. Interior panel:
   a. Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
      1) Color: Igloo White (IG)

B. Insulated Wall panel:
1. Exterior panel:
   a. PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):
      1) Color: Surrey Beige (SU)
2. Interior panel:
   a. Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):
      1) Color: Igloo White (IG)

2.9 FABRICATION

A. General:
1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
3. All framing members must carry an identifying mark.

B. Primary Framing:
1. Plates, Stiffeners and Related Members: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
2. Bolt Holes and Related Machining: Shop fabricated base plates, splices, and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.

3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
4. Manufacturer is responsible for all shop welding inspection in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.

C. Zee Purlins:
1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.

D. Girts
1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.

E. Bracing:
1. Diagonal Bracing:
   a. Longitudinal bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind or seismic forces. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.
   b. Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded at each end or galvanized cable with suitable threaded end anchors. If load requirements dictate, bracing may be of structural angle and/or pipe, bolted in place.

2. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column may be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.

3. Flange Braces: The inside compression flange of all primary framing must be braced laterally with angles connecting to the bottom chords of joists or to the webs of purlins/girts so that the flange compressive stress is within allowable limits for any combination of loading.

F. Vertical Rib Standing Seam Panels - General:
1. One side of the panel is configured as female, having factory applied mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.

2. Panels are factory swaged when endlaps are required. Panels cannot start at both ends of the building and work towards each other.

3. Maximum panel length is 50 feet (16,764mm) unless otherwise noted in the Contract Documents.

4. Endlaps:
   a. Endlaps must have a 16 gauge backup plate and have the (5) endlap joint fasteners installed in dimpled locations in the flat at each endlap.
   b. Apply mastic between the panels and secured with #1/4-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.
   c. "Through-the-Roof" fasteners may only be used at endlaps and eaves.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment's to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer's tolerances.

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

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

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

3.3 INSTALLATION

A. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
B. Erect framing in accordance with *MBMA Metal Building Systems Manual, Chapter IV Common Industry Practices*
C. There shall be no field modifications to primary structural members except as authorized and specified by the manufacturer.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

ERV SCHEDULE

SYMBOL	AREA SERVED	BASIS OF DESIGN MFR	BASIS OF DESIGN MODEL	SUPPLY FAN TOTAL CFM	SUPPLY FAN ESP (IN H2O)	SUPPLY FAN MOTOR HP	SUPPLY FAN VFD/ ECM	EXHAUST FAN TOTAL CFM	EXHAUST FAN ESP (IN H2O)	EXHAUST FAN MOTOR HP	EXHAUST FAN VFD/ ECM	ENERGY RECOVERY TYPE	SUMMER EFFEC. SENS %	SUMMER EFFEC. TOTAL %	WINTER OA EAT (°F)	WINTER SA LAT (°F)	WINTER RA EAT (°F)	SUMMER OA EAT DB(°F)	SUMMER OA EAT WB(°F)	SUMMER SA LAT DB(°F)	SUMMER SA LAT WB(°F)	SUMMER RA EAT DB(°F)	SUMMER RA EAT WB(°F)	RA-FILTER EFF MERV	RA-FILTER TYPE	RA-FILTER DIMENSIONS	OA-FILTER EFF MERV	OA-FILTER TYPE	OA-FILTER DIMENSIONS	ELECTRICAL VOLTS	ELECTRICAL PH	ELECTRICAL MCA	ELECTRICAL MOCP	EMERG. POWER (Y/N)	MAX WT (LBS)	NOTES
ERV-1	EXISTING BLDG GARAGE	RENEWAIRE	EV PREMIUM LH	200	0.75	0.11	ECM	200	0.75	0.11	ECM	COUNTERFLOW	76.1	56.2	-10	50.9	70	88.3	73.1	78.2	67.4	75	62.4	8	POLYESTER	10 1/2"X21 3/4"X1"	8	POLYESTER	10 1/2"X21 3/4"X1"	120	1	15	15	N	70	1-6
ERV-2	NEW BLDG GARAGE	RENEWAIRE	EV PREMIUM MH	130	0.75	0.11	ECM	130	0.75	0.11	ECM	COUNTERFLOW	71.5	49.3	-10	47.2	70	88.3	73.1	73.1	68.1	75	62.4	8	POLYESTER	10 1/2"X21 3/4"X1"	8	POLYESTER	10 1/2"X21 3/4"X1"	120	1	15	15	N	70	1-6

NOTES:
1. UNIT TO OPERATE CONTINUOUSLY.
2. UNIT TO BE CEILING HUNG
3. CORES SHALL BE AHRI CERTIFIED WITH ZERO CROSS CONTAMINATION. CORE SHALL HAVE NO MOVING PARTS
4. UNIT SHALL BE CONDENSATE FREE. UNIT SHALL BE FROST FREE WITH -10F OA AND RA AT 40% RH.
5. UNIT TO BE CEILING HUNG
6. LOW LEAK INSULATED DAMPERS ON EXHAUST AND INTAKE.

AIR HANDLING UNIT SCHEDULE

SYMBOL	MFR	BOD MODEL	BOD UNIT TYPE	DE-RATED HEAT PUMP CAPACITY COOLING CAP (MBH)	COOLING AMBIENT DB (°F)	COOLING LAT DB (°F)	HEATING CAP @ 4.3F (MBH)	HEATING AMBIENT WB (°F)	HEATING CAP @ -10F (MBH)	HEATING AMBIENT WB (°F)	HEATING LAT DB (°F)	ELEC. RESIST. HTG (KW)	MAX HTG LAT DB (°F)	ELECTRICAL HEAT PUMP SECTION ONLY VOLTS	PH	MCA	MOCP	FILTER EFF MERV	FILTER TYPE	DIMENSIONS	NOTES
AHU-1	MITSUBISHI	TPVFYP054AM141A	VERTICAL AHU	76.1	88.3	53	80.0	4.3	60.3	-10	105	13	105	208	1	5.6	15	8	POLYPROPYLENE	20"X24"X1"	1, 2
AHU-2	MITSUBISHI	TPVFYP054AM141A	VERTICAL AHU	76.1	88.3	53	80.0	4.3	60.3	-10	105	13	105	208	1	5.6	15	8	POLYPROPYLENE	20"X24"X1"	1, 2
AHU-3	MITSUBISHI	TPVFYP048AM141A	VERTICAL AHU	41.8	88.3	52	48.0	4.3	40.9	-10	97	-	-	208	1	5.6	15	8	POLYPROPYLENE	20"X24"X1"	1, 2

NOTES:
1. PROVIDE WITH FACTORY WALL MOUNT THERMOSTAT
2. PROVIDE WITH SECOND STAGE ELECTRIC HEAT KIT PER SCHEDULED CAPACITIES. PROVIDE AUXILIARY LOCKOUT OF HEAT KIT OPERATION ABOVE 4.3 DEG F.

3

CONDENSING UNIT SCHEDULE

SYMBOL	AREA SERVED	BASIS OF DESIGN MFR	BASIS OF DESIGN MODEL	BOD CAPACITIES COOLING CAP (MBH)	COOLING AMBIENT DB (°F)	HEATING CAP @ 4.3F (MBH)	HEATING AMBIENT WB (°F)	HEATING CAP @ -10F (MBH)	HEATING AMBIENT WB (°F)	ELECTRICAL VOLTS	PH	MCA	MOCP	EMERG. POWER (Y/N)	MAX WT (LBS)	NOTES
CU-1	AHU-1	MITSUBISHI	TUHYE0723AN41AN	76.1	88.3	80	4.3	60.3	-10	208	3	32	50	N	550	1,2,3
CU-2	AHU-2	MITSUBISHI	TUHYE0723AN41AN	76.1	88.3	80	4.3	60.3	-10	208	3	32	50	N	550	1,2,3
CU-3	AHU-3	MITSUBISHI	NTXMSH48A182BA	47.1	88.3	48	4.3	40.9	-10	208	1	36	40	N	300	4,5,6

3

NOTES:
1. PROVIDE PANEL HEATER KIT TO PREVENT ICE BUILDUP ON OUTDOOR DRAIN PAN
2. PROVIDE SNOW/HAIL KIT TO PREVENT DAMAGE OR SNOW BUILD-UP.
3. PROVIDE 18" SUPER STAND KIT
4. PROVIDE NEW 4" CONCRETE PAD.
5. PROVIDE WITH HAILGUARDS
6. PROVIDE WITH MANUFACTURER CONDENSER STAND.

EXHAUST FAN SCHEDULE

SYMBOL	AREA SERVED	BASIS OF DESIGN MFR	BASIS OF DESIGN MODEL	TYPE	DRIVE	AIR FLOW (CFM)	TSP (IN H2O)	FAN RPM	SOUND (SONES)	ELECTRICAL VOLTS	PH	BHP	MHP	CONTROLS	APPROX. DIMS (LxWxH)	MAX WT (LBS)	NOTES
EF-1	EXISTING GARAGE	GREENHECK	SBE-1H20	SIDEWALL	BELT	710	0.25	732	9.8	115	1	0.16	0.25	TOXALERT	20x26x26	75	1
EF-2	EXISTING GARAGE	GREENHECK	SBE-1H20	SIDEWALL	BELT	660	0.25	721	9.6	115	1	0.15	0.25	TOXALERT	20x26x26	75	1
EF-3	NEW GARAGE	GREENHECK	SBE-1H20	SIDEWALL	BELT	1,130	0.25	814	11.6	115	1	0.19	0.25	TOXALERT	20x26x26	75	1
TEF-1	EXISTING GARAGE	GREENHECK	SP-B90	CEILING	DIRECT	70	0.25	700	1.3	115	1	0.01	20 W	LIGHT SWITCH	12x14x7	20	

NOTES:
1. PROVIDE WITH VARIABLE SPEED CONTROLLER.

ELECTRIC HEATER SCHEDULE

SYMBOL	QUANTITY	AREA SERVED	BASIS OF DESIGN MFR	BASIS OF DESIGN MODEL	TYPE	ELECTRICAL VOLTS	PH	HEAT KW	STAGES	NOTES
EUH-1	4	EXISTING GARAGE	MODINE	HER-100	UNIT HEATER	208	3	15	1	
EUH-2	2	NEW GARAGE	MODINE	HER-150	UNIT HEATER	208	3	10	1	

NOTES:
1. PROVIDE WITH INTEGRAL THERMOSTAT UNLESS SHOW OTHEWISE ON FLOORPLAN

VENTILATION SCHEDULE - EXISTING BUILDING

PROJECT INFORMATION ROOM NO.	ROOM NAME	ROOM SIZE (SQFT)	CODE OUTDOOR AIRFLOW CODE CLASSIFICATION	OCCUPANTS	OCC/ 1000SF	CFM/ OCC	AREA CFM/SF	TOTAL CFM	CFM	PLAN REQUIREMENTS OA CFM	EXH. CFM	EQUIPMENT - VENTILATION UNIT TAG
100	GARAGE	936	REPAIR GARAGE - FULL ON EX.	0	0.0	-	0	-	702	710	710	EF-1
			REPAIR GARAGE - STANDBY EX.	0	0.0	-	0	-	47	100	100	ERV-1
101	GARAGE	868	REPAIR GARAGE - FULL ON EX.	0	0.0	-	0	-	651	660	660	EF-2
			REPAIR GARAGE - STANDBY EX.	0	0.0	-	0	-	43	100	100	ERV-1
102	TOILET ROOM	42	TOILET ROOMS - PUBLIC	0	0.0	-	0	-	70	0	70	TEF-1

VENTILATION SCHEDULE - NEW BUILDING

PROJECT INFORMATION ROOM NO.	ROOM NAME	ROOM SIZE (SQFT)	CODE OUTDOOR AIRFLOW CODE CLASSIFICATION	OCCUPANTS	OCC/ 1000SF	CFM/ OCC	AREA CFM/SF	TOTAL CFM	CFM	PLAN REQUIREMENTS OA CFM	EXH. CFM	EQUIPMENT - VENTILATION UNIT TAG
100	GARAGE	1495	REPAIR GARAGE - FULL ON EX.	0	0.0	-	0	-	1121	1130	1130	EF-3
			REPAIR GARAGE - STANDBY EX.	0	0.0	-	0	-	75	130	130	ERV-2

PUBLIC BUILDING COMMISSION
FOREST PRESERVES OF COOK COUNTY

MCGINNIS FIELD STATION
BUILDING ID #72, #101 & #1398

METAL STORAGE BUILDING
13700 SOUTH 110TH AVE.
ORLAND PARK, IL 60467

FOREST PRESERVE DISTRICT OF COOK COUNTY
PRESIDENT TONI PRECKWINKLE

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Interface Engineering Inc.
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MEFP Engineers of Record

ECL Consultants
Chicago, IL
Plumbing Engineers of Record

Issuance

Mark	Description	Date
10	**ISSUED FOR FINAL REVIEW**	10.04.24
11	**ISSUE FOR BID**	12.18.24
12	**ADDENDUM #1** 1	01.14.25
13	**ADDENDUM #3** 3	01.24.25

PBC Project Name: FPDCC 2023 METAL BUILDINGS

PBC Contract No: C1613

PBC Project No.: 15070

FPDCC Project No.: 23-80-42

Title
SCHEDULES

Sheet
M0.2

POINT #	DESCRIPTION	POINT TYPE					SOFTWARE FUNCTIONS										
							ALARMS						TREND		OTHER		
	RENEWAIRE ERV BACNET DATA OBJECTS	ANALOG INPUT	BINARY INPUT	ANALOG OUTPUT	BINARY OUTPUT		HIGH ANALOG	LOW ANALOG	SAFETY	OFFNORMAL	STATUS MISMATCH		INTERVAL	CHANGE OF VALUE	SET POINT	TOTALIZE RUNTIME	NOTES
	ON/OFF		X											X		X	
	LOW TEMPERATURE FLOW REDUCTION		X							X				X			
	FAN INLET ERROR		X							X							
	FAN OUTLET ERROR		X							X							
	FILTER INLET ERROR		X							X							
	FILTER OUTLET ERROR		X							X							
	SUPPLY AIRFLOW DEMAND	X											X				
	EXTRACT AIRFLOW DEMAND	X											X				
	AIR FLOW SUPPLY	X						X					X				
	AIR FLOW EXHAUST	X						X					X				
	TEMPERATURE OUTDOOR AIR	X											X				
	TEMPERATURE SUPPLY AIR ERV	X						X					X				
	TEMPERATURE EXTRACT AIR	X											X				
	TEMPERATURE EXHAUST AIR	X											X				
	PRESSURE FILTER SUPPLY	X					X						X				
	PRESSURE FILTER EXTRACT	X					X						X				
	PRESSURE FAN SUPPLY	X						X					X				
	PRESSURE FAN EXHAUST	X						X					X				
	HEALTH OUTSIDE AIR FILTER	X											X				
	HEALTH EXTRACT AIR FILTER	X											X				
	TEMPERATURE SETPOINT	X											X				
	MAX FLOW CALIBRATED			X											X		
	SETPOINT TEMPERATURE			X											X		
	POWER STATE STANDBY/ON				X						X			X			

SYMBOL	DESCRIPTION	POINT TYPE					SOFTWARE FUNCTIONS										
							ALARMS						TREND		OTHER		
	VRF OUTDOOR UNIT BACNET DATA OBJECTS	ANALOG INPUT	MULTI STATE INPUT	BINARY INPUT	ANALOG OUTPUT	BINARY OUTPUT	HIGH ANALOG	LOW ANALOG	SAFETY	OFFNORMAL	STATUS MISMATCH	INTERVAL	CHANGE OF VALUE	SET POINT	TOTALIZE RUNTIME	NOTES
	ACCUMULATOR LEVEL		X										X			
	COMPRESSOR DISCHARGE TEMPERATURE	X					X									
	COMPRESSOR FREQUENCY	X											X			
	COMPRESSOR OPERATION STATUS		X											X			
	COMPRESSOR RUN TIME	X															
	COMPRESSOR SUMP TEMPERATURE	X											X				
	CONTROL MODE STATUS		X											X			
	FAN 1 RPM	X															
	FAN 2 RPM	X															
	HIGH SIDE SATURATION TEMPERATURE	X					X										
	LOW SIDE SATURATION TEMPERATURE	X						X									
	OPERATIONAL MODE STATUS		X											X			
	REFRIGERANT HIGH SIDE PRESSURE	X					X										
	REFRIGERANT LOW SIDE PRESSURE	X						X									
	REVERSING VALVE POSITION	X											X				
	SUCTION LINE TEMPERATURE	X						X									

POINT #	DESCRIPTION	POINT TYPE						SOFTWARE FUNCTIONS										
								ALARMS						TREND		OTHER		
	VRF FAN COIL UNIT BACNET DATA OBJECTS	ANALOG INPUT	MULTI STATE INPUT	BINARY INPUT	ANALOG OUTPUT	BINARY OUTPUT	DATA CONNECTION	HIGH ANALOG	LOW ANALOG	SAFETY	OFFNORMAL	STATUS MISMATCH	INTERVAL	CHANGE OF VALUE	SET POINT	TOTALIZE RUNTIME	NOTES
	ON/OFF SETUP					X											
	ON/OFF STATE			X								X		X		X	
	ALARM SIGNAL			X							X			X			
	ERROR CODE		X								X						
	OPERATION MODE STATE		X								X						
	FAN SPEED STATE		X								X						
	ROOM TEMPERATURE	X						X	X				X				
	SET TEMP				X								X		X		
	SET TEMP COOL				X										X		
	SET TEMP HEAT				X										X		
	SET TEMP AUTO				X										X		
	SYSTEM FORCED OFF - COLLECTIVE					X								X			
	SET HIGH LIMIT SETBACK TEMP				X										X		
	SET LOW LIMIT SETBACK TEMP				X										X		
	SYSTEM ALARM SIGNAL		X								X			X			
	ERROR CODE DETAIL	X											X				

SYMBOL	DESCRIPTION	POINT TYPE					SOFTWARE FUNCTIONS										
							ALARMS						TREND		OTHER		
	MISCELLANEOUS POINTS	ANALOG INPUT	BINARY INPUT	ANALOG OUTPUT	BINARY OUTPUT		HIGH ANALOG	LOW ANALOG	SAFETY	OFFNORMAL	STATUS MISMATCH	INTERVAL	CHANGE OF VALUE	SET POINT	TOTALIZE RUNTIME	NOTES
	OUTDOOR AIR DEW POINT TEMPERATURE	X					X						X			

VEHICLE EXHAUST DETECTION SYSTEM

FURNISH AND INSTALL COMPLETE GAS DETECTION SYSTEM AS DESCRIBED BELOW. PROVIDE A FUNCTIONAL TEST AT THE TIME OF ACCEPTANCE USING PROPER TRACE GAS TO ENSURE COMPLIANCE WITH THE LOCAL CODES AND SETPOINTS AS DESCRIBED HERE IN. ALSO PERFORM A FINAL SYSTEM CALIBRATION AND SUBMIT THIS CALIBRATION REPORT TO THE OWNER.

SYSTEM IS FURNISHED BY DIV 15 CONTRACTOR. SYSTEM PROGRAMMING AND CALIBRATION IS TO BE PERFORMED BY FACTORY CERTIFIED PERSONNEL FROM THE GAS MANAGEMENT SYSTEM VENDOR. GAS MANAGEMENT SYSTEM VENDOR IS TO ENSURE CONTACT RATINGS FOR RELAYS/CONTACTORS ARE ADEQUATE FOR THE LOAD.

WIRING:

DIVISION 16 SHALL PROVIDE 120V WIRING TO CONTROL PANEL AND POWER FAN(S) AS FOLLOWS:

SINGLE PHASE

IF FANS ARE SPECIFIED AS SINGLE PHASE, DIVISION 16 SHALL WIRE FANS THRU CONTROL PANEL THRU FACTORY PROVIDE CONTROL RELAYS.

THREE PHASE

IF FANS ARE SPECIFIED AS THREE PHASE, DIVISION 16 SHALL WIRE FANS AND PROVIDE COMBINATION STARTERS(S) WITH CONTROL TRANSFORMER, PILOT LIGHT, START/STOP PUSH BUTTON AND TWO NORMALLY OPEN / TWO NORMALLY CLOSED AUXILIARY CONTACTS.

DIVISION 15 SHALL PROVIDE ALL CONTROL WIRING AND ASSOCIATED CONDUIT TO ALL SENSORS AND INTAKE DAMPERS.

CONTROLLER:

MAIN CONTROL PANEL SHALL BE TOXALERT MODEL TOX-4, MICROPROCESSOR BASED WITH INPUTS MAPPED TO THE APPROPRIATE OUTPUT (VENTILATION ZONES) AS SHOWN ON THE EQUIPMENT SCHEDULE. CONTROLLER ALLOWS FOR REPROGRAMMING AS THE BUILDING NEEDS CHANGE. THE CONTROLLER SHALL UTILIZE NON-VOLATILE MEMORY AND/OR SHALL MAINTAIN ALL PROGRAMS FOR A MINIMUM OF 72 HOURS DURING POWER LOSS. CONTROLLER SHALL BE IN A NEMA1 ENCLOSURE WITH THE PANEL FACE CONFIGURED WITH STATUS LIGHTS INDICATING.

- NORMAL (PER SENSOR)
- WARNING (PER SENSOR)
- ALARM (PER SENSOR)
- SENSOR FAILURE (PER SENSOR)
- VENT SYSTEM STATUS ON/OFF (PER ZONE)

PANEL FACE IS TO INCLUDE A MANUAL VENT/PURGE SWITCH WITH AUTO/ON FEATURE. IN THE ON POSITION THE USER CAN RUN THE VENTILATION SYSTEM CONTINUOUSLY, IN THE AUTO POSITION THE CONTROL SYSTEM WILL START/STOP THE VENTILATION SYSTEM.

INCLUDE VISUAL AND AUDIBLE ALARM ANNUNCIATORS AND HORN SILENCE SWITCH ON PANEL FACE.

SEQUENCE OF OPERATION:

GARAGE EXHAUST FANS SHALL BE CONTROLLED BASED UPON CARBON MONOXIDE LEVELS WITHIN THE GARAGE AND INDOOR VS OUTDOOR AIR TEMPERATURES. SENSORS SHALL BE MONITORED BY THE BAS FOR CONTROL, ALARM GENERATION AND TREND LOGGING. A CO LEVEL ABOVE 25 PPM OR NO2 LEVEL ABOVE 3 PPM AT ANY SENSOR STARTS BOTH EXHAUST FANS AT LOW SPEED. FANS INCREASE SPEED TO MAINTAIN A CO LEVEL NO MORE THAN 30 PPM AND NO2 LEVEL NO MORE THAN 5 PPM. A CO LEVEL ABOVE 35 PPM OR NO2 LEVEL ABOVE 5 PPM GENERATES AN ALARM. FANS REDUCE SPEED AND CYCLE OFF 5 PPM BELOW CO SETPOINT OR 1 PPM BELOW NO2 SETPOINT.

GARAGE EXHAUST FANS WILL START AT HALF SPEED WHENEVER THE WARMEST GARAGE TEMPERATURE IS ABOVE 70 DEGREES (ADJ) AND THE OUTDOOR AIR TEMPERATURE IS FIVE OR MORE DEGREES COOLER THAN THE WARMEST GARAGE TEMPERATURE. TURN OFF WHEN THE WARMEST GARAGE TEMPERATURE DROPS 5 DEGREES BELOW SETPOINT.

CARBON MONOXIDE SENSOR:

INSTALL MODEL TOX-CO/ANA CARBON MONOXIDE (CO) SENSOR WHERE INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. THE SENSORS SHALL HAVE A MAXIMUM RANGE OF 0 TO 400 PPM (PARTS PER MILLION) AND AN ACCURACY OF ±3% OF RANGE, WITH A RESOLUTION OF .1PPM. THE CO SENSORS SHALL BE 12-BIT MICROPROCESSOR BASED AND SHALL SELF CALIBRATE ON A PROGRAMMED TIME BASIS. THE SENSOR CABINET SHALL BE A NEMA 1 AND BE KEY LOCKED TO PREVENT TAMPERING. THE SENSOR SHALL HAVE INDICATING LAMP(S) TO INDICATE; POWER ON, SENSOR OPERATING NORMALLY, AND SENSOR FAILURE.

NITROGEN DIOXIDE SENSOR:

INSTALL TOXALERT MODEL TOX-NO2/ANA NITROGEN DIOXIDE (NO2) SENSOR WHERE INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN. THE SENSOR SHALL HAVE A MAXIMUM RANGE OF 0 TO 10 PPM (PARTS PER MILLION) AND AN ANALOG OUTPUT OF 4 TO 20MA OVER ITS RANGE. THE SENSOR SHALL BE HOUSED IN AN EXPLOSIVE PROOF HOUSING. THE SENSOR RESPONSE TIME SHALL REACH 90% OF LEVEL BEING SENSED IN 30 SECONDS. THE SENSOR SHALL BE POWERED BY LOW VOLTAGE AND HAVE A SELF-CHECK CAPABILITY AND AN LED TO INDICATE SENSOR "OKAY".

SYSTEM SHALL BE AS MANUFACTURED BY TOXALERT INC.

CONTROLS SCOPE OF WORK

GENERAL REQUIREMENTS

1. PROVIDE APPLICATION ENGINEERING, MATERIALS, INSTALLATION LABOR, SOFTWARE PROGRAMMING, START-UP, CONTROL SYSTEM COMMISSIONING, ENERGY MONITORING FOR 24 MONTHS AFTER PROJECT COMPLETION AND WARRANTY SERVICES FOR THE COMPLETE INSTALLATION OF THE BUILDING MANAGEMENT SYSTEM (BMS) FOR THE NEW HVAC EQUIPMENT INSTALLED BY THIS PROJECT.
2. TRIDIUM NIAGARA 4 BMS. FURNISH AND INSTALL TRIDIUM NIAGARA 4 BMS AND BACNET MS/TP DIGITAL CONTROLLERS FOR CONTROL POINT MONITORING.
3. RENEWAIRE ERV UNITS. INSTALL, WIRE AND TERMINATE AN OAT SENSOR AND WALL-MOUNTED CONTROL PANEL TO EACH RENEWAIRE ERV UNIT. OAT SENSOR AND CONTROL PANEL WILL BE FURNISHED BY THE MECHANICAL CONTRACTOR PURCHASING VENTACITY UNITS. PROVIDE CAT6 CABLING FROM EACH RENEWAIRE UNIT TO AN ETHERNET SWITCH FOR BMS INTEGRATION. PROVIDE THE ETHERNET SWITCH.
4. HEAT PUMP VRF SYSTEM. INSTALL, WIRE AND TERMINATE EACH REMOTE CONTROLLER (WALL THERMOSTAT) TO EACH VRF FAN COIL UNIT. INSTALL, WIRE AND TERMINATE THE VRF CONTROL NETWORK BETWEEN EACH VRF FAN COIL UNIT AND ITS ASSOCIATED OUTDOOR UNIT. INSTALL, WIRE AND TERMINATE THE VRF CONTROL NETWORK BETWEEN EACH VRF OUTDOOR UNIT AND ONE TE-200A MASTER CONTROLLER IN MECHANICAL ROOM. THE REMOTE CONTROLLERS AND MASTER CONTROLLER WILL BE FURNISHED BY THE MECHANICAL CONTRACTOR PURCHASING THE HEAT PUMP VRF SYSTEM. PROVIDE CABLE ACCORDING TO THE VRF MANUFACTURER'S SPECIFICATIONS.
5. INSTALL TOXALERT VEHICLE EXHAUST DETECTION SYSTEM PER SPECIFICATIONS ON THIS DRAWING.

TECHNICAL REQUIREMENTS

6. PROVIDE A TRIDIUM NIAGARA 4 BMS PLATFORM WITH OPEN LICENSED SOFTWARE WITH THE FPD AS THE LICENSE HOLDER.
7. PROVIDE A JACE N4 BUILDING CONTROLLER WITH SUFFICIENT FIELD DEVICE AND POINT RESOURCES TO MONITOR AND ARCHIVE ALL CONTROL OBJECT AND ENERGY DATA EVERY 10 SECONDS FOR AT LEAST 48 HOURS FOR PERIODIC UPLOADS TO THE NIAGARA SUPERVISOR. THE BUILDING CONTROLLER FUNCTIONS AS THE SITE SERVER AND HOSTS ALL WEB PAGES FOR THE HVAC SYSTEMS, SCHEDULING AND HISTORY TRENDING. INTERNET ACCESS TO THE BMS BUILDING CONTROLLER IS ENCRYPTED, REQUIRES AUTHENTICATION CERTIFICATES AND MEETS THE FIPS 140-2 FEDERAL STANDARD.
8. PROVIDE A VIRTUAL CLOUD-BASED NIAGARA 4 SUPERVISOR TO PROVIDE LONG TERM DATA STORAGE AND ANALYSIS, PROGRAMMING AND USER MANAGEMENT TOOL SETS TO MODIFY AND BACK-UP THE SITE BUILDING CONTROLLER. THE VIRTUAL SERVER HAS THE SAME INTERNET SECURITY FEATURES AS THE SITE NETWORK CONTROLLER. THE VIRTUAL SUPERVISOR ALLOWS ENERGY DATA TO BE EXPORTED IN STANDARD HTML5 FORMAT TO 3RD PARTY ENERGY ANALYTIC SOFTWARE APPLICATIONS PROVIDED BY OTHERS. NOTE, THE FPD WILL DIRECTLY PAY THE CLOUD HOSTING FEES FROM INCEPTION, BUT THE CONTROL SYSTEM CONTRACTOR INCLUDES IN ITS INSTALLATION BID THE TECHNICAL SUPPORT LABOR AND SOFTWARE UPDATES FOR THE 24 MONTH MONITORING PERIOD.
9. PROVIDE BACNET MS/TP PROTOCOL DIRECT DIGITAL CONTROLLER(S) TO MONITOR CONTROL POINTS SHOWN ON THE MISCELLANEOUS MONITORING POINT SCHEDULE.
10. PROVIDE BACNET IP INTEGRATION TO EACH RENEWAIRE ERV UNIT. SEE ASSOCIATED CONTROL POINTS LIST. SET UP EACH ERV FOR REMOTE BMS TIME SCHEDULING AND CONSTANT VOLUME VENTILATION AS THE PRIMARY AIRFLOW MODE. SET THE TIME SCHEDULE BASED UPON BUILDING OCCUPANCY. INTEGRATE ALL POINT OBJECTS TO THE BMS.
11. PROVIDE BACNET IP INTEGRATION TO THE VRF MASTER CONTROLLER. SEE ASSOCIATED CONTROL POINTS ON THE VRF POINTS LIST FOR THE FAN COIL UNITS, OUTDOOR UNITS AND BRANCH CONTROLLERS. SET UP EACH OUTDOOR UNIT FOR REMOTE BMS TIME SCHEDULING AND OPTIMAL START. SET THE TIME SCHEDULE BASED UPON BUILDING OCCUPANCY. SET OPTIMAL START FOR BOTH HEATING WARM-UP AND COOLING PULL-DOWN.
12. THE BMS WILL MAINTAIN DAILY AND HOLIDAY SCHEDULES AND MODIFY THE OCCUPIED/UNOCCUPIED VARIABLE IN THE ODU CONTROLLER. THE VRF FAN COIL UNITS AND ASSOCIATED ODU MAINTAIN OCCUPIED HEATING 72°F (ADJ.) AND COOLING 75°F (ADJ.) SPACE TEMPERATURE SETPOINTS DURING OCCUPIED MODE. THE VRF FAN COIL UNITS AND ASSOCIATED ODU MAINTAIN UNOCCUPIED HEATING 65°F (ADJ.) AND COOLING 85°F (ADJ.) SPACE TEMPERATURE SETPOINTS DURING UNOCCUPIED MODE.
13. THE BMS VARIES THE START TIME BEFORE THE TIME SCHEDULED OCCUPANCY TO PRECONDITION THE SPACE TO ACHIEVE OCCUPIED TEMPERATURE SETPOINTS AT OCCUPANCY. THE BMS USES THE SPACE TEMPERATURE VALUES FROM THE VRF FAN COIL UNIT CONTROLLERS (SENSORS) TO MONITOR AND CALCULATE THE OPTIMAL START TIME BASED UPON THE AVERAGE SPACE TEMPERATURE FOR THE VRF ZONE AND THE OUTDOOR AIR TEMPERATURE. THE OPTIMAL START ALGORITHM SELF LEARNS THE SEPARATE WARM-UP AND COOL-DOWN RATES OF CHANGE FOR DIFFERENT OUTDOOR AIR CONDITIONS. THE OPTIMAL START ALGORITHM SHALL ACHIEVE THE ZONE AVERAGE HEATING OR COOLING OCCUPIED SPACE TEMPERATURE NO EARLIER THAN 20 MINUTES BEFORE OCCUPANCY.
14. PROVIDE THE FOLLOWING GRAPHICAL USER INTERFACE WEB PAGES. SUBMIT WEB PAGES FOR REVIEW AND APPROVAL BEFORE INSTALLING ON LIVE SERVER:
    a. FLOW DIAGRAM FOR EACH ERV UNIT SHOWING ALL OPERATIONAL PARAMETERS AND SETPOINTS.
    b. TABLE SUMMARY FOR ALL ERV UNITS SHOWING KEY OPERATION PARAMETERS.
    c. FLOW DIAGRAM FOR EACH VRF ODU UNIT SHOWING ALL OPERATIONAL PARAMETERS.
    d. TABLE SUMMARY FOR ALL VRF ODU UNITS SHOWING KEY OPERATION PARAMETERS.
    e. TABLE SUMMARY FOR THE VRF FAN COIL UNITS ASSOCIATED WITH EACH ODU UNIT SHOWING KEY OPERATION PARAMETERS.
    f. FLOOR PLANS SHOWING VRF FAN COIL UNIT LOCATIONS AND ASSOCIATED ERV ZONING VIA COLOR BACKGROUND.
    g. TABLE SUMMARY OF MISCELLANEOUS MONITORING POINTS.

STAGED HEATING
AHU-1,2 TO BE CONTROLLED WITH TWO STAGES OF HEAT.
STAGE 1 IS PROVIDED BY DX HEATING AND SHALL BE PROGRAMMED TO OPERATE TO MAINTAIN DISCHARGE TEMPERATURE OF MAX 105F DURING HEATING MODE.
STAGE 2 OF HEATING IS PROVIDE BY ELECTRIC RESISTANCE HEATING. CONTRACTOR TO PROVIDE LOCKOUT TO LIMIT ELECTRIC HEATING OPERATION BELOW 4 DEG. F.

3

PUBLIC BUILDING COMMISSION
FOREST PRESERVES OF COOK COUNTY

MCGINNIS FIELD STATION
BUILDING ID #72, #101 & #1398

METAL STORAGE BUILDING
13700 SOUTH 110TH AVE.
ORLAND PARK, IL 60467

FOREST PRESERVE DISTRICT OF COOK COUNTY
PRESIDENT TONI PRECKWINKLE

Architect of Record:
TAYLOR MADE DESIGN, INC.

TMD

ADDRESS: 600 S. DEARBORN ST. #1103
CHICAGO, ILLINOIS 60605
PHONE: 312.241.1300
FAX: 855.304.2655
WEB: www.tmd-architects.com

Terra Consulting Group Ltd.
Park Ridge, IL
Civil Engineers of Record

Hutter-Trankina Engineering
Wayne, IL
Structural Engineers of Record

Interface Engineering Inc.
Chicago, IL
MEFP Engineers of Record

ECL Consultants
Chicago, IL
Plumbing Engineers of Record

Issuance

Mark	Description	Date
10	**ISSUED FOR FINAL REVIEW**	10.04.24
11	**ISSUE FOR BID**	12.18.24
12	**ADDENDUM #1** 1	01.14.25
13	**ADDENDUM #3** 3	01.24.25

PBC Project Name: FPDCC 2023 METAL BUILDINGS

PBC Contract No: C1613

PBC Project No.: 15070

FPDCC Project No.: 23-80-42

Title
TEMPERATURE CONTROLS

Sheet
M4.1

EQUIPMENT SCHEDULE

TAG	SERVICE	LOCATION	VOLTAGE	PHASE	MOTOR HP	MOTOR KW	FULL LOAD AMPERES	PANEL	CIRCUIT NUMBER	BRANCH CIRCUIT BREAKER (AMPS/POLES)	MOTOR CONDUCTORS				MOTOR STARTER			MOTOR DISCONNECT SWITCH (AMPS)	ALTERNATE POWER SOURCE	REMARKS
											NO. SETS	POWER CONDUCTORS	GROUND CONDUCTOR	CONDUIT SIZE	NEMA SIZE	STARTER TYPE	VFD			
AIR HANDLING UNITS																				
AHU-1	Ventilation	Existing Garage	208	1			5.6	HP	19,21	15A/2P	1	2#12AWG	1#12G	3/4"		*		30A/2P	NO	*Factory installed controls
AHU-1	AHU-1 Heater Circuit 1	Existing Garage	208	1			31.6	HP	35,37	40A/2P	1	2#8AWG	1#10G	3/4"				*	NO	*Factory installed integral disconnect switch
AHU-1	AHU-1 Heater Circuit 2	Existing Garage	208	1			31.6	HP	39,41	40A/2P	1	2#8AWG	1#10G	3/4"				*	NO	*Factory installed integral disconnect switch
AHU-2	Ventilation	Existing Garage	208	1			5.6	HP	20,22	15A/2P	1	2#12AWG	1#12G	3/4"		*		20A/2P	NO	*Factory installed controls
AHU-2	AHU-2 Heater Circuit 1	Existing Garage	208	1			31.6	HP	36,38	40A/2P	1	2#8AWG	1#10G	3/4"				*	NO	*Factory installed integral disconnect switch
AHU-2	AHU-2 Heater Circuit 2	Existing Garage	208	1			31.6	HP	40,42	40A/2P	1	2#8AWG	1#10G	3/4"				*	NO	*Factory installed integral disconnect switch
AHU-3	Ventilation	Existing Garage	208	1			5.6	LP	28,30	15A/2P	1	2#12AWG	1#12G	3/4"		*		30A/2P	NO	*Factory installed controls
ENERGY RECOVERY																				
ERV-1	Ventilation	Existing Garage	120	1			1.2	LP	26	15A/1P	1	2#12AWG	1#12G	3/4"		*		20A/1P	NO	*Factory installed controls
ERV-2	Ventilation	New Garage	120	1			1.2	GP	3	15A/1P	1	2#12AWG	1#12G	3/4"		*		20A/1P	NO	*Factory installed controls
EXHAUST FANS																				
EF-1	Ventilation	Existing Garage	120	1	0.25		5.6	LP	25	15A/1P	1	2#12AWG	1#12G	3/4"				20A/1P	NO	
EF-2	Ventilation	Existing Garage	120	1	0.25		5.6	LP	29	15A/1P	1	2#12AWG	1#12G	3/4"				20A/1P	NO	
EF-3	Ventilation	New Garage	120	1	0.25		5.6	GP	5	15A/1P	1	2#12AWG	1#12G	3/4"				20A/1P	NO	
TEF-1	Ventilation	Existing Garage	120	1		0.02		LP	27	15A/1P	1	2#12AWG	1#12G	3/4"				20A/1P	NO	
CONDENSING UNITS																				
CU-1	Ventilation	Existing Garage	208	3			32.0	DP	4 (3)	50A/3P	1	3#6AWG	1#10G	3/4"		*		60A/3P NEMA 3R	NO	*Factory installed controls
CU-2	Ventilation	Existing Garage	208	3			32	DP	5	50A/3P	1	3#6AWG	1#10G	3/4"		*		60A/3P NEMA 3R	NO	*Factory installed controls
CU-3	Ventilation	Existing Garage	208	1			36	DP	8	40A/2P	1	2#4AWG	1#10G	3/4"		*		60A/2P NEMA 3R	NO	*Factory installed controls
MISCELLANEOUS EQUIPMENT																				
BP-1	Booster Pump	New Garage	120	1	1/2		9.8	GP	10	15A/1P	1	2#12AWG	1#12G	3/4"		*		20A/1P	NO	*Factory installed controls
EUH-1	Unit Heater	Existing Garage	208	3		15	41.0	See Floor Plans	See Floor Plans	60A/3P	1	3#4AWG	1#10G	1"				60A/3P	NO	
EUH-2	Unit Heater	New Garage	208	3		10	27.8	See Floor Plans	See Floor Plans	40A/3P	1	3#8AWG	1#10G	3/4"				60A/3P	NO	
SS-1	Garage Door	New Garage	208	1			8.0	GP	33,35	20A/2P	1	3#12AWG	1#12G	3/4"				20A/2P	NO	
SS-2	Garage Door	New Garage	208	1			8	GP	34,36	20A/2P	1	2#12AWG	1#12G	3/4"				20A/2P	NO	

(3) 3

(3) 3

(3) 3

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MEFP Engineers of Record

ECL Consultants
Chicago, IL
Plumbing Engineers of Record

LICENSED PROFESSIONAL ENGINEER
F. THOMAS VOLTAGGIO
062042501
STATE OF ILLINOIS
Expires 11/30/2025

Issuance

Mark	Description	Date
10	**ISSUED FOR FINAL REVIEW**	10.04.24
11	**ISSUE FOR BID**	12.18.24
12	**ADDENDUM #1** (1)	01.14.25
13	**ADDENDUM #3** (3)	01.24.25

PBC Project Name: FPDCC 2023 METAL BUILDINGS

PBC Contract No: C1613

PBC Project No.: 15070

FPDCC Project No.: 23-80-42

Title
SCHEDULES - ELECTRICAL

Sheet
E0.2

DISTRIBUTION PANEL NAME **DP (N)**

VOLTAGE: 208/120 Volts, 3 Ph, 4W
MAIN BUS RATING: 800A
MAIN DEVICE RATING: 800A MCB
SHORT CIRCUIT RATING: 65,000 SYM. AMPS

CCT.	LOAD	KVA	P.F.	KW	AMP	GROUND BUS	BRANCH CIRCUIT BREAKER FRAME SIZE (AMP)	BRANCH CIRCUIT BREAKER TRIP RAT. (AMP)	BRANCH CIRCUIT BREAKER POLE	REMARKS
1	PANEL GP	28.4	0.9	25.6	78.9	YES	250	200	3	
2	PANEL LP	87.1	0.9	78.4	242.0	YES	400	400	3	
3	PANEL HP	52.7	0.9	47.4	146.5	YES	400	400	3	
4	CU-1	11.5	0.9	10.4	32.0	YES	150	50	3	
5	CU-2	11.5	0.9	10.4	32.0	YES	150	50	3	
6	~~Space for Future EV Charger~~	0.0	0.9	0.0		YES			2	
7	Space for Future EV Charger	0.0	0.9	0.0		YES			2	
8	CU-3	7.5	0.9	6.7	36.0	YES	150	40	2	
9	Space	0.0	0.9	0.0		YES			3	
10	Space	0.0	0.9	0.0		YES			3	
11	Space	0.0	0.9	0.0		YES			3	
12	Space	0.0	0.9	0.0		YES			3	

TOTAL DEMAND KVA: 198.7
TOTAL CONNECTED KW: 178.8
TOTAL DEMAND AMPS: 552.2

MOUNTING: SURFACE
PANEL BUS RATING: 400A
MAIN LUGS ONLY:
MAIN BREAKER 400A MCB

PANEL NAME: **HP (N)**

GROUND BUS:	YES	
ISO GROUND BUS:	NO	
NEUTRAL CAPACITY:	100%	

SCCR: 22,000
VOLTS: 208 /120
PHASE: 3
WIRE: 4

CKT NO.	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD DESCRIPTION	BREAKER AMP	BREAKER POLE	CKT NO.
1	20	1	Existing Load (E)	500			540			Receptacle In Garage (E)	20	1	2
3	20	1	Kitchen (E)		1500			500		Dishwasher (E)	20	1	4
5	20	1	Existing Load (E)			500			360	Porch Front (E)	15	1	6
7	15	1	Crawl (E)	360			900			2nd Floor (E)	15	1	8
9	15	1	Office (E)		540			1000		Kitchen (E)	15	1	10
11	15	1	Existing Load (E)			500			540	Garage (E)	15	1	12
13	15	1	Mud (E)	540			0			Spare (N)	15	1	14
15	15	1	Spare (N)		0			540		Basement (E)	15	1	16
17	20	1	Computer Outlet (E)			180			540	Basement (E)	15	1	18
19	15	2	AHU-1 (N)	582			582			AHU-2 (N)	15	2	20
21					582			582.4					22
23	15	1	Hub Rack (E)			500			3000	Exsting Load (E)	40	2	24
25	15	1	Existing Load (E)	500			3000						26
27	20	2	Existing Load (E)		1500			1900					28
29						1500			1900				30
31	20	1	Basement Lighting (N)	260			500			Fire Alarm (N)	20	1	32
33	20	1	Spare (N)							Spare (N)	20	1	34
35	40	2	AHU-1 Heater Circuit #1 (N)			3286.4			3286.4	AHU-2 Heater Circuit #1 (N)	40	2	36
37				3286			3286						38
39	40	2	AHU-1 Heater Circuit #2 (N)		3286			3286		AHU-2 Heater Circuit #2 (N)	40	2	40
41						3286			3286				42
			TOTAL	8029	7408	9753	8809	7809	12913	TOTAL:			

TOTAL A: 14837.6
TOTAL B: 15217.2
TOTAL C: 22665.6

TOTAL CONNECTED KVA: 52.7
TOTAL CONNECTED AMPS: 146.5

PANEL NAME: **SP (E)**

MOUNTING: SURFACE
PANEL BUS RATING: 60A
MAIN LUGS ONLY: X
MAIN BREAKER

GROUND BUS:	YES	
ISO GROUND BUS:	NO	
NEUTRAL CAPACITY:	100%	

SCCR: 14,000
VOLTS: 208 Y/120
PHASE: 1
WIRE: 3

CKT NO.	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION	LOAD (VA) A	LOAD (VA) B	LOAD (VA) A	LOAD (VA) B	LOAD DESCRIPTION	BREAKER AMP	BREAKER POLE	CKT NO.
1	20	1	Outside Lights (E)	360		180		Ceiling Receptacle (E)	20	1	2
3	20	2	Equipment (E)		1000		180	Ceiling Receptacle (E)	20	1	4
5				1000.0		180.0		Ceiling Receptacle (E)	20	1	6
7	20	1	Super Cooler (E)		800		180	Ceiling Receptacle (E)	20	1	8
9	20	1	Fire Alarm (N)	500.0		3000		Deer Cooler (E)	40	2	10
11	20	1	Spare (E)				3000				12
13	20	1	Spare (E)					Space (E)		1	14
15		1	Space (E)					Space (E)		1	16
17		1	Space (E)					Space (E)		1	18
			TOTAL	1860	1800	3360	3360	TOTAL:			

TOTAL A: 5220.0
TOTAL B: 5160.0

TOTAL CONNECTED KVA: 10.4
TOTAL CONNECTED AMPS: 28.8

MOUNTING: SURFACE
PANEL BUS RATING: 400A
MAIN LUGS ONLY:
MAIN BREAKER 400A MCB

PANEL NAME: **LP (N)**

GROUND BUS:	YES	
ISO GROUND BUS:	NO	
NEUTRAL CAPACITY:	100%	

SCCR: 22,000
VOLTS: 208 Y/120
PHASE: 3
WIRE: 4

CKT NO.	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD DESCRIPTION	BREAKER AMP	BREAKER POLE	CKT NO.
1	15	1	Spare (N)	0			1000			Northwest Door Opener (E)	20	1	2
3	20	1	South Wall Receptacle (E)		360			1000		Northeast Door Opener (E)	20	1	4
5	15	1	Spare (N)			0			1000	Southwest Door Opener (E)	20	1	6
7	20	1	North Wall Receptacle (E)	360			400			North Garage Lights (E)	15	1	8
9	60	2	Sub-Panel Main (E)		5220			400		South Garage Lights (E)	15	1	10
11						5160			180	East Outdoor Outlet (E)	20	1	12
13	20	2	Well Pump (E)	1000			540			Front Office Receptacle (E)	20	1	14
15					1000			540		Work Area Receptacle (E)	20	1	16
17	30	2	Air Conditioner (E)			2000			800	Lab Ice Chest (E)	20	1	18
19				2000			540			Lab Receptacle (E)	20	1	20
21	15	1	Spare (N)		0			300		Front Office Lights (E)	15	1	22
23	15	1	Lights and Receptacle - Furnace (E)			300			300	Rear Lab & Bathroom Lights (E)	20	1	24
25	15	1	EF-1 (N)	672			144			ERV-1 (N)	15	1	26
27	15	1	TEF-1 (N)		20			582		AHU-3 (N)	15	2	28
29	15	1	EF-2 (N)			672			582				30
31	60	3	EUH-1 (N)	5000			5000			EUH-1 (N)	60	3	32
33					5000			5000					34
35						5000			5000				36
37	60	3	EUH-1 (N)	5000			5000			EUH-1 (N)	60	3	38
39					5000			5000					40
41						5000			5000				42
			TOTAL	14032	16600	18132	12624	12822.4	12862.4	TOTAL:			

TOTAL A: 26656.0
TOTAL B: 29422.4
TOTAL C: 30994.4

TOTAL CONNECTED KVA: 87.1
TOTAL CONNECTED AMPS: 242.0

MOUNTING: SURFACE
PANEL BUS RATING: 200A
MAIN LUGS ONLY:
MAIN BREAKER 200A MCB

PANEL NAME: **GP (N)**

GROUND BUS:	YES	
ISO GROUND BUS:	NO	
NEUTRAL CAPACITY:	100%	

SCCR: 22,000
VOLTS: 208 Y/120
PHASE: 3
WIRE: 4

CKT NO.	BREAKER AMP	BREAKER POLE	LOAD DESCRIPTION	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD (VA) A	LOAD (VA) B	LOAD (VA) C	LOAD DESCRIPTION	BREAKER AMP	BREAKER POLE	CKT NO.
1	20	1	Receptacles (N)	180			6			Exit Signs (N)	15	1	2
3	15	1	ERV-2 (N)		144			600		Lighting Controller Receptacle (N)	20	1	4
5	15	1	EF-3 (N)			696			684	Lighting (N)	15	1	6
7	20	1	Receptacle (N)	180			152			Exterior Lighting (N)	15	1	8
9	20	1	Receptacle (N)		180			1176		Booster Pump (N)	15	1	10
11	20	1	Receptacle (N)			180			500	Fire Alarm Control Panel (N)	20	1	12
13	20	1	Receptacle (N)	180			512			Heat Trace (N)	20	1	14
15	20	1	Receptacle (N)		180					Spare (N)	20	1	16
17	20	1	Spare (N)							Spare (N)	20	1	18
19	20	1	Spare (N)							Spare (N)	20	1	20
21	20	1	Spare (N)							Spare (N)	20	1	22
23	20	1	Spare (N)							Spare (N)	20	1	24
25	20	1	Spare (N)							Space (N)		1	26
27		1	Space (N)							Space (N)		1	28
29		1	Space (N)							Space (N)		1	30
31		1	Space (N)							Space (N)		1	32
33	20	2	Garage Door (SS-1) (N)		960			960		Garage Door (N)	20	2	34
35						960			960				36
37	40	3	EUH-2 (N)	3333			3333			EUH-2 (N)	40	3	38
39					3333			3333					40
41						3333			3333				42
			TOTAL	3873	4797	5169	4003	6069	5477	TOTAL:			

TOTAL A: 7876.0
TOTAL B: 10866.0
TOTAL C: 10646.0

TOTAL CONNECTED KVA: 29.4
TOTAL CONNECTED AMPS: 81.7

PUBLIC BUILDING COMMISSION
FOREST PRESERVES OF COOK COUNTY

MCGINNIS FIELD STATION
BUILDING ID #72, #101 & #1398

METAL STORAGE BUILDING
13700 SOUTH 110TH AVE.
ORLAND PARK, IL 60467

FOREST PRESERVE DISTRICT OF COOK COUNTY
PRESIDENT TONI PRECKWINKLE

Architect of Record:
TAYLOR MADE DESIGN, INC.

TMD

ADDRESS: 600 S. DEARBORN ST. #1103
CHICAGO, ILLINOIS 60605
PHONE: 312.241.1300
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Terra Consulting Group Ltd.
Park Ridge, IL
Civil Engineers of Record

Hutter-Trankina Engineering
Wayne, IL
Structural Engineers of Record

Interface Engineering Inc.
Chicago, IL
MEFP Engineers of Record

ECL Consultants
Chicago, IL
Plumbing Engineers of Record

LICENSED PROFESSIONAL ENGINEER
F. THOMAS VOLTAGGIO
062040501
STATE OF ILLINOIS
Expires 11/30/2025

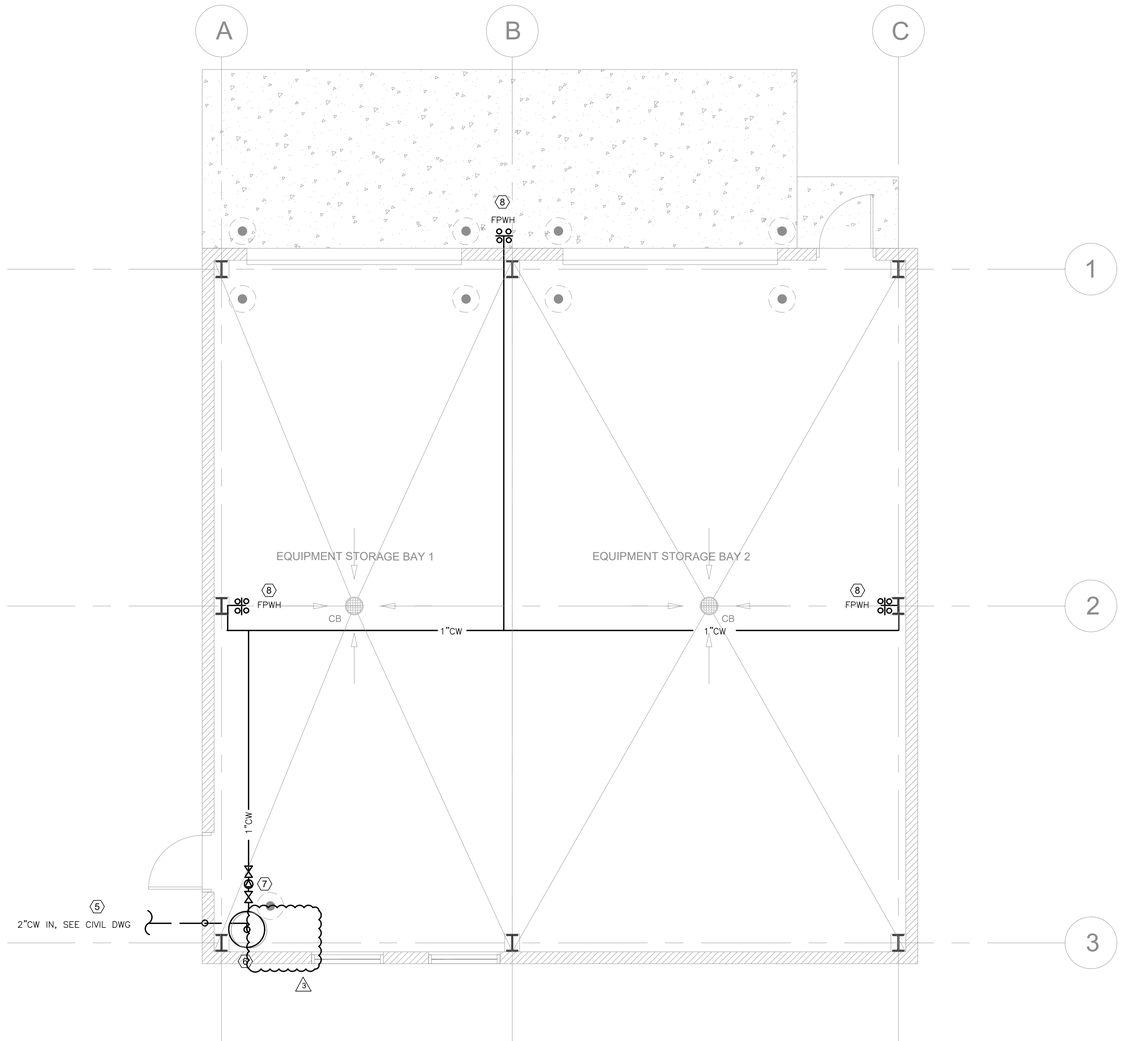
Issuance

Mark	Description	Date
10	**ISSUED FOR FINAL REVIEW**	10.04.24
11	**ISSUE FOR BID**	12.18.24
12	**ADDENDUM #1** 1	01.14.25
13	**ADDENDUM #3** 3	01.24.25

PBC Project Name: FPDCC 2023 METAL BUILDINGS
PBC Contract No: C1613
PBC Project No.: 15070
FPDCC Project No.: 23-80-42

Title
SCHEDULES - ELECTRICAL

Sheet
E0.3



PLUMBING KEYED NOTES:

1. NEW 4"SANITARY MAIN OUT, SEE CIVIL DRAWINGS.
2. 4x5 VENT UP THROUGH ROOF
3. CATCH BASIN.
4. RECESSED OIL SEPARATOR
5. 2"CW IN, SEE CIVIL DRAWINGS
6. 100 GALLON HOLDING TANK
7. CW BOOSTER PUMP
8. ¾" CW DOWN TO FROST PROOF WALL HYDRANT.
9. ¾" CW DOWN TO HOSE BIBB
10. NOT USED
11. PROVIDE ELECTRICAL HEAT TRACING ON ALL CW PIPING WITHIN BUILDING.

1 / P1.1A CW PLUMBING PLAN
SCALE: 1/4" = 1'-0"

NORTH

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BRIAN A. TAYLOR
001-015425
REGISTERED
PROFESSIONAL
ARCHITECT
OF
ILLINOIS
EXPIRATION DATE: 11.30.2026

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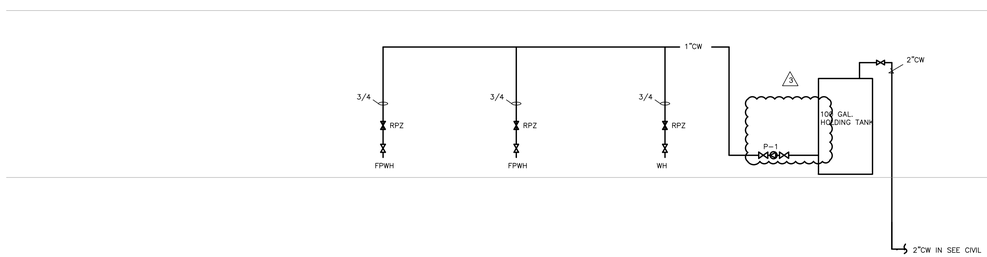
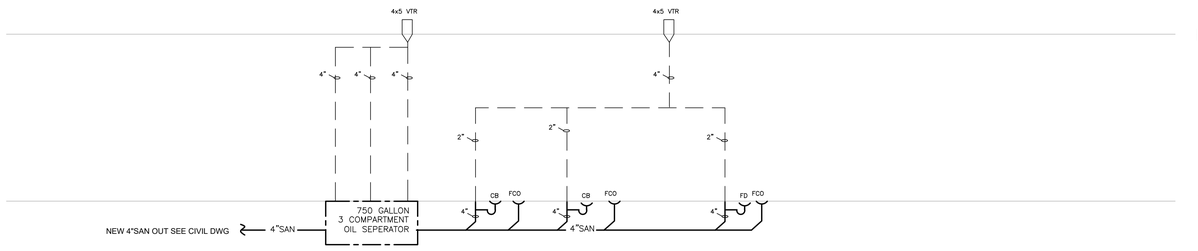
Title
CW PLUMBING PLAN
METAL STORAGE BUILDING

Sheet
P1.1A



CW RISER DIAGRAM



SAN. & VENT RISER DIAGRAM

PLUMBING FIXTURES SCHEDULE

OIL SEPARATOR

OIL SPARATOR TO BE A IN FLOOR MOUNTED OIL SEPARATOR BY JR SMITH SERIES 8500 OR EQUAL. UNIT TO PROVIDED WITH HEAVY DUTY LIDS RATED FOR VEHICLE TRAFFIC. LIDS SHALL BE SEALED AND BOLTED.

FLOOR DRAINS:

FD-1: JR. SMITH # 2142, 12" DIA, HEAVY DUTY, CAST IRON BODY PROVIDE HEAVY DUTY GRATE RATED FOR TRUCK TRAFFIC.

CLEAN-OUTS:

CO: J.R. SMITH #4020 CAST IRON BODY CLEANOUT WITH ROUND SCORIATED NICKLE BRONZE TOP.

FROST PROOF WALL HYDRANT:

FPWH: J.R. SMITH #5509QT, RECESSED WITH LOCKABLE COVER INTERGRAL VACUUM BREAKER, 3/4" HOSE CONNECTION,BRONZE FINISH.

WALL HYDRANT/HOSE BIBB:

WH: J.R. SMITH #5609, W/ INTEGRAL VACUUM BREAKER 3/4" HOSE CONNECTION.

FIXTURE COUNT *

FIXTURE TYPE	QUANTITY	DFU	TOTAL:
FLOOR DRAINS	3	2	6
			6 DFU

6 DFU = 4" SAN MIN. AT 1/8" SLOPE; 4" PROVIDED AT 1/8" SLOPE

FIXTURE COUNT *

FIXTURE TYPE	QUANTITY	WSFU	TOTAL:
HOSE BIBB	3	5	15
			15 WSFU

15 WSFU = 11 GPM, 3/4" REQUIRED, 1"CW PROVIDED

PUMP SCHEDULE

EQUIP. TAG	GPM	HEAD (FT.)	RPM	FLANGE SIZE (IN.)	MOTOR			MANUFACTURER
					HP	PHASE	VOLT	
1	15	25	1992	1"	1/2	1	120	BELL & GOSSET #E-90e

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PLUMBING RISER & SCHEDULES
METAL STORAGE BUILDING

Sheet

P2.0A