



Addendum No.: 2

Date Of Addendum: August 14, 2017

CT DAS • Construction Services • Process Management and Procurement Unit

Quinebaug Valley Hatchery Energy & Water Supply  
System Operating Improvements  
145 Trout Hatchery Road  
Plainfield, CT  
BI – T – 611

Original Bid Due Date / Time:

August 23, 2017

1:00 PM

Previous Addendums: Addendum #1 dated August 8, 2017

**TO: Prospective Bid Proposers:**

This Addendum forms part of the "Contract Documents" and modifies or clarifies the original "Contract Documents" for this Project dated 4/22/2017. Prospective Bid Proposers **shall** acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form.

**Failure to acknowledge receipt of the total number the Addenda issued for this Project on the space provided on Section 00 41 00 Bid Proposal Form shall subject Bid Proposers to disqualification.**

The following clarifications are applicable to drawings and specifications for the project referenced above.

**Item 1:**

In section 01 23 00 Supplemental Bids, Paragraph D. Schedule of Supplemental Bids, the order of the Supplemental Bids have changed. **DELETE** Paragraph D and **REPLACE** Paragraph D Schedule of Supplemental Bids with the following:

"D. Schedule of Supplemental Bids:

1. Supplemental Bid No. 1: Well 6 – ADD the replacement well pump, pump motor, flow meter and all related plumbing, electrical and HVAC work as shown in the drawings for Well 6.
2. Supplemental Bid No. 2: Well 15 – ADD the replacement well pump, pump motor, flow meter and all related plumbing, electrical and HVAC work as shown in the drawings for Well 15.
3. Supplemental Bid No. 3: Well 16 – ADD the replacement well pump, pump motor, flow meter and all related plumbing, electrical and HVAC work as shown in the drawings for Well 16.
4. Supplemental Bid No. 4: Well 13 and Well 14 – ADD the replacement well pumps, pump motors, flow meters and all related plumbing, electrical and HVAC work as shown in the drawings for Wells 13 and 14."

**Item 2:**

In the Project Manual, Section 01 81 13, Sustainable Design Requirements,

- **DELETE** paragraph G. There is no requirement that Salvaged or refurbished materials be used for this project.
- **DELETE** paragraph H. There is no requirement to use building materials with a minimum percentage of recycled content.
- **DELETE** paragraph I. There are no requirements to use regional materials

**Item 3:**

In the Project Manual, Specification Section 07 26 00 Under Slab Vapor Retarder, paragraph 2.2A 2, **DELETE** "15 mil" and **REPLACE** with "10 mil".

**Item 4:**

In the Project Manual, **ADD** Specification Section 08 15 00 Fiberglass Reinforced Plastic (FRP) Doors and Frames. See Attachment.



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**Item 5:**

In the Project Manual, ADD Specification Section 08 71 00 Finish Hardware. See Attachment.

**Item 6:**

In the Project Manual, ADD Specification Section 09 77 61 Fiberglass Reinforced Plastic (FRP) Panels. See Attachment.

**Item 7:**

In the Project Manual, ADD Specification Section 09 91 10 Painting. See Attachment.

**Item 8:**

In the Project Manual, Specification Section 11 60 10 Pumping Equipment, paragraph 2.4, A., 2a, DELETE the words "mixed flow design capable of passing a 0.5" solid."

**Item 9:**

In the Project Manual, Specification Section 11 60 10 Pumping Equipment, paragraph 2.4, A., 3a, DELETE the words "cast steel. Cast iron will not be permitted" and REPLACE with the words "cast iron or stainless steel."

**Item 10:**

In the Project Manual, ADD Specification Section 13 34 19 Metal Building Systems. See Attachment.

**Item 11:**

In the Project Manual, Specification Section 40 05 58 Water Control Gates, paragraph 2.1, A., ADD paragraph 3 as follows: "3. Coldwell-Wilcox Technologies."

**Item 12:**

In the Project Manual, Specification Section 40 71 00 Flow Instrumentation, paragraph 2.2, A., 1., ADD paragraph c as follows: "c. Eldridge Products Inc."

**Item 13:**

In the Project Manual, Specification Section 46 71 33 Rotary drum Filters, paragraph 21, A. ADD paragraph 3. As follows: "3. Hex Filters".

**Item 14:**

On the Drawings, Drawing No. B-1, DOOR SCHEDULE, ADD the column "HARDWARE SET". Hardwood set types for each door are as follows: Door 101, set HW-1; Door 102, set HW-2; and Door 201, set HW-3.

**Item 15:**

On the Drawings, Drawing No. B-5, Section 4: DELETE the text that reads "2x6 Outlooker" and REPLACE with "Outlooker, sized by light gauge steel truss manufacturer".

**Item 16:**

On the Drawings, Drawing No. P-2, Site Piping Plan 2: Piping plan 2/ P-2 shows the 6" waste drain (WD) line tying into an existing manhole on the north side of the piping plan. This existing manhole does not exist. A 45 degree bend shall be installed at the location the manhole is shown and the pipe shall be routed northwest to daylight at the existing setting pond nearby (approximately 50 feet away). The invert at the 45 degree bend shall be 134.5', and the pipe shall slope toward the pond from the 45 degree bend at a minimum slope of 0.5%

**Item 17:**

On the Drawings, Drawing No. P-8, Above Ground Piping Plan:

1. Drawing 1/ P-8 shows the supply panel (header) in the wrong location. The header is actually located in the metal building east of the headtank, to the right of the entry doorway.
2. Detail 2/ P-8 shows and elevation and section. This detail shall be modified as follows:

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- a. On the elevation (the left side of the detail) the right most oxygen supply rotometer on the existing panel is no longer in operation and shall be removed from the station.
- b. Two new oxygen supply stations (each with a rotometer and oxygen mass flow meter) shall be installed on the existing panel where the existing rotometer and mass flow meter was removed.
- c. The new panel shown to the left on the elevation view shall be deleted.
- d. The installation of the new supply rotometers piping and mass flow meters shall be similar to the installation of the existing system.
- e. Oxygen piping shall be field routed from the new oxygen supply stations to the new Gas Management columns. The field routing shall avoid interferences and be as noted on drawing 1/ P-8. Connection to the gas management columns shall include isolation valves at the columns and be in accordance with the recommendations of the Gas Management Column manufacturer.

**Item 18:**

On the Drawings, Drawing No. P-10, Demolition Plan 1: The order of the Supplemental Bids have changed. **CHANGE** Note 2 to read as follows: "2. All work at Wells 13 and 14 shall be included in Supplemental Bid 4 only."

**CHANGE** Note 3 to read as follows: "3. All work at Wells 15 shall be included in Supplemental Bid 2 only."

**CHANGE** Note 4 to read as follows: "4. All work at Wells 16 shall be included in Supplemental Bid 3 only."

**Item 19:**

On the Drawings, Drawing No. P-12, Well House Piping and Mechanical Plans 1: The order of the Supplemental Bids have changed.

**CHANGE** Note 2 to read as follows: "2. All work at Wells 13 and 14 shall be included in Supplemental Bid 4 only."

**CHANGE** Note 3 to read as follows: "3. All work at Wells 15 shall be included in Supplemental Bid 2 only."

**CHANGE** Note 4 to read as follows: "4. All work at Wells 16 shall be included in Supplemental Bid 3 only."

**Item 20:**

On the Drawings, Drawing No. P-15, Equipment Schedules: Because of the on-going well rehabilitation at the site, the yield for the wells has increased. The well pumps and flow meters have been resized to match the new well yield flow rates.

**DELETE** the Pump Schedule and **REPLACE** it with the attached Pump Schedule. The changes are highlighted in yellow.

**DELETE** the Flow Meter Schedule and **REPLACE** it with the attached Flow Meter Schedule. The changes are highlighted in yellow.

**Item 21:**

On the Drawings, Drawing No. E-6, Partial Plan Main Head Box:

- a. There are three existing panels shown along the east wall of the Main Headtank Building. The center panel is mislabeled. **CHANGE** the note for the center panel from "CPHT (Existing)" to "Power Panel PCHT (Existing)".
- b. On the east wall of the Headtank Building, near the south corner, there are 5 existing oxygen flow meters and 5 existing oxygen mass flow meters (not shown). Electrical work shall include disconnecting the south most mass oxygen flow meter. New work shall include connecting the two (2) new mass oxygen flow meters (not shown). Run power and signal wiring in conduit from the existing control panel CPHT in the Headtank Building, to the new oxygen mass flow meters. Power and signal wiring shall be in separate conduits. Power wiring shall be #14, two wire with ground, and the signal wiring shall consist of a #16 shielded twisted pair to each oxygen mass flow meter. Connect the oxygen mass flow meters per the instrumentation shop drawings.
- c. Modify control CPHT as required to connect the new and existing alarm and instrumentation wiring in the Headtank Building. Control panel modifications shall be per specification section 40 94 43.

**Item 22:**

On the Drawings, Drawing No. E-9, Partial Plan Well 15: The order of the Supplemental Bids have changed. **CHANGE** the note located under the One Line Diagram from Supplemental Bid #3 to Supplemental Bid #2.

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On the Drawings, Drawing No. E-11, Partial Plans, Well 5 & Well 16: The order of the Supplemental Bids have changed. **CHANGE** the note located under the One Line Diagram from Supplemental Bid #4 to Supplemental Bid #3.

**Item 24:**

On the Drawings, Drawing No. E-12, Partial Plans, Well 13 & Well 14: The order of the Supplemental Bids have changed. **CHANGE** the note located under the One Line Diagram from Supplemental Bid #2 to Supplemental Bid #4.

**Item 25:**

On the Drawings, Drawing No. E-15, Partial Plans, Well 8 & Well 6: Because of the on-going well rehabilitation at the site, the yield for some of the wells has increased. The well pump #8 has been resized to match the new well yield flow rate.

- a. On the Well House #8 Floor Plan for New Work, **CHANGE** the motor horsepower from 10 HP to 15 HP.
- b. On the One Line Diagram, Detail E-15/3, **CHANGE** the breaker feeding the VFD for Well 8 from a 30A, 3P to a 60A, 3P. **CHANGE** the feeder from the breaker in panel DPW08 to the Well 8 VFD from a ¾" conduit with 3#10 and #10 ground to a ¾" conduit with 3#6 and #8 ground

**QUESTIONS FROM PLAN HOLDERS:****QUESTION SET 1:**

1. Section 00 11 16 indicates that the contract time allowed is 310 calendar days. Section 00 41 00 indicates there is 310 days for the completion of the project. Section 01 10 00 states the project will be substantially complete within 310 days. Please confirm if 310 calendar days is the total contract time or to substantial completion with additional days to final completion.

RESPONSE: As stated in 00 11 16, the contract time allowed is 310 calendar days.

2. Drawing P-12 & P-13 has multiple well pump houses that are replacing the exhaust fans and louver/dampers. Notes 10 and 11 indicate size to match existing. We have no indication of size on the existing units or have any details on them. Please provide specifications for the louvers/dampers and exhaust fans at the well pump houses.

RESPONSE: Specifications for the louvers and dampers are in section 08 90 00. Contractor shall field verify louver /damper sizes, but for purposes of bidding assume the sizes are 24" x 24" for all well houses. Louvers and dampers are installed similar to detail 2 on sheet M1. Dampers are motorized.

Fans shall be as specified in section 23 34 00. Well houses 1, 3, 6, 7, 8 and 13-16 have wall mounted propeller fans. Well houses 10, 11, and 12 have roof mounted fans. Existing roof fans are installed on a concrete roof. Contractor shall field verify the existing fan size and performance, but for purposes of bidding assume 18" diameter fans rated for 2000 cfm at 0.25" WC that rotate at 1140 rpm.

3. Who provides and installs the hand-holes HH 30B & 30C?

RESPONSE: The handhole detail is located on sheet E-25.

4. Specifications 26 05 26 3.1 A.6. a. indicates the electrician is providing excavation and backfill for the grounding systems. Who provides excavation and backfill for the site electrical? Is there a detail? Is there concrete encasement?

RESPONSE: See specification 31 23 33, Trenching, Backfilling, and Compacting for Utilities. The electrical duct banks are not concrete encased.

5. Plan view on P-2 shows 45 degree bends in several locations that plan view on P-4 shows 90 degree bends. Example is the 18" RW line to the West that goes to the Existing Reuse Water Pump Station. Are the 90 degree bends acceptable as shown on P-4?

RESPONSE: 90 degree bends are acceptable on RW piping. 45 degree bends or sanitary bends shall be used on WD piping.

6. Does the under-slab piping get concrete encased?

RESPONSE: Only the 6" WD line under the bio-filter on the north side of the structure needs to be concrete encased. See detail 2 on sheet P-17.

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7. Drawing B-4 Section A shows the m of the frost wall at wall line 2 to be at the same elevation as the trench bottom. Section A on S-9 shows this as only 3' to the top of footer.  
RESPONSE: The top of footing elevation shall be a minimum of 3'-0" below finish grade.
8. Please provide specification section for the following Items:  
a. Painting  
b. FRP Doors and Frames  
c. FRP Wall & Ceiling Panels  
d. Pre Engineered Metal Building  
RESPONSE: Five specification sections have been added to the Project Manual.
9. Reference drawing B-1: Door Schedule does not list hardware sets required for each door location, what is required?  
RESPONSE: The door hardware has been added to the schedule.
10. Per Drawing S-13 Typical Room connection detail 3/S-1'3 calls for outriggers to be by cold form steel truss manufacturer but section at gable end 4/B-5 shows 2x6 outlocker/outrigger, what is required?  
RESPONSE: The detail has been clarified.
11. Reference Drawing B-5 Detail 3 calls for 10 mil vapor barrier under floor slab but spec section 07-26-00 par. 2.2A2 calls for a min 15 mil thickness, what is required?  
RESPONSE: The spec has been corrected to include a 10 mil vapor barrier.
12. Reference Drawing B-5 Door Head detail 2/B-5 shows door @ exterior face of wall with prefinished metal flashing and trim covering edge of interior wall system where as door jamb detail 5/B-5 shows door 1" off interior face wall with no trim @ edge of interior wall system. What detail are we to use for door location?  
RESPONSE: The distance from the interior face of finished wall to interior face of door panel shall be 1".
13. Please provide a signage schedule or quantities required for each Identification Device type listed in specification section 10-14-00.  
RESPONSE: See specification 10 14 00, 1.3 A for submittal requirements.
14. Under section 01 50 00/01 52 13, it appears that there is a repetitive group under C for the Owner/CA field office computer system. Please confirm how many laptop computer systems will be required to be supplied.  
RESPONSE: In specification section 01 50 13 paragraphs 2, 3,4, and 6 on pages 5 and 6 of 16 is a duplicate of the information on previous pages. Paragraphs 2, 3, 4, and 6 on pages 5 and 6 of 16 in section 01 50 00/01 52 13 should be deleted.
15. Under section 01 10 00/01 12 16, C1 states that the treatment building must be fully operational before any wells can be taken out of service for well replacement. The treatment system involves a bio filter which requires an acclimation period before actual treatment takes place. Please define if fully operational includes an acclimation period required to meet the treatment system effluent requirements and if so what is the assumed duration of this period and what the effluent requirements are as they are not defined.  
RESPONSE: Biofilters can take up to one month to be fully operational. Time is required to inoculate the media and allow the beneficial bacteria time to grow. The actual time will ultimately depend upon the rate of growth from the bacteria. In cooler waters, such as those at Quinebaug, the timeline may be a bit longer. Startup of the biofilter could be sooner than a month depending on the conditions within the hatchery. This will be related to the pounds of feed in the system at the time of operation and relationship to the amount of ammonia that needs to be reduced. These items can vary throughout the production year so coordination would be required for any use of the biofilter sooner than a month after inoculation.
16. Section 00 11 16 indicates that the cost estimate range is \$2,855,751 to \$3010996. Please confirm if this cost estimate range includes the supplemental bids.  
RESPONSE: As stated in 00 11 16, the cost range for the project is \$2,855,751 to \$3,010,966.
17. Section 01 10 00/01 12 16 C1 states that the treatment building must be fully functional before any wells are replaced and C2 states that only one well will be taken off at a time. If the supplemental bids are accepted and included into the project will additional time be added to the contract as well?  
RESPONSE: As stated in specification 00 11 16, the contract time allowed is 310 calendar days.

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1. Section 46 51 36 Part 2.2 A or drawing P-3 do not indicate if there is an intake pipe that needs run from the blower to outside of the structure. Please confirm if an intake air for the blowers needs to be run from outside of the building to the blowers. Also, please provide details for roof or wall penetrations if required.

RESPONSE: Blowers will pull air from inside the building.

2. Is the backwash system/pump required to be supplied by the Rotary Drum supplier under section 46 71 33? Is a water source required for the Rotary Drum back wash?

RESPONSE: The backwash pump will be supplied by the drum filter manufacturer and will draw water from the clean side of the filter.

3. Detail 1 on Drawing P-8 shows a drain line on each of the Gas Management Columns. This detail does not show what the drain line ties into. Please confirm if this drain line ties into a buried line or does it spill on the ground.

RESPONSE: The pipe will spill out to the ground. Please provide a precast concrete splash pad where the pipe exits and provide an MPT connection on the end of the pipe, to allow a hose connection to be added by the operators later on. The size of the drains shall match the size of the connection to the Gas Management Columns.

4. Please indicate where the oxygen volume and mass flow meters shown on P-8 are specified.

RESPONSE: See specification section 40 71 00, paragraphs 2.2.C and 2.2.D.

5. Please indicate where the service water pump shown on drawing P-3 is specified.

RESPONSE: See section 11 60 10, paragraph 2.4.C.

6. Please confirm if a pipe insulation system is required on the piping systems in pipe schedule on P-16.

RESPONSE: No pipe insulation is required.

7. Please indicate where the stop logs shown on S-15 and P-9 are specified and detailed.

RESPONSE: Stoplogs shall be constructed of 2 x 6 tongue and groove Douglas Fir- Larch, Select Structural.

8. Please confirm if the existing Reuse Pump Station can be taken off line in its entirety. This will be needed to core for new 18" penetration and removal and replacement of the screen.

RESPONSE: Shut down of reuse pump station will need to be coordinated with hatchery staff.

9. Under section 01 80 00-performance requirements/01 81 13 items G, H1, and I all have two percentages noted. Please confirm which is applicable for each.

RESPONSE: This spec has been corrected as part of this addendum.

**QUESTION SET 3:**

1. In the Specs, it calls for chain link fencing. Please provide the location of fencing in the drawings.

RESPONSE: No chain link fencing is required.

**QUESTION SET 4:**

1. Our Vendor has some questions regarding the Vertical Line Shaft Pumps Specification Section 11 60 10 Pumping Equipment Page 4 of 5, 2.4 Vertical Line Shaft Pumps 3.a (See attached) "The Bowls shall be made of Cast Steel. Cast Iron will not be permitted." Please confirm as the Pump Manufactures Vendor found this extremely unusual.

RESPONSE: Cast iron and stainless steel bowls will be allowed.

2. Our Vendor has requested the Inlet pressure and Temperature for the Rotameters.

RESPONSE: The inlet pressure will be approximately 50 psi. The supply temperature will vary depending upon whether they are using bulk O2 or on site generated O2, but on average it is about 50 psi.



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All questions must be in writing (not phone or e-mail) and must be forwarded to the consulting Architect/Engineer (Rick Schmutde, email [rick.schmutde@hdrinc.com](mailto:rick.schmutde@hdrinc.com)) with copies sent to the DAS Project Manager (Thomas Surprenant, email [Thomas.surprenant@ct.gov](mailto:Thomas.surprenant@ct.gov)).

Attachments:      Specification 08 15 00, Fiberglass Reinforced Plastic (FRP) Doors and Frames  
                         Specification 08 71 00, Finish Hardware  
                         Specification 09 77 61, Fiberglass Reinforced Plastic Panels  
                         Specification 09 90 10, Painting  
                         Specification 13 34 19, Metal Building Systems  
                         Pump Schedule  
                         Flow Meter Schedule

End of Addendum 2

A handwritten signature in cursive script that reads "Mellanee Walton".

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Mellanee Walton, Associate Fiscal Administrative Officer  
State of Connecticut  
Department of Administrative Services  
Construction Services  
Office of Legal Affairs, Policy & Procurement

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Section Includes:
  - 1. FRP doors and frames.
- B. Related Specification Sections include but are not necessarily limited to:
  - 1. Division 00 - Procurement and Contracting Requirements.
  - 2. Division 01 - General Requirements.
  - 3. Section 08710 - Finish Hardware.
  - 4. Section 09 96 00 - High Performance Industrial Coatings.

**1.2 QUALITY ASSURANCE**

- A. Referenced Standards:
  - 1. ASTM International (ASTM):
    - a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
  - 2. Door and Hardware Institute/American National Standards Institute (DHI/ANSI):
    - a. A115.1, Preparation of Mortise Locks in 1-3/8 IN and 1-3/4 IN Standard Steel Doors and Frames.
  - 3. National Fire Protection Association (NFPA):
    - a. 80, Standard for Fire Doors and Other Opening Protectives.
  - 4. Steel Door Institute (SDI):
    - a. 117, Manufacturing Tolerances for Standard Steel Doors and Frames.
    - b. All applicable SDI publications.
- B. Qualifications:
  - 1. Manufacturer shall have been producing products specified for minimum of 10 years.
  - 2. Installer shall have minimum of five (5) years experience in the installation of fiberglass reinforced plastic doors and frames.
    - a. Experience shall include field repair of fiberglass and gel coating.
- C. Doors and frames shall be fabricated and prepared for hardware by single manufacturer except for fire rated frames.
- D. Door hardware and accessories are to be provided by others and installed in the field.
- E. All door hardware is to be provided per Specification Section 08710.



### 1.3 DEFINITIONS

#### A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

### 1.4 SUBMITTALS

#### A. Shop Drawings:

1. See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
2. Product technical data including:
  - a. Acknowledgement that products submitted meet requirements of standards referenced.
  - b. Manufacturer's installation instructions.
3. Schedule of doors and frames specific to this Specification Section, using same reference numbers as used on Drawings.
4. Certification of manufacturer's qualifications.
5. Certification of installer's experience.
6. Certification that doors and frames have been protected against chemical exposures listed.

#### B. Samples:

1. Provide one (1) 6 x 6 IN sample of frame and one (1) 6 x 6 IN sample of standard door and sample of fire rated door specified.
  - a. Frame sample shall show corner construction.
  - b. Door sample shall show core specified and reinforcing construction.

#### C. Contract Closeout Information:

1. Operation and Maintenance Data:
  - a. See Specification Section 01730 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

#### D. Informational Submittals:

1. Warranty.

### 1.5 DELIVERY, STORAGE, AND HANDLING

#### A. Store doors and frames in a dry, weather protected area.

1. Place units on wood skids providing a minimum 6 IN air space above the ground.
2. Do not store units flat, set frames and doors on edge providing a minimum 1/2 IN air circulation space between each unit.

3. Provide covering which will ensure air flow around each unit to prevent trapping moisture.
4. If door wrapper becomes wet, remove immediately and provide dry protection equivalent to wrapper removed.

B. Storage recommendations by unit manufacturer shall take precedence over the above requirements.

#### 1.6 WARRANTY

A. Warranty all FRP components to be free of defects in materials and workmanship for one (1) year and from degradation or failure due to corrosion for minimum of five (5) years from date of building acceptance.

1. Warranty against door warpage of more than 1:100 when measured diagonally across the door.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. FRP doors and frames:
  - a. Corrim Company.

B. Submit request for substitution in accordance with the Instructions to Bidders.

#### 2.2 MATERIALS

A. Face Panel: Fiberglass reinforced plastic.

B. Supports and Reinforcing: Non-swelling polymer or equivalent non-corrosive material.

C. Inserts, Bolts and Fasteners: Stainless steel.

D. Core:

1. Non-fire rated:
  - a. Rigid, end grain balsa.
  - b. Thickness: Minimum 1-1/2 IN.
  - c. Density: 8.5 - 9.0 PCF.
  - d. Compressive strength: Minimum 1400 PSI.

E. Frames:

1. Non-fire rated: Fiberglass reinforced plastic.

#### 2.3 ACCESSORIES

A. Frame Anchors:

1. Jamb anchors in masonry: 9 GA steel, masonry wire anchor, galvanized per ASTM A153/A153M, G60 coating.
2. Floor anchors: 12 GA steel, galvanized per ASTM A153/A153M, G60 coating.
3. Anchors in existing openings: Stainless steel machine screws and stainless steel expansion shield.

## 2.4 FABRICATION

### A. General:

1. Fabricate rigid, neat in appearance and free from defects.
2. Form to sizes and profiles indicated on Drawings.
  - a. Sizes indicated in DOOR SCHEDULE are nominal.
  - b. Refer to Architectural details for actual conditions affecting actual size of rough openings.
3. Fit and assemble in shop wherever practical.
4. Mark work that cannot be fully assembled in shop to assure proper assembly at site.
5. For door frames, all surfaces, both exposed and concealed, shall be gel coated to prevent acid attack of the glass reinforcing.
6. Fabricate doors and frames to tolerance requirements of SDI 117.
7. Fit doors to SDI and NFPA 80 clearances.
8. Doors shall be fabricated to withstand splash and spillage attack from the following chemicals for a period of 8 HRS.

### B. FRP Doors:

#### 1. General:

##### a. Construction:

- 1) 1-3/4 IN thick, minimum.
- 2) Face sheets, 0.125 IN thick, minimum.
- 3) Fabricate with flush top closure.
- 4) Doors with a maximum size of 48 IN wide x 96 IN tall shall be fabricated in one (1) piece.
- 5) Fill and dress all joints.
- 6) Resin: Polyester or vinyl ester as required to meet chemical resistance requirements.
- 7) Fiberglass content (by weight): Minimum 30 PCT, maximum 40 PCT.
- 8) UV stabilized.
- 9) Core:
  - a) End grain balsa for non-fire rated doors.
  - b) Mineral core for fire rated doors.

##### b. Finish:

- 1) Minimum 15 MIL gel coat thickness.
- 2) Gel coat color: As selected by Owner.

2. Exterior:
    - a. SDI Grade III, Model 4, seamless.
      - 1) Face sheet 0.125 IN thickness.
  3. Interior (except fire rated):
    - a. SDI Grade II, Model 4, seamless with Balsa core.
- C. Frames:
1. General:
    - a. Frame size to be 2 IN x 5-3/4 IN with equal rabbets on each side.
    - b. One (1) piece or if shipped knocked down, all joints shall be filled with fiberglass compound, ground and sanded smooth and finished with gel coat.
    - c. Minimum thickness: 0.1875 IN.
    - d. Resin: Polyester as required to meet chemical resistance requirements.
    - e. Fiberglass content (by weight): Minimum 30 PCT, maximum 40 PCT.
    - f. UV stabilized.
  2. FRP frames:
    - a. Corner reinforcement: Minimum 4 x 4 x 0.25 IN FRP angle attached to top reinforcing bar with concealed stainless steel screws.
    - b. Hinge reinforcement: Minimum 0.25 IN thick polymer plate attached to frame.
    - c. Minimum 0.25 IN thick polymer plate reinforcement bonded and mechanically fastened to frame for strikes, closers and surface-mounted hardware.
- D. Prepare for finish hardware in accordance with hardware schedule, templates provided by hardware supplier, and DHI/ANSI A115.1.
1. Locate finish hardware in accordance with SDI.
  2. See Specification Section 08710 for hardware.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Install doors and frames in accordance with SDI and manufacturer's instructions.
  1. Manufacturer's instructions take precedent over SDI.
- B. Place frames prior to construction of enclosing walls and ceilings.
- C. Plumb, align, and brace securely until permanently anchored.
- D. After completion of walls, remove temporary braces and spreaders.
- E. Install fire rated frames in accordance with NFPA 80 and manufacturer's instructions.
  1. Manufacturer's instructions take precedent over NFPA.

- F. Use plastic plugs to keep silencer holes clear during construction.
- G. Immediately after erection, repair damaged areas of gel coat and primer coat.
  - 1. Fill corner miter joints with fiberglass compound as recommended by frame manufacturer.
    - a. Filling miter joints with sealant is not acceptable.
  - 2. Sand filled area to match adjacent frame and coat with minimum 15 MIL gel coating to match adjacent frame finish.
- H. On doors not requiring weatherstripping, sound seals or smoke seals, install three (3) silencers on strike jamb of single door frame and two (2) on head of double door frame.
  - 1. See Specification Section 08710.
- I. Number and location of anchors shall be in accordance with frame manufacturer's recommendation with minimum of three (3) anchors per jamb.
- J. Protect frames during construction.

Cover all thru bolts and other stainless steel accessories with minimum 15 MIL gel coating to match door frame.

### 3.2 FIELD QUALITY CONTROL

- A. Provide for services of manufacturer's authorized representative to be present during and observe the installation of the first three (3) doors and frames.
  - 1. If project has less than three (3) doors and frames, manufacturer's authorized representative shall be present for installation of all doors and frames.
  - 2. Manufacturer's representative shall instruct installer on proper methods for installing doors and frames [in each type of wall construction], repairing damaged gel coating, repairing scratches in finish and filling and finishing all joints.

END OF SECTION

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section Includes:

1. Finish hardware.
  1. Inspection and testing of door operation.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Division 01 - General Requirements.
3. Section 08 11 00 - Hollow Metal Doors and Frames.

**1.2 QUALITY ASSURANCE**

A. All door hardware shall be provided by a single hardware supplier.

B. Referenced Standards:

1. Americans with Disabilities Act (ADA):
    - a. Accessibility Guidelines for Buildings and Facilities (ADAAG).
  2. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
    - a. A156.1, Butts and Hinges.
    - b. A156.3, Exit Devices.
    - c. A156.4, Door Controls - Closers.
    - d. A156.6, Architectural Door Trim.
    - e. A156.8, Door Controls - Overhead Stops and Holders.
    - f. A156.13, Mortise Locks and Latches Series 1000.
    - g. A156.16, Auxiliary Hardware.
    - h. A156.18, Materials and Finishes.
    - i. A156.21, Thresholds.
  3. Door and Hardware Institute (DHI).
  4. National Fire Protection Association (NFPA):
    - a. 101, Life Safety Code.
- Steel Door Institute (SDI).

5. Building code:
  - a. International Code Council (ICC):
    - 1) International Building Code and associated standards, 2012 Edition including all amendments, referred to herein as Building Code.
- C. Qualifications:
  1. Installation shall be inspected by a certified Architectural Hardware Consultant (AHC).

### 1.3 DEFINITIONS

- A. AHC: Architectural Hardware Consultant, certified by DHI.
- B. Installer or Applicator:
  1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
  2. Installer and applicator are synonymous.
- C. All weather: Capable of operation from -50 to +120 DEGF.
- D. Active Leaf: Right-hand leaf when facing door from keyed side unless noted otherwise on Drawings.

### 1.4 SUBMITTALS

- A. Shop Drawings:
  1. See Specification Section 01340 for requirements for the mechanics and administration of the submittal process.
  2. Qualifications
    - a. AHC qualifications.
  3. Certification from AHC stating:
    - a. All door hardware has been reviewed by AHC and verified to be compatible with doors and frames.
    - b. No submittals will be reviewed until Engineer has received AHC certification.
  4. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's installation instructions.
  5. Schedule of all hardware being used on each door.
    - a. Number hardware sets and door references same as those indicated on Drawings.
  6. Technical data sheets on each hardware item proposed for use.
  7. Warranty information for all hardware devices having extended warranties.

B. Informational Submittals:

1. Certifications:

- a. Certification from AHC stating all door hardware has been provided per approved Shop Drawings, has been installed in accordance with manufacturer's recommended installation instructions and all doors have been inspected and tested and found to be in proper working order.
- 1) Door assemblies required to swing in the direction of egress have been inspected and tested in accordance with NFPA 101.

**1.5 WARRANTY**

- A. Provide all individual manufacturers' extended warranties as advertised.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

- 1. Locksets and latchsets:
  - a. Corbin/Ruswin.
  - b. Best Access Systems.
- 2. Closers:
  - a. LCN.
  - b. Norton.
  - c. Corbin/Ruswin.
- 3. Hinges:
  - a. Stanley Works.
  - b. Hager Hinge Co.
  - c. McKinney Manufacturing Co.
- 4. Door stops and holders:
  - a. Trimco.
  - b. Rockwood.
  - c. Ives.
- 5. Overhead stops:
  - a. Glynn-Johnson Corp.
  - b. Rockwood.
  - c. Trimco.
  - d. Rixson.



6. Weatherstripping and thresholds:
    - a. Pemko Manufacturing Co.
    - b. Reese Enterprises, Inc.
    - c. Zero Weatherstripping, Inc.
    - d. National Guard Products, Inc.
  7. Exit devices:
    - a. Von Duprin, Inc.
    - b. Corbin/Ruswin.
    - c. Precision.
    - d. Sargent.
  8. Door bolts, coordinators and strikes:
    - a. Ives.
    - b. Trimco.
    - c. Hager.
    - d. Rockwood.
    - e. Dorma.
  9. Other materials: As noted.
- B. Submit request for substitution in accordance with Specification Section the Instructions to Bidders.

## 2.2 MATERIALS

- A. General: As indicated in the FABRICATION Article in PART 2 of this Specification Section.
- B. Fasteners: Stainless steel or aluminum.
- C. Closers:
  1. Standard closer:
    - a. Shell: Aluminum or cast iron.
    - b. Arms and piston: Forged steel.
- D. Kickplates:
  1. Stainless steel.
- E. Thresholds: Aluminum.
- F. Overhead Stops and Wall Stops: Stainless steel or aluminum.
- G. Keys: Brass or bronze.
- H. Weatherstripping and Smoke Seals: Polypropylene, neoprene, or EPDM.

I. Pulls and Push Plates: Stainless steel.

J. Silencers: Rubber.

## 2.3 ACCESSORIES

A. Strikes:

1. Curved lips.
  - a. Extended lips when required.
2. Furnish strike boxes.
3. Appropriate for function and hardware listed.

## 2.4 FABRICATION

A. Hardware - General:

1. Generally prepare for Phillips head machine screw installation.
2. Exposed screws to match hardware finish or, if exposed in surfaces of other work, to match finish of other work as closely as possible.
3. Provide concealed fasteners unless thru bolted.
4. Through bolt closers on all doors.
5. Furnish items of hardware for proper door swing.
6. Furnish lock devices which allow door to be opened from inside room without a key or any special knowledge.

B. Hardware:

1. Provide following ANSI/BHMA A156.18 finishes:
  - a. Locksets, latchsets and strikes: 630.
  - b. Door pulls, push bars, push plates: 630.
  - c. Kickplates:
    - 1) Stainless steel: 630.
  - d. Exit devices: 630 where available; 626 if 630 not available.
    - 1) Provide 630 finish on trim.
  - e. Butt hinges: 630.
  - f. Door stops, dead locks, mortise bolts, and miscellaneous hardware: 630 where available, 626 if 630 not available.
  - g. Door overhead stops: 630.
  - h. Closers: 600 prime coat with 689 finish coat, unless noted otherwise.

C. Mortise Locks and Latches:

1. ANSI/BHMA A156.13, Series 1000, Operational Grade 1, Security Grade 1.
  - a. Meet requirements of ADA.
2. Antifriction two-piece mechanical latchbolt with stainless steel anti-friction insert.
  - a. One-piece stainless steel deadbolt, minimum 1-1/4 IN x 9/ 16 IN thick with 1 IN throw.
  - b. 2-3/4 IN backset.
  - c. Cylinder: Brass, 6 pin, with interchangeable core.
  - d. ADA compliant thumb turn lever.
3. Locking, latching and retracting mechanism and lock case:
  - a. Steel, unless noted otherwise.
    - 1) Chrome or zinc dichromate plated.
4. Trim design: Corbin/Ruswin "NSP".
  - a. Functions as indicated in following table in accordance with ANSI/BHMA A156.13.
    - 1) All electric lock hardware to be 24 VDC.

MORTISE LOCK NUMBERS		
ANSI	FUNCTION	CORBIN/RUSSWIN
F07	Passage	ML2057
F13	Entrance	ML2065

D. Door Closers:

1. ANSI/BHMA A156.4, Grade 1.
2. Size door closers to comply with ANSI recommendations for door size and location.
3. Fabricate all closers with integral back check.
4. Provide integral stop unless noted otherwise.
  - a. Do not provide integral stop at closers indicated to be installed on pull side of door.
  - b. Provide all weather fluid for all closers used in exterior doors and where otherwise indicated.
5. Full cover.
  - a. Manufacturer's standard plastic cover.
6. Arms, brackets, and plates: As required for complete installation.

7. Closers:
    - a. LCN 4040 Series or Norton 7500 Series or Corbin-Russwin DC6200 Series.
  8. Provide manufacturer's standard 10 year warranty.
- E. Hinges:
1. Butt hinges:
    - a. ANSI/BHMA A156.1.
      - 1) A5111: Stainless steel, full-mortise, anti-friction bearing, Grade 1.
    - b. Ball bearing.
    - c. Flat button tips.
    - d. Butt hinges:
      - 1) Hager BB1199.
      - 2) McKinney T4B3386.
    - e. Transfer hinge:
      - 1) Hager BB1199ETW.
      - 2) McKinney T4B3386CC.
    - f. Hinge size:
      - 1) Doors up to and including 46 IN wide: 4.5 IN x 4.5 IN.
      - 2) Doors over 46 IN up to and including 60 IN wide: 5 IN high x 4.5 IN.
- F. Door Stops:
1. ANSI/BHMA A156.16.
    - a. Wall stops: Ives WS406-CVX or WS406-CCV.
- G. Kickplates:
1. ANSI/BHMA A156.6.
  2. 8 IN high x 2 IN less than door width.
  3. Beveled on all edges.
  4. Thickness
    - a. Stainless steel: 0.050 IN.
- H. Thresholds:
1. ANSI/BHMA A156.21.
  2. One-piece unit.
  3. Height: 1/2 IN high maximum.

4. Width: 6 IN as noted in hardware schedule.
  5. Provide required bolt cutouts.
- I. Exit Devices:
1. ANSI/BHMA A156.3, Grade 1.
  2. Single doors: Mortise Rim.
  3. Pairs of doors: Concealed Surface vertical rods.
  4. Trim: Sargent "ET".
    - a. Lever operation.
    - b. Lever style: Sargent "L".
  5. Sargent "80 Series".
    - a. Function as indicated on Hardware Schedule.
  6. Coordinate power supply and electric option requirements with access control system and electric door assisting device.
- J. Weatherstripping:
1. Weather seal at jambs and head:
    - a. Self-adhesive strip: Reese #797W.
    - b. Color: As selected by owner.
  2. Sweep at bottom of doors:
    - a. Reese 701.
    - b. Color: As selected by owner.
  3. Weather seal astragal at meeting edges of pairs of doors:
    - a. Reese 92 each leaf.
    - b. Color: As selected by owner.
- K. Silencers:
1. Hollow metal frames: Trimco 1229A or Rockwood 608.
  2. Self-adhesive silencers are not acceptable.
- L. Keying:
1. Establish keying with Owner.
    - a. Tag and identify keys.
    - b. Provide two (2) keys for each lock or cylinder.
    - c. Master key and key in groups as directed.

d. Provide construction master keys for all exterior doors.

M. Bolts:

1. ANSI/BHMAA 156.16.
2. Surface bolts: Rockwood 580 Series with top and bottom strikes.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

A. Install products in accordance with manufacturer's installation instructions.

1. Perform installation by or under the direct supervision of an AHC.

B. Provide all hardware in accordance with Building Code.

C. Fit hardware before final door finishing.

D. Permanently install hardware after door finishing operations are complete.

E. Use SDI mounting heights for hardware.

F. Butt Hinges:

1. Provide non-removable pin (NRP) at:
  - a. Exterior doors.
  - b. Reverse handed doors equipped with locks.
2. Quantities:
  - a. Door height 61 - 90 IN: Three (3).
  - b. Door height 91 - 114 IN: Four (4).
  - c. Door height 115 - 144 IN: Five (5).
  - d. Doors over 48 IN wide and over 96 IN high:
    - 1) Provide top butt hinge within 6 IN of the top of the door to top of hinge.
    - 2) Provide one (1) additional butt hinge approximately 6 IN below the bottom of the top butt hinge.
3. Provide transfer hinge as necessary where electrified lockset or exit device is specified or as otherwise indicated in Hardware Schedule.

G. Closers:

1. Mount closers on push side of doors unless noted otherwise.

H. Provide coordinator when required by hardware specified.

I. Overhead Stops:

1. Provide overhead stop when corrosion resistant closer is specified.

2. Provide concealed overhead stop on doors scheduled to receive closer mounted on pull side of door.
  3. Provide at interior doors not scheduled to receive a closer as follows:
    - a. Doors that swing more than 105 DEG without encountering a wall or obstruction.
      - 1) Stop shall limit swing of door from impacting wall or obstruction.
    - b. Inactive leaves of pairs of doors.
- J. Wall Mount Door Stops:
1. Provide where specifically indicated on Hardware Schedule and at doors not otherwise indicated to receive:
    - a. Overhead stop.
    - b. Closer with integral stop.
- K. Floor mounted stops are not acceptable unless noted otherwise in this Specification Section.
- L. Provide silencers for door frames.
- M. Provide weather seal, door sweep and threshold at all exterior doors and where scheduled on interior doors.
1. Set thresholds in a full bed of sealant.
  2. Mount door sweeps on exterior face of door.
  3. Mount weather seal astragal at meeting edges of pairs of doors on the exterior face of the doors.
- N. Provide smoke seals on all fire rated doors.
- O. Mount kickplates on push side of doors.

### 3.2 FIELD QUALITY CONTROL

- A. Adjust and check each operating item of hardware to assure proper operation or function.
1. Lubricate moving parts with lubricant recommended by manufacturer.
- B. During week prior to startup, make a final check and adjustment of all hardware items.
1. Clean and lubricate as necessary to assure proper function and operation.
  2. Adjust door control devices to compensate for operation of heating and ventilating equipment.
- C. Inspection and Testing:
1. AHC shall inspect and test all door assemblies and provide written certification that door assemblies are in proper working order.
    - a. Door assemblies required to swing in the direction of egress shall be inspected and tested in accordance with NFPA 101.
  2. Submit documentation and certification of testing in accordance with the certifications paragraph in the SUBMITTALS Article in PART 1 of this Specification Section.

3.3 SCHEDULES

A. Hardware Schedule:

Hardware Set	Quantity	Unit	Description
HW-1	1 1/2	PR	Butts
	1	EA	Lockset (Entrance)
	1	EA	Closer w/Stop
	1	EA	Kick Plate
	1	EA	Weatherstripping
	1	EA	Threshold
	1	EA	Head Drip
	1	EA	Sweep
HW-2	3	PR	Butts
	1	EA	Lockset (Entrance)
	1	EA	Astragal
	1	EA	Closer w/Stop
	1	EA	Weatherstripping
	1	EA	Threshold
	1	EA	Sweep
	1	EA	Flush Bolts
	2	EA	Kick Plates
	2	EA	Stops
	1	PR	Dustproof Strike
	HW-3	1 1/2	PR
1		EA	Lockset (Storeroom)
1		EA	Closer w/Stop
1		EA	Kick Plate

END OF SECTION



**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Furnish labor, materials, tools, equipment, and services for Fiberglass Reinforced Plastic Panels, as indicated, in accordance with provisions of Contract Documents.
- B. Completely coordinate with work of other trades.

**1.2 QUALITY ASSURANCE**

- A. ASTM Standards:
  - 1. ASTM D570 Standard Test Method for Water Absorption of Plastics
  - 2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials

**1.3 SUBMITTALS**

- A. Product Data:
  - 1. Manufacturer's literature indicating material and fire test information in compliance with specifications.
- B. Samples:
  - 1. Two 12 IN 300 x 300 MM square pieces of each pattern and color as specified in Drawing I-001 Interior Notes and Finish Legend.
- C. Contract Closeout Information:
  - 1. Maintenance data:
    - a. See Section 01 78 23.
  - 2. Interior finish fire performance data:
    - a. Provide for each finish material and type specified:
      - 1) Manufacturer's printed information including:
        - a) Photograph.
        - 2) Proof of purchase.
        - 3) See Section 01 78 26.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Fiberglass Reinforced Plastic Panels:
  - 1. Base:
    - a. Crane Composites.
  - 2. Optional:
    - a. Marlite.
    - b. Glasteel.

- c. Nudo.
  - d. Kalwall.
  - e. Graham.
- B. Other manufacturers desiring approval comply with Section 00 26 00.

## 2.2 MATERIALS

- A. Class A Fiberglass Reinforced Plastic (FRP) Wall and Ceiling Panels:
- 1. For use on walls and ceilings, see Drawings for locations.
  - 2. Panel thickness:
    - a. 0.09 IN 2.3 MM.
  - 3. Barcol hardness not greater than 50.
  - 4. Interior finish rating: Class A (I) when tested in accord with ASTM E84:
    - a. Flame spread: Less than 25.
    - b. Smoke developed: Less than 450.
  - 5. Water absorption no greater than 0.20 PCT at 24 HRS at 77 DEGF 25 DEGC in accordance with ASTM D570.
  - 6. Identify boards by manufacturer's standard marking on reverse side of panel.
  - 7. Embossed finish.
  - 8. Color: White.
  - 9. Adhesive:
    - a. Compatible with panels and substrate.
    - b. As recommended by panel manufacturer.
  - 10. Base product: Fire-X Glasbord FXE by Crane Composites.
- B. Moldings:
- 1. Manufacturer's standard extruded vinyl trim.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Verify suitability of substrate to accept installation.
- B. Correct unsatisfactory conditions.
- C. Start of installation indicates acceptance of responsibility for performance.

**3.2 INSTALLATION**

- A. Install in accordance with manufacturer's recommendations and approved shop drawings.
- B. Install moldings to panels prior to erection.
  - 1. Apply moldings to panel edges.
  - 2. Apply silicone sealant to manufacturer's recommendations.
- C. Apply adhesive full coverage at panel back.

**3.3 CLEANING**

- A. Remove excessive sealant and adhesive with cleaner recommended by panel manufacturer.
- B. Clean entire surface prior to closeout.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 WORK INCLUDES**

- A. The work under this section shall consist of providing all work, materials, labor, equipment, and supervision necessary to provide for the installation of interior painting as indicated on the drawings and specified herein.
- B. Base Bid:
  - 1. Contractor Provide:
    - a. Interior surfaces in finished rooms or spaces, unless indicated not to be painted
- C. Definitions:
  - 1. "Paint" and "painting" refer to applied coatings.

**1.2 SUBMITTALS**

- A. Product data:
  - 1. Manufacturer's data for each paint type to be applied indicating conformance to specifications.
- B. Samples:
  - 1. Manufacturers complete range of colors for selection.
  - 2. Gloss samples.
- C. Contract closeout information:
  - 1. Maintenance data.

**1.3 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver in original labeled containers.
- B. Protect from freezing or damage.
- C. Store materials in place designated by Owner or Architect.
- D. Keep storage neat and clean.
- E. Repair damage thereto or to surroundings.
- F. Remove rags and waste from building daily.
- G. Avoid danger of fire.

**1.4 JOB CONDITIONS**

- A. Install when temperature and humidity conditions approximate conditions that will exist when building is occupied. Maintain conditions after installation.
- B. Schedule installation to minimize accumulation of air contaminants that cannot be removed prior to occupancy.

- C. Air out construction with 100% outside air.
  - 1. Do not recirculate prior to occupancy.
  - 2. Ventilate during installation. Seal return air ducts and use direct exhaust to outdoors.
- D. Maintain schedule indicating when painter expects to complete respective coats of paint for various areas.
  - 1. Keep schedule current as job progress dictates.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. Acceptable manufacturers:
  - 1. Provide paint as product of one manufacturer as far as possible.
  - 2. Paint, stain, and coating systems listed are Sherwin-Williams unless noted otherwise.
    - a. Use comparable performance, environmental, and aesthetic requirements for paints by Optional manufacturers.
    - b. Manufacturers listed in Room Finish and Color Schedule is for color reference only.
  - 3. Paints:
    - a. Base: Sherwin-Williams.
    - b. Optional:
      - 1.) PPG Architectural Finishes.
      - 2.) Pratt & Lambert.
      - 3.) I.C.I.
      - 4.) Benjamin Moore Paints
- B. Paints and stains:
  - 1. As Scheduled in Part 3.
    - a. Unscheduled items: Bring to the attention of A/E.
    - b. Colors:
      - 1.) As selected by Owner.
        - a.) Owner reserves right to select accent colors from entire range of manufacturer's colors, including deep colors.
        - b.) Owner reserves right to require that one or more walls in a room or space be painted a contrasting accent color, except in janitor's and electric closets and other small miscellaneous rooms and spaces.

- c.) Primer color:
  - 1.) White. Bold, deep, vivid, and transparent top coats:
  - 2.) Gray tint. Coordinate with top coat color.
- 3. Gloss range:
  - a. MPI Standards as measured in accordance with ASTM-D523:
    - 1.) Gloss Level 1 (Flat): Maximum 5 at 60 degrees, maximum 10 at 85 degrees.
    - 2.) Gloss Level 2 (Velvet): Maximum 10 at 60 degrees, 10-35 at 85 degrees.
    - 3.) Gloss Level 3 (Eggshell): 10-25 at 60 degrees, 10-35 at 85 degrees.
    - 4.) Gloss Level 4 (Satin): 20-35 at 60 degrees, minimum 35 at 85 degrees.
    - 5.) Gloss Level 5 (Semi-gloss): 35-70 at 60 degrees.
    - 6.) Gloss Level 6 (Gloss): 70-85 at 60 degrees.
    - 7.) Gloss Level 7 (High gloss): More than 85 at 60 degrees.
  - 4. If the gloss range is not indicated, provide top coat with a MPI Gloss Level 3 (Eggshell) finish.
  - 5. Submit gloss samples for approval prior to use.
  - 6. Add flatteners if necessary to achieve specified gloss.
  - 7. Part 3 includes a listing of surfaces and type of paint to be applied.

### **PART 3 - EXECUTION**

#### **3.1 INSPECTION**

- A. Examine surfaces carefully for defects which cannot be corrected and might prevent satisfactory results.
- B. Commencing of work in a specific area constitutes acceptance of surfaces, and responsibility for performance.

#### **3.2 SURFACES NOT TO BE PAINTED**

- A. Anodized aluminum, stainless steel, chromium plate, glass, copper, bronze or similar materials.
- B. Moving parts of valves, operating units, mechanical and electrical parts, such as valve and damper operators, sending devices, motor, and fan shafts.
- C. Code labels, such as UL, FM that are mylar or flat (non-embossed) plates.
  - 1. Embossed plates and labels stamped into frames will be painted, label and information on label to be readily visible and convenient for identification by authority having jurisdiction.
- D. Equipment identification or rating plates.
- E. Items having complete factory finish with exception of:
  - 1. Electrical panels.
  - 2. Control cabinets.

3. Similar surfaces in finished areas.

### 3.3 PREPARATION – GENERAL

- A. Assure that surfaces are clean and dry.
- B. Assure that surfaces are free of foreign materials which will affect adhesion or appearance.
- C. Remove mildew and neutralize surface.
- D. Eliminate efflorescence before painting.
- E. Before painting, test surfaces with moisture meter.
- F. Paint when moisture is within paint manufacturer's acceptable limits.

### 3.4 MATERIAL PREPARATION

- A. Mix and prepare materials per manufacturer's specifications.
- B. Stir, agitate, or blend materials to produce a mixture of uniform density as required for application of materials.

### 3.5 PREPARATION – FERROUS METAL SURFACES AND HOLLOW METAL

- A. Follow requirements of SSPC SP1 and SP3.
  1. Except where higher prep levels are indicated.
- B. Wire brush, or grind as necessary to remove shoulders at edge of sound paint to prevent telegraphing.
- C. Touch up damaged shop coats.
- D. For surfaces with touched up shop coat, omit first coat.
- E. Hollow metal frame joints at intersections of Rabbits, Stops, and Soffit Joints:
  1. Neatly fill corner seam with painter's caulk (in field) prior to painting.

### 3.6 PREPARATION – GALVANIZED METAL SURFACES

- A. Follow requirements of SSPC SP1.
- B. Treat surfaces with galvanized surface cleaner as recommended by primer and topcoat manufacturer.

### 3.7 PREPARATION – CONCRETE AND MASONRY

- A. Repair minor defects.
- B. Remove oil from concrete by washing with xylol.
- C. Block filler:
  1. Apply to level out substrate.
  2. Apply in two coats applied at right angles to each other.
  3. Provide complete cover with recommended coating system.
- D. Obtain Owner's Representative's approval of finish for surfaces to receive high build glazed coatings.

**3.8 APPLICATION – GENERAL**

- A. Paint surfaces as specified in paragraphs "Schedule - Interior Paint Systems".
- B. Provide complete coverage and hide.
  - 1. Paint systems are to cover.
  - 2. When color or undercoats show through, apply additional coats at no additional cost until paint film is of uniform finish and color.
- C. Employ only skilled mechanics.
- D. Mix and apply as recommended by manufacturer.
- E. If Owner's Representative so directs, do not apply succeeding coats until Owner's Representative has an opportunity to observe previous coat.
- F. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.
- G. Upon completion of painting, carefully replace removed items and/or remove protection.
- H. Apply materials under adequate illumination.
- I. Evenly spread and smoothly flow on for full, smooth cover.
- J. Assure that coats are dry before recoating.
- K. Touch up suction or hot spots in plaster, gypsum wallboard, concrete block, and concrete before painting.
- L. Touch up abraded areas of shop prime coats before subsequent coats are applied.
- M. Back prime wood trim with penetrating sealer.

**3.9 APPLICATION**

- A. Finish closets, semi-exposed surfaces behind grilles, radiation, etc., to match nearest adjoining surfaces.

**3.10 PROTECTION AND CLEANUP**

- A. Protect adjacent work against damage by painting and finishing work.
- B. Clean, repair or replace, and repaint damaged work as directed by Owner.
- C. Provide "WET PAINT" signs.
- D. Remove temporary protective wrappings, after completion of operations.
- E. Clean paint spattered surfaces.
- F. Use care not to damage finished surfaces.
- G. Remove surplus materials, scaffolding, and debris.
- H. Leave areas broom clean.



3.11 SCHEDULE – PAINT SYSTEMS

A. Concrete and concrete block walls:

1. Latex (PNTL), Semi-gloss:

a. Base: Sherwin-Williams

- 1.) Primer coat: Latex block filler, PrepRite Block Filler; B25W25.
- 2.) Intermediate coat: ProGreen 200 Interior Latex, semi-gloss; B20W651.
- 3.) Topcoat: ProGreen 200 Interior Latex, semi-gloss; B20W651.

b. PPG:

- 1.) Primer coat: Speedhide Latex Block Filler; 6-7.
- 2.) Intermediate coat: Speedhide Latex Semi-gloss; 6-411.
- 3.) Topcoat: Speedhide Latex Semi-gloss; 6-411.

c. Benjamin Moore

- 1.) Primer coat: Super Craft Latex Block Filler 285.
- 2.) Intermediate coat: Super Hide Interior Latex, Semi-Gloss 283
- 3.) Topcoat: Super Hide Interior Latex, Semi-Gloss 283

B. Structural steel, exposed (Interior):

1. Water based urethane, Gloss Level 6 (Gloss):

a. Base: Sherwin Williams

- 1.) Primer coat: Recommended by topcoat manufacturer for each substrate.
- 2.) Intermediate coat: Acrolon 218 HS Acrylic Polyurethane, B65-600 Series.
- 3.) Topcoat: Acrolon 218 HS Acrylic Polyurethane, B65-600 Series.
- 4.) Clear coat: Diamond-Clad Clear Coat Urethane, B65 Series.

b. PPG:

- 1.) Primer coat: Recommended by topcoat manufacturer for each substrate.
- 2.) Intermediate coat: Pitthane Ultra Gloss Urethane; 95-812.
- 3.) Topcoat: Pitthane Ultra Gloss Urethane; 95-812.
- 4.) Clear coat: Pitthane Ultra Gloss Urethane; 95-812.

c. Benjamin Moore:

- 1.) Primer coat: Super Spec HP Alkyd Metal Primer
- 2.) Intermediate coat: Super Spec HP Waterborne Urethane Semi-gloss

3.) Topcoat: Super Spec HP Waterborne Urethane Semi-gloss

4.) Clear coat: Interior Clear Acrylic Urethane

C. Exterior Ferrous Metals

1. Steel Bollards

a. Water based urethane, Gloss Level 5 (Semi gloss):

1.) Base: Sherwin-Williams

a.) Primer coat: Pro-Cryl Universal Acrylic Primer, B66-310 Series.

b.) Intermediate coat: Pro Classic Waterborne Acrylic Semi-Gloss, B31 Series.

c.) Topcoat: Pro Classic Waterborne Acrylic Semi-Gloss, B31 Series.

2.) Benjamin Moore:

a.) Primer coat: ICI TruGlaze WB4030.

b.) Intermediate coat: 4206 Devflex Waterborne Acrylic Semi-gloss.

c.) Topcoat: 4206 Devflex Waterborne Acrylic Semi-gloss.

3.) PPG:

a.) Primer coat: Pitt Tech 100% Acrylic Primer; 90-712.

b.) Intermediate coat: Manor Hall Semi-Gloss 40-60.

c.) Topcoat: Manor Hall Semi-Gloss 40-60.

**END OF SECTION**

**PART 1 - GENERAL**

**1.1 SUMMARY**

A. Section includes:

1. Complete metal building system including but not limited to:
  - a. Design.
  - b. Materials.
  - c. Fabrication.
  - d. Shipment.
  - e. Erection.
  - f. Components as specified.

B. Related Specification Sections include but are not necessarily limited to:

1. Division 00 - Procurement and Contracting Requirements.
2. Division 01 - General Requirements.
3. Section 03 15 19 - Anchorage to Concrete.
4. Section 07 92 00 - Joint Sealants.
5. Section 08 11 00 - Hollow Metal Doors and Frames.

**1.2 QUALITY ASSURANCE**

A. Referenced Standards:

1. American Architectural Manufacturers Association (AAMA):
  - a. 621, Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) and Zinc-Aluminum Coated Steel Substrates.
2. American Institute of Steel Construction (AISC):
  - a. 303, Code of Standard Practice for Steel Buildings and Bridges (referred to herein as AISC Code of Standard Practice).
3. ASTM International (ASTM):
  - a. A36/A36M, Standard Specification for Carbon Structural Steel.
  - b. A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  - c. A325, Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
  - d. A490, Standard Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength.

- e. A792/A792M, Standard Specification for Steel Sheet, 55 PCT Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
  - f. B221, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
  - g. C991, Standard Specification for Flexible Fibrous Glass Insulation for Metal Buildings.
  - h. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.
  - i. F593, Standard Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs.
  - j. F1554, Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
4. American Welding Society (AWS):
- a. D1.1/D1.1M, Structural Welding Code - Steel.
  - b. D1.3/D1.3M, Structural Welding Code - Sheet Steel.
5. FM Global (FM).
- a. FMRC Standard 4471, Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.
6. International Accreditation Service (IAS):
- a. AC472, Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems.
7. Metal Building Manufacturer's Association (MBMA):
- a. Low Rise Building Systems Manual.
8. Research Council on Structural Connections (RCSC):
- a. Specification for Structural Joints Using High-Strength Bolts.
9. The Society for Protective Coatings/NACE International (SSPC/NACE).
- a. SP 6/NACE No. 3, Commercial Blast Cleaning.
10. Underwriters Laboratories, Inc. (UL):
- a. Building Materials Directory.
11. Building code:
- a. International Code Council (ICC):
    - 1) International Building Code and associated standards, 2012 Edition including all amendments, referred to herein as Building Code.
- B. Qualifications:
1. Manufacturer's qualifications:
- a. Manufacturer must be member in good standing of the MBMA.
  - b. Manufacturer must be currently approved by IAS Accreditation Committed under the Inspection Programs for Manufacturers of Metal Buildings Systems IAS AC472 to assure compliance with fabrication Special Inspections as required by the Building Code.

2. Erector qualifications:
  - a. Erector (installer) must be approved in writing by metal building manufacturer.
  - b. Erector must have minimum of 10 years current experience in erection of similar structures.
3. Manufacturer's Structural Engineer: Registered in the State where project is located.

### 1.3 DEFINITIONS

- A. Code: The word "code" refers to the Building Code.
- B. Installer, Erector or Applicator:
  1. Installer, erector or applicator is the person actually installing, erecting or applying the product in the field at the Project site.
  2. Installer, erector and applicator are synonymous.
- C. PVDF: Polyvinylidene fluoride.

Nomenclature as listed in Bibliography of the MBMA Low Rise Building Systems Manual.

### 1.4 SUBMITTALS

- A. Shop Drawings:
  1. See Specification Section 01 33 00 for requirements for the mechanics and administration of the submittal process.
  2. Product technical data including:
    - a. Acknowledgement that products submitted meet requirements of standards referenced.
    - b. Manufacturer's technical reference manual containing all of the manufacturer's standard construction details and specifications.
      - 1) Manufacturer's erection manual containing all details and methods for installation of building frame, roof system, wall system, and accessories.
      - 2) Edit to mark out items not used for this installation.
  3. Design and fabrication drawings:
    - a. Erection drawings minimum scale: 1/8 IN = 1 FT-0 IN.
    - b. Details and sections minimum scale: 1-1/2 IN = 1 FT-0 IN.
    - c. List of all design loads and combination of loads.
    - d. Size and location of each component of the building.
      - 1) Include clearance under structural framing members, both horizontal and vertical.
      - 2) Include cross-section of components.
    - e. Fasteners and details of fasteners connecting each component of the building.
    - f. Size, location and details of anchor bolts, base plates, and all other components fastened to the foundation.

- 1) Size anchor bolts and base plates assuming 3000 PSI concrete.
  - g. Details of wall panels, roof panels, finishes, flashings, closures, closure strips, trim, gutters, downspouts, sealant, and all other miscellaneous components.
- B. Samples:
1. Metal color and finish samples of roof and wall panels, roof trim, wall trim, and interior liner panel colors for Engineer's selection.
  2. Color chart is not acceptable.
- C. Contract Closeout Information:
1. Operation and Maintenance Data:
    - a. See Specification Section 01 33 04 for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.
- D. Informational Submittals:
1. Manufacturer's and Erector's Qualifications.
  2. Manufacturer's approval of erector.
  3. Manufacturer's Certificate of Accreditation per IAS AC472.
  4. Structural calculations stamped and signed by a professional Structural Engineer licensed in the State where Project is located.
    - a. Include list of design loads and loads transmitted to foundation through columns or walls and location where loads occur.
    - b. Submit calculations for information only.
  5. Certificate of compliance by fabricator that steel was fabricated in accordance with the approved construction documents.

## 1.5 WARRANTY

- A. Manufacturer's standard warranty.
- B. Manufacturer's standard warranty for factory applied PVDF coating system against blistering, chipping, cracking, peeling, or color fading of wall and roof panels.
- C. Metal building system manufacturer shall provide a written weathertightness warranty for a maximum of 25 years against leaks in roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
1. Warranty shall be signed by both the metal roof system manufacturer and the metal roof system installer.
  2. Maximum liability of warranty shall be no less than \$0.70/SQFT of roof area.
- D. Metal building system manufacturer shall provide a written warranty for 20 years against perforation of metal roof and wall panels due to corrosion under normal weather and atmospheric conditions.
1. Warranty shall be signed by metal roof system manufacturer.

2. Acrylic Coated Galvalume: Product will not rupture, fail structurally, or perforate within period of 20 years due to normal atmospheric corrosion.
- E. Metal building system manufacturer shall provide a paint film written warranty for 25 years against cracking, peeling, chalking, and fading of exterior coating on painted roof and wall panels.
1. Warranty shall be signed by metal building system or roof system manufacturer and state that the coating contains 70 PCT "Kynar 500 IN or "Hynar 5000 IN resin.
  2. Failure of adhesion, peeling, checking, or cracking for 25 years.
  3. Color fading in excess of 5 Hunter units per ASTM D2244 for 25 years.
  4. Chalking in excess of No. 8 rating per ASTM D4214 for 25 years.
- F. Provide written notice of any exceptions taken to warranties.
1. Any exceptions may be grounds for not accepting the manufacturer, at the discretion of the Owner or Engineer.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
1. Metal building systems:
    - a. Butler Manufacturing.
    - b. NCI Building Systems.
    - c. Nucor Building Systems.
    - d. Star Building Systems.

- B. Submit request for substitution in accordance with Specification Section 01 25 13.

### **2.2 SYSTEM DESCRIPTION**

- A. Building shall be non-insulated, clear span rigid frame with walls and gable roof.
1. Provide partial height wall panels.
  2. Provide cross bracing in the side walls perpendicular to the rigid frame.
  3. Buildings with flush girts must have cast-in-place anchor bolts, due to minimum edge distance requirements for alternate anchor types.
- B. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns.

### **2.3 BUILDING DESIGN CRITERIA**

- A. Critical Dimensions:
1. Building Size:
    - a. As indicated on the Drawings.

2. Roof slope:
    - a. As indicated on the Drawings.
  3. Provide minimum clear height of Eight (8) FT at lowest interior structure line.
  4. Horizontal Plan Dimensions:
    - a. Measure to exterior face of girts.
  5. Eave Height:
    - a. Measure from top of finished floor to intersection of insides of roof and sidewall sheets.
  6. Clear height between finished floor and bottom of roof steel: indicated on the drawings.
- B. Building Foundation:
1. All footings, foundations, anchor bolts and piers have been designed based on assumed loadings and reactions.
    - a. Member sizes and geometry may vary depending on the building being supplied.
    - b. Do not construct these members until Engineer has verified design with approved Shop Drawings of metal building being supplied.
    - c. Design all column base plates as pinned connections. Fixed base plates are not permitted.
- C. Roof Live Loads:
1. Roof panels:
    - a. Per Building Code.
    - b. 50 PSF uniformly distributed live load.
    - c. 200 LB concentrated (point) live load (over a 1 x 1 FT area) located at center of maximum roofing (panel) span.
    - d. The most severe condition governs.
  2. Roof framing members:
    - a. Roof live loads as shown on Drawings.
    - b. Roof framing members do not need to be designed for 50 PSF uniform or 200 LB concentrated live loads.
  3. The above loads are in addition to other applicable equipment loads and shall be applied to the horizontal projection of the roof.
- D. Snow Loads:
1. Design structure for snow loading as set forth in the Building Code.
    - a. Project site conditions are as follows:
      - 1) Basic ground snow: 40 PSF.



- 2) Importance factor: 1.0.
  - 3) Snow exposure coefficient: 1.0.
  2. Design roof panels, secondary support members and primary framing where appropriate for a snow load drifting accumulation as specified in the Building Code.
- E. Wind Loads:
1. Design structure for wind loading as set forth in the Building Code.
    - a. Project site conditions are as follows:
      - 1) Basic wind speed: 131MPH.
      - 2) Site exposure: Class C.
      - 3) Importance factor: 1.0.
      - 4) Enclosure type: Open.
- F. Seismic (Earthquake) Loads:
1. Design structure for seismic forces as set forth in the Building Code.
    - a. Project site conditions are as follows:
      - 1) Importance factor: 1.0.
      - 2) Spectral response acceleration (Ss): 0.172.
      - 3) Spectral response acceleration (S1): 0.064.
      - 4) Site class: D.
      - 5) Spectral response coefficient (Sds): 0.183.
      - 6) Spectral response coefficient (Sd1): 0.102.
      - 7) Seismic design category: B.
- G. Combination of Loads:
1. The combining of dead, live, wind, seismic and auxiliary loads for design purposes as set forth in the Building Code, unless otherwise specified.
  2. Horizontal sway deflection of building due to combination of required design loads:
    - a.  $H/60$ .
  3. Deflection of purlins and secondary members not to exceed  $L/180$  of its span when supporting applicable vertical live, dead, and auxiliary loads.

## 2.4 MATERIALS

- A. Steel:
1. Structural Shapes and Plate:
    - a. All W-shapes and WT-shapes: ASTM A992/A992M.

- b. All other plates, bars and rolled shapes: ASTM A36/A36M.
- c. Unless noted otherwise on Drawings.
- 2. Miscellaneous Metals:
  - a. Insulation support: Structural Steel Grade 50 per ASTM C653.
- B. Bolts, Nuts and Washers, High Strength:
  - 1. ASTM A325.
  - 2. Galvanized, ASTM A153/A153M.
  - 3. Provide two (2) washers with all bolts.
- C. Bolts and Nuts:
  - 1. ASTM A307, Grade A.
  - 2. Galvanized, ASTM A153/A153M.
- D. Anchor Bolts:
  - 1. ASTM A307, ASTM A36/A36M, galvanized steel.
  - 2. Embedment details to be developed by Engineer upon receipt of anchor bolt and loading information for approved Shop Drawings from building manufacturer.
- E. Fasteners:
  - 1. Roof and wall panels: 300 series stainless steel, ASTM F593.
  - 2. Miscellaneous fasteners: Corrosion resistant.
- F. Any structural member to be hot-dipped galvanized shall be minimum 12 GA thickness.
- G. Roof and Fascia Panels:
  - 1. General:
    - a. Galvalume per ASTM A792/A792M.
      - 1) Painted surfaces: AZ50.
      - 2) Unpainted surfaces: AZ55.
    - b. Apply clear acrylic film for additional protection.
      - 1) Apply to both sides of panels.
  - 2. Wall Panels:
    - a. General:
    - b. Galvalume per ASTM A792/A792M.
      - 1) Painted surfaces: AZ50.
      - 2) Unpainted surfaces: AZ55.

- c. Apply clear acrylic film for additional protection.
  - 1) Apply to both sides of panels.
- 3. Wall and Roof Liner Panels and Soffit Panels:
  - a. Galvalume: ASTM A792/A792M, Grade 50B.
- H. Perimeter Trim, Panel Closures, Flashing and Counterflashing:
  - 1. Same material and factory applied finish to match roof and wall panels.
- I. Insulation:
  - 1. Blanket or Batt:
    - a. Glass or other inorganic fibers and resinous binders formed into flexible blankets or semi-rigid sheets.
      - 1) Unfaced: ASTM C665, Type I.
      - 2) Nonreflective membrane: ASTM C665, Type II.
      - 3) Reflective membrane: ASTM C665, Type III.
  - 2. Rigid Foam Board:
    - a. Extruded polystyrene, ASTM C578, Type X.
- J. Vapor Retarder: ASTM C665.
- K. Translucent Panels: ASTM D3841, Grade 1 (weather resistant).
- L. Gutters and Downspouts:
  - 1. Same material and factory applied finish to match roof panels.
- M. Grout: See Division 03.
- N. Closures: Neoprene.

## 2.5 FABRICATION

- A. General:
  - 1. Fabricate building structure, roof and wall panels, accessories and trim in accordance with requirements of AISC and MBMA.
  - 2. Provide all necessary clips, flashing angles, caps, channels, closures, bases and any other miscellaneous trim required for complete water and airtight installation.
    - a. Provide an inside closure at the base of all corrugated panels and an outside closure at the top of all corrugated panels in addition to all other closure strips required.
      - 1) Form closure strips to fit the corrugation of the metal panels and securely support in place.
      - 2) Closure strips shall fit between corrugated panels and trim or flashing as required to completely separate the interior of the building from the exterior.

- b. Provide flashing at all intersections of wall panels and roof panels, and above all openings in wall and roof panels, in addition to all other flashing required.
    - 1) Form flashing:
    - 2) To completely contain water on the outside of the building.
      - a) To be watertight and securely fastened in place.
  - c. Provide sealant at all edges where metal panel trim or flashing is adjacent to the foundation of the building in addition to all other sealant required.
  3. At door openings, provide additional framing and fasteners as required to structurally replace the wall panel and/or framing displaced.
  4. Fabricate and prepare material for shipment knocked down.
  5. Factory punch frame to receive all fasteners.
  6. Finishes:
    - a. Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances.
      - 1) All primary and secondary structural steel members shall be hot-dipped galvanized.
    - b. Wall and roof panels:
      - 1) Exterior surface:
        - a) Thermosetting fluoropolymer resin enamel.
          - (1) Minimum 70 PCT "KYNAR" resin.
        - b) Meet requirements of AAMA 621.
        - c) FM Class 1 rated.
        - d) Exposed screw heads shall match color of panel.
      - 2) Interior surface:
        - a) Manufacturer's standard shop applied polyester coating.
- B. Structural Steel Design:
1. Structural Mill Sections or Welded-up Plate Sections: Design in accordance with AISC Specification for Structural Steel Buildings.
  2. Cold-Formed Steel Structural Members: Design in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
  3. Structural System: Design in accordance with specified building code (Refer to Design Loads and Building Codes).
- C. Primary Framing:
1. Galvanized Steel.

2. Rigid Frames:
    - a. Frames: Welded-up plate section columns and roof beams, complete with necessary splice plates for bolted field assembly.
    - b. Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes factory fabricated.
    - c. Columns and Roof Beams: Fabricated complete with holes in webs and flanges for attachment of secondary structural members and bracing.
    - d. Bolts for Field Assembly of Frame Members: High-strength bolts.
  3. Endwall Structural Members:
    - a. Cold-formed channel members designed in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members or welded-up plate sections designed in accordance with AISC Specification for Structural Steel Buildings.
    - b. Endwall corner posts, endwall roof beams, and endwall posts as required by design criteria.
    - c. Splice Plates and Base Clips: Shop fabricated complete with bolt connection holes.
    - d. Base Plates, Cap Plates, Compression Splice Plates, and Stiffener Plates: Factory welded into place and connection holes shop fabricated.
    - e. Beams and Posts: Factory fabricated complete with holes for attachment of secondary structural members.
  4. Intermediate Frames:
    - a. Substituted for end-wall roof beams, when specified.
    - b. Factory fabricate necessary endwall posts and holes for connection to intermediate frame used in endwall.
- D. Secondary Structural Members:
1. Wall Purlins (Girts):
    - a. In-set column purlins.
  2. Purlins:
    - a. Purlins:
      - 1) Zee-shaped, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
      - 2) Zee sections to be design by manufacturer.
    - b. Eave Members:
      - 1) Eave Struts:
        - a) Cee-shapped precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
        - b) Factory punched cee sections to be design by manufacturer.

- 2) Girts:
  - a) Zee or Cee shaped, precision-roll-formed, acrylic-coated G30 galvanized steel in different gauges to meet specified loading conditions.
  - b) Zee or cee sections to be design by manufacturer.
- 3) Outer Flange of Girts: Factory-punched holes for panel connections.

c. Bracing:

- 1) Locate bracing as indicated on the Drawings.
- 2) Diagonal Bracing:
  - a) Hot-rolled rods of sizes sections to be design by manufacturer.
  - b) Attach to columns and roof beams.
  - c) Optional fixed-base wind posts or pinned-base portal frames may be substituted for wall rod bracing on buildings as required.
- 3) Flange Braces and Purlin Braces: Cold formed and installed as indicated on the Drawings.

E. Welding:

1. Welding Procedures, Operator Qualifications, and Welding Quality Standards:
  - a. AWS D1.1.
  - b. AWS D1.3.
2. Welding inspection, other than visual inspection as defined by AWS D1.1, paragraph 6.9, shall be identified and negotiated before bidding.
3. Certification of Welder Qualification: Supply when requested.

F. Framed Openings:

1. Walls:
  - a. Provide all necessary subframing, including connections, to support wall openings for doors, windows, louvers, pipe or duct penetrations, etc.
    - 1) Material gage to be determined by metal building manufacturer for size of opening.
  - b. Size and location of opening as shown on the Drawings.
  - c. Jamb, lintel and girts:
    - 1) Steel:
      - a) Galvanized, ASTM A123/A123M, Grade 85.
    - 2) Metal building manufacturer responsible for providing correct size opening for penetration scheduled, shown or specified.
  - d. Provide trim to cover all exposed areas of opening frames to match with the wall panels.

2. Roofs:
  - a. Provide all necessary roof subframing to support roof mounted equipment and to frame roof penetrations.
    - 1) Material gage to be determined by metal building manufacturer for size of equipment or opening.
  - b. Location of roof mounted equipment and/or roof or wall opening as shown on the Drawings.
  - c. Purlins, angles, clips:
    - 1) Steel:
      - a) Galvanized, ASTM A123/A123M, Grade 85.
    - 2) Metal building manufacturer responsible for providing correct size of opening for penetration scheduled, shown or specified.

## 2.6 ROOF PANEL SYSTEM

- A. Metal Roof Panel System 3 (Bulterib II):
  1. Design Performance:
    - a. Design roof panels to support a 200 LB load distributed evenly over a 2 FT square area centered between purlins, without exceeding a panel deflection-to-span ratio of 1/180 IN a 2-span condition.
    - b. See "Roof System Performance Requirements" section below for additional requirements.
  2. Materials:
    - a. Steel.
    - b. Thickness: 24 Gauge.
    - c. Finish: Factory applied color coating.
      - 1) PVDF Coating.
  3. Factory roll-formed panel.
  4. Standing seam interlocking rib configuration.
  5. Machined seaming.
  6. Use panels of maximum possible lengths to minimize end laps.
  7. Extend eave panels beyond structural line of sidewalls.
  8. Factory punch panels at panel end to match factory-punched holes in eave structural member.
  9. Panel End Splices: Factory punched and factory notched.
  10. Panel End Laps: Locate directly over, but not fastened to, a supporting secondary roof structural member and be staggered, to avoid 4-panel lap-splice condition.
  11. End Laps: Floating. Allows roof panels to expand and contract with roof panel temperature changes.
  12. Self-Drilling Fasteners: Not permitted.

13. Fasteners per manufactures standard recommendations.
14. Ridge Assembly:
  - a. One-piece, factory formed to match roof slope.
  - b. Ridge Panel Cross Section: Match roof panels.
  - c. Ridge Panel Splices: Occur over first purlin on either side of building center.
  - d. Design ridge assembly to allow roof panels to move lengthwise with expansion and contraction as roof panel temperature changes.
  - e. Factory punch parts for correct field assembly.
  - f. Install panel closures and interior reinforcing straps to seal panel ends at ridge.
  - g. Do not expose attachment fasteners on weather side.
  - h. Use lock seam plug to seal lock seam portion of panel.
  - i. High-Tensile Steel Ridge Cover: Span from panel closure to panel closure and flex as roof system expands and contracts.
15. Provision for Expansion and Contraction:
  - a. Provision for Thermal Expansion Movement of Roof Panels:
    - 1) Provide for thermal expansion and contraction without detrimental effects on roof panels, with plus or minus 100 DEGF temperature difference between interior structural framework of building and of roof panels.
    - 2) Slotted Holes: Permit thermal movement of panels without detrimental effect on roof panels.
16. Roof panels based on: Butler Manufacturing.
  - a. Profile: Butlerib II.
  - b. Panel width: 36 IN minimum.
  - c. Panel depth: 2 IN minimum.
  - d. Panel corrugations:
    - 1) Majors: Four (4) per panel at 12 IN on centers, 1-1/2 IN high x 2-7/8 IN wide tapering, nominal.
    - 2) Minors (in flat portion): Two (2) per panel flat zone, 1 IN wide, 1/8 IN high, spaced 4 IN OC, between major corrugations.
  - e. Panel length:
    - 1) Sufficient to cover entire length of any unbroken roof slope up to 40 FT.
    - 2) When cut panels are required provide a 20 FT minimum panel length.
    - 3) Provide 6 IN end laps at each panel.
  - f. Panel Side Laps:
    - 1) Overlap one (1) major corrugation.



- 2) One of the Outboard Corrugations: Formed as overlapping corrugation.
- 3) Other Outboard Corrugation:
  - a) Formed as underneath corrugation.
  - b) Full corrugation to provide bearing support to side lap.

Formed with continuous-length sealant groove.

17. Color:

- a. To be selected from manufacturer's full range of primary and secondary colors.

B. Roof System Performance Requirements:

1. Design roof paneling system for a minimum roof slope of 1/2 IN in 12 IN.
  - a. Refer to Drawing for project required roof slope.
2. Design roof paneling system to support design live, snow, and wind loads
3. Endwall Trim and Roof Transition Flashings: Allow roof panels to move relative to wall panels and/or parapets as roof expands and contracts with temperature changes.
4. UL Wind Uplift Classification Rating, UL 580: Class 90.
5. Structural Performance Under Uniform Static Air Pressure Difference: Test roof system in accordance with ASTM E1592.
6. FM Global (Factory Mutual):
  - a. Roof system has been tested in accordance with FMRC Standard 4471 and approved as a Class 1 Panel Roof.
  - b. Metal Building System Manufacturer: Provide specific assemblies to meet required wind rating in accordance with FM Global.
  - c. Installation modifications or substitutions can invalidate FM Global approval.

C. Metal Wall and Fascia Panels:

- a. Steel.
- b. Thickness: 24 Gauge.
- c. Finish: Factory applied color coating.
  - 1) PVDF Coating.
  - 2) Smooth finish.
2. Length sufficient to cover entire height of any unbroken wall up to 40 FT.
3. Roll-form panels with alternating box corrugations.
4. Interlocking panels
5. Provide thermal blocking at connection to purlins or structural system.
6. Exposed fasteners.

7. Wall panels based on: Butler Manufacturing.
8. Profile: eStylewall II – Fluted, 4 IN wide flutes.
9. Panel width: 16 IN nominal.
10. Panel depth: 2 IN nominal.
11. Color:
  - a. To be selected from manufacturer's full range of primary and secondary colors.
12. Accessories:
  - a. Provide all necessary trim accessories to provide a weathertight building.

## 2.7 FINISHES

### A. PVDF Finish:

1. Substrate Preparation:
  - a. G90 Hot-Dipped Galvanized Steel or AZ50 Galvalume.
    - 1) Factory-controlled chemical-conversion treatment.
2. Clean ferrous surfaces of oil, grease, loose rust, loose mill scale, and other foreign substances.
  - a. Clean all primary and secondary structural steel members, not noted as being galvanized, in accordance with SSPC SP 6/NACE No. 3.
3. All structural components shall have primer paint coats applied in the [shop] [field] and finish coats applied in the [shop] [field].
  - a. Shop paint, prime and finish coats, all surfaces which will be inaccessible after erection.
  - b. Paint in accordance with Section 09 96 00.
  - c. Paint surfaces of all components not exposed to view.
  - d. Manufacturer's standard shop applied primer is not acceptable as substitute for primer specified.
4. Paint with exterior finish system, full-strength, fluoropolymer (PVDF) coating.
5. Exterior Panel surface (exposed side):
  - a. Minimum 70 PCT "Kynar 500 IN or "Hynar 5000 IN resin.
  - b. Meet requirements of AAMA 621.
  - c. FM Class 1 rated.

Exposed screw heads shall match color of panel.
6. Interior surface (unexposed side):
  - a. Manufacturer's standard shop applied polyester coating.

B. Panel and Accessories Finishes:

1. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years for the following.
  - a. Not to peel, crack, or chip.
  - b. Chalking: Not to exceed ASTM D 4214, #8 rating.
  - c. Fading: Not more than five color-difference units, ASTM D2244.
2. Meet requirements of AAMA 621.

C: Provide this finish system for the following products but not limited too:

1. Contact the Engineer for finishes not identified clearly or covered.
2. Roof panels and accessories.
3. Wall panels and accessories.
4. Liner panels and accessories.
5. Gable and Eave Trim and accessories.
6. Flashing and accessories.
7. Soffit panels and accessories.
8. Gutters, downspouts and accessories.

**2.8 ACCESSORIES**

**2.9 MAINTENANCE MATERIALS**

- A. Provide 8 OZ of touch up paint for each color provided on the building.

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. Install products in accordance with manufacturer's instructions.
1. Install tolerances in accordance with AISC 303, Code of Standard Practice.
    - a. Install products straight without bowing, sagging, or warping.
  2. Install all fasteners.
  3. Install base plates on grout bed.
    - a. Grout bed to be 1 IN thick unless noted otherwise on the Drawings.

**3.2 INSTALLATION – METAL ROOF SYSTEM**

- A. Metal Roof System Installation:
1. Install roof system in accordance with metal building system manufacturer's instructions at locations indicated on the Drawings.

2. Install roof system weathertight.
3. Factory cut-to-length roof panels in accordance with erection drawings furnished by metal building system manufacturer.
4. Position and align roof panels to hold 3 FT module throughout building length.
  - a. Position and align optional factory-punched roof panels by matching factory-punched holes in panels with factory-punched holes in roof structural members.
5. Install side laps with minimum of 1 full corrugation.
6. End Laps:
  - a. Minimum of 6 IN.
  - b. Fasten together over and to structural members.
7. Panel Side and End Laps: Seal with "Panlastic" sealant to prevent entry of capillary moisture.

### 3.3 INSTALLATION – METAL WALL SYSTEM

### 3.4 INSTALLATION – OTHER ITEMS

- A. Fasten roof panels to purlins or secondary support members in accordance with manufacturer's recommendations.
- B. Install wall panels to supporting structure with concealed fasteners.
  1. Finish of fasteners to match panel finish.

### 3.5 FIELD QUALITY CONTROL

- A. All inspections and tests are to be performed at the Project site by a third party independent testing agency.
- B. Inspect field welding in accordance with AWS D1.1/D1.1M, Section 6 including the following non-destructive testing:
  1. Visually inspect all welds.
  2. Test 50 PCT of full penetration welds and 10 PCT of fillet welds with liquid dye penetrant.
  3. Test 20 PCT of full penetration welds with ultrasonic or radiographic testing.
- C. Inspect high-strength bolting in accordance with the RCSC Specification for Structural Joints, Section 9.
  1. Inspect while work is in progress.  
Inspect structural steel which has been erected.
- D. Prepare and submit test reports to Engineer.

### 3.6 ADJUSTING AND CLEANING

- A. See Specification Section 01 75 00 for Adjusting requirements.
- B. See Specification Section 01 74 13 for Cleaning requirements.
- C. Touch up paint any scratched factory finished surfaces or remove and replace as directed by Engineer.

D. Remove and replace any damaged wall or roof panels, frames, etc., as directed by Engineer.

**END OF SECTION**

Pump Schedule (note 1)																		
Tag No.	Bid Package	Location	Type of Pump	Design Flow (gpm)	Design Head (ft)	Maximum Horse Power (HP)	Motor RPM	Voltage and Phase	Well Casing Dia (in)	Pump Column or Drop Pipe Dia. (Dimension B) (in)	Pump Setting (Dimension C) (ft)	Discharge Pipe Diameter (Dimension D) (ft)	Drop Tubes 1 & 2 Length (Dimension E) (ft)	Drop Tube 3 Length (Dimension F) (ft)	Water Level Probe Setting (Dimension G) (ft)	Low Water Level Cutout Setting (Dimension H) (ft)	Detail	
01-P-01	Base Bid	Well House 1	Line Shaft Turbine	205	160	15	1800	460V, 3 Phase	Contractor Verify	4	55 (note 2)	4	54 (notes 2, 3 and 4)	49 (notes 2 & 4)	53 (note 2)	51 (note 2)	1/P14	
01-P-02	Base Bid	Well House 3	Line Shaft Turbine	530	133	30	1800	460V, 3 Phase	Contractor Verify	5	44 (note 2)	6	42 (notes 2, 3 & 4)	37 (notes 2 & 4)	41 (note 2)	39 (note 2)	1/P14	
01-P-06	Supplemental No 1	Well House 6	Line Shaft Turbine	400	190	30	1800	460V, 3 Phase	Contractor Verify	6	67 (note 2)	6	65 (notes 2, 3 & 4)	60 (notes 2 & 4)	64 (note 2)	63 (note 2)	1/P14	
01-P-07	Base Bid	Well House 7	Line Shaft Turbine	650	221	25	1800	460V, 3 Phase	Contractor Verify	6	44 (note 2)	6	42 (notes 2, 3 & 4)	37 (notes 2 & 4)	41 (note 2)	39 (note 2)	1/P14	
01-P-08	Base Bid	Well House 8	Line Shaft Turbine	300	183	15	1800	460V, 3 Phase	Contractor Verify	4	85 (note 2)	4	83 (notes 2, 3 and 4)	78 (notes 2 & 4)	82 (note 2)	80 (note 2)	1/P14	
01-P-10	Base Bid	Well House 10	Line Shaft Turbine	300	180	25	1800	460V, 3 Phase	Contractor Verify	6	70 (note 2)	6	68 (notes 2, 3 & 4)	63 (notes 2 & 4)	67 (note 2)	65 (note 2)	1/P14	
01-P-11	Base Bid	Well House 11	Line Shaft Turbine	270	135	15	1800	460V, 3 Phase	Contractor Verify	4	51 (note 2)	4	49 (notes 2, 3 & 4)	44 (notes 2 & 4)	48 (note 2)	46 (note 2)	1/P14	
01-P-12	Base Bid	Well House 12	Line Shaft Turbine	550	120	25	1800	460V, 3 Phase	Contractor Verify	6	41 (note 2)	6	39 (notes 2, 3 & 4)	34 (notes 2 & 4)	36 (note 2)	36 (note 2)	1/P14	
01-P-13	Supplemental No 4	Well House 13	Submersible Turbine	200	270	30	1800	460V, 3 Phase	10	4	195	6	168	153	167	165	2/P14	
01-P-14	Supplemental No 4	Well House 14	Submersible Turbine	700	268	10	1800	460V, 3 Phase	10	4	200	4	173	158	171	170	2/P14	
01-P-15	Supplemental No 2	Well House 15	Submersible Turbine	100	287	15	1800	460V, 3 Phase	12	4	190	4	163	158	162	160	2/P14	
01-P-16	Supplemental No 3	Well House 16	Submersible Turbine	100	329	20	1800	460V, 3 Phase	12	4	273	4	255	251	255	253	2/P14	
03-P-01	Base Bid	Reuse Pump House	Line Shaft Turbine	1200	73	30	1800	460V, 3 Phase	NA	10	See Sheet P9	10	See Electrical	See Electrical	See Electrical	See Electrical	Sheet P9	
03-P-02	Base Bid	Reuse Pump House	Line Shaft Turbine	1200	73	30	1800	460V, 3 Phase	NA	10	See Sheet P9	10	See Electrical	See Electrical	See Electrical	See Electrical	See Electrical	Sheet P9

- Notes
- Backwash Pumps for Drum Filters and the Treatment Building Service Water Pump are Not included in Schedule. See Specifications for these pumps.
  - The pump settings, conduit lengths, low water cutout level settings and the water level probe settings are based upon the best available data and may require revision based upon contractor field measurements as follows:
    - When the existing pump is removed the contractor shall verify the pump setting (the length of column or drop pipe from the pump house floor to the top of the pump intakes screen).
    - The new pump settings (Dimension C) shall match the existing pump settings.
    - The drop tube 1 and 2 lengths (Dimension E) shall be adjusted to be 2 feet less than the pump setting. (Example - if the pump setting is at 100 feet, the drop tube lengths would be set at 98 feet)
    - The drop tube 3 length (Dimension F) shall be adjusted to be 7 feet less than the pump setting. (Example - if the pump setting is at 100 feet, the drop tube length would be set at 93 feet)
    - The Water Level Probe Depth (Dimension G), which will be dropped into drop tube 3, shall be set at 1 foot above the pump setting and stripped to the column pipe. (Example - if the drop tube length is 98 feet the probe setting should be 97 feet.)
    - The Low Water Level Cutout depth (Dimension H), which will be dropped into drop tube 3, shall be set 2 feet above the pump setting and stripped to the column pipe. (Example - if the pump setting is 100 feet, the Low Water Level Cutout shall be set at 95 feet)
  - If it is not possible to provide the drop tube 1 & 2 lengths called for in note 2, due to interference with the pump bow assembly, install drop tube as low as possible and set the water level probe at the bottom of the conduit.
  - All Drop Tubes shall be vented above the pump base plates.

Flow Meter Schedule

Tag No.	Bid Package	Location	Type of Meter	Design Flow (gpm)	Voltage and Phase	Diameter (in)	Operating Pressure (psi)	Notes
01- FM-01	Base Bid	Well House 1	V-Cone	205	120V, 1 PHASE	4	50	
01- FM-03	Base Bid	Well House 3	V-Cone	530	120V, 1 PHASE	6	50	
01- FM-06	Supplemental No 1	Well House 6	V-Cone	400	120V, 1 PHASE	6	50	
01- FM-07	Base Bid	Well House 7	V-Cone	650	120V, 1 PHASE	6	50	
01- FM-08	Base Bid	Well House 8	V-Cone	200	120V, 1 PHASE	4	50	
01- FM-10	Base Bid	Well House 10	V-Cone	300	120V, 1 PHASE	6	50	
01- FM-11	Base Bid	Well House 11	V-Cone	270	120V, 1 PHASE	4	50	
01- FM-12	Base Bid	Well House 12	V-Cone	550	120V, 1 PHASE	6	50	
01- FM-13	Supplemental No 4	Well House 13	Magnetic	200	120V, 1 PHASE	6	30	Install with 5 diameters of straight pipe upstream and 2 downstream
01- FM-14	Supplemental No 4	Well House 14	Magnetic	70	120V, 1 PHASE	4	30	Install with 5 diameters of straight pipe upstream and 2 downstream
01- FM-15	Supplemental No 2	Well House 15	Magnetic	100	120V, 1 PHASE	4	30	Install with 5 diameters of straight pipe upstream and 2 downstream
01- FM-16	Supplemental No 3	Well House 16	Magnetic	100	120V, 1 PHASE	4	30	Install with 5 diameters of straight pipe upstream and 2 downstream
04- FM-01	Base Bid	Main Headtank	Magnetic	1000	120V, 1 PHASE	12	25	Install with 5 diameters of straight pipe upstream and 2 downstream
04- FM-02	Base Bid	Main Headtank	Magnetic	1000	120V, 1 PHASE	12	25	Install with 5 diameters of straight pipe upstream and 2 downstream