1. 13 34 19

**METAL BUILDING SYSTEMS**

**Note: This section must be reviewed and edited by the Architect or Engineer to meet the requirements of the project and local building code. Coordinate this section with other specification sections and the drawings. Delete all “Notes” after editing.**

* 1. GENERAL
     1. SECTION INCLUDES
        1. Metal Framing Components
        2. Metal Wall Panels and Trim
        3. Metal Roof Panels and Trim
        4. Metal Building Accessories

**Note: Please add to this as needed and delete any that do not apply.**

* + 1. RELATED SECTIONS
       1. Section 03 15 00- Placement of anchor bolt, leveling plates and grout.
       2. Section 03 30 00- Cast-in-place concrete.
       3. Section 05 21 00 - Steel joist framing.
       4. Section 05 31 00 - Steel decking.
       5. Section 08 31 00 - Overhead doors.
       6. Section 08 50 00 - Windows.
       7. Section 08 60 00 - Skylights, Translucent Panels, Wall lights.
       8. Section 09 90 00 - Painting: Finish painting of primed steel surfaces.
    2. REFERENCE STANDARDS
       1. American Institute of Steel Construction (AISC):
          1. AISC Specification for Structural Steel Buildings.
          2. AISC Serviceability Design Considerations for Low-Rise Buildings
       2. American Iron and Steel Institute (AISI):
          1. AISI North American Specification for the Design of Cold-Formed Steel Structural Members
       3. American Welding Society (AWS):
          1. AWS D1.1 / D1.1M – Structural Welding Code – Steel.
          2. AWS D1.3 / D1.3M – Structural Welding Code – Sheet Steel
       4. Association for Iron & Steel Technology (AISE):
          1. AISE 13 – Specifications for Design and Construction of Mill Buildings.
       5. ASTM International (ASTM):
          1. ASTM A 36 – Standard Specification for Carbon Structural Steel
          2. ASTM A 48 – Specification for Gray Iron Castings
          3. ASTM A 123 – Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
          4. ASTM A 307 – Specification for Carbon Steel Bolts and Studs, 60 000 psi Tensile Strength
          5. ASTM A 325 – Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
          6. ASTM A 354 – Standard Specification for Quenched and Tempered Alloy Steel Bolts, Studs, and Other Externally Threaded Fasteners
          7. ASTM A 475 – Specification for Zinc-Coated Steel Wire Strand
          8. ASTM A 490 – Specification for Structural Bolts, Alloy Steel, Heat Treated, 150 ksi Minimum Tensile Strength
          9. ASTM A 500 – Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
          10. ASTM A 529 – Standard Specification for High-Strength Carbon-Manganese Steel of Structural Quality.
          11. ASTM A 563 – Specification for Carbon and Alloy Steel Nuts
          12. ASTM A 572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.
          13. ASTM A 653 / A 653M – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
          14. ASTM A 792 / A 792M – Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process
          15. ASTM A 992 – Standard Specification for Structural Steel Shapes.
          16. ASTM A 1011 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
          17. ASTM A 1039 – Specification for Steel, Sheet, Hot Rolled, Carbon, Commercial, Structural, and High-Strength Low-Alloy, Produced by Twin-Roll Casting Process
          18. ASTM E 96 / E 96M – Standard Test Methods for Water Vapor Transmission of Materials.
          19. ASTM E 108—Spread-of Flame Testing: Class 1A Rating.
          20. ASTM E 283 – Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
          21. ASTM E 331 – Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
          22. ASTM E 1592 – Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference
          23. ASTM E 1646 – Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference
          24. ASTM E 1680 – Test Method for Rate of Air Leakage Through Exterior Metal Roof Panel Systems
          25. ASTM E 2140 – Test Method for Water Penetration of Metal Roof Panel Systems by Static Water Pressure Head
          26. ASTM F 436 – Specification for Hardened Steel Washers
          27. ASTM F 1145 – Specification for Turnbuckles, Swaged, Welded, Forged
          28. ASTM F 1554 – Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength
       6. CSA – Canadian Standards Association
       7. CWB – Canadian Welding Bureau
       8. IAS – International Accreditation Service
       9. LGSI – Light Gauge Steel Institute
       10. SJI – Steel Joist Institute
       11. Florida Product Approval:
           1. Nucor CFR approved under file number FL4891
       12. FM Global:
           1. FMRC Standard 4471 – Approval Standard for Class 1 Roofs for Hail Damage Resistance, Combustibility, and Wind Uplift Resistance.
       13. Metal Building Manufacturers Association (MBMA):
           1. MBMA Metal Building Systems Manual
       14. Underwriters Laboratories (UL):
           1. UL 580 – Standard for Tests for Uplift Resistance of Roof Assemblies
    3. DEFINITIONS
       1. Metal Building System: A building system that will employ:  
          - Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed purlins or open-web steel joists for support of the roof cladding.  
          - Either a continuous or simple-span ‘Z’ or ‘C’-shaped cold-formed girts or open-web steel joists for support of the steel wall cladding.  
          - Three-plate, built-up rigid space frames and/or cold-formed ‘C’ or hot-rolled I-shaped post-and-beam framing to support the roof and wall secondary members.  
          - All systems (cladding, roof and wall secondary, lateral primary framing, and longitudinal bracing) work together to provide resistance to vertical and lateral loading demands.
       2. Gable Symmetrical: A continuous frame building with the ridge in the center of the building, consisting of tapered or straight columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (inset in the column line). The rafters may or may not have interior columns.
       3. Gable Asymmetrical: A continuous frame building with an off-center ridge, consisting of tapered or straight columns and tapered or straight rafters. The eave height and roof slope may differ on each side of the ridge. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
       4. Single-Slope: A continuous frame building which does not contain a ridge, but consists of one continuous slope from side to side. The building consists of straight or tapered columns and tapered or straight rafters. The sidewall girts may be continuous (by-passing the columns) or simple span (flush in the column line). The rafters may or may not have interior columns.
       5. Lean-To (LTO): A building extension, which does not contain a ridge, but consists of one continuous slope from side to side. These units usually have the same roof slope and girt design as the building to which they are attached and supported by.
       6. Roof Slope: Pitch expressed as inches of rise for each 12" of horizontal run.
       7. Building Width: Measured from outside to outside of sidewall secondary structural member (girt).
       8. Building Eave Height: A nominal dimension measured from the finished floor to top flange of eave strut.
       9. Building Length: Measured from outside to outside of endwall secondary structural member.
       10. Auxiliary Loads: Dynamic loads induced by cranes, conveyors, or other material handling systems.
       11. Collateral Loads: The weight of any non-moving equipment or material, such as ceilings, electrical or mechanical equipment, sprinkler systems, plumbing, or ceilings.
       12. Dead Load: The actual weight of the building system (as provided by the metal building supplier) supported by a given member.
       13. Floor Live Loads: Loads induced on a floor system by occupants of a building and their furniture, equipment, etc.
       14. Roof Live Loads: Loads produced by maintenance activities, rain, erection activities, and other movable or moving loads but not including wind, snow, seismic, crane, or dead loads.
       15. Roof Snow Loads: Gravity load induced by the weight of snow or ice on the roof, assumed to act on the horizontal projection of the roof.
       16. Seismic Loads: Loads acting in any direction on a structural system due to the action of an earthquake.
       17. Wind Loads: The loads on a structure induced by the forces of wind blowing from any horizontal direction.
    4. DESIGN REQUIREMENTS

**Note: Please fill in information required for this project.**

* + - 1. General
         1. The building manufacturer will use standards, specifications, recommendations, findings and/or interpretations of professionally-recognized groups such as AISC, AISI, AWS, ASTM, CSA, CWB, MBMA, Federal Specifications, and unpublished research by MBMA as the basis for establishing design, drafting, fabrication, and quality criteria, practices, and tolerances. The Manufacturer's design, drafting, fabrication and quality criteria, practices, and tolerances shall govern, unless specifically countermanded by the contract documents.
         2. Design structural mill sections and built-up plate sections in accordance with:

(US) code-appropriate edition of AISC's "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", ANSI/AISC 360 ASD method.

(Canada) CSA S16, “Design of Steel Structures”, latest edition.

* + - * 1. Cold-Formed steel structural members and panels will generally be designed in accordance with "Specifications for the Design of Cold-Formed Steel Structural Members", 2007 Edition, ANSI/AISI S-100-07 or CAN CSA S136-07.
        2. Design weldments per the following:

Structural Welding

(US) Design per AWS D1.1, “Structural Welding Code – Steel”, Latest Edition.

(Canada) Design per CWB W59, “Welded Steel Construction (Metal Arc Welding)”, Latest Edition.

Cold-Formed Welding

(US) Design per AWS D1.3, “Structural Welding Code – Sheet Steel”, Latest Edition.

(Canada) Design per CWB W59, “Welded Steel Construction (Metal Arc Welding)”, Latest Edition.

* + - 1. Design Code:
         1. Structural design for the building structural system shall be provided by the metal building system manufacturer for the following design criteria:

Governing Building Code: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Year/Version: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Occupancy Category: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - 1. Design Loads:
         1. Dead Load – Weight of the building system as determined by manufacturer.
         2. Roof Live Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
         3. Collateral Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
         4. Roof Snow Load:

Ground Snow Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Snow Exposure Coefficient (Ce) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Thermal Coefficient (Ct) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Roof Snow Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Wind Load:

Wind Speed – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Wind Exposure – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Seismic Load:

Spectral response acceleration for short periods (Ss) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Spectral response acceleration for 1-sec. period (S1) – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Site Class – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Floor Load.

Live Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Dead Load (Weight of Material by others)– \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Collateral Load – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* + - * 1. Auxiliary Loads: Auxiliary loads shall include dynamic loads, such as cranes and material handling systems, and will be defined in the Contract Documents.
        2. Crane Loads:

Crane loads shall be a function of the Service Class as defined by the governing code and Crane Manufacturers Association of America (CMAA) and the rated tonnage (A- Standby or Infrequent service, B- Light service, C- Moderate service, D- Heavy Service, E- Severe Service, F- Continuous Severe Service).

Cranes in Service Class E or F shall be in accordance with AISE 13.

Service Class of Crane: \_\_\_\_\_\_\_\_\_\_\_\_.

Deflection Criterion for Crane: \_\_\_\_\_\_\_\_\_\_\_\_.

Crane loads will be obtained from the crane manufacturer and supplied by the Architect to the metal building system manufacturer at the time of bid.

Building structure shall be designed for the crane loads in accordance with the governing code.

Multiple cranes in the same bay or aisle shall be designed in accordance with the governing code.

If the governing code does not address multiple crane design practices, MBMA Metal Building Systems Manual shall be used.

**Note: Listed below are the General Serviceability Limits, please adjust if necessary.**

* + - 1. General Serviceability Limits :
         1. Deflection Limits shall be in accordance with the applicable provisions of the Metal Building Systems Manual (MBMA), latest edition.
         2. Vertical Deflections:

Roof Secondary (Purlins) – L/150.

Main Frame roof beams – L/180.

* + - * 1. Horizontal Deflections:

Wall Secondary (Girts) – L/90.

Main Frames – H/60.

* + - * 1. Vertical deflection limits apply for snow load (50-year mean-recurrence interval) plus collateral load, or the code required live load. The horizontal drift and deflections limits apply for the loads induced by a basic wind speed corresponding to a 10 year mean-recurrence interval.
    1. SUBMITTALS

**Note: Please delete all submittals that do not apply to this project**

* + - 1. Submit under provisions of Section 01 33 00.
      2. Product Data: Manufacturer's data sheets on each product to be used, including:
         1. Preparation instructions and recommendations.
         2. Storage and handling requirements and recommendations.
         3. Installation methods.
      3. Shop Drawings: Provide complete erection drawings for the proper identification and assembly of all building components. Drawings will show anchor bolt settings, transverse cross-sections, sidewall, endwall and roof framing, flashing and sheeting, and accessory installation details.
      4. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
      5. Verification Samples: For each finish product specified, two samples, representing actual product, color, and patterns.
      6. Certifications: Shop drawings and design analysis shall bear the seal of a registered professional engineer upon request. Design analysis shall be on file and furnished by manufacturer upon request.
      7. Bill of Materials: Bills of material shall be furnished and shall include item weights.
      8. Preventative Maintenance Manual.
      9. Welder's Certifications: Certification of welder qualifications shall be furnished as specified by the Project Engineer.

**Note: Specify *any* of the following *three* sentences that apply to this project, delete any or all that do not apply. For Factory Mutual identify the proper classification.**

* + - 1. Submit certification verifying that the metal roof system has been tested and approved by Underwriter’s Laboratory as Class 90.
      2. Submit certification verifying that the metal roof system has been tested and approved by Factory Mutual as Class \_\_\_\_\_\_\_\_.
      3. Submit certification verifying that the metal standing seam roof system has been tested in accordance with ASTM E 1592 test protocols.
    1. QUALITY ASSURANCE
       1. Manufacturer / Fabricator Qualifications:
          1. (US) All primary products specified in this section will be supplied by a single IAS AC 472 Accredited Manufacturer /Fabricator with a minimum of five (5) years’ experience.
          2. (Canada) All primary products specified in this section will be supplied by a single Manufacturer / Fabricator certified by the CAN/CSA A660-10, “Certification of Manufacturers of Steel Building Systems” program.
       2. Weldments/Welder/Weld Inspection Qualifications:
          1. (US) Welding inspection and welding inspector qualification for structural steel shall be in accordance with AWS D1.1, “Structural Welding Code – Steel”, latest edition. Welding inspection and welding inspector qualification for cold-formed steel shall be in accordance with AWS D1.3, “Structural Welding Code – Sheet Steel”, latest edition.
          2. (Canada) The metal building manufacturer shall be certified per CWB W47.1, “Certification of Companies for Fusion Welding of Steel”, latest edition.
       3. Erector Qualifications: All products listed in this section are to be installed by a single installer with a minimum of five (5) years demonstrated experience in installing products of the same type and scope as specified.
       4. Design: Standard drawings and design analysis must bear the seal of a registered professional engineer. Design analysis must be on file and furnished by manufacturer upon request.
    2. DELIVERY, STORAGE AND HANDLING
       1. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
       2. Storage and Handling Requirements:
          1. Store and handle materials in accordance with manufacturer’s instructions.
          2. Keep materials in manufacturer’s original, unopened containers and packaging until installation.
          3. Do not store materials directly on ground.
          4. Store materials on flat, level surface, raised above ground, with adequate support to prevent sagging.
          5. Protect materials and finish during storage, handling, and installation to prevent damage.
       3. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
       4. Store and dispose of hazardous materials, and materials contaminated by hazardous materials, in accordance with requirements of local authorities having jurisdiction.
    3. WARRANTY
       1. Building System Warranty
          1. Furnish manufacturer’s standard warranty for the metal building system, excluding paint.
          2. The manufacturer shall warrant the metal building system against failure due to defective material or workmanship for a period of one (1) year from date of shipment.
          3. The liability under this warranty shall be limited to furnishing, but not dismantling or installing, necessary replacement material F.O.B. manufacturer’s plant. In no event shall the manufacturer be liable for loss of profits, or other incidental, consequential, or special damages.
       2. Standing Seam Roof Weathertightness Warranty(Optional)
          1. Furnish manufacturer’s weathertightness warranty for a maximum of 20 years against leaks in standing seam roof panels, arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions.
       3. Roof and Wall Paint Finish Warranty
          1. Paint Systems

Furnish manufacturer’s standard warranty for the metal panel paint system against chipping, peeling, blistering, fading in excess of 5 NBS Hunter units as set forth in ASTM-D-2244, and chalking in excess of 8 units as set forth in ASTM-D-4214.

The warranty shall be for a period of 30 years from the date of shipment for PVDF paint systems.

The warranty shall be for a period of 25 years from the date of shipment for silicone-polyester paint systems.

* + - * 1. Galvalume® systems

Furnish manufacturer’s standard warranty for the Galvalume® panels against rupture, structural failure, or perforation due to normal atmospheric conditions.

The warranty shall be for a period of 20 years from the date of shipment for Galvalume® systems.

* 1. PRODUCTS
     1. MANUFACTURERS
        1. Acceptable Manufacturer: Nucor Building Systems; <http://www.nucorbuildingsystems.com>
        2. Substitutions: Not permitted.
     2. MATERIALS
        1. Primary Framing Steel:
           1. Steel for hot rolled shapes must conform to the requirements of ASTM Specifications A-36, A-572 or A-992, with minimum yield of 36 or 50 ksi, respectively.
           2. Steel for built-up sections must conform to the requirements of ASTM A-1011, A-1018, A-529, A-572 or A-36 as applicable, with minimum yield of 42, 46, 50, or 55 ksi as indicated by the design requirements.
           3. Round Tube must conform to the requirements of ASTM A-500 Grade B with minimum yield strength of 42 ksi.
           4. Square and Rectangular Tube must conform to the requirements of ASTM A-500 Grade B with a minimum yield strength of 46 ksi.
           5. Steel for Cold-Formed Endwall "C" sections must conform to the requirements of ASTM A-1011 or A-1039 Grade 55, or ASTM A-653 Grade 55 with minimum yield strength of 55 ksi.
           6. X-bracing will conform to ASTM A-36 or ASTM A-529 for rod and angle bracing or ASTM A-475 for cable bracing.
        2. Secondary Framing Steel:
           1. Steel used to form purlins, girts and eave struts must meet the requirements of ASTM A-1011 or ASTM A-1039 Grade 55 for primed material or ASTM A-653 Grade 55 for galvanized material with a minimum yield of 55 ksi.
           2. Design Thicknesses – Gauge to be determined by design to meet specified loading conditions.
        3. Panels:
           1. Roll-formed Galvalume®, pre-painted Galvalume® or Galvanized G90 Exterior-Side and G60 Interior-Side. In Canada, Galvanized panel will have a coating thickness of G90 on both sides.
           2. Standing Seam Panels must have:

(For US and Export) 50 percent minimum aluminum-zinc alloy- coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.

(For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume® finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A-792or ASTM A-653 with a minimum yield of 50 ksi.

* + - * 1. Through-fastened panels must have:

(For US and Export) 50 percent minimum aluminum-zinc alloy coating and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.

(For Canada) 55 percent minimum aluminum-zinc alloy- coating with Galvalume finish or 50 percent minimum aluminum-zinc alloy- coating with paint finish and conform to ASTM A-792 or ASTM A-653 with a minimum yield of 50 ksi.

* + - * 1. Panel Finish:

SP Finish: Modified Siliconized Polyester paint system with a 25-year finish warranty.

PVDF Finish: 70% PVDF paint system with a 30-year finish warranty.

* + - 1. Panel Fasteners:
         1. For Galvalume® and Painted finished roof panels: Long Life Cast Zinc head.
         2. For wall panels: Coated carbon steel.
         3. Color of exposed fastener heads to match the wall and roof panel finish.
         4. Concealed Fasteners: Self-drilling type, of size required.
      2. Flashing and Trim: Match material, finish, and color of adjacent components. Provide trim at rakes, including peak and corner assemblies, high and low eaves, corners, bases, framed openings and as required or specified to provide weathertightness and a finished appearance.
      3. Roof Clips:
         1. All clips must have factory-applied mastic and designed so that movement between the panel and the clip does not occur.
         2. Short or Tall Fixed clips; shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height. Used for applications where only a moderate amount of thermal expansion and contraction in the roof panel is expected.
         3. Short or Tall Sliding clips: shall be either 3 ½ inches (89mm) or 4 ½ inches (114mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction, depending on clip choice.
         4. Super Tall Sliding clips: shall be 5 ½ inches (140mm) in height and provide either 1-7/8 inches from neutral position or 3 3/4 total inches of travel for panel thermal expansion and contraction.
      4. Sealant And Closures:
         1. Sidelaps: Factory applied non-skinning Butyl mastic.
         2. Endlaps, Eave, Ridge Assembly, and Gable Flashings: Field applied 100% solids butyl-based elastomeric tape sealant, furnished in pre-cut lengths.
         3. Outside Closures: Closed-cell, plastic or metal
         4. Inside Closures: Closed-cell, plastic or metal
    1. PRIMARY FRAMING

**Note: Please specify the desired configurations for each category; delete all that do not apply.**

* + - 1. Rigid Frames: Fabricated as welded built-up "I" sections or hot-rolled sections.
         1. Frame Design: Gable Symmetrical.
         2. Frame Design: Gable Unsymmetrical.
         3. Frame Design: Single Slope.
         4. Frame Design: Lean-To.
         5. Frame Type: Clear-Span.
         6. Frame Type: Multi-Span.
      2. Rigid Frame Columns:
         1. Straight/Uniform depth
         2. Tapered
      3. Rigid Frame Rafters:
         1. Straight/Uniform depth
         2. Tapered
      4. Endwall Frames / Roof Beams: Fabricated as mill-rolled sections or built-up "I" sections depending on design requirements. Fabricate endwall columns of cold-formed "C" sections, mill-rolled sections, or built-up "I" sections depending on design requirements.
      5. Interior Columns: Columns supporting rafters of mainframes shall be of the following cross-section type(s):
         1. Pipe (Round HSS).
         2. Tube (Square HSS).
         3. "I"-Shaped (Built-Up or Mill-Rolled depending on design requirements).
      6. Finish: Red-Oxide or Gray Primer, or galvanized (pre coated galvanized cold-form, hot-dipped otherwise).
      7. Field Bolted Connections: All field bolted connections shall be designed and detailed utilizing ASTM A-325 or A-490 depending on design requirement.
    1. SECONDARY FRAMING

**Note: Please specify the desired configurations (Depth and finish) of each type of secondary framing.**

* + - 1. Purlins and Girts: Purlins and girts shall be cold-formed "Z" sections with stiffened flanges. Flange stiffeners shall be sized to comply with the requirements of the latest edition of AISI and LGSI. They shall be pre-punched at the factory to provide for field bolting to the rigid frames. They shall be simple or continuous span as required by design. Connection bolts will install through the purlin/girt webs, not purlin/girt flanges.
      2. Purlins (Excluding Open Web Joists): Horizontal structural members which support roof coverings.
         1. Depth: To be determined by design (8”, 9.5”, 10” or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      3. Girts: Horizontal structural members that support vertical panels.
         1. Depth: To be determined by design (8”, 9.5”, 10”, or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      4. Eave Struts: Unequal flange, cold-formed "C" sections or “Z” purlins.
         1. Depth: To be determined by design (8”, 9.5”, 10” or 12”)
         2. Maximum Length: To be determined by design.
         3. Finish: Red Oxide Primer.
         4. Finish: Gray Primer.
         5. Finish: Pre-Coated Galvanized.
      5. Base Framing: Base members to which the base of the wall covering may be attached to the perimeter of the slab. Secured to the concrete slab with mechanical anchors.
         1. Formed base sill.
         2. Base channel.

With flashing.

Without flashing.

* + - * 1. Base angle.

With flashing.

Without flashing.

* + - * 1. Base girt.

With flashing.

Without flashing.

* + - * 1. Finish: Red Oxide Primer.
        2. Finish: Gray Primer.
        3. Finish: Pre Coated Galvanized.
      1. Nucor Building Systems Roof Joist system.
         1. Open web, parallel chord, simple span load carrying members suitable for the direct support of roof systems utilizing material sizes and yield strengths as required.
         2. Open web members shall be fabricated of material that conforms to the material specifications designated by the Steel Joist Institute as acceptable for this product.
         3. Nucor ClearBay® roof joist system with reduced bridging on qualified “CFR” projects.
         4. Roof Joist Seat attachment

Fully Bolted (no welding required)

Welded

Alternate Bolt Option (some welding required)

* + - * 1. Roof Joist Bridging attachment

Fully Bolted (no welding required)

Welded

* + - * 1. Roof Joist Flange Brace attachment

Fully Bolted (no welding required)

Welded

**Note: Please specify the desired roof panel and applicable configurations (gauge, clip, and size/Thermal value). Delete roof panels that are not applicable.**

* + 1. ROOF PANELS
       1. Nucor Classic Roof™ Panel: A through-fastened roof with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
          1. Gauge: 26 (Std.)
          2. Gauge: 24
          3. Gauge: 22
          4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
          5. Finish/Color: As specified in Article 2.8 PANEL FINISH
       2. Nucor CFR Roof™ Panel: A mechanically seamed trapezoidal standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
          1. Gauge: 24 (Std.)
          2. Gauge: 22
          3. Dimensions: 24 inches (610mm) wide by 3 inches (76mm) high
          4. Clips: Tall Fixed
          5. Clips: Short Fixed
          6. Clips: Tall Sliding
          7. Clips: Short Sliding
          8. Clips: Super Tall Sliding
          9. Finish/Color: As specified in Article 2.8 PANEL FINISH
       3. Nucor VR16 II™ Roof Panel: A mechanically seamed pan-type standing seam roof panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 1646 and E 1680 for water penetration and air infiltration, and per ASTM E1592 for wind uplift capacity.
          1. Gauge: 24(Std.)
          2. Gauge: 22
          3. Dimensions: 16 inches (406mm) wide by 2 inches (51mm) high
          4. Clips: Tall Fixed
          5. Clips: Short Fixed
          6. Clips: Tall Sliding
          7. Clips: Short Sliding
          8. Finish/Color: As specified in Article 2.8 PANEL FINISH
       4. AWI "SR2" Insulated Roof Panel: A mechanically seamed trapezoidal standing seam roof sandwich panel with concealed clips. Installed directly over purlins. Tested in accordance with ASTM E 283 and E 331 for water penetration and air infiltration.
          1. Exterior panel gauge: 26 (Std.)
          2. Exterior panel gauge: 24
          3. Exterior panel gauge: 22
          4. Interior panel gauge: 26 (Std.)
          5. Interior panel gauge: 24
          6. Interior panel gauge: 22
          7. Size / Thermal Value: 40 inches (1016mm) wide by 3.25 inches (83mm) high (R-26)
          8. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-33)
          9. Size / Thermal Value: 40 inches (1016mm) wide by 5 inches (127mm) high (R-42)
          10. Size / Thermal Value: 40 inches (1016mm) wide by 6 inches (152mm) high (R-50)
          11. Color: As specified in Article 2.8 PANEL FINISHES
          12. Standard Finish:

Exterior: Smooth with Mesa profile

Interior: Light Embossed with Mesa profile

* + - 1. AWI "HR3" Insulated Panel: A through-fastened roof sandwich panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to prevent oil-canning. . Tested in accordance with ASTM E 283 and E 331 for water penetration and air infiltration.
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 40 inches (1016mm) wide by 2 1/2 inches (64mm) high (R-21)
         8. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-33)
         9. Size / Thermal Value: 40 inches (1016mm) wide by 5 inches (127mm) high (R-42)
         10. Size / Thermal Value: 40 inches (1016mm) wide by 6 inches (152mm) high (R-50)
         11. Color: As specified in Article 2.8 PANEL FINISHES
         12. Standard Finish:

Exterior: Smooth with Mesa profile

Interior: Light Embossed with Mesa profile

**Note: Please specify the desired wall panel and applicable configurations (gauge, and size/Thermal value). Delete wall panels that are not applicable.**

* + 1. WALL PANELS
       1. Nucor Classic™ Wall Panel: A through-fastened sidewall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
          1. Gauge: 26 (Std.)
          2. Gauge: 24
          3. Gauge: 22
          4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
          5. Finish/Color: As specified in Article 2.8 PANEL FINISH
       2. Nucor Accent™ Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.
          1. Gauge: 26 (Std.)
          2. Gauge: 24
          3. Gauge: 22
          4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
          5. Finish/Color: As specified in Article 2.8 PANEL FINISHES
       3. Nucor Reverse Classic™ Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.
          1. Gauge: 26 (Std.)
          2. Gauge: 24
          3. Gauge: 22
          4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
          5. Finish/Color: As specified in Article 2.8 PANEL FINISHES
       4. AWI "HE40" Insulated Panel: A through-fastened wall sandwich panel with concealed fasteners.
          1. Exterior panel gauge: 26 (Std.)
          2. Exterior panel gauge: 24
          3. Exterior panel gauge: 22
          4. Interior panel gauge: 26 (Std.)
          5. Interior panel gauge: 24
          6. Interior panel gauge: 22
          7. Size / Thermal Value: 40 inches (1016mm) wide by 2 inches (51mm) high (R-16)
          8. Size / Thermal Value: 40 inches (1016mm) wide by 2 1/2 inches (64mm) high (R-20)
          9. Size / Thermal Value: 40 inches (1016mm) wide by 3 inches (76mm) high (R-24)
          10. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-32)
          11. Color: As specified in Article 2.8 PANEL FINISHES
          12. Standard Finish:

Exterior: Heavy Embossed with no profile

Interior: Light Embossed with Mesa profile

* + - 1. AWI "HE40-A" Insulated Panel: A through-fastened wall sandwich panel with concealed fasteners.
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 40 inches (1016mm) wide by 2 inches (51mm) high (R-16)
         8. Size / Thermal Value: 40 inches (1016mm) wide by 2 1/2 inches (64mm) high (R-20)
         9. Size / Thermal Value: 40 inches (1016mm) wide by 3 inches (76mm) high (R-24)
         10. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-32)
         11. Color: As specified in Article 2.8 PANEL FINISHES.
         12. Standard Finish:

Exterior: Adobe Texture™ with no profile

Interior: Light Embossed with Mesa profile

* + - 1. AWI "ST40" Insulated Panel: A through-fastened wall sandwich panel with concealed fasteners.
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 40 inches (1016mm) wide by 2 inches (51mm) high (R-16)
         8. Size / Thermal Value: 40 inches (1016mm) wide by 2 1/2 inches (64mm) high (R-20)
         9. Size / Thermal Value: 40 inches (1016mm) wide by 3 inches (76mm) high (R-24)
         10. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-32)
         11. Color: As specified in Article 2.8 PANEL FINISHES.
         12. Standard Finish:

Exterior: Light Embossed with Mesa profile

Interior: Light Embossed with Mesa profile

* + - 1. AWI "DM40" Insulated Panel: A through-fastened wall sandwich panel with concealed fasteners.
         1. Exterior panel gauge: 26 (Std.)
         2. Exterior panel gauge: 24
         3. Exterior panel gauge: 22
         4. Interior panel gauge: 26 (Std.)
         5. Interior panel gauge: 24
         6. Interior panel gauge: 22
         7. Size / Thermal Value: 40 inches (1016mm) wide by 2 inches (51mm) high (R-16)
         8. Size / Thermal Value: 40 inches (1016mm) wide by 2 1/2 inches (64mm) high (R-20)
         9. Size / Thermal Value: 40 inches (1016mm) wide by 3 inches (76mm) high (R-24)
         10. Size / Thermal Value: 40 inches (1016mm) wide by 4 inches (102mm) high (R-32)
         11. Color: As specified in Article 2.8 PANEL FINISHES.
         12. Standard Finish:

Exterior: Light Embossed with Mesa profile

Interior: Light Embossed with Mesa profile

**Note: Please specify the applicable accessories to be used on this project. Delete all that do not apply.**

* + 1. ACCESSORIES
       1. Canopies: Overhanging or projecting roof structures off the sidewall or endwall with the extreme end usually unsupported. For aesthetic application or to cover entrance or walkway.
       2. Roof Line Trim:
          1. Trim Type: Simple Eave/Rake Trim
          2. Trim Type: Sculptured Eave/Rake Trim
          3. Trim Type: Low-Eave Gutter / Sculptured Rake Trim
       3. Purlin Extensions: Overhanging or projecting roof structure at the end of a building.
       4. Framed Openings: Used to frame out doors, windows, louvers, and any other openings. Refers to the framing members and flashing which surround an opening and includes jambs, header and or sill, trim, and fasteners.
       5. Walk Doors: Personnel entry doors.
          1. Size: As noted on the Contract Drawings.
          2. Accessories: As noted on the Contract Drawings
          3. Size: 3 foot by 7 foot (914x2133mm) Single Leaf
          4. Size: 4 foot by 7 foot (1219x2133mm) Single Leaf
          5. Size: 6 foot by 7 foot (1828x2133mm) Double Leaf
       6. Windows: Self-flashing, self-framing horizontal slide or fixed narrow-lite windows.
          1. Type / Size: As noted on the Contract Drawings.
          2. Type: Fixed Glass

Size: 2 foot by 6 foot (610x1828mm)

Size: 4 foot by 4 foot (1219x1219mm)

Size: 5 foot by 4 foot (1524x1219mm)

* + - * 1. Type: Horizontal Slide

Size: 3 foot by 3 foot (914x914mm)

Size: 4 foot by 3 foot (1219x914mm)

Size: 4 foot by 4 foot (1219x1219mm)

Size: 5 foot by 3 foot (1524x914mm)

Size: 6 foot by 3 foot (1828x914mm)

* + - 1. Daylighting with Prismatic Skylights:
         1. Curb Mounted Prismatic Skylights
         2. Curb Mounted Smoke & Heat Vent Skylights
      2. Translucent Roof and Wall Panels: Translucent Acrylit™ panels consisting of 8 oz. 100% acrylic translucent panel woven roving strand combined with chopped strand matrix fiberglass reinforcement. White in color with a minimum of 55-60 percent light transmittance. U/L 90 rated panel available. Allows natural light into the building.
      3. Liner Panels: Nucor Classic™ Liner Panel: A through-fastened sidewall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.
         1. Gauge: 28
         2. Gauge: 26
         3. Gauge: 24
         4. Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high
         5. Finish: As specified in Article 2.8 PANEL FINISHES
      4. Soffit Panels:
         1. Nucor Classic™ Wall Panel: A through-fastened sidewall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center. The area between the ribs is reinforced to minimize oil-canning.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - * 1. Nucor Accent™ Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - * 1. Nucor Reverse Classic™ Wall Panel: Reverse-rolled wall panel with 1 1/4 inch (32mm) ribs at 12 inches (305mm) on center with semi-concealed fasteners.

Gauge: 26 (std.)

Gauge: 24

Dimensions: 36 inches (915mm) wide by 1 1/4 inch (32mm) high

Finish: As specified in Article 2.8 PANEL FINISHES

* + - 1. Facades: Decorative structural and panel system projecting from the face of a wall panel.
      2. Parapet Walls: Wall panels below the roof line that extend above the roof line to a given elevation. Parapet walls include 14 gauge pre-galvanized parapet gutter (gutter liner and drainage members by others) when located on a sidewall (except at the high side of a Single-Slope or Lean-to building).
      3. Partitions: Interior or exterior walls that are inside the building footprint to section off parts of the interior space of a building.
      4. Valley Gutter: Gutter used to carry off water from attached buildings or multi-gabled buildings. Standard valley gutter is 14 gauge pre-galvanized 10 foot (3048mm) sections, field welded in place (gutter liner and drainage members by others).
      5. Roof Curbs: Welded units fabricated for Metal Roof application. Minimum 18 gauge Galvalume™ coated steel, with welds cleaned and treated with protective coating compatible with the Galvalume™ substrate. Minimum curb height shall be 8”.
         1. Top of curb to be level with ground, with 1 ½” top flange.
         2. Curb walls insulated with 1 ½”-3lb.density fiberglass insulation.
         3. Welded integral cricket on upslope side of curb to divert water.
         4. Metal or plastic rib covers supplied loose for flexibility when installing curb.
         5. Standard sub-frame shall be minimum 16 gauge steel.
         6. All fasteners and sealants required for installation shall be furnished by Roof Curb manufacturer.
      6. Roof Vents: Accessories used on the roof to allow air to pass through.
         1. Gravity Ridge Vents: Can be used as single unit or continuous.

Size: 9 inch by 10 foot (229x3048mm) with Damper & Lockerpull.

Size: 12 inch by 10 foot (305x3048mm) with Damper & Lockerpull.

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

**Note: Please specify the desired panel finish for each type of panel. Delete all that do not apply.**

* + 1. PANEL FINISHES
       1. Roof Panel:
          1. Galvalume® (GM)
          2. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. Nucor PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + - 1. Wall Panel:
         1. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. Nucor PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + - 1. Insulated Roof panel:
         1. Exterior panel:

Nucor PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):

Color: Cypress Green (CY)

Color: Pearl Gray (PG)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Surrey Beige (SU)

Color: Warm White (WW)

* + - * 1. Interior panel:

Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

Color: Imperial White (IW)

* + - 1. Insulated Wall panel:
         1. Exterior panel:

Nucor PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):

Color: Cypress Green (CY)

Color: Pearl Gray (PG)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Surrey Beige (SU)

Color: Warm White (WW)

* + - * 1. Interior panel:

Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

Color: Imperial White (IW)

* + - 1. Liner Panel:
         1. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

28 gauge:

Color: Polar White (PW)

26 & 24 gauge:

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - 1. Soffit Panel:
         1. Nucor Standard Panel Paint System (Siliconized Polyester Resin, 25-year Finish Warranty):

Color: Aztec Blue (AB)

Color: Brick Red (BD)

Color: Burnished Slate (BS)

Color: Fox Gray (FG)

Color: Forest Green (FO)

Color: Polar White (PW)

Color: Sagebrush Tan (SA)

Color: Sandstone (SS)

* + - * 1. Nucor PVDF Panel Paint System (PVDF Resin, 30-year Finish Warranty):

Color: Midnight Black (BL)

Color: Brite Red (BT)

Color: Charcoal (CH)

Color: Cypress Green (CY)

Color: Dark Bronze (DB)

Color: Desert Sand (DS)

Color: Pearl Gray (PG)

Color: Reflective White (RF)

Color: Royal Blue (RO)

Color: Regal White (RW)

Color: Slate Gray (SG)

Color: Surrey Beige (SU)

Color: Terra Cotta (TC)

Color: Warm White (WW)

* + 1. **FABRICATION**
       1. General:
          1. Shop-fabricate all framing members for field bolted assembly. The surfaces of the bolted connections must be smooth and free from burrs or distortions.
          2. Shop connections must conform to the manufacturer's standard design practices as defined in this section. Certification of welder qualifications will be furnished when required and specified in advance.
          3. All framing members must carry an identifying mark.
       2. Primary Framing:
          1. Plates, Stiffeners and Related Members: Factory weld base plates splice plates, cap plates, and stiffeners into place on the structural members.
          2. Bolt Holes and Related Machining: Shop fabricate base plates, splices and flanges to include bolt connection holes. Shop fabricated webs to include bracing holes.
          3. Secondary structural connections (purlins and girts) to be ordinary bolted connections, which may include welded clips.
          4. Manufacturer is responsible for all welding inspection in accordance with the manufacturer's IAS Accreditation or CAN/CSA A660 Certification. Special inspection by the buyer or owner may be done in the manufacturer's facility and must be noted on the Contract Documents.
          5. Non-Destructive Testing (NDT) - NDT shall be performed and documented as required by the governing building code for this project.
       3. Open-Web Roof Joists:
          1. Purlins for ‘long-bay’ building layouts shall consist of open-web bar joists designed under Steel Joist Institute (SJI) specifications by an SJI-Certified Joist Manufacturer for the prescribed loads.
       4. Zee Purlins:
          1. Fabricate purlins from cold-formed "Z" sections with stiffened flanges. Size flange stiffeners to comply with the requirements of the latest edition of AISI. Connection bolts will install through the webs, not the flanges.
       5. Girts
          1. Girts must be simple or continuous span as required by design. Connection bolts will install through the webs, not the flanges.
       6. Bracing:
          1. Diagonal Bracing:

Wind bracing in the roof and/or walls need not be furnished where it can be shown that the diaphragm strength of the roof and/or wall covering is adequate to resist the applied wind or seismic forces. Diagonal bracing in the roof and sidewalls may be used to resist longitudinal loads (wind, crane, etc.) in the structure if diaphragm action cannot be used.

Diagonal bracing will be furnished to length and equipped with hillside washers and nuts at each end. It may consist of rods threaded each end or galvanized cable with suitable threaded end anchors. If load requirements so dictate, bracing may be of structural angle and/or pipe, bolted in place.

* + - * 1. Special Bracing: When diagonal bracing is not permitted in the sidewall, a rigid frame type portal or fixed base column will be used. Shear walls can also be used where adequate to resist the applied wind or seismic forces.
        2. Flange Braces: The inside compression flange of all primary framing must be braced laterally with angles connecting to the bottoms chords of joists or to the webs of purlins/girts so that the flange compressive stress is within allowable limits for any combination of loading.
        3. Bridging: Laterally bridge the top and bottom chords of the open-web bar joists as required by design thereof and specified on the building erection drawings.
      1. Standing Seam Panels - General:
         1. One side of the panel is configured as female, having factory applied hot-melt mastic inside the female seam. The female side will hook over the male side and when seamed creates a continuous lock, forming a weathertight seam.
         2. Panels are factory notched at both ends so that field installation can commence or terminate from either end of the building. Panels cannot start at both ends of the building and work towards each other.
         3. Maximum panel length is 55 feet (16,764mm) unless otherwise noted in the Contract Documents.
         4. Endlaps:

Endlaps must have a 16 gauge backup plate and have the (8) endlap joint fasteners installed in dimpled locations in the flat with (1) endlap joint fastener installed in each trapezoid shoulder for a total of (10) fasteners at each endlap.

Apply mastic between the panels and secured with #12-14 x 1 1/4 inch (32mm) self-drilling fasteners through the panels and backup plate to form a compression joint.

"Through-the-Roof" fasteners may only be used at endlaps and eaves.

* 1. **EXECUTION**
     1. **EXAMINATION**
        1. Examine substrates, areas, and conditions, with Erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.
        2. Before erection proceeds, survey elevations and locations of concrete and masonry bearing surfaces and locations of anchor rods, bearing plates and other embedment’s to receive structural framing, with Erector present, for compliance with requirements and metal building system manufacturer’s tolerances.
        3. Proceed with erection only after unsatisfactory conditions have been corrected.
     2. **PREPARATION**
        1. Clean surfaces thoroughly prior to installation.
        2. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads equal in intensity to design loads. Remove temporary supports when permanent structural framing connections and bracing are in place, unless otherwise indicated.
     3. **INSTALLATION**
        1. The erection of the building system shall be performed by a qualified erector, in accordance with the appropriate erection drawings, erection guides and /or other documents furnished by manufacturer, using proper tools, equipment and safety practices.
        2. Erection practices shall conform to “Common Industry Practices”, Section 6, MBMA (LR)-Building Systems Manual.
        3. There shall be no field modifications to primary structural members except as authorized and specified by manufacturer.
     4. **PROTECTION**
        1. Protect installed products until completion of project.
        2. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**