FORESITE design

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Berkley, Michigan 48072
Phone 248-547-7757
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Website: www.foresitedesign.com

ADDENDUM

ADDENDUM No: #2 **PAGES: 31**

PROJECT: **Livonia Public Schools**
Dugout Renovations 2018

DATE: August 3, 2018

TO: All Bidders

This Addendum is issued prior to the Bid Opening to clarify or change the Bid Documents. This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents issued July 20, 2018. All requirements contained in the Contract Documents shall apply to this Addendum. All incidental work necessary to complete the work shall be included in the Contractor's Proposal even though not particularly mentioned. Parts of the Specifications and Drawings referred to herein supersede previously issued data and shall form a part of the Bid Documents.

Receipt of this Addendum should be noted on the proposal form; failure to do so may subject Bidder to disqualification.

General:

GN-1 **BID DUE DATE HAS BEEN EXTENDED TO THURSDAY AUGUST 9, 2018 at 1:00p.m. EST. Location of Bid Opening remains unchanged.**

GN-2 Insert Pre-Bid Meeting Sign-In Sheet and Meeting Agenda

The Pre-Bid Walk-thru will still be held On August 1st at 9:00 AM starting at Stevenson High School, 33500 Six Mile Road, Livonia, MI 48152 the moving to Churchill High School, 8900 Newburgh, Livonia, MI 48150.

Specifications:

SC-1 Insert Revised Section 00 1115 Scope of Work (reissued):
A. Revisions included clarifications to scope of Churchill and Stevenson HS.

SC-2 Insert Revised Section 00 4200 Proposal Form (reissued):
A. Revisions include updated construction schedule from Addendum #1 and inclusion of Alternate No. 1.

SC-3 Insert Revised Section 01 2300 Alternates (reissued):
A. Revisions include addition of Alternate No. 1

SC-4 Insert Specification Section 07 4113 Metal Roof Panels (new issue):
A. To be applied to Alternate No. 1

Drawings:

NO DRAWING CHANGES

END OF ADDENDUM #2

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Churchill HS Athletic Improvements 2018 - Pre Bid Meeting

Project Name: Churchill High School
Athletic Improvements 2018

Date: February 27, 2018

Location: Churchill High School
8900 Newburgh Road
Livonia, MI 48150

Time: 10:00 a.m.

Name	Company	Phone	E-mail
Mike Sims	Foresite Design	810-499-0659	Mike@foresitedesign.com
Mike Schumacher	Brix Corporation	313-965-0000	MSchumacher@brixcorporation.com
Scott Smith	Plante Moran	248.767.5982	scott.smith@plantemoran.com.

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LIVONIA PUBLIC SCHOOLS
CHURCHILL HIGH SCHOOL – Churchill Dugout Re-Bid
PRE-BID MEETING AGENDA
August 1, 2018 at 9:00 A.M.

I. INTRODUCTIONS
- Livonia Public Schools Representatives
- Scott Smith, Plante Moran CRESA
- Mike Sims, Foresite Design

II. PURPOSE OF PRE-BID MEETING

1) Bidding Documents available electronically through www.livoniapublicschools.org under the section titled DISTRICT, Purchasing Bids, 2017-2018 school year, open bids OR SIGMA Website www.michigan.gov/SIGMAVSS. Bidders are responsible for their own printing and shipping costs.

2) Review of Pricing Requests
   1) Base Bid Proposal
   2) Alternates
      i. No Base Bid Alternates included with Proposal
      ii. Bidders are encouraged to submit Voluntary Alternates as desired using form **01 2300 Alternates**

III. BIDDING REQUIREMENTS

A. Any proposal over $23,230.00 requires **US Treasury Listed Bid Bond** or **cashier's check of at least 5% of the proposal amount**. Proposals that do not have the proper bid security will not be read or considered.

B. Successful bidders whose proposals are $50,000 or more will be required to furnish a Performance and Payment Bond (US Treasury listed) in the amount of 100% of their bid. Cost of this bond shall be included with your bid.

C. The Project is taxable, will comply with the Equal Opportunity Laws of Michigan and is **a Prevailing Wage Bid.**

D. Submission of the Proposal shall include the following forms that **must** be filled out, signed and included with your bid. **Proposals that do not have these required forms will not be read or considered:**
   1) Signed Proposal Form and Official Bid Requirements Form
   2) Alternates (as required)
   3) Unit Prices (as applicable)
   4) Signed & Notarized Familial Disclosure Statement
   5) Signed & Notarized Iran Economic Sanctions Act
   6) Equal Opportunity Statement
   7) Contractor Qualifications Section
   8) Bid Security

E. **Sealed bids marked *CHURCHILL DUGOUT RE-BID* will be received until 1:00 p.m. on the 8th day of August, 2018, in the Business Office at the Board of Education complex, 15125 Farmington Road, Livonia, Michigan.** Mailed bids should be sent to

the attention of: Phillip Francis, Director of Operations, Livonia Public Schools,15125 Farmington Road, Livonia, Michigan, 48154. **Livonia Public Schools is not liable for any delivery or postal delays.**

F. **Any bid submitted will be binding for ninety (90) days subsequent to the date of bid submission.**

G. The Livonia Public Schools Board of Education reserves the right to accept or reject any or all bids; to waive any irregularities and/or informalities; and in general to make awards in any manner deemed to be in the best interests of the District, including awarding by line item, with rationale to support such a decision. Livonia Public Schools local preference resolution will be followed for all proposals.

H. All questions or clarifications regarding bid specifications and/or drawings should be referred to Harry Lau, Administrator of Facilities and Operations hlau@livoniapublicschools.org between 8am – 3:30pm EST.

IV. MILESTONE SCHEDULE

PRE CONTRACT	COMPLETION DATES
Bids Due	August 8, 2018
Post-Bid Interviews	August 9-10, 2018
Letter of Recommendation	August 10, 2018
Anticipated Board Award	August 20, 2018

CONSTRUCTION MILESTONE DATES

Proposal A – Dugouts *(per Addendum #1)*

-Start	September 5, 2018
-Complete	November 2, 2018

V. BID DOCUMENT REVIEW

A. Address any questions regarding clarification of scope

B. RFI Cut off is **Friday August 3, 2018 at 3:00pm EST**

C. **ADDENDUMS**

1) Addendum #1 was issued on July 31, 2018
2) Addendum #2 to be issued on Friday August 3, 2018

SECTION 00 1115
SCOPE OF WORK

GENERAL NOTES (Applicable to All Bid Categories)

1. Bidder/Contractor shall be aware of and include the cost for, all State and Local laws, codes, ordinances, building rules and regulations, as are or may become applicable to the Work.

2. Contractor shall coordinate with other trades that affect the installation of the Work.

3. Bidders shall exclude costs of testing from bid unless required on the proposal form. Independent testing will be hired directly by the Owner/Owner's Representative and contractor shall cooperate with the testing agency.

4. Each contractor/subcontractors shall coordinate and cooperate with other contractors and independent testing firms for expedient completion of the work of this project.

5. Each contractor shall be solely responsible and make every effort to locate existing underground utilities. This shall include consulting with all local utility companies, using a signal locator prior to excavation for private utility lines and consulting with a private utility locating company.

6. The Scope of Work for each Bid Category includes cleaning and maintaining streets free of dirt, debris, mud, gravel caused by the construction operations as it pertains to their scope of work. Contractors shall be aware that local authorities intend to enforce local ordinances in this regard. Penalties resulting from contractor negligence in adhering to the State and Local ordinances, laws, codes shall be the responsibility of the Contractor.

7. The Scope of Work for each Bid Category includes strict adherence to the safety requirements as defined in the General Conditions and Supplementary General Conditions.

8. Each Contractor shall review existing building and site conditions prior to commencement of work and advise the Owner's Representative of any claim of changes in the work within seventy-two (72) hours therefore, or waive its right for claim of changes in the existing site conditions. Each Contractor shall be responsible for restoring site to its original conditions upon completion of their respective work.

9. All excess materials shall be legally disposed of off-site unless indicated otherwise.

SECTION 00 1115
SCOPE OF WORK

PROPOSAL A: DUGOUTS

CM Supplementary Conditions
General Conditions
Division 1 General Requirements
Division 2 Existing Conditions

Specification Section	02 4113	Demolition
Specification Section	03 3010	Portland Cement Concrete
Specification Section	04 0513	Mortar
Specification Section	04 2000	Unit Masonry
Specification Section	07 4113	Metal Roof Panels
Specification Section	07 7100	Roof Specialties
Specification Section	09 9000	Painting
Specification Section	116838	Baseball Equipment
Specification Section	31 1000	Site Preparation
Specification Section	32 3100	Chainlink Fence- Galvanized
Specification Section	32 9227	General Lawn Restoration

General Scope of Work:

1. Requirements of items included under General Work to be completed by all contractors.
2. Provide all required engineering and layout as required to complete this work.
3. All engineering, layout and establishment of grade levels are the responsibility of this contractor.
4. Include all required permits and bonds.
5. Provide final cleaning, including washing of block and broom cleaning.
6. Furnish attic stock of materials in the amounts indicated in the specifications.
7. Provide all required closeout documents upon completion of project.
8. Strict enforcement of this contractor's requirement to provide timely clean-up, removal and disposal of all debris generated by this trade during the work. Maintain a clean condition at all areas on site and free from dirt, mud, and gravel as it pertains to scope of work.
9. Provide required submittal items for approval.
10. **Note**: Milestone Schedule. This trade will be required to confirm a detailed schedule prior to award of this contract.
11. General Scope of Work included with Bid:

CHURCHILL HIGH SCHOOL – SOFTBALL DUGOUTS
Remove existing chainlink dugouts, metal roof, and footings at softball field. Remove and salvage existing windscreen and at dugout and turn over to Owner.
Provide all labor, materials and equipment necessary to construct the modular block dugouts as shown on the drawings.
New foundations and flatwork required and all reinforcing materials
Provide excavation and backfill required to complete this work and haul spoils offsite. Contractor should be prepared to recompact the foundation bearing soils with the proper equipment to achieve the recommended bearing pressures
Install electrical/utility sleeves located within the scope of work and provide all new connections, and mounting of existing scoreboard control inside home dugout.
Provide dowel caps on all exposed rebar
Furnish and install masonry reinforcing and grouting
Furnish and install steel columns and anchor bolts as required
Provide all rough framing, weather shield and nailers, including roof sheathing. **Base Bid Roofing**: New Asphalt Shingles and Wood Fascia. **Alternate Bid Roofing**: Standing Seam

SECTION 00 1115
SCOPE OF WORK

Metal Roof and Aluminum Fascia.
Furnish and install coat hooks, helmet & bat cubbies in home dugout. Provide coat hooks only in visitor dugout.
Furnish all labor, materials and equipment necessary for complete surface preparation, painting and finishing work including but not limited to sealing, block filling, priming and finish coats as required to complete the work as indicated on the drawings. Contractor shall prepare surfaces to receive new material by washing, etching, sanding, filling or other procedures deemed necessary for a satisfactory installation
Provide all required painting as indicated on plans. Colors to be selected by Owner
Minor fence additions and modifications
Provide final cleaning, including washing of block and broom cleaning.
Furnish and install new galvanized chainlink fencing in front of dugouts. Work shall also include minor modifications to tie existing fencing into dugouts, to ensure a closed site.

CHURCHILL HIGH SCHOOL – BASEBALL DUGOUTS
Remove existing helmet cubbies & shelving. Fill holes as required for preparation of painting
Remove existing hollow metal door and frame on storage building. Furnish and install new FRP door, frame and hardware. Include grouting of all frames in masonry walls.
Furnish and install coat hooks, helmet & bat cubbies in home dugout. Provide coat hooks only in visitor dugout.
Furnish all labor, materials and equipment necessary for complete surface preparation, painting and finishing work including but not limited to sealing, block filling, priming and finish coats as required to complete the work as indicated on the drawings. Contractor shall prepare surfaces to receive new material by washing, etching, sanding, filling or other procedures deemed necessary for a satisfactory installation
Repaint interior and exterior of dugouts (excludes interior or storage room), including underside of roofing, header, fascia, and front wood support beams Colors to be selected by Owner. Any logos will be painting/installed by Owner.
Provide final cleaning, including washing of block and broom cleaning.

STEVENSON HIGH SCHOOL – BASEBALL DUGOUTS
Remove existing helmet cubbies, shelving, and benches. Fill holes as required for preparation of painting
Remove existing shingle roof, sheathing and wood fascia. **Base Bid Roofing**: New Asphalt Shingles and Wood Fascia. **Alternate Bid Roofing**: Standing Seam Metal Roof and Aluminum Fascia.
Furnish and install coat hooks, helmet & bat cubbies in home dugout. Provide coat hooks only in visitor dugout.
Remove existing benches and provide new
Furnish all labor, materials and equipment necessary for complete surface preparation, painting and finishing work including but not limited to sealing, block filling, priming and finish coats as required to complete the work as indicated on the drawings. Contractor shall prepare surfaces to receive new material by washing, etching, sanding, filling or other procedures deemed necessary for a satisfactory installation
Repaint interior and exterior of dugouts, including underside of roofing, header, fascia, and front wood support beams. Colors to be selected by Owner. Any logos will be painting/installed by Owner.
Provide final cleaning, including washing of block and broom cleaning.

END OF SECTION 00 1115

SECTION 00 1115
SCOPE OF WORK

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SECTION 00 4200
PROPOSAL FORM – ADDENDUM #2

PROPOSAL FOR: DUGOUT RENOVATIONS 2018
CHURCHILL & STEVENSON HIGH SCHOOLS

PROPOSAL TO: LIVONIA PUBLIC SCHOOLS
15125 Farmington Road
Livonia, MI 48154

Attn: Mr. Phillip Francis, Director of Operations

ARCHITECT: FORESITE DESIGN, INC
3269 Coolidge Highway
Berkley, MI 48072
248-547-7757
Email: mike@foresitedesign.com

SUBMITTING CONTRACTOR: _____

ADDRESS: _____

PHONE: _____ / FAX: _____

EMAIL: _____

1. BASE PROPOSAL

I have carefully examined the bidding documents which include the Instructions to Bidders, all drawings title **"Livonia Public Schools"** and all various addenda numbered _____ to _____ as prepared by FORESITE DESIGN, INC. which cover the general and architectural trades, as well as the premises and conditions affecting this work.

The undersigned proposes to furnish all labor, materials and equipment, all utilities, transportation services and taxes for the general construction as indicated under each proposal in accordance with said documents for the sum(s) provided below.

Within one (1) hour after the completion of the opening of the bids, the Contractors who submitted the three lowest bids must submit a list of the names of each subcontractor who will provide labor or a portion of the work or improvement to the Contractor for which he will be paid an amount exceeding 5 percent of the prime Contractor's total bid or $40,000 whichever is greater. If the Contractor(s) fail to submit such a list within the required time, his bid shall be deemed not responsive.

A. PROPOSAL _A_ COMPLETE

PROPOSAL _A_ : BASE BID $_____

_____ **Dollars**

(written sum)

SECTION 00 4200
PROPOSAL FORM – ADDENDUM #2

2. ALTERNATES

A. Install Standing Seam Metal Roofing and Fascia in lieu of Asphalt Shingles

(Applicable for Churchill Softball and Stevenson Baseball Dugouts)

_____

Add to or Delete from Base Proposal Amount: $ _____

3. TIME OF COMPLETION

The undersigned understands and agrees that time is of the essence and that all services and installation of all work and materials provided for in the contract must be fully completed on or before the following dates:

Proposal A: Dugouts

Start- September 5, 2018
Complete- November 2, 2018

4. VOLUNTARY ALTERNATES

The following alternates are offered at this time for the consideration of the Owner. If accepted, the Base Proposal will be changed by the amount listed.

A. _____

_____

Add to or Delete from Base Proposal Amount: $ _____

B. _____

_____

Add to or Delete from Base Proposal Amount: $ _____

C. _____

_____

Add to or Delete from Base Proposal Amount: $ _____

5. PRICE GUARANTEE

The Undersigned agrees that its proposal shall not be withdrawn and the price stated in the Proposal is guaranteed for ninety (90) consecutive days from the bid date.

6. TAXES

The undersigned acknowledges that the prices stated above include all applicable taxes of whatever character or description.

7. ADDENDA

If any Addenda covering changes to the Bidding Documents have been received during the bidding period, the bidder shall fill in their numbers and dates which acknowledge having received the same, and having included in this proposal the work involved.

No. 1 Dated _____
No. 2 Dated _____
No. 3 Dated _____

8. NEGOTIATION

The Undersigned agrees that, should the overall cost exceed the funds available, it will be willing to negotiate with the Owner for the purpose of making further reductions in the Contract Work, and shall agree to give full credit for all such reductions in the work requested by the Owner, including full value of labor, materials, and subcontract work and reasonable proportionate reductions in overhead and profit, thereby arriving at an agreed upon Contract price.

9. UNIT PRICES

All unit prices quoted shall include the sum total of all additional costs of labor, material, overhead, profit, fees, general conditions, and such other costs incidental to the work described. Any increase in cost must be approved by the Owner in writing prior to work being performed.

For all revisions involving the deletion of Contract work, it is agreed that full credit shall be given the Owner for such work deleted on a unit basis as quoted hereinafter.

UNIT PRICE BID PROPOSAL A (DUGOUTS)

A.	Over excavation and spoil removal	$ _____	Truck cu. yard (cy)
B.	Helmet Cubby	$ _____	Each
C.	Bat Storage Container	$ _____	Each
D.	Portland Cement Concrete	$ _____	Cubic yard (cy)

Any increased cost based on the unit prices must be approved by Owner's written change order prior to starting work. Quantities must be confirmed by a Testing Agency or Architect and the Owner.

10. LIQUIDATED DAMAGES PROVISION

Contractor shall complete the entire work and obtain a Certificate of Substantial Completion by the substantial completion date indicated on the Proposal Form. Contractor and Owner agree that if the Certificate of Substantial Completion is obtained later than the date, the following liquidated provisions apply. The project completion date shall be adjusted by an amount of time properly documented in Change Orders. If the Owner and Contractor do not agree with the adjustment in Contract time due to Change directives, such adjustment shall be determined by the Architect.

A. SITE OBSERVATION FEE

If the Contractor fails to obtain the Certification of Substantial Completion for the Project by the Project Completion Date (as adjusted pursuant to this paragraph), the Contract Sum payable to the Contractor will be reduced in the amount of $1000.00 for each day that the issuance of the Certificate of Occupancy exceeds the Project Completion Date, weather permitting and through no fault of the Owner or Foresite Design, Inc.

11. RIGHTS RESERVED BY OWNER

The Owner reserves the unconditional right to waive any irregularities, reject any or all proposals or to accept proposals which in the judgment of the Owner will serve the best interests of the Owner. The Owner reserves the right to award to a Contractor based on factors other than low bid.

12. PROPOSAL GUARANTEE (BID BOND)

Is required: Refer to AIA Document A701-1997 "Instruction to Bidders"
Amount: 5% of contract sum

13. CONTRACT SECURITY (Performance and Labor & Material Payment Bond)

Is required: Refer to AIA Document A701-1997 "Instruction to Bidders"
Amount: 100% of contract sum

14. CONTRACT EXECUTION

The Undersigned agrees to execute a Contract for work covered by this Proposal as provided for in the Bidding Documents. The Undersigned declares the legal status indicated below:

( ) Individual

( ) Partnership, having the following partners:

1. _____
2. _____
3. _____

( ) Corporation, Incorporated under the laws of the State of _____

The Undersigned affirms that:

A. This proposal is based upon the materials and construction, equipment, etc., named or described in the specifications.

B. The address, given below, is the legal address to which all notices, directions, or other communications may be served or mailed.

C. Its proposal is made in good faith, without collusion or connection with any other person or persons bidding for the same work, and that the process quoted herein include all terms, insurance, royalties, transportation charges, allowances, taxes, use of all tools and equipment, overhead, profit, etc., necessary to fully complete the work in accordance with the Contract Documents.

15. The Contractor shall hold harmless from and indemnify the Owner and Architect against all claims, suits, actions, costs, counsel fees, expenses, damages, judgments or decrees, by reason of any person or persons or property being damaged or by the Contractor, or any other employed under said Contractor, in any capacity during the progress of the work whether by negligence or otherwise.

The Undersigned agrees to live up to the above specifications and gives the Owner the right to deduct the cost of any damage caused by faulty work and any item conflicting with good workmanship from the final payment.

If notified of acceptance of this proposal, the undersigned agrees to execute a contract for the above work, for the above stated compensation, in form of the standard form of the AIA.

SECTION 00 4200
PROPOSAL FORM – ADDENDUM #2

FIRM NAME: _____

ADDRESS: _____

_____

SIGNED: _____

NAME: _____

TITLE: _____

TELEPHONE: _____

FAX: _____

EMAIL: _____

DATE: _____

Return TWO (2) signed copies.

The Owner reserves the unconditional right to waive any informality or irregularity, reject any or all proposals, or to accept proposals which in the judgment of the Owner will serve its best interests, and to make in its judgment a determination as to the adequacy of the Contractor's qualifications, experience, and capability.

SECTION 00 4200
PROPOSAL FORM – ADDENDUM #2

CONTRACTOR QUALIFICATIONS

1. Years in Business: _____years
   (This company and this business)

2. Minimum Experience – at least three (3) comparable (similar) projects of similar size and cost, with customer reference.

Project Name: _____

Location: _____

Cost: _____

Year: _____

Contact Name: _____ Title:

Phone: _____ Email: _____

Project Name: _____

Location: _____

Cost: _____

Year: _____

Contact Name: _____ Title:

Phone: _____ Email: _____

Project Name: _____

Location: _____

Cost: _____

Year: _____

Contact Name: _____ Title:

Phone: _____ Email: _____

SECTION 01 2300
ALTERNATES – ADDENDUM #2

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for alternates as proposed by the Landscape Architect. The bidder proposes the following Voluntary Alternates for the sums to be deleted from the Base Bid as stated below:

1. **Voluntary Alternates or Substitutions proposed by Bidders will not form the Base Bid Proposal Price**

B. VOLUNTARY ALTERNATE NO. 1:

_____

_____

_____

Which would save the Owner:

_____ ( ) Dollars

C. VOLUNTARY ALTERNATE NO. 2:

_____

_____

_____

Which would save the Owner:

_____ ( ) Dollars

1.3 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Proposal Form for certain work defined in the Bidding Requirements that may be added to or deducted from the Base Bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment or installation methods described in the Contract Documents.

1. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the work, No other adjustments are made to the Contract Sum.

B. Voluntary Alternate: Bidders proposing voluntary alternates and substitutions will not be recognized as part of the Base Bid Price. Owner may review voluntary proposal with the successful Bidder.

1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate work of the alternate into the project.

1. Include as part of each alternate, miscellaneous products, equipment, and similar items incidental to or required for a complete installation whether or not indicated as part of the alternate.

B. Notification: Immediately following award of Contract, notify each party involved of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.

C. Execute accepted alternates under the same conditions as other work of the Contract.

D. Schedule: A schedule of Alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Alternate No. A-1: Supply and install standing seam Metal Roofing and fascia as specified in lieu of asphalt shingles. Alternate work shall apply to Churchill Softball Dugouts and Stevenson Baseball Dugouts.

END OF SECTION 01 2300

SECTION 07 4113
METAL ROOF PANELS – ADDENDUM #2

SECTION 07 4113 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Standing-seam metal roof panels.
2. Fascia panels.
3. Under-layment materials – ice and water shield.
4. Manufacturers Roofing Representative – on-site inspection.

1.3 DEFINITIONS

A. Metal Roof Panel Assembly: Metal roof panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weather-tight roofing system.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Metal roof panels shall comply with performance requirements without failure due to defective manufacture, fabrication, installation, or other defects in construction.

1. Comply with Building codes and other agency jurisdictional requirements.

B. Delegated Design: Design metal roof panel assembly, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Air Infiltration: Air leakage through assembly of not more than **0.06 cfm/sq. ft. (0.3 L/s per sq. m)** of roof area when tested according to ASTM E 1680 at the following test-pressure difference:

1. Test-Pressure Difference: Positive and negative **1.57 lbf/sq. ft. (75 Pa)**.
2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
3. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

D. Water Penetration: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:

1. Test-Pressure Difference: 20 percent of positive design wind pressure, but not less than 6.24 lbf/sq. ft. (300 Pa) and not more than 12.0 lbf/sq. ft. (575 Pa).
2. Positive Preload Test-Pressure Difference: Greater than or equal to 15.0 lbf/sq. ft. (720 Pa) and the greater of 75 percent of building live load or 50 percent of building design positive wind-pressure difference.
3. Negative Preload Test-Pressure Difference: 50 percent of design wind-uplift-pressure difference.

E. Hydrostatic-Head Resistance: No water penetration when tested according to ASTM E 2140.

F. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90.

G. Structural Performance: Provide metal roof panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated, based on testing according to ASTM E 1592:

1. Wind Loads: Determine loads based on the following minimum design wind pressures:

a. Uniform pressure of **30 lbf/sq. ft. (1436 Pa)**, acting inward or outward.
b. Uniform pressure as indicated on Drawings.

2. Snow Loads: **30 lbf/sq. ft. (1436 Pa)**.
3. Deflection Limits: Metal roof panel assemblies shall withstand wind and snow loads with vertical deflections no greater than 1/180 of the span.

H. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): **120 deg F (67 deg C),** ambient; **180 deg F (100 deg C)**, material surfaces.

I. Thermal Performance: Provide insulated metal roof panel assemblies with thermal-resistance value (R-value) indicated when tested according to ASTM C 518.

J. Solar Reflectance: Initial solar reflectance of not less than 0.25 when tested according to ASTM E 903, and maintained, under normal conditions, solar reflectance not less than 0.15 for 3 years after installation.

K. Minimum Emissivity Rating: Provide roofing materials with 0.75 or greater emissivity when tested according to ASTM E 408.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of roof panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and end-lap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

1. Accessories: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:10):

a. Flashing and trim.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Metal Roof: 12 inches (300 mm) long by actual panel width. Include fasteners, clips, battens, closures, and other metal roof panel accessories.

D. Delegated-Design Submittal: For metal roof panel assembly indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

E. Coordination Drawings: Roof plans, drawn to scale, on which the following are shown and coordinated with each other, based on input from installers of the items involved:

1. Roof panels and attachments.
2. Purlins and rafters.

F. Qualification Data: For qualified Installer, professional engineer and testing agency.

G. Material Certificates: For thermal insulation and vapor retarders, from manufacturer.

H. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

I. Field quality-control reports by the Contractors and Manufacturer.

J. Maintenance Data: For metal roof panels to include in maintenance manuals.

K. Warranties: Samples of special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A company in continuous business at least three (3) years that is approved by the manufacturer that employs trained workers.

B. Source Limitations: Obtain each type of metal roof panels from single source from single manufacturer.

C. Surface-Burning Characteristics: Provide metal roof panels having insulation core material with the following surface-burning characteristics as determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

D. Fire-Resistance Ratings: Where indicated, provide metal roof panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
2. Combustion Characteristics: ASTM E 136.

E. Mockups: Build in-place mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical roof eave**,** including fascia, and soffit as shown on Drawings; approximately four panels wide by full eave width, including insulation, under-layment, attachments, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

F. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, metal roof panel Installer, metal roof panel manufacturer's representative, deck, purlin and rafter Installer, and installers whose work interfaces with or affects metal roof panels including installers of roof accessories and roof-mounted equipment.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal roof panel installation, including manufacturer's written instructions.
4. Examine deck substrate, purlin and rafter conditions for compliance with requirements, including flatness and attachment to structural members.
5. Review structural loading limitations of deck, purlins and rafters during and after roofing.
6. Review flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
7. Review governing regulations and requirements for insurance, certificates, and testing and inspecting if applicable.
8. Review temporary protection requirements for metal roof panel assembly during and after installation.
9. Review roof observation and repair procedures after metal roof panel installation.
10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

G. Manufacturer’s Roofing Systems On-Site Field Inspections:

1. Provide Manufacturer’s Roofing Technical Representative to conduct on-site field inspections with the Roofing Contractor at the beginning of roofing installation and at the completion of roof construction.
2. Provide additional On-Site roofing technical service when requested by the Contractor.
3. Submit written reports of all meetings to the Architect within ten (10) calendar days.

SECTION 07 4113
METAL ROOF PANELS – ADDENDUM #2

1.7 DELIVERY, STORAGE, AND HANDLING

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

B. Unload, store, and erect metal roof panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal roof panels on platforms or pallets, covered with suitable weather-tight and ventilated covering. Store metal roof panels to ensure dryness. Do not store metal roof panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Protect strippable protective covering on metal roof panels from exposure to sunlight and high humidity, except to extent necessary for period of metal roof panel installation.

E. Protect foam-plastic insulation as follows:

1. Do not expose to sunlight, except to extent necessary for period of installation and concealment.
2. Protect against ignition at all times. Do not deliver foam-plastic insulation materials to Project site before installation time.
3. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit metal roof panel work to be performed according to manufacturer's written instructions and warranty requirements.

B. Field Measurements: Verify actual dimensions of construction contiguous with metal roof panels by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

B. Coordinate metal roof panels with rain drainage work, flashing, trim, and construction of decks, purlins and rafters, parapets, walls, and other adjoining work to provide a leak-proof, secure, and noncorrosive installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal roof panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing, cracking, or puncturing.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Two (2) years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal roof panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: Twenty (20) years from date of Substantial Completion.

C. Special Weather-tightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace metal roof panel assemblies that fail to remain weather-tight, including leaks, within specified warranty period.

1. Weather-tight Warranty Period: Five (5) years from date of Substantial Completion.

D. Special Weather-tightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weather-tight, including leaks, within specified warranty period.

1. Warranty Period: Twenty (20) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANEL MATERIALS

A. Metallic-Coated Steel Sheet: Restricted flatness steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation; structural quality. Provide 0.40 inch (1.02 mm) minimum metal thickness.
2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, Class AZ50 coating designation, Grade 40 (Class AZM150 coating designation, Grade 275); structural quality. Provide 0.050 inch (1.27 mm) minimum metal thickness
3. Surface: Smooth finish.
4. Exposed Coil-Coated Finish:

a. 2-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
b. 3-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare,

pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

d. Plastisol: Epoxy primer and vinyl plastisol topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 3.8 mil (0.97 mm) for topcoat.

5. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

B. Aluminum Sheet: Coil-coated sheet, ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer, with temper as required to suit forming operations and structural performance required. Provide 0.050 inch (1.27 mm) minimum metal thickness.

1. Surface: Smooth finish.
2. Exposed Coil-Coated Finish:

a. 2-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

b. 3-Coat Fluoropolymer: AAMA 620. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 0.8 mil (0.02 mm) for topcoat.

d. Plastisol: Epoxy primer and vinyl plastisol topcoat; with a dry film thickness of not less than 0.2 mil (0.005 mm) for primer and 3.8 mil (0.97 mm) for topcoat.

3. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

C. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal roof panels and remain weathertight; and as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: 30 to 40 mils (0.76 to 1.0 mm) thick minimum, consisting of slip-resisting, polyethylene-film top surface laminated to layer of butyl or SBS-

modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by under-layment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
3. Products: Subject to compliance with requirements, provide one of the following:
   a. Carlisle Coatings & Waterproofing Inc., Div. of Carlisle Companies Inc.; CCW WIP 300HT.
   b. Grace Construction Products; a unit of Grace, W. R. & Co.; Ultra.
   c. Henry Company; Blueskin PE200 HT.
   d. Metal-Fab Manufacturing, LLC; MetShield.
   e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

B. Felts: ASTM D 226, Type II (No. 30) or Type I (No. 15), asphalt-saturated organic felts.

C. Slip Sheet: Manufacturer's recommended slip sheet, of type required for application.

2.3 MISCELLANEOUS METAL FRAMING

A. Miscellaneous Metal Framing, General: ASTM C 645, cold-formed metallic-coated steel sheet, ASTM A 653/A 653M, G40 (Z120) hot-dip galvanized or ASTM A 653/A 653M, G60 (Z180) hot-dip galvanized or coating with equivalent corrosion resistance unless otherwise indicated.

B. Hat-Shaped, Rigid Furring Channels:

1. Nominal Thickness: 0.040 inch (1.02 mm), unless otherwise indicated.
2. Depth: 1-1/2 inches (38 mm), unless otherwise indicated.

C. Cold-Rolled Furring Channels: Minimum 1/2-inch- (13-mm-) wide flange.

1. Nominal Thickness: As required to meet performance requirements or 0.064 inch (1.63 mm), minimum.
2. Depth: As indicated, 3/4 inch (19 mm).
3. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with nominal thickness of 0.040 inch (1.02 mm).
4. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.57-mm-) diameter wire, or double strand of 0.048-inch- (1.22-mm-) diameter wire.

D. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), and depth required to fit insulation thickness indicated.

1. Nominal Thickness: As required to meet performance requirements, 0.025 inch (0.64 mm).

E. Fasteners for Miscellaneous Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten miscellaneous metal framing members to substrates.

2.4 MISCELLANEOUS MATERIALS

A. Panel Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide exposed fasteners with heads matching color of metal roof panels by means of plastic caps or factory-applied coating. Provide EPDM, PVC, or neoprene sealing washers.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 STANDING-SEAM METAL ROOF PANELS

A. General: Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weather-tight installation.

1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
2. Aluminum Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1637.

B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels, and snapping panels together.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Architectural Building Components.
   b. Architectural Roofing and Siding, Inc.
   c. CENTRIA Architectural Systems.
   d. Fabral.
   e. Metecno-Morin; Division of Metecno Inc.
   f. Petersen Aluminum Corporation.
2. Manufacturer’s Product:
   a. Color and Finish: As selected by Architect from manufacturer’s full range.

2.6 ACCESSORIES

A. Roof Panel Accessories: Provide components approved by roof panel manufacturer and as required for a complete metal roof panel assembly including trim, copings, fasciae, corner units, ridge closures, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal roof panels.

2. Closure Strips: Closed-cell, expanded, cellular, rubber or cross-linked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weather-tight construction.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.

B. Flashing and Trim: Formed from same material as roof panels, prepainted with coil coating, minimum 0.018 inch (0.45 mm) thick. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers. Finish flashing and trim with same finish system as adjacent metal roof panels.

2.7 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. End Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. End Seams for Other Than Aluminum: Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices of size and metal thickness recommended by SMACNA's "Architectural Sheet Metal Manual" or by metal roof panel manufacturer for application, but not less than thickness of metal being secured.

2.8 FINISHES

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

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal roof panel supports, and other conditions affecting performance of the Work.

B. Examine primary and secondary roof framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been installed within alignment tolerances required by metal roof panel manufacturer.

C. Examine solid roof sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof panel manufacturer.

D. Examine roughing-in for components and systems penetrating metal roof panels to verify actual locations of penetrations relative to seam locations of metal roof panels before metal roof panel installation.

E. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

1. Submit manufacturer’s written roofing report to the Architect within seven (7) days.

3.2 PREPARATION

A. Clean substrates of substances harmful to insulation, including removing projections capable of interfering with insulation attachment.

B. Miscellaneous Framing: Provide and install additional subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Under-layment: Apply primer if required by manufacturer. Comply with temperature restrictions of under-layment manufacturer for installation. Apply at locations indicated on Drawings, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Extend under-layment into gutter trough. Roll laps with roller. Cover under-layment within 14 days.

1. Roof perimeter for a distance up from eaves of **36 inches (914 mm)** beyond interior wall line.
2. Valleys, from lowest point to highest point, for a distance on each side of **18 inches (460 mm)**. Overlap ends of sheets not less than 6 inches (150 mm).
3. Rake edges for a distance of **18 inches (460 mm)**.
4. Hips and ridges for a distance on each side of **12 inches (300 mm)**.
5. Roof to wall intersections for a distance from wall of **18 inches (460 mm)**.
6. Around dormers, chimneys, skylights, and other penetrating elements for a distance from element of **18 inches (460 mm)**.
7. Ice and Water Shield Waterproof Under-layment: Apply waterproof under-layment at eaves. Cover deck from eaves to at least 36 inches (900 mm) inside exterior wall line.

    a. In addition to eaves, apply waterproof under-layment in place of felt under-layment at valleys.

B. Felt Under-layment: Apply at locations indicated on Drawings, in shingle fashion to shed water, and with lapped joints of not less than 2 inches (50 mm).

1. Apply over entire roof surface.
2. Apply on roof not covered by self-adhering sheet under-layment. Lap over edges of self-adhering sheet under-layment not less than 3 inches (75 mm), in shingle fashion to shed water.

C. Apply slip sheet over under-layment before installing metal roof panels.

D. Install flashings to cover under-layment to comply with requirements specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.4 METAL ROOF PANEL INSTALLATION, GENERAL

A. Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

B. Thermal Movement. Rigidly fasten metal roof panels to structure at one and only one location for each panel. Allow remainder of panel to move freely for thermal expansion and contraction. Predrill panels for fasteners.

1. Point of Fixity: Fasten each panel along a single line of fixing located at eave, ridge, center of panel length.
2. Avoid attaching accessories through roof panels in a manner that will inhibit thermal movement.

C. Install metal roof panels as follows:

1. Commence metal roof panel installation and install minimum of **300 sq. ft. (27.8 sq. m.)** in presence of factory-authorized representative.
2. Field cutting of metal panels by torch is not permitted.
3. Install panels perpendicular to purlins.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Provide metal closures at rake edges, rake walls, and each side of ridge and hip caps.

6. Flash and seal metal roof panels with weather closures at eaves, rakes, and perimeter of all openings.
7. Install ridge and hip caps as metal roof panel work proceeds.
8. End Splices: Locate panel end splices over, but not attached to, structural supports. Stagger panel end splices to avoid a four-panel splice condition.
9. Install metal flashing to allow moisture to run over and off metal roof panels.

D. Fasteners:

1. Steel Roof Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized-steel fasteners for surfaces exposed to the interior.
2. Aluminum Roof Panels: Use aluminum or stainless-steel fasteners for surfaces exposed to the exterior and aluminum or galvanized-steel fasteners for surfaces exposed to the interior.
3. Copper Roof Panels: Use copper, stainless-steel, or hardware-bronze fasteners.

E. Anchor Clips: Anchor metal roof panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.

F. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt under-layment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

1. Coat back side of roof panels with bituminous coating where roof panels will contact wood, ferrous metal, or cementitious construction.

G. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal roof panel assemblies. Provide types of gaskets, fillers, and sealants indicated or, if not indicated, types recommended by metal roof panel manufacturer.

1. Seal metal roof panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal roof panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.

1. Install clips to supports with self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
4. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

3.6 FASCIA PANEL INSTALLATION

A. In addition to complying with requirements in "Metal Roof Panel Installation, General" Article, install metal soffit panels to comply with requirements in this article.

B. Metal Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.7 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weather-tight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (600 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.8 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal roof panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines as indicated and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.9 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect metal roof panel installation, including accessories. Report results in writing.

B. Remove and replace applications of metal roof panels where inspections indicate that they do not comply with specified requirements.

C. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.10 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

B. Replace metal roof panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 4113