

**USD 320-Phase 1-Bid Package 3- 2017 Summer  
Work**

**Addendum 4**

**Issue Date: 4-17-17**

Architect: BBN Architects Inc.

MEP: Orazem & Scalora Engineering, P.A.

Construction Manager: Coonrod & Associates Construction Co., Inc.

Owner: USD 320 Wamego

The attached documents and / or items below shall hereby become part of the Construction Documents for the referenced project above.

**Architectural Plans / Specifications**

**ADD 4-1:** Replace entire specification section 074116-Standing Seam Metal Roof Panels with the attached specification section 074116-Standing Seam Metal Roof Panels -Preparation for Re-Roofing.

**ADD 4-2:** Replace entire sheets A110 and A111 with attached A110 and A111.

**ADD 4-3:** Replace Bid Scopes with attached revised Bid Scopes.

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**SECTION 07 41 16 - STANDING-SEAM 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 standing-seam metal roof, fascia panels, ~~substrate boards~~, underlayment, and rigid **composite** insulation.
- B. Related Sections:
  - 1. Section 07 01 50 "Preparation for Reroofing" for removal of existing standing seam metal roofing system and protection of exposed surfaces.
  - 2. Section 07 72 53 "Snow Guards" for prefabricated devices designed to hold snow on the roof surface, allowing it to melt and drain off slowly.

**1.3 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at Project site.
  - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of roof and fascia 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 panel installation, including manufacturer's written instructions.
  - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
  - 5. Review structural loading limitations of deck during and after roofing.
  - 6. Review flashings, special details, drainage, penetrations, equipment curbs, and condition of other construction that affect metal panels.
  - 7. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
  - 8. Review temporary protection requirements for metal panel systems during and after installation.
  - 9. Review procedures for repair of metal panels damaged after installation.
  - 10. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

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**1.4 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.
- B. Shop Drawings:
  - 1. Include fabrication and installation layouts of metal panels; insulation, details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, fasciae, flashings, closures, and accessories; and special details.
  - 2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Calculations: Include calculations with registered engineer seal, verifying roof panel and attachment method resist wind pressures imposed on it pursuant to applicable building codes.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
  - 1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include clips, fasteners, closures, and other metal panel accessories.

**1.5 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

**1.6 CLOSEOUT SUBMITTALS**

- A. Maintenance Data: For metal panels to include in maintenance manuals.

**1.7 QUALITY ASSURANCE**

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

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- C. Benchmark Samples (Mockups): Provide a complete benchmark sample of a complete section of roof system.
  - 1. Once sequence of removal of existing roofing and installation of new materials is established, the Architect will designate a specific roof area for constructing the benchmark sample to demonstrate the complete system.
    - a. Roof Surfaces: Construct at least 400 square feet (36 sq. m).
  - 2. Approval of benchmark does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
  - 3. Approved benchmark shall remain undisturbed throughout the construction period.

**1.8 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.
- D. Retain strippable protective covering on metal panels during installation.
- E. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

**1.9 FIELD CONDITIONS**

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

**1.10 COORDINATION**

- A. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.
- B. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

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**1.11 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems 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 and other materials beyond normal weathering.
  2. Warranty Period: Two 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 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: 20 years from date of Substantial Completion.
- C. Special Weathertightness Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.
1. Warranty Period: 20 years from date of Substantial Completion.

**PART 2 - PRODUCTS****2.1 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
1. Roof Live Load: 20 psf
  2. Flat-Roof Snow Load: 22 psf
  3. Snow Exposure Factor:  $C_e=1.0$
  4. Basic wind speed (3-second gust):
    - a.  $V_{ult} = 120$  mph Ultimate
    - b.  $V_{asd} = 93$  mph Nominal
  5. Wind exposure category: C
  6. Deflection Limits: For wind loads, no greater than 1/240 of the span.

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- B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E 1680 at the following test-pressure difference:
1. Test-Pressure Difference: 1.57 lbf/sq. ft. (75 Pa).
- C. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
1. Test-Pressure Difference: 2.86 lbf/sq. ft. (137 Pa).
- D. Wind-Uplift Resistance: Provide metal roof and fascia panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
1. Uplift Rating: UL 90.
- E. FM Global Listing: Provide metal roof and fascia panels and component materials that comply with requirements in FM Global 4471 as part of a panel roofing system and that are listed in FM Global's "Approval Guide" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
1. Fire/Windstorm Classification: Class 1A- 90.
  2. Hail Resistance: SH.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. 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.

## 2.2 STANDING-SEAM METAL ROOF AND FASCIA PANELS

- A. General: Provide factory-formed metal roof and fascia 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 weathertight installation.
1. Steel Panel Systems: Unless more stringent requirements are indicated, comply with ASTM E 1514.
- B. Vertical-Rib, Snap-Joint, Standing-Seam Metal Roof and Fascia Panels: Formed with vertical ribs at panel edges and smooth striated pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and snapping panels together.
1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; Berridge Cee-Lock or comparable product by one of the following:

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- a. CENTRIA Architectural Systems.
  - b. Fabral.
  - c. MBCI; a division of NCI Group, Inc.
  - d. Petersen Aluminum Corporation.
2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    - a. Nominal Thickness: 0.029 inch (0.74 mm) minimum.
    - b. Exterior Finish: Three-coat fluoropolymer.
    - c. Color: Berridge, Colonial Red.
  3. Clips: Continuous clips with vinyl weatherseal insert to accommodate thermal movement and clip bearing plates for rigid insulation.
    - a. Material: 0.029 inch (0.74 mm) nominal thickness, G90 (Z180) hot-dip zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
  4. Joint Type: Single folded.
  5. Panel Coverage: 16.5 inches (419 mm).
  6. Panel Height: 1.5 inches (38 mm).

~~C. Vertical Rib, Seamed Joint, Standing Seam Metal Roof and Fascia Panels: Formed with vertical ribs at panel edges and smooth striated pan between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels, engaging opposite edge of adjacent panels, and mechanically seaming panels together.~~

- ~~1. Basis of Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; Berridge Zee Lock or comparable product by one of the following:
 
  - ~~a. CENTRIA Architectural Systems.~~
  - ~~b. Fabral.~~
  - ~~c. MBCI; a division of NCI Group, Inc.~~
  - ~~d. Petersen Aluminum Corporation.~~~~
- ~~2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
 
  - ~~a. Nominal Thickness: 0.029 inch (0.74 mm) minimum.~~
  - ~~b. Exterior Finish: Three-coat fluoropolymer.~~
  - ~~c. Color: Berridge, Colonial Red.~~~~

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- ~~3. Clips: Continuous clips with vinyl weatherseal insert to accommodate thermal movement and clip bearing plates for rigid insulation.~~
- ~~a. Material: 0.029 inch (0.74 mm) nominal thickness, G90 (Z180) hot dip zinc coated (galvanized) or aluminum-zinc alloy coated steel sheet.~~
- ~~4. Joint Type: Single folded.~~
- ~~5. Panel Coverage: 16 inches (406 mm).~~
- ~~6. Panel Height: 2.0 inches (51 mm).~~

**~~2.3 SUBSTRATE BOARDS~~**

- ~~A. Substrate Board: ASTM C 1177/C 1177M, glass mat, water resistant gypsum board or ASTM C 1278/C 1278M, fiber reinforced gypsum board.~~
- ~~1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:~~
- ~~a. CertainTeed Corporation.~~
- ~~b. Georgia Pacific Building Products.~~
- ~~c. National Gypsum Company.~~
- ~~2. Thickness: 1/4 inch (6 mm) thick.~~
- ~~3. Surface Finish: Factory primed.~~
- ~~B. Fasteners: Factory coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.~~

**2.42.3 UNDERLAYMENT MATERIALS**

- A. Self-Adhering, High-Temperature Underlayment: Provide self-adhering, cold-applied, sheet underlayment, a minimum of 40 mils (1.02 mm) thick, consisting of slip-resistant, polyethylene-film top surface laminated to a layer of butyl or SBS-modified asphalt adhesive, with release-paper backing. Provide primer when recommended by underlayment 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. Basis-of-Design Product: Subject to compliance with requirements, provide "Grace Ice & Water Shield® HT", GCP Applied Technologies Inc. (formerly Grace Construction Products) or comparable product by one of the following:
    - a. Carlisle Residential; a division of Carlisle Construction Materials.
    - b. Drexel Metals.
    - c. GCP Applied Technologies Inc. (formerly Grace Construction Products).
    - d. Henry Company.
    - e. Owens Corning.



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~~B. Felt Underlayment: ASTM D 226/D 22M, Type II (No. 30), asphalt-saturated organic felts.~~

**2.52.4 COMPOSITE INSULATED ROOF SHEATHING**

- A. Plywood-Surfaced, Polyisocyanurate-Foam Sheathing: ASTM C 1289, Type V with DOC PS 2, Exposure 1, plywood on one face and felt or glass-fiber mat facer on the other surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Atlas Roofing Corporation.
    - b. Cornell Corporation.
    - c. Dow Chemical Company (The).
    - d. Johns Manville; a Berkshire Hathaway company.
    - e. Rmax, Inc.
  2. Polyisocyanurate-Foam Thickness: ~~2-1/8 inches (54 mm)~~**2-3/8 inches (60 mm)**.
  3. CDX Plywood: 5/8 inch (15.9 mm).
  4. Compressive Strength: 25 psi (172 kPa).
  5. Size: 48 by 96 inches (1219 by 2438 mm).
  6. Thickness: ~~2.75 inches (70 mm)~~**3.0 inches (76 mm)**

**2.62.5 MISCELLANEOUS MATERIALS**

- A. Miscellaneous Metal Subframing and Furring: ASTM C 645; cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
1. Closures: Provide closures at eaves and ridges, fabricated of same metal as metal panels.
  2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
  3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels 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 panels.

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- D. Gutters: Formed from same material as roof and fascia panels, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- (2400-mm-) long sections, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Furnish gutter supports spaced a maximum of 36 inches (914 mm) o.c., fabricated from same metal as gutters. Provide wire ball strainers of compatible metal at outlets. Finish gutters to match metal roof and fascia panels.
- E. Downspouts: Formed from same material as roof and fascia panels. Fabricate in 10-foot- (3-m-) long sections, complete with formed elbows and offsets, of size and metal thickness according to SMACNA's "Architectural Sheet Metal Manual." Finish downspouts to match gutters.
- F. Panel Fasteners: Self-tapping screws designed to withstand design loads.
- G. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
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 or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
  3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.
  4. **Vinyl Weatherseal: Manufacturer's standard seal for watertight installations.**

**2.72.6 FABRICATION**

- A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.
- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

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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. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
4. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
  - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal panel manufacturer for application, but not less than thickness of metal being secured.

**2.82.7 FINISHES**

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are unacceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
- C. Steel Panels and Accessories:
  1. Three-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.
  2. 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).

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
  1. Examine primary and secondary roof and fascia framing to verify that rafters, purlins, angles, channels, and other structural panel support members and anchorages have been

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installed within alignment tolerances required by metal roof and fascia panel manufacturer.

2. Examine solid roof and fascia sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal roof and fascia panel manufacturer.
  - a. Verify that air- or water-resistive barriers have been installed over ~~sheathing or backing~~ **composite insulation** substrate to prevent air infiltration or water penetration.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

### ~~3.3 SUBSTRATE BOARD INSTALLATION~~

- ~~A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
  - ~~1. At steel roof decks, install substrate board at right angle to flutes of deck.
    - ~~a. Locate end joints over crests of steel roof deck.~~~~
  - ~~2. Tightly butt substrate boards together.~~
  - ~~3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.~~
  - ~~4. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.~~~~

### 3.43.3 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply at locations indicated below, wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.
  1. Apply over the entire roof and fascia surface.

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**3.53.4 INSULATION INSTALLATION**

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

**C. Installation Over Metal Decking:**

- 1. **Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.**
  - a. **Locate end joints over crests of decking.**
  - b. **Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.**
  - c. **Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.**
  - d. **Fill gaps exceeding 1/4 inch (6 mm) with insulation.**
  - e. **Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.**
    - 1) **Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.**
  - f. **Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.**
  - g. **Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.**
  - h. **Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.**
  - i. **Trim insulation so that water flow is unrestricted.**
  - j. **Fill gaps exceeding 1/4 inch (6 mm) with insulation.**
  - k. **Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.**

~~C. Installation Over Substrate Board:~~

- ~~1. Install base layer of insulation with joints staggered not less than 24 inches (610 mm) in adjacent rows.~~
  - ~~a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.~~
  - ~~b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.~~
  - ~~c. Fill gaps exceeding 1/4 inch (6 mm) with insulation.~~
  - ~~d. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations. Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.~~

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~~D. Felt: Apply felt over plywood face of insulation over the entire roof surface, in shingle fashion to shed water, and with lapped joints of not less than 2 inches (50 mm).~~

**3.63.5 METAL PANEL INSTALLATION**

- A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
1. Shim or otherwise plumb substrates receiving metal panels to be level to 1/4 inch in 20 ft. (6 mm in 6.1 m).
  2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
  3. Locate and space fastenings in uniform vertical and horizontal alignment.
  4. Install flashing and trim as metal panel work proceeds.
  5. Panels should be continuous without end laps.
  6. Align bottoms of metal panels and fasten.
  7. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.
- B. Fasteners: Use stainless-steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Anchor Clips: Anchor metal roof and fascia panels and other components of the Work securely in place, using manufacturer's approved fasteners according to manufacturers' written instructions.
- D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- E. Standing-Seam Metal Roof and Fascia Panel Installation: Fasten metal roof and fascia panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended in writing by manufacturer.
1. Install clips to substrate with self-tapping fasteners.
  2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
  - ~~3. Seamed Joint: Crimp standing seams with manufacturer approved, motorized seamer tool so clip, metal roof and fascia panel, and factory applied vinyl waetherseal are completely engaged.~~
  - ~~4.3.~~ Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied vinyl weatherseal.
  - ~~5.4.~~ Watertight Installation:
    - a. Apply a continuous ribbon of sealant or **vinyl** tape to seal joints of metal panels, using sealant or tape as recommend in writing by manufacturer as needed to make panels watertight.

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- b. Provide sealant or **vinyl** tape between panels and protruding equipment, vents, and accessories.
- c. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

**5. Panel Alignment: Align vertical ribs of roof and fascia panels.**

- F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
  1. Install components required for a complete metal panel system including trim, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal roof and fascia panel manufacturers; or, if not indicated, types recommended by metal roof and fascia panel manufacturer.
- G. 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 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 achieve 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 (610 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).
- H. Gutters: Join sections with riveted and soldered or lapped and sealed joints. Attach gutters to eave with gutter hangers spaced not more than 36 inches (914 mm) o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.
- I. Downspouts: Join sections with telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately 60 inches (1524 mm) o.c. in between.
  1. Provide elbows at base of downspouts to direct water away from building.
- J. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to metal roof panels as recommended by manufacturer.

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**3.73.6 ERECTION TOLERANCES**

- A. Installation Tolerances: Shim and align metal 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.

**3.83.7 FIELD QUALITY CONTROL**

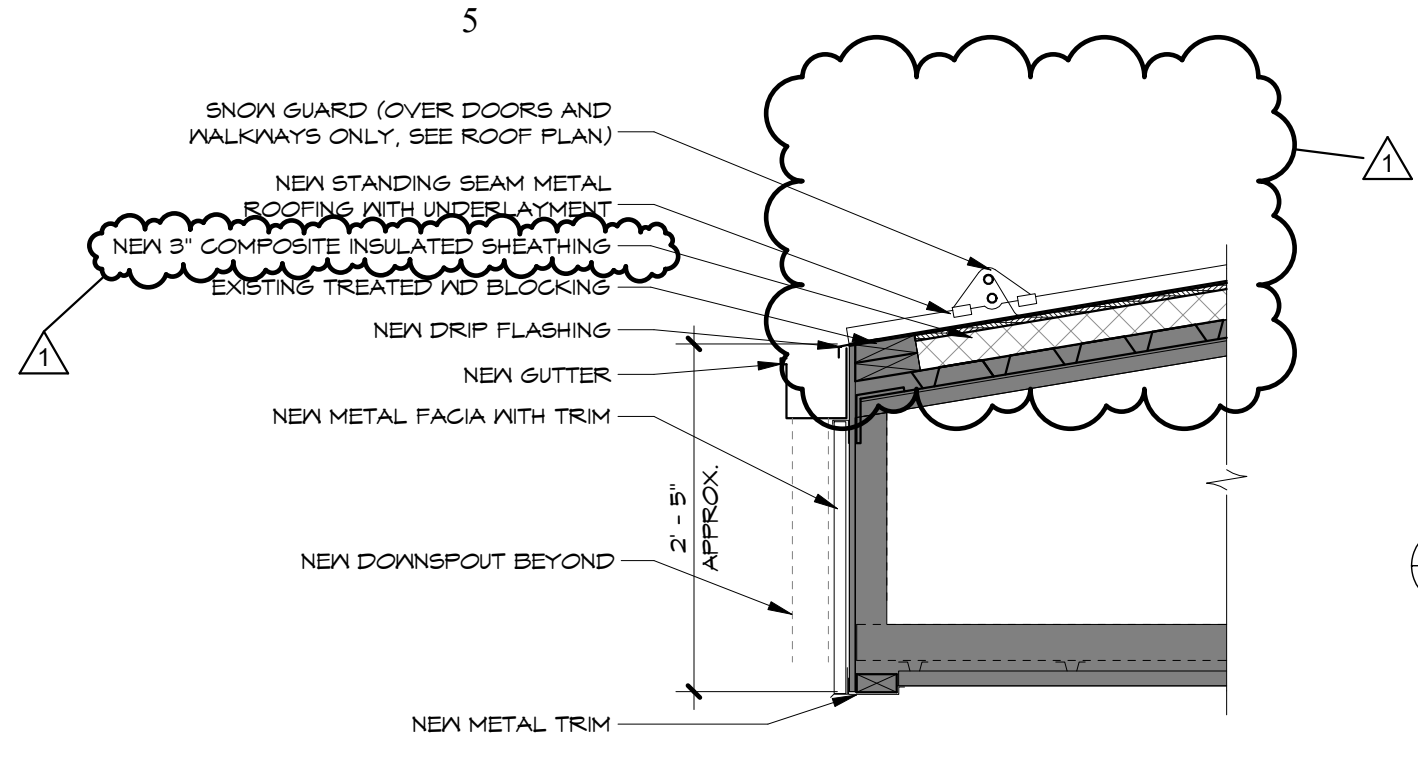
- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect metal roof and fascia panel installation, including accessories. Report results in writing.
- B. Remove and replace applications of metal roof and fascia panels where tests and inspections indicate that they do not comply with specified requirements.
- C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare test and inspection reports.

**3.93.8 CLEANING AND PROTECTION**

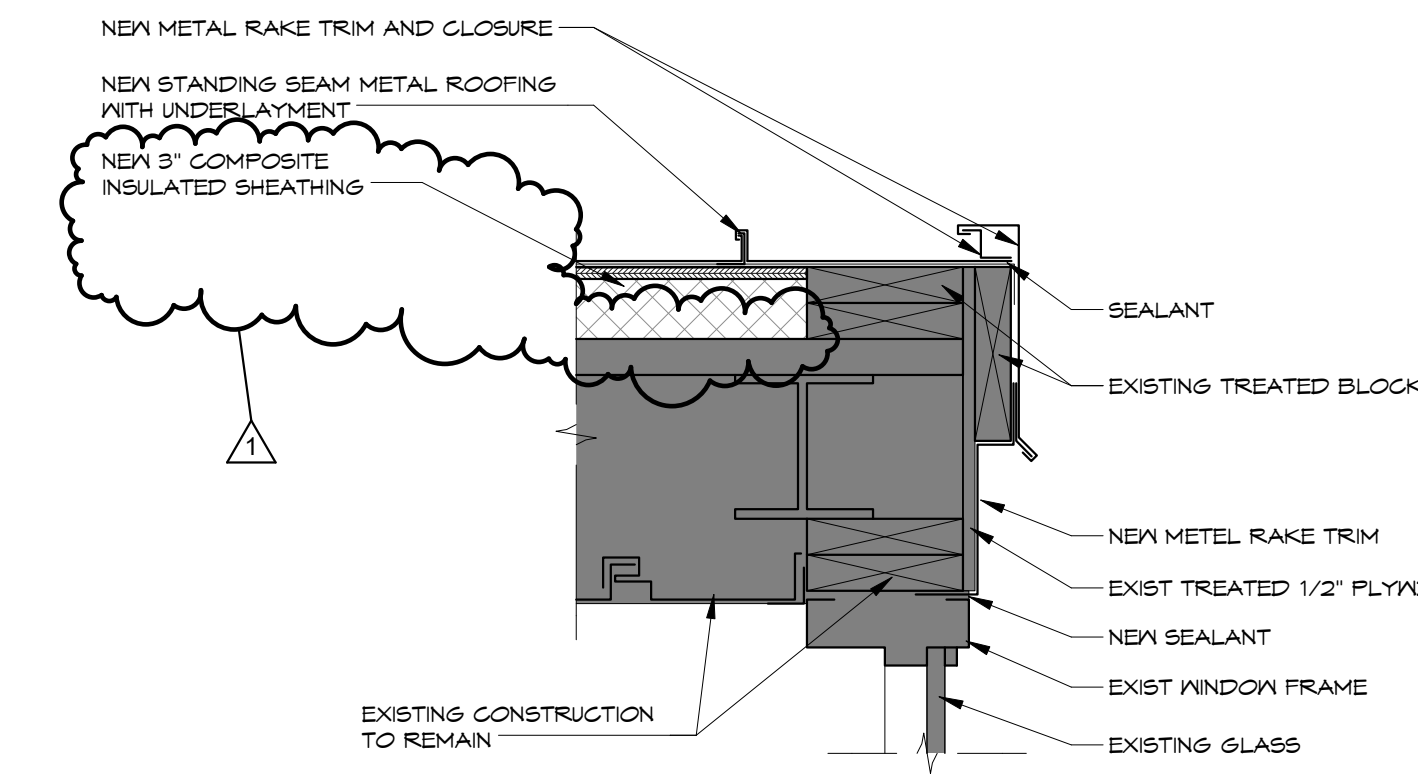
- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 41 16

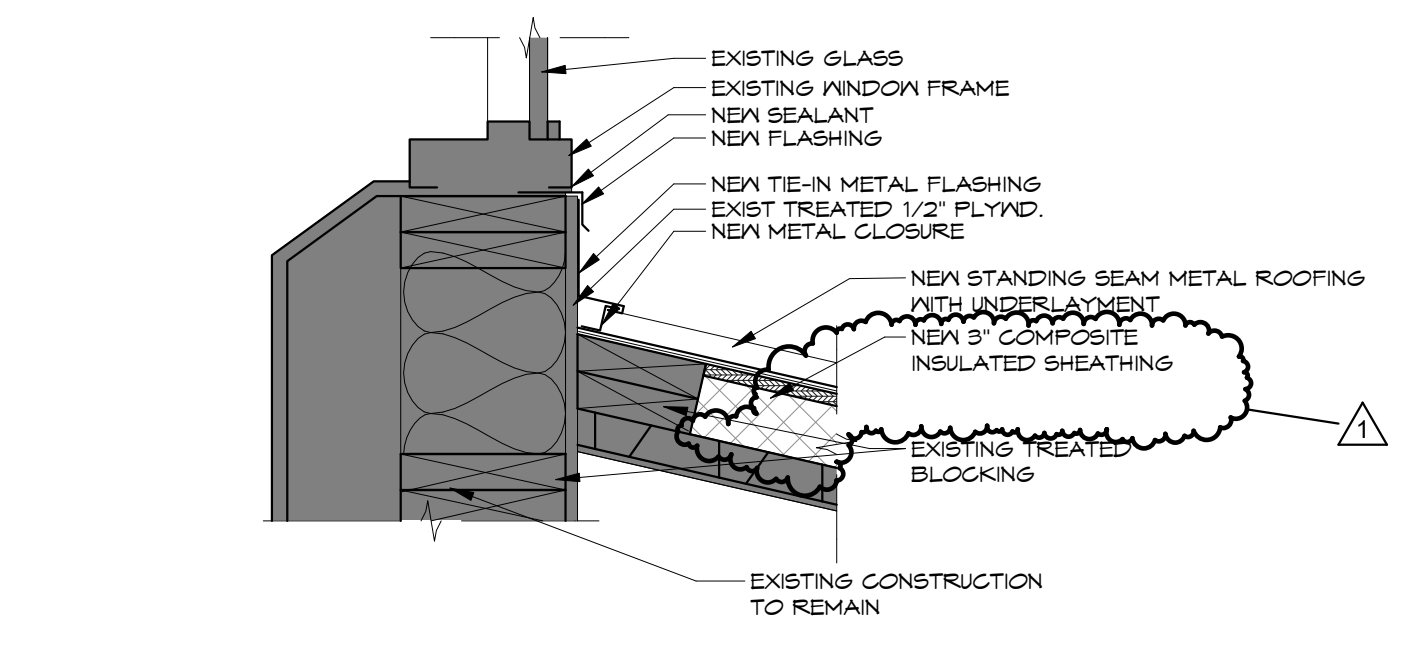




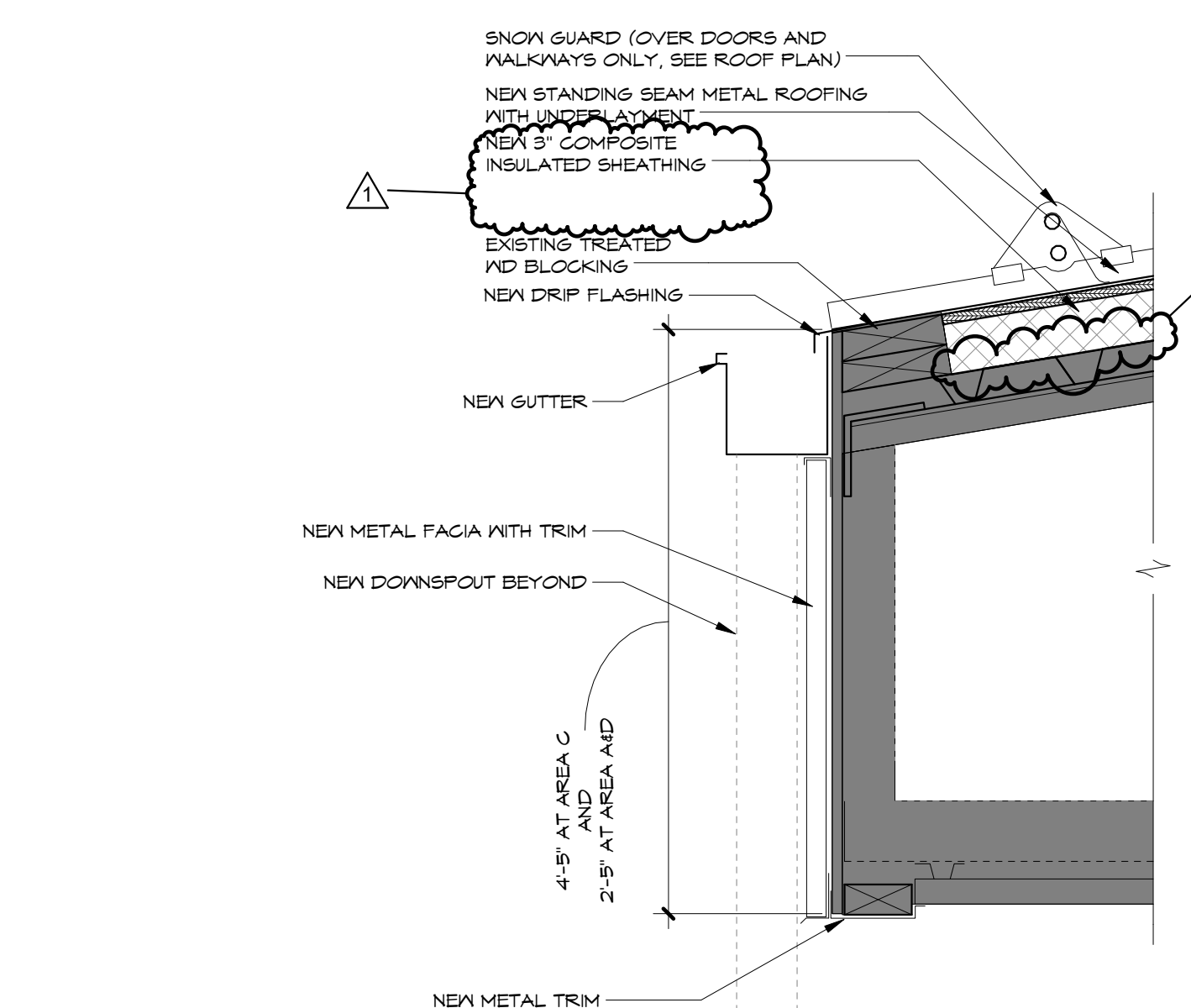
**A5**  
A110  
ROOF DETAIL (10/A12)  
3/4" = 1'-0"



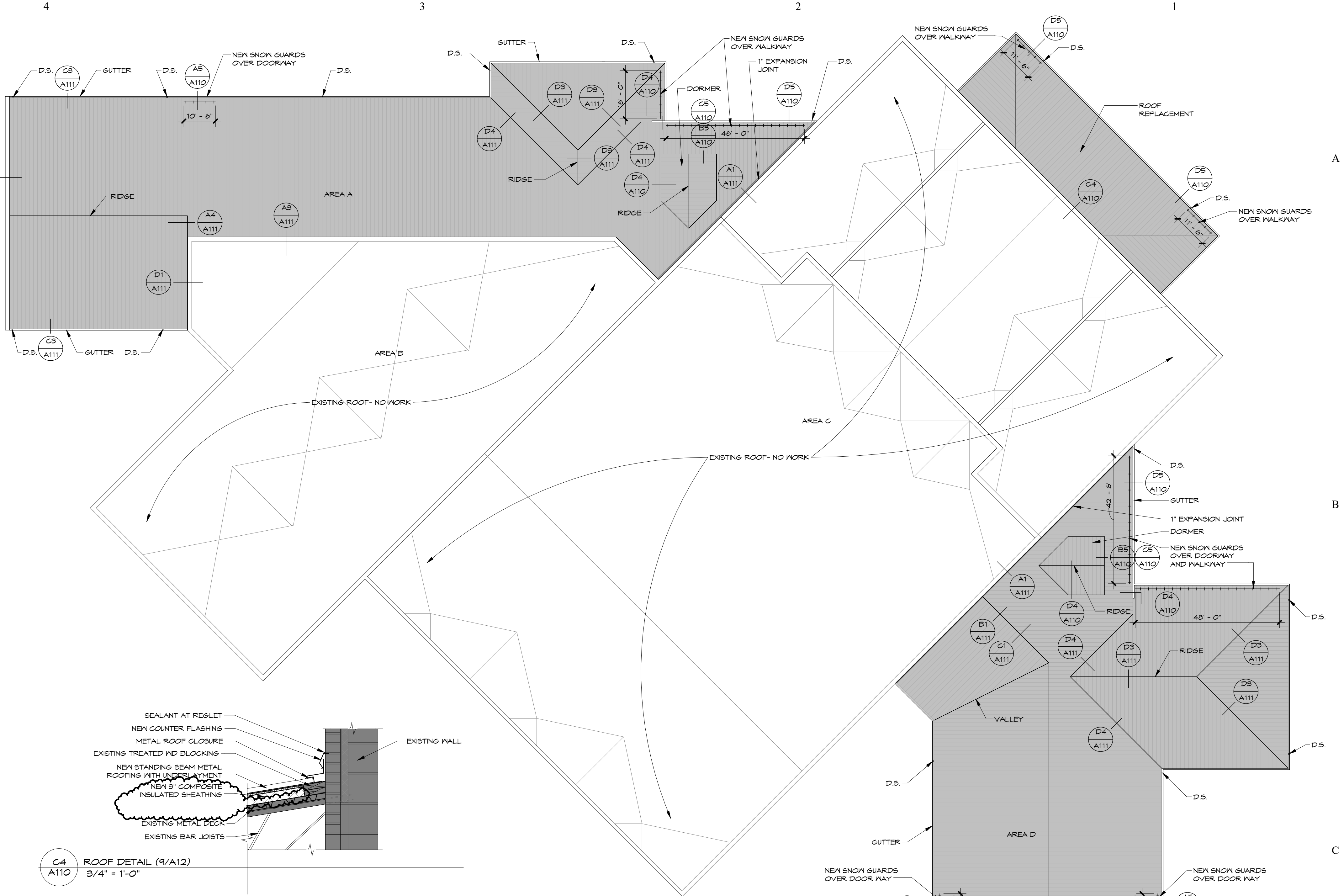
**B5**  
A110  
ROOF DETAIL AT DORMER RAKE (4/A14)  
1 1/2" = 1'-0"



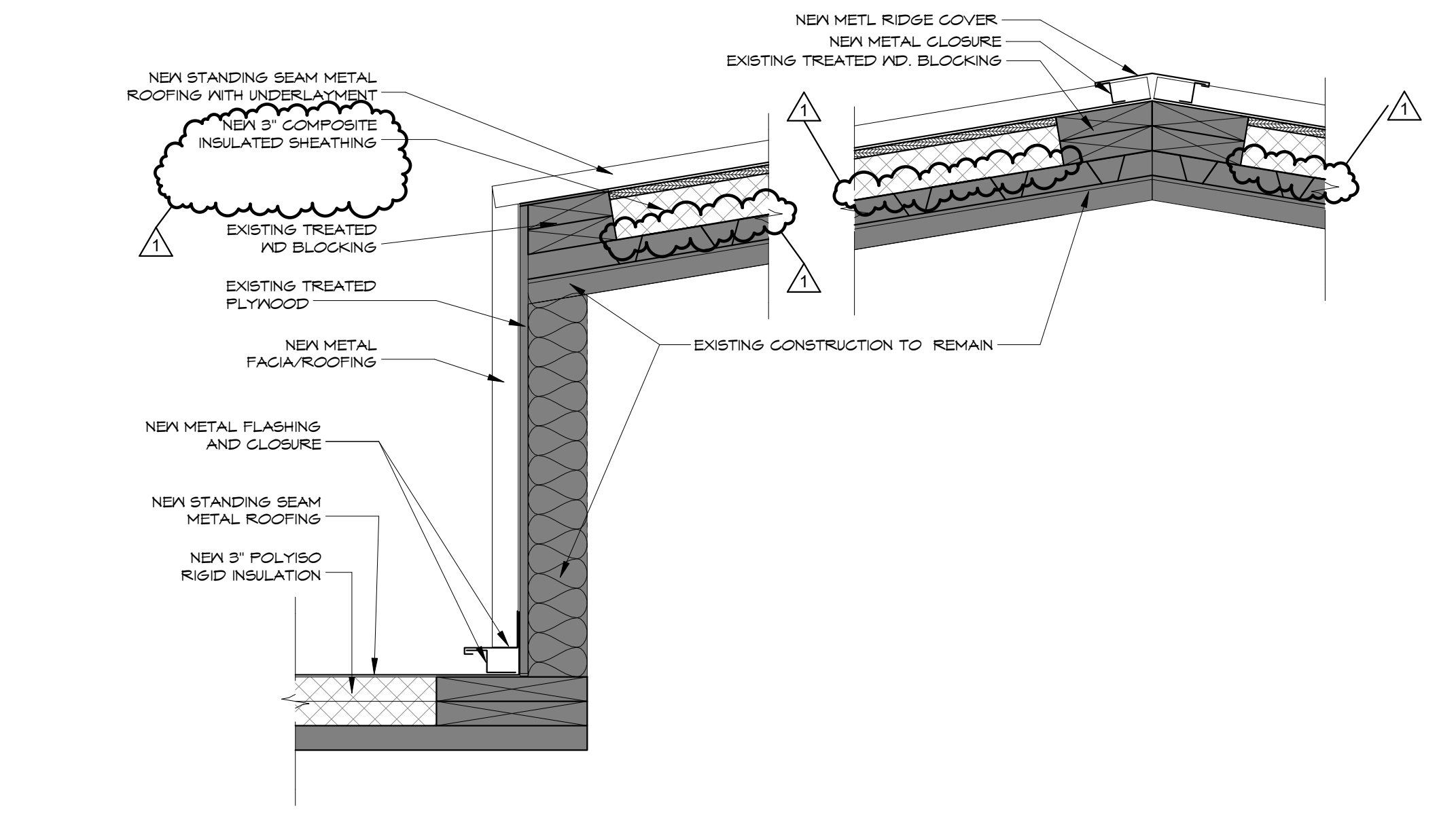
**C5**  
A110  
ROOF DETAIL AT DORMER SILL/CANOPY ROOF (5/A14)  
1 1/2" = 1'-0"



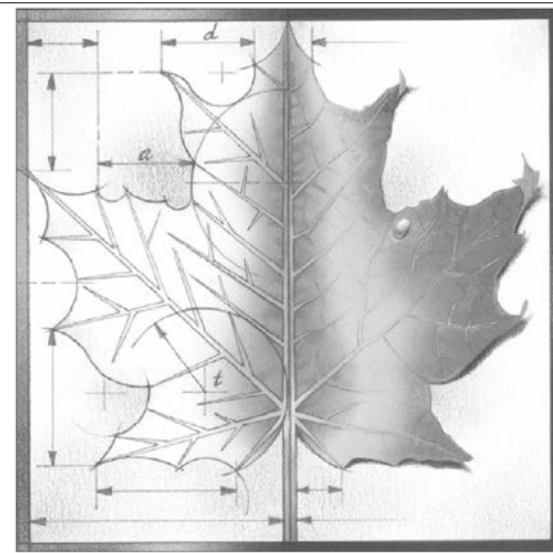
**D5**  
A110  
ROOF DETAIL AT CANOPY EAVE (2/A14)  
1 1/2" = 1'-0"



**C4**  
A110  
ROOF DETAIL (9/A12)  
3/4" = 1'-0"



**D4**  
A110  
ROOF DETAIL AT EAVE AND RIDGE AT DORMER (3/A14) (1/A15)  
1 1/2" = 1'-0"



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REV	DESC	DATE
1	ROOFING	4/14/17



Project Number: ---  
Date: **01/13/16**

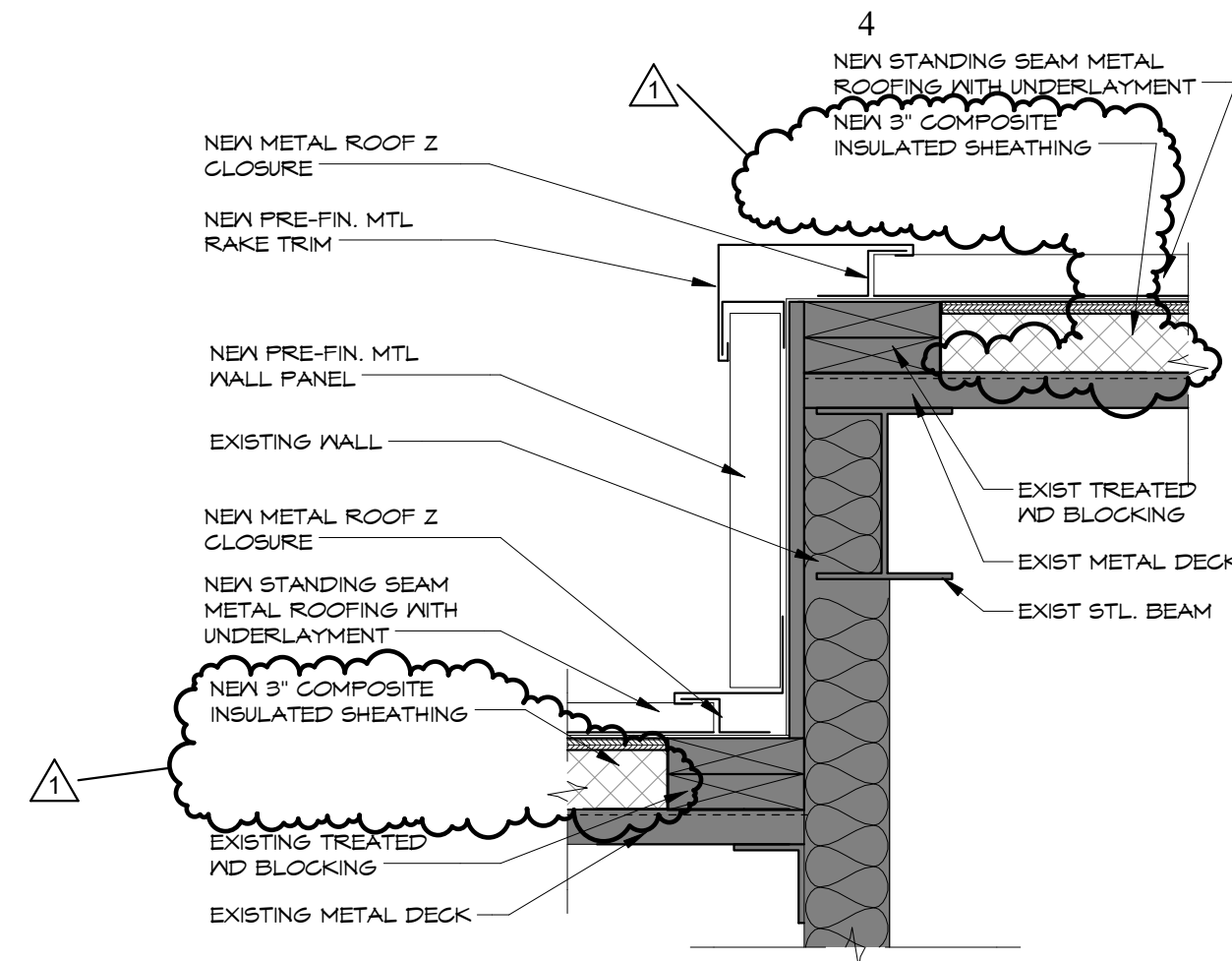
Project Name:  
**USD 320 WAMEGO MIDDLE SCHOOL IMPROVEMENTS**

Project Address:  
**1701 KAW VALLEY ROAD  
WAMEGO, KS 66547**

Sheet Title:  
**ROOF PLAN**

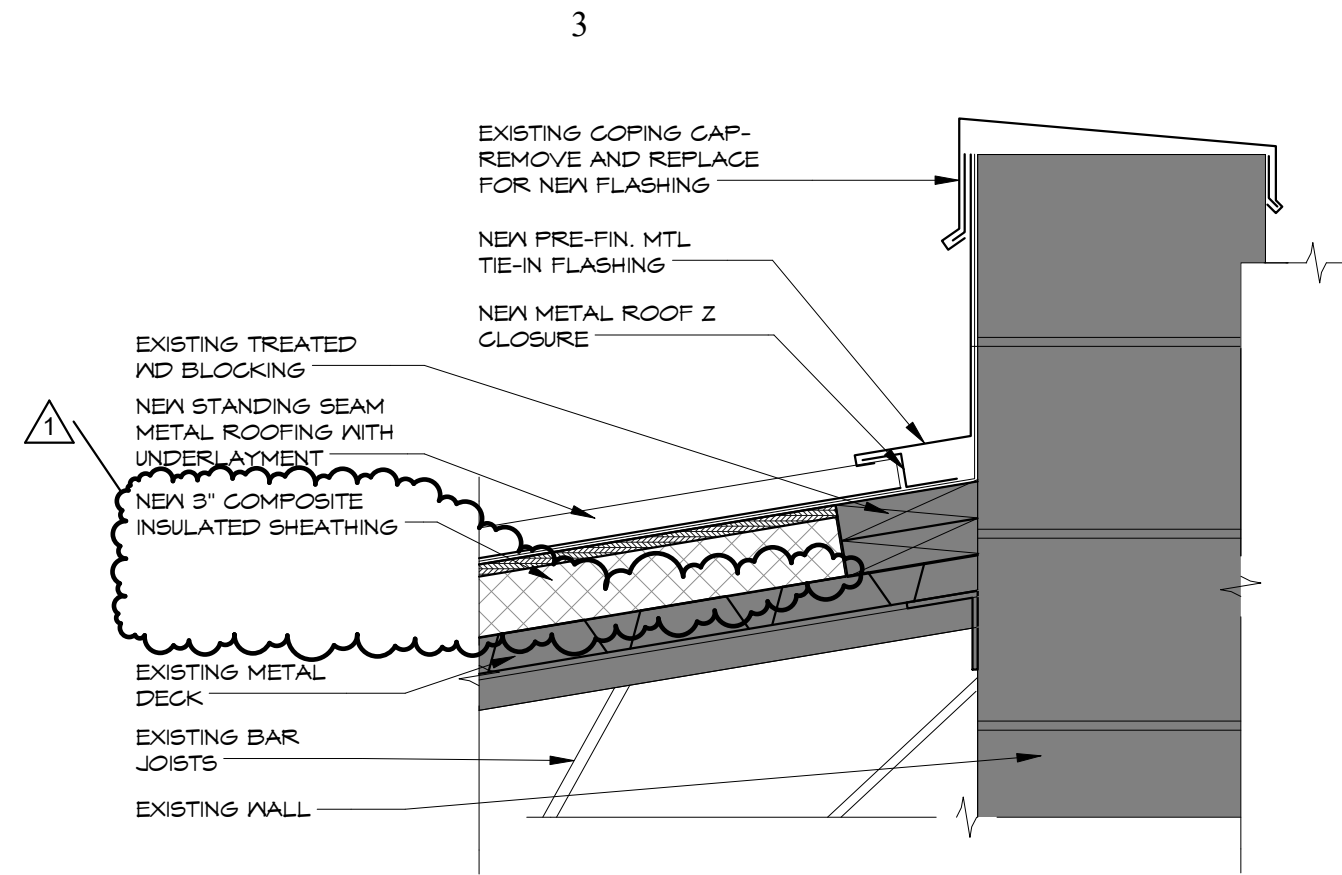
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**A110**

5



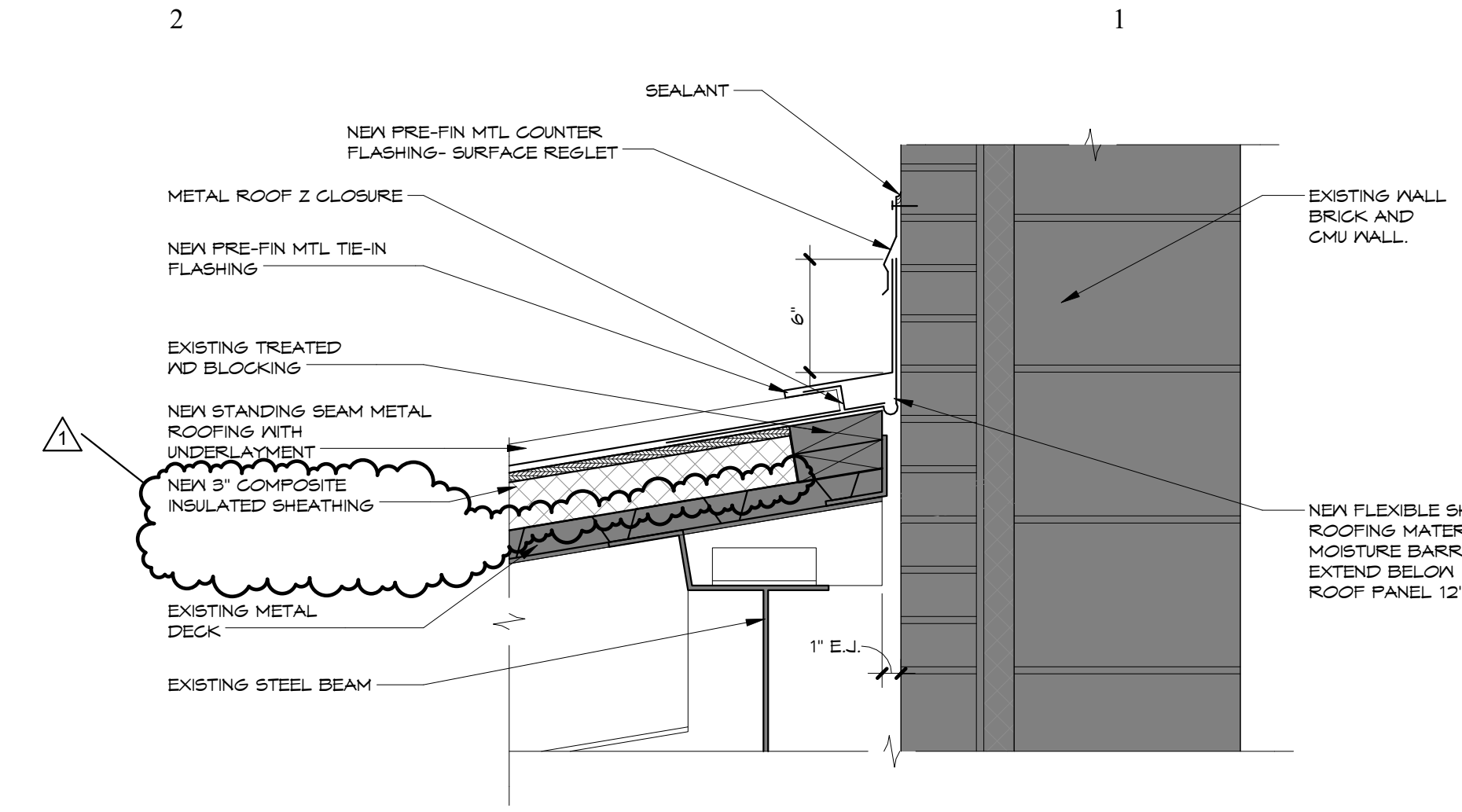
**A4**  
A111  
ROOF DETAIL - ROOF/SIDE WALL AREA  
A (8/A15)  
1 1/2" = 1'-0"

3

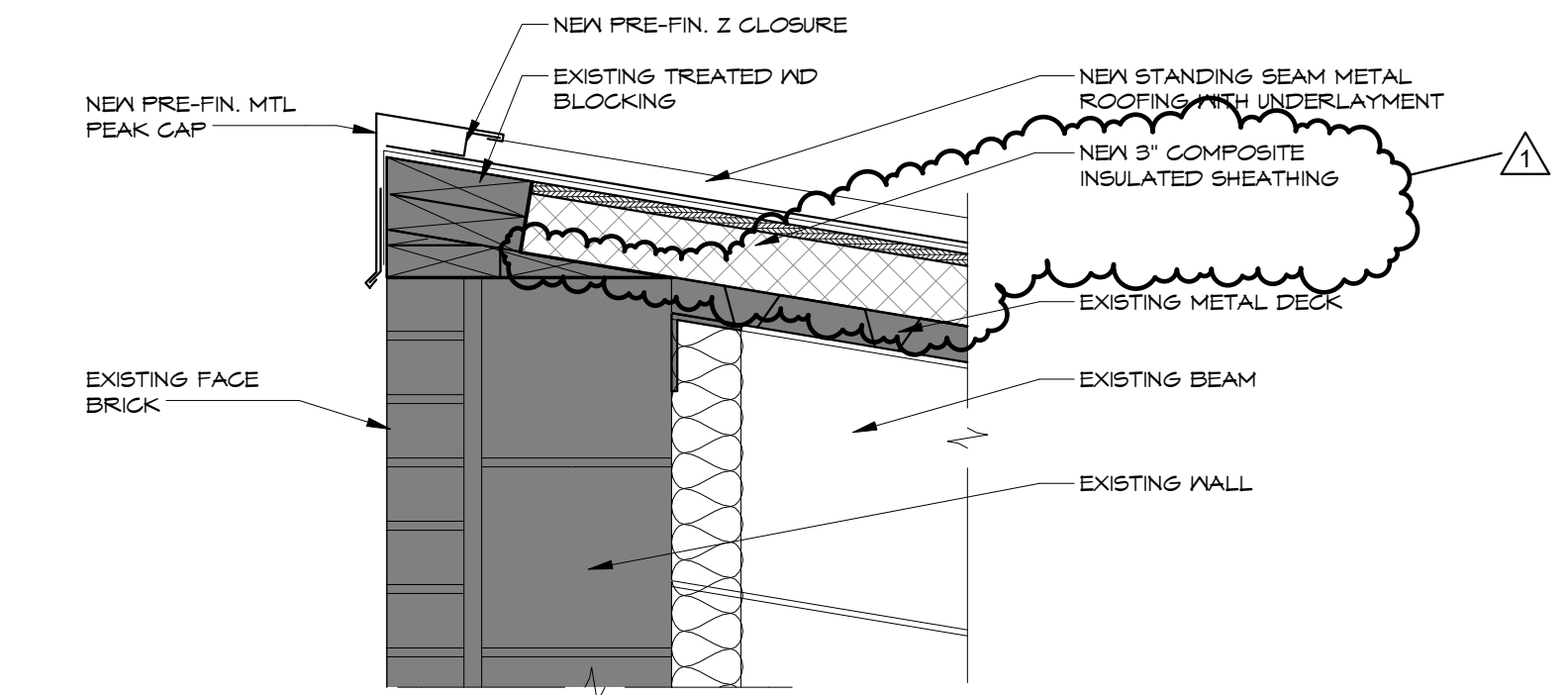


**A3**  
A111  
ROOF DETAIL AREA A - MTL ROOF TO  
AREA B WALL (4/A15)  
1 1/2" = 1'-0"

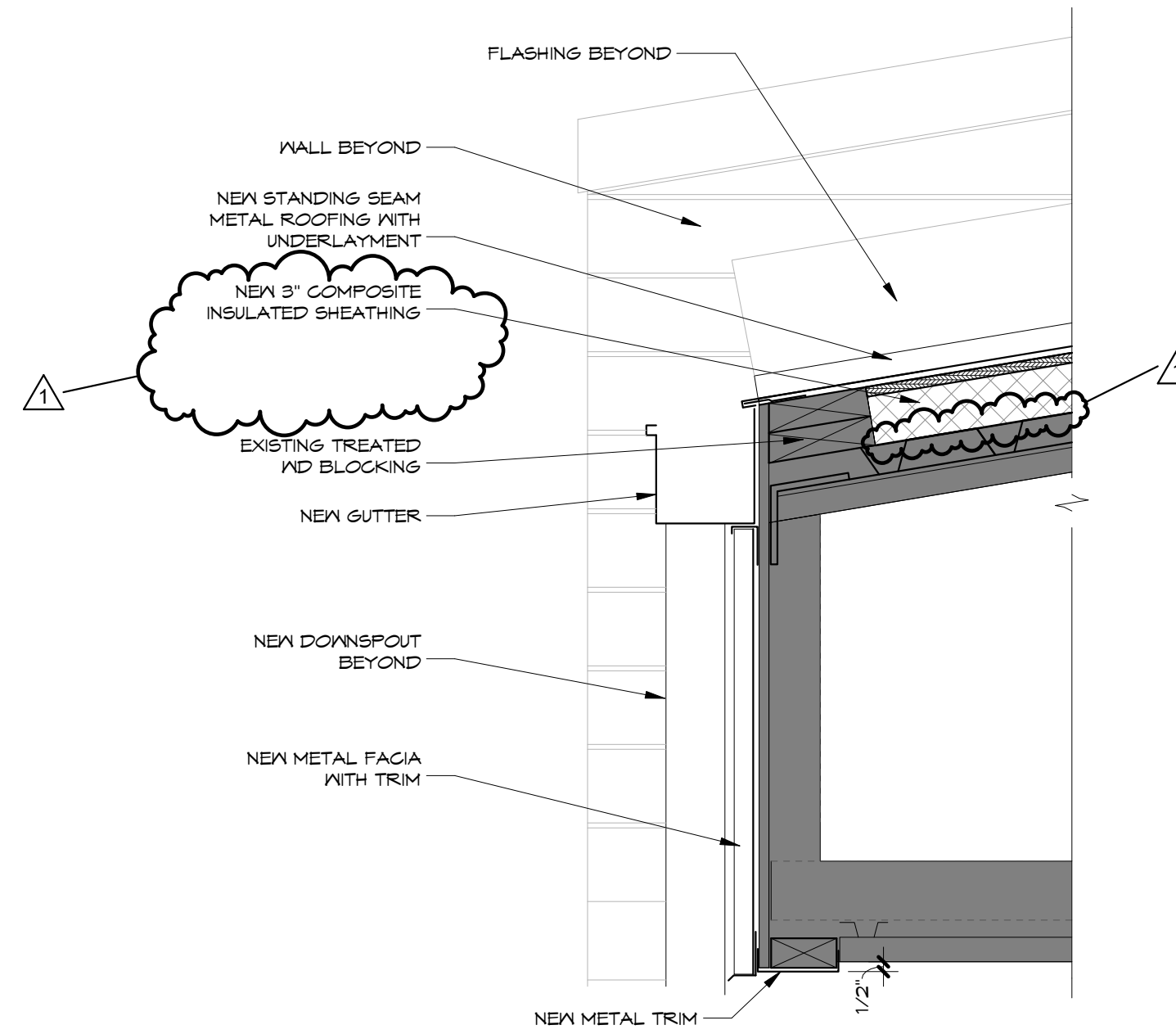
2



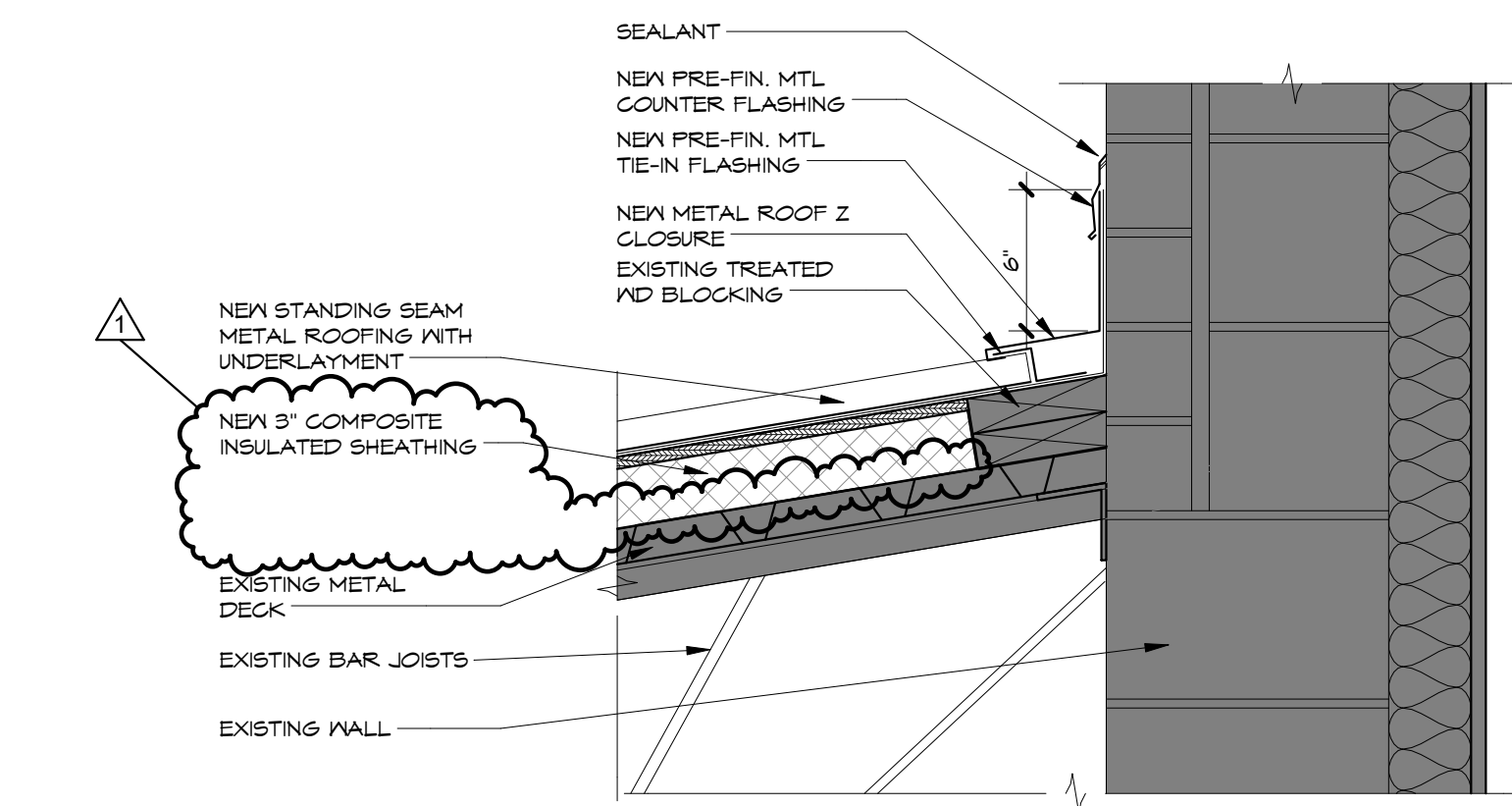
**A1**  
A111  
E.J. DETAL AT METAL ROOF TO WALL  
(1/A15)  
1 1/2" = 1'-0"



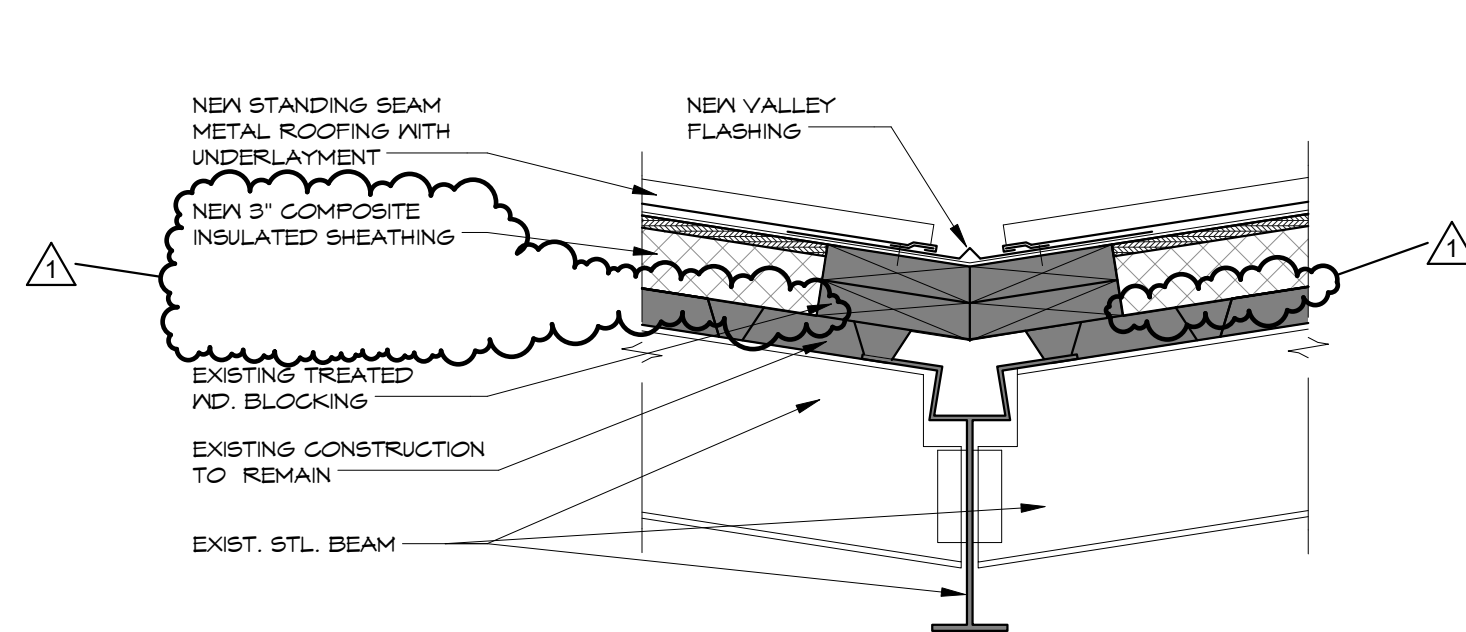
**B1**  
A111  
ROOF DETAIL AT AREA D ROOF PEAK  
(2/A15)  
1 1/2" = 1'-0"



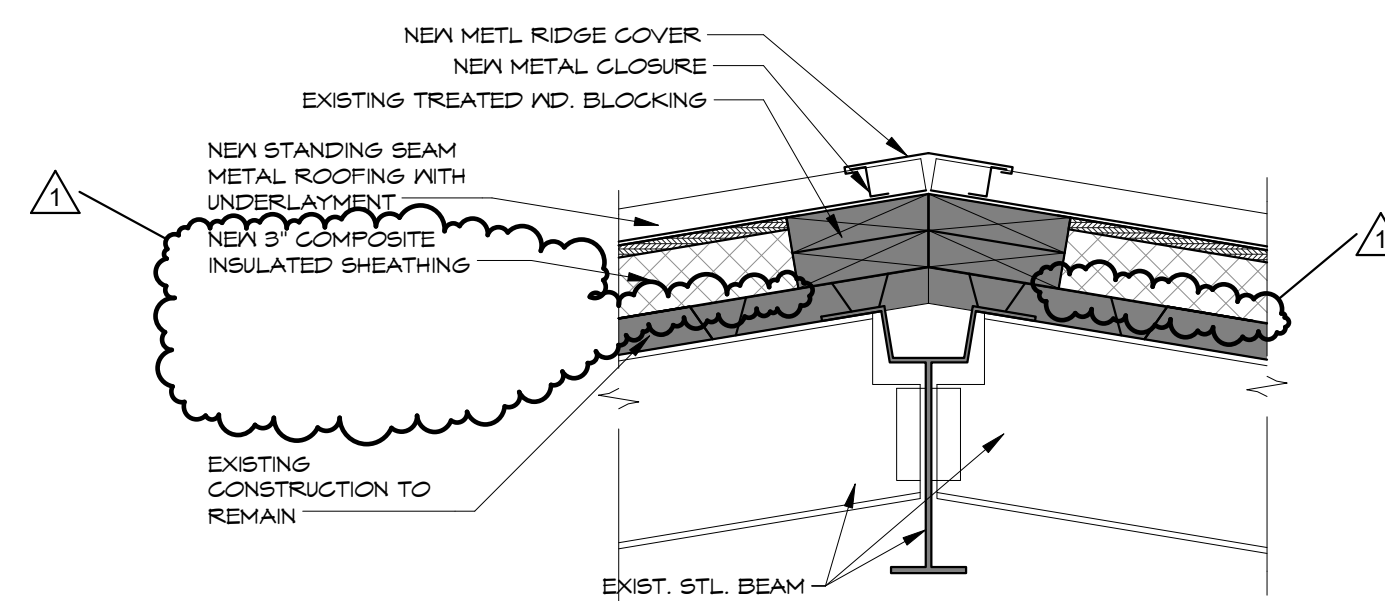
**C3**  
A111  
ROOF DETAIL AT METAL ROOF EAVE  
(5/A15)  
1 1/2" = 1'-0"



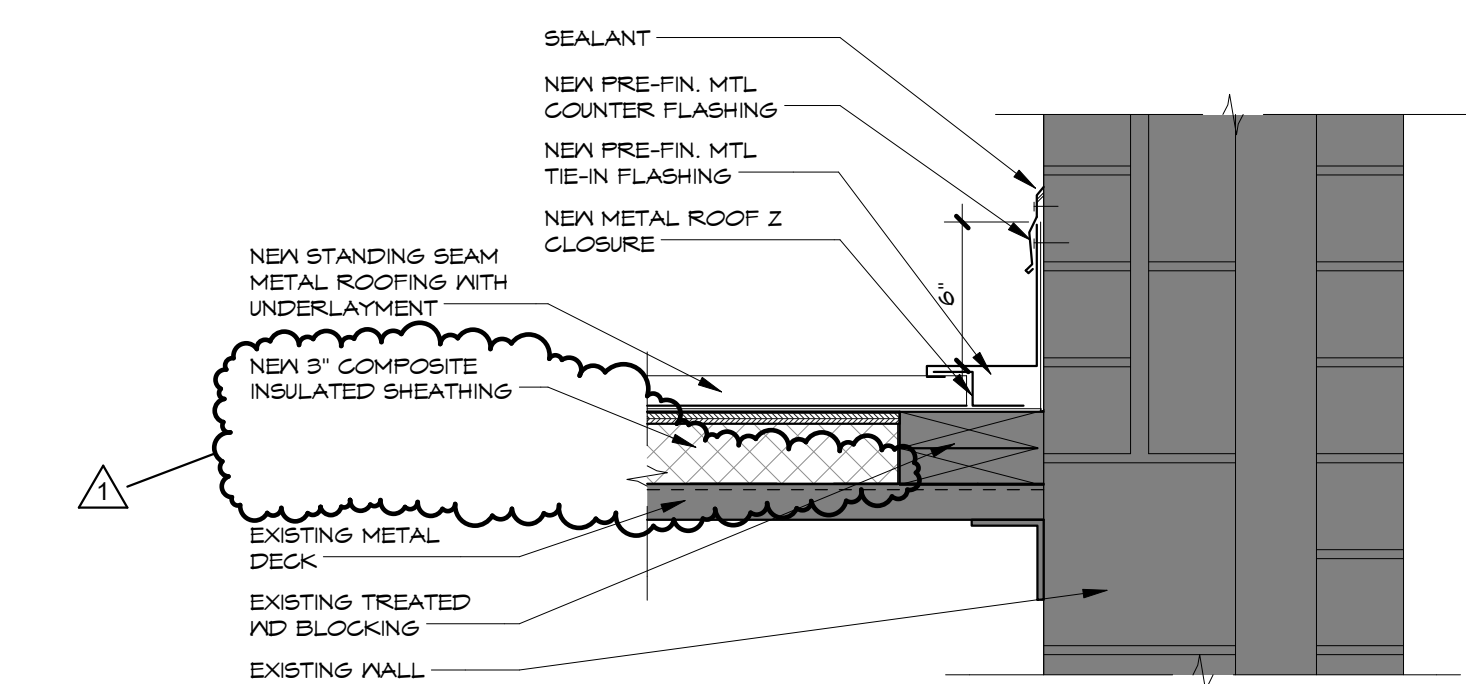
**C1**  
A111  
ROOF DETAIL AREA D PEAK WALL  
(3/A15)  
1 1/2" = 1'-0"



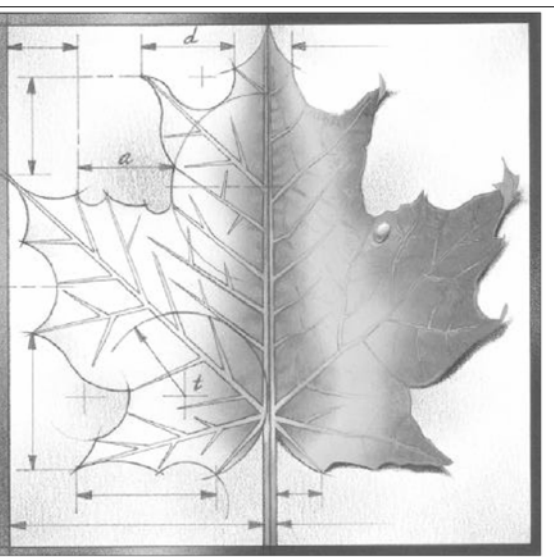
**D4**  
A111  
ROOF DETAIL AT VALLEY AT MTL. ROOF  
(11/A15)  
1 1/2" = 1'-0"



**D3**  
A111  
ROOF DETAIL AT RIDGE/HIP AT MTL.  
ROOF (10/A15)  
1 1/2" = 1'-0"



**D1**  
A111  
ROOF DETAIL - ROOF RAKE/WALL  
(6/A15) (15/A15 SIM.)  
1 1/2" = 1'-0"



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Sheet Title:  
**ROOF DETAILS**

Sheet:  
**A111**

Of:

**USD 320 Wamego Schools - Wamego Phase 1, Bid Package 3- 2017 Summer Work**

*lowest, responsible bidder or combination of bidders to provide the most benefit economically to the owner. The owner, architect, engineer and / or construction manager reserve the right to reject any and all bids.*

**BID SCOPES**

BID SCOPES	Specification Section Name	Description
<b>02A-Demolition</b>		
02.41.19	Selective Demolition (Interior Demolition as required). Reference note ADD3-7 on Addendum 3.	Complete- Labor and equipment to demo items per plans.
<b>03A-Miscellaneous Concrete</b>		
	Replace paving/sidewalk at WMS where new downspout work occurs on southwest side of building, outside of room B124.	Complete- Labor, material and equipment
<b>03B-Light Pole Bases</b>		
	Concrete light pole bases for site lighting	Complete- Labor and equipment to demo items per plans.
<b>07A-Roofing</b>		
07.01.50	Preparation for Reroofing	Complete- Labor, material and equipment
07.41.16	Standing Seam Metal Roof Panels	Complete- Labor, material and equipment
07.72.53	Snow Guards	Complete- Labor, material and equipment
<b>09A-Flooring</b>		
09.65.19	Resilient Tile Flooring	Complete- Labor, material and equipment
09.65.19	Wall Base and Accessories	Complete- Labor, material and equipment
09.68.13	Tile Carpeting	Complete- Labor, material and equipment
<b>09B-Painting</b>		
09.91.23	Interior Painting	Complete- Labor, material and equipment
<b>10A-Plastic Toilet Compartments-Material</b>		
10.21.19	Plastic Toilet Compartments	Furnish material only to jobsite
<b>10B-Plastic Toilet Compartments-Install</b>		
10.21.19	Plastic Toilet Compartments	Installation only
<b>10C-Fire Protection Specialties-Material</b>		
10.44.00	Fire Protection Specialties	Furnish material only to jobsite
<b>10D-Fire Protection Specialties-Install</b>		
10.44.00	Fire Protection Specialties	Installation only
<b>12A-Solid Surfacing Countertops</b>		
12.36.16	Solid Surfacing Countertops	Complete- Labor, material and equipment
<b>22A-Plumbing</b>		
22.00.00	Plumbing	Complete- Labor, material and equipment
<b>23A-HVAC</b>		
23.01.00	Basic Mechanical Requirements	Complete-Labor, material and equipment
23.85.00	Ductwork & Accessories	Complete-Labor, material and equipment
<b>26A-Electrical</b>		
260100-	Basic Electrical Requirements	Complete- Labor, material and equipment
26.16.00	Power Distribution Equipment	Complete- Labor, material and equipment
26.17.00	Motor & Circuit Disconnects	Complete- Labor, material and equipment
26.51.00	Site Lighting	Complete- Labor, material and equipment
27.88.00	Intercomm Systems	Complete- Labor, material and equipment
<b>31A-Sitework / Site Demo</b>		
	Site Demo / Clearing and Grubbing- 8th and Poplar, Middle School	Complete- Labor, material and equipment
	Earthwork-Rough Grading- 8th and Poplar, Middle School	Complete- Labor, material and equipment
	Finish Grading/spreading topsoil ready for landscape work- 8th and Poplar, Middle School	Complete- Labor, material and equipment
	Stabilized construction entrance- 8th and Poplar	Complete- Labor, material and equipment
	Erosion control- 8th and Poplar	Complete- Labor, material and equipment
<b>32A-Paving</b>		
	Paving, Curb and Gutter- 8th and Poplar	Complete- Labor, material and equipment
	Soil Stabilization	Complete- Labor, material and equipment
<b>33A-Downspout Drains</b>		
	Excavation, piping, rock, inlets, HDPE Downspout adapter	Complete- Labor, material and equipment
<b>33B-Landscaping</b>		
	Seeding, mulch, edging, trees/shrubs	Complete- Labor, material and equipment