ROCKY MOUNTAIN REGIONAL OFFICE
BRANCH OF FACILITIES

STATEMENT OF WORK

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF INDIAN AFFAIRS

FOR

Building #2

ROOFING PROJECT

CROW AGENCY, MONTANA

1.0 DEFINITIONS AND ACRONYMS:

"BIA" means Bureau of Indian Affairs
"CO" means Contracting Officer
"COR" means Contracting Officers Representative
"CONTRACTOR" means commercial vendor
"A/E" means the Architectural-Engineering firm
"CM" means Construction Management
"DSRM" means Division of Safety Risk Management
"ECCAA" means estimated construction contract award amount
"QC" means Quality Control
"RFI" means Request for Information
"SOW" means Statement of Work

1.1 INTRODUCTION AND OVERVIEW

The BIA, through a contract will provide for roofing replacement work to be performed in this Statement of Work (SOW). The roofing work shall be based on the enclosed floor drawings/plans for the quarters. All work will adhere to the approved drawings/plans and specifications provided under this SOW. The Contractor will provide professional and contracted services for the roofing replacement of Bureau of Indian Affairs Building #2. **Any additional work must be through an addendum to this agreement based upon the availability of funds and required prior approval**.

1.2 BACKGROUND:

Funding for the roofing replacement project has been provided by Congressional appropriations to the Bureau of Indian Affairs (BIA), Division of Facilities Management and Construction (DFMC).

1.3 PROJECT SCOPE:

This contract includes but not limited to the removal of the existing roofing material and the installation of new roof to include, synthetic felt, ice dam material, asphalt roofing shingles, ridge vents, flashings, roof jacks, penetration boots, and drip edges on building #2 located in Crow Agency, Montana. The contractor shall provide all labor, equipment, materials and oversight to complete the (estimated 180 squares) project in accordance with manufacturer's recommendations and the attached plans and specifications. The contractor shall be responsible for providing all costs associated for the replacement of old roofing material and dispose of said materials outside the reservations boundaries, in accordance with all federal and state regulations. The contractor shall be responsible for storage, final shipping and delivery costs from the factory to the roofing materials

final site. The Contractor shall furnish all supervision, equipment, and labor and other incidentals necessary for the performance of the work required under this SOW. The Contractor shall perform field measurements, and identifying work items so the proposal submitted will be complete.

1.4 OBJECTIVE:

The objective of this SOW is to define and establish a general scope of services necessary for the roofing project which entails the following: preparation of construction documents; and related services for bidding phases and award services; and construction phase services including field testing and inspection services.

1.5 PERIOD OF PERFORMANCE

The period of performance shall be eighty-six days (45) calendar days after Notice-To-Proceed is issued.

1.6 PROJECT LOCATION:

The project is located on the Crow Reservation in Crow Agency, Montana.

2.0 N/A

3.0 REQUIREMENTS/TASKS

1) The Contractor shall provide new asphalt shingled roof on quarters building #2 in compliance with project plans, specifications and supplemental documentation.
   a) Bidders are encouraged to visit the site prior to bidding the project to verify site conditions and area of roof.
   b) All flashing, roofing penetration boots, and roof jacks shall be replaced. Any penetration in need of flashing or roof jacks shall be installed. Simple sealing a roof penetration without flashing or a roof jack shall not be allowed.
   c) The contractor shall install roofing capable of withstanding 130 miles per hour wind speeds.
   d) The contractor shall install roofing at temperatures in accordance with manufactures recommendation to allow for proper sealing.
   e) The contractor shall provide a 48 hour advance notice to the agency facilities manager and occupants, before beginning work on each unit. And shall proceed on each roof until completed.

f) Remove roofing materials shall be disposed of, as regulated by the Federal and State regulations.
g) All material with technical specifications shall be submitted to the contracting officer representative for approval before installation.
h) Daily progress reports shall be submitted weekly
i) Overall construction schedule shall be provided ten days after contract award.
j) Temporary fencing shall be installed and maintained around work area to prevent accidents.
k) Safe access in and out of quarters shall be provided for residents
l) Work shall proceed during normal business hours Monday through Friday(8am – 5pm). Exceptions are extremely rare.
m) OSHA requirement shall be enforced on this project.
n) If damages occur and it is determined by the BIA the damages are a result of work done by the roofing contractor the contractor will be responsible for permanent correction of the damage area to the satisfaction of the BIA.
o) The contract shall use 4" galvanized metal drip edge under the shingles. The drip edge shall extend two inches into the roof and two inches below it. This requirement supersedes the specification.
p) The Contractor shall verify all roof dimensions, pitch, and material required to complete the project.
q) The Contractor shall retain three copies of each submittal for their use and review and provide three copies to the BIA's CO.

CO – Contracting Officer
US-DOI-Bureau of Indian Affairs
Mary King, Contracting Officer
2021 4th Avenue North
Billings, Montana 59101
Telephone: 406 247-7941
Email: Mary.King@bia.gov

US-DOI-Bureau of Indian Affairs
Branch of Facilities RMR
Raymond Standing Bear, C.O.R.
2021 4th Avenue North
Telephone: 406-657-6682; Telefax: 406-657-6682
Email: Raymond.Standingbear@bia.gov

3.2 End Results/Deliverables

All work shall have a professional and finished appearance. The work area shall be free of debris and material that was generated by the roofing project. All roof penetrations shall be sealed. Warranty forms and information shall be completed by the contractor and presented to COR on final completions of project.

3.3 Other Considerations

4. Progress/Compliance

4.0 Government Furnished Materials:

A. None

5.0 Technical Consultation and Coordination:

A. Technical items not specified or substituted in plans or specifications will require prior approval before installation by Contracting Officer.

B. Daily Construction reports shall be submitted weekly to the COR.

C. Project schedule shall be submitted to Contracting Officer for approval prior to the start of any work.

6.0 Inspections and Quality Controls:

The contractor is responsible for all quality control for this project

6.1 Construction Management Services:

The Contractor will provide on-site Construction Management. The Contractor shall be responsible and will monitor the construction job performance.

6.2 Testing During Construction:

The Contractor shall ensure that the proper testing of materials is accomplished in accordance with industry standards. The Contractor shall require the testing to be accomplished under the terms and conditions of the Construction Contract. The Contractor shall review and approve the proposed testing entity and lab before the services are performed.

6.3 Post Construction Services:

6.4 Operation and Maintenance Manuals and Warranties:

The Contractor shall provide the BIA COR with both electronic files and paper copies of the Warranties. Warranty period for this project is **Five** years. The number and type of electronic files shall be mutually agreed upon between the BIA COR and the Contractor.

6.5 Completion Report:

Not Applicable

6.6 Construction Contract Closeout:

The Contractor shall be responsible for the closeout of the contract with the subcontractors. Closeout procedures shall conform to those in the contract clauses. The BIA COR shall be provided with a copy of the signed original report prepared by the Contractor, documenting the closeout.

7.0 Attachments:

END OF STATEMENT OF WORK

SECTION 07 31 13

ASPHALT SHINGLES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Heavyweight asphalt shingles.
   1. Windsor Scotchgard (285).
   2. Or Approved Equal

B. Underlayment and accessories.

C. Vented nail base insulated panels.

1.2 RELATED SECTIONS

1.3 REFERENCES

A. ASTM International (ASTM):
   1. ASTM C209 - Standard Test Methods for Cellulosic Fiber Insulating Board.
   2. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
   3. ASTM D226 - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing.
   4. ASTM D1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
   5. ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   6. ASTM D2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
   7. ASTM D3018 - Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
   8. ASTM D3161 - Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
   9. ASTM D3462 - Standard Specification for Asphalt Shingles Made from Glass Felt and Surfaced with Mineral Granules.
   10. ASTM D4586 - Standard Specification for Asphalt Roof Cement, Asbestos- Free.
   11. ASTM D4601 - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
   12. ASTM D4869 - Standard Specification for Asphalt-Saturated Organic Felt Underlayment Used in Steep Slope Roofing.
   13. ASTM D6757 - Standard Specification for Underlayment Felt Containing Inorganic Fibers Used in Steep-Slope Roofing.
   14. ASTM D7158 - Standard Test Method for Wind Resistance of Asphalt Shingles (Uplift Force/Uplift Resistance Method).
   15. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
   16. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.
   17. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings.

B. Underwriters Laboratory (UL):
   1. UL 790 - Standard Test Methods for Fire Tests of Roof Coverings.
   2. UL 2218 - Impact Resistance of Prepared Roof Covering Materials.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

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

C. Samples for Selection: For the following products, of sizes indicated: For each product specified, two complete sets of color samples representing manufacturer's full range of available colors and patterns.
   1. Asphalt Shingles: Full size.
   2. Asphalt Starter Shingles: Full size.
   3. NEX Polymer Modified Fiberglass Hip and Ridge Shingles: Full size.
   4. Synthetic Underlayment: 12 inches (305 mm) square.
   5. NEX Polymer Modified Self-Adhering Fiberglass Reinforced Underlayment: 12 inches (305 mm) square.
   6. NEX Polymer Modified Fiberglass Reinforced Underlayment: 12 inches (305 mm) square.

1.5 QUALITY ASSURANCE

A. Primary Roofing Materials Manufacturer Requirements:
   1. Manufacturer specified asphalt shingles for a minimum of ten years.
   2. Manufacturer shall be an associate member in good standing of either the National Roofing Contractors Association (NRCA), Western States Roofing Contractors Association (WSRCA), or the Midwest Roofing Contractors Association (MRCA).

B. Installer Qualifications: Approved by the manufacturer to install the specified products and provide the specified warranties.

C. Source Limitations: Obtain hip and ridge shingles, starter, all underlayment products, insulation, and vented nail base from single source, from single manufacturer.

D. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.

E. Exterior Fire-Test Exposure: Class A; ASTM E108 or UL 790, for application and roof slopes indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 PROJECT CONDITIONS

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

1.8 PROJECT MEETINGS

A. Pre-Construction Meeting:
   1. Prior to the start of the roofing project, the Owner will hold a job-site meeting and roof tour to review the scope of work.
   2. Authorized representatives of the Owner, the Roofing Contractor (Project Superintendent), the asphalt shingle manufacturer, other Subcontractors whose work complements, penetrates, or is mounted on the roof or will use the roof as a work platform, will be in attendance.
   3. The agenda for the meeting shall include:
      a. A review of the submittals.
      b. Distribution of approved submittals.
      c. A walkover inspection of the roof.
      d. Establishment of a schedule for the work.
      e. Selection of staging and storage locations.

B. Final Inspection: Following the completion of the work, a final inspection shall be scheduled by Owner's Representative. Any uncompleted work shall be noted on a punch list. Final payment shall be made only after punch list is completed.

1.9 WARRANTY

A. Standard Warranty: Shingles subjected to terms and conditions of the standard Manufacturer's Limited Warranty. Wind warranty coverage is subject to the shingles being sealed.
   1. Warranty Length: 25 years.
   2. Limited Term Resistance to Wind: 130 mph (209 kph).
   3. Limited Term Resistance to Wind: 140 mph (225 kph).

B. Special Warranty for Polymer Modified Shingles: Manufacturer's standard or customized form, without monetary limitation (NDL), in which manufacturer agrees to repair or replace components of asphalt shingle roofing system that fail in materials or workmanship within specified warranty period. Includes asphalt shingles, flashings, roof insulation, nail base, and other components of roofing system.
   1. Emerald Pro: Limited Lifetime (Dura-Seal, 30 years); Other Structures, 20-50 years

C. Upon project completion and acceptance by Owner, the Roofing Contractor shall promptly provide executed copies of the specified warranties.

D. Furnish a list containing the names and contact telephone numbers of the Roofing Contractor's Service Manager, Superintendent, and Project Manager and the Roofing Contractor's current mailing address.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Malarkey Roofing Products, which is located at: 3131 N. Columbia Blvd. P.O. Box 17217; Portland, OR 97217; Toll Free Tel: 800-545-1191; Tel: 503-283-1191; Fax: 503-289-7644; Email: request info (jkouba@malarkeyroofing.com); Web: WWW.MALARKEYROOFING.COM

B. Substitutions: Approved equals

2.2 SHINGLES

A. Heavyweight Shingles:

1. Heavyweight Shingles (285) as manufactured.
    a. Heavyweight shingles shall hold a Class A Fire Rating.
    b. As manufactured, Heavy Weight Shingles meets the requirements of:
        1) ASTM D7158 Class H, ASTM D3462, ASTM D3161 Class F, ASTM D3018 Type I, ASTM E108 Class A, UL 2218 Class 4 Impact Resistance, and CSA A123.5.
        2) ICC Approval: ESR-3150.
        3) FBC Approval: No. 14809.
        4) Listed with UL and Intertek/WHI.
    c. Performance:
        1) Enhanced Wind Warranty Available: 140 mph (225 kph).
        2) Limited Lifetime Warranty.

2.3 UNDERLAYMENT

A. Polymer Modified, Self-Adhering Fiberglass Underlayment:
1. Product: Ice and Water Seal.
2. As manufactured, Ice and Water Seal meets the requirements of ASTM D1970.
3. Self-adhering sheet shall be nominal 55 mils (1.4 mm) thick.
4. Self-adhering sheet shall be 36 inches (0.91 meter) in width.
5. Two (2) square roll.

B. Synthetic Underlayment:
1. Product: Synthetic Underlayment.
2. As manufactured, Undeerlayment meets the requirements of ASTM D226, ASTM D4869, ASTM E108 Class A, ICC-ES AC188, and CAN/CSA A123.3.
3. FBC Approval: FL23186.
4. Code Approval: CCRR-1082.
5. Sheet shall be nominal 15 ±1 mils (0.4 mm) thick.
6. Sheet shall be 48 inches (1.2 meter) in width.
7. Ten (10) square roll.

2.4 Fasteners:
a. Fasteners shall be equal to the panel depth plus a minimum of 1 inch (25 mm) penetration into the structural substrate.

2.5 RELATED PRODUCTS

A. Plastic Roof Cement conforming to ASTM D4586.

B. Fasteners: Hot Dip Galvanized nails with minimum 3/8 inch (9.5 mm) head.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING IMPORT

A. New and dry roof materials delivered to the job site in containers unopened and undamaged. Manufacturer's products stamped with labels, names, and run codes of manufacture and testing laboratory.

B. Store underlayment materials on ends only. Discard rolls which may have been flattened, creased, or otherwise damaged. Place materials on pallets or wood sleepers. Do not stack palletized materials.

C. Cover underlayment rolls with weatherproof materials secured to prevent materials from becoming exposed to moisture. Use breathable tarps.

D. Disperse materials stored on the roof surface to avoid concentrated loading. Set larger concentrations over structural members.

3.2 ENVIRONMENTAL REQUIREMENTS

A. Application of roofing materials shall not be performed when weather conditions interfere with good roofing practices.

3.3 UNDERLAYMENT AND EDGING

A. Apply specified underlayment as follows:
   1. Slopes of 5 units in 12 units or greater, apply single layer, polymer modified fiberglass or synthetic underlayment laid parallel to eaves, lapping to the 2 inch (51 mm) or 4 inch (102 mm) ply line, and 6 inches (152 mm) on ends, end laps staggered 6 feet (1829 mm) from course to course.
   2. Slopes of 5 units in 12 units or greater in ice dam regions, apply single layer, self-adhering, polymer modified underlayment along eaves to a point 24 inches (610 mm) beyond the interior surface of exterior walls. From there, apply single layer polymer modified fiberglass or synthetic underlayment, lapping over self-adhering underlayment a minimum of 6 inches (152 mm) and continuing up roof, lapping to the 2 inch (51 mm) or 4 inch (102) ply line.
   3. Slopes of less than 5 units in 12 units, apply double layer of specified underlayment laid parallel to eaves, installed shingle fashion with 50% side laps and 6-inch (152 mm) end laps.
   4. Slopes of less than 5 units in 12 units in ice dam regions, apply single layer of self-adhering underlayment along eaves to a point 24 inches (610 mm) beyond the interior surface of exterior walls. From there, apply double layer, polymer modified fiberglass or synthetic underlayment, lapping over self-adhering underlayment a minimum of 6 inches (152 mm) and continuing up roof with 50% side laps and 6-inch (152 mm) end laps.
   5. In ice dam regions, application of self-adhering underlayment is recommended on the rake edges of roof following eave application.

B. Valleys: Only those valley installations listed in the manufacturer's installation instructions shall be permitted.
   1. Regardless of valley method used, begin application by centering a full-width valley liner of self-adhering underlayment to the roof deck in all valleys.
   2. The field underlayment is then woven through the valley over the layer of self-adhering underlayment or lapped 6 inches (152 mm) on each side. If fastening the field underlayment, be aware no fasteners are allowed within 6 inches (152 mm) of the valley centerline.

C. Pipe Flashing: Apply ASTM D1970 underlayment around the pipe, sealing it to the field underlayment prior to installing the metal pipe flashing. Install and secure the metal jack so the bottom flange laps over onto the shingles. Side and top flanges shall have shingles lapping onto the flange. Shingles that lap onto flanges shall be sealed to the metal with asphalt roof cement conforming to ASTM D4586.

D. Perimeter Flashing: Use non-corrosive, 26-gauge (0.55 mm) sheet metal drip edge flashing. Install prior to underlayment on eave edges of roof and then along rake edges over the ends of installed underlayment. Install drip edge with flanges large enough (recommend 4-inch (102 mm) flanges) to completely cover roof edges. Secure with galvanized (or compatible) roofing nails, centered on the top flange at 8 to 10 inches (203 to 254 mm) O.C. or according to local code requirements.

3.4 APPLICATION OF SHINGLES

A. Shingle Application; 6-3/8 inches (162 mm) Offset - Diagonal Pattern:
   1. Starter courses: Use starter shingles or self-sealing 3-tab shingles with the tabs cut off; apply to eave and rake edges of roof.
   2. Apply the initial, full-length starter shingle on a lower corner of roof. The starter course shall overhang the edge metal 1/4 to 3/4 inch (6 mm to 19 mm). Fasten with four (4) nails, 1-1/2 inches to 3 inches (38-76 mm) up from the eave with one fastener 1 inch (25 mm) from each end and the remaining two evenly spaced on the same line as the end fasteners.
   3. Continue starter course across the roof, butting the shingles loosely together to avoid buckling and fastening in place.
   4. Starter course: Trim one end of the first starter shingle, 6-3/8 inches (162 mm), and lay it over the starter course, positioning the starter shingle so the full color blend overhangs the starter course by approximately 1/8 inches (3 mm). Fasten with four (4) nails in-between the paint lines, approximately 1 inch (25 mm) from each side of the starter and the remaining two evenly spaced. Continue across the roof, butting the shingles loosely together to prevent buckling and fastening in place.
   5. First course: Start with a full shingle applied directly over the starter course at the same lower corner of the roof. Maintain the 1/8 inch (3 mm) overhang previously established, and secure with fasteners.
   6. Second course: Cut 6-3/8 inches (162 mm) off one end of a full shingle and apply the remaining 31-7/8 inch (810 mm) piece over the underlying first course shingle. The bottom edge of the shingle tabs should line up with the top edge of the cutouts in the underlying shingle, exposing the first course 5-3/4 inches (146 mm). Secure with fasteners.
   7. Another way to position it is to align the right side with the right outside notch in the underlying first course shingle.
   8. Third course: Cut 12-3/4 inches (314 mm) off the rake end of a full shingle and apply the remaining 25-1/2 inch (648 mm) piece over the underlying second course shingle. Position as before, lining up the bottom edge of the shingle tabs with the top edge of the cutouts in the underlying shingle, exposing the second course 5-3/4 inches (146 mm). Secure with fasteners.
   9. Another way to position it is to align the right side with the right outside notch in the underlying second course shingle.
   10. Fourth course: Cut 19-1/8 inches (486 mm) off the rake end of a full shingle and apply the remaining 19-1/8 inch (486 mm) piece over the underlying third course shingle.
   11. Position as before, lining up the bottom edge of the shingle tabs with the top edge of the cutouts in the underlying shingle, exposing the third course 5-3/4 inches (146 mm). Secure with fasteners.
   12. Another way to position it is to align the right side with the right outside notch in the underlying third course shingle.
   13. Apply a full shingle adjacent to each of the first four courses to extend the pattern. When fastening, butt ends loosely together to prevent buckling.
   14. Courses five and above: To continue installation on up the roof, repeat the diagonal pattern established in courses one to four.
   15. Strike a chalk line every six courses or so to ensure straight courses. Shingles may be laid from either lower corner of roof. Start at either rake edge and follow layout and cutting instructions as required for proper application. If starting from the right rake, position the left side of cut shingles with the left outside notch in shingles of underlying courses.

B. Valley Installation:
   1. Valley Underlayment: Center a full-width strip of self-adhering underlayment (or equivalent conforming to ASTM D1970) in the valley and apply it directly to the roof deck. Ensure this valley liner is tight to the deck without bridging in the center of the valley. Apply the field underlayment across the valley liner and up the opposite side at least 12" (305 mm) or overlap the valley liner a minimum of 6 inches (152 mm) on

each side. When fastening, none should be placed closer than 6 inches (152 mm) from the valley centerline.

2. Closed-cut valleys: Start on the roof face that has less slope or height. Lay a first course of shingles along the eave, across the valley, and onto the adjoining roof a minimum 12 inches (305 mm). Press shingles well into the break of the valley and fasten no closer than 6 inches (152 mm) from the valley centerline. Add a fastener in the upper corner of the last shingle crossing the valley. Repeat this process with the first course of shingles on the intersecting roof. Note: The first course of shingles is the only one woven in this fashion. Return to the side of the roof you began with, and resume laying shingle courses across the valley and onto the adjoining roof. Complete installation of shingles on that roof face. Snap a chalk line 2 inches (51 mm) from the centerline of the valley on the unshingled side, and begin applying shingle courses there, trimming the ends diagonally to match the centerline angle. Crop the tops of each valley shingle at a 1 inch (25 mm), 45 degree cut. Embed the ends of the cut valley shingles in a continuous 3 inch (76 mm) wide bead of mastic.
3. Open metal valleys: Install minimum 24 inches (610 mm) wide, 26-gauge, metal valley flashing over the valley liner, and secure with fasteners no more than 1 inch (25 mm) from the outside edges at a spacing of 10 inches (254 mm) to 12 inches (305 mm) on center. For additional sealing, a continuous, 6-inch (152 mm) wide stripping ply of self-adhering Arctic Seal may be applied over the fasteners. Overlaps in the metal should be a minimum of 4 inches (102 mm) and embedded in a continuous bead of sealant. Do not fasten the metal laps. Lay a first course of shingles along the eave of one roof area and over the valley, making sure the end of the last shingle meets or goes beyond the centerline of the metal valley. Complete the installation of shingles on that roof section. After all shingles have been installed in the valley, snap a chalk line 2 inches (51 mm) from the center of the metal valley, and trim shingles to the chalk line, matching the centerline angle. Crop the tops of each shingle course at a 1 inch (25 mm), 45 degree cut. Embed the ends of the cut valley shingles in a continuous 3 inch (76 mm) wide bead of mastic. Install shingles on the adjoining roof as described above.
4. “Bleeder,” “Point,” or “California-cut” valleys are not acceptable.

3.5 FASTENERS

A. Nailing Pattern: Due to its open-tab design and size, shingles have three (3) nailing patterns that are determined by conditions. Consistent in all patterns are the placing of end fasteners 1 inch (25 mm) in from each end of the shingle and the remaining nails in the high or low nailing areas as directed. Fasteners shall be seated flush to the shingle surface and not overdriven to cut into shingles. When fastening, butt shingles loosely together to prevent buckling.

1. Fasteners per shingle/high wind areas: Nine (9), and six (6) each for starter shingles and Smart Start starter shingles.
2. Steep slope fastening (roof decks > 21:12): Nine (9), six (6) each for starter shingles and hand-sealing of tabs with ASTM D4586.

END OF SECTION

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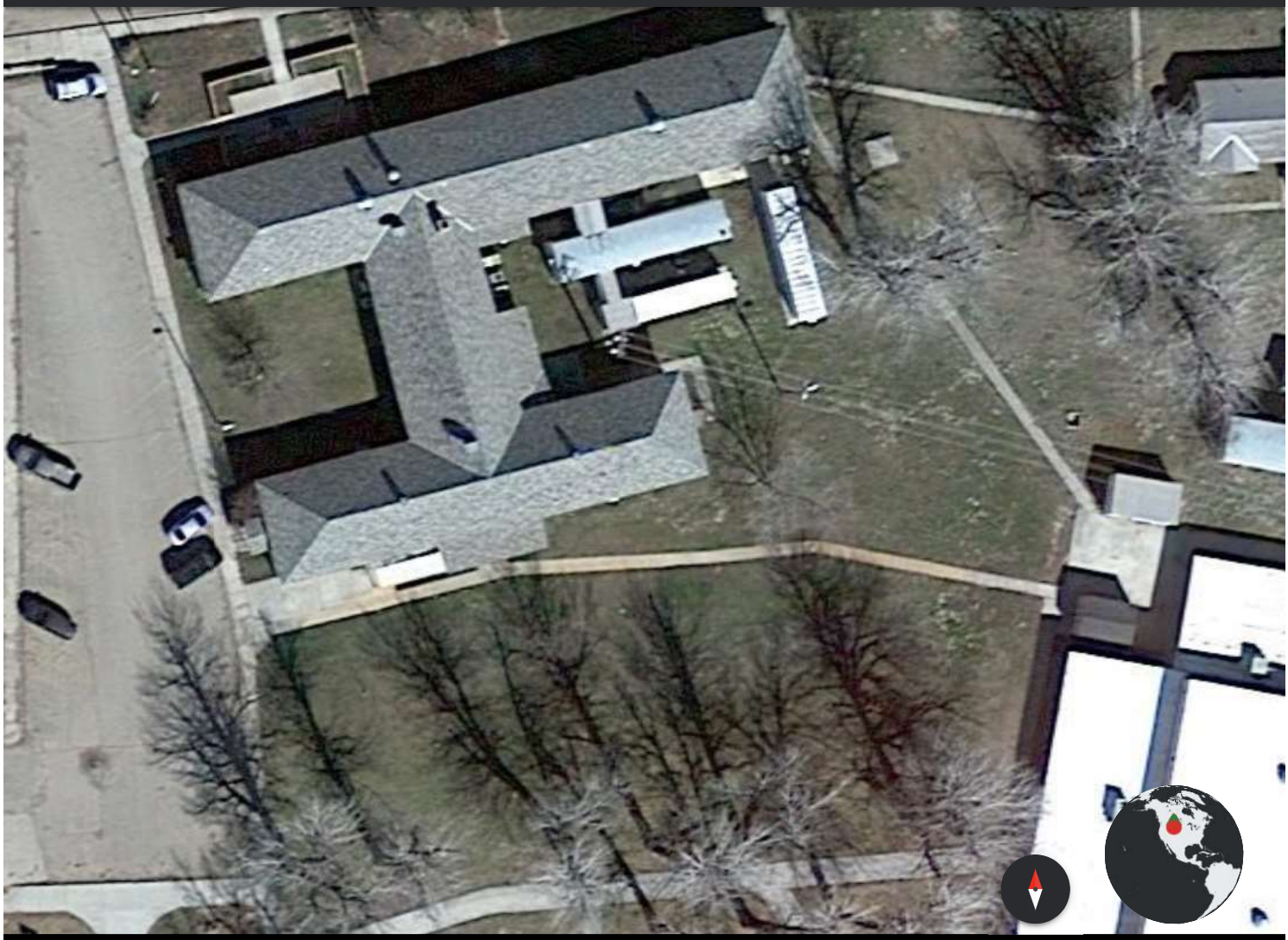

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