

GUIDE NOTE: This master specification section includes guide notes identified as “GUIDE NOTE” for information purposes and to assist the specification writer in making appropriate decisions. The GUIDE NOTE always immediately precedes the text to which it is referring. The section serves as a guideline only and should be edited with deletions and additions to meet specific project requirements.

GUIDE NOTE: This specification section follows the recommendations of the Construction Specifications Institute, Project Resource Manual including MasterFormat™, SectionFormat™, and, PageFormat™. Optional text is indicated by brackets []; delete optional text including brackets in the final copy of the specification. Delete the GUIDE NOTES in the final copy of the specification. Trade/brand names with appropriate product model numbers, styles and types are used in GUIDE NOTES and in the specification text Article or Paragraph title “Acceptable Material”. This Section is written as a pound-inch document with SI Metric shown in parenthesis immediately following the SI Metric units.

1 GENERAL

1.01 SUMMARY OF WORK

- A. This Section specifies dimensioned quarried stone veneer masonry, flagstone paving, cobblestone paving and accessories.

1.02 RELATED REQUIREMENTS

GUIDE NOTE: Include in this Paragraph only those sections and documents that directly affect the work of this section. If a reader of this section could reasonably expect to find a product or component specified in this section, but it is actually specified elsewhere, then the related section number(s) should be listed in the Paragraph below. Do not include Division 00 Documents or Division 01 Sections since it is assumed that all technical sections are related to all project Division 00 Documents and Division 01 Sections to some degree. Refer to other documents with caution since referencing them may cause them to be considered a legal part of the Contract. Edit the following paragraphs to suit specific project conditions.

- A. Section 04 05 00 – Common Work Results for Masonry.
- B. Section 04 05 13 – Masonry Mortaring.
- C. Section 04 05 19 – Masonry Anchorage and Reinforcing.
- D. Section 31 32 19 – Geotextile Separation Layer.
- E. Section 32 1123 – Aggregate Base Course.

GUIDE NOTE: Only include defined terms for items that appear in the final specification section and which are not commonly known terms in the industry or are open to interpretation.

1.03 DEFINITIONS

- A. Argillite: Fine-grained sedimentary rock composed predominantly of indurated clay particles derived from lithified muds and oozes. A highly compacted sedimentary or slightly metamorphic rock consisting primarily of particles of clay or silt that it is not fissile.
- B. Quartzite: Hard metamorphic rock which was originally sandstone but which has been converted into quartzite through heating and pressure usually related to tectonic compression within orogenic belts.
- C. Slate: Fine-grained, foliated, homogeneous metamorphic rock derived from an original shale type sedimentary rock composed of clay or volcanic ash through low grade regional metamorphism.

GUIDE NOTE: In the following Article, include only those reference standards which appear in the finished version of the project specification.

1.04 REFERENCE STANDARDS

- A. ASTM International (ASTM).
 - 1. ASTM C97/C97M – 2009, Standard Test Methods for Absorption and Bulk Specific Gravity of

Dimension Stone.

2. ASTM C170/C170M – 2009, Standard Test Method for Compressive Strength of Dimension Stone.
 3. ASTM C207 - 2006, Standard Specification for Hydrated Lime for Masonry Purposes.
 4. ASTM C476-2007, Specification for Grout for Masonry.
 5. ASTM C780 – 2009, Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.
 6. ASTM C847-2010, Specification for Metal Lath
 7. ASTM C933-2009, Standard Specification for Welded Wire Lath.
 8. ASTM D2240-2010, Standard Test Method for Rubber Property - Durometer Hardness.
- B. US Green Building Council (CaGBC).
1. LEED® NC Version 2.2-2009, LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations including Addendum 2007.
- C. US Army Corps of Engineers (USACE).
1. USACE – CRD-C 144-1992, Standard Test Method for Resistance of Rock to Freezing and Thawing.

1.05 ADMINISTRATIVE REQUIREMENTS

- A. Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.
- B. Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
1. Comply with Section 01 31 19 - Project Meetings and co-ordinate with other similar pre-installation meetings.
 2. Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
 - a. Owner;
 - b. Contractor;
 - c. Prime Consultant;
 - d. Masonry Sub-contractor;
 3. Ensure meeting agenda includes review of methods and procedures related to installation of work of this Section including co-ordination with related work.
 4. Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

GUIDE NOTE: Article below includes submittal of relevant data to be furnished by Contractor.

1.06 ACTION AND INFORMATIONAL SUBMITTALS

- A. Make submittals in accordance with Contract Conditions and Section 01 33 00 - Submittal Procedures
- B. Product Data: Submit product data including manufacturer's literature for stone material and components of indicating compliance with specified requirements and material characteristics.
- C. Shop Drawings: Submit drawings stamped and signed by Professional Engineer registered or licensed in State of [____], USA. Include on shop drawings:
1. Full bed wall reinforcement and anchoring details.
 2. Include design calculations for stone supports.

GUIDE NOTE: Include the following Paragraph if project is located in seismically active zone.

3. Show size and location of seismic restraints. Include seismic design calculations.

- D. Samples:
 - 1. Submit duplicate samples of each type of stone masonry unit used.
 - 2. Submit one [1] lb size sample for each type and color of mortar.
- E. Test and Evaluation Reports:
 - 1. Submit test report for strength and color of mortar.
- F. Sustainable Design Submittals (LEED).
 - 1. LEED Submittals: In accordance with Section [01 35 21 – LEED Requirements]
- G. Qualification Submittals:
 - 1. Submit letter verifying installer’s experience with work similar to work of this Section.

1.07 CLOSEOUT SUBMITTALS

GUIDE NOTE: Use the following Paragraph for larger projects only. Delete for small projects.

- A. Operation and Maintenance Data: Supply maintenance data for stone and mortar for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

GUIDE NOTE: If LEED is not a part of the project delete the following Paragraph in its entirety.

- B. Sustainable Design Closeout Documentation (LEED).
 - 1. Provide calculations on end-of-project recycling rates, salvage rates, and landfill rates for work of this Section demonstrating percentage of construction wastes which were recycled.
 - 2. Submit verification from recycling facility showing receipt of materials.
- C. Record Documentation: In accordance with Section 01 78 00 - Closeout Submittals.
 - 1. List materials used in masonry work.
 - 2. Warranty: Submit warranty documents specified.

1.08 QUALITY ASSURANCE

- A. Sustainability Standards Certification (LEED).
 - 1. LEED NC Version 2.2 submittals: in accordance with Section 01 35 21 - LEED Requirements.

GUIDE NOTE: Consultant may want to construct a Mock-up to establish quality of work for the Project. The Mock-up can be used as a standard to which work on the Project can be compared. For smaller projects that do not have a separate Division 01 Section for quality assurance delete the reference to Section 01 43 00 – Quality Assurance. Delete the following paragraph if the section is not included in the project.

- B. Mock-up: Construct mock-up where directed by Consultant [and in accordance with Section 01 43 00 - Quality Assurance].

GUIDE NOTE: Edit the following Paragraph to meet the project requirements. If mock-ups for more than one application of the materials is required repeat the Paragraph as necessary.

- 1. Construct 10 x 10 feet (3 x 3 m) mock-up of masonry wall using proposed procedures, materials and quality of work.
 - a. Purpose: To judge quality of work and material application.
 - b. Do not proceed with work prior to receipt of written acceptance of mock-up by Consultant.
 - c. When accepted, mock-up will demonstrate minimum standard of quality required for work of this Section.
 - d. Approved mock-up will [not] remain part of finished work.

GUIDE NOTE: The following Article although not part of Quality Assurance, can be used to enhance the quality of materials by ensuring that they are delivered and handled properly at the work site.

1.09 DELIVERY STORAGE AND HANDLING

- A. Delivery and Acceptance Requirements:
 - 1. Deliver stone material in accordance with Section 01 61 00 - Common Product Requirements.
 - 2. Deliver mortar materials in manufacturer's original packaging with identification labels intact and in sizes to suit project.
- B. Storage and Handling Requirements: Store packaged materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
 - 1. Store stone materials on pallets until used.
- C. Packaging Waste Management:

GUIDE NOTE: For smaller projects that do not have a separate Section for waste management and disposal, delete the following paragraph.

- 1. Separate and recycle waste materials in accordance with Section 01 74 19 - Construction Waste Management And Disposal.
- 2. Remove from site and dispose of packaging materials at appropriate recycling facilities.
- 3. Collect and separate for disposal paper and plastic material in appropriate on-site storage containers for recycling in accordance with Waste Management Plan.
- 4. Return pallets to stone quarry for recycling.

2 PRODUCTS

2.01 MANUFACTURER

- A. Manufacturer: K2 Stone Montana LLC, 3154 Hwy 2 East, Kalispell, MT 59901, Phone: (406) 755-7714 or FAX: (406) 752-0368, URL: www.K2Stone.ca.

2.02 DESCRIPTION

GUIDE NOTE: Retain one only of the following three paragraphs to suit project requirements. The argillite and argillite/quartzite rocks come as blends of color. It is difficult to predict exactly what colors will be included in the rock. However, good communication with the stone manufacturer and quarry may be able to assist in having stone delivered which predominantly leans towards a particular blend of color.

- A. Argillite: Fine-grained sedimentary, precambrian metasedimentary rock, indurated with clay particles and colored blend of chocolate brown, dark grey, and pale orange.
 - 1. Density: [166 lbs/ft³ (2654 kg/m³)].
 - 2. Hardness: [7] Mohs minimum.
 - 3. Average Moisture Absorption: To ASTM C970, [0.36] %.
 - 4. Freeze-Thaw: To USACE – CRD-C 144, [0.01] %.
 - 5. Compressive Strength: To ASTM C170/C170M, [21,000 psi (146.5 MPa)].
- B. Argillite/quartzite composite: Fine-grained, hard metamorphic, precambrian metasedimentary silica rock colored blend of gold, tan, earth toned, dark red, brown, grey, and copper.
 - 1. Density: [165 lbs/ft³ (2639 kg/m³)].
 - 2. Hardness: [7] Mohs minimum.
 - 3. Average Moisture Absorption: To ASTM C97, [0.40] %.
 - 4. Freeze-Thaw: To USACE – CRD-C 144, [0.03] %.
 - 5. Compressive Strength: To ASTM C170/C170M, [20,500 psi (141.2 MPa)].
- C. Slate: Fine-grained, foliated, homogeneous, metamorphic, colored dense blue-grey with green, brown and gold highlights and liberally veined with quartz.
 - 1. Density: [169 lbs/ft³ (2707 kg/m³)].
 - 2. Hardness: [7] Mohs minimum.
 - 3. Average Moisture Absorption: To ASTM C97, [0.1] %.
 - 4. Freeze-Thaw: To USACE – CRD-C 144.

5. Compressive Strength: To ASTM C170/C170M, [17,900 psi (124 MPa)].

2.03 DESIGN CRITERIA

- A. General: Design, fabricate and install stonework to withstand normal loads from wind, gravity, movement of building structure, and thermally induced movement, as well as to resist deterioration under conditions of normal use including exposure to weather.
- B. Engineering Calculations: Base calculations on design loads, material properties, and applicable safety factors. Include as part of calculation information as follows:
1. Stone loads and allowable loads;
 2. Stone thicknesses;
 3. Support and anchorage loads, stresses, safety factors, design loads, and allowable loads;
 4. Support and anchorage sizes;
- C. Control of Corrosion: Prevent galvanic and other forms of corrosion by insulating metals and other materials from direct contact with non-compatible materials, or by suitable coating.

GUIDE NOTES: Include the following Paragraph if project is located in a seismically active zone.

- D. Seismic Anchorage and Restraint: Design masonry anchorage and seismic restraints to meet project location and usage requirements.
- E. Ensure design calculations including seismic are made by Professional Engineer licensed to practice in State of [____], USA.

GUIDE NOTE: Use the following Article ONLY when stone is used for ledgerstone veneer masonry applications.

2.06 FULL BED MASONRY

- A. Ledgerstone: Flat edge grain, [3 x 6 inches (75 x 150 mm)], [4 inches (102 mm)] deep.
1. Acceptable Material: K2 Stone Inc., Type [Natural] [Ocean Mist] [Black Pearl] [Autumn Gold] [Autumn Flame] [Elk Ridge].
- B. Fieldstone: Flate, face grain, [3 x 6 inches (75 x 150 mm)], [4 inches (102 mm)] deep.
1. Acceptable Material: K2 Stone Inc., Type [Arbutus Fieldstone] [Tofino Sky Fieldstone].

GUIDE NOTE: Use the following Article ONLY when stone is used for ashlar masonry applications.

2.08 FULL BED ASHLAR MASONRY

- A. Cut top and bottom, random lengths maximum 610 mm (24 inches), and [2] [4] [6] [8] inches ([50] [100] [150] [200] mm) high by 4 inches (102 mm) deep.
- .2 Acceptable Material: K2 Stone Inc. [Pacific Ashlar].

2.09 ACCESSORIES

- A. Mortar: To ASTM C207, Type [N] [S] with acrylic bonding agent [in accordance with Section 04 05 13 – Masonry Mortaring].

GUIDE NOTE: For small projects delete the reference to Section 04 05 19 – Masonry Anchors.

- B. Masonry Anchors, Cramps and Dowels: [Yellow brass] [Commercial bronze] [Stainless steel, Type [304] [316]] [in accordance with Section 04 05 19 – Masonry Anchors].
- C. Wall Ties: To [ASTM A951 / A951M], [steel wire] [corrugated strap] type, [hot dip galvanized] [stainless]

steel.

- D. Fasteners: [Hot dip galvanized] [Stainless] steel.
- E. Metal Lath: 2.5 lbs (1.13 kg) galvanized steel with rust inhibiting coating to ASTM [C847] [C933].
- F. Flashing Materials:

GUIDE NOTE: The following Paragraphs indicate several types of through-wall or drip flashing. Select type on basis of intended function and to meet project requirements.

- 1. Polyethylene flashings:
 - a. Plain: [2] [4] [30] mil ([.05] [.10] [.75] mm) thick polyethylene film bonded to asphalt treated creped kraft.
 - b. Reinforced: two [2] [4] [30] mil ([.05] [.10] [.75] mm) thick polyethylene films bonded each side of asphalt treated creped kraft paper, reinforced with [$\frac{1}{2}$ x $\frac{1}{2}$ inch (12.7 x 12.7 mm)] fibreglass scrim.
- 2. Copper flashings: Copper sheet, [0.98] [1.97] [2.95] oz/ft² ([300] [600] [900] g/m²), asphalt laminated to 2 layers of creped kraft paper, reinforced with [$\frac{1}{2}$ x $\frac{1}{2}$ inch (12.7 x 12.7 mm)] fibreglass scrim.
- 3. Aluminum flashings: Aluminum foil, .0157 mil (0.004 mm) thick, asphalt laminated between two sheets of creped kraft paper with one exposed paper surface coated with asphalt-wax treatment.
- G. Flashing overlap adhesive in accordance with written recommendations of flashing manufacturer.
- H. Control joint filler: purpose made elastomer [___] durometer hardness to ASTM D2240 of size and shape indicated.
- I. Weep hole vents: Purpose made [PVC] [galvanized steel] [polypropylene fibre filter].

3 EXECUTION

3.01 INSTALLERS

- A. Use only installers with 2 years minimum experience in work similar to work of this Section.

3.02 EXAMINATION

- A. Verification of Conditions: Verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for stone installation in accordance with stone suppliers written instructions.
 - 1. Visually inspect substrate in presence of Consultant.
 - 2. Inform Consultant of unacceptable conditions immediately upon discovery.
 - 3. Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

GUIDE NOTE: Use the following Article for installation of full bed masonry (ledgestone or fieldstone) for the construction of exterior self-supporting walls in a landscaping application.

3.06 PREPARATION FOR FULL BED MASONRY INSTALLATION

GUIDE NOTE: K2 Stone publishes an Application Guide which includes recommendations for preparation of substrates required before installation of stone veneer.

- A. Exterior Framed Wall: Apply exterior sheathing and metal lath in accordance with stone manufacturer's written instructions.
- B. Interior Framed Wall: Apply wallboard and metal lath in accordance with stone manufacturer's written

instructions.

- C. Existing Concrete Masonry Wall: Clean substrate in accordance with stone manufacturer's written instructions.
- D. New Concrete Masonry Wall: Ensure new substrate is clean and free of deleterious materials in accordance with stone manufacturer's written instructions.
- E. Insulated Concrete Forms: Apply vapour barrier and metal lath in accordance with stone manufacturer's written instructions.

3.07 FULL BED MASONRY INSTALLATION

- A. Mortar preparation:
 - 1. Thoroughly mix mortar ingredients in quantities needed for immediate use to [ASTM C270].
 - 2. Add mortar color and admixtures to requirements of mortar manufacturer's written instructions.
 - 3. Ensure uniformity of mix and coloration.
 - 4. Take representative samples for testing consistency of strength and color according to [CSA A179] [ASTM C780].
 - 5. Use mortar within 2 hours after mixing at temperatures of [79] °F ([26] °C), or 2½ hours at temperatures under [50] °F ([10] °C).

GUIDE NOTE: Delete the following Paragraph for small masonry projects.

- B. Do masonry work in accordance with Section 04 05 00 – Common Work Results for Masonry [and stone manufacturer's written recommendations].

GUIDE NOTE: Use the following Paragraph for small masonry projects.

- C. Do masonry work in accordance with good trade practices acceptable to [Masonry Contractor's Association of America] [Masonry Institute of Washington] [Masonry and Ceramic Tile Institute of Oregon].
- D. Install masonry connectors and reinforcement to [CSA A370] and in accordance with [Section 04 05 19 – Masonry Anchorage and Reinforcement] [and] stone manufacturer's written recommendations.
 - 1. Before placing [mortar] [grout], obtain written approval of placement of connectors and reinforcement from [Consultant].
 - 2. Connect walls of two or more wythes using [metal] connectors as indicated.
 - 3. Tie masonry veneer to backing as indicated.
 - 4. Reinforce masonry lintels as indicated.
- E. Bond: [Stretcher].
 - 1. Keep bond plumb throughout.
- F. Remove chipped, cracked, and otherwise damaged units in exposed masonry and replace with undamaged units.
- G. Grouting: Grout masonry to ASTM C476 and as indicated, and in accordance with [Section 04 05 12 – Mortar and Masonry and Grout] [and] manufacturer's written recommendations.
 - 1. Use rotating motion to press stone evenly into mortar and allow mortar to squeeze out freely beyond finished joint.
 - 2. Remove excess mortar from joints.
- H. Install continuous control joint fillers in control joints at locations indicated.
- I. Jointing: [Concave] [Raked] [V-shaped] [Weathered] where exposed or where paint or similar thin finish coating is specified.
 - 1. Make joints [¼] [3/8] [½] inch ([6] [10] [13] mm) thick.

- J. Set stones in full bed of mortar with vertical joints buttered and placed full, except where otherwise specified.
1. Completely fill anchor, dowel and lifting holes.

GUIDE NOTE: Use the following Paragraph for full bed stone material with 65 mm (2.5 inches) bed depth or greater.

- K. Embed only ends of lugged sills and steps in mortar.
1. Leave balance of joint open for final pointing.
- L. Place setting buttons or soft-wood wedges under stones to maintain joint thickness.
1. Set heavy stones and projecting courses after mortar in courses below has hardened sufficiently to support weight.
- M. Brace and anchor projecting stones until wall above is set.
- N. Use soaked softwood wedges to support stone in proper alignment until mortar has set.
1. Remove wedges when dry and without breaking them off, fill voids with pointing mortar.
- O. Install through-wall flashing membranes at continuous shelf angles, steel lintels, ledges and similar obstructions to downward flow of water.
- P. Install weep hole vents at 24 inches (610 mm) on centre horizontally where indicated.
- Q. Install cavity vents at top of cavity space at 24 inches (610 mm) on centre horizontally.
- R. Tool joints only after initial set occurs.
- S. Rake out joints to 1 inch (25 mm) depth and make ready for pointing.
1. Sponge stone face along joints and remove droppings and splashed mortar immediately.
- T. Set [cornices,] [copings,] [projecting belt courses,] [steps] [platforms] with vertical joints unfilled.
- U. Grouting: Wet ends of stone and pack exposed joints with joint filler. Fill joint with grouting mortar to within 0.75 inches (19 mm) of top.
1. Grout vertical joints of [cornices,] [copings,] [projecting belt courses,] [steps] [and] [platforms].
 2. After grout has set, remove packing for pointing.
- V. Pointing: Remove dirt and loose mortar from joints by using pressurized airstream.
1. Wet joints for mortar pointing. Dry joints for sealant pointing.
 2. Point joints with pointing mortar in [two] [three] stages. Rub smooth with appropriate tool to slightly concave joint.

3.08 FIELD QUALITY CONTROL

GUIDE NOTE: For small projects where field tests are not required, delete the following Paragraph.

- A. Field Tests, Inspection: Coordinate [field] [site] test with Section [01 45 00 - Quality Control].
- B. Site Tolerances:
1. Variation from plumb: Plus or minus 0.25 inches per 10 feet (6 mm per 3 metres) maximum.
 2. Variation from level: Plus or minus 0.5 inches per 20 feet (13 mm per 6 metres) maximum.

GUIDE NOTE: Specify requirements if manufacturers are to provide field quality control with onsite personnel for instruction or supervision of product installation, application, erection or construction. Manufacturer field reports are included under PART 1, Action and Informational Submittals.

- C. Manufacturer's Services:

GUIDE NOTE: Use the following Paragraphs only when manufacturer's field services are provided and are required to verify the quality of the installed components. Establish the number and duration of periodic site visits required by manufacturer and specify below. Consult

manufacturer for services required. Delete if field services are not required.

1. Co-ordinate manufacturer's services with Section [01 45 00 - Quality Control]. Have manufacturer review work involved in handling, installation/application, protection, and cleaning of products and submit written reports in acceptable format to verify compliance of work with Contract.
2. Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for product installation inspection in accordance with stone manufacturer's written instructions.
3. Schedule site visits to review work at stages listed:
 - a. After delivery and storage of products, and when preparatory work on which work of this Section depends is complete, but before installation begins.
 - b. Twice during progress of work at 25% and 60% complete.
 - c. Upon completion of work, after cleaning is carried out.
4. Obtain reports within three days of review and submit immediately to Consultant.

3.09 CLEANING

GUIDE NOTE: For smaller projects that do not have a separate Division 01 Section for cleaning, delete the reference to Section 01 74 00 – Cleaning in the following two Paragraphs.

- A. Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 - Cleaning and Waste Management].
 1. Leave work area clean at end of each day.
- B. Final Cleaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 – Cleaning and Waste Management].
- C. Waste Management:

GUIDE NOTE: For smaller projects that do not have a separate Division 01 Section for waste management and disposal, delete the following Paragraph.

1. Co-ordinate recycling of waste materials with 01 74 19 - Construction Waste Management and Disposal.
2. Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
3. Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.10 PROTECTION

- A. Protect installed products and components from damage during construction.
- B. Repair damage to adjacent materials caused by work of this Section.

END OF SECTION