SPEC NOTES:

- .1 This specification has been prepared to assist design professionals in the preparation of a comprehensive office master specification or a project specific specification for concrete unit masonry. For structural specification items, the Guide Structural Notes and Structural Drawings should be referenced.
- .2 This specification section assumes the project manual will contain complete Division 1 General Requirements sections and close coordination with it is required. If the project manual does not contain these sections, additional information should be included under appropriate articles.
- .3 This specification is directed to the General Contractor (or Construction Manager). Where there is no General Contractor substitute the term masonry contractor.
- .4 Review all requirements noted herein and carefully choose those that meet project requirements.

 The Specifier must choose one item from a series of items surrounded with [...] brackets and delete the remainder, including all SPEC NOTES and other items not required. Items surrounded with (...) brackets are additional information / comments that should be left in the specification.
- .5 Adding or deleting items in this specification must be done with care and caution. The onus of doing so rests with the Specifier who must have a complete and thorough understanding of what is required. Where additional information must be added to this specification the Specifier must ensure that such information is not only accurate but also in accordance with Masonry Institute of BC recommendations. Because of the above noted requirements the Masonry Institute strongly recommends that this specification be edited by a qualified specification writer.
- .6 This specification is set-up with auto-numbering. Any changes (additions or deletions) must be done correctly to ensure numbering and spacing is maintained to suit.
- .7 Revise header and footer to suit project requirements. As a suggestion insert project name particulars on left side of header and consultant name on bottom left and issue date on bottom right of the footer.
- .8 A final note: The Section number (04 22 00) including Section references noted under Related Work Specified Elsewhere is based on the MasterFormat 2005 numbering system. The use of Section numbers based on MasterFormat 1995 are no longer applicable.

GENERAL

1.1 Description:

- .1 **Section Includes:** All materials, equipment, labour, and services necessary for the supply and installation of structural and non-structural masonry units as indicated on the drawings and as specified herein.
- .2 The work shall also include, but not necessarily be limited to, the supply and installation of the following:

SPEC NOTE: Review, amend, or delete following items not appropriate to the project.

Determine whether masonry contractor supplies and installs air barrier membrane and rigid or spray-applied insulation to face of masonry, and add or delete in items .2 or .3.

- .a steel reinforcement within masonry joints, cores, lintels and bond beams, excluding dowels from other work.
- .b concrete grout in masonry.
- .c site mixed or pre-mixed mortar.
- .d loose fill insulation in masonry cores for thermal or fire rating requirements.
- .e movement joints, excluding caulking and sealant.
- .f cutting and patching of masonry to accommodate the work of other trades during

- masonry work only.
- .g cleaning of exposed masonry surfaces.
- .h application of a clear water repellent coating to exposed exterior masonry surfaces.
- i coordination with work of other sections.
- .j scaffolding and planks for masonry work only.
- .k provision of a masonry maintenance guide.

SPEC NOTE: Review, amend, or delete following items not appropriate to the project.

- .3 The work shall also include building in or around products supplied by others, including the following:
 - .a pressed steel door frames including grout fill.
 - .b steel lintels and ties.
 - .c steel angles for seismic restraint.
 - .d steel angle protection at door openings and masonry corners.
 - .e steel channel vehicle door frames including grout fill.
 - .f access doors and frames.
 - .g louvres and vents.
 - .h piping and duct sleeves.

choose an alternate method.

- i Inserts, imbeds, and attachments for work of other trades.
- .j expansion control joints specified under Section 079500.

SPEC NOTE: Use the following examples and modify as / if required where Separate, Alternative, or Unit Pricing for materials is required. Note that pricing indicated below uses the Section number as an aid to listing such pricing in a numerical order on the Bid Form. Specifiers may

.4 **Separate Prices:** Provide the following Separate Price and note same on Bid Form:

- .a [Separate Price 042200S-1: for application of a clear water repellent coating to exterior masonry walls using specified materials. Note a Separate Price will also be provided by others under Section 09 90 00 to requirements noted herein.]
- .b [Separate Price 042200S-2: for mock-up of masonry wall using specified materials at testing facility.]
- .5 **Alternative Prices:** Provide the following Alternative Price for following items preapproved before Bid Closing and note same on Bid Form:
 - .a [Alternate Price 042200A-1: for supply and installation of coloured split face masonry in lieu of specified plain smooth face masonry at exterior wall locations.]
- .6 **Unit Prices:** Provide the following Unit Price and note same on Bid Form:
 - .a Addition: [Unit Price 042200U-1: square metre cost for supply and installation of [each type of masonry unit specified.]
 - .b Deletion: [**Unit Price 042200U-1:** square metre cost for supply and installation of [each type of masonry unit specified.]
- .7 Related Work Specified Elsewhere: shall include, but not necessarily be limited to,

building in products supplied by others, including the following:

SPEC NOTE: Delete and/or amend following Sections not appropriate to the project as required. Note that the Section numbers are based on MasterFormat 1995.

- .a Section 01 33 00 Submittal Procedures
- .b Section 01 35 40 Environmental Program Requirements [LEED or other]
- .c Section 01 45 00 Quality Control (materials testing)
- .d Section 01 50 00 Temporary Facilities and Controls (bracing, scaffolding)
- .e Section 01 57 20 Project Waste Management
- .f Section 01 57 21 Environmental Controls / Procedures
- .g Section 03 22 00 Concrete Reinforcement (reinforcing within masonry walls)
- .h Section 03 30 00 Cast-in-Place Concrete (dowels)
- i Section 04 22 70 Glass Unit Masonry
- .j Section 04 23 15 Veneer Masonry
- .k Section 04 40 00 Stone Masonry
- .I Section 04 70 00 Manufactured Masonry
- .m Section 05 50 00 Metal Fabrications (anchors to masonry)
- .n Section 07 21 19 Spray Applied Foam Insulation (in masonry cells)
- .o Section 07 27 00 Air Barrier Membrane
- .p Section 07 60 00 Flashing and Sheet Metal (parapet and coping flashing)
- .q Section 07 84 00 Fire Stopping
- .r Section 07 90 00 Caulking and Sealants
- .s Section 07 95 00 Expansion Control (proprietary joint systems for building structure)
- .t Section 08 11 13 Hollow Metal Doors and Pressed Steel Frames (supply and setting of door frames for building in by this section)
- .u Section 08 51 00 Metal Windows (frames)
- .v Section 09 90 00 Painting

SPEC NOTE: Use the following only as required. Clauses may be revised to suit specification and/or form of Contract requirements as required.

- .8 Work and materials specified herein supplement requirements noted on structural drawings. Where conflicts occur notify the Consultant, and unless noted otherwise, this specification shall govern.
- .9 This Section along with the drawings forms part of the Contract and is to be read, interpreted, and coordinated with all other parts.
- .10 Division 00 Procurement and Contracting Requirements and Division 01 General Requirements form an integral part of this Section of Work.

1.2 References Standards:

.1 The latest applicable edition of following reference standards and codes shall govern all work specified herein as appropriate:

SPEC NOTE: Delete sections not appropriate to project. Ensure / insert current standard date.

- .a CAN/CSA A23.1-00, Concrete Materials and Methods of Concrete Construction.
- .b CAN/CSA A23.2-00, Methods of Test for Concrete (including grout).

- .c CAN/CSA A23.4-00, Precast Concrete Materials and Construction (for precast concrete headers and sills, etc.).
- .d CSA-A82-06, Fired Masonry Brick Made From Clay Or Shale.
- .e CSA A165.1-04, Concrete Block Masonry Units.
- .f CSA A179-04, Mortar and Grout for Unit Masonry.
- .g CSA A370-04, Connectors for Masonry.
- .h CSA A371-04, Masonry Construction for Buildings.
- .i CSA G30.3-M1983 (R1998), Cold-Drawn Steel Wire for Concrete Reinforcement.
- .j CAN/CSA G30.18-M92 (R2002), Billet-Steel Bars for Concrete Reinforcement.
- .k CSA-S304.1-04, Masonry Design for Buildings (Limit States Design).
- .I CSA-A3000-03 Cementitious Material Compendium

SPEC NOTE: The 04 editions of masonry standards are the most current, and are referenced by the 2006 National Building Code and the 2007 B.C. Building Code.

1.3 Quality Assurance:

- .1 The masonry contractor shall be a member in good standing of the Masonry Institute of BC, and be qualified under the Technical Masonry Certification (TMC) program.
- .2 The masonry contractor shall have a minimum of five years of experience on projects of similar size and magnitude, and shall provide continuous active supervision while masonry work is in progress.
- .3 Unless otherwise specified, do all masonry work in accordance with CSA A371.
- .4 Grout specimens shall be sampled and tested for compressive strength and slump.
- .5 Cooperate and assist Consultant and inspection agency with inspections and testing by providing access and samples as required.

1.4 Design Criteria:

SPEC NOTES:

- .1 For ties embedded in unit masonry, the responsibility of veneer tie design, type, and spacing to be by a registered structural engineer as part of this work by masonry contractor.
- .2 Location of vertical expansion joints shall also consider changes in wall heights and thicknesses, corners, offsets and wall intersections as well as location of substrate expansion/control joints.
 - .1 Design masonry connectors in accordance with requirements of CSA-A370.

1.5 Submittals:

.1 All submittals shall be in accordance with the requirements of Section 01 30 00.

SPEC NOTE: Edit the following to suit project requirements.

- .2 Submit product literature indicating unit masonry types, shapes, sizes, textures, (e.g., smooth, split face, ground face, etc.), and colours for review and selection.
- .3 Submit product literature, testing data, and samples of each type of masonry accessory for

review and selection.

- .4 Submit colour samples of pre-mixed mortar when used for review and selection.
- .5 Submit ULC certificates verifying compliance with requirements for fire resistance rated concrete masonry units when supplied.
- .6 If requested, submit letter of certification from manufacturer for each concrete masonry unit type, ready-mix mortar, and ready-mix grout verifying compliance with design requirements and stating strength and composition.
- .7 Submit documentation and proof of use of products required to meet environmental program certification [LEED] [other] in accordance with requirements of Section 01580 at time of product delivery and prior to Substantial Performance.
- .8 At completion of work, submit maintenance guide for masonry types installed (eg. MIBC Maintenance Guide).

1.6 Mock-Ups:

SPEC NOTE: Use the following to suit project requirements.

- .1 Prior to commencement of work, construct a minimum 1200 mm (48") square sample panel of each type and colour of specialty masonry units from job run showing, jointing, coursing, mortar, colour, texture and workmanship for Consultant's review on site at a location designated by the Consultant.
- .2 If required by envelope consultant coordinate and construct a sample panel of specified masonry complete with a window specified in applicable Section showing head, sill, and jamb details, including ledger angle, cast-in items (sill and head units as applicable), flashings, air barrier membrane, and caulking and sealant, and showing, jointing, coursing, mortar, colour, texture and workmanship for Consultant's review on site at a location designated by the Consultant. Construction of a similar mock-up at a testing facility shall be provided under separate price work noted herein.
- .3 Approved sample panels on site shall become the standard for all work of similar construction and finish, and may become part of the work if built on site as part of the assembly. Mock-up panel not approved shall be removed. Do not commence work on site until panel has been approved by the Consultant.

1.7 Product Delivery, Handling, and Storage:

- .1 Stack masonry units on pallets to avoid chipping, shrink wrap, and deliver to site in dry condition. Store off the ground under waterproof cover and protect from the elements.
- .2 Deliver cement, lime, and mortar in dry condition with manufacturer's labels intact, and store under waterproof cover and protect from the elements. Protect pre-mixed mortar as well.
- .3 Store cementitious materials in accordance with CSA A5 and aggregate in accordance with

CSA A23.1.

1.8 Environmental Requirements:

.1 Unless otherwise pre-approved, conform to requirements of CSA-A371 during hot and cold weather.

1.9 Protection:

- .1 Coordinate with the installation of bracing by General Contractor.
- .2 Coordinate with the General Contractor to provide suitable enclosures and heating for masonry work as required during construction.
- .3 Protect masonry and work of other sections during masonry work from marking, mortar droppings and damage resulting from work of this section by use of non-staining coverings and/or other means as required.
- .4 Until completed and protected by flashings or other permanent construction, keep recently constructed masonry dry using waterproof, non-staining coverings that extend over walls and down sides enough to protect from wind driven rain. Cover top of all work with polyethylene tarpaulin when work is discontinued.

PRODUCTS

2.1 Masonry Units:

Provide [concrete][clay] masonry units of sizes and types as specified herein and as noted on Architectural and Structural drawings with profiles as indicated and required and with all masonry units from the same manufacturer for this project.

- .1 Clay Masonry Units: to CSA-A82 with the following properties:
 - .a Grade: EG
 - .b Type: [S] [X] [A].
 - .c Dimensions: [width] x [height] x [length]

SPEC NOTE: Nominal dimensions include the mortar joint. Actual dimensions are for the unit only.

- .d Texture(s): [smooth] [wire cut] [other]
- .e Colour(s): [].
- .f Accent units: [indicate texture, profile, colour, etc.]
- [after due diligence and comparison insert acceptable products / manufacturers]
- .2 **Concrete Masonry Units:** to CSA-A165.1, classification H /[15,20,25,30]/[A,B,C,D]/ M. [The following manufacturers are pre-approved.]
 - .a Dimensions: [width] x [height] x [length]

SPEC NOTE: Nominal dimensions include the mortar joint. Actual dimensions are for the unit only.

- .b Texture(s) / Profile(s): [smooth] [split] [groundface] [ribbed] [other]
- .c Colour(s): [].
 - Coloured smooth units may display an unacceptably large range in colour.

- .d Accent units: [indicate texture, profile, colour, etc.]
- .e Specialty units [Shouldice] [Pre-faced]
- [after due diligence and comparison insert acceptable products / manufacturers]

SPEC NOTES: Use four facet system H/15/A/M for hollow normal weight and strength units.

- .1 1st Facet Hollow or Solid
- .2 2nd Facet Strength 15, 20, 25, 35 MPa (15 MPa standard inventory strength)
- .3 3rd Facet Density:
 - .a A Normal, (sand and gravel).
 - .b B and C Semi lightweight, (sand, gravel, and pumice).
 - .c D Light weight, (sand and pumice), generally used for 4 hr. fire rated block.
- .4 4th Facet Moisture Content:
 - .a M (moisture controlled)

O (no limits)

.3 Provide the following unit types where indicated on the drawings:

SPEC NOTES:

- .1 Select type and indicate height of units (e.g. 100 or 200 mm high) only where required, i.e. where heights other than 200 mm are to be used. Note that width of units shall be indicated on the drawings and not in the specification.
- .2 Where coloured block is used, insert selected manufacturer's colour.
- .3 Where profiled block is used, insert selected profile, e.g. ledge, ribbed, scored, etc.
 - .a **Fire Rated Units:** [2] [3] [4] hour rating complete with an Underwriter Laboratories of Canada (ULC)Certificate. [The following manufacturers are pre-approved.]
 - [after due diligence and comparison insert acceptable products / manufacturers]

SPEC NOTE: There are two ways to achieve fire ratings: by equivalent thickness as per the National Building Code; and by ULC fire test ratings. The NBC method applies to all manufacturers and requires no certification. The higher ratings by the ULC method are only available from certified manufacturers, and must be specified and confirmed on a project basis.

.4 Provide special units where indicated on drawings or as required to maintain bonds and even face without any exposed cut faces or cavities.

2.2 Mortar and Grout Materials:

- .1 **Cement:** normal Portland Type GU cement to CSA-A3001
- .2 Masonry or Mortar Cement: to CSA-A3002
- .3 **Hydrated Lime:** Type S to ASTM-C-207.
- .4 **Mortar Pigments:** (for coloured mortar) inorganic mineral oxide, colour as selected by the Consultant.
- .5 **Mortar Aggregate:** to CSA A82.56, washed, clean, sharp and free of organic materials.

- .6 **Grout Aggregate:** to CAN3-A23.1, clean, uncoated grains of sound material with coarse aggregates passing a 10 mm sieve.
- .7 **Water:** potable and free of deleterious matter and acids and alkalis.
- .8 **Mortar Admixtures:** [as pre-approved by consultant]

SPEC NOTE: Specific mortar admixtures are used to inhibit efflorescence and shrinkage, produce faster strength development and produce dirt and water resistant mortar.

2.3 Mortar Mixes:

- .1 Use brands of products and materials from the same source for the entire project.
- .2 Site Mixed Mortar: Type S mortar by proportion specification in accordance with CSA A179 requirements
- .3 Pre-Manufactured Mortar: quality-controlled, plant batched and mixed Type S mortar by property specification to CSA A179 complete with admixtures and colour additives as required [with colour as selected by the Consultant]. Mortar to be either delivered to job site for ready use as wet mortar or site mixed in a portable powered and controlled silo/mixer or as pre-bagged dry mortar manufactured off-site.
 - [after due diligence and comparison insert acceptable products / manufacturers]
- .4 **Coloured Mortar:** [% by weight] of [manufacturer] [colour #].
 - [after due diligence and comparison insert acceptable products / manufacturers]

SPEC NOTE: Mortar colour has a significant effect on the overall colour of the wall. Coloured mortar is usually used with coloured concrete block.

- .5 When pre-approved, incorporate admixtures into mixes in strict accordance with manufacturer's instructions.
- .6 Use all site mixed mortar within 2½ hours of mixing at temperatures under 25°C and within 1½ hours for temperatures over 25°C. Mortar may be re-tempered within 2 hours of mixing to replace water lost by evaporation by using minimum amounts of water.

2.4 Grout Mixes:

.1 See "Structural Notes".

2.5 Reinforcing:

.1 See "Structural Notes".

2.6 Anchorage:

.1 Refer to structural drawings and specifications for anchorage requirements

2.7 Accessories:

- .1 **Fire stopping and Smoke Sealing:** ULC or WHI listed, non-combustible, compressible type to the requirements of Section 07 84 00.
- .2 Caulking and Sealants: in accordance with the requirements of Section 079000, with colour of caulking to be same colour as or to match masonry units for vertical joints, and same colour as mortar for horizontal joints.

SPEC NOTE: Specifier to ensure that the colours for caulking in masonry as noted above is noted in Section 07 90 00.

2.8 Masonry Cleaning Compounds:

- .1 **Masonry Cleaners:** in accordance with masonry manufacturer's recommendations for type of units supplied. Note that muriatic acid is not permitted.
- [after due diligence and comparison insert acceptable products / manufacturers]

SPEC NOTE: Use the following where specific products are required. After due diligence and comparison provide acceptable products as noted below

2.9 Water Repellent Coating:

- .1 Water Repellent Coating: clear, breathable, penetrating type with a manufacturer's minimum five year written warranty for water repellency. Coating to be compatible with masonry units and acceptable to masonry unit manufacturer for use with their products.
 - [after due diligence and comparison insert acceptable products / manufacturers]

SPEC NOTE: The use of an integral waterproofing admixture in concrete masonry does not eliminate the requirement for the use of a water repellent coating on exterior masonry.

Assess the suitability of a coating using ASTM E514 with the requirement for such typical results as:

1% dampness max after 4 hours
Moisture absorption tube (RILEM) test result of less than 1ml/hr
Life expectancy of coating is 7-10 years with fading performance over time. Scheduled maintenance necessary.

EXECUTION

3.1 Examination:

- .1 Examine all drawings and coordinate installation of masonry with related sections so that this work can be performed with a minimum of cutting and patching during masonry work
- .2 Examine all site conditions and surfaces affecting the installation of masonry including concrete and reinforcement, structural steel, heating, plumbing and electrical work and report deficiencies to the Consultant in writing. Commencement of installation constitutes

acceptance of existing conditions.

3.2 Preparation:

- .1 Establish all coursing lines and plumb levels for masonry work and protect from disturbance. All other lines and levels shall be established and maintained by the General Contractor.
- .2 Coordinate all work of this section with other related sections, such as location of dowels in concrete, field welding of anchors to steel work, etc.
- .3 Prior to laying up of concrete masonry confirm locations of walls which will be "fair faced" construction with Consultant.
- .4 Protect adjacent finished materials from damage due to masonry work.

3.3 Installation:

- .1 Construct masonry work in accordance with requirements and tolerances of CSA-A371, including variation from mean plane, plumb, level and position as well as variation of wall opening sizes.
- .2 Lay masonry units in [running][stacked] bond with accurately spaced courses, true to lines and levels and plumb throughout with exterior and interior corners and intersections masonry bonded, or bonded with equivalent masonry reinforcement. Maintain bond pattern below and above openings.

SPEC NOTE: Stack Pattern is not recommended for the following reasons:

- poor seismic performance
- accentuates unit colour range
- accentuates unit size variations.
- .3 Masonry horizontal and vertical joints to be 10 mm thick except where adjustments are necessary to maintain the bond pattern or to adjust coursing.

SPEC NOTE:

Nominal 10 mm thickness of the mortar joints for concrete unit masonry can be slightly adjusted in the field for coursing to meet desired elevations, provided they are within joint tolerances of <u>+</u> 3 mm. Mortar joint thickness may also have to be adjusted on site to account for tolerances in masonry unit sizing.

- .4 Install hollow masonry units using face shell bedding with full head and bed joints. Minimize mortar protruding or dropping into core spaces.
- .5 Tamp units firmly into place.
- .6 Closure units must receive "double buttering" to ensure full head joints.
- .7 Install units as may be required to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond pattern or module.

- .8 After mortar has initially "set up", tool all joints, wipe wall surfaces with a suitable brush or burlap to remove mortar protrusions and re-tool the joints.
- .9 Fill all holes and cracks, remove loose mortar, and repair defective work.
- .10 Exposed joints shall be concave, firmly pointed and compacted with round tooling bar. Use flush joints only where masonry units are not exposed to view. Provide raked joints at expansion joints and where masonry abuts other materials.

SPEC NOTE: Concave tooled joints provide the highest resistance to water penetration due to their shape, compaction and bond. Raked joints are not as weather resistant and are not recommended in moderate-to-high exposure situations.

- .11 Do not reset masonry units after laying. Where resetting of masonry is required, remove and clean units and reset in new mortar.
- .12 Do not wet concrete masonry units at any time during installation.

3.4 Built-in Work:

- .1 Cooperate with all other trades for materials to be built into masonry and the exact location of openings which will be required. Provide cutting and fitting of masonry required for incorporation of such items during the progress of masonry work only.
- .2 Built in miscellaneous items such as bearing plates, loose angles, bolts, anchors, inserts, sleeves and conduits. Supply and lay-out of these items to be done by others.
- .3 Fit masonry closely against electrical and plumbing outlets so that collars, plates, and covers will overlap and conceal all cuts.
- .4 Build around door frames supplied by others. Do not distort frames. Bed anchors of frames in mortar and fill frame voids.

3.5 Reinforcing and Grouting: (See Structural Notes)

3.6 Masonry Anchors: (See Structural Notes)

3.7 Expansion and Control Joints:

- .1 Form movement joints as noted on drawings. Keep joint free of mortar, ready to receive backer rod and sealant.
- .2 For reinforcement details at movement joints, see Structural Notes.

3.8 Cutting and Patching:

.1 Do all cutting, fitting, drilling, patching, and making good of masonry veneer work for other trades during progress of masonry work. All exposed work shall be clean, true and free

from spalls, chips, and similar defects. Patched areas shall use brick and mortar matching in colour, texture, and plane. Such work after completion of masonry work shall be at additional cost.

3.9 Cleaning:

- .1 Keep adjacent surfaces clean, dry, and free of mortar droppings and stains during laying using suitable protection.
- .2 Prior to full scale cleaning, confirm suitability of materials and methods by cleaning an inconspicuous test area.
- .3 Unless otherwise required by cleaning agent manufacturer, wet wall with clean water and flush off all loose dirt and mortar prior to cleaning.
- .4 Clean masonry using specified cleaning agents in strict accordance with cleaning agent and masonry manufacturer's requirements.
- .5 When pressure washing, do not leave wand streaks.
- .6 Protect adjacent surfaces and work from damage and staining during cleaning process.
- .7 Unless otherwise required by cleaning agent manufacturer, rinse all areas thoroughly with clean water to remove all cleaning solutions and residue.

3.10 Water Repellent coating:

- .1 All surfaces shall be clean, dry, and free of scale, mud, or efflorescence, and cracks shall be filled prior to application of water repellent coating.
- .2 All surfaces shall be dry enough to meet manufacturer requirements at time of application
- .3 Prior to application of water repellent coating, test an inconspicuous area with product to confirm suitability and to establish typical coverage rate and method of application.
- .4 Apply water repellent coating to wall surfaces in strict accordance with manufacturer's directions.
- .5 Protect adjacent surfaces and work from damage and staining.
- .6 Application shall be in strict accordance with manufacturer's recommendations for surfaces affected.

END OF SECTION

For additional information on concrete unit masonry contact the Masonry Institute of B.C. at 604-291-1458.