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SPECIAL PROVISIONS

DIVISION "SC"

SPECIAL REQUIREMENTS

SC-1 (2540) CONCRETE AND MASONRY MONUMENTS

SC-1.1 DESCRIPTION

- A. This work shall consist of constructing concrete and masonry monuments structures as shown on the Plans and in accordance with the applicable portions of Mn/DOT 2411 and as specified in these Special Provisions.

SC-1.2 MATERIALS

- A. Where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, products specified.
- B. Concrete: Mn/DOT 2461, Mix 3A32
- C. Reinforcement and Anchorage
1. Reinforcement bars: Mn/DOT 3301, Grade 60.
 2. Anchors: Type and size indicated, fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.
- D. Masonry Units
1. Performance Requirements:
 - a. Provide structural unit masonry that develops indicated net-area compressive strengths (f'm) at 28 days.
 - b. Determine net-area compressive strength (f'm) of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

- c. Determine net-area compressive strength (f'_m) of masonry by testing masonry prisms according to ASTM C 1314.
2. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
3. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to exceed tolerances and to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects, including dimensions that vary from specified dimensions by more than stated tolerances, will be exposed in the completed Work or will impair the quality of completed masonry.

E. Brick

1. General: Provide shapes indicated and as follows:
 - a. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
 - b. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
 - c. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
 - d. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

2. Face Brick:

Brick shall match existing masonry monuments on Lowry Avenue between Penn and Lyndale Avenues.
Size: 4" Modular (4" x 4" x 8" w/ mortar slot)
Texture: Matte
Color: Ironstone

3. No substitutions allowed, brick as designated is to match monuments from previous phases.

F. Cast Stone

1. General: Comply with ASTM C 1364 and the following:
 - a. Portland Cement: ASTM C 150, Type I, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.
 - b. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33, gradation as needed to produce required textures and colors as needed to produce required cast stone colors.
 - c. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation as needed to produce required textures and colors as needed to produce required cast stone colors.
 - d. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, non-fading, and resistant to lime and other alkalis.
 - e. Admixtures: Do not use admixtures unless specified or approved in writing by Engineer.
 - (1) Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
 - (2) Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
 - (3) Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.
 - (4) Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
 - (5) Water-Reducing, Retarding Admixture: ASTM C 494/C 494M, Type D.

- (6) Water-Reducing, Accelerating
Admixture: ASTM C 494/C 494M,
Type E.
- f. Reinforcement: Deformed steel bars
complying with ASTM A 615/A 615M. Use
galvanized or epoxy-coated reinforcement
when covered with less than 1-1/2 inches (38
mm) of cast stone material.
 - (1) Epoxy Coating: ASTM A 775/A
775M.
 - (2) Galvanized Coating: ASTM A 767/A
767M.
- g. Embedded Anchors and Other Inserts:
Fabricated from stainless steel complying with
ASTM A 240/A 240M, ASTM A 276, or
ASTM A 666, Type 304.

G. Cast Stone Units

- 1. Manufacturers: Products produced by manufacturers
listed below, and others, and which meet these
specifications may be used on this project:
 - a. American Art Stone Co., Inc.
 - b. Architectural Cast Stone, Inc.
 - c. Architectural Ornaments, Inc.
 - d. Continental Cast Stone Manufacturing, Inc.
 - e. Custom Cast Stone, Inc.
 - f. Edwards Cast Stone Company.
 - g. Thunderstone.
- 2. Provide cast stone units complying with ASTM C
1364 using the vibrant dry tamp method. Provide
units that are resistant to freezing and thawing as
determined by laboratory testing according to ASTM
C 666, Procedure A, as modified by ASTM C 1364, or
are made from cast stone that has a history of
successful resistance to freezing and thawing.
- 3. Fabricate units with sharp arris and details accurately
reproduced with indicated texture on all exposed
surfaces, unless otherwise indicated.
 - a. Slope exposed horizontal surfaces 1:12, unless
otherwise indicated.
 - b. Provide raised fillets at backs of sills and at
ends indicated to be built into jambs.

- c. Provide drips on projecting elements, unless otherwise indicated.
4. Fabrication Tolerances:
- a. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch (3 mm).
 - b. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit of 1/8 inch (3 mm), whichever is greater, but in no case by more than 1/4 inch (6 mm).
 - c. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit of 1/8 inch (3 mm), whichever is greater.
 - d. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch (3 mm) on formed surfaces of units and 3/8 inch (10 mm) on unformed surfaces.
5. Cure units by one of the following methods:
- a. Cure units with steam in enclosed curing room at temperatures of 105 deg F (41 deg C) or above and 95 to 100 percent relative humidity for 6 hours.
 - b. Cure units with dense fog and water spray in enclosed warm curing room at 95 to 100 percent relative humidity for 24 hours.
 - c. Cure units to comply with one of the following:
 - (1) Not less than 5 days at mean daily temperature of 70 deg F (21 deg C) or above.
 - (2) Not less than 6 days at mean daily temperature of 60 deg F (16 deg C) or above.
 - (3) Not less than 7 days at mean daily temperature of 50 deg F (10 deg C) or above.
 - (4) Not less than 8 days at mean daily temperature of 45 deg F (7 deg C) or above.

- d. Wet-cast cast stone ambient cure at temperature of 65 deg F (13 deg C) or above for 24 hours.
6. Acid etch units after curing to remove cement film from surfaces to be exposed to view.
7. Colors and Textures: Shall match existing masonry monuments on Lowry Avenue between Penn and Lyndale Avenues.
8. Source Limitations for Cast Stone: Obtain cast stone units through one source from a single manufacturer.

H. Mortar and Grout

1. Mortar and grout to meet the following:
 - a. ASTM C 150, Type I except Type III may be used for cold-weather construction, Portland Cement.
 - b. ASTM C270, Masonry Mortar.
 - c. ASTM C5; non-hydraulic type, Quicklime.
 - d. ASTM C207, Hydrated Lime.
 - e. Aggregate for Mortar: ASTM C144; use aggregate graded with 100 percent passing the No. 16 sieve, except for joints less than ¼ inch thick.
 - f. ASTM C404; Maximum size 3/8 inch, Aggregate for Grout.
 - g. Fly ash, slag, and pozzolans are not permitted, neither are masonry cement and calcium chloride.
 - h. Only use mortar pigments with records of satisfactory performance in masonry mortar, natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Acceptable Products:
 - (1) Lafarge Corporation; Centurion Pigments.
 - (2) Solomon Grind-Chem Services, Inc.; SGS Mortar Colors.
 - (3) Davis Colors; True Tone Mortar Colors.
 - (4) American Masonry Product
 - (5) Landscape Architect approved equivalent.

- i. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C494, Type c, and recommended by the manufacturer for use in masonry mortar of composition indicated.
Acceptable Products:
 - (1) Euclid Chemical Co.; Accelguard 80.
 - (2) Sonneborn, Div. of ChemRex, Inc.; Trimix-NCA.
 - (3) Grace, W.R.& Co., construction Products Division; Morseled.
 - (4) American Masonry Products.
 - (5) Landscape Architect approved equivalent.
 - j. Source Limitations for Mortar Materials:
Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from a single manufacturer for each cementitious component and from one source or producer for each aggregate.
2. Mortar Mix:
 - a. Mortar for Unit: ASTM C270, Type s using Property Method.
 3. Mortar Color for face Brick and Cast Stone Units:
 - a. Shall match existing masonry monuments on Lowry Avenue between Penn and Lyndale Avenues.
 4. Mortar Mixing:
 - a. Per manufacturer's instructions, mix colored mortar
 - b. Mix mortar ingredients thoroughly per ASTM C 270, in quantities needed for immediate use.
 - c. Per manufacturer's instructions, add admixtures. Provide uniformity of mix.
 - d. In order to lower freezing point of mortar, do not use anti-freeze compounds.
 - e. Retemper only within 2 hours of mixing, if water is lost by evaporation.

- f. Use mortar 2-1/2 hours at temperatures under 50 degrees F or use mortar within 2 hours after mixing at temperatures of 80 degrees F.
5. Grout Mix:
- a. Per ASTM C476 Course grout, thoroughly mix mortar ingredients in quantities needed for immediate use.
 - b. Uniformity of mix to be provided. Add admixtures per manufacturer's instruction.
 - c. Anti-freeze compounds not to be used to lower freezing point of grout.
- I. Anti-Graffiti Coating
1. Provide a non-yellowing water-based resin, cross-linked co-polymer, or waterborne polymer sacrificial anti-graffiti coating which meets the following:
 - a. Solids by Volume: 8% minimum
 - b. VOC: 13 oz./gal./maximum
 - c. Color when cured: Clear
 2. Use compatible anti-graffiti coating system components from the same manufacturer which meet all Federal, State, and Local environmental requirements.
- J. Accessories
1. General purpose cleaning agent to be used, not harmful to masonry work or adjacent materials.
 2. Premolded filler strips to be used for compressible filler, complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent of width and thickness indicated; formulated from neoprene.
 3. Asphalt saturated organic felt to be used for bond breaker strips, complying with ASTM D226, Type 1,015 pound asphalt felt.

SC-1.3 CONSTRUCTION REQUIREMENTS

A. Submittals and Samples

1. Provide the following submittals and samples for review and approval by the Engineer:
 - a. Product, material, and installation data for each type of product indicated.
 - b. Shop Drawings for the following:

- (1) Masonry units – show sizes, profiles, coursing, and location of special shapes.
 - (2) Cast stone units – show fabrication and installation details and indication of finished faces.
 - (3) Foundation plan – show plan and section views with rebar layout
 - (4) Fabricated aluminum frames and lettering
- c. Samples for initial selection and verification:
- (1) Face brick, in form of straps of five or more bricks
 - (2) Each color and texture of cast stone – 10 inches square in size
 - (3) Colored mortar
 - (4) Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project. Label Samples to indicate types and amounts of pigments used.
 - (5) Fabricated aluminum frames and lettering
 - (6) Other accessories embedded in masonry
- d. Material Certificates: Include statements of material properties indicating compliance with requirements including compliance with standards and type designations within standards. Provide for each type and size of the following:
- (1) Masonry units. Include material test reports substantiating compliance with requirements. For bricks, include size-variation data verifying that actual range of sizes falls within specified tolerances. For exposed brick, include material test report for efflorescence according to ASTM C 67.

- (2) Cementitious materials. Include brand, type, and name of manufacturer.
- (3) Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
- (4) Grout mixes. Include description of type and proportions of ingredients.
- (5) Joint reinforcement.
- (6) Anchors, ties, and metal accessories.
- e. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing. Provide test reports based on testing within previous two years.
- f. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
 - (1) Include test reports, per ASTM C 780, for mortar mixes required to comply with property specification.
 - (2) Include test reports, per ASTM C 1019, for grout mixes required to comply with compressive strength requirement.
- g. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.
- h. Cold-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold-weather requirements.
- i. Qualification Data: For manufacturer and testing agency.

SC-1.4 QUALITY ASSURANCE

- A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, with

sufficient production capacity to manufacture required units.

1. Manufacturer is a producing member of the Cast Stone Institute or has on file and follows a written quality-control plan approved by A/E that includes all elements of the Cast Stone Institute's "Quality Control Procedures Required for Plant Inspection."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1093 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.
- C. Preconstruction Testing Service: Contractor will engage a qualified independent testing agency to perform preconstruction testing indicated below. Payment for these services will be at Contractor's expense.
1. Clay Masonry Unit Test: For each type of unit required, per ASTM C 67.
 2. Mortar Test (Property Specification): For each mix required, per ASTM C 780.
 3. Grout Test (Compressive Strength): For each mix required, per ASTM C 1019.
 4. Prism Test: For each type of construction required, per ASTM C 1314.
- D. Sample Panels: Build sample panels to verify selections made under sample submittals and to demonstrate aesthetic effects.

Build sample panels for each type of exposed unit masonry construction in sizes approximately 48 inches long by 48 inches high by full thickness.

1. Where masonry is to match existing, erect panels adjacent and parallel to existing surface.
2. Clean one-half of exposed faces of panels with masonry cleaner indicated.
3. Protect approved sample panels from the elements with weather-resistant membrane.
4. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing. Approval of sample panels does not constitute approval of deviations from the Contract Documents contained in sample panels unless such deviations are specifically approved by Engineer in writing.

SC-1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers designed for lifting and emptying into dispensing silo. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in a metal dispensing silo with weatherproof cover.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.
- F. Pack, handle, and ship cast stone units in suitable packs or pallets.
 - 1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
 - 2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

SC-1.6 Preinstallation Examination

- A. Examine conditions for compliance with requirements for installation tolerances and other conditions affecting performance of work.
 - 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
 - 2. Verify that foundations are within tolerances specified.
 - 3. Verify that reinforcing dowels are properly placed.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions

have been correct.

SC-1.7 General Installation Requirements

- A. Thickness: Build composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Wetting of brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.
- G. Comply with construction tolerances in ACI 530.1/ASCE 6/TMS 602 and with the following:
 - 1. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.
 - 2. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet, or 1/2 inch maximum.
 - 3. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2 inch maximum.

4. For exposed bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
 5. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
 6. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.
 7. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.
- H. Construct reinforced concrete footings and foundations in accordance with Mn/DOT 2461.

SC-1.8

Laying Masonry Walls

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in stacked bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4-Inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

- F. Fill space between steel frames and masonry solidly with mortar, unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.
- H. Fill cores in hollow concrete masonry units with grout 24 inches under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

SC-1.9 Mortar Bedding and Jointing

- A. Lay hollow brick as follows:
 - 1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
 - 2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
 - 3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
 - 4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Set cast-stone trim units in full bed of mortar with full vertical joints as indicated under “Setting Cast Stone in Mortar” section below.
- D. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated. For glazed masonry units, use a nonmetallic jointer $\frac{3}{4}$ inch or more in width.
- E. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.
 - 1. Setting Cast Stone in Mortar
 - a. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to

established relationships and indicated tolerances.

- b. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
- c. Wet joint surfaces thoroughly before applying mortar or setting in mortar.
- d. Set units in full bed of mortar, unless otherwise indicated. If not indicated:
 - (1) Set units with joints $\frac{1}{4}$ to $\frac{3}{8}$ inch (6 to 10 mm) wide.
 - (2) Build anchors and ties into mortar joints as units are set.
 - (3) Fill dowel holes and anchor slots with mortar.
 - (4) Build concealed flashing into mortar joints as units are set.
 - (5) Keep head joints in wall caps and other units with exposed horizontal surfaces open to receive sealant.
- e. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
- f. Provide expansion, control, and pressure-relieving joints of widths and at locations indicated. Keep joints free of mortar and other rigid material. Form open joint of width indicated, but not less than $\frac{3}{8}$ inch (10 mm).
- g. Prepare joints indicated to receive sealant and apply sealant of type and at locations indicated to comply with applicable requirements and manufacturer's recommendations.
- h. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant, unless otherwise indicated.

SC-1.10 Control and Expansion Joints

- A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to

span control and expansion joints without provision to allow for in-plane wall or partition movement.

- B. Form expansion joints in brick made from clay or shale as follows:
1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.
 2. Build flanges of factory-fabricated, expansion-joint units into masonry.
 3. Build in compressible joint fillers where indicated.
 4. Form open joint full depth of brick wythe and of width indicated, but not less than ½ inch for installation of sealant and backer rod.
- C. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod, but not less than 3/8 inch. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

SC-1.11 Installation of Accessories

- A. Install the following accessories as shown on Plans, in accordance with manufacturer's recommendations, and as indicated below:
1. Skate Deterrent:
 - a. Attach with manufacturer-supplied mounting hardware.
 - b. Apply bitumastic to underside of device where contact is made with cast stone.

SC-1.12 Installation of Anti-Graffiti Coating

- A. Install in accordance with manufacturer's requirements and the following:
1. Apply when ambient temperature is between 40 degrees F and 90 degrees F, and the surface temperature is between 50 degrees F and 85 degrees F and rising.
 2. Do not apply coating when precipitation is expected within 12 hours of the completion of application of the relative humidity is above 88 percent.

3. Prepare masonry surfaces and concrete surfaces to be coated in accordance with ASTM D 4261 and ASTM D 4258, respectively.
4. Protect all surfaces not intended to be coated and take necessary precautions to prevent materials from being dispersed outside the work area during cleaning and application of coating.

SC-1.13 Protection of Work

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
 1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
 2. Where 1 wythe of multi wythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.
- B. Do not apply heavy loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.
- C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
 2. Protect sills, ledges, and projections from mortar droppings.
 3. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.
- D. Cold-Weather Requirements: do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

SC-1.14 Field Quality Control

- A. Testing Agency: Contractor will engage a qualified independent testing and inspecting agency to perform field tests and inspections indicated below and prepare test reports. Payment for these services will be Contractor's responsibility.
1. Testing Frequency: One set of tests for each 500 sq. ft. of wall area or portion thereof.
 2. Clay Masonry Unit Test: for each type of unit provided, per ASTM C 67.
 3. Mortar Test (Property Specification): for each mix provided, per ASTM C 780. Test mortar or mortar air content and compressive strength.
 4. Grout Test (Compressive Strength): For each mix provided, per ASTM C 1019.
 5. Prism Test: For each type of construction provided, per ASTM C 1314 at 7 days and at 28 days.

SC-1.15 Repairing, Pointing, and Cleaning

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement. Cast stone may be repaired if methods and results are approved by Engineer.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured,

clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
7. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
8. Clean stone trim to comply with stone supplier's written instructions.

E. Waste Disposal

1. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
2. Excess Masonry Waste: Remove excess clean masonry waste and other masonry waste, and legally dispose of off Owner's property.

SC-1.16 METHOD OF MEASUREMENT

- A. Measurement of concrete and masonry monuments will be made by the number of structures constructed. No separate measurement will be made for structural concrete, masonry blocks and stones, grout, reinforcement bars, formwork, aluminum components, connections, anti-graffiti coating,

cleaning, or any other items of work required to construct the structure as a complete unit in-place.

SC-1.17 BASIS OF PAYMENT

- A. Payment for concrete and masonry monuments will be under Item 2540.602 (Concrete and Masonry Monuments) at the Contract price per unit of measure for each type specified. Payment shall be considered compensation in full for all costs of constructing the structures complete in-place as specified.

SC-2 (2575) TURF ESTABLISHMENT

SC-2.1 Description

The work to be done under this Contract shall include the furnishing of all materials, labor, tools and equipment to construct complete in-place all fine grading, AND seeding as shown on the plans and as specified herein. Included in this Contract, but not limited to, are:

1. Fine Grading
2. Fertilizing
3. Seeding
4. Mulching
5. Maintenance
6. Replacement and Reseeding, if required
7. Cleanup

SC-2.2 Materials and Application

The seeding Contractor shall carefully coordinate his work with that of other Contractors and Subcontractors. The Contractor shall protect existing trees, sidewalks drives, curbs, utilities, buildings, or other facilities on or adjacent to the site from damage from the work of this specification where such items exist.

All materials shall conform to the following requirements:

- A. All seeds shall be true to their name as specified. All native grass seed varieties and wildflower seed shall originate from Minnesota, North Dakota, South Dakota, or Wisconsin unless otherwise approved by the Engineer and/or Landscape Architect.

All seed shall be packed and covered in such a manner as to ensure adequate protection against damage and maintain dormancy while in transit and storage and during planting operations.

All seeds shall have the proper stratification and/or scarification to break seed dormancy for other than fall planting.

Species and quantities to be planted shall be those specified in the Specifications. Seed mixtures shall be proportioned by seed count and seed count percentages. If specified seed is not available, the Contractor shall submit proof of unavailability and proposal of equivalent for approval by the Engineer and/or Landscape Architect. No substitutions will be approved unless they are native, adapted for growth on the site, and meet the origin criteria specified in this Section.

Seeds shall be free of the project location's state DNR- or DOC-identified noxious weed seeds, Reed Canary Grass (*Phalaris arundinacea*), Common Reed (*Phragmites rundinacea*), and Purple Loosestrife (*Lythrum salicaria*).

1. Low Mow Fescue Seed Mix (Seed Mixture Special 1)

Cover Crop (Application rate shall be 40 lbs. per acre)

80% Oats (Winter Wheat can be substituted for fall plantings) 16% Rye-grass, annual
4% Slender Wheatgrass

Seed Mix (Broadcast seeding rate shall be 110 lbs. per acre)

16% Fescue, Improved Chewing
20% Fescue, Creeping Red Boreal
20% Fescue, Creeping Red Navigator
20% Hard Fescue
20% Sheep Fescue
4% Annual Ryegrass

B. **Seed Requirements**

Other grass seed mixtures under other brand names may be acceptable if they approach the above mixture, but are subject to approval by the Landscape Architect or Owner before purchase or use. All seed shall conform to requirements of latest seed laws of the state, including those governing weed seed tolerances. Also, the seed shall conform to the purity and germination requirement by Mn/DOT, Specification 3876, January 1, 1972. Labels from all seed packages shall be delivered to the Owner at the end of each working day.

C. Water

The Contractor will secure water as needed for turf establishment. The Contractor will assume all costs associated with obtaining water. Water must be free of harmful substances.

D. Mulch and Erosion Control Blankets

Mulch shall be seed-free threshed straw mulch of oats at a rate of 1.5 tons per acre within the Prairie Area only.

Wood fiber biodegradable erosion control blanket with staples will be placed on all river bank soil disturbed locations. Non-biodegradable erosion control blankets will not be accepted.

SC-2.3 Installation Requirements

A. Site Preparation

Areas to be seeded shall have a 4" layer of topsoil cover as specified and as approved by the Engineer and/or Landscape Architect. In the event that the existing topsoil cover has been disturbed or is not of acceptable depth prior to the application of seed, the Contractor shall be required to supplement the topsoil in the area to bring it up to the specified depth. Topsoil shall be considered incidental to payment for seeding.

Topsoil shall be natural, friable, fertile, fine sandy loam. The topsoil shall be free from subsoil, noxious weeds, stones, lime, concrete, ashes, slag, or other deleterious matter and shall be well-drained in its original conditions and free of toxic quantities of acid or alkaline elements. It shall contain sand and clay in approximately equal proportions. It shall have an organic content by weight of not less than 1.5% or more than 5% as determined by laboratory tests. The Ph shall be between 6 and 7.

On all areas to be seeded, topsoil shall be placed as indicated above and brought to a smooth, well-drained, evenly-textured surface conforming to the grades shown on the Construction Drawings. The Contractor shall do finish grading until the soil is in a mellow condition to finish grade. All holes, depressions, and rivulets shall be filled in and brought to a smooth grade to ensure no disruption of established drainage patterns. All rubble, sticks, branches, or stones and extraneous material over ½" diameter on the surface which will interfere with a quality installation of the seed shall be picked up and removed.

Using a rolling-type packer, the Contractor shall pack any areas of tilled, loose, or regraded soil within the zone to be seeded, unless grading has already resulted in a smooth, firm seedbed.

B. Herbiciding

If Low Mow Fescue seeding does not occur immediately after site grading and vegetation has emerged in the area to be seeded, the site shall be prepared by broadcast herbiciding. There shall be at least 3 applications of herbicide 10-14 days apart. Apply post emergent, systematic herbicide with no soil residual activity per manufacturer's directions, using a surfactant, to entire area to be seeded in order to kill existing growing vegetation. 5-7 days after each of the first two applications, cover crop shall be mowed to a height of 6". Clippings shall be removed off-site. 10-14 days after each application, make another application to the same area. Cover crop shall be mowed to a height of 2" 5-7 days after the last herbicide application. Clippings shall be removed off-site. Applications must be made in 12-hours-dry conditions, no precipitation or dew, above 50 degrees Fahrenheit, wind less than 3 mph. After completion of herbiciding, Contractor shall obtain written approval from the Engineer before seeding.

<u>Timing</u>	<u>Activity</u>
6 weeks before seeding	Herbicide Application 1: Broadcast herbicide all areas to be seeded with prairie seed.
5-7 days after herbicide application 1	Mow 1: Mow all herbicided areas to height of 6". Clippings shall be removed offsite.
10-14 days after herbicide to application 1	Herbicide Application 2: Broadcast herbicide all areas be seeded with prairie application 1 seed.
5-7 days after herbicide application 2	Mow 2: Mow all herbicided areas to height of 6". Clippings shall be removed offsite.
10-14 days after herbicide to application 2	Herbicide Application 3: Broadcast herbicide all areas be seeded with prairie seed.
5-7 days after herbicide application 3	Mow 3: Mow all herbicided areas to height of 2". Clippings shall be removed application 3 offsite.
6 weeks after beginning of site preparation	Begin seeding if no unacceptable species are visible to Engineer within 10 days of herbiciding and Engineer

approves seeding; otherwise, continue to herbicide every 10-14 days and mow to 2" 5-7 days after every herbicide application until approval of Landscape Architect is obtained.

C. Seeding and Mulching

All seeding shall be performed between May 1 and July 15 or between September 1 and October 1. No seeding will be approved outside these dates.

The Engineer shall be notified 24 hours prior to beginning the seeding operations. The Engineer shall inspect seed and previously mentioned seed information prior to application.

Seeding of all grasses, forbs, and cover crop will take place using a broadcast seeding method by either hand or cyclone seed spreaders.

Immediately prior to seeding operations, all seeding equipment shall be calibrated and adjusted to sow seeds at the proper seeding rate.

Cover crop and grasses shall be sown separately.

The broadcast seeder will be equipped with an agitator that effectively prevents seed from bridging or plugging. Seed shall be broadcast twice over each area to help ensure even distribution. Grass and wildflower seed shall be broadcast separately. After the grass seed is broadcast, the seeded area shall be hand-raked or dragged with an implement to the extent necessary to cover a majority of the seed with 1/4" of soil. Harrowing or raking should not be done after wildflower seeding.

After sowing and harrowing or raking, seed should be watered with a fine spray. Water will be furnished by the Contractor.

No fertilizer shall be applied.

Within 12 hours, if conditions permit, or as soon thereafter as practical, but no later than 7 days after seeding, all seeded areas shall be rolled at right angles to the line of run-off with an approved type roller or cultipacker to compact the seedbed and place the seed in contact with the soil.

No machinery shall run across seeded area after seeding operations have been completed. Foot traffic shall be minimized; workers shall travel along the perimeter of the seeded area only. Any damage to seeded areas caused by construction traffic or construction activities shall be repaired and reseeded at no cost to the Owner.

Observance of machinery on seeded areas after seeding operations have been completed will result in a \$250 fine per occurrence, deducted from the Contractor's next invoice.

The Contractor shall be fully responsible for implementing and maintaining permanent and temporary erosion control measures within prescribed seeding areas for the duration of the stipulated maintenance period.

All waste material and litter shall be removed from the site after seeding is completed.

SC-2.4 ACCEPTANCE AND GUARANTEES

Maintenance shall begin immediately after each portion of lawn is seeded and shall continue in accordance with the following requirements:

A. Guarantees

The Contractor shall guarantee seeded areas through the specified maintenance period and until final acceptance. Success is defined as minimum 80% ground cover of acceptable species (see below for undesirable species) as determined by the Engineer and/or Landscape Architect, and minimum 50% ground cover of seeded species. Areas unsuccessful because native plants have not become successfully established or because native plants have been choked out by exotic species or destroyed by herbicide drift at any time during the stipulated maintenance period shall be re-seeded at ½ the original density.

Warranty shall not include damage or loss to ground cover caused by fires, floods, freezing rains, lightening or wind storms, winter kill caused by temperatures below -35 degrees F, acts of vandalism, or negligence on the part of the Owner.

B. Inspection and Acceptance Schedule

The Contractor shall be responsible for the satisfactory growth of plants on all areas seeded under the Contract until final acceptance of the work. Acceptance shall occur in three stages, which shall be:

Stage 1: Acceptance of installation: 90 days after completion of seeding

Stage 2: Interim acceptance of maintenance: 1 year

Stage 3: Guarantee of work acceptance and final acceptance of maintenance: 2 years

Acceptance of installation: 90 days after seeding is completed, the Engineer and/or will, upon request, make an inspection to determine acceptability of installation.

Final acceptance of guaranteed work: Two years after the seeding is completed (at the conclusion of the maintenance period), the Engineer will, upon request, make a final inspection to determine acceptability.

C. Time Meander Search

Acceptance of the work will be determined using a time meander search to be conducted by the Engineer and/or Landscape Architect.

Each search shall be conducted during the growing season and will randomly sample 20% of each area that was seeded. If the sample area has minimum 80% ground cover of acceptable species, including germination of desirable seed bank flora and minimum 50% ground cover of species that were seeded, the work will receive acceptance. The following species will be considered unacceptable:

Purple Loosetrife (*Lythrum salicaria*), Yellow Sweet Clover (*Melilotus officinalis*), White Sweet Clover (*Melilotus alba*), Curly Dock (*Rumex crispus*), Garlic Mustard (*Alliaria petiolata*), Reed Canary Grass (*Phalaris arundinacea*), Smooth Brome (*Bromus inermis*), Crown Vetch (*Coronilla varia*), Bird's Foot Trefoil (*Lotus corniculatus*), Canada Thistle (*Cirsium arvense*), Giant Ragweed (*Ambrosia trifida*), Common Ragweed (*Ambrosia artemisiifolia*), Foxtail (*Setaria* spp.), Leafy Spurge (*Euphorbia esula*), Japanese Knotweed (*Polygonum cuspidatum*), Buckthorns (*Rhamnus* spp.), Honeysuckles (exotic *Lonicera* spp.), Asian Mulberry (*Morus alba*).

D. Non-Acceptance

When inspected seeding does not comply with the requirements stated in this Section, the Contractor shall replace the rejected work until inspected again by the Engineer and/or Landscape Architect and found to be acceptable. The Contractor shall resow at half the original seeding rate within 2 weeks of notification by the Engineer and/or Landscape Architect.

SC-2.5 Measurement and Payment

Seeding will be measured for payment in units of acres. Measurement will be made of the area seeded to the nearest 0.10 acre. Payment will be made at the contact unit price for the Item

Nos. 2575.608 “Seed Mixture Special 1” (Low Mow Fescue Seed Mix). This price shall be full compensation for all costs of soil testing and liming, fine grading, seeding, fertilizing and mulching, maintenance, replacement and clean-up, as specified.