



Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

April 15, 2011

SUBJECT: FAU 8003 (Long Bay Drive)
Project TE-00D6(101)
Section 09-00469-00-BR (Springfield)
Sangamon County
Contract No. 93546
Item 064
April 29, 2011 Letting
Addendum (A)

TO PROSPECTIVE BIDDERS:

Due to clarify information necessary to revise the following:

Proposal – Revised Index of Special Provisions.
Revised pages 7, 8, 9, 10, 11, 12 & 13 of the Special Provisions.
Added pages 14a. through 14i. to the Special Provisions.

Prime contractors must utilize the enclosed material when preparing their bid and must include any Schedule of Prices changes in their bidding proposal.

Bidders using computer-generated bids are cautioned to reflect any and all Schedule of Prices changes, if involved, into their computer programs.

Very truly yours,

Scott Stitt
Acting Engineer of Design and Environment

A handwritten signature in black ink, appearing to read 'Ted B. Walschleger' followed by the initials 'DE'.

By: Ted B. Walschleger
Engineer of Project Development
and Implementation

INDEX

Description Of Work	1
Start and Completion Date	1
Salvable Materials	1
Cooperation With Utilities	2
Joint Utility Locating Information for Excavators	2
Traffic Control Plan	3
Maintenance Of Navigation	4
Status Of Utilities To Be Adjusted	5
Remove And Replace Floor Drains	5
Bridge Deck Concrete Crack Sealer	6
Lighting Unit Complete	6
Remove and Replace Balusters	7
Removing and Replacing Railing Stones	8
Remove and Reset Face Stone	9
Pier Stone	10
Remove and Reset Stonework at Pier	11
Material for Railing Stones	12
Masonry Cleaning and Tuckpointing	13
Polymer Overlay Pretreatment	14
Anchor Rods	14
Sequence of Construction	14
Cast Stone	14a.-14g.
Masonry Mortar	14h.-14i.

REMOVE AND REPLACE BALUSTERS

This work shall consist of removing and replacing the existing balusters with new balusters and removing, stockpiling, and re-erecting existing railing cap stones as required to remove and replace the balusters.

Materials. The materials shall meet the following requirements:

Replacement Balusters: See special provision for MATERIAL FOR RAILING STONE REPLACEMENT.

Mortar: See special provision for MASONRY MORTAR.

Dowel Bars shall be in accordance with Article 1006.31(b) of the standard specifications.

Construction Requirements. The Contractor shall salvage three hundred (300) of the existing balusters for reuse by the City. See Special Provision for SALVABLE MATERIALS. Brass pipe dowels from the original construction may be reused when setting the new balusters. All remaining balusters, dowel bars, and damaged stones shall be removed and disposed of as specified in Article 202.03 of the Standard Specifications.

Railing cap stones, suitable for reuse, shall be marked for identification purpose, carefully removed, and stored on the project site. Any stones damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense as directed by the Engineer. Damaged railing cap stones, as scheduled on the plans or as directed by the engineer, shall be replaced in accordance with the special provision for REMOVING AND REPLACING RAILING STONES.

All existing balusters shall be replaced with new balusters meeting the requirements of the special provision for MATERIAL FOR RAILING STONE REPLACEMENT. New balusters shall match the profile, shape, color, and texture of the original work. Railing Cap Stones shall be cleaned of all mortar and power washed prior to resetting.

The railing shall be reconstructed using the original stones, wherever possible, placed in their original position using the identification marks established during removal. Methods of construction, inspection and repair shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook for limestone and the Cast Stone Institute Technical Manual for cast stone.

Method of Measurement. Removing and re-erecting existing railing cap stone will not be measured for payment but shall be included in the cost of REMOVE AND REPLACE BALUSTERS. Balusters will be measured for payment in place as each.

Basis of Payment. Removing and replacing the existing balusters will be paid for at the contract unit price per each for REMOVE AND REPLACE BALUSTERS which price shall include the cost to remove and reset the railing cap stones, remove and dispose of the existing balusters, furnish and install the new balusters, including the cost of any dowel bars and mortar required to complete this work.

REMOVING AND REPLACING RAILING STONES

This work consists of removing and replacing railing stones indicated in the plans and as directed by the Engineer.

Materials. The materials shall meet the following requirements:

Replacement Stones: See special provision for MATERIAL FOR RAILING STONE REPLACEMENT.

Mortar: See special provision for MASONRY MORTAR.

Dowel Bars shall be in accordance with Article 1006.31(b) of the standard specifications.

Construction Requirements. The Contractor shall remove all damaged stones, scheduled in the contract plans, and at locations directed by the Engineer in the field. The Contractor shall also furnish replacement stones and install them in the locations of the original stones. Adjacent stones that must be removed to allow the removal and replacement of the damaged stones shall be carefully removed, marked for identification purposes, and stored on the project site. Stones damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense as directed by the Engineer.

Replacement stones shall match the dimensions, color, shape, profile and texture of the original work. Joints adjacent to stones being reset shall be cleaned of all mortar and power washed prior to resetting. The stones to be reset shall be set on spacers and a grout bed to match the existing horizontal joint lines in the remaining railing. Alignment and level shall be checked by the Contractor in all directions to ensure the stones are in full contact with the grout base and properly seated. Stones shall be placed side-by-side with an equal gap between stones.

All damaged stones shall be removed and disposed of as specified in Article 202.03 of the Standard Specifications.

The railing shall be reconstructed using the original stones, wherever possible, placed in their original position using the identification marks established during removal. Methods of construction, inspection and repair shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook for limestone and the Cast Stone Institute Technical Manual for cast stone.

Method of Measurement. Replacement stones will be measured and the quantity computed in linear feet.

Basis of Payment. Removing and replacing cap stones shall be paid for at the contract unit price per foot for REMOVE AND REPLACE RAILING CAP STONE. Removing and replacing the base stones shall be paid for at the contract unit price per foot for REMOVE AND REPLACE BASE STONE. Removing and replacing the face stone shall be paid for at the contract unit price per foot for REMOVE AND REPLACE FACE STONE. Removing and replacing the intermediate stone shall be paid for at the contract unit price per foot for REMOVE AND REPLACE INTERMEDIATE STONE which price shall include the cost to remove and reset any necessary adjacent stones, remove and dispose of the damaged stones, furnish and install the replacement stones, including the cost of any dowel bars and mortar required to complete this work.

REMOVE AND RESET FACE STONE

This work consists of removing and resetting the existing face stone at the base of the railing along the entire length of the bridge. This work is required to repair the deteriorated mortar joints and is necessary to install the electrical conduit for the lighting.

Materials. The materials shall meet the following requirements:

Mortar: See special provision for MASONRY MORTAR.

Dowel Bars shall be in accordance with Article 1006.31(b) of the standard specifications.

Construction Requirements. The Contractor shall remove and reset all face stones at the base of the railing along the entire length of both sides of the bridge. Stones suitable for reuse shall be carefully removed, marked for identification purposes, and stored on the project site. Damaged stones, scheduled in the contract plans, and at locations directed by the Engineer in the field shall be removed and replaced in accordance with the special provision for REMOVING AND REPLACING RAILING STONES. Stones damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense as directed by the Engineer.

The railing shall be reconstructed using the original stones, wherever possible, placed in their original position using the identification marks established during removal. Methods of construction, inspection and repair shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook for limestone and the Cast Stone Institute Technical Manual for cast stone.

Method of Measurement. Removing and Resetting of the face stone shall be measured in linear feet.

Basis of Payment. Removing and resetting the face stone shall be paid for at the contract unit price per foot for REMOVE AND RESET FACE STONE which price shall include the cost to remove and reset the face stone and any necessary adjacent stones including the cost of any dowel bars and mortar required to complete this work.

PIER STONE

This work consists of removing and replacing various size stones and furnishing stones that will fill the existing lighting openings on the inside face of each pier.

Materials. The materials shall meet the following requirements:

Replacement Stones: See special provision for MATERIAL FOR RAILING STONE REPLACEMENT.

Mortar: See special provision for MASONRY MORTAR.

Dowel Bars shall be in accordance with Article 1006.31(b) of the standard specifications.

Construction Requirements. The Contractor shall remove all damaged stones, scheduled in the contract plans, and at locations directed by the Engineer in the field. The Contractor shall also furnish replacement stones and install them in the locations of the original stones. Adjacent stones that must be removed to allow the removal and replacement of the damaged stones shall be carefully removed, marked for identification purposes, and stored on the project site. Stones damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense as directed by the Engineer.

The Contractor shall furnish and set new stones to fill the existing openings on the inside face of each pier. The dimensions of this stone shall be approximately 1'-2" x 1'-10" x 4". The actual dimensions of the stone shall be determined by measuring the void on the inside face of each pier less the area of grout required. The face of the stone shall have reveals consistent with those of the adjacent pier panel stones.

Replacement stones shall match the dimensions, color, shape, profile and texture of the original work. Joints adjacent to stones being reset shall be cleaned of all mortar and power washed prior to resetting. The stones to be reset shall be set on spacers and a grout bed to match the existing joint lines in the pier. Alignment and level shall be checked by the Contractor in all directions to ensure the stones are in full contact with the grout base and properly seated. Stones shall be placed side-by-side with an equal gap between stones.

All damaged stones shall be removed and disposed of as specified in Article 202.03 of the Standard Specifications.

The piers shall be reconstructed using the original stones, wherever possible, placed in their original position using the identification marks established during removal. Methods of construction, inspection and repair shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook for limestone and the Cast Stone Institute Technical Manual for cast stone.

Method of Measurement. Pier stones shall be measured in cubic feet.

Basis of Payment. Furnishing and setting the pier stone shall be paid for at the contract unit price per cubic foot for PIER STONE which price shall include the cost to remove and reset any necessary adjacent stones, remove and dispose of the damaged stones, furnish and install the replacement stones, including the cost of any dowel bars and mortar required to complete this work.

REMOVE AND RESET STONEWORK AT PIER

This work consists of removing, storing and resetting pier stones at each pier location where light poles are being installed. This work also includes drilling holes in the pier cap stone for anchor bolts and wiring as indicated in the plans.

Materials. The materials shall meet the following requirements:

Mortar: See special provision for MASONRY MORTAR.

Dowel Bars shall be in accordance with Article 1006.31(b) of the standard specifications.

Construction Requirements. The Contractor shall carefully remove and reset the pier panel stones, the middle pier cap stone and any other stones necessary for the installation of the lighting conduit and light unit. Stones suitable for reuse shall be carefully removed, marked for identification purposes, and stored on the project site. Stones damaged by the Contractor's operations shall be repaired or replaced at the Contractor's expense as directed by the Engineer. Damaged stones at locations directed by the Engineer in the field shall be removed and replaced in accordance with the special provision for PIER STONES.

Replacement stones shall match the dimensions, color, shape, profile and texture of the original work. Joints adjacent to stones being reset shall be cleaned of all mortar and power washed prior to resetting. The stones to be reset shall be set on spacers and a grout bed to match the existing joint lines in the pier. Alignment and level shall be checked by the Contractor in all directions to ensure the stones are in full contact with the grout base and properly seated. Stones shall be placed side-by-side with an equal gap between stones.

The piers shall be reconstructed using the original stones, wherever possible, placed in their original position using the identification marks established during removal. Methods of construction, inspection and repair shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook for limestone and the Cast Stone Institute Technical Manual for cast stone.

Method of Measurement. Removing and resetting the stonework at pier locations will be measured as each. Drilling holes in the pier cap stone, necessary for installation of the light pole, shall not be measured separately but shall be included in the cost for REMOVE AND RESET STONEWORK AT PIER.

Basis of Payment. Removing and resetting the stonework at pier locations shall be paid for at the contract unit price per each for REMOVE AND RESET STONEWORK AT PIER which price shall include the cost to remove and reset any necessary stones for installation of the light poles, including the cost of any dowel bars and mortar required to complete this work.

MATERIAL FOR RAILING STONE REPLACEMENT

Replacement Stone shall be Cut Indiana Limestone, Cast Stone, or precast concrete material matching the dimensions, color, shape, profile and texture of the original stonework.

Cut Indiana Limestone: Limestone shall match the existing material and shall be cut accurately to match the shape and dimensions of the stone being replaced.

Cast Stone: Cast Stone shall meet the requirements of the special provision for Cast Stone contained here-in.

Precast Concrete: Precast concrete shall be wetcast and shall be produced according to Sections 1020 and Article 1042. The concrete shall be Class PC with a minimum compressive strength of at least 6500 psi at 28 days. Producer shall be listed on the **APPROVED LIST OF CERTIFIED PRECAST CONCRETE PRODUCERS** and able to produce items similar to the required replacement stones.

All replacement materials shall match the dimensions, color, shape, profile and texture of the original work.

Sample Panels: The Contractor shall provide samples of the proposed replacement material. These samples can be 2' x 2' panels or can be full size mock ups of the piece being replaced. These samples shall be submitted to the Engineer for inspection and comparison to the original stones. Samples will be required to match the existing limestone, after cleaning, in color and texture. The Engineer will be required to consult with the Illinois Historic Preservation Agency (IHPA) prior to approval. Production stones shall not be ordered until the sample panels have been approved. Samples not matching the original stones, after cleaning, in color and texture will be rejected and additional sample panels will be supplied at the Contractor's expense. It is suggested that the sufficient samples, in a variety of colors if required, be provided such that a match can be selected. The cost of the Sample Panels is included in the cost of REMOVING AND REPLACING RAILING STONES.

Sample Balusters. The Contractor shall provide three (3) sample balusters. These samples shall be submitted to the Engineer for inspection and comparison to the original balusters. Sample balusters will be required to match the existing limestone, after cleaning, in color and texture, and will be required to match the size shape and profile of the existing balusters. The Engineer will be required to consult with the Illinois Historic Preservation Agency (IHPA) prior to approval. Production balusters shall not be ordered until the sample balusters have been approved. Sample balusters not meeting approval will be rejected and additional sample balusters will be supplied at the Contractor's expense. It is suggested that the sufficient samples be provided, in a variety of colors if required, such that a match can be selected. The cost of the Sample Balusters is included in the cost of REMOVE AND REPLACE BALUSTERS.

MASONRY CLEANING AND TUCKPOINTING

Description. This work includes the cleaning of the masonry and tuckpointing of the joints between all stones that do not require resetting as indicated in the contract plans.

General. All joints not affected by the work required to reset/replace railing stones shall be pointed with the mortar mix. After the specified amount of mortar has been removed existing mortar joints shall be water blast cleaned. All stones not required to be removed and reset as indicated in the contract plans shall be cleaned. Upon completion of the project, all stones on the structure will have been cleaned and all joints will have new mortar.

Methods of cleaning and tuckpointing shall comply with the Indiana Limestone Institute of America, (ILI): Indiana Limestone Handbook.

Materials. Materials shall be according to the following:

Mortar: See special provision for MASONRY MORTAR.

Construction Requirements. Old mortar should be removed to a minimum depth of 2 times the width of the joint or until sound mortar is reached, whichever is greater. The existing mortar shall be removed only to the limits specified. The deteriorated mortar shall be removed in a manner acceptable to the Engineer, which does not damage the stone or sound existing mortar to remain. Any damage caused by the Contractor's operations shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

After cleaning, the joints shall be thoroughly flushed with clean, potable water. All free standing water shall be removed by an oil free air blast immediately prior to tuckpointing. The surface of the stone masonry shall be at a saturated surface dry condition at the time of pointing. With very rapid drying under hot, dry and/or windy conditions, very light wetting of the masonry, such as a fog spray, shall be performed. Overwetting of the masonry will not be permitted.

The mortar shall be well driven into the joints and finished with a pointing tool approved by the Engineer. The Contractor shall provide consistency in the tooling, size and profile of the finished joint.

During hot, dry weather, the masonry shall be kept wet a minimum of three days after completion of the pointing.

All stones shall be cleaned in such a manner that no permanent discoloration of the stone shall occur.

Method of Measurement. Masonry tuckpointing will be measured in place per foot of tuckpointed joint. Only joints located in areas of the existing masonry that are not reconstructed will be measured for payment. Masonry cleaning shall not be measured for separate payment but shall be included in the cost of Masonry Tuckpointing.

Basis of Payment. This work shall be paid at the contract unit price per foot for MASONRY CLEANING AND TUCKPOINTING, which price shall include full payment for all labor, material and equipment necessary to remove deteriorated mortar and to furnish, install and cure masonry pointing, including the cost to clean the adjacent masonry.

CAST STONE

PART 1 GENERAL

1.1 SECTION INCLUDES - Architectural cast stone.

- A. Scope - All labor, materials and equipment to provide the cast stone shown on architectural drawings and as described in this specification.
 - 1. Manufacturer shall furnish cast stone covered by this specification.
 - 2. Installing contractor shall unload, store, furnish all anchors, set, patch, and clean the cast stone as required.

1.2 RELATED SECTIONS

- A. Section - 1042 - Precast Concrete Products.
- B. Special Provision - Masonry Mortaring.
- C. Section - 1024 - Nonshrink Grout.

1.3 REFERENCES

- A. ACI 318 - Building Code Requirements for Reinforced Concrete.
- B. ASTM A 185 - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
- C. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Reinforced Concrete.
- D. ASTM C 33 - Standard Specification for Concrete Aggregates.
- E. ASTM C 150 - Standard Specification for Portland Cement.
- F. ASTM C 173 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volume Method.
- G. ASTM C 231 - Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
- H. ASTM C 260 - Standard Specification for Air-Entrained Admixtures for Concrete.
- I. ASTM C 270 - Standard Specification for Mortar for Unit Masonry.
- J. ASTM C 426 - Standard Test Method for Linear Shrinkage of Concrete Masonry Units
- K. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.
- L. ASTM C 618 - Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

Added 9-15-11

14a.

- M. ASTM C 666 – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
- N. ASTM C 979 - Standard Specification for Coloring Pigments for Integrally Pigmented Concrete.
- O. ASTM C 989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete.
- P. ASTM C 1194 - Standard Test Method for Compressive Strength of Architectural Cast Stone.
- Q. ASTM C 1195 - Standard Test Method for Absorption of Architectural Cast Stone.
- R. ASTM C 1364 - Standard Specification for Architectural Cast Stone.
- S. ASTM D 2244 – Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
- T. Cast Stone Institute SM Technical Manual (Current Edition)

1.4 DEFINITIONS

- A. Cast Stone - a refined architectural concrete building unit manufactured to simulate natural cut stone, used in unit masonry applications.
 - 1. Dry Cast Concrete Products – manufactured from zero slump concrete.
 - a. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero-slump concrete against a rigid mold until it is densely compacted.
 - 2. Wet Cast Concrete Products – manufactured from measurable slump concrete.
 - a. Wet casting method: manufactured from measurable slump concrete and consolidated into a mold.

1.5 SUBMITTAL PROCEDURES

- A. Samples: Submit pieces of the cast stone that are representative of the general range of finish and color proposed to be furnished for the project.
- B. Test results: Submit test results of previous cast stone made by the manufacturer and certification that the test results of Cast Stone produced for this contract will meet or exceed the specified requirements.
- C. Shop Drawings: Submit manufacturers shop drawings including profiles, cross-sections, reinforcement, exposed faces, anchoring methods, anchors (if required), annotation of stone types and location.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
 - 1. Manufacturer shall have sufficient plant facilities to produce the shapes, quantities and size of cast stone required in accordance with the project schedule.

Added 4-15-11

14b.

2. Manufacturer should be a certified producing member of the Cast Stone Institute and/or an Architectural Precast Association Certified Plant with a minimum of five years history of manufacturing cast stone of similar units.
- B. Standards: Comply with the requirements of the Cast Stone Institute Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.

PART 2 - PRODUCTS

2.1 ARCHITECTURAL CAST STONE

- A. Comply with ASTM C 1364
- B. Physical properties: Provide the following:
 1. Compressive Strength - ASTM C 1194: 6,500 psi (45 Mpa) min. for products at 28 days.
 2. Absorption - ASTM C 1195: 6% max. by the cold water method, or 10% maximum by the boiling method for products at 28 days.
 3. Air Content – ASTM C173 or C 231, for wet cast product shall be 4-8% for units exposed to freeze-thaw environments. Air entrainment is not required for VDT products.
 4. Freeze-thaw – ASTM C 666: The Cumulative Percentage Weight Loss shall be less than 5% after 300 cycles of freezing and thawing.
 5. Linear Shrinkage – ASTM C 426: Shrinkage shall not exceed 0.065%.
- C. Job site testing – One (1) sample from production units may be selected at random from the field for each 500 cubic feet (14 m³) delivered to the job site.
 1. Three (3) field cut cube specimens from each of these samples shall have an average minimum compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
 2. Three (3) field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
 3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.

2.2 RAW MATERIALS

- A. Portland cement – Type I or Type III, white and/or gray, ASTM C 150.
- B. Coarse aggregates - Granite, quartz or limestone, ASTM C 33, except for gradation, and are optional for the VDT casting method.
- C. Fine aggregates - Manufactured or natural sands, ASTM C 33, except for gradation.
- D. Colors - Inorganic iron oxide pigments, ASTM C 979 except that carbon black pigments shall not be used.
- E. Admixtures- Comply with the following:

Added 9-15-11

19c.

1. ASTM C 260 for air-entraining admixtures.
2. ASTM C 494/C 495M Types A - G for water reducing, retarding, accelerating and high range admixtures.
3. Other admixtures: integral water repellents and other chemicals, for which no ASTM Standard exists, shall be previously established as suitable for use in concrete by proven field performance or through laboratory testing.
4. ASTM C 618 mineral admixtures of dark and variable colors shall not be used in surfaces intended to be exposed to view.
5. ASTM C 989 granulated blast furnace slag may be used to improve physical properties. Tests are required to verify these features.

F. Water – Potable

G. Reinforcing bars:

1. ASTM A 615/A 615M. Grade 40 or 60 steel galvanized or epoxy coated when cover is less than 1.5 in. (37 mm).
2. Welded Wire Fabric: ASTM A 185 where applicable for wet cast units.

H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

2.3 COLOR AND FINISH

- A. Match the approved samples submitted in accordance with the special provision MATERIAL FOR RAILING STONE REPLACEMENT.
- B. All exposed to view surfaces shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 in. (0.8 mm) and the density of such voids shall be less than 3 occurrences per any 1 in.2 (25 mm²) and not obvious under direct daylight illumination at a 5 ft (1.5m) distance.
- C. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 ft (3 m) distance.
 1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
 - a. Total color difference – not greater than 6 units.
 - b. Total hue difference – not greater than 2 units.
- D. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20-ft (6 m) distance.
- E. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.
- F. Remove cement film, if required, from exposed surfaces prior to packaging for shipment.

2.4 REINFORCING

- A. Reinforce the units as required by the drawings and for safe handling and structural stress.
- B. Minimum reinforcing shall be 0.25 percent of the cross section area.
- C. Reinforcement shall be non corrosive where faces exposed to weather are covered with less than 1.5 in. (38 mm) of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.
- D. Panels, soffits and similar stones greater than 24 in. (600 mm) in one direction shall be reinforced in that direction. Units less than 24 in. (600 mm) in both their length and width dimension shall be non-reinforced unless otherwise specified.
- E. Welded wire fabric reinforcing shall not be used in dry cast products.

2.5 CURING

- A. Cure units in a warm curing chamber approximately 100°F (37.8°C) at 95 percent relative humidity for approximately 12 hours, or cure in a 95 percent moist environment at a minimum 70°F (21.1°C) for 16 hours after casting. additional yard curing at 95 percent relative humidity shall be 350 degree-days (i.e. 7 days @ 50°F (10°C) or 5 days @ 70°F (21°C)) prior to shipping. Mold cured units shall be protected from moisture evaporation with curing blankets or curing compounds after casting.

2.6 MANUFACTURING TOLERANCES

- A. Cross section dimensions shall not deviate by more than $\pm 1/8$ in. (3 mm) from approved dimensions.
- B. Length of units shall not deviate by more than length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater, not to exceed $\pm 1/4$ in. (6 mm).
 - 1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.
- C. Warp, bow or twist of units shall not exceed length/ 360 or $\pm 1/8$ in. (3 mm), whichever is greater.
- D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features On formed sides of unit, 1/8 in. (3 mm), on unformed sides of unit, 3/8 in. (9 mm) maximum deviation.

2.7 PRODUCTION QUALITY CONTROL

- A. Testing.
 - 1. Test compressive strength and absorption from specimens selected at random from plant production.
 - 2. Samples shall be taken and tested from every 500 (14 m³) cubic feet of product produced.
 - 3. Perform tests in accordance ASTM C 1194 and C 1195.

Added 9-15-11

4. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.

2.8 DELIVERY, STORAGE AND HANDLING

- A. Mark production units with the identification marks as shown on the shop drawings.
- B. Package units and protect them from staining or damage during shipping and storage.
- C. Provide an itemized list of product to support the bill of lading.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Installing contractor shall check Cast Stone materials for fit and finish prior to installation. Do not set unacceptable units.

3.2 SETTING TOLERANCES

- A. Set stones 1/8 in. (3 mm) or less, within the plane of adjacent units.
- B. Joints, plus - 1/16 in. (1.5 mm), minus - 1/8 in. (3 mm).

3.3 JOINTING

- A. Joint size:
 1. At stone/brick joints 3/8 in. (9.5 mm).
 2. At stone/stone joints in vertical position 1/4 in. (6 mm) (3/8 in. (9.5 mm) optional).
 3. Stone/stone joints exposed on top 3/8 in. (9.5 mm).

Joint materials:

4. Mortar: See special provision for MASONRY MORTAR

- B. Location of joints:

1. As shown on shop drawings or match existing.

3.4 SETTING

- A. Drench units with clean water prior to setting.
- B. Fill dowel holes and anchor slots completely with nonshrink grout.
- C. Set units in full bed of mortar, unless otherwise detailed.
- D. Rake mortar joints 3/4 in. (18 mm) in. for pointing.
- E. Remove excess mortar from unit faces immediately after setting.

- F. Tuck point unit joints to a slight concave profile.

3.5 REPAIR AND CLEANING

- A. Repair chips with touchup materials furnished by manufacturer.
- B. Protect units and surrounding masonry prior to cleaning.
- C. Saturate all units prior to applying an approved masonry cleaner.
- D. Consult with manufacturer for appropriate cleaners.

3.6 INSPECTION AND ACCEPTANCE

- A. Inspect finished installation according to Cast Stone Institute Technical Bulletin #36.

MASONRY MORTAR

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. This work consists of all labor, materials and equipment necessary and required to furnish the mortar and masonry grout required for this contract.

1.02 QUALITY ASSURANCE

- A. Use same manufacturer of products throughout project.
B. Mortar shall meet requirements of: ASTM C 270 Type N or S.
C. Mortar and grout shall meet the requirements of Building Code Requirements for Masonry Structures (with Commentary) ACI 530-05/ASCE 5-05/TMS 402-05, and Specifications for Masonry Structures (with Commentary) ACI 530.1-05/ASCE 6-05/TMS 602-05.

1.05 SUBMITTALS

- A. Samples:
1. Submit samples of mortar for selection by Engineer.
a. Color of Mortar shall match the existing mortar and masonry.
B. Material test reports from a qualified independent testing laboratory employed and paid by Contractor indicating and interpreting test results relating to compliance of the following proposed materials with requirements indicated.
1. Mortar complying with property requirements of ASTM C 270.
2. Grout mixes: Include description of type and proportions of grout ingredients.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store manufactured products in original unopened containers.
B. Store cementitious ingredients in weather-tight enclosures and protect against contamination and warehouse set.
C. Stock pile and handle aggregates to prevent contamination from foreign materials.
D. Keep water free of harmful materials.

1.07 ENVIRONMENTAL REQUIREMENTS

- A. Heat mixing water when air temperature is below 40 degrees F and heat aggregates when air temperature is below 32 degrees F to assure mortar temperatures between 40 degrees F and 120 degrees F until used.

PART 2 – PRODUCTS

2.01 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce required mortar color.
B. Hydrated Lime: Type S conforming to ASTM C207.
C. Aggregates for Mortar: Natural, clean sand, conforming to ASTM C144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.
D. Water: Clean and free of deleterious amounts of acids, alkalis or organic materials.
E. Admixtures: Only as approved by the Engineer.

2.02 MIXING MORTARS

- A. Measurement of Materials: The method of measuring materials for mortar used in construction shall be by either volume or weight, and such that the specified proportion of the mortar materials can be controlled and accurately maintained. Measurement by shovel shall not be permitted.
B. Mixing: All cementitious materials and aggregate shall be mixed in accordance with the suppliers

Added 4-15-11

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instructions to provide a workable consistency. Mortar that is not mixed in accordance with the recommended practice shall be rejected.

- C. Retempering: Mortars that have stiffened because of evaporation of water from the mortar shall be retempered by adding water frequently to restore the specified consistency. Mortars shall be used and placed in final position within 2 hours after initial mixing.

2.03 PROPORTIONING MORTARS

- A. Mortar Type S: Shall be proportioned of 1 part by volume of portland cement, 1/2 part by volume of hydrated lime, and sand (measured in a damp, loose condition) not less than 2-1/4 and not more than 3 times the sum of the volume of cement and lime used, mixed with sufficient water.
- B. Mortar Type N: Shall be proportioned of 1 part by volume of portland cement, 1 part by volume of hydrated lime, and sand (measured in a damp, loose condition) not less than 2-1/4 and not more than 3 times the sum of the volume of cement and lime used, mixed with sufficient water.
- C. Color Pigmented Mortar: Select and proportion pigments with other ingredients to produce color Required to match the approved sample.
- F. Pointing Mortar: Same mortar used in setting or resetting the masonry, which has been allowed to hydrate for at least 30 minutes before using, retempered to the desired consistency. For existing joints use one part portland cement, one part hydrated lime, and six parts white sand passing a #16 sieve, colored to match the approved sample.

PART 3 – EXECUTION

3.01 MORTAR PREPARATION IN HOT WEATHER

- A. Store materials and mixing equipment in shaded areas.
- B. Provide shade in area of work to be performed for workers and to cool existing masonry.
- C. Maintain moisture in sand as required.
- D. Dampen masonry and mortar boards as required. Cover mortar boxes.
- E. Construct wind breaks, if necessary, to protect construction areas.