BECKER
STRUCTURAL ENGINEERS

CITY OF PORTLAND, MAINE · RESURGAM
Reviewed for Code Compliance
Inspections Division
Approved with Conditions
Date: 04/04/16

PROJECT MANUAL AND SPECIFICATIONS
FOR
FORE STREET PARKING FACILITY
PHASE IX RESTORATION

Prepared by:

Becker Structural Engineers, Inc.
BSE Project No. W0 3708
Engineer: Todd M. Neal, P.E.

Issued for Pricing:
December 2, 2015

12/2/15 DRAFT
NOT FOR CONSTRUCTION

75 York Street, Portland, ME 04101-4701 ▪ Tel 207-879-1838 ▪ Fax 207-879-1822

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SECTION 00410

BID FORM

To: Cow Plaza Garage LLC
Attn: Todd Dominski
100 Commercial Street
Portland, Maine 04101

From: _____

1. The undersigned, having examined the proposed Contract Documents consisting of Drawings, The Form of Agreement, General Conditions, Supplementary Conditions, Specifications and have examined the site for the proposed work titled:

Fore Street Parking Facility
Phase 9 Restoration
419 Fore Street
Portland, Maine

Hereby propose and agrees to furnish all permits, labor, materials, equipment, tools, and appliances, and perform operations necessary to complete the Work as required by the Contract Documents for the stipulated sum as follows:

A. For all Work other than Unit Price Work listed in sections C (including but not limited to all temporary shoring, temporary enclosures and protection, temporary traffic control, signage, heat, and utilities, etc.), a Lump Sum of:

_____ $_____
(words) (numerals)

B. General Conditions

_____ $_____
(words) (numerals)

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C. For all Unit Price Work, based on quantities shown:

UNIT PRICE WORK

Item No.	Description	Unit	Estimated Quantity	Unit Price	Estimated
1	Cast-in-place concrete topping repairs	sf	1,300		
2	Overhead spall knockdown and reinf. coat	ea	40		
3	Paint steel column/beam	sf	2,400		
4	Paint drain and leader	sf	200		
5	Steel beam replacement	ea	3		
6	Heavy duty traffic membrane (over conc repairs)	sf	250		
7	Medium duty traffic membrane (over conc repairs)	sf	500		
8	Apply 2 coats Protectosil CIT (over conc repair)	sf	600		
9	Power wash ceiling to remove deposits	ea	40		
10	Shotcrete wall at grade level	ls	1		

TOTAL OF ALL ESTIMATED PRICES

_____ $ _____
(words) (numerals)

D. For a total estimated (Items A+B+C) Bid amount of:

_____ $_____
(words) (numerals)

E. Unit Pricing

1. The following unit prices are required for the Owner to evaluate additions to or deductions from the work:

UNIT PRICING

Item No.	Description	Unit	Addition Unit Price	Deductions Unit Price
1	Cast-in-place concrete topping repairs	sf		
2	Overhead spall knockdown and reinf. coat	ea		
3	Paint steel column/beam	sf		
4	Paint drain and leader	sf		
5	Steel beam replacement	ea		
6	Heavy duty traffic membrane repair (over conc repairs)	sf		
7	Medium duty traffic membrane repair (over conc repairs)	sf		
8	Apply 2 coats Potectosil CIT (over conc repair)	sf		
9	Power wash ceiling to remove deposits	ea		
10	Shotcrete wall at grade level	ls		

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2. The undersigned acknowledges the receipt of addenda numbers (if applicable):

3. The Contractor shall provide along with this Bid Form, copies of the following documentation:

   A. List of all subcontractors, including:
      1. Company Name.
      2. Address.
      3. Type of Construction/Supplies.
      4. Percent of contract price.
   B. List of all proposed materials substitutions, including:
      1. Manufacturer.
      2. Proposed use.
      3. Cut sheets for all proposed Materials.
   C. Proof of Insurance: General Liability, Vehicle and Worker's Compensation Insurance as Required by Maine State Law.

5. The undersigned agrees that if he/she is selected as Contractor, he/she will within five days, Saturdays, Sundays, and legal holidays excluded, after presentation thereof by the Awarding Authority, execute the Contract in accordance with the terms of this bid and furnish proof of the capacity of the contractor to furnish a performance bond and also a labor and materials bond, each of a surety company qualified to do business under the laws of the State and satisfactory to the Awarding Authority, and each in the sum of one hundred percent of the Contract Price, the premiums for which are (if bond are required by the Owner) to be paid by the Contractor and are included in the Contract Price.

6. The undersigned agrees that if selected as general contractor, they will promptly confer with Owner on the question of subcontractors; and that the Owner may request a substitute for any subcontractor listed, as noted above.

7. Commencement and Completion of Work: The undersigned agrees to commence work on the Contract within seven (7) calendar days from **January 1, 2016** and to thereafter diligently and continuously carry on with the work.

8. The undersigned agrees that the Work will be substantially complete and completed and ready for final payment by **April 22, 2016**.

9. The undersigned understands that the Owner reserves the right to reject any and all bids.

10. The undersigned certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other

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person. As used in this subsection the word person shall me any natural person, joint venture, partnership, corporation or other business or legal entity.

11. The undersigned agrees that this Bid shall be good and may not be withdrawn for a period of 30 business days after the scheduled bid due date.

Date: _____

Name of Bidder: _____

Signed: _____

By: _____
(Name and title of person signing bid)

Business Address: _____

City and State: _____

Phone Number: _____

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AGREEMENT
BETWEEN OWNER AND CONTRACTOR FOR
CONSTRUCTION CONTRACT (STIPULATED PRICE)

THIS AGREEMENT is by and between **Cow Plaza Garage, LLC**

(Owner) and **Knowles Industrial Services, Corp.**

(Contractor).

Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

ARTICLE 1 - WORK

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Slab repairs, traffic membrane repair, steel painting and ground level shotcrete wall.

ARTICLE 2 - THE PROJECT

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

Fore Street Parking Facility
Phase 9 Restoration
419 Fore Street
Portland, Maine

ARTICLE 3 - ENGINEER

3.01 The Project has been designed by:

Becker Structural Engineers, Inc.
75 York Street
Portland, Maine

(Engineer), who is to act as Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

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ARTICLE 4 - CONTRACT TIMES

4.01 Time of the Essence

A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment a in the Contract Documents are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

A. The Work will be substantially completed on or before **April 22, 2016**, and completed and ready for final payment on or before **May 1, 2016**.

4.03 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner $N/A for each day that expires after the time specified in Paragraph 4.02 for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner $N/A for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 - CONTRACT PRICE

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, through 5.01.I. noted below:

A. For all Work other than Unit Price Work listed in sections C (including but not limited to all temporary shoring, temporary enclosures and protection, temporary traffic control, signage, heat, and utilities, etc.), a Lump Sum of:

_____ ***$***
(words) (numerals)

B. General Conditions

_____ ***$***
(words) (numerals)

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C. For all Unit Price Work, based on quantities shown:

UNIT PRICE WORK

Item No.	Description	Unit	Estimated Quantity	Unit Price	Estimated
1	Cast-in-place concrete topping repairs	sf	1,300		
2	Overhead spall knockdown and reinf. Coat	ea	40		
3	Paint steel column/beam	sf	2,400		
4	Paint drain and leader	sf	200		
5	Steel beam replacement	ea	3		
6	Heavy duty traffic membrane (over conc repairs)	sf	250		
7	Medium duty traffic membrane (over conc repairs)	sf	500		
8	Apply 2 coats Protectosil CIT (over conc repair)	sf	600		
9	Power wash ceiling to remove deposits	ea	40		
10	Shotcrete wall at grade level	ls	1		

TOTAL OF ALL ESTIMATED PRICES

_____ $ _____
(words) (numerals)

D. For a total estimated (Items A+B+C+D) Bid amount of:

_____ ***$***
(words) (numerals)

All specific cash allowances are included in the above price and have been computed in accordance with paragraph 11.02 of the General Conditions.

ARTICLE 6 - PAYMENT PROCEDURES

6.01 Submittal and Processing of Payments

A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by Engineer as provided in the General Conditions.

6.02 Progress Payments; Retainage

A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's Applications for Payment on or about the 20th day of each month, provided application is submitted to engineer no later than the 20th of the previous month, during performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:

a. 95 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and

Engineer, Owner, on recommendation of Engineer, may determine that as long as the character and progres Work remain satisfactory to them, there will be no additional retainage.

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2. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contr 100 percent of the Work completed, less such amounts as Engineer shall determine in accordance with Paragraph 14 of the General Conditions and less 100 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 Final Payment

A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer as provided in said Paragraph 14.07.

ARTICLE 7 - INTEREST

7.01 All moneys not paid when due as provided in Article 14 of the General Conditions shall bear interest at the rate of 1 percent per annum.

ARTICLE 8 – CONTRACTOR'S REPRESENTATIONS

8.01 In order to induce Owner to enter into this Agreement Contractor makes the following representations:

A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.

B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.

E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.

G. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.

H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.

I. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.

J. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

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ARTICLE 9 - CONTRACT DOCUMENTS

9.01 Contents

A. The Contract Documents consist of the following:

1. This Agreement (pages 00520-1 to 00520-7, inclusive).

2. General Conditions (pages 00700-1 to 00700-43, inclusive).

3. Drawings consisting of 7 sheets with each sheet bearing the following general title: Fore Street Parking Facility, Phase 7 as noted below:
   S1.0 General Notes
   S1.1 Grade Level
   S1.2 1st Supported Level
   S1.3 2nd Supported Level
   S1.4 Roof Supported Level
   S3.1 Concrete Repair Sections and Details
   S3.2 Traffic Membrane Notes and Details
   S3.3 Misc. Repair Details and Notes

4. Specifications consisting of the following:
   Division 0 – Contract Requirements
   00410 Bid Form
   01500 Contract Agreement
   Division 1 – General Requirements
   01300 Submittals
   01500 Construction Facilities and Temporary Controls
   01710 Cleaning
   Division 2 – Existing Conditions
   02070 Selective Demolition
   Division 3 – Concrete
   03310 Concrete Repair
   03320 Galvanic Anode
   03370 Shotcrete
   Division 5 – Metals
   05120 Structural Steel
   Division 7 – Thermal and Moisture Protection
   07180 Traffic Coatings
   07920 Joint Sealant
   Division 9 – Finishes
   09900 Painting

6. Addenda: N/A

7. Exhibits to this Agreement (enumerated as follows):

   a. Bid Form

8. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:

   a. Work Change Directives.

   b. Change Order(s).

B. The documents listed in Paragraph 9.01.A are attached to this Agreement (except as expressly noted otherwise above).

C. There are no Contract Documents other than those listed above in this Article 9.

D. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 General Conditions.

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ARTICLE 10 - MISCELLANEOUS

10.01 Terms

A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplementary Conditions.

10.02 Assignment of Contract

A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

10.03 Successors and Assigns

A. Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

10.04 Severability

A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

This Agreement will be effective on **December 1, 2015** (which is the Effective Date of the Agreement).

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OWNER: **Cow Plaza Garage, LLC**

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

_____

_____

_____

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of Owner-Contractor Agreement.)

CONTRACTOR: **Knowles Industrial Services**

By: _____

Title: _____

[CORPORATE SEAL]

Attest: _____

Title: _____

Address for giving notices:

_____

_____

_____

License No.: _____
(Where applicable)

Agent for service or process: _____

_____

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

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SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. The CONDITIONS OF THE CONTRACT, all Drawings, and all Sections of Division 1 are hereby made a part of this Section.

1.02 WORK INCLUDED

A. This Section specifies administrative and procedural requirements for submittals required for performance of work, including:

1. Product data
2. Shop drawings

B. Administrative Submittals: Refer to requirements specified in other Division 1 Specification Sections, and other Contract Documents, for administrative submittals, including:

1. Permits
2. Applications for payment
3. Performance and payment bonds (where required).
4. Insurance certificates
5. List of subcontractors

1.03 RELATED REQUIREMENTS

A. Examine Contract Documents for requirements that affect Work of this Section. Other Specification Sections that directly relate to Work of this Section include, but are not limited to:

1. Concrete Repair: SECTION 03310
2. Structural Steel: SECTION 05120
3. Traffic Coating: SECTION 07180
4. Paints and Coatings: SECTION 09900

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5. Joint Sealants: SECTION 07920

1.04 SUBMITTAL PROCEDURES

A. Coordination of Submittals: Coordinate timing of submittals with construction activities. Transmit submittals well enough in advance of performance of work to avoid delays. Coordinate submittals of related elements of work.

1. Engineer may reject, or withhold action on submittals requiring coordination with other submittals until related submittals are received.

B. Processing of Submittals: Allow sufficient review time to ensure installation will not be delayed because of time required to process submittals. Minimum processing times are as follows:

1. Review by Engineer: Allow ten (10) business days for review and processing.

2. No extension of Contract Time will be authorized due to failure to transmit submittals sufficiently in advance of scheduled performance of work.

C. Contractors Preparation of Submittals: Place permanent label or title block on each submittal for identification. Indicate Project Name, Engineer's Project Number, Specification Section number and title, date of submittal, name and address of Engineer, name and address of Contractor, name and address of subcontractor and/or supplier, name of manufacturer, Drawing number and detail reference.

1. Contractor's Review and Action Stamp: Provide suitable space on label or title block for Contractor's review and action stamp. Stamp and sign each submittal to show Contractor's review and approval prior to transmittal to Engineer. Submittals not signed and stamped by Contractor will be returned without action.

2. Engineer's Review and Action Stamp: Provide minimum 6 in. x 4 in. space on drawing for Engineer's review and action stamp. Deliver submittals to Engineer at address listed on cover of Project Manual.

3. Modify and customize submittals as required to show interface with adjacent work and attachment to building.

D. Transmittal of Submittals: Transmit each item with transmittal form. Identify Project, Contractor, subcontractor, major supplier; identify pertinent Drawing sheet and detail number and Specification section number, as appropriate, on transmittal form.

1. Source: Submittals received from sources other than Contractor will be returned without action.

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2. Deviations from Contract Documents: When products, materials or systems submitted deviate from Contract Documents, record deviations clearly on transmittal form, or separate attached sheet.

3. If deviation includes design and/or material change, this shall be accompanied by design calculations stamped by a registered professional Engineer or additional time and fee (payable by Contractor) will be required for submittal review.

E. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

1. All field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with the respect thereto;

   a. the suitability of all materials with respect to the intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

   b. all information relative to the Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

   c. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

F. Each Submittal shall bear a stamp or specific written certification that Contactor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review an approval of that submittal.

G. With each Submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

H. After Engineer reviews submittal, revise and resubmit as required. Identify recipients to promptly report inability to comply with provisions.

I. Distribute copies of reviewed submittals to concerned persons. Instruct recipients to promptly report inability to comply with provisions.

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1.05 SUBMITAL SCHEDULE

A. Not required for this project.

1.06 SHOP DRAWINGS

A. Provide accurately prepared, large scale and detailed shop drawings prepared specifically for this Project on reproducible sheets. Show adjacent conditions and related work. Show accurate field dimensions where appropriate. Identify materials and products shown. Note special coordination required. Standard information prepared without specific reference to Project is not considered shop drawings.

B. Shop drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates, and similar drawings.

C. Show every component of fabricated item, notes regarding manufacturing process, coatings and finishes, identifying numbers conforming to Contract Documents, (i.e. stair numbers, door numbers, etc.) dimensions, and appropriate trade names. Show anchorage and fastening details, include type, size and spacing. Show material gage and thickness. Indicate welding details and joint types.

D. Show Drawing Sheet Size: Except for templates, patterns, and other full-size drawings, submit shop drawings on sheets at least 8-1/2 in. x 11 in., but no larger than 24 in. x 36 in.

E. Submittal Quantities: Submit shop drawings in following quantities:

1. For shop drawings submitted for Engineer's review, submit **one** reproducible and **two** black line prints of each sheet. Reproducible will be returned to Contractor for printing and distribution. **Multiple copies will not be marked by Engineer.**

1.07 PRODUCT DATA

A. Definition: Product data includes manufacturer's standard published literature, such as installation instructions, catalog cuts and color charts. When product data must be prepared specifically because standard published data is not suitable for use, submit as shop drawing.

B. Preparation: Mark each copy of product data to show applicable choices and options. Where published product data includes information on several products and choices, mark copies to clearly indicate information applicable to this Project.

C. Do not submit product data until compliance with requirements of Contract Documents has been confirmed.

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D. Submittal Quantities: Submit product data in following quantities:

1. Submit three copies for review. One copy will be returned to Contractor for printing and distribution. Multiple copies will not be marked by Engineer.

E. Installer Copy: Verify that installer of work possesses a current copy of Engineer approved product data prior to installation.

1.08 ENGINEER'S ACTION

A. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

B. Engineer's review and approval shall not relieve the Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with all requirements of this section, the general and supplementary conditions of the Contract and the Engineer has given approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of paragraph 1.04.

1.09 DISTRIBUTION BY CONTRACTOR

A. Distribution: When submittal is marked "APPROVED" or "APPROVED AS NOTED", make prints and copies and distribute to subcontractors, suppliers, fabricators, and other parties requiring information from submittal for proper coordination and performance of work. Print copies of shop drawings from approved reproducible only.

END OF SECTION

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SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Drawings, Contract Conditions, and other Technical Specifications Sections apply to work of this Section insofar as applicable.

1.02 WORK INCLUDED

A. This Section specifies construction facilities and temporary controls, including, but not limiting to:

1. Temporary restrictions on construction activity.
2. Temporary utilities.
3. Temporary construction and support facilities.
4. Temporary signage.
5. Security and protection facilities.

B. Contractor shall pay for all costs related to temporary facilities and utility service including but not limited to temporary heat, water and power. If required.

1.03 RELATED REQUIREMENTS

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that directly relate to work of this Section include, but are not limited to:

1. SECTION 00520: Contract Agreement
2. SECTION 01300: SUBMITTALS

1.04 QUALITY ASSURANCE

A. Comply with requirements of authorities having jurisdiction, codes, utility companies, OSHA, and industry standards including, but not limiting to:

1. NFPA 241.
2. NFPA 70.

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3. ANSI A10.

4. NECA NJG-6.

B. Electric Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70.

C. Inspections: Arrange for authorities having jurisdiction to inspect temporary utilities prior to use. Obtain required certifications and permits.

1.05 PROJECT CONDITIONS

A. Conditions of Use: Maintain temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload temporary facilities. Do not allow hazardous, dangerous, or unsanitary conditions to develop on site.

PART 2 PRODUCTS

2.01 MATERIALS, GENERAL

A. Materials may be new or used, but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

B. Lumber and Plywood:

1. Signs and Directory Boards: Provide exterior grade, Medium Density Overlay (MDO) plywood, conforming to USDC PS1, of size and thickness indicated.

2. Fences, Vision Barriers, and Safety Barriers: Provide exterior grade, C-D veneered plywood.

2.02 TEMPORARY UTILITIES

A. Scope: Temporary utility work includes, but is not limited to:

1. Electric power

2. Telephone Service.

B. Temporary Electric Power and Light:

1. Power is currently available in the garage and can be used. Not all outlets are currently operational and may not provide easy access to all areas of work. Additional power maybe required and should be provided by the contractor.

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2. Provide generator to run any equipment that exceeds the capacity of the existing system.

C. Telephone Service: Provide cell phone contact for project superintendent and project manager for this project.

2.03 TEMPORARY CONSTRUCTION AND SUPPORT FACILITIES

A. Scope: Temporary construction and support facilities include, without limitation:

1. Temporary heat.

2. Temporary enclosures.

3. Construction aids.

4. Waste disposal services.

5. Water control.

6. Rodent and pest control.

7. Pollution and dust control.

B. Temporary Heat and Ventilation: Provide temporary heat and ventilation required to maintain adequate environmental conditions to facilitate progress of work, to meet manufacturers' specified minimum installation conditions, and to protect materials and finishes from damage due to temperature and humidity.

1. Ventilate enclosed areas for curing of installed materials, to disperse humidity, and to prevent hazardous accumulations of dust, fumes, vapors and gases.

2. Portable heaters shall be standard approved units with controls.

3. Pay costs of installation, maintenance, operation, removal, and fuel consumed.

C. Contractor's Field Offices and Sheds: Prior to installation of offices and sheds, consult with Engineer and Owner on location, access, and related facilities.

D. Sanitary Facilities: Toilet facilities within the building will be available.

1. Maintain washrooms in clean and sanitary condition and supply exhaustible materials such as soap, hand towels, and toilet tissue.

E. Temporary Enclosures: Provide temporary weathertight enclosures of exterior walls as Work progresses. Design and construct temporary enclosures to provide acceptable working conditions, to provide weather protection for materials, to allow effective temporary heating, and to prevent entry of unauthorized persons.

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1. Provide temporary exterior doors with self-closing hardware and padlocks.

2. Design enclosures to be removable to allow handling of materials.

F. Construction Aids: Provide construction aids and equipment required by personnel to facilitate execution of the work; scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, and other such facilities and equipment.

1. Refer to respective sections for particular requirements for each trade.

G. Use of Elevator: Will not be permitted for construction use.

H. Waste Disposal: Maintain all areas under Contractor's control free of debris. Initiate and maintain a specific program to prevent accumulation of debris at construction area, storage and parking areas.

1. Provide containers for deposit of debris.

2. Schedule daily collection and weekly disposal of debris.

3. Provide additional collections and disposals of debris whenever the weekly schedule is inadequate to prevent accumulation.

I. Water Control: Provide methods to control surface water to prevent damage to Project, site, and adjoining properties.

J. Dispose of drainage water in a manner to prevent flooding, erosion, or other damage to any portion of the site or to adjoining areas and properties.

K. Pollution Control: Provide methods, means, and facilities required to prevent contamination of soil, water, or atmosphere by the discharge of noxious substances from construction operations. Provide equipment and personnel, perform emergency measures required to contain any spillage and to remove contaminated soils or liquids.

1. Take special measures to prevent harmful substances from entering public waters.

2. Prevent disposal of wastes, effluents, chemicals, or other such substances in sanitary or storm sewers.

3. Provide systems for control of atmospheric pollutants.

4. Prevent toxic concentrations of chemicals.

5. Prevent harmful dispersal of pollutants to atmosphere.

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L. Dust Control: Provide positive methods and apply dust control materials to minimize raising dust from construction/demolition operations. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

2.04 TEMPORARY SIGNAGE

A. Scope: Temporary signage includes, but is not limited to:

1. Traffic.

2. Pedestrian.

3. Means of Egress.

4. Other signage as required in the Contract Documents.

B. Sign Structure and Framing: New or used, wood or metal, in sound condition structurally adequate to work and suitable for specified finish.

C. Rough Hardware: Galvanized steel or cadmium plated.

D. Paint: Exterior quality.

2.05 SECURITY AND PROTECTION FACILITIES

A. Scope: Security and protection facilities includes, but is not limited to:

1. Temporary fire protection.

2. Barricades, warning signs, lights.

3. Temporary traffic control.

4. Temporary access routes.

5. Security procedures.

B. Temporary Fire Protection: Provide and maintain suitable fire protection equipment and services. Establish procedures for fire protection for welding and other potentially hazardous construction operations. Ascertain and comply with requirements of Project insurance carrier, City of Portland Fire Department and the State of Maine Fire Marshal. Permanent fire protection system may be activated to meet these requirements. Replace fusible ink heads and other expended or discharged components at time of Substantial Completion.

1. Locate temporary portable fire extinguishers in convenient locations, not less than one extinguisher per floor.

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2. Store combustible materials in containers in fire-safe locations.

3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes.

C. Barricades, Warning Signs, and Lights: Provide and maintain barricades, warning signs, warning lights, railings, walkways, and the like. Paint signs and barricades with appropriate colors, graphics, and warnings to inform public and job-site personnel of hazards.

D. Construction Parking Control: Control vehicular parking to preclude interference with public traffic or parking, access by emergency vehicles, Owner's operations, or construction operations. Monitor parking of construction personnel's private vehicles:

1. Maintain free vehicular access to parking spaces and through parking garage.

2. Prohibit parking on or adjacent to access roads, or in non-designated areas.

3. Contractor has been provided with 20 spaces to complete work and for storage and contractor parking.

E. Safety Controls and Safety Signing:

1. Detour signs shall have breakaway post assemblies conforming to the applicable provisions of MDOT Specifications.

PART 3 EXECUTION

3.01 MAINTENANCE, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit waste and abuse.

B. Maintenance: Maintain temporary facilities in operating conditions; repair damages immediately upon discovery. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour per day basis.

C. Termination and Removal: Unless otherwise requested by Engineer, remove each temporary facilities when no longer useful, or when replaced by permanent facility. Clean and renovate permanent facilities that have been used during construction period.

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SECTION 01710
CLEANING

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Throughout the construction period, maintain the buildings and site in a standard of cleanliness as described in this Section.

B. Provide waste storage containers.

C. Related work: In addition to standards described in this Section, comply with requirements for cleaning as described in pertinent other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Conduct inspections to verify that requirements for cleanliness are being met.

PART 2 – PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Provide required personnel, equipment, and materials needed to maintain the specified standard of cleanliness.

2.02 COMPATIBILITY

A. Use only the cleaning materials and equipment which are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

2.03 WASTE STORAGE CONTAINER

A. The Contractor is responsible for providing a suitable waste storage container of sufficient size or numbers for the temporary storage of wastes generated by the work of this Section and other Sections of these Specifications.

B. The Contractor is responsible for the proper and timely transfer of stored wastes to a proper off-site disposal.

C. Demolition debris shall not be stored on site.

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PART 3 – EXECUTION

3.01 PROGRESS CLEANING

A. General:

1. Retain stored items in an orderly arrangement, in designated areas allowing maximum access, not impeding traffic or drainage, and providing required protection of materials.

2. Do not allow accumulation of scrap, debris, waste material, and other items not required for construction of this work, except in proper waste container(s).

3. Provide adequate storage for all debris and trash awaiting removal from the job site, observing requirements for fire protection and protection of the ecology.

4. Waste containers shall be emptied, off site, a minimum of once per week.

B. Site:

1. Continuously inspect the site and pick up all scrap, debris, and waste material. Remove such items to the container(s) designated for their storage.

2. Daily and more often if necessary, inspect all arrangements of construction materials stored on the site. Restack, organize neatly, tidy or otherwise service arrangements to meet requirements of subparagraph 3.01-A-1 above.

C. Building:

1. Daily, and more often if necessary, inspect and pick up all scrap, debris, and waste material. Remove such items to the container(s) designated for their storage.

2. As required preparatory to installation of succeeding materials, clean the surfaces to the degree of cleanliness recommended by the manufacturer of the succeeding material, using equipment and materials required to achieve the necessary cleanliness.

3.02 FINAL CLEANING

A. Prior to completion of the work, remove from the job site all tools, surplus materials, equipment, scrap, debris, and waste. Conduct final progress cleaning as described in Article 3.01 above.

B. Site:

1. Broom clean paved areas and slab used by construction.

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2. Rake grass and garden areas to remove construction debris.

3. Completely remove resultant debris.

C. Building:

1. Exterior:

   a. Visually inspect exterior building surfaces and remove all traces of soil, waste materials, smudges, and other foreign matter caused by the work.

   b. Remove all traces of splashed materials from adjacent surfaces.

2. Interior:

   a. Visually inspect interior of building and remove all traces of soil, waste material, smudges, and other foreign matter caused by the work.

   b. Remove all unused construction material.

   c. Remove all temporary protection and shoring.

   d. Wash down all parking decks where work has been completed and/or affected by the work.

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SECTION 02070

SELECTIVE DEMOLITION

PART 1 GENERAL

1.01 DESCRIPTION

A. Work included: Remove the existing joint sealant, damaged concrete, deteriorated traffic membrane and any other material as directed.

1. Removal of materials and debris includes proper site storage and off-site disposal. Should contractor discover, upon removal of damaged concrete, damage or deterioration of the embedded structural steel connections or reinforcement, they shall, immediately and prior to performing any repairs to these surfaces, inform the Engineer of encountered conditions. The Engineer will promptly review these conditions. As appropriate, the Engineer will provide the contractor with recommendations for repair of these conditions as described on the plans and in the specifications. Conform to all Federal, State and local safety requirements.

1.02 SUBMITTALS

Request for Engineer's consent:

1. Should conditions of the work, or schedule, indicate a required change of materials or methods for cutting and patching, so notify the Engineer and secure his written permission and the required Change Order prior to proceeding.

PART 2 PRODUCTS

2.01 TOOLS AND EQUIPMENT

A. Provide the adequate tools and equipment necessary to carry out the work of this Section.

B. Do not use tools, products and/or equipment which could damage the portions of the building which are to remain.

C. Any repairs that are caused to sound material by the use of improper equipment shall be the responsibility of the contractor.

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PART 3 EXECUTION

3.01 SURFACE CONDITIONS

A. Inspections:

1. Inspect existing conditions, including elements subject to movement or damage during cutting and patching.

2. After uncovering the work, inspect conditions affecting installation of new work.

3. Visually examine all areas of the project to determine actual conditions

B. Discrepancies:

1. If uncovered conditions are not as indicated, immediately notify the Engineer and secure needed directions prior to proceeding.

2. Do not proceed until written directions are obtained from the Engineer.

3.02 PREPARATION PRIOR TO CUTTING

A. Contractor shall sound all concrete surfaces and confirm extent of repair area within locations marked on plan. The Engineer should be immediately notified of any discrepancies in quantities.

B. Provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work and existing members.

C. Contractor shall construct barriers and other methods of protecting people and property prior to demolition.

1. Barriers and other methods shall be constructed in a manner that is acceptable to the Owner and the Building Inspector.

D. Barriers and other methods shall be maintained throughout construction.

1. As a minimum, all portions of deck areas where demolition or construction is taking place shall be completely closed to public access.

3.03 PERFORMANCE

A. Perform required cutting and patching as required under other Sections of these Specifications.

1. Perform cutting and demolition by methods which will prevent damage

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SECTION 03310

CONCRETE REPAIR

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:

1. The extent of the concrete repair work required to install traffic membrane.

1.03 RELATED WORK:

A. Galvanic Anode: Section 03320

B. Traffic Coatings: Section 07180

C. Joint Sealants: Section 07920

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1.ACI 362.1R-97 “Guide for the Design of Durable Parking Structures.”

2.ACI 546R-04 "Concrete Repair Guide."

3.ICRI Technical Guideline No. 03731 “Guide for Selecting Application Methods for the Repair of Concrete Surfaces.”

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4. ICRI Technical Guideline No. 03730 "Guide for Surface Preparation for the Repair of Deteriorated Concreter Resulting from Reinforcing Steel Corrosion"

5. ICRI Technical Guideline No. 03732 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."

6. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Materials and installed work may require testing and retesting, as directed by the Engineer, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.05 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Division 1.

B. All submittals shall be reviewed and returned to the Contractor within 10 working days.

C. **Incomplete submittals will not be reviewed**.

D. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

E. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate the owner for Engineer's for additional review(s) cycles.

F. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. One Component, Early Strength Gaining, Cementitious Repair Material .

2. High Modulus, Low Viscosity, High Strength Epoxy Grout.

3. Admixtures.

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4.Primers/Bonding Agents.

G. Contraction/Construction Joints: Reference Section 07920.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site in manufacturer's original unopened containers and packaging bearing labels as to type and names of products and manufacturers.

B. Deliver and store restoration material in manufacturer's original, unopened containers with the grade, batch and production data shown on the container or packaging.

C. Protect restoration material during storage and construction from rain, ground water, and other sources of moisture and from staining or intermixture with soils or other types of material.

D. Protect grout, mortar and other materials from deterioration by moisture and temperature. Store in a dry location or in waterproof containers. Keep containers tightly closed and away from open flames. Protect liquid components from freezing. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

E. Damaged Material: Remove any damaged or contaminated materials from job site immediately, including materials in broken packages or packages containing water marks or other evidence of damage, unless Engineer specifically authorizes correction and use on project.

1.07 PROTECTION/SITE CONDITIONS:

A. Protect pedestrians, vehicles, building site and surrounding buildings from injury resulting from concrete restoration work.

B. Clean surfaces only when air temperatures are above 40 degrees F and will remain so until concrete has cured.

C. Do not perform any patching work if precipitation is expected. In case of unexpected precipitation, work shall cease and all uncured material shall be adequately protected with an impermeable polyethylene sheet.

D. Do not perform any patching unless the air temperatures are between 40 degrees F and 86 degrees F and will remain a minimum of 40 degrees F for at least 48 hours after completion of work.

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E. If the ambient or subsurface temperature is expected to rise above 86 degrees F during curing then the hot weather requirements of ACI 305R hot weather concreting shall be followed.

F. If the ambient or subsurface temperature is expected to fall below 40 degrees F during curing then the cold weather requirements of ACI 306R cold weather concreting shall be followed.

G. Prevent patching materials from staining the face of other surfaces to be exposed to view. Immediately remove all patching materials that come into contact with such surfaces.

H. Do not apply any material to frozen surfaces.

I. If materials are installed and cured in temperatures outside of the range noted above or per the manufacturer's recommendations. Written approval and modified installation instructions must be provided from the manufacturer and submitted for record to the Engineer. This installation shall not void the warranty.

PART 2 PRODUCTS

2.01 FORM MATERIALS:

A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.

B. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.02 REINFORCING MATERIALS:

A. Reinforcing Bars: ASTM A 615, Grade 60, deformed and ASTM A 706, Grade 60, deformed, weldable.

B. Welded Wire Fabric: ASTM A 185, welded steel wire fabric. Provide welded wire fabric in flat sheets.

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C. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use plastic or wire bar type supports complying with CRSI recommendations, unless otherwise specified. **Wood, concrete block, clay brick and other unspecified devices are not acceptable.**

2.03 REPAIR MATERIALS:

A. All concrete repair materials shall be compatible with each other and with existing concrete. If possible all primers, repair material, and other products should be from the same manufacturer.

B. All materials shall be compatible with chloride contents of 1.0 lbs/cy or greater.

C. All pre-mixed concrete repair products shall be one-component cemetitious products specifically noted for use in parking structures.

D. All materials shall be resistant to stresses resulting from automobile traffic and freeze/thaw cycles, de-icing salts, continuous presence of moisture, and a temperature range of –30 to 100 degrees F.

E. C.I.P. Topping Repairs.

1. One-component, early strength gaining cementititious repair material with the following properties:

   a. Minimum 28 day compressive strength: 5000 psi.

   b. Maximum water cement ratio: 0.40

   c. Air Content: 6 ½ +/- 2%

2. Product shall be recommended for vertical application in parking garages in ACI Exposure Zone III.

3. Manufacturers:

   a. Sika

   b. Masterbuilders

   c. Sonneborn

   d. ThoRoc

   e. Approved equal (must be submitted with bid)

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2.04 RELATED MATERIALS:

A. Moisture-Retaining Cover: One of the following, complying with ANSI/ASTM C 171.

1. Waterproof paper.

2. Polyethylene film.

3. Polyethylene-coated burlap.

B. Liquid Membrane-Forming Curing Compound: Not permitted.

C. Preformed Expansion Joint Formers:

1. Bituminous Fiber Type, ASTM D 1751.

2. Felt Void, Poly-Styrene Cap with removable top as manufactured by SUPERIOR.

D. Slab Joint Filler: Multi-component polyurethane sealant (self-leveling type). Reference Section 07920.

2.05 CONCRETE MIXING:

A. Mixing shall be in strict conformance with manufacturer's recommendations.

PART 3 EXECUTION

3.01 FORMS:

A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.

B. Design, construct, erect, maintain, and remove forms for cast-in-place concrete work in compliance with ACI 347.

C. Design formwork to be readily removable without impact, shock or damage to existing and new concrete surfaces and adjacent materials.

D. Chamfer exposed corners and edges as indicated or to match existing, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.

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E. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten forms and bracing after concrete placement as required to eliminate mortar leaks and maintain proper alignment.

3.02 PLACING REINFORCEMENT:

A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars", for details and methods of reinforcement placement and supports, and as herein specified.

1. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials which reduce or destroy bond with concrete.

2. Accurately position, support and secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required.

3. Install welded wire fabric in flat sheets in as long lengths as practicable. Lap adjoining pieces at least two full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.03 PREPARATION OF FORM SURFACES

A. Prior to patching, all surfaces must be prepared in accordance with this section of the specification and the manufacturers recommendations.

B. Sawcut perimeter of damage area to a depth of 1/2”+/- (unless note otherwise on Drawings). Do not cut reinforcement. Remove, by hand, a section to confirm depth of reinforcement and adjust depth as required.

C. The removal of all unsound concrete, using lightweight demolition hammers, not to exceed **15 pounds is recommended**. All removals to be performed with ICRI Guidelines, which shall be a part of these specifications, with regard to removal geometry, exposure, undercutting and cleaning of embedded reinforcement, and conditioning of edges and surfaces. **Damage caused as a result of using larger hammers will be repaired at the Contractors expense.**

D. Steel reinforcement shall be thoroughly prepared by mechanical cleaning to remove all traces of rust.

E. Pressure wash all surfaces, including reinforcement using 3000 to 4000 psi water blast, as required to remove all dust and dirt. The surface shall be saturate surface dry (SSD) with no standing water during application

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F. The result of this preparation shall render an exposed aggregate surface with a minimum surface profile of +/- 1/8". The surface shall be clean, meaning having complete exposure of sound original material without any deposits of contaminants, foreign matter or loose material, which could affect the bond or long term durability of the surface and the repair material.

3.04 INSPECTION:

A. Inspect all concrete surfaces prior to application of primers/adhesives to insure proper preparation and surface drying.

B. Conform to all manufacturers' preparation instructions.

C. Inspect reinforcement for section loss at locations of deterioration. If loss exceeds 25% notify Engineer prior to proceeding with the repair.

3.05 PRIMING OF REINFORCING STEEL

A. Any reinforcement exposed in the course of removing unsound materials shall be cleaned and prepared in accordance with the above specifications.

B. All exposed reinforcement shall be primed with an approved bonding agent compatible with the repair materials. Coat all exposed surfaces in accordance with the manufacturer's instructions. Care must be taken to create a continuous coating on the full surface, including the underside of the undercut reinforcement. Observe manufacturer's minimum and maximum timing window for repair after application of primer.

3.06 CONCRETE REPAIR

A. Following preparation, as specified above, contractor shall maintain work area in a clean condition, including materials, equipment and workers' footwear, to avoid tracking in of contaminants, dirt, dust, mud or other materials which may interfere with adhesion and durability of repairs.

B. Prior to installation, all repair areas shall be kept continuously wet for at least 20 minutes prior to application of patching compound. Before placing repair material, excess water shall be blown, vacuumed or otherwise removed from the surface, leaving the surface damp or saturated/surface dry.

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C. Vigorously brush apply a thin primer coat of acrylic latex bonding agent with added 10% neat Type 1 portland cement into all cavity surfaces. Unless noted otherwise in manufacturer's installation instructions. All primers shall be compatible with repair material.

D. Within specified time frame of primer application, mix and place repair compound in accordance with manufacturer's instructions.

E. Mix the precisely measured quantity of water specified by the manufacturer with full bags of patching compound only. Mix using slow speed drill (450 rom maximum) with mud or paddle mixer. Motorized mortar mixers may be used for mixing larger quantities. Mix to a uniform consistency, free of lumps or dry material. Do not whip air into the mix. Do not overmix

F. When placing the repair material, care shall be taken to assure that all corners and gaps under reinforcing steel and entire cavity profile is completely filled and properly compacted to prevent formation of voids or unbonded areas. "Work" the material into corners and gaps, and onto cavity sidewalls using pressure on the trowel to assure good contact between patch and substrates.

G. Patches deeper than 1" (25 mm) may be extended by coarse aggregate addition. 20 pounds of clean, washed, 3/8" pea stone suitable in composition and surface profile for use as a concrete aggregate, may be added to each 50 pound bag of patching compound.

H. Do not re-temper material which has begun to set. Discard any unused material after 20 minutes. Do not excessively wet repair surfaces after placement or as an aid to trowelling. Limit surface water addition to light misting and do not wet or rework repeatedly.

I. Observe the curing requirements for each day's working conditions, as specified herein. Do not open to traffic or expose to weather until adequate strength has been reached, as affected by working and curing conditions.

J. Finish: Provide finish to match existing or as required for membrane application.

3.07 CRACK REPAIR:

A. Preparation:

1. Remove all existing joint sealant.

2. Center routed groove on crack.

3. Remove all loose and deteriorated material.

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4. All joint wall surfaces must be clean, sound, and frost free. Joint walls must be free of oils, grease, curing compound residues, and any other foreign matter that might prevent bond. This should be accomplished by blast cleaning or equivalent mechanical means.

5. Conform to all manufacturers' preparation requirements.

B. Sealant Installation:

1. Sealant shall conform to specification Section 07920; Joint Sealant.

2. Install as per manufacturer's requirements.

3. Install sealant evenly and recess 1/8" below surface. DO NOT OVERFILL JOINT.

3.08 MONOLITHIC REPAIR FINISHES:

A. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, and as otherwise indicated.

B. Trowel Finish: Apply trowel finish to monolithic slab surfaces indicated, including slab surfaces to be covered with carpet, resilient flooring, paint or other thin-film finish coating system.

C. Slab finishes for floor coverings not indicated shall be coordinated with the Engineer prior to slab placement.

3.09 CONCRETE CURING AND PROTECTION:

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with the requirements of ACI 306 as herein specified.

B. Curing Methods: Perform curing of concrete by moist curing, by moisture-retaining cover curing. **Slab repairs shall be cured by moist curing methods for a minimum of 3 days.**

C. Protection From Mechanical Injury: During the curing period, the concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock, and excessive vibration. All finished concrete surfaces shall be protected from damage by construction equipment, materials, or methods, by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete.

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3.10 QUALITY CONTROL TESTING DURING CONSTRUCTION:

A. Engineer shall verify reinforcement, including slab reinforcement (WWF or reinforcing bar).

B. Concrete shall be sampled and tested for quality control during placement. Quality control testing shall include the items listed in paragraph D, this section, unless otherwise directed by the Engineer.

3.11 CLEANING:

A. Clean off excess material adjacent to work in progress by methods and with cleaning materials approved by manufacturer of patch materials.

END OF SECTION

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SECTION 03320

EMBEDDED GALVANIC ANODES

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 SUMMARY

A. This Section includes furnishing all labor, tools, materials, equipment and services necessary to properly install embedded galvanic anodes.

B. Embedded galvanic anodes are designed to provide localized corrosion protection. When placed at the appropriate spacing along the perimeter of concrete patches or along the interface between new/existing concrete, the anodes mitigate active corrosion and the formation of new corrosion sites in the adjacent existing concrete.

1.03 RELATED SECTIONS

A. Section 01300 SUBMITTALS

B. Section 01500 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

C. Section 01710 CLEANING

D. Section 03310 CONCRETE REPAIR

1.04 REFERENCES

A. ACI Guideline No. 222 – Corrosion of Metals in Concrete

B. ACI Repair Application Procedure (RAP) Bulletin 8 – Installation of Embedded Galvanic Anodes (2010)

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C. ICRI Guideline 310.1R-2008 Guide for Surface Preparation for the Repair of Deteriorated Concrete resulting from Reinforcing Steel Corrosion

D. ASTM A615/A615M Standard Specification for Deformed and Plain Billet-Steel Bar for Concrete Reinforcement

E. ASTM B418-12 – Standard Specification for Cast and Wrought Galvanic Zinc Anodes

F. ACI/ICRI Concrete Repair Manual

1.05 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Section 01300.

B. All submittals shall be reviewed and returned within 10 working days.

C. Incomplete submittals will not be reviewed.

D. Submittals not reviewed by the Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Section 01300 have been complied with.

E. Engineer will review submittals a maximum of two review cycles as part of their normal services. **If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate the Owner for additional review cycles.**

F. Product Data: Submit manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Material substitutions may be submitted for Engineer and Owner approval.

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1.06 QUALITY ASSURANCE

A. Contractor qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.

B. Mockup: Provide mockup of at least 5 galvanic anodes for each condition. Notify Engineer for approval of mockup and testing of steel to anode continuity.

1. Locate where directed by Engineer or Owner.

2. Mockup may remain as part of Work if acceptable to Engineer and Owner.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original sealed factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

B. Store product in location protected from freezing, damage, construction activity, precipitation, and direct sunlight, in strict accordance with manufacturer's recommendations.

C. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

PART 2 PRODUCTS

2.01 MATERIALS

A. Approved Galvanic Anode Manufacturers:

1. Sika

2. BASF

3. Euclid Chemical

4. Vector Corrosion Technologies

B. Galvanic Anode with the following properties:

1. Minimum of 100 grams of zinc in compliance with ASTM B6 Special High Grade cast around a pair of steel wires.

2. For use as corrosion control and corrosion prevention.

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3. The zinc anode is alkali-activated with an alkaline cementitious shell with a pH of 14 or greater

4. Contain no added constituents corrosive to reinforcing steel or detrimental to concrete, e.g. chloride, bromide, sulfate, etc.

5. Documented test results from field installations showing that the anodes have achieved a minimum of 10 years in service.

6. Anode units shall be supplied with solid zinc core (ASTM B418) cast around uncoated, non-galvanized, non-spliced steel tie wires for wrapping around the reinforcing steel and twisting to provide a durable steel to steel connection between the tie wire and the reinforcing steel

C. Repair Material:

1. Repair mortars, concrete and bonding agents shall be Portland cement based materials with suitable electrical conductivity less than 15,000 ohm-cm. Non-conductive repair materials such as epoxy, urethane or magnesium phosphate shall not be permitted. Anodes used with high resistance repair material shall be embedded in repair material approved by the anode manufacturer to create a conductive bridge to the substrate prior to repair material installation.

PART 3 EXECUTION

3.01 CONCRETE REMOVAL

A. Reference Spec Section 02070 Selective Demolition and 03310 Concrete Repair for removal and preparation of concrete surfaces.

3.02 CLEANING AND REPAIR OF REINFORCING STEEL

A. Reference Spec 03310 Concrete Repair for cleaning and preparation of reinforcing in conjunction with the requirements below.

B. Clean exposed reinforcing steel of rust, mortar, etc. to provide sufficient electrical connection and mechanical bond.

C. Secure loose reinforcing steel by tying tightly to other bars with steel tie wire.

D. Verify electrical continuity of all reinforcing steel, including supplemental steel, as per Section 3.4.

E. If significant reduction in the cross section of the reinforcing steel has occurred, replace or install supplemental reinforcement as directed by the Engineer.

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3.03 GALVAIC ANODE INSTALLATION

A. Install anode units and repair material immediately following preparation and cleaning of the steel reinforcement.

B. Place anodes as close as practical to edge of repair area while providing sufficient clearance for anode to be completely surrounded by repair material.

C. Galvanic anodes shall be installed along the perimeter of the repair at a maximum spacing of 24 in. At larger repair areas greater than 50 square feet galvanic anodes should be installed in a grid patter throughout the entire repair and attached to steel reinforcement where it penetrates exist concrete in the field of the repair area.

D. Place the galvanic anodes as close as possible to the patch edge while still providing sufficient clearance between anodes and substrate to allow the repair material to fully encase the anode with a minimum concrete or mortar cover over the anode of 1 in. If necessary, increase the size of the repair cavity to accommodate the anodes.

   1. Place the anode such that it fits along a single bar or at the intersection between two bars and secure to each clean bar.

   2. If less than 1 in. of concrete cover is expected, place anode beneath the bar and secure to clean reinforcing steel.

E. The tie wires shall be wrapped around the cleaned reinforcing steel at least one full turn in opposite directions and then twisted tight to create a secure electrical connection and allow no anode movement during concrete placement.

F. If repair materials with resistivity greater than 15,000 ohm-cm are to be used or if the resistivity is unknown, pack an approved mortar between the anode and the substrate concrete to create a conductive grout bridge ensuring no voids exist.

3.04 ELECTRICAL CONTINUITY

A. Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohm Ω) or DC potential (mV) with a multi-meter.

B. Electrical connection is acceptable if the DC resistance measured with the multi-meter is 1 Ω or less or the DC potential is 1 mV or less.

C. Confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established by tying discontinuous steel to continuous steel using steel tie wire.

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END OF SECTION

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SECTION 033713

SHOTCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

A. Related Documents: The general provisions of the Contract, including General and Supplementary Conditions and General Requirements apply to work specified in this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.01 DESCRIPTION OF WORK:

A. Shotcrete work includes all labor, materials, and equipment necessary and required for shotcrete.

B. Extent of work to be performed and/or coordinated shown on the drawings and indicated in the specifications including, but not limited to shotcrete, reinforcing and accessories.

C. Dry mix or wet mix process may be used.

D. Coordinate work with all other trades, including but not limited to concrete reinforcement and structural steel.

1.03 RELATED WORK

A. Concrete: Section 03310

1.04 QUALITY ASSURANCE:

A. Codes and Standards: Comply with provisions of the latest edition of the following except where more stringent requirements are shown or specified:

1. ACI 506R “Guide to Shotcrete”.

2. ACI 506.2 “Specification for Shotcrete”.

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3. ACI 117R "Specification for Tolerances for Concrete Construction and Materials".

4. ACI "Detailing Manual for Reinforced Concrete" (SP-66).

5. CRSI "Manual of Standard Practice"

6. CRSI "Placing Reinforcing Bars"

7. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Fire Performance Characteristics: Where indicated, provide materials and construction identical to those of assemblies whose fire resistance has been determined by ASTM E119, by a testing and inspecting organization, by equivalent concrete masonry thickness, or by another means, as acceptable to authorities having jurisdiction.

C. Contractor Qualifications: Firm specializing in manufacturer of shotcrete materials, with minimum 10 years' experience with shotcrete crew foreman have at least 5 years' experience in reinforced shotcrete..

D. Nozzleman must be ACI certified per ACI C660 for vertical surfaces using wet or dry mix shotcrete. Only nozzlemen approved by the Engineer shall be used on the project.

E. Testing Agency Qualifications: An independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

F. Nozzlemen shall prepare an in place mock-up test demonstrating their ability to satisfactory construct the reinforced shotcrete structural elements require for this project.

G. Quality Assurance/Control Testing: Test reports prepared by a qualified independent laboratory indicating compliance with the following performance requirements:
   1. ACI 506.2 Specifications for Shotcrete.
   2. ACI 301 Specifications for Structural Concrete.

H. Materials and installed work may require testing and retesting, as directed by the Architect, at any time during progress of work. Allow free access to material stockpiles and facilities. Tests not specifically indicated to be done at Owner's expense, including retesting of rejected materials and installed work, shall be done at Contractor's expense.

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1.05 DEFINITIONS

A. Shotecrete: Mortar or concrete pneumatically projected onto a surface at high velocity.

B. Dry-Mix Shotcrete: Shotecrete with most of the water added at nozzle.

C. Wet-Mix Shotcrete: Shotcrete with ingredients, including mixing water, mixed before introduction into delivery hose.

1.06 PROJECT CONDITIONS

A. Cold-Weather Shotcreting: Protect shotcrete work from physical damage or reduced strength caused by frost, freezing, or low temperatures according to ACI 306.1 and as follows:
   1. Discontinue shotcreting when ambient temperature is 40 deg. F and falling. Uniformly heat water and pre-packaged materials before mixing to obtain a shotcrete shooting temperature of not less than 50 deg. F and not more than 90 deg. F.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not place shotcrete on frozen surfaces or surfaces containing frozen materials.
   4. Do not use calcium chloride, salt or other materials containing antifreeze agents.

B. Unless otherwise specified, submittals required in this section shall be submitted for review.

1.07 SUBMITTALS:

A. Unless otherwise specified, submittals required in this section shall be submitted for review.

B. General Contractor shall submit a Submittal Schedule to the engineer within 30 days after they have received the Owner's Notice to Proceed.

C. All submittals shall be reviewed and returned to the Architect within 10 working days.

D. Incomplete submittals will not be reviewed.

E. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by

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Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Section 01000 have been complied with.

F. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

G. Product Data: Submit producers or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

   1. Reinforcement certified mill reports covering chemical and physical properties and yield strength.

   2. Design Mixes for each shotcrete mix.

   3. Accessories, Ties, and Joint Reinforcement

   4. Admixtures.

   5. Expansion/Adhesive Anchors.

H. Shop Drawings:

   1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Submit shop drawings for fabrication, bending and placement of masonry reinforcement. Comply with ACI 315, showing bar schedules, stirrup and tie spacing, diagrams of bent bars, and arrangement of masonry reinforcement. Include special reinforcement required at openings through masonry. Include supplemental reinforcing and bar supports necessary to support reinforcing steel at proper location within masonry units and bond beams. Coordinate masonry reinforcement with concrete reinforcement.

   2. Review of the shop drawings will be made for the size and arrangement of reinforcement. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility. Submit one print and one reproducible. Print will be reviewed and a reproducible will be returned to Contractor for printing and distribution. Multiple copies will not be marked by Engineer.

   3. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided all items listed prior. Incomplete submittals will not be reviewed.

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4. Mix designs: Submit all laboratory test reports and materials for each mix design listed within. Prepare mixes by the field experience method and/or trial mixtures per the requirements of chapter 5 of ACI 318. Proportioning by water cement ratio method will not be permitted.

5. Samples: Submit samples of materials as specified and as otherwise requested by Architect, including names, sources and descriptions.

PART 2 - PRODUCTS

2.01 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A615, Grade 60, deformed.

B. Reinforcing Anchors: ASTM A 36, unheaded rods or ASTM A 307 Grade A, hex-head bolts, carbon steel and carbon steel nuts, galvanized.

C. Supports: Bolters, chairs, spacers, ties and other devices for spacing, supporting and fastening reinforcing steel in place according to CRSI's "Manual of Standard Practice".

2.02 SHOTCRETE MATERIALS

A. Provide pre-blended high early strength, low permeability and low rebound cement based product containing Portland cement, aggregate, fly ash, silica fume, steel or synthetic fibers and chemical admixtures specifically designed for vertical shotcrete application.

B. Mix pre-packaged shotcrete materials with water either in dry mix or wet mix process. The compressive strength of shotcrete at the age of 28 days shall not be less than 5000 psi.

C. Aggregate for Shotcrete: Gradation shall be one of the three options specified by ACI 506R, Table 2.1 unless otherwise specified.

D. Water: Clean and potable.

E. Additives: None permitted.

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2.03 CURING MATERIALS

A. Absorptive Cover: AASHTO M182, Class 2 burlap cloth made from jute or kenaf weighing approximately 9 oz/sq yd dry.

B. Moisture Retaining Cover: ASTM C171, polyethylene film or white burlap polyethylene sheet.

2.04 SHOTCRETE EQUIPMENT

A. Mixing equipment: Capable of thoroughly mixing shotcrete materials in sufficient quantities to maintain continuous placement.

B. Dry Mix Delivery Equipment: Capable of discharging aggregate-cement mixture into delivery hose under close control and maintaining continuous stream of uniformly mixed materials at required velocity to discharge nozzle. Equip discharge nozzle with manually operated water-injection system for directing even distribution of water to aggregate-cement mixture.

1. Provide water supply with uniform pressure at discharge nozzle to ensure uniform mixing with aggregate-cement mix. Provide water pump to system if line water pressure is inadequate.

2. Provide uniform, steady supply of clean, compressed air to mainitan constance nozzle velocity while simultaneously operating blow pipe for cleaning away rebound.

C. Wet Mix Delivery Equipment: Capable of discharging aggregate-cement-water mixture accurately, uniformly, and continuously.

2.05 MIXING

A. The proportions of the shotcrete mix shall be controlled on the basis of the weight of each component material, except that water may be measured by volume. Materials shall have the following batch tolerances of their mix proportion weights: Cement, plus or minus two (2) percent; Aggregate, plus or minus four (4) percent; Admixtures, plus or minus six (6) percent. Weighing equipment used shall be accurate to within 0.4 percent of scale capacity.

B. Dry-Mix Process: Dampen pre-packaged shotcrete materials and thoroughly mix prior to use. Verify with manufacturer the water mix ratio at head to achieve specified mix design prior to application.

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C. Wet-Mix Process: Thoroughly mix clean water with pre-packaged shotcrete materials in batch mixer prior to use. Verify with manufacturer quantity of water to be added to batch to achieve specified mix design.

PART 3 - EXECUTION

3.01 PREPARATION:

A. Concrete or Masonry: Before applying shotcrete, remove unsound or loose materials and contaminants that may inhibit shotcrete bonding. Sand blast, water blast. chip or scarify areas to be repaired to extent necessary to provide sound substrate. Cut edges square and 1/2 inch deep at perimeter of work, tapering remaining shoulder at 1:1 slope into cavity to eliminate square shoulders. Dampen surfaces before shotcreting.

B. Steel: Clean steel surfaces by abrasive blasting according to SSPC-SP6/NACE No 3, “Commercial Blast Cleaning.”

C. Abrasive blast or hydroblast existing surfaces that do not require chipping to remove paint, oil, grease, or other contaminant and to provide roughened surface for proper shortcrete bonding.

3.02 FORMS

A. General: Design, erect, support, brace, and maintain forms, according to ACI 301, to support shotcrete and construction loads and to facilitate shotcreting. Construct forms so shotcrete members and structures are secured to prevent excessive vibration or deflection during shotcreting.

B. Fabricate forms to be readily removable with impact, shock or damage to shotcrete surfaces and adjacent materials.

C. Construct forms to required sizes, shapes, lines, and dimensions using ground wires and depth gages to obtain accurate alignment, location and grades in finished structures. Construct forms to prevent leakage but permit escape of air and rebound during shotcreting. Provide for openings, offsets, blocking, screeds, anchorage, inserts, and other feature required in the Work.

3.03 STEEL REINFORCEMENT:

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

B. General: Clean reinforcement of loose rust, mill scale, earth, ice, or other materials which will reduce bond to mortar or grout. Do not use reinforcement with kinks or bends not shown on drawings or final shop drawings, or bars with reduced cross-section

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due to excessive rusting or other causes. Position reinforcement accurately at spacing shown on contract drawings.

C. Securely embed reinforcing anchors into existing substrates, located as required.

D. Accurately position, support, and rigidly secure reinforcement against displacement by formwork, construction, or shotcreting. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.

E. Place reinforcement to obtain minimum coverage for shotcrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during shotcreting. Set wire ties with ends directed into shotcrete, not toward exposed shotcrete surfaces.

F. Vertical Reinforcing: Support and secure vertical reinforcing against displacement. Vertical reinforcing shall be held in position at the top and bottom and at intervals not exceeding 192 bar diameters nor 10’-0” with a minimum clearance of ¼” from the face of the masonry and not less than one bar diameter or 1”, whichever is greater, between adjacent bars.

G. Horizontal Reinforcing: Support and secure horizontal reinforcing against displacement. Horizontal reinforcing shall be held in position at intervals not exceeding 100 bar diameters with a minimum clearance of ¼” from the face of the masonry and not less than one bar diameter or 1”, whichever is greater, between adjacent bars. Provide laps or dowels around corners and across intersections as indicated on the drawings.

    1. Horizontal reinforcing shall be placed in continuous bond beam or lintel block units and shall be solidly grouted in place.

H. Splices: Splice reinforcement where shown or indicated on the drawings. Do not splice at other locations unless acceptable to the Structural Engineer. Minimum lap splice length shall be 48 bar diameters, of the smaller bar diameter, unless indicated otherwise on the drawings. Stagger adjacent splices at least one full lap length so that no more than 25% of the number of bars are spliced at any one location. Where splicing at vertical bars or at dowels, provide full contact, lap ends of bars, and wire tie.

I. Reinforcing Bar Positioners: Provide where required and at required spacing to support and secure horizontal and vertical reinforcing against displacement and to accurately align and position splices in reinforcement.

J. Anchors: Install anchors for reinforced masonry elements to supporting structure as indicated on the drawings or required in the specifications.

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3.04 EMBEDDED ITEMS:

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by shotcrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

3.05 APPLICATION

A. Apply temporary protective coverings and protect adjacent surfaces against deposit of rebound and overspray or impact from nozzle stream.

B. Moisten substrate immediately before placing shotcrete to saturated surface dry (SSD).

C. Apply shotcrete according to ACI 506.2.

D. Apply dry-mix shotcrete materials within 45 minutes after pre-dampening and wet-mix shortcrete materials within 90 minutes after batching.

E. Deposit shotcrete continuously in multiple passes, to required thickness, without cold joints and laminations developing. Place shotcrete with nozzle held perpendicular to receiving surface. Begin shotcreting in corners and recesses.

F. Remove and dispose of rebound and overspray materials during shotcreting to maintain clean surfaces and to prevent rebound entrapment.

G. Maintain reinforcement in position during shotcreting. Place shotcrete to completely encase reinforcement and other embedded items. Maintain steel reinforcement free of overspray and prevent buildup against front face during shotcreting.

H. Do not place subsequent lifts until previous lift of shotcrete is capable of supporting new shotcrete.

I. Shotcrete shall be uniform and dense, free from "drummy" areas that indicate laminations, voids, sand pockets, or disbanded material.

J. Do not permit shotcrete to sag, slough, or dislodge.

K. Remove hardened overspray, rebound, and laitance from shotcrete surfaces to receive additional layers of shotcrete; dampen surfaces before shotcreting.

L. Do not disturb shotcrete surfaces before beginning finishing operations.

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M. Installation Tolerances: Place shotcrete without exceeding installation tolerances permitted by ACI 117R, increased by a factor of 2.

3.06 PLACING IN COLD WEATHER

A. When the atmospheric temperature may be expected to drop below 40° F at the time shotcrete is placed, or at any time during the curing period, the following provisions shall also apply:

1. Shotcrete placement shall be permitted when the air temperature is at least 40° F and rising. Placement shall be discontinued if the temperature falls to 40° F and is expected to continue to fall.

2. The temperature of the shotcrete at time of placing shall not be less than 50° F nor more than 90° F. The temperature of neither aggregates nor mixing water shall be more than 100° F just prior to mixing with the cement.

3. When the daily minimum temperature is less than 40° F, shotcrete shall be insulated or housed and heated after placement. The temperature of the shotcrete and air adjacent to the shotcrete shall be maintained at not less than 50° F nor more than 90° F for the duration of the curing period.

4. Methods of insulating, housing and heating the structure shall be in accordance with "Standard Specification for Cold Weather Concreting," ACI Standard 306.1.

5. The use of accelerators or antifreeze compounds will not be allowed unless otherwise specified.

6. When dry heat is used to protect shotcrete, means of maintaining an ambient humidity of at least 40 percent shall be provided unless the shotcrete has been covered tightly with an approved impervious material.

3.07 PLACING IN HOT WEATHER

A. When climatic factors such as high air temperature, reduced relative humidity and increased wind velocities are present, or conditions are such that the temperature of placed shotcrete exceeds 90° F at, or during the first 24 hours after placement, the following provisions shall also apply:

1. The Contractor shall maintain the temperature of the shotcrete below 90° F during mixing, conveying, and placing.

2. Exposed shotcrete surfaces which tend to dry or set too rapidly shall be continuously moistened by means of fog sprays or otherwise protected from drying immediately after placement.

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3. Shotcrete surfaces exposed to the air shall be covered as soon as the shotcrete has hardened sufficiently and shall be kept continuously wet for at least the first 24 hours of the curing period, and for the entire curing period.

3.08 SURFACE FINISHES:

A. Rebound material shall be carefully swept off the finished shotcrete surface and discarded before it becomes too hard for removal. After the shotcrete has been placed to the depth required, the surface shall be checked with a straightedge or template and any low spots shall be brought up to grade by placing additional shotcrete.

B. General: Finish shotcrete according to descriptions in ACI 606R for surface finishes.

C. Provide broom finish rough textured finish obtained by screeding exposed face of shotcrete to required plane by rod, cutting screed or trowel and brooming after initial set.

3.09 CURING:

A. Protect freshly placed shortcrete from premature drying and excessive cold or hot temperatures.

B. Start initial curing as soon as free water has disappeared from shotcrete surface after placing and finishing.

C. Curing exposed surfaces: Cure shotcrete by moist curing. Keep surfaces continuously moist for at least seven days with water, continuous water-fog spray, water saturated absorptive covers or moisture-retaining covers maintaining 95% relative humidity. Lap and seal sides and ends of covers.

3.10 FIELD QUALITY CONTROL:

A. Testing Laboratory: Independent of the Owner, Architect and Contractor; the testing laboratory, in addition to meeting requirements of ASTM E-329, and must be an approved laboratory competent to perform concrete physical testing. All tests must be performed in strict accordance with the applicable ASTM standard.

B. Distribution of Results of Tests: Within 24 hours of results of tests, copies of the results shall be submitted to the Architect, Contractor and the supplier if applicable.

C. Shotcrete Testing:

1. Air Content: ASTM C 173, volumetric method or ASTM C 231, pressure

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method; 1 test for each compressive-strength test for each mix of air-entrained, wet-mix shotcrete measured before pumping.

2. In-Place Shotcrete: Take a set of 3 unreinforced cores for each ix and for each workday or for every 50 cu. Yards of shotcrete placed; whichever is less. Test cores for compressive strength according to ACI 506.2 and ASTM C 42. Do not cut reinforcing steel.

3. Shotcrete Temperature: ASTM C 1064; 1 test hourly when air temperatures 40 degree F and below and when 80 degrees F and above, and 1 test for each set of compressive strength specimens.

3.11 REPAIRS:

A. Remove and replace shotcrete that is delaminated or exhibits laminations, voids or sand/pockets exceeding limits for specified core grade of shotcrete.

1. Remove unsound or loose materials and contaminants that may inhibit bond of shotcrete repairs. Chip or scarify areas to be repaired to extent necessary to provide sound substrate. Cut edges square and ½ inch deep at perimeter of work, tampering remaining should at 1:1 slope into cavity to eliminate square shoulders. Dampen surfaces and apply new shotcrete.
2. Repair core holes from in-place testing according to repair provisions in ACI 301 and match adjacent finish, texture and color.
3. Verify that grouting operations are performed and grout is placed and consolidated in accordance with the specifications.

3.12 CLEANING:

A. Remove and dispose of rebound and overspray materials from final shotcrete surfaces and areas not intended for shotcrete placement.

END OF SECTION

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SECTION 05120

STRUCTURAL STEEL

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK:

A. Extent of structural steel work is shown on drawings, including removal of existing beams and installation of new beams using existing connections.

B. Structural steel is that work defined in AISC "Code of Standard Practice" and as otherwise shown on drawings.

1.03 QUALITY ASSURANCE:

A. Codes and Standards: Comply with latest provisions of the following, except as otherwise indicated:

1. AISC "Code of Standard Practice for Steel Buildings and Bridges", Latest Edition.

   a. The provisions of Section 10, "Architecturally Exposed Structural Steel", apply to exposed steel elements for this project. In addition, exposed welds shall be ground to provide smooth surface.

   b. Exclude the word "structural" in reference to the "Design Drawings" in section 3.1 of the Code.

2. AISC "Specification for Structural Steel Buildings", including "Commentary" and Supplements issued thereto.

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3. AISC "*Specifications for Structural Joints using ASTM A 325 or A 490 Bolts"* approved by the Research Council on Structural Connections of the Engineering Foundation.

4. AWS D1.1 - "Structural Welding Code" - Steel.

5. AWS D1.3 - "Structural Welding Code" - Sheet Steel.

6. ASTM A6 "General Requirements for Delivery of Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use."

7. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

B. Qualifications for Welding Work: Qualify welding processes and welding operators in accordance with AWS D1.1 "Standard Qualification Procedure."

1. Provide certification that welders to be employed in work have satisfactorily passed AWS D1.1 qualification tests and maintained a current certification. Current certification and/or continuity log shall be submitted and be available in the field.

2. If re-certification of welders is required, retesting will be the Contractor's responsibility.

C. Fabricator Qualifications: N/A.

D. Paint Endorsement: N/A.

1.04 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with this section and 01300.

B. All submittals shall be reviewed and returned to the contractor within 10 working days.

C. INCOMPLETE SUBMITTALS WILL NOT BE REVIEWED.

D. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in Division 1 have been complied with.

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E. Engineer will review submittals a maximum of two review cycles as part of their normal services. If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate Engineer for additional review cycles.

F. Hardcopy Submittals: Submit three prints. Prints will be reviewed by the Engineer. One marked print will be returned to Contractor for printing and distribution. Multiple copies will not be marked by the Engineer.

G. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Structural steel certified mill reports for each grade of steel covering chemical and physical properties and yield strengths.

2. High-strength bolts (each type), including nuts and washers.

3. Structural steel primer paint.

4. Structural steel top coat paint or add painting into this specification.

H. Shop Drawings:

1. Shop Drawing Review: Electronic files of structural drawings will not be provided to the contractor for preparation of shop drawings. Reproduction of any portion of the Construction Documents for use as Shop drawings and/or Erection Drawings is prohibited. Shop drawings and/or Erection drawings created from reproduced Construction Documents will be returned without review.

a. Review of the shop drawings will be made for the size and arrangement of the members and strength of the connections. Conformance of the Shop Drawings to the Contract Drawings remains the responsibility of the General Contractor. Engineer's review in no way relieves the General Contractor of this responsibility.

b. Shop drawings will not be reviewed as partial submittals. A complete submittal shall be provided and shall include; erection and piece drawings indicating all members, braced frames, moment frames and connections. <u>Incomplete submittals will not be reviewed.</u>

1.05 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials to site at such intervals to insure uninterrupted progress of work.

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B. Store materials to permit easy access for inspection and identification. Keep steel members off ground, using pallets, platforms, or other supports. Protect steel members and packaged materials from corrosion and deterioration.

C. Do not store materials on structure in a manner that might cause distortion or damage to members or supporting structures. Steel materials shall be stored in a manner to avoid ponding of precipitation on members. Repair or replace damaged materials or structures as directed.

PART 2 PRODUCTS

2.01 MATERIALS:

A. Structural Steel Shapes, Plates and Bars (U.N.O): ASTM A 36 minimum, higher strength steel is acceptable.

B. Structural Steel Hot Rolled Wide Flange Shapes: ASTM A 992 Grade 50 (ASTM A572 Grade 50 with special requirements per AISC Technical Bulletin #3, dated March 1997)

C. Unfinished Threaded Fasteners: ASTM A 307, Grade A, regular low-carbon steel bolts and nuts. Provide hexagonal heads and nuts for all connections.

D. Electrodes for Welding:

1. Minimum 70 ksi electrodes. Filler material shall meet the grouping requirements per AWS D1.1 Table 3.1 for matching strength of connected materials.

2. All filler metal used welding shall meet the following Charpy V-Notch (CVN) requirements.

a. 20 ft-lb at 0 degrees Fahrenheit unless noted otherwise.

b. 20 ft-lb at -20 degrees Fahrenheit and 40 ft-lb at 70 degrees Fahrenheit at all complete joint penetration (CJP) groove welds.

E. Structural Steel Coatings shall be as specified in the Structural Steel Coatings section of this specification, and as specified in Division 9.

2.02 FABRICATION:

A. Shop Fabrication and Assembly: Fabricate and assemble structural assemblies in shop to greatest extent possible. Fabricate items of structural steel in accordance with AISC Specifications and as indicated on final shop drawings.

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1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials.

2. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure free of markings, burrs and other defects.

B. Connections: Weld or bolt shop connections, as indicated.

1. Provide field bolted connections, except where welded connections or other connections are indicated.

2. Provide high-strength threaded fasteners for principal bolted connections, except where unfinished bolts are indicated.

C. High-Strength Bolted Connection: Install high-strength threaded fasteners in accordance with AISC "Specification for Structural Joints using ASTM A 325 or A 490 Bolts". Unless otherwise indicated, all bolted connections are to be tightened to the snug tight condition as defined by AISC.

D. Welded Construction: Comply with AWS Codes for procedures, appearance and quality of welds, and methods used in correcting welding work.

E. Holes for Other Work: Provide holes required for securing other work to structural steel framing, and for passage of other work through steel framing members, as shown on final shop drawings.

F. Cut, drill, or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.

G. Fabricator, Erector and General Contractor shall coordinate safety requirements for the project, in accordance with OSHA Part 1926. Provide all necessary pieces and fabrications as required to safely erect and access the structure for the duration of project construction.

2.03 STRUCTURAL STEEL COATINGS

A. Coordinate coating requirements with Division 9 of the specifications.

B. To the greatest extent possible, structural steel coatings shall be shop applied.

C. Galvanizing, priming and painting for structural steel permanently exposed to view shall meet the requirements of Section 10 of the Code of Standard Practice, "Architecturally Exposed Structural Steel".

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D. Follow manufacturer's installation and safety instructions when applying coatings. Adhere to recoat time recommendations set forth by manufacturer.

E. General: Shop priming of structural steel is not required for heated, interior steel not exposed to view unless noted otherwise.

F. Coatings: All exterior steel and/or steel permanently exposed to view shall receive a coating. Unless noted otherwise, refer to Division 9 specifications for products and surface preparation requirements.

G. Unheated structural steel to be enclosed with architectural finishes, including but not by limitation, canopy members and/or roof pop-up members shall be primed with rust inhibitive alkyd primer, Tnemec Series 349 unless noted otherwise. Follow manufacturer's instructions for surface preparation and application. Substitution shall be equal to the above specified products, and shall be submitted for review.

H. Field Touch-up: Touch-up all paint and galvanizing damage, including but not by limitation, damage caused during shipping, erection, construction damage, and field welded steel. See Division 9 specifications for additional requirements.

PART 3 EXECUTION

3.01 ERECTION:

A. General: Comply with AISC Specifications for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

B. Erection Procedures: Comply with "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

C. Temporary Shoring and Bracing: This is the sole responsibility of the Contractor. Provide temporary shoring and bracing members with connections of sufficient strength to support imposed loads. Remove temporary members and connections when all permanent members are in place, and all final connections are made, including the floor and roof diaphragms. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds. Comply with OSHA Standard referenced previous. Retain the services of a Specialty Structural Engineer (Not the Engineer of Record) to design specialty shoring and bracing.

D. Field Assembly:

1. Set structural members accurately to lines and elevations indicated.

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2. Align, adjust, level and plumb members of complete frame in to the tolerances indicated in the AISC Code of Standard Practice and in accordance with OSHA regulations.

3. Clean bearing surfaces and other surfaces which will be in permanent contact before assembly.

4. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

5. Do not enlarge unfair holes in members by burning or by use of drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.

E. Erection bolts: Remove erection bolts. On exposed welded construction and at all braced frame members fill holes with plug welds and grind smooth at exposed surface.

F. Gas Cutting: Do not use gas cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members which are not under stress, as accepted by the Engineer of Record. Finish gas-cut sections equal to a sheared appearance when permitted.

G. Coating Damage: Touch up shop applied paint or galvanizing whenever damaged or bare. See "Coatings" sections for additional requirements.

H. Field Cut Beam Web Penetrations:

1. Field cut beam web penetrations are not permitted.

I. Welders shall have current evidence of passing and maintaining the AWS D1.1 Qualifications test available in the field.

J. Welding electrodes, welding process, minimum preheat and interpass temperatures shall be in accordance with AISC and AWS specifications. Any structural steel damaged in welding shall be replaced.

3.02 QUALITY CONTROL:

A. General: Contractor is responsible for maintaining quality control in the field and for providing a structure that is in strict compliance with the Contract Documents.

1. Required inspection intended to assist the Contractor in complying with the Contract Documents. These specified services, however, do not relieve the Contractor of his responsibility for compliance, nor are they intended to limit the Contractor's quality control efforts in the field.

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B. Nonconforming Work: Contractor shall be responsible for correcting deficiencies in structural steel work which inspections laboratory test reports have indicated to be not in compliance with requirements. Additional tests and/or surveys shall be performed, at the Contractor's expense, as may be necessary to show compliance of corrected work. Any costs associated with the Engineer's review and disposition of faulty works shall be borne by the Contractor.

END OF SECTION

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SECTION 07180

TRAFFIC COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. The drawings and general conditions of the contract apply to work of this section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

D. The work described in this section will proceed while garage operations continue. Contractor to coordinate traffic patterns with garage manager for garage to remain open to traffic during construction. Contact information for garage manager will be provided after the award of the contract.

E. There will be parking spaces made available to the contractor Monday through Sunday for the work and traffic alterations at any one time during construction. Contractor to provide all traffic barriers signage, and traffic flagging personnel as required to maintain safe garage operation during construction. **Security and flagging personnel are mandatory if two-way traffic is required on any ramp.**

F. Contractor's Use of Premises: During construction, Contractor shall have restricted use of the garage as described within the specifications. Contractor's use of premises is limited only by Owner's right to perform work or employ other contractors on these premises.

1.02 DESCRIPTION OF WORK

A. Furnish all the labor, materials, equipment, and incidentals necessary to coat the levels indicated on the drawings. Coat these locations with NEOGARD AUTO-GARD® FC where surfaces have been previously coated with a membrane. Preparation, application and clean up are per these specifications and manufacturers recommendations. This work shall include restriping of parking spaces and painting of directional information to match existing layout and a five (5) year Joint and Several (material and labor) warranty.

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B. Contractor shall specify which product they intend to use in the bid package. No substitutions will be considered after the bids have been opened unless it is determined to be a benefit to the owner.

C. All existing membrane that is loose or not fully adhered shall be completely removed to concrete.

D. The traffic membrane system shall be a complete system of compatible materials supplied by NEOGARD® to create a seamless waterproof membrane.

1.03 RELATED SECTIONS

A. Section 01300 SUBMITTALS

B. Section 01500 CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

C. Section 01710 CLEANING

D. Section 03310 CAST-IN-PLACE CONCRETE REPAIR

E. Section 07920 JOINT SEALANTS

1.04 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with Section 01300.

B. All submittals shall be reviewed and returned within 10 working days.

C. Incomplete submittals will not be reviewed.

D. Submittals not reviewed by the Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Section 01300 have been complied with.

E. Engineer will review submittals a maximum of two review cycles as part of their normal services. **If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate the Owner for additional review cycles.**

F. Product Data: Submit manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

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1. NEOGARD AUTO-GARD® FC Traffic-Bearing Membrane System

2. Warranty: Submit a sample warranty that states that the material and labor/workmanship involved in this application will be warranted for 5 years from the date of substantial completion by the installer and NEOGARD®.

3. **Applicator's Approval: Submit a currently dated letter from NEOGARD® Division of JONES-BLAIR® stating applicator is approved to install vehicular traffic coating system specified in full compliance with the material warranty.**

4. No substitutions will be considered.

1.05 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated:

1. ICRI Guidelines No. 03732 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."

2. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

3. ACI 308: Standard Practice for Curing Concrete

4. Neogard Construction Products, "Recoat Guidelines Standard & Fast-Cure Coating Systems", www.neogard.com.

B. Manufacturer qualifications: Auto-Gard® FC as supplied by NEOGARD® is approved for use on this project.

C. Contractor qualifications: Qualified to perform work specified by reason of experience or training provided by product manufacturer.

D. Mockup: Provide mockup of at least 25 square feet to include surface preparation/profile, for each condition and allow for evaluation of slip resistance of Traffic Deck Coating System and adhesion test in accordance with ASTM D4541.

1. Install mockup with specified coating types and with other components noted.

2. Locate where directed by Engineer or Owner.

3. Mockup may remain as part of Work if acceptable to Engineer and Owner.

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E. Notify manufacturer's authorized representative at least two weeks before start of work. Schedule minimum of 2 job site inspections by manufacturer's authorized representative, first scheduled before application of product to review surface preparation for each condition. Second, to review application/installation of membrane systems at each condition. **Application of elastomeric Traffic Deck Coating System without prior review by manufacturer will not void the warranty provided to the Owner.**

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in original sealed factory packaging bearing identification of product, manufacturer, and batch number. Provide Material Safety Data Sheets for each product.

B. Store product in location protected from freezing, damage, construction activity, precipitation, and direct sunlight, in strict accordance with manufacturer's recommendations.

C. Recommended storage temperature is 75 degrees F.

D. Handle all products with appropriate precautions and care as stated on Material Safety Data Sheet.

1.07 PROJECT CONDITIONS

A. Do not use products under conditions of precipitation or freezing weather or when such conditions are imminent. Use appropriate measures for protection and supplementary heating to ensure proper drying and curing conditions in accordance with manufacturer's recommendations if application during inclement weather occurs.

B. Ensure substrate is clean and dry prior to application.

C. **Do not proceed with application of materials when deck temperature is less than 40 degrees F unless approved in writing by the manufacturer.**

D. Protect all adjacent work from contamination due to mixing, handling, and application of preparation and repair products and Traffic Deck Coating System.

E. Conform to all the manufacturer’s recommendations regarding project/surface conditions.

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PART 2 PRODUCTS

2.01 MANUFACTURERS

A. The only acceptable manufacturer and supplier allowed under this section is NEOGARD® Division of JONES-BLAIR® Company, P.O. Box 35286, Dallas, TX 75235, Toll Free (800) 321-6588, Fax (214) 357-7532, www.neogard.com.

2.02 PERFORMANCE CRITERIA

A. Compliance: ASTM C957

2.03 MATERIALS

A. Vehicular Traffic Coating Material

1. Primer: Concrete and metal primers as required by NEOGARD®.

2. Flashing Tape: 86218 flashing tape (ETERNABOND™ WebSeal™) or approved equal having a minimum thickness of 30 mils.

3. Liquid Flashing: FC7500/FC7960 or FC7520/FC7962 polyurethane coating.

4. Sheet Flashing: 6" wide or 12" wide UltraGard EPDM flashing manufacturered by John Manville or equal non-staining elastomeric sheet flashing having a min thickness of 60 mils.

5. Aggregate: 7992T silica (quartz) sand or other aggregate approved by NEOGARD®.

6. Elastomeric Base Coat: FC7500/FC7960 polyurethane coating, gray in color.

7. Elastomeric Topcoat (Interior or Covered Use Only): FC7510/FC7961 series polyurethane coating.

8. Elastomeric Topcoat (Exterior/Interior Use): FC7520/FC7962 series polyurethane coating.

9. Sealant: Polyurethane sealant approved by NEOGARD®.

B. Match as close as possible to existing colors.

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PART 3 EXECUTION

3.01 EXAMINATION

A. Inspect all areas involved in work to establish extent of work, access and need for protection of surrounding construction.

B. Protect all surroundings from Primers, Patching Repair Compounds and Finish products and to include, but not be limited to, windows, roofs, walkways, drives, automobiles, and landscaping.

C. Existing Concrete Decks: Verify that the work done under other sections meets the following requirements:

1. That the concrete deck surface is free of ridges and sharp projections.

2. That the concrete was cured for a minimum of 28 days. (Minimum of 5,000 psi compressive strength). Water-cured treatment of concrete is preferred. The use of concrete curing agents require written approval by NEOGARD®.

3. That the concrete was finished by a power or hand steel trowel followed by soft hair broom to obtain light texture or "sidewalk" finish.

4. That damaged areas of the concrete deck be restored to match adjacent areas.

D. Existing Membrane

1. Review all existing areas of membrane and ensure that all loose/deteriorated areas are completely removed to concrete. **Any existing membrane left in place, to be coated over, must be fully adhered to the substrate.**

3.02 SITE VERIFICATIONS OF CONDITIONS

A. Conduct all pre-application inspections of site verification with authorized Manufacturer's Representative.

B. Inspect all joints to ensure there is no deteriorated sealant, adhesion loss or non-elastomeric caulks installed in joints. Repair all deficient sealant.

C. Inspect all through deck penetrations, including electrical, lighting, signage, plumbing, HVAC, fire sprinkler piping for watertight seal. Repair all deficiencies.

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3.03 SURFACE PREPARATION:

A. NEW & EXISTING CONCRETE SURFACES:

1. Cleaning: Surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean, and dry. Areas where oil or other contaminants penetrate deep into the concrete may require removal by mechanical methods.

2. Shot Blasting: Required surface preparation method for remedial construction, is also the preferred method for new construction. Mechanically prepare surface by shot blasting to industry standard surface texture (ICRI's CSP3-4) without causing additional surface defects in deck surface. Shot blasting does not remove deep penetrating oils, grease, tar or asphalt stains. Proper cleaning procedures should be followed to insure proper bonding of the deck coating.

3. Cracks and Cold Joints: Visible hairline cracks (up to 1/16" in width) in concrete and cold joints shall be cleaned, primed as required and treated with liquid flashing a minimum distance of 2" on each side of crack to yield a total thickness of 30 dry mils. Large cracks (over 1/16" in width) shall be routed and sealed with sealant. Sealant shall be applied to inside area of crack only, not applied to deck surface. Detail sealed cracks with liquid flashing a distance of 2" on each side of crack to yield a total thickness of 30 dry mils.

4. Control Joints: Seal secondary control joints with sealant. Sealant shall be applied to inside area of joint only, not applied to deck surface. Detail sealed joints with liquid flashing a distance of 2" on each side of joint to yield a total thickness of 30 dry mils.

5. Flashing Tape: Install flashing tape where recommended by manufacturer prior to the application of elastomeric coating.

6. Surface Condition: Surface shall be clean and dry prior to coating.

B. EXISTING MEMBRANE

1. Remove all existing surface applied membrane material that is loose or marginally bonded.

2. Check all exposed concrete surfaces for defects and repair in accordance with section 03310.

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3. Clean existing deck coatings by power washing, (600 to 800 psi), with trisodium phosphate or other non-sudsing detergent. The use of stiff bristle brooms may be required to help remove some contaminants. Rinse decks thoroughly and clean potable water and allow to dry completely. All low sports where water puddles must be vacuumed dry to remove any contaminants left by the rinsing operation.

4. Existing Membrane surfaces contaminated with oil or grease shall be vigorously scrubbed with a power broom and a strong non-sudsing detergent. Thoroughly wash, clean, and dry.

3.04 APPLICATION:

A. NEW & EXISTING CONCRETE SURFACES:

1. Complete all preparatory work before application begins. Apply base coat, intermediate, and top coats with properly sized equipment to arrive at required mil thickness. Verify mil thickness of all coats by use of wet-mil thickness gauge.

2. Vacuum thoroughly all surfaces to be coated. Apply primer to all deck surfaces at manufacturers recommended application rate. Force primer into pores and voids to eliminate pinholes. Do not apply Primer over pre-striping.

3. **The application of this product by the "Seed and Back Roll" method is not allowed on this project. The "Seed and Lock Method" is to be utilized.**

4. Installation: **NEOGARD AUTO-GARD FC**

a. **Primer**: Apply primer at a rate of 300-500 sf/gallon to all exposed concrete and coated surfaces in strict accordance with procedures outlined by NEOGARD®. **Within 24 hours of application of primer, base coat must be applied. If base coat cannot be applied within 24 hours, re-prime.**

b. **Base Coat**: Apply FC7500/7960 to concrete surfaces at a rate of 80 sf/gallon (20 mils) in strict accordance with procedures outlined by NEOGARD®. Extend base coat over cracks and control joints which have received treatment.

c. **Wearing Surface Coat for <u>Medium Duty</u> Applications**: Apply FC7510/7961 coat at a rate of 200 sf/gallon (8 mils) in strict accordance with procedures outlined by NEOGARD® and immediately broadcast **<u>7992U aggregate</u>**, evenly distributed, into wet coating at the rate of 15 pounds per 100 square feet.

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d. **Additional Wearing Surface Coat for <u>Heavy Duty</u> (Turn Areas) Applications**: At all turn areas noted on drawings, apply double-texture as follows: After the wearing surface coat to receive aggregate has cured and loose aggregate removed, apply FC7510/7961 at a rate of 133 sf/gallon (12 mils) strict accordance with procedures outlined by NEOGARD® and immediately broadcast additional **<u>7992U aggregate</u>**, evenly distributed, into wet coating at the rate of 10 pounds per 100 square feet.

e. **Finish Top Coat**: When dry, remove excess aggregate and recoat surface with FC7510/7961 at rate of 133sf/gallon (12 mils) in strict accordance with procedures outlined by NEOGARD®.

f. Total system coating thickness averages 40 dry mils exclusive of aggregate. Double-textured turn areas will yield an average of 52 dry mils exclusive of aggregate.

B. EXISTING MEMBRANE SURFACES:

1. Complete all preparatory work before application begins. Apply intermediate and top coats with properly sized equipment to arrive at required mil thickness. Verify mil thickness of all coats by use of wet-mil thickness gauge.

2. Vacuum thoroughly all surfaces to be coated. Apply primer to all deck surfaces at manufacturers recommended application rate. Force primer into pores and voids to eliminate pinholes. Do not apply Primer over pre-striping.

3. Installation: **NEOGARD AUTO-GARD FC**

a. **Primer**: Apply primer at a rate of 300-500 sf/gallon to all exposed concrete and coated surfaces in strict accordance with procedures outlined by NEOGARD®. **Within 24 hours of application of primer, base coat must be applied. If base coat cannot be applied within 24 hours, re-prime.**

b. **Wearing Surface Coat for <u>Medium Duty</u> Applications**: Apply FC7510/7961 coat at a rate of 200 sf/gallon (8 mils) in strict accordance with procedures outlined by NEOGARD® and immediately broadcast **<u>7992U aggregate</u>**, evenly distributed, into wet coating at the rate of 15 pounds per 100 square feet.

d. **Additional Wearing Surface Coat for <u>Heavy Duty</u> (Turn Areas) Applications**: At all turn areas apply double-texture as follows: After the wearing surface coat to receive aggregate has cured and loose aggregate removed, apply FC7510/7961 at a rate of 133 sf/gallon (12 mils) strict accordance with procedures outlined by NEOGARD® and immediately

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broadcast additional **7992T aggregate**, evenly distributed, into wet coating at the rate of 10 to 15 pounds per 100 square feet.

e. **Finish Top Coat**: When dry, remove excess aggregate and recoat surface with FC7510/7961 at rate of 133 sf/gallon (12 mils) in strict accordance with procedures outlined by NEOGARD®.

f. Total system coating thickness averages 20 dry mils exclusive of aggregate. Double-textured areas will yield an average of 32 dry mils exclusive of aggregate.

3.05 PROTECTION

A. After completion of application, do not allow traffic on coated surfaces for a period of at least 24 - 36 hours at 75°F. and 50% R.H., or until completely cured.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service, Final inspection, and Warranty request: Manufacturer's representative will inspect finished surface preparation, application, and finished coating and may require further preparation or application to achieve appropriate result. In no case will manufacturer's representative approve surface or finish if following conditions are found: pinholes, insufficient coating thickness, or any other conditions, that, in manufacturer's representative's opinion, may cause failure of installation.

3.06 CLEANING

A. Conform with specification Section 01710.

B. Clean all equipment, tools, and spillage with manufacturer’s recommend solvent.

C. Clean up and properly dispose of all debris remaining on job site related to application.

END OF SECTION

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SECTION 07920

JOINT SEALANTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

1. The drawings and general conditions of the contract including General and Supplementary Conditions and other Division 1 Specification sections apply to work of this section.

2. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

3. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract

1.02 DESCRIPTION OF WORK

A. This Section includes joint sealants for the following locations:

1. All joints in Cast-In-Place Concrete Toppings.

1.03 RELATED SECTIONS

A. Concrete Repair: Section 03310.

B. Traffic Membrane: Section 07180.

1.04 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that have been produced and installed to establish and to maintain watertight and airtight continuous seals without causing staining or deterioration of joint substrates.

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1.05 SUBMITTALS

A. Unless otherwise specified, submittals required in this section shall be submitted for review. Submittals shall be prepared and submitted in accordance with 01300.

B. All submittals shall be reviewed and returned within 10 working days.

C. Incomplete submittals will not be reviewed.

D. Submittals not reviewed by the General Contractor prior to submission to the Engineer will not be reviewed. Include on the submittal statement or stamp of approval by Contractor, representing that the Contractor has seen and examined the submittal and that all requirements listed in this Section and Division 1 have been complied with.

E. Engineer will review submittals a maximum of two review cycles as part of their normal services. **If submittals are incomplete or otherwise unacceptable and re-submitted, General Contractor shall compensate the Owner for additional review cycles.**

F. Product Data: Submit producer's or manufacturer's specifications and installation instructions for the following products. Include laboratory test reports and other data to show compliance with specifications (including specified standards).

1. Joint Sealant Material.

2. Certification that joint sealant product plus the primers and cleaners required for sealant installation comply with local regulations controlling use of volatile organic compounds.

3. Warranty.

1.06 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following, except as otherwise indicated:

1. ACI 504R-90 "Guide to Sealing Joints in Concrete Structures."

2. SWR "Applying Liquid Sealants."

3. SWR " Sealants: The Professionals Guide."

4. "Code of Federal Regulations, Part 1926" per the Occupational Safety and Health Administration (OSHA), Department of Labor (Latest Revision).

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B. Installer Qualifications: Engage an experienced Installer who has completed joint sealant applications similar in material, design, and extent to that indicated for Project that have resulted in construction with a record of successful in-service performance.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver Materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle materials in compliance with manufacturer's recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

1.08 PROJECT CONDITIONS

A. Environmental Conditions: Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside the limits permitted by joint sealant manufacturer or below 40 deg. F.

2. When joint substrates are wet.

B. Joint Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than or greater than that allowed by joint sealant manufacturer for application indicated.

C. Joint Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

1.09 WARRANTY

A. System Manufacturer: Furnish Owner with written total responsibility guarantee that system will be free of defects, water penetration and chemical damage related to system design, workmanship or material deficiency, consisting of:

1. Any adhesive or cohesive failures.

2. Weathering

3. Surface crazing.

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B. If material surface shows any of defects listed above, supply labor material to repair all defective areas and to repaint all damaged line stripes.

C. Guarantee period shall be 5 yrs commencing with date of acceptable Work.

D. Perform any repair under this guarantee at no cost to Owner.

E. Before Construction, provide Owner with sample of final guarantee. Guarantee shall be provided by manufacturer.

F. Vandalism and abnormally abrasive maintenance equipment are exempted from warranty.

PART 2- PRODUCTS

2.01 MATERIALS GENERAL

A. Compatibility: Provide joint sealants, joint fillers, and other related materials that are compatible with one another, with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience and the traffic membrane.

2.02 ELASTOMERIC JOINT SEALANTS

A. General building sealants: 2 or 3-component, Type II, non-sag, urethane sealant, conforming to ASTM C 920.

B. Accepted general building sealants:

1. “MasterSeal NP2,” BASF Construction Chemicals, Shakopee, MN.

2. “Sikaflex-2C NS/TG,” Sika Corp., Lyndhurst, NJ.

3. Approved equal.

4. Self-leveling products are not acceptable.

5. All products must be traffic grade.

C. Packing and backer rod: See heading, “Joint Sealant Backing.”

D. Sealants used shall not stain masonry or concrete. Aluminum pigmented compounds not acceptable.

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2.03 MISCELLANEOUS MATERIALS

A. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance. Do not proceed with installation of joint sealants until unsatisfactory have been corrected.

3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with recommendations of joint sealant manufacturer and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean concrete, masonry, and similar porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressor.

3. Remove laitance and form release agents from concrete.

B. Joint Priming: Priming not required.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

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3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's printed installation instructions applicable to products and applications indicted, except where more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Installation of Sealants: Install sealants by proven techniques that result in sealants directly contacting and fully wetting joint substrates, completely filling recesses provided for each joint configuration, and providing uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability. Install sealants at the same time sealant backings are installed.

D. Tooling of Non sag Sealants: Immediately after sealant application and prior to time skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated, to eliminate air pockets, and to ensure contact and adhesion of sealant with sides of joint. Remove excess sealants from surfaces adjacent to joint. Do not use tooling agents that discolor sealants or adjacent surfaces or are not approved by sealant manufacturer.

1. Provide concave joint configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.

   a. Use masking tape to protect adjacent surfaces of recessed tooled joints.

3.04 CLEANING

A. Clean off excess sealants or sealant smears adjacent to joints as work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.05 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so that and installations with repaired areas are indistinguishable from original work.

END OF SECTION

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SECTION 09900

PAINTS AND COATINGS

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Examine all other sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.

C. Coordinate work with that of all trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

A. Work included: Provide labor, materials, and equipment necessary to complete the work of this Section and, without limiting the generality thereof, furnish and include the following:

1. Cleaning and painting the following areas:

a. Columns, beams, drain leaders and miscellaneous steel.

1.03 RELATED SECTIONS

A. Section 05120 – Structural Steel

1.04 QUALITY ASSURANCE:

A. Applicator Qualifications: Engage an experienced applicator who has a minimum of successful years experience with high performance coating systems and their application in renovation.

B Source Limitations: Obtain primers and undercoat materials for each coating system from the same manufacturer as the finish coats.

C Sample: Provide a full coat benchmark finish sample on existing steel member for color approval.

1. Color to match existing.

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2. Final approval of colors will be from sample.

D. Standards: Comply with applicable recommendations made by following:

1. SSPC Painting Manual – eighth edition.

1.05 REFERENCES

A. SSPC-SP 1 - Solvent Cleaning

B. SSPC-SP 2 - Hand Tool Cleaning

C. SSPC-SP 3 - Power Tool Cleaning

D. SSPC-SP 6 – Commercial Blast Cleaning

E. EPA-Method 24

F. OTC-Regulation No. 41

1.06 SUBMITTAL

A. Submit under provisions of Section 01300, Submittal Procedures.

B. Product Data: Manufacturer's data sheets on each paint and coating product should include:

1. Product characteristics

2. Surface preparation instructions and recommendations

3. Primer requirements and finish specification

4. Storage and handling requirements and recommendations

5. Application methods

C. Selection Samples: Submit a complete set of color chips that represent the full range of manufacturer's color samples available.

D. Verification Samples: For each finish product specified, submit samples that represent actual product, color, and sheen.

1.07 MOCKUP

A. Finish surfaces for verification of products, colors, & sheens

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B. Finish area designated by Engineer.

C. Provide samples that designate prime & finish coats

D. Do not proceed with remaining work until the Engineer approves the mock-up samples.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver manufacturer's unopened containers to the work site. Packaging shall bear the manufacturer's name, label, and the following list of information:

1. Product name, and type (description)

2. Application & use instructions

3. Surface preparation

4. VOC content

5. Environmental issues

6. Batch date

7. Color number

B. Storage: Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.Store materials in an area that is within the acceptable temperature range, per manufacturer's instructions. Protect from freezing.

C. Handling: Maintain a clean, dry storage area, to prevent contamination or damage to the coatings.

1.09 WARRANTY

A. Provide 5 year written guarantee that re-painted areas will be free of defects related to workmanship, material, deficiency and exposure.

1.10 PROJECT CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 45 and 95 deg F (7 and 35 deg C). Unless otherwise indicated and warranted by manufacturer.

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B. Do not apply coatings in snow, rain, fog, or mist: when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

C. Post wet paint signs immediately after application and maintain until paint has cured.

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

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. PPG Pittsburgh Paint, www.ppgpaints.com

B. The Sherwin-Williams Company, www.sherwin-williams.com

2.02 SCHEDULE

A. Structural Steel

1. High Gloss Finish

a. 1st Coat: Macropoxy 646 Fast Cure Epoxy by Sherwin Williams or Amerlock Sealer by PPG Pittsburgh Paints

b. 2nd Coat: Macropoxy 646 Fast Cure Epoxy by Sherwin Williams or Amercoat 235 by PPG Pittsburgh Paints

c. 3rd Coat: Hi-Solids Polyurethane by Sherwin Williams or Amercoat 450H Polyurethane Gloss Aliphatic by PPG Pittsburgh Paints

2.03 ACCESSORIES:

A. Coating Application Accessories:

1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required, per manufacturer's specifications.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin application of coatings until substrates have been properly prepared. Notify Engineer of unsatisfactory conditions before proceeding.

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B. If substrate preparation is the responsibility of another installer, notify Engineer of unsatisfactory preparation before proceeding.

C. Proceed with work only after conditions have been corrected, and approved by all parties, otherwise application of coatings will be considered as an acceptance of surface conditions.

3.02 SURFACE PREPARATION

A. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion. Concrete and mortar must be cured at least 30 days at 75 degrees F. The pH of the surface should be between 6 and 9 unless the products are designed to be used in high pH environments.

B. Remove mildew before painting by washing with a solution of 1 part liquid household bleach and 3 parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

C. SSPC-SP6/NACE 3 Commercial Blast Cleaning: Removal of all visible oil, grease, dust, dirt, mill scale, rust, paint oxides, corrosion products and other foreign matter by compressed air nozzle blasting, centrifugal wheels or other specified method. Reference paint manufacturer technical date for required surface profile.

D. No exterior painting should be done immediately after a rain, during foggy weather, when rain is predicted, or when the temperature is below 50°F, unless products are designed specifically for these conditions.

E. Methods:

1. Steel: Smart Strip paint remover by Dumond Chemicals, Inc. (212-869-6350), www.dumondchemicals.com or Engineer approved equal. Follow Manufacturer's requirements for preparation, application, removal, and clean up.

3.03 APPLICATION

A. Prior to paint application, provide a 2 square foot test area at three separate locations as determined by the owner or their representative. Test area to determine compativliity and adhesion between existing surface and new fresh paint. Allow paint to fully cure prior to adhesion testing.

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B. Apply all coatings and materials in accordance with manufacturer s specifications. Mix and thin coatings according to manufacturer's recommendation.

C. Do not apply to wet or damp surfaces.

D. Apply coatings using methods and at rates recommended by manufacturer.

E. Uniformly apply coatings without runs, drips, or sags, without brush marks, and with consistent sheen.

F. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.

G. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

H. Inspection: The coated surface must be inspected and approved by the Engineer just prior to each coat.

3.04 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged coatings after substantial completion, following manufacturer's recommendation for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION