

PROJECT MANUAL AND OUTLINE SPECIFICATIONS
FOR
HCC EAST & WEST GARAGES

Columbia, Maryland

2022 REPAIR AND PREVENTIVE MAINTENANCE

Desman Project No. 30-21127.01

February 15, 2022

Prepared For:

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HCC East & West Garages
Project # 30-21127.01

TABLE OF CONTENTS

DIVISION 00 – List of Drawings

Section Number	Title
00 01 15	List of Drawings

DIVISION 01 - GENERAL REQUIREMENTS

01 10 00	Summary of Work
01 31 00	Project Coordination
01 33 00	Submittals
01 42 00	Reference Standards and Definitions
01 78 00	Project Closeout (Execution and Requirements)
01 78 30	Warranties

DIVISION 2 - EXISTING CONDITIONS

02 41 00	Selective Demolition
----------	----------------------

DIVISION 3 - CONCRETE

03 20 00	Concrete Reinforcement
03 31 24.16	Concrete Repair Using High Strength, Fast Setting Materials
03 37 15.11	Concrete Repairs Using Trowel Applied Materials

DIVISION 05 - METALS

05 50 00	Miscellaneous Metals
----------	----------------------

DIVISION 07 - THERMAL & MOISTURE PROTECTION

07 18 16	Traffic Bearing Waterproofing Membrane
07 92 00	Sealants and Caulking
07 92 23	Pressure Epoxy Injection
07 95 00	Expansion Joint Seals

DIVISION 09 – FINISHES

09 91 00	Painting
----------	----------

END OF SECTION

DIVISION 00

List of Drawings

HCC East & West Garages
 Project # 30-21127.01

SECTION 00 01 15

LIST OF DRAWINGS

The Drawings dated 2/15/2022 and listed below form a part of the Contract.

HCC East Garage

<u>Drawing Number</u>	<u>Title</u>
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T-1	Title Sheet
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West Garage

WG-1	Ground Level Floor Plan
WG-2	Level 2 Floor Plan
WG-3	Level 3 Floor Plan
WG-4	Level 4 Floor Plan
WG-5	Level 5 Floor Plan
WG-6	Level 6 Floor Plan

East Garage

EG-1	Ground Level Floor Plan
EG-2	Level 2 Floor Plan
EG-3	Level 3 Floor Plan
EG-4	Level 4 Floor Plan
EG-5	Level 5 Floor Plan
EG-6	Level 6 Floor Plan
EG-7	Elevations
R-1	Repair Details
R-2	Repair Details
R-3	Repair Details
R-4	Repair Details

END OF SECTION

DIVISION 01

GENERAL REQUIREMENTS

SECTION 01 10 00

SUMMARY OF WORK 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 work of this Section.

1.02 INTENT OF PLANS AND SPECIFICATIONS

- A. The intent of the Plans and Specifications is to describe The Work which the Contractor undertakes to do, in full compliance with the Contract, and it is understood that the Contractor will furnish, unless otherwise provided in the Contract, all materials, machinery, equipment, tools, supplies, transportation, labor, and all other incidentals necessary to the satisfactory prosecution and completion of the Work. The Plans and Specifications are complementary, and what is called for by either is as binding as if called for by both.
- B. The Special Conditions (if applicable) shall control where in conflict with the Standard Specifications. However, such portions of the Standard Specifications not in conflict or not rendered meaningless by the Special provisions shall remain in full force and effect and be binding on the parties hereto.

- C. In the event the Contractor discovers any error or discrepancy in the Contract Documents, he shall immediately call upon the Engineer for his decision. The Engineer shall then make such corrections and interpretations as may be deemed necessary for the fulfillment of the intent of the Specifications, Special Conditions, Plans and other Contract Documents, as construed by him and his decision shall be final.

1.03 SUMMARY OF WORK

- A. General Mobilization: This work consists of all labor, materials, tools and equipment required for setting-up general plant, storage/staging areas and facilities required by State Laws and City Ordinances; and the general mobilization of equipment required for the completion of the work shown on the Contract Documents. The cost of this item shall include all permits and fees required to perform the project, unless otherwise noted in the Contract Documents, and all expenses for the de-mobilization to a 'broom clean or better' condition after the work has been completed. If a building permit is required, it will be the contractor's responsibility to get the necessary permit to perform the repair work, unless noted otherwise in the documents. This work shall also include the following items:

Reviewing existing electrical plans, if available, and existing conditions to identify the locations of conduits/wiring on the soffit slabs. All existing mechanical and electrical services shall be maintained/restored by the Contractor for all work areas.

Provide effective ventilation system to safely remove all dust and hazardous fumes generated from the concrete demolition and any surface treatment applications.

Protection of overhead fire protection system to be maintained in-place, if any.

Protection of existing overhead mechanical and electrical systems, if any, to be maintained in-place.

Removal of loose overhead concrete from the structural concrete members in areas adjoining work locations within the structure prior to the start of any demolition work.

Electricity (power) and water required for the completion of the work shall be furnished by the Owner at existing fixtures or outlets. (The Owner will not provide any temporary pipes, cables, etc.). The contractor shall provide temporary lighting in the work areas, as required, during the restoration work. If the existing capacity is insufficient for the contractor's use, the contractor is responsible for supplementing existing capacity as needed.

B. Concrete Work:

- Precast concrete repairs
- Concrete topping repairs
- Patch deteriorated lift anchor pockets
- Vertical surface concrete repairs
- Connector repairs
- Re-grouting horizontal wall panel joints

C. Moisture Protection:

- Rout and seal concrete slab cracks and construction joints
- Replace joint sealants
- Stair roof replacement
- Replacement of expansion joint
- Installation of new vertical expansion joints
- Epoxy injection
- Membrane repairs
- Stair roof replacement

D. Other Work:

- Railing posts repairs

E. Miscellaneous Items: This work consists of items not otherwise specifically indicated or shown on the plans, but which are ancillary to the specified scope of work. This work shall also include the following:

1. The contractor shall furnish, install, maintain, relocate and remove all signs, barricades, cones, warning lights, and other safety control devices and temporary signage required for the proper execution of the project. The Engineer and the Owner shall review the safety control device placement before work begins and also prior to the beginning of work on any subsequent construction stages. Any deficiencies in the

location or arrangement of devices shall be corrected by the contractor before starting work.

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2. The miscellaneous work shall include documentation of any non-functioning electrical/mechanical systems within work areas prior to contractor's activities. This documentation should be based on the contractor's condition survey performed immediately prior to the scheduled mobilization. The contractor shall not start the mobilization until the Owner approves the submittal.
3. The miscellaneous work shall also include cleaning and repairs to the existing drainage system in work areas of parking structure, as required.
4. The miscellaneous work shall also include the dismantling of any existing mechanical, fire protection and electrical installations in the repair areas in order to perform the overhead repairs to the deck soffit, as required. The temporarily dismantled installations shall be reinstalled immediately after the repairs are completed.

At other locations of repair areas, the contractor shall provide adequate protection systems, as required, for the existing mechanical, plumbing and electrical installations to remain in-place.

5. The miscellaneous work shall include re-striping areas affected by waterproofing membrane installation as reasonably necessary.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION
SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

- A. This Section specifies administrative and procedural requirements for unit prices.
1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials and/or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.
 2. Unit prices include all necessary labor, materials, equipment and incidentals, overhead, profit and applicable taxes.
 3. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- B. Schedule: A "Unit Price Schedule" is included in the Proposal Form and at the end of this Section.
1. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.
 2. Repair Details referenced in the schedule contain requirements for the materials and drawings details described under each unit price.
 3. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 UNIT PRICE SCHEDULE:

- A. Unit prices for all items are as shown in the Bid Forms shall be considered an integral part of this Section.

UNIT PRICES

01 22 00/1

3.02 PAYMENT FOR EXTRA WORK:

- A. Extra work which results from any of the changes as specified and for which no unit price is provided in the Contract, shall not be started until receipt of a written authorization or work order from the Owner, which authorization shall state the items of work to be performed and the method of payment for each item. The Contractor shall not be entitled to payment for work performed without such authorization.
- B. If it is practicable to pay for Extra Work on the unit price, or lump sum basis, a fair and equitable sum shall be fixed by agreement of the parties and shown in an Extra Work Order Agreement. Work to be performed directly by the Contractor should be submitted showing a detailed breakdown of labor and material costs to which a 15 percent markup should be added for overhead and profit.
- C. Work to be performed by the subcontractor should be submitted showing a detailed breakdown of labor and materials by the subcontractor to which a five percent markup should be added by the Contractor for overhead and profit.
- D. When the Owner deems it impracticable to handle any Extra Work on the unit price or lump sum basis, or if agreement of the parties cannot be reached, the work may be ordered done and paid for on a Force Account basis, as follows, unless otherwise stipulated in Owner's front end project documents:
 - 1) Labor: The Contractor will be paid the actual amount of wages for all labor and foremen who are actually engaged in such work, to which cost shall be added 10 percent of the sum of such wages. A foreman shall not be used when there are less than three laborers employed, except with the written consent of the Engineer.
 - 2) Welfare and Pension Fund: The Contractor will receive the actual additional amount of contributions paid for regular and uniform health and welfare benefits, pension fund benefits or other benefits, to which 10 percent shall be added, when such amounts are required by collective bargaining agreement or other employment contract generally applicable to the class of labor employed on the Work.
 - 3) Insurance and Tax: The Contractor will receive the actual cost or increase in cost of Contractor's Public Liability and Property Damage insurance, Workmen's Compensation tax, and Social Security tax required for Force Account work. The Contractor shall furnish satisfactory evidence of the cost or rates paid for such insurance and tax.
 - 4) Materials: The Contractor will receive the actual cost for all materials, including freight charges as shown by the original paid invoices, which become an integral part of the finished work, to which shall be added 10 percent of the sum thereof.

The Contractor will be reimbursed for any materials used in the construction of such work as sheeting, falsework, form lumber, etc., which are not an integral part of the finished work. The amount of reimbursement shall be agreed upon in writing before such work is begun,

and no percent shall be added. The salvage value of such materials shall be taken into consideration in the reimbursement agreed upon.

- 5) Equipment: For any machinery or special equipment (other than small tools), the use of which has been authorized by the Engineer, the Contractor will be paid as following:
- a) For his own equipment, he will be paid by the monthly rate in accordance with the latest edition of Means Construction Cost Data.
 - b) For rental equipment, he will be paid for the actual invoice amount as shown by the original paid invoices.

The equipment shall be of a type and size reasonably required to complete the Extra Work. Compensation will not be allowed for transportation to or from The Work or for the time required for setting up and removing the equipment from The Work or for equipment of a type, size or condition unsuitable for The Work.

3.03 CANCELED ITEMS:

- A. It shall be in the sole judgment and sole discretion of the Engineer or its representatives to cancel or alter any or all portions of the Contract due to circumstances either unknown at the time of bidding or arising after the Contract was entered into. Should such actions result in elimination or non-completion of any portion of the Contract, payment shall be made as follows:
- 1) For the canceled work completed by the Contractor, payment shall be made to the Contractor for the actual number of units or items completed at the Contract unit or lump sum prices. For canceled work partially completed by the Contractor, payment shall be made to the Contractor for the partially completed units or items as specified in Payment for Extra Work.
 - 2) For materials obtained by the Contractor for the unfinished (uncompleted) portions of the canceled work, that have been inspected, tested and accepted by the Engineer, and that have not been incorporated in the canceled work, payment shall be made to the Contractor for the actual costs for all such materials, including freight charges, as shown by the original paid invoices, to which shall be added 10 percent of the sums thereof. The materials, when so paid for by the Owner, shall become the property of the Owner.

3.04 PARTIAL PAYMENTS:

- A. The Engineer shall review the Contractor's pay request for materials in-place and completed, the amount of work performed, and the value thereof, at the Contract Unit Prices. From the amount so determined there shall be deducted ten percent to be retained until after the completion of the entire work to the satisfaction of the Engineer, and the balance certified to the Owner for payment. Notwithstanding the above, after 50 percent or more of the work is completed, the Engineer may certify the remaining partial payments or some of them without

any further retention, provided that satisfactory progress is being made in accordance with the Contract requirements and continues to be made, and provided that the amount retained shall not be less than five percent of the total adjusted Contract Price.

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- B. If stored matter is lost or damaged prior to incorporation in The Work, the materials shall be replaced or satisfactory repaired at the Contractor's expense. Where payment is made for materials in storage and not yet incorporated into The Work, the Contractor shall provide to the Owner, satisfactory evidence of insurance against loss by damage or disappearance. The Contractor shall pay and be responsible for cost of storage, if any, of said materials.

3.05 ADJUSTMENT OF UNIT PRICES BASED ON ACTUAL QUANTITIES PERFORMED:

- A. For unit price bid items, the quantities as listed in the schedule of bid items are estimates only. The Contractor will be required to complete the work specified in accordance with the Contract and at the quoted unit prices, whether quantities greater or less than the estimated amounts are involved. Should the actual quantity of a unit price pay item vary from the original estimate, the following adjustments to the unit prices shall be made:
 - 1) When the actual quantity of a unit price pay item is less than 75 percent of the original bid estimate, the Contract will be paid an amount equal to the actual quantity times the original unit price plus 10 percent of the difference between this amount and the original estimated quantity times the original unit price for that particular item.
 - 2) When the actual quantity of a unit price pay item is greater than 120 percent of the original bid estimate (based upon prior approval to exceed this quantity by the Owner and Engineer) the Contractor will be paid for the actual work performed in excess of the 120 percent of the original bid estimate at an adjusted unit price of 0.90 times the original unit price. The first 120 percent of the bid estimate quantity will be paid at the original unit price.
- B. The foregoing provisions shall be instituted only after it can be accurately determined that the actual contract sum for the project (exclusive of all change orders unrelated to the original scope of work) will be greater than or less than the original contract sum by more than 5 percent. Until such time that this determination can be made, the Contractor will be paid at his base unit price for actual quantities of work performed. No associated adjustments will be made to lump sum items within the original contract sum due to changes in the actual quantities of unit price items and the Contractor shall not be entitled to an adjusted compensation for unit price items that are deleted in their entirety from the actual scope of work performed.

END OF SECTION

SECTION 01 31 00

PROJECT COORDINATION PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY:

- A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Coordination.
2. Administrative and supervisory personnel.
3. General installation provisions.
4. Cleaning and protection.

- B. Requirements for the Contractor's Construction Schedule are included in Section "Submittals".

1.03 COORDINATION:

- A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections of the Specifications that are dependent upon each other for proper installation, connection, and operation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.
2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate Contractors where coordination of their Work is required.

- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

PROJECT COORDINATION

01 31 00/1

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project Close-out activities.

- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

1.04 SUBMITTALS

- A. Coordination Drawings: Prepare and submit coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals."

- B. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other personnel in attendance at the site; identify individuals, their duties and responsibilities; list their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, the temporary field office, and each temporary telephone.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

PROJECT COORDINATION

01 31 00/2

- A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
- B. Manufacturer's Instructions: Comply with manufacturer's installation instructions and recommendations, to the extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.
- C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.
- D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and building movement.
- E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Architect for final decision.
- F. Recheck measurements and dimensions, before starting each installation.
- G. Install each component during weather conditions and project status that will ensure the best possible results. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.
- H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.
- I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Consultant for final decision.

3.02 CLEANING AND PROTECTION

- A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period. Where applicable, such exposures include, but are not limited to, the following:

1. Excessive static or dynamic loading.
2. Excessively high or low temperatures.
3. Air contamination or pollution.
4. Water or ice.
5. Solvents.
6. Chemicals.
7. Puncture.
8. Abrasion.
9. Heavy traffic.
10. Soiling, staining and corrosion.
11. Bacteria.
12. Combustion.
13. Electrical current.

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14. Unusual wear or other misuse.
15. Contact between incompatible materials.
16. Destructive testing.
17. Misalignment.
18. Excessive weathering.
19. Unprotected storage.
20. Improper shipping or handling.
21. Theft.
22. Vandalism.

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 SUMMARY

- A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop Drawings.
5. Product Data.
6. Samples.

- B. Administrative Submittals: Refer to other Division-1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to:

1. Permits.
2. Applications for payment.
3. Performance and payment bonds.
4. Insurance certificates.
5. List of Subcontractors.

- C. The Schedule of Values submittal is included in Section "DGS-30104 Schedule of values and Certificate for Payment, CO-12."

- D. Inspection and test reports are included in Section "Quality Control Services."

1.03 SUBMITTAL PROCEDURES

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

SUBMITTALS

01 33 00/1

- a. The Consultant reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals.
 - a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Consultant will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
 - b. If an intermediate submittal is necessary, process the same as the initial submittal.
 - c. Allow two weeks for reprocessing each submittal.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Consultant sufficiently in advance of the Work to permit processing.
 - B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of Consultant.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 - C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Electronically transmit each submittal from Contractor to Consultant using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

SUBMITTALS

01 33 00/2

1. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
2. Transmittal Form: Use AIA Document G 810.

1.04 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit Work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.
- B. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.
- C. Distribution: Following response to the initial submittal, print and distribute copies to the Consultant, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.
 1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

1.05 SUBMITTAL SCHEDULE

- A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 10 days of the date required for establishment of the Contractor's construction schedule.
 1. Coordinate submittal schedule with the list of subcontracts, schedule of values and the list of products as well as the Contractor's construction schedule.
 2. Prepare the schedule in chronological order; include submittals required during the first 90 days of construction. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category.
 - d. Name of subcontractor.
 - e. Description of the part of the Work covered.
 - f. Scheduled date for re-submittal.
 - g. Scheduled date the Consultant's final release or approval.

- B. Distribution: Following response to initial submittal, distribute copies to the Consultant's, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.
1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.06 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report, recording the following information concerning events at the site; and submit duplicate copies to the Consultant at weekly intervals:
1. List of subcontractors at the site.
 2. Approximate count of personnel at the site.
 3. High and low temperatures, general weather conditions.
 4. Accidents and unusual events.
 5. Meetings and significant decisions.
 6. Stoppages, delays, shortages, losses.
 7. Meter readings and similar recordings.
 8. Emergency procedures.
 9. Orders and requests of governing authorities.
 10. Change Orders received, implemented.
 11. Services connected, disconnected.
 12. Equipment or system tests and start-ups.
 13. Partial Completions, occupancies.
 14. Substantial Completions authorized.

1.07 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:
1. Dimensions.
 2. Identification of products and materials included.
 3. Compliance with specified standards.
 4. Notation of coordination requirements.
 5. Notation of dimensions established by field measurement.

6. Sheet Size: Except for templates, patterns and similar full- size Drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 36" x 48".
 7. Initial Submittal: When possible electronically submit product sheets, MSDS sheets and shop drawings for the Consultant's review; the submittal will be reviewed and returned/distributed in the same manner.
 8. Final Submittal: When possible electronically submit reviewed product sheets, MSDS sheets and shop drawings where required for maintenance manuals and for final distribution.
 9. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.
- C. Coordination drawings are a special type of Shop Drawing that show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or function as intended.
1. Preparation of coordination Drawings is specified in section "Project Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
 2. Submit coordination Drawings for integration of different construction elements. Show sequences and relationships of separate components to avoid conflicts in use of space.
- 1.08 PRODUCT DATA
- A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where Product Data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings."
1. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with recognized trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
 2. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
 3. Preliminary Submittal: Submit a preliminary single-copy of Product Data where selection of options is required.
 4. Submittals: Electronically transmit each submittal where required for maintenance manuals. The Consultant will return submittals marked with action taken and corrections or modifications required.

1. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
5. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
 - a. Do not proceed with installation until an applicable copy of Product Data applicable is in the installer's possession.
 - b. Do not permit use of unmarked copies of Product Data in connection with construction.

1.09 SAMPLES

- A. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.
 1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to match the Consultant's Sample. Include the following:
 - a. Generic description of the Sample.
 - b. Sample source.
 - c. Product name or name of manufacturer.
 - d. Compliance with recognized standards.
 - e. Availability and delivery time.
 2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
 - a. Where variation in color, pattern, texture or other characteristics are inherent in the material or product represented, submit multiple units (not less than 3), that show approximate limits of the variations.
 - b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation and similar construction characteristics.
 - c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
 3. Preliminary submittals: Where Samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit a full set of choices for the material or product.

- a. Preliminary submittals will be reviewed and returned with the Consultant's mark indicating selection and other action.
4. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit for action.
5. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.
 - a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
 - b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
- B. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
 1. Field Samples specified in individual Sections are special types of Samples. Field Samples are full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be judged.
 - a. Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

1.10 ARCHITECT'S ACTION

- A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Consultant will review each submittal, mark to indicate action taken, and return promptly.
 1. Compliance with specified characteristics is the Contractor's responsibility.
- B. Action Stamp: The Consultant will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:
 1. Final Unrestricted Release: Where submittals are marked "Accepted," that part of the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
 2. Final-But-Restricted Release: When submittals are marked "Accepted as Noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Returned for Re-submittal: When submittal is marked "Not Accepted, Revise and Resubmit," do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.
 - a. Do not permit submittals marked "Not Accepted, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.
4. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked "Action Not Required."

PART 2 - PRODUCTS (Not Applicable).

PART 3 - EXECUTION (Not Applicable).

END OF SECTION

SECTION 01 42 00

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

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

1.02 DEFINITIONS:

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. Indicated: The term "indicated" refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- C. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Consultant," "requested by the Consultant," and similar phrases.
- D. Approve: The term "approved," where used in conjunction with the Consultant's action on the Contractor's submittals, applications, and requests, is limited to the Consultant's duties and responsibilities as stated in the Conditions of the Contract.
- E. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."
- I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier for performance of a particular construction activity, including installation, erection, application, and similar

operations. Installers are required to be experienced in the operations they are engaged to perform.

REFERENCE STANDARDS AND DEFINITIONS

01 42 00/1

1. The term "experienced," when used with the term "Installer," means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.
2. Trades: Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades persons of the corresponding generic name.
3. Assignment of Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists must be engaged for those activities, and assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.
 - a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
- J. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- K. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION:

- A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format and MASTER FORMAT numbering system.
- B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
1. Abbreviated Language: Language used in Specifications and other Contract Documents is the abbreviated type. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated shall be interpolated as the sense required. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and the context of the Contract Documents so indicates.
 2. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.
 - a. The words "shall be" shall be included by inference wherever a colon (:) is used within a sentence or phrase.

1.04 INDUSTRY STANDARDS

- A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with the standard in effect as of the date of the Contract Documents.

- C. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Consultant for a decision before proceeding.
1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum, as appropriate for the context of the requirements. Refer uncertainties to the Consultant for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with the Contract Documents.
1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
- E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.
- F. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. The following acronyms or abbreviations, as referenced in Contract Documents, are defined to mean the associated names. Names and addresses are subject to change and are believed to be, but are not assured to be, accurate and up to date as of date of Contract Documents.
- AA Aluminum Association
900 19th St., NW, Suite 300
Washington, DC 20006 (202) 862-5100

AASHTO American Association of State Highway and
Transportation Officials 444 North Capitol St., Suite 225
Washington, DC 20001 (202) 624-5800

ACI American Concrete Institute

P.O. Box 19150
Detroit, MI 48219 (313) 532-2600

ACIL American Council of Independent Laboratories
1725 K St., NW
Washington, DC 20006 (202) 887-5872

AI Asphalt Institute
P.O. Box 14052
Lexington, KY 40512-4052 (606) 288-4960

AIA American Institute of Architects
1735 New York Ave., NW
Washington, DC 20006 (202) 626-7300

AISC American Institute of Steel Construction
One East Wacker Drive Suite 700
Chicago, IL 60601 (312) 670-2400

APA American Plywood Assoc. P.O. Box 11700
Tacoma, WA 98411 (206) 565-6600

ARMA Asphalt Roofing Manufacturers Assoc.
6288 Montrose Rd.
Rockville, MD 20852 (301) 231-9050

ASC Adhesive and Sealant Council
1627 K Street, NW, Suite 1000
Washington, DC 20006 (202) 452-1500

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Blvd., Suite 210
Westlake, CA 91362 (805) 495-7120

ASTM American Society for Testing and Materials
1916 Race St.
Philadelphia, PA 19103 (215) 299-5400
AWS American Welding Society
550 LeJeune Road, NW
P.O. Box 351040
Miami, FL 33135 (305) 443-9353

BANC Brick Association of North Carolina
P.O. Box 13290
Greensboro, NC 27415-3290 (919) 273-5566

BHMA Builders' Hardware Manufacturers Assoc.
355 Lexington Ave., 17th Floor
New York, NY 10017 (212) 661-4261

BIA Brick Institute of America
11490 Commerce Park Drive, Suite 300
Reston, VA 22091 (703) 620-0010

CRSI Concrete Reinforcing Steel Institute 933 Plum Grove Rd.
Schaumburg, IL 60173 (847) 517-1200

EJMA Expansion Joint Manufacturers Assoc.
25 N. Broadway
Tarrytown, NY 10591 (914) 332-0040

HPMA Hardwood Plywood Manufacturers Assoc.
1825 Michael Farraday Drive
P.O. Box 2789
Reston, VA 22090 (703) 435-2900

IEEE Institute of Electrical and Electronic
Engineers 345 E. 47th St.
New York, NY 10017 (212) 705-7900

620 NAPA National Asphalt Pavement Assoc.
Calvert Building, Suite
6811 Kenilworth Ave.

Riverdale, MD 20737 (301) 779-4880

NCMA National Concrete Masonry Assoc.
P.O. Box 781
Herndon, VA 22070 (703) 435-4900

NEC National Electric Code (from NFPA)

NECA National Electrical Contractors Assoc.
7315 Wisconsin Ave.
Bethesda, MD 20814 (301) 657-3110
NFPA National Fire Protection Assoc.
One Batterymarch Park
P.O. Box 9101
Quincy, MA 02269-9101 (617) 770-3000

NPCA National Paint and Coatings Assoc.
1500 Rhode Island Ave., NW
Washington, DC 20005 (202) 462-6272

NRCA National Roofing Contractors Assoc.
One O'Hare Centre
6250 River Road, Suite 8030
Rosemont, IL 60018 (708) 318-6722

PCA Portland Cement Assoc.
5420 Old Orchard Road
Skokie, IL 60077 (847) 966-6200

PCI Prestressed Concrete Institute 175 W. Jackson Blvd.
Chicago, IL 60604 (312) 786-0300

PDI Plumbing and Drainage Institute c/o Sol Baker
1106 W. 77th St., South Dr.

Indianapolis, IN 46260 (317) 251-6970

RMA Rubber Manufacturers Assoc.
1400 K St., NW
Washington DC 20005 (202) 682-4800

Council

SSPC Steel Structures Painting
4400 Fifth Ave.
Pittsburgh, PA 15213 (412) 268-3327

WRI Wire Reinforcement Institute
1760 Reston Parkway, Suite 403
Reston, VA 22090 (703) 790-9790

- G. Federal Government Agencies: Names and titles of federal government standard or Specification producing agencies are often abbreviated. The following acronyms or abbreviations referenced in the Contract Documents indicate names of standard or Specification producing agencies of the federal government. Names and addresses are subject to change but are believed to be, but are not assured to be, accurate and up to date as of the date of the Contract Documents.

CE Corps of Engineers
(U.S. Department of the Army)
Chief of Engineers - Referral
Washington, DC 20314 (202) 272-0660

CFR Code of Federal Regulations
Available from the Government Printing Office
N. Capitol St. between G and H St. NW
Washington, DC 20402 (202) 783-3238

(Material is usually first published in the
"Federal Register")

Commission CPSC Consumer Product Safety
5401 Westbard Ave.
Bethesda, MD 20816 (800) 638-2772

CS Commercial Standard
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 377-2000

DOC Department of Commerce
14th St. and Constitution Ave., NW
Washington, DC 20230 (202) 377-2000

DOT Department of Transportation
400 Seventh St., SW
Washington, DC 20590 (202) 366-4000

EPA Environmental Protection Agency
401 M St., SW
Washington, DC 20460 (202) 382-2090

FAA Federal Aviation Administration
(U.S. Department of Transportation)
800 Independence Ave., SW
Washington, DC 20590 (202) 366-4000

NIST National Institute of Standards and Technology
(U.S. Department of Commerce)
Gaithersburg, MD 20899 (301) 975-2000

OSHA Occupational Safety and Health Administration
(U.S. Department of Labor)
Government Printing Office
Washington, DC 20402 (202) 523-6091

PS Product Standard of NBS
(U.S. Department of Commerce)
Government Printing Office
Washington, DC 20402 (202) 783-3238

1.05 GOVERNING REGULATIONS/AUTHORITIES:

- A. The Consultant has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents. Contact authorities having jurisdiction directly for information and decisions having a bearing on the Work.
- B. Copies of Regulations: Obtain copies of the applicable regulations and retain at the Project Site, available for reference by parties who have a reasonable need for such reference.

1.06 SUBMITTALS:

- A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

END OF SECTION

SECTION 01 78 30

WARRANTIES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY:

- A. This Section specifies general administrative and procedural requirements for warranties required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
 - 1. Refer to the General and/or Special Conditions for terms of the Contractor's special warranty of workmanship and materials.
 - 2. General closeout requirements are included in Section "Project Closeout."
 - 3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, may be included in the individual Sections.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.03 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

1.04 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

01 7

Project # 30-21127.01

- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
 - 1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.05 SUBMITTALS

- A. Submit written warranties to the Consultant prior to the date certified for Substantial Completion. If the Consultant's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Consultant.

1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Consultant within fifteen days of completion of that designated portion of the Work.

- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Consultant for approval prior to final execution.
 1. Refer to individual Sections for specific content requirements, and particular requirements for submittal of special warranties. In general, the Corrective Period for all work will be five (5) years.

- C. Form of Submittal: At Final Completion compile each required warranty properly executed by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

7

- D. A single PDF file of the project warranties are to be included as part of the project close-out documents and shall be distributed to all parties.

- E. If required, bind warranties in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8 1/2" by 11" paper.
 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.

 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES", the Project title or name, and the name of the Contractor.

 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 SCHEDULE OF WARRANTIES

- A. Schedule: Provide a five (5) year labor and material (manufacturers) warranty on products and installations specified.
- B. The General Contractor shall provide an executed Certificate of Five Year Corrective Period (included in the contract documents) for all repairs performed to conform with the specifications in addition to specific warranties for individual products.
- C. At the close of the project the contractor shall submit all as-builts and warranties as directed in the project manual, including a 5-year corrective certificate. It is the Contractors responsibility to meet the requirements and obtain all warranties as specified. Any warranties that cannot be obtained as specified shall be brought to the Owner/Engineers attention prior to bid submission.

END OF SECTION

01 7

DIVISION 02

EXISTING CONDITIONS

SECTION 02 41 00

SELECTIVE DEMOLITION

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.

1.02 SUMMARY

A. DESCRIPTION

1. Furnish labor, materials, equipment and transportation necessary to do all concrete demolition, as shown on drawings and as specified herein, including but not necessarily limited to the following:
 - a. Removal of existing deteriorated concrete as noted on plans or directed by the Engineer.
 - b. Removal of existing vertical and overhead concrete where directed by the Engineer.
 - c. Dust and water control.
 - d. Removal and disposal of all debris.
 - e. Disconnecting and relocating/reinstalling any existing utility lines on the site, which interfere with the repairs.
 - f. Protection of all existing electrical systems, mechanical equipment, light fixtures, overhead piping, fire protection system etc. scheduled to remain.
2. Contractor shall provide barricades with warning lights, enclose the construction area and take all precautions necessary to ensure public and employee safety.
3. All work shall be done in accordance with the requirements of all local and state agencies.

B. QUALITY ASSURANCE

1. Demolition Contractor's Qualifications: Minimum of 5 years- experience on comparable projects.
2. Comply with all pertinent codes and regulations which apply to this type of work and with requirements of insurance carriers providing coverage for this work. Dispose of debris in a legal manner off site daily. Do not allow to accumulate on site.

C. JOB CONDITIONS

1. Dust and Water Control: Contractor shall contain particular debris generated by his work activities from polluting the atmosphere or waterways.
2. On-site burning shall not be permitted.
3. Use all means necessary to protect existing facilities, utilities, and appurtenances within the project areas.

SELECTIVE DEMOLITION

02 41 00/1

1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.
- B. Schedule indicating proposed sequence of operations for selective demolition work to Owner's Representative for review prior to start of work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.
 1. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
 2. Coordinate with Owner's continuing use of portions of existing building and/or with Owner's partial occupancy of completed new addition.
- C. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of work.

1.04 JOB CONDITIONS

- A. Occupancy: Conduct selective demolition work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.
- B. Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.
 1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur prior to start of selective demolition work.

C. Partial Demolition and Removal: Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from site as they are removed.

1. Storage or sale of removed items on site will not be permitted.

D. Protections: Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of Owner's personnel and general public to occupied portions of the project.
2. Erect temporary covered passageways as required by authorities having jurisdiction.
3. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished and adjacent facilities or work to remain.

4. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
 5. Protect floors with suitable coverings when necessary.
 6. Construct temporary insulated dust resistant partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dust resistant doors and security locks.
 7. Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces and installation of new construction to ensure that no water leakage or damage occurs to structure or interior areas of existing building.
 8. Remove protections at completion of work.
- E. Variations and Thicknesses: Existing materials to be removed may vary in thickness and such variations shall be considered by the Contractor in determining means, methods and costs of performing the work of this section. Such variations will not be a basis for changing the value of work performed under this section.
- F. Damages: Promptly repair damages caused to adjacent facilities by demolition work.
- G. Traffic: Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- H. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame-cutting operations. Maintain portable fire suppression devices during flame-cutting operations.
- I. Utility Services: Maintain existing utilities in service and protect them against damage during demolition operations.
1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
 2. Maintain fire protection services during selective demolition operations.

- J. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.
1. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Use appropriate materials and proper equipment to complete the work of this Section. Provide all necessary barricades, warning devices, enclosures, etc. as required to comply with governing safety regulations.

PART 3 - EXECUTION

3.01 PREPARATION

- A. General: Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.
1. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.
 2. Cover and protect equipment, and fixtures from soilage or damage when demolition work is performed in areas where such items have not been removed.
 3. Erect and maintain dust resistant partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.
 - a. Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust resistant partitions of minimum 4-inch studs and ½inch fire-retardant plywood on demolition side.
 - b. Provide weatherproof closures for exterior openings resulting from demolition work.
 4. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.
 - a. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.
 5. No removal of concrete by conventional (mechanical impact) methods shall proceed within the parking deck following concrete placement within the same floor area until 48 hours of curing has elapsed, unless areas are separated by expansion joints or as approved by the Engineer.

3.02 DEMOLITION

- A. General: Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.
1. Demolish concrete in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.
 2. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.
 3. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.
- B. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Consultant written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.03 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from building site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off site.
1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.
 2. Burning of removed materials is not permitted on project site.

3.04 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment, and demolished materials from site. Remove protections and leave interior areas broom clean.
1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION

DIVISION 03

CONCRETE

SECTION 03 20 00

CONCRETE REINFORCEMENT

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.

1.02 DESCRIPTION

- A. Furnish, fabricate and install reinforcement and associated items required or indicated on the drawings for cast-in-place concrete, including, but not necessarily limited to, conventional and epoxy-coated bars, welded wire fabric, ties, and supports.

1.03 WORK SPECIFIED ELSEWHERE

- A. Furnishing and placement of inserts, anchorages, and other embedded items as specified in other sections.

1.04 QUALITY ASSURANCE

- A. Unless otherwise shown or specified, fabrication and placement of all concrete reinforcement and related items shall conform to the following codes and standards:
 1. American Concrete Institute, ACI 318, "Building Code Requirement for Reinforced Concrete."
 2. American Concrete Institute, ACI 315, "Manual of Standard Practice for Detailing Reinforced Concrete Structures."
 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice."

1.05 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with the ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures." Show bar schedule, stirrup spacing, diagrams of bent bars, arrangements and assemblies, for the fabrication and placement of concrete reinforcement.

1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver reinforcement to the Project Site bundled, tagged, and marked. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

Protection: Use all means necessary to protect concrete reinforcement before, during, and after installation and to protect the materials and installed work of all trades. Take all necessary precautions to maintain identification of fabricated bars after bundles are broken.

Storage: Store concrete reinforcement materials at the site to prevent damage and accumulation of dirt or excessive rust. Epoxy-coated reinforcing bars shall be stored on protective cribbing.

Epoxy-coated reinforcing bars: Coating damage due to handling, shipment and placing need not be repaired where the damaged area is 0.1 square inches or smaller; damaged areas larger than 0.1 square inches shall be repaired with Section 2.01 C; the maximum amount of damage including repaired and unrepaired areas shall not exceed 2 percent of the surface area of each bar.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars: ASTM A615, Grade 60, deformed.
- B. Welded Wire Fabric: ASTM A82 and ASTM A185. (EPOXY COATED)
- C. Epoxy-Coated Reinforcing Bars: ASTM A775. When required, damaged epoxy coating shall be repaired with patching material conforming to ASTM A775 and done in accordance with the material manufacturer's recommendations. Reinforcing bars to be coated shall conform to Section 2.01-A.
- D. Bar Supports: Bar supports and spacing of same shall be per recommendations set forth by Chapter 3 of the "CRSI Manual of Standard Practice." Epoxy coated reinforcing bars supported from formwork shall rest on coated wire bar supports, or on bar supports made of dielectric material or other acceptable materials. Wire bar supports shall be coated with dielectric material, compatible with concrete, for a minimum distance of 2 inches from the point of contact with epoxy-coated reinforcing bars. Reinforcing bars used as support bars shall be epoxy-coated.
- E. Tie Wire: Wire shall be 16 gauge or heavier, black-annealed. Epoxy-coated reinforcing bars shall be tied with plastic coated, epoxy coated, or nylon-coated tie wire or other acceptable materials.
- F. For epoxy grouting reinforcing steel use the Hilti "HIT RE 500 System" supplied by Hilti Fastening Systems, "Pure 110+"Dowel Fast" System by Powers Fasteners, or approved equal. Follow manufacturer's directions for installation and required surface preparation.

2.02 FABRICATION

- A. General Requirements: Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication to tolerances complying with CRSI Manual of Standard Practice. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.
- B. Unacceptable Workmanship: Reinforcement with any of the following defects will not be permitted in the work:
 - 1. Bar lengths, depths and bends exceeding specified fabrication tolerances.
 - 2. Bends or kinks not indicated on drawings or final shop drawings.
 - 3. Bars with reduced cross-section due to excessive rusting or other cause.
- C. When epoxy-coated reinforcing bars are cut in the field, the ends of the bars shall be coated with the same material used for repair of coating damage.

PART 3 - EXECUTION

3.01 PLACING REINFORCEMENT

- A. General Requirements:
 - 1. All reinforcing bars shall be placed in accordance with CRSI "Recommended Practice for Placing Reinforcing Bars."
 - 2. Bars shall be placed to the tolerance specified in ACI 318-2011.99.
 - 3. Place all reinforcement according to the approved placement drawings. Use sufficient bar supports, tie anchors, additional reinforcing bars, if required, and other accessories to hold all bars securely in place.
- B. Concrete Coverage: Place reinforcement to obtain the minimum coverage specified on the drawings for concrete protection. Arrange, space, and securely tie bars and bar supports together with 16-gauge wire to hold reinforcement accurately in position during concrete placement operation. Set wire ties so that twisted ends are directed away from exposed concrete surfaces.
- C. Cleaning Reinforcement: Steel reinforcement, at the time concrete is placed around it, shall be free from loose rust and mill scale, oil, grease, paint, earth, ice and all coatings, which would reduce or destroy bond between steel and concrete. Clean reinforcement as necessary prior to, during, or after placement to achieve this result. When bars project from construction joints, all cement mortar clinging to the bars from previous concreting shall be removed before the ensuing enveloping concrete is placed.

3.02 REINFORCING BAR LAP SPLICES

A. New slab reinforcing bars may be spliced to existing bars by lapped splices if adequate lengths of exposed existing bars are available. Provide reinforcement lap splices by placing bars in contact and tying with wire tightly. Comply with the requirements of Engineering Data Report Number 45, 'Tension Development and Lap Splice Lengths of Reinforcing Bars Under ACI 318-08' for minimum required length of bar for lap splices. Alternatively, the contractor can follow the values provided below for lap splice lengths based on the following guidelines:

LAP SPLICE LENGTHS FOR BARS IN TENSION (IN INCHES)

<u>Bar Size</u>	<u>Uncoated Reinforcement</u>	<u>Epoxy-Coated Reinforcement</u>
3	19	22
4	19	28
5	24	35
6	28	42
7	41	61
8	47	70

Note 1. Based on Class B splice = $1.3 l_d$ (l_d = tensile development length)
 Normal weight concrete
 f'_c = 4,000 psi min.
 Grade 60 reinforcement
 Concrete cover = 1.00 in. or greater
 Bars have less than 12 in. concrete cast below them.

Note 2. Lap splice lengths for epoxy-coated steel based on concrete cover equal to or greater than 3 bar diameters and clear spacing between bars equal to or greater than 6 bar diameters.

Note 3. For lightweight aggregate concrete, multiply the tabulated values by 1.3.

- B. Do not make splices at points of maximum stress if possible.
- C. Stagger top splices, and in horizontal wall reinforcement separate at least five feet longitudinally in alternate bars of opposite tiers.
- D. Stubs and dowels required to receive and engage subsequent work shall extend a sufficient length to develop the strength of the bar. Place dowel and stub bars in the forms and secure

against displacement during the placing of concrete. Where stub steel and dowels extend through construction joints in walls, they shall be thoroughly cleaned of adhering particles of concrete, before continuing the placing of any subsequent concrete.

- E. Where splicing length is insufficient either additional concrete removal or mechanical bar splicing shall be implemented at the direction of the Engineer.

3.03 REINFORCING BAR MECHANICAL SPLICES

- A. Bars to be spliced by the mechanical splicing process shall be free of paint, oil, rust, scale or other foreign material. The splice shall be done in accordance with the manufacturer's recommendations which shall be submitted to the Engineer for approval.

The mechanical splice shall meet full tension requirement of 100% of the yield strength (fy). The mechanical splices shall be performed using the Quick Wedge system manufactured by Erico Products, Inc. (800)248-2677, MBT Bar Lock System (800) 755-4888, or approved equal.

Test assemblies shall include the same bars, couplers and anchors. The same equipment shall be used to make these assemblies as to be used on the project.

- B. Unskilled operators must be trained and indoctrinated by an authorized representative of the system manufacturer. Upon satisfactory completion of the training, a certificate will be issued by the system manufacturer to show the splicer's name, badge, number/Social Security Number and date certified.
- C. Test splices should be made on the size, type and grade of rebar to be used in production. If a change of size, type of grade or rebar occurs, new test results should be obtained.

Minimum rebar deformation heights and spacing within the splice must conform to the requirements of ASTM A625, or ASTM A706 as appropriate. If minimum deformation heights and spacing requirements cannot be satisfied, the system's manufacturer may at its option offer and get an approval for alternate splicing procedure to meet the specified splicing strength requirements.

- D. The frequency of test splices shall be as follows:

First Fifty (50) - One Test
Next Fifty (50) - One Test
Thereafter, every one hundred (100) - One Test

The test splice shall be a SISTER SPLICE (removable splice made in-place and in sequence adjacent to production splices by the same operator and under same conditions).

Separate test frequencies are not necessary to horizontal, vertical and diagonal splices.

- E. If any splice used for testing fails to meet the design code strength requirements, two splices in-place shall be cut from the previous lot and tested. If these sister splices fail, the contractor shall at his own expense, test as many splices as directed by the Engineer and re-splice all test and failed splices.

END OF SECTION

SECTION 03 31 24.16

CONCRETE REPAIR USING HIGH STRENGTH, FAST-SETTING MATERIALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE OF WORK

- A. This work shall consist of the removal of existing delaminated concrete and the installation of a fast-setting, high-strength concrete at locations jointly identified by the Contractor with the Engineer and as shown on plans.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The fast-setting concrete repairs must achieve a compressive strength of 3,500 psi or safely accept vehicular traffic within 3 hours of placement.
- B. The concrete shall resist freeze/thaw damage and scaling in compliance with ASTM Test Procedures C-666 and C-672. The products approved under this section shall be:
1. "MasterEmaco T 1060 or 1061" as manufactured by BASF Building Systems (www.buildingsystems.basf.com)
 2. "MasterEmaco T 415 or T 430" as manufactured by BASF Building Systems (www.buildingsystems.basf.com)
 3. "SikaQuick 1000 or 2500" as manufactured by Sika Corporation (www.sikausa.com)
 4. "HP Deck Mix AE" as manufactured by USCP (410-561-8770).

Note: Products related to those above with extended working times may be acceptable at the discretion of the Engineer.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

- A. The exact location of spalled concrete to be repaired will be determined in the field by tapping of slab with a sounding rod, chain drag or hammer. An outline of the area to be repaired will be marked with chalk.
- B. The areas of the spalled concrete to be removed will be outlined by making a sawcut around the perimeter of the spalled area. The nominal depth of sawcut shall be 1/2 inch. Do not, under any circumstances, cut existing reinforcing bars or pre-tensioning strands.
- C. All loose unsound concrete shall be removed with pneumatic or electric jack hammer weighing no more than 15 lbs. Where unsound concrete is below reinforcement, removal to 3/4 inch below reinforcement is required.
- D. All deteriorated reinforcing steel bars which have lost more than 20% (or more) of their cross-sectional areas or selected by the Engineer shall be replaced. New reinforcing steel bars shall be furnished and placed in accordance with Section 03 20 00 of the technical specifications and under the directions of the Engineer.
- E. The deck surface shall be blown clean with compressed air to assure that all loose or hollow concrete is removed. The reinforcing steel shall be sand blasted to remove all rust.

3.02 PLACING, FINISHING AND CURING

- A. Place and properly mixed concrete into the prepared area from one side to the other. Do not place concrete in lifts. Work the material firmly into the bottom and sides of the patch to assure good bond. Do not re-temper or finish material after initial set.
- B. For maximum performance and minimal shrinkage, wet curing shall be performed for a minimum of 3 hours followed by the application of an approved curing compound.

3.03 METHOD OF MEASUREMENT

This work will be measured for payment in square feet. The quantity of repair area will be computed from areas marked by the Contractor and approved by the Engineer.

END OF SECTION

CONCRETE REPAIR USING HIGH STRENGTH, FAST-SETTING MATERIALS

03 31 24.16/2

HCC East & West Garages

Project # 30-21127.01

SECTION 03 37 15.11

CONCRETE REPAIRS USING TROWEL APPLIED MATERIALS

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.

1.02 SCOPE OF WORK:

- A. This work shall consist of the removal of existing unsound concrete to required depth and the installation of a trowel applied, fast-setting cement repair material at locations indicated on drawings and/or at other locations designated by the Engineer.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. The fast-setting polymer repair mortar shall achieve a compressive strength of 5,000 psi in 28 days. The products approved under this section are as follows.
 - 1. "MasterEmaco T310 CI", "MasterEmaco N400 RS or N400" or "MasterEmaco N425" as manufactured by BASF Building Systems (www.buildingsystems.basf.com)

2. "SikaTop-123 Plus or SikaQuick VOH" as manufactured by Sika Corporation (www.sikausa.com)
3. "Verticoat or Verticoat Supreme" as manufactured by the Euclid Chemical Company (www.euclidchemical.com)
4. "CT-40" as manufactured by J.E. Tomes & Associates (www.jetomes.com)
5. "Thin Patch VO" as manufactured by USCP (410) 561-8770.

PART 3 - EXECUTION

3.01 SURFACE PREPARATIONS:

- A. All loose and unsound concrete shall be removed with small chipping hammers. Remove concrete a minimum of 3/4" beyond the reinforcing steel.
- B. The surface shall be blown clean with compressed air to assure that all loose and hollow concrete is removed. The reinforcing steel shall be sandblasted to remove all rust.

CONCRETE REPAIRS USING TROWEL APPLIED MATERIALS

03 37 15.11/1

**HCC East & West Garages
Project # 30-21127.01**

3.02 PLACING, FINISHING AND CURING (Trowel Applied Mortar):

- A. Apply patching material as follows and in accordance with manufacturer's recommendations.
- B. Saturate the surface with water and allow to dry so that there is no standing water and the surface maintains a dark gray color one half hour before placing.
- C. Scratch a base coat firmly into the dampened surface and apply the balance of the patch before base coat is allowed to dry. Consolidate the mortar for density. For deep patches, add recommended filler and apply the material in lifts, allowing it to stiffen enough between lifts to support its own weight. For repairs over 4 inches deep, steel ties shall be provided to aid in weight support. Maximum filler addition to be 1 part filler to 2 parts by volume. The surface shall be troweled and brushed to match surrounding concrete.
- D. The finished patch shall be cured for at least forty-eight hours. Keep damp with water or coat with a water-based curing and sealing compound conforming to ASTM C1315 as recommended by the polymer repair mortar manufacturer.

- E. In hot weather, the surface shall be kept cool by shading. Use cold liquid for mixing. Work material rapidly since heat accelerates set. Cure immediately. In cold weather, do not make repair if temperature is expected to fall below freezing within 48 hours of placing. The patches must be kept at a minimum of 60 degrees F. for seventy-two hours for proper curing.

3.03 TESTING:

- A. The patched areas shall be sounded with a chain drag and/or hammer after 7 days after concrete placement; any hollowness detected shall be corrected by the Contractor by removing and replacing the patch at no extra cost to the Owner.

END OF SECTION

CONCRETE REPAIRS USING TROWEL APPLIED MATERIALS

03 37 15.11/2

DIVISION 05

METALS

SECTION 05 50 00

MISCELLANEOUS METALS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 specification Sections apply to the work of this section.

1.02 DESCRIPTION OF WORK

- A. The extent of Miscellaneous Metal items is typically shown on the drawings or called for in the specifications.

1.03 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to verify and supplement dimensions shown on Repair Drawings, where possible. Do not delay job progress; allow for trimming and fitting wherever taking field measurements before fabrication might delay work.
- B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Materials shall be properly marked and match-marked where field assembly so requires. The sequence of shipment shall be such as to expedite and minimize the field handling of materials.

1.04 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's specifications, anchor details and installation instruction for products to be used in the fabrication of miscellaneous metal work, including painting products.

PART 2 - PRODUCTS

2.01 MATERIALS AND COMPONENTS

- A. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Steel Shapes: ASTM A36 unless noted otherwise.

- C. Steel Bars and Bar-Size Shapes: ASTM A663 or A675, Grade 65, or ASTM A36.
- D. Steel Pipe: ASTM A53, type as selected; Grade A, black finish unless galvanizing is required; standard weight (Schedule 40).
- E. Wedge Inserts: Malleable iron insert with stainless steel askew-head ½” bolts, nuts, washers, and horseshoe shims; by Dayton Superior or Gateway or Hohmann & Bernard.
- F. Concrete Inserts: Threaded type, galvanized ferrous castings, either malleable iron ASTM A47 or cast steel ASTM A27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A153.
- G. Non-shrink Nonferrous Grout: Five-Star Non-Shrink Grout, or approved equal.
- H. All Miscellaneous metal components shall be factory hot-dipped galvanized and any abrasions shall be field corrected.
- I. T Flange Connection: Plates and bars; stainless steel per ASTM A666, Type 304, Grade A36.
- J. Welding Electrodes: Comply with AWS Standards
 - 1. Accessories: Provide clips, hangers, and other accessories required for installation of project units and for support of subsequent construction or finishes.

2.02 FASTENERS

- A. General: Provide zinc-coated fasteners unless otherwise noted. Select fasteners for the type, grade and class required.
- B. Bolts and Nuts: Regular hexagon head type, ASTM A307-86a, Grade A.
- C. Lag Bolts: Square head type, FS FF-B-561C-70.
- D. Machine Screws: Cadmium plated steel, FS FF-S-92B-75B-75.
- E. Plain Washers: Round, carbon steel, FS FF-W-92B-74B-74.
- F. Toggle Bolts: Tumble-wing type, FS FF-B-588C-74, type, class and style as required.
- G. Lock Washers: Helical spring type carbon steel, FS FF-W-84A-69.

2.03 PRIMERS AND PAINT FINISHES – SEE SPEC SECTION 09 90 00 (Where Applicable)

2.04 FABRICATION, GENERAL

A. Workmanship:

1. Use materials of size and thickness shown or, if not shown, of required size and thickness to produce strength and durability in finished product. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.
2. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 inch unless otherwise shown. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
3. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections grind exposed welds smooth and flush to match and blend with adjoining surfaces.
4. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, Phillips flat-head (countersunk) screws or bolts.
 - a. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
 - b. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.

B. Galvanizing:

1. Provide a zinc coating for those items shown or specified to be galvanized, as follows:
 - a. ASTM A153 for galvanizing iron and steel hardware.
 - b. ASTM 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8 thick and heavier.
 - c. ASTM A386 for galvanizing assembled steel products.

C. Shop Painting:

1. Shop paint miscellaneous metal work except surfaces and edges to be field welded and members or portions of members to be embedded in concrete or masonry which are galvanized, unless otherwise specified.
2. Remove scale, rust and other deleterious materials before applying shop coat. Clean in accordance with SSPC SP-3-63 "Power Tool Cleaning" to remove all scale, rust, and foreign matter after first solvent cleaning to remove all oil and grease.
3. Remove oil, grease and similar contaminants in accordance with SSPC SP-1 63 "Solvent Cleaning".

4. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at a rate to provide uniform dry film thickness of 2 to 4 mils for each coat. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
5. Apply one shop coat to fabricated metal items, except apply two coats of paint to surfaces inaccessible after assembly or erection. Change color of second coat to distinguish it from the first.

2.05 MISCELLANEOUS METAL FABRICATIONS

A. Rough Hardware:

1. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel shapes as required.
2. Manufacture or fabricate items of sizes, shapes and dimensions required.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Furnish setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry or similar construction.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut

or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrications, and are intended for bolted or screwed field connections.

- D. Field Welding: Comply with AWS Code for procedures of manual shielded metal arc-welding, appearance and quality of welds made, and methods used in correcting welding work.
 - 1. Protect units from damaged by field welding or cutting operations and provide noncombustible shield as required.
 - 2. Repair damaged metal surfaces by cleaning and applying a coat of liquid galvanizing repair compound to galvanize surfaces and compatible primer to painted surfaces.
- E. Touch-up Painting: Cleaning and touch-up painting of field welds, bolted connections and abraded areas of the shop paint on miscellaneous metal is specified in Section 09 90 00 of these specifications.

END OF SECTION

DIVISION 07

THERMAL & MOISTURE PROTECTION

SECTION 07 18 16

TRAFFIC BEARING WATERPROOFING MEMBRANE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SCOPE OF WORK

This work shall consist of total membrane system removal in patches at concrete repair locations and at debonded/failed membrane areas using approved means, shotblasting (or other approved means of preparation) concrete surfaces, cleaning of existing membrane surfaces and installation of a new thin waterproofing membrane system and/or new top coat as specified and as shown on plans. No substitutions to proposed systems in bid proposals other than the waterproofing membranes specified hereinafter shall be allowed unless approved in writing by the Consultant.

1.03 GENERAL

- A. The work of this Section includes, but is not limited to, full/partial removal of existing membrane as specified, surface preparation, installation of a liquid applied elastomeric membrane system to provide a waterproof, chemical and abrasion resistant non-skid traffic bearing topping. New membrane system must be compatible with existing membrane systems.
- B. Examine existing surfaces and verify existing conditions. Determine acceptability of the concrete and/or existing membrane surfaces and notify, in writing, the General Contractor and the Consultant of acceptance. Verify dimensions as no extras will be allowed for inconsistency in dimensions.
- C. Cleaning and preparation of existing surfaces to receive materials shall be the Contractor's responsibility. Prepare surfaces as specified hereinafter and as recommended by manufacturer of the material selected.
- D. Provide and maintain barricades and traffic control at special coating areas during installation and curing period for vehicular and pedestrian traffic.

1.04 QUALIFICATIONS

- A. Work specified herein shall be performed by and be the responsibility of the Installation Contractor authorized, trained, approved and qualified by the manufacturer of materials used; having necessary equipment and facilities to fulfill requirements of the manufacturer and this section.
- B. Manufacturer Qualifications: Manufacturer shall provide evidence showing that the specified materials have been manufactured by the same source and successfully installed on a yearly basis for a minimum of ten years on projects of similar scope and complexity. Manufacturer to be ISO 9001 certified.
- C. Installer Qualifications: Waterproofing installer shall demonstrate qualifications to perform the work of this Section by submitting the following documentation:
 - 1. Licensing by the waterproofing manufacturer as an applicator of the product to be used in order to provide a warranty as described.
 - 2. List of at least five projects (with reference names and phone numbers) satisfactorily completed under the current company name within the last 3 years, of similar scope and complexity to this project. Previous experience submittal shall correspond to specific membrane system proposed for use by applicator.
 - 3. A minimum of five (5) years in business under the same name.

1.05 SUBMITTALS

- A. Each Bidder shall submit with its Bid a written description of the method proposed to be used for membrane removal, along with the name of the membrane removal subcontractor. Include with the Bid the following information:
 - 1. Description of the equipment to be used, including removal process and equipment manufacturer. Include in description any specialized equipment to be used for slab edges and other difficult access areas.
 - 2. Expected production rate.
 - 3. Description of resulting profile of concrete surface.
 - 4. Provisions for dust and moisture protection at the site.
 - 5. Procedures for disposal of removed material and waste, if any.
- B. Manufacturer's Data: Submit specifications, installation instructions and general recommendations by the manufacturer of fluid applied waterproofing materials. Include manufacturer's certified test data showing compliance with the requirements. Provide copy of license agreement between manufacturer and installer indicating division of warranty responsibility.
- C. Shop Drawings: Submit shop drawings showing large scale details of all edge terminations, joint treatments, penetration or projections and flashing conditions.

- D. Samples: Submit complete samples of each membrane system to be used. Sample shall be applied to plywood or similar rigid material.
- E. As-Built Information: Upon completion of the work and prior to final payment, submit two (2) maintenance manuals identified with the project name, location and date, types of coating systems applied and drawings indicating the types of coating systems and their location in the structure. Include a schematic drawing of each membrane type which clearly identified the successive coats or layers of the membrane system. Identify each coat or layer by dry film thickness or application rate and by manufacturer's reference number or name which specifically identifies the product used for each coat. Include recommendations for routine care and maintenance. Provide list of contractors nearest the project location who are qualified to perform repairs to the membrane. Identify common causes of damage and include instructions for temporary patching until permanent repairs can be made by qualified personnel.
- F. VOC Requirements: Where applicable, the manufacturers shall ensure that all components of specified products do not exceed volatile organic compound (VOC) limits of 400 g/l. Projects in the following locations are affected by this requirement.

Maricopa County (Arizona), California (excluding LA, Orange, San Bernadino and Riverside Counties), Connecticut, Delaware, Illinois, Indiana, Maine, Maryland, Massachusetts, New York, New Jersey, New Hampshire, Ohio, Pennsylvania, Vermont, Rhode Island, Washington DC and Arlington County, Alexandria, Fairfax County, Fairfax, Loudoun County, Falls Church, Prince William County, Manassas, Manassas Park, Stafford County (all northern Virginia).

1.06 DELIVERY AND STORAGE

- A. Deliver materials to project site in sealed, original packages or containers bearing name and brand of manufacturer. Each container shall have manufacturer's printed label. Materials shall be stored in the area designated by the General Contractor or Consultant.
- B. Upon delivery, notify the Consultant. Only materials brought to area and approved may be used.
- C. Store materials in single place designated by Owner and/or Consultant. Keep storage place neat and clean. Cleaning rags and waste materials shall be deposited in metal containers having tight covers or removed from the garage each night. Every precaution shall be taken to avoid danger of fire. Provide dry chemical or CO2 fire extinguishers in areas. Allow no smoking or open containers or solvents. Store solvents in safety cans.
- D. Empty containers used on job shall have labels canceled and shall be marked as to reuse.

1.07 JOB CONDITIONS

- A. A specified coating shall not be applied if weather is too cold, raining, snowing or if any other conditions exist that will not permit proper application or curing of coating. Follow

manufacturer's written directions. Humidity should not deviate from acceptable ranges during application and curing. Protection required for proper installation and curing shall be the responsibility of the Coating Contractor and shall be reflected in Bid.

- B. Protect adjacent surfaces and materials with covering, duct tape and drop cloths as required to keep adjacent surfaces free of coating. Upon completing, remove protection and clean. Surfaces soiled or damaged by special coating shall be cleaned or replaced at no extra cost to Owner.
- C. Proceed with the installation of waterproofing only after the substrate construction has been completed and cured and after penetrating components have been installed, so that the membrane will not be penetrated or damaged by subsequent work.
- D. When payment for elastomeric deck coating is based on area of application, the area used in calculations shall be horizontal surfaces only.

1.08 MEMBRANE REMOVAL METHOD REQUIREMENTS

A. Membrane removal method shall meet the following requirements:

- 1. In patch areas where the full membrane replacement is required, method shall entirely remove existing membrane coating without cracking or causing other damage to the structural slab, and shall not remove more than 1/16" in thickness of existing concrete from the slab top surface.
- 2. Method shall not damage embedded slab drains.
- 3. Method shall leave a surface profile suitable for final cleaning and installation of the new membrane.
- 4. Method shall not utilize chemicals, or scabbling or milling.
- 5. Method shall not heat the existing slab surface to a temperature of more than 140 degree F.

Membrane removal method shall be submitted for Engineer's review.

1.09 MEMBRANE RECOATING REQUIREMENTS

- A. Membrane recoating requirements shall meet the following guidelines for full depth membrane repair:
 - 1. Patch repair existing membrane as required.
 - 2. Visually inspect deck for oil or grease deposits and remove by chemical cleaning with detergents, caustic sodas solutions, or trisodium phosphate. A vigorous scrubbing action should be carried out during the washing procedure. It is important to

thoroughly flush the water to remove all traces of the loosened oil as well as the cleaning solution itself. If any residue remains, it will interfere with the bond of the new membrane.

3. Inspect all surfaces for cracks and cold joints. Cold joints and visible hairline cracks (up to 1/16" in width) in existing membrane or new patching material shall be cleaned, primed (on concrete or patching material) and treated with 5 mils of primer and 30 dry mils of polyurethane deck coating material. Large cracks (over 1/16" in width) shall be routed and sealed with a two component urethane sealant as recommended by the membrane manufacturer. Sealant shall be applied to inside area of crack only, not applied to deck surface. Detail sealed cracks with 30 dry mils of polyurethane deck coating material.
 4. Construction joints between precast members shall be sealed with two component urethane sealant prior to membrane application. Joints between precast members to be detailed per the manufacturer's recommendations.
 5. Apply 5 mils of primer to new concrete or patching material only. Do not apply primer to any elastomeric surface.
 6. Apply polyurethane coating at the rate of 25 dry mils to all patched areas, feathering into the perimeter edge of existing membrane. Do not apply material where it will overflow the patched area and puddle on top of the existing membrane.
 7. Apply top coat at a rate of 140 square feet per gallon to yield 11 mils thickness. Broadcast 20-40 mesh aggregate at a rate of 10 pounds per 100 square feet and backroll.
 8. For heavy traffic areas such as ticket booths, turn areas, ramps, or in other areas subjected to extremely high traffic abrasion, double-texture as follows:
 - a. Apply within 24 hours of base coat application, one gallon per 100 square feet of intermediate wear coarse material to yield an average of 15 dry mils and immediately broadcast 20-40 mesh aggregate to excess and backroll.
 - b. When dry, remove excess aggregate and apply wear course at a rate of 100 square feet per gallon to average of 15 mils. Broadcast 20-40 mesh aggregate at a rate of 10 pounds per 100 square feet and backroll.
 9. Remove debris resulting from completion of coating operation from the project site.
- B. Membrane top coating requirements shall meet the following guidelines over the new and old existing membrane:
1. Prepare the surface by abrading the existing membrane using scrubber pads or other approved method. Powerwash the surface to remove contaminants. Visually inspect

deck for oil or grease deposits and remove by chemical cleaning with detergents, caustic sodas solutions, or trisodium phosphate. A vigorous scrubbing action should be carried out during the washing procedure. It is important to thoroughly flush the water to remove all traces of the loosened oil as well as the cleaning solution itself. If any residue remains, it will interfere with the bond of the new membrane.

2. For overlay over the old existing membrane, apply primer at a rate of approximately 150 square feet per gallon to yield 10 mils thickness. Broadcast 30-70 mesh aggregate to excess and backroll. When dry, remove excess aggregate.
3. For overlay over the new existing membrane, apply primer at a rate of approximately 300 square feet per gallon to yield 5 mils thickness. Broadcast 30-70 mesh aggregate at a rate of 5 pounds per 100 square feet and backroll.
4. The top coat at both new and old existing membrane areas shall be applied at a rate of approximately 100 square feet per gallon to yield 15 mils thickness. Broadcast 20-40 mesh aggregate at a rate of 10 pounds per 100 square feet and backroll.
5. Remove debris resulting from completion of coating operation from the project site.

1.10 QUALITY ASSURANCE FOR MEMBRANE REMOVAL

- A. Contractor or subcontractor performing membrane removal work shall be experienced in the removal of deck coating systems, as evidenced by satisfactory completion, as evidenced by satisfactory completion within the past five (5) years of not less than three projects of comparable scope and complexity to this Project.
- B. Membrane removal procedure shall be located at select locations of the parking structure as determined by the Engineer.
 1. The removal shall be observed by the Owner's Representative, and authorized representative of the membrane manufacturer. The proposed procedure shall be acceptable to Owner's Representative. The membrane manufacturer shall verify, in writing that the surface resulting from the membrane removal procedure will be suitable for installation of membrane system.
 2. If the removal procedure does not meet the requirements of the Contract Documents, Contractor shall make necessary adjustments or modifications of the removal.
 3. Submit removal method to Engineer for approval.
- C. Submit one copy with bid of manufacturer's authorization, experience, previous installations, materials conformance per Paragraph 1.03B and 1.03C herein before. Submit 1 copy of

Warranty specified hereinafter to Engineer prior to final payment. Submit a copy or manufacturer's directions and compatible material conformance when requested by Owner.

1.11 WARRANTY

- A. Materials Manufacturer and Installation Contractor shall be jointly and severally responsible and shall submit an affidavit signed by both parties warranting the installed system for a minimum period of five years from date of final completion. The Installer shall repair or replace membrane which leaks water, deteriorates excessively, wears prematurely or otherwise fails to perform as required within the guarantee period, due to failure of materials or workmanship. The guarantee shall include an agreement to remove and reinstall other work which has been superimposed on elastomeric waterproofing work as required to repair or replace the waterproofing system if known at time of installation.

PART 2 - PRODUCTS

2.01 SOURCE OF MATERIALS

- A. The waterproofing membrane system shall be a complete system of compatible materials, designed by the manufacturer to produce a waterproofing, traffic-bearing and chemical resistance surface. Systems approved for use under this section shall be one of the following:

Standard Applications

Application of systems within this category are designed for stand-alone parking structures and/or other structures where the presence of odors due to solvents contained in the membrane materials are not expected to create a disruption to adjacent businesses, etc. Precautions should be taken during the installation and for a period of approximately one week thereafter to reduce the risk for fire due to the presence of solvents.

1. "Auto-Gard" as manufactured by Neogard (www.neogard.com).

The system consists of the following:

Epoxy Primer

Product: 7780/7781

WMT: NA

DMT: NA

Base Coat

Product: 70410

WMT: 25

DMT: 20

Wear Coat

Product: 7400

Aggregate Broadcast: 10-15 lbs/100 sf (12/20 Sieve Size)
WMT: 10
DMT: 8

Double Texture Coat
Product: 7400
Aggregate Broadcast: 10-15 lbs/100 sf (12/20 Sieve Size)
WMT: 15
DMT: 12

Lock Coat
Product: 7400
WMT: 15
DMT: 12

Total DMT: 52 (double texture)

This system consists of an epoxy primer applied to the cleaned concrete surface more than 24 hours prior to base coat application. When cured apply 70410 urethane base coat. When cured apply 7400 urethane wear coat and broadcast aggregate. When cured apply 7400 urethane double texture coat and broadcast aggregate. When cured apply 7400 urethane lock coat.

2. "Iso-Flex 780/750 Coating System," as manufactured by Lym-Tal (www.lymtal.com).

The system consists of the following:

Epoxy Primer
Product: 757 Primer
WMT: NA
DMT: NA

Base Coat
Product: 780 Basecoat
WMT: 23 mils
DMT: 20 mils

Wear Coat
Product: 780IC
Aggregate Loading: 15-20 lbs/100 sf (12/20 Sieve Size)
WMT: 21 mils
DMT: 18 mils

Lock Coat
Product: 750TCAR (no UV exposure) or 750 TCAL (UV exposure)
WMT: 15 mils

DMT: 12 mils

Total DMT: 50

This system consists of an epoxy primer applied to the cleaned concrete surface no more than 24 hours prior to base coat application. When cured apply 780 Basecoat. When cured apply 780IC urethane wear coat and broadcast aggregate. When cured apply 750 TCAR (no UV exposure) or 750 TCAL (UV exposure) urethane lock coat.

3. "MasterSeal Traffic 1500," as manufactured by BASF Building Systems (www.buildingsystems.basf.com).

The system consists of the following:

Epoxy Primer

Product: MasterSeal P 255

WMT: NA

DMT: NA

Base Coat

Product: MasterSeal M 200

WMT: 25

DMT: 20

Wear Coat

Product: MasterSeal TC 225

Aggregate Broadcast: 40 lbs/100 sf (12/20 Sieve Size)

WMT: 25

DMT: 20

Lock Coat

Product: MasterSeal TC 225

WMT: 20

DMT: 15

Total DMT: 55

This system consists of an epoxy primer applied to the cleaned concrete surface less than 24 hours prior to base coat application. When cured apply MasterSeal M 200. When cured apply MasterSeal TC 225 and broadcast aggregate. When cured apply MasterSeal TC 225.

4. "Sikalastic 710/715", as manufactured by Sika Corporation (www.sikausa.com).

The system consists of the following:

Epoxy Primer
Product: Sikafloor FTP
WMT: NA
DMT: NA

Base Coat
Product: Sikalastic 710
WMT: 32
DMT: 23

Wear Coat
Product: Sikalastic 715
Aggregate Broadcast: 10-15 lbs/100 sf (12/20 Sieve Size)
WMT: 11
DMT: 8

Double Texture Coat
Product: Sikalastic 715
Aggregate Broadcast: 10-15/100 sf (12/20 Sieve Size)
WMT: 16
DMT: 12

Lock Coat
Product: Sikalastic 715
WMT: 16
DMT: 12

Total DMT: 55 (double texture)

This system consists of an epoxy primer applied to the cleaned concrete surface for no more than 24 hours prior to base coat application. When cured apply Sikalastic 710 urethane base coat. When cured apply Sikalastic 715 urethane wear coat and broadcast aggregate. When cured apply Sikalastic 715 urethane double texture coat and broadcast aggregate. When cured apply Sikalastic 715 urethane lock coat.

5. "Qualideck Coating System," as manufactured by APT (www.advpolytech.com).

The system consists of the following:

Epoxy Primer

Product: Qualipur 102 Primer

WMT: NA

DMT: NA

Base Coat

Product: 252 Basecoat

WMT: 20

DMT: 20

Wear Coat

Product: 372

Aggregate Loading: 15-20 lbs/100 sf (12/20 Sieve Size)

WMT: 15

DMT: 15

Lock Coat

Product: 372 (no UV exposure) or 512 (UV exposure)

WMT: 15

DMT: 15

Total DMT: 50

This system consists of an epoxy primer applied to the cleaned concrete surface no more than 24 hours prior to base coat application. When cured apply 252 Basecoat. When cured apply 372 urethane wear coat and broadcast aggregate. When cured apply 372 (no UV exposure) or 512 (UV exposure) urethane lock coat.

B. WATERPROOFING MEMBRANE (Base Coat)

- (1) The base coat (membrane) shall meet the following minimum performance criteria:

(a) Minimum Tensile Strength (ASTM D412):

Base Coat - 1,000 psi

Top Coat - 2,000 psi

(b) Minimum Elongation (ASTM D412):

Base Coat - 350%

(c) Minimum Adhesion – one of the following:

ASTM D903: Base Coat - 20 psi

ASTM C794: Base Coat – 25 psi

ASTM D4541: Base Coat – 250 psi

ACI 503: Failure occurs in concrete when $f_c < 6000$ psi

(d) A light application of primer compatible with the elastomeric seal coat shall be applied onto the clean, dry concrete surface. The elastomeric coating shall be applied uniformly to the primed surface. The elastomeric base coat shall be applied in strict accordance with manufacturer's requirements for the system and verified by wet mil thickness testing (minimum one test per 500 square feet). The coating shall be allowed to cure adequately. Special treatment shall be provided at all construction joints, cove joints and at all cracks over 1/16" in width. This special treatment shall be included in the bid price for the waterproofing membrane installation. The coating shall also be applied at base of columns, walls and curbs to produce a 4" minimum high base.

(2) Minimum System Thickness (Dry Mils): As herein specified or 20 mils, whichever is greater

C. WEARING COURSE

- (1) A compatible wearing course shall be applied over the base coat in accordance with the manufacturer's instructions. A selected aggregate shall be broadcast evenly over the surface and fall on the surface in vertical direction so as not to displace uncovered coating. **The aggregate shall be 12/20 mesh sand approved by the Engineer and broadcast evenly over the surface, unless noted otherwise.**
- (2) A compatible second wearing course, when specified herein, shall be applied over the base coat in accordance with the manufacturer's instructions. A selected aggregate shall be broadcast evenly over the surface and fall on the surface in vertical direction so as not to displace uncovered coating. **The aggregate shall be 12/20 mesh sand approved by the Engineer and broadcast evenly over the surface, unless noted otherwise.**
- (3) Aggregates should be spread to an excess thickness until surface appears dry. After the coating has sufficiently cured, the excess aggregates shall be removed and the tie coat shall be applied to the surface.

D. LEVELING COURSE (IF REQUIRED)

- (1) A compatible leveling course shall be applied directly onto the concrete surface after cleaning and prior to application of the primer. The leveling course is intended to fill and smooth pop-outs, scaling, depressions and pitting in the concrete surface due to abrasion, finishing problems or other existing conditions. Products listed below should be confirmed with the manufacturer's instructions.

Neogard:

Leveling of the concrete surface prior to membrane system application in order to achieve a suitable substrate shall be performed using a Neogard 70714/70715-09 epoxy and sand mixture or FC base coat, depending on profile of concrete.

Lym-Tal:

Leveling of the concrete surface prior to membrane system application in order to achieve a suitable substrate shall be performed using Iso-Flex 750 base coat extended with sand.

MasterSeal:

Leveling of the concrete surface prior to membrane system application in order to achieve a suitable substrate shall be performed using MasterSeal 350 two component, fast-setting 100% solids epoxy, extended with sand as needed.

Sika:

Leveling of the concrete surface prior to membrane system application in order to achieve a suitable substrate shall be performed using either the Sikalastic 720 base coat with a mixture of sand, or by using the Sikadur 21 Lo-Mod with a mixture of sand as needed.

APT:

Leveling of the concrete surface prior to membrane system application in order to achieve a suitable substrate shall be performed using 152 Urethane Primer extended with sand.

PART 3 - EXECUTION

3.01 QUALITY CONTROL TESTING

A. General:

1. The Contractor will employ and pay for a testing laboratory to perform tests and to submit test reports.

2. All testing shall be performed by a qualified independent testing agency, which shall be submitted to the Engineer/Owner for approval.
3. All test reports shall include date, time, and existing site conditions (temperature, rain, fog, cloudy, etc.). All reports are to be submitted to the Engineer/Owner and manufacturer within one working day.
4. At the preconstruction meeting, a representative from an approved Testing Agency and a representative from the manufacturer must be present. During this meeting the scope of the testing program will be discussed.
5. Any test results that do not meet the specified requirements are to be reported immediately to the contractor. Immediate actions shall be taken by the contractor to address the non-compliant test result to insure that the system installed is as specified.

B. Mil Thickness Readings

1. Wet Mil thickness readings shall be taken during the installation of the pre-primer (if required), primer, basecoat, wear course, additional wear course, lock coat, etc. One reading shall be performed per 1,000 s.f. and recorded. Test results recorded shall include material being measured (primer, basecoat, etc.), measured thickness, location (column lines, level, etc.). Test results are to be directly forwarded to the Engineer/Owner and manufacturer within one working day.
2. Dry Mil thickness reading shall be taken between 2 to 3 days after the completion of the installation of the entire system. A minimum of one test shall be performed per 10,000 s.f. of slab area or per the manufacturer's recommendation. For sampling locations, testing agency will be required to install coupons (duct tape) on deck prior to installation of waterproofing membrane allowing a piece to extend above the finished surface. Once system is fully cured, each location shall be cut out and sent to lab for evaluation. Test results recorded shall include measured thickness and location (column lines, level, etc.). All sampling areas shall be repaired by contractor and shall receive entire waterproofing system.

C. A manufacturer's representative shall be required to visit the site at least once per week during the installation process to inspect and evaluate surface preparation, material storage, installation procedures, testing, overall workmanship, etc. and any other factor(s) influencing the quality of the installation. A field report shall be issued and submitted to the Engineer/Owner summarizing the visit.

D. Additional Tests: The testing service will make additional tests at no cost to the Engineer/Owner when test results indicate specified characteristics have not been attained, as directed by the Engineer. Testing service may conduct tests to determine DMT, proper adhesion (to both the substrate and/or intermediate coats), chemical

composition of individual components (primer, basecoat, topcoat), or other methods as directed. Contractor shall pay for such tests.

3.02 CONDITION OF SUBSTRATE

A. Examine the substrate and the conditions under which the elastomeric waterproofing work is to be applied. Do not proceed with the work until unsatisfactory conditions have been corrected and approved by the manufacturer's representative.

(1) Installation of products constitutes Installers and Manufacturer's acceptance of existing construction.

3.03 PREPARATION OF SUBSTRATE

A. Clean the substrate of protrusions, dust, debris, oily materials and other substances detrimental to the work, as recommended by the waterproofing system's manufacturer.

(1) Shot blast horizontal surfaces to remove contaminants and to provide a clean uniform textured surface. Any other proposed cleaning methods must be submitted and approved by the Engineer.

(2) Clean vertical surfaces of column bases, spandrels, walls, protrusions, etc., to provide a clean uniform textured surface.

B. Install cant strips and similar accessories as shown and as recommended by the waterproofing manufacturer (even though not shown) in the manner recommended by the manufacturer.

3.04 FLASHINGS, PRIMERS AND JOINT CONTROL

A. Cracks/Construction Joints: At locations of possible movement in the substrate construction, including cracks which have developed and construction joints, prepare the substrate to increase the fluid applied waterproofing capability for bridging the movement without failure. Use only products which have been determined to be compatible with the elastomeric waterproofing.

B. Fill voids and non-moving cracks and joints in the substrate with sealant or other compounds as recommended by the waterproofing manufacturer for compatibility. Fill rough areas of substrate (rough within limitations specified by the manufacturer) with a feathered-out coating of elastomeric waterproofing, squeegee-applied to form a smooth top surface.

C. Prime substrate as recommended by the waterproofing system's manufacturer.

D. Mask off adjoining surfaces not to receive fluid applied waterproofing, to effectively prevent the spillage or migration of materials outside the membrane area.

3.05 INSTALLATION

- A. Manufacturer's Technical Representative: Start the installation of elastomeric waterproofing membrane, only in the presence and with the advice of the manufacturer's technical representative. A series of four (4) wet mill gauge tests shall be conducted for every 1000 sq. ft. on the first day of installation in the presence of the representative to ensure proper coverage rate.
- B. General: Comply with manufacturer's instruction, except where more stringent requirements are shown or specified, and except where project conditions require extra precautions or provisions to ensure satisfactory performance of the work.
- C. Mix separately packaged components in accordance with manufacturer's instructions.
- D. Apply the elastomeric membrane to the primed deck within the time specified by the manufacturer.
- E. Apply a uniform coating of cold applied elastomeric waterproofing to the substrate and adjoining surfaces indicated to receive the membrane.
 - (1) Apply coating by hand, complying with manufacturer's recommendations regarding horizontal and vertical surfaces.
 - (2) Provide waterproof membrane at base of columns, spandrels, to produce a 4" minimum high base. Curb surfaces shall be considered floors and waterproofed unless otherwise noted.
- F. Wearing Surface: Apply top coat in one or two applications to achieve the specified dry film thicknesses.
 - (1) While coating is still fluid, uniformly broadcast aggregate over the surface at the rate specified.
 - (2) After top coat has cured, remove all excess aggregate from the deck surface.
 - (3) Apply a tie coat to the cured surface to encapsulate the top layer of aggregate.
- G. Permit cold applied membrane to cure without delay, and under conditions which will not contaminate or deteriorate the fluid applied waterproofing material. Block off traffic and protect membrane from physical damage.

3.06 CLEAN-UP

- A. Upon completion of work, carefully examine entire installation. Correct all defective or damaged work.

- B. Upon completion, or at such other times as directed, remove all surplus materials, cartons, rubbish and debris resulting from these operations and legally dispose of off-site.

3.07 PERFORMANCE REQUIREMENTS

- A. It is required that traffic topping be watertight and not deteriorate excessively under normal weather exposure and for normal traffic conditions in applications indicated, not under manufacturer-recommended cleaning procedures, for period of warranty.
- B. It is required that traffic topping work not deteriorate under spillage of motor oil, transmission fluids, and other motor vehicle operating compounds, nor for exposure to normal ice/snow melting substances not specifically excluded by manufacturer's product information.

3.08 PROTECTION

- A. Provide protection to ensure that work will be without damage or deteriorations at time of final acceptance.

END OF SECTION

SECTION 07 92 00

SEALANTS AND CAULKING 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.

1.02 DESCRIPTION OF WORK:

- A. Sealing and caulking of floor cracks, construction and/or control joints and cove joints in the areas shown on drawings or designated by the Consultant. In the case of repair of existing cracks/joints which are sealed or filled with other materials, the existing sealant material shall be raked out and the exposed concrete cleaned by sandblasting or grinding at those locations designated for repair. The sealant shall be compatible with any specified waterproofing membrane base coat material.
- B. Removal of all existing sealants throughout the building façade and installing silicone sealants.

1.03 QUALITY ASSURANCE

- A. Obtain elastomeric materials from only manufacturers who will, if required, send a qualified technical representative to project site, for the purpose of advising the installer of proper procedures and precautions for the use of the materials.
- B. The Contractor shall have a minimum of three years of experience in performing work similar to that shown in the drawings and specifications.
- C. The Contractor shall submit a list of five projects in which similar work to that specified hereinbefore was successfully completed. The list shall contain the following for each of the five projects:
 - 1. Project Name
 - 2. Owner of Project
 - 3. Owner's Representative, Address and Telephone Number
 - 4. Brief Description of Work
 - 5. Cost of Portion of Work Similar to that Specified in this Section
 - 6. Total Restoration Cost of Project
 - 7. Date of Completion of Work

The sum of the costs of the five projects provided shall be a minimum of \$50,000.

- D. A full time on-site supervisor shall be provided by the contractor for the duration of the sealant and caulking work. This supervisor shall have had a minimum of 2 years documented supervisory experience with the products to be used.

1.04 SUBMITTALS

- A. Manufacturer's Data: Submit manufacturer's specifications, recommendations and installation instructions for sealant, caulking compound and associated miscellaneous material required. Include manufacturer's published data, or letter of certification, or certified test laboratory report indicating that each material complies with the requirements and is intended generally for the applications shown.
- B. Samples: Submit color samples of caulking from which the Owner will select color.

1.05 JOB CONDITIONS

- A. Examine all surfaces to receive work of this Section and report to the Architect any condition which is not acceptable. Commencement of work on any continuous run constitutes acceptance of conditions and places the responsibility of a sound installation on this section.
- B. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength. Wherever joint width is affected by ambient temperature variations, install elastomeric sealants only when temperatures are in the lower third of manufacturer's recommended installation temperature range, so that sealant will not be subjected to excessive elongation and bond stress at subsequent low temperatures. Coordinate time schedule to avoid delay of project.

1.06 DELIVERY AND STORAGE

- A. Materials shall be delivered and stored in original, unopened manufacturer's containers with brand marked clearly thereon. Materials shall be stored in a dry location, protected from adverse conditions.

1.07 SPECIAL PROJECT WARRANTY

A. System manufacturer will have the full responsibility for: (1) Instructing the Contractor on the required configuration of joints and (2) Reviewing and approving tooled joints constructed as a part of surface preparation prior to installing the sealant.

B. The Contractor shall provide a single source performance guarantee that the joint system repaired, including related work in the slab/facade installed by the Contractor, will achieve airtight or watertight seal, will not fail in adhesion, cohesion, will maintain color stability, will maintain bond and not stain. Provide copy of actual warranty to be provided at the completion of the work and a letter from manufacturer indicating their intent to issue warranty for referenced project. The warranty period will be as follows, from the date of acceptance by the Owner.

1. For urethane sealants the warranty will be for a five year period

2. For hybrid sealants the warranty will be for a ten year period
3. For silicone sealants the warranty will be for a twenty year period

D. Should defects in materials or workmanship be discovered within the warranty period, make satisfactory repairs thereto promptly without additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. The joint sealant to be used for cracks and construction joints shall be two component polyurethane sealants of the chemically curing type containing no asphalt, coal tar, or plasticizers. The sealant shall be used with a compatible primer specified by the manufacturer. Approved products for use are:

1. "MasterSeal-SL-2" as manufactured by BASF Building Systems
(www.buildingsystems.basf.com)
2. "Vulkem 45SSL (with catalyst) or THC-900" as manufactured by Tremco 800-3217906
3. "Iso-Flex 880GB Sealant" as manufactured by LymTal International, Inc. 800-3738100
4. "Sikaflex-2C-SL," as manufactured by Sika Corporation 800-933-SIKA

B. The sealant to be used shall meet or exceed the requirements of Interim Federal Specification TT-S0027-E, Sealants Class A, Type 1 and 2. The sealant shall not de-bond or fail while elongated 25 percent in a water immersion test, according to Federal Specification TT-S-0027-E. When tested according to Paragraph 4.3.5. of Federal Specification TT-S-0027E, weight loss shall not be greater than 5 percent. Shore A hardness under standard conditions shall be 25-30.

C. The cove sealant to be used shall be a non-sag, two component polyurethane sealants of the chemically curing type containing no asphalt, coal tar, or plasticizers. The cove joint sealant shall comply with Federal Specification TT-S-00227E, Type II, Class A, Corporation of Consultants CRD-C-506-72; ASTM C-920-79, Type M, Grade NS, Class 25.

Approved Cove Sealants are as follows:

1. "MasterSeal-NP-2" as manufactured by BASF Building Systems
(www.buildingsystems.basf.com)
2. "Dymeric 240FC" or "THC-901" as manufactured by Tremco 800-321-7906

3. "Iso-Flex 881 NS Sealant" as manufactured by LymTal International, Inc. 810-3738100
 4. "Sikaflex-2C-NS," as manufactured by Sika Corporation 800-933-SIKA
- D. The joint sealant to be used on the exterior, vertical control joints shall be a one-part, fast curing, non-sag, silyl-terminated polyether elastomeric sealant. If necessary, the sealant shall be used with a compatible primer specified by the manufacturer. Approved products for use are:
1. "MasterSeal-NP-150" as manufactured by BASF Building Systems
(www.buildingsystems.basf.com)
 2. "Iso-Flex 825" as manufactured by LymTal International, Inc. (www.lymtal.com)
 3. "Dymonic FC" as manufactured by Tremco (www.tremcosealants.com).

Note: Color selection shall be by the **Owner** from standard choices available.

- E. The joint sealant to be used throughout the **building façade** shall be a silicone rubber sealant.
1. ASTM C920, Type S, Class 25, Grade NS mold and mildew resistant type sealant.
 2. Approved silicone sealants must provide the required 20 year warranty.
 3. Products offered by manufacturers to comply with the requirements include the following:
 - a. Pecora
 - b. Tremco
 - c. General Electric
 - d. Dow

Note: Color selection shall be by the Owner from standard choices available.

- F. The manufacturer of the sealant system used in this project shall share responsibility for all sealant work and joint preparation.

2.02 PRIMER AND FILLERS

- A. Joint Cleaner: Provide the type of joint cleaning compound recommended by the sealant or caulking compound manufacturer, for the joint surfaces to be cleaned.
- B. Joint Primer/Sealer: Provide the type joint primer/sealer recommended by the sealant manufacturer, for the joint surfaces to be primed or sealed.

- C. Bond Breaker Tape: Polyethylene tape or other plastic tape as recommended by the sealant manufacturer, to be applied to sealant-contact surfaces where bond to the substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape wherever applicable.
- D. Sealant Backer Rod: Compressible rod stock polyethylene foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other flexible, permanent, durable non-absorptive material as recommended for compatibility with sealant by the sealant manufacturer. Provide size and shape of rod which will control the joint depth for sealant placement, break bond of sealant at bottom of joint, form optimum shape of sealant bead on back side, and provide a highly compressible backer to minimize the possibility of sealant extrusion when joint is compressed.

2.03 CELLULAR FOAM EXPANSION JOINT FILLERS

A. Expanded Polyethylene Joint Filler:

1. Provide flexible, compressible, closed-cell polyethylene of not less than 10 psi compression deflection (25%); except provide higher compression deflection strength as may be necessary to withstand installation forces and provide proper support for sealants; surface water absorption of not more than 0.1 lbs. per sq. ft.
2. Products offered by manufactured to comply with the requirements include the following:
 - a. Ethafoam SB; Dow Chemical Co.
 - b. Sonofoam; Sonneborn Building Products.
 - c. Expand-O-Foam; Williams Products, Inc.

2.04 CONCRETE CONTROL-EXPANSION JOINT FILLERS

A. Bituminous and Fiber Joint Filler:

1. Provide resilient and non-extruding type premolded bituminous impregnated fiberboard units complying with ASTM D1751-73 (78), FS HH-F-341-F-77, Type I and AASHTO M213-74.
2. Products offered by manufacturers to comply with the requirements include the following:
 - a. Flexcell; Celotex Corporation
 - b. Cane Fiber 1290; W. R. Grace & Co.
 - c. Fibre; W. R. Meadows, Inc.

PART 3 - EXECUTION

3.01 CAULKING/SEALANT APPLICATION

A. Joint Surface Preparation: Clean joint surfaces immediately before installation of sealant or caulking compound. Remove dirt, insecure coatings, moisture and other substances which would interfere with bond of sealant or caulking compound.

1. For elastomeric sealants, do not proceed with installation of sealant over joint surfaces which have been painted, lacquered, waterproofed or treated with water repellent or other treatment or coating unless a laboratory test for durability (adhesion), in compliance with Paragraph 4.3.9 of FS TT-S-00227E-70 has successfully demonstrated that sealant bond is not impaired by the coating or treatment. If laboratory test has not been performed, or shows bond interference, remove coating or treatment from joint surfaces before installing sealant.
2. Etch concrete and masonry joint surfaces to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance.

B. Typical Surface Preparation for Slab:

1. The Contractor shall either grind the surface of all cracks and construction joints designated for repair with sealant to the shape of 1/2" x 1/2" v-groove, or sawcut a square 1/2" x 1/2" groove, grind sharp corner of groove and apply bond breaker to bottom horizontal surface. Edges of cracks or joints to be sealed shall be of sound concrete. Prior to installing sealant, surfaces shall be cleaned of foreign materials and debris, Vgroove ground and primed.

C. Installation: Comply with sealant manufacturer's printed instructions except where more stringent requirements are shown or specified and except where manufacturer's technical representative directs otherwise.

1. Prime or seal the joint surfaces wherever shown or recommended by the sealant manufacturer. Do not allow primer/sealer to spill or migrate onto adjoining surfaces.
2. Install sealant backer rod for liquid elastomeric sealants, except where recommended to be omitted by sealant manufacturer for the application shown.
3. Install bond breaker tape wherever required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.
4. Employ only proven installation techniques, which will ensure that sealants will be deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of the joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and a vertical surface, fill joint to form a slight Cove so that joint will not trap moisture and dirt.
5. Install sealants to depths as recommended by the sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead.

- a. For sealed with elastomeric sealants and subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, but not more than 5/8 inch deep or less than 3/8 inch deep.
 - b. For normal moving joints sealed with elastomeric sealants, but not subject to traffic, fill joints to a depth equal to 50% of joint width, but not more than 1/2 inch deep or less than 1/4 inch deep.
6. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces. Use masking tape or other precautionary devices to prevent staining of adjoining surfaces, by either the primer/sealer or the sealant/caulking compound.
 7. Remove excess and spillage of compounds promptly as the work progresses. Clean the adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage, without damage to the adjoining surfaces or finishes.

D. Cure and Protection:

1. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations to obtain high early bond strength, internal cohesive strength and surface durability.
2. Provide all procedures required for the protection of sealants and caulking compounds during the construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at the time of acceptance.

3.02 JOINT FILLERS

- A. Set units at proper depth or position in the joint to coordinate with other work, including the installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.

3.03 RECORD OF SEALED CRACK AND JOINT LOCATIONS AND TYPES:

- A. After determining the cracks and joints to be sealed and the detail types required, the Contractor shall prepare scale shop drawings showing the sealed crack and/or joint locations and submit them to the Consultant for his approval. The Shop Drawings submitted shall be reviewed by the Consultant for the condition of the existing cracks/joints, the size/shape of the routed crack, and the type of detail selected.
- B. The Shop Drawings submitted shall be used as a record of the detail types used and the measured number of linear feet of each sealed crack. Quantities of work done on a unit price

basis shall be recorded on the document and submitted to the Consultant with Request for Payment.

END OF SECTION

SECTION 07 92 23

PRESSURE EPOXY INJECTION 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.

1.02 DESCRIPTION

- A. The Contractor shall provide all necessary materials, equipment, and labor required to epoxy inject cracks at locations shown on drawings or as directed by the Consultant.

1.03 APPLICATOR QUALIFICATIONS

- A. The Contractor shall have a minimum of three years of experience performing work similar to that shown in the drawings and specifications.

- B. The Contractor shall submit a list of five projects in which similar work to that specified herein was successfully completed. The list shall contain the following for each of the five projects:

1. Project Name
2. Owner of Project
3. Owner's Representative, Address and Telephone Number
4. Brief Description of Work
5. Cost of Portion of Work Similar to that specified in this Section
6. Total Restoration Cost of Project
7. Date of Completion of Work

- C. The sum of the costs of the five projects provided in B.5 above shall be a minimum of \$50,000.

- D. A full-time on-site supervisor shall be provided by the Contractor for the entire duration of the epoxy injection work. The supervisor shall have had a minimum of 2 years of documented supervisory experience with the products to be used. If the supervisor does not have that experience, the supplier or manufacturer of the materials shall provide a full-time qualified, certified by the manufacturer, field inspector on jobsite during the entire period of material application. The Installation Contractor shall submit with his bid to the Consultant a proof of obtaining licenses or permits as required.

1.04 QUALITY CONTROL

- A. The materials supplier shall provide the following test data for each production run or batch of epoxy formulation to be used:

1. Tensile strength by ASTM D638

2. Elongation at break by ASTM D638
3. Flexural strength of ASTM D790
4. Flexural modulus by ASTM D790
5. Compressive yield strength by ASTM D695
6. Compressive modulus by ASTM D695
7. Heat deflection temperature by ASTM D648
8. Slant shear strength by AASHTO-237

1.05 SUBMITTALS

A. The Contractor shall submit the following to the Consultant:

1. Documentation showing compliance with the Applicator Qualifications as specified hereinbefore.
2. Technical data sheets published by the material manufacturers for each epoxy product or formulation to be used showing that his products meet the requirements of the specifications. Technical data shall include the following:
 - a. Intended use
 - b. Pot life (neat)
 - c. Initial cure time (1000 psi)
 - d. Tack free (thin film)
 - e. Final cure (75% ultimate strength)
 - f. Tensile strengths by ASTM D638-76 (14 days)
 - g. Tensile elongation by ASTM D638-76 modified (14 days)
 - h. Flexural strength and modules per ASTM D790-71 at 24 hours, 3 days, and 7 days at 77 degrees F.
 - i. 24-hr. compressive strength by ASTM C109 modified (1 part epoxy to 3-1/4 parts aggregate)
3. Submit safety data sheets for each product.

1.06 PRODUCT DELIVERY

A. The product shall be delivered and handled strictly according to the manufacturer's recommendations. Any containers of the material to be used which have been opened previously shall not be accepted.

1.07 JOB CONDITIONS

A. Existing and environmental conditions: The Installation Contractor shall examine the condition of surfaces into which the epoxy is to be injected. He shall follow the recommendations of the manufacturer with regard to limitations of the materials in various moisture and temperature levels.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The epoxy injection materials shall be a two-component, 100% solids, low viscosity, high strength epoxy resin adhesive.

One of the following approved products shall be used:

1. "Sikadur 35, Hi-Mod LV or LPL" as manufactured by the Sika Corporation (www.sikausa.com)
2. "Concresive Standard LVI" as manufactured by BASF (www.buildingsystems.basf.com)
3. "Eucopoxy Injection Resin" as manufactured by the Euclid Chemical Company (www.euclidchemical.com)

or approved equal.

- B. One of the following approved products shall be used to seal injection ports and cracks for injection grouting:

1. "Sikadur Injection Gel" as manufactured by the Sika Corporation.
2. "Concresive Paste SPL" as manufactured by BASF.
3. "Euco #452 or #620 Gel" as manufactured by the Euclid Chemical Company.

or approved equal.

- C. Aggregate:

1. Aggregate shall be clean, dry, graded, and bagged
2. Well-rounded or spherical-shaped sand is recommended for flowability
3. Aggregate may be graded as follows by volume:

2 parts, 12 mesh to 1 part, 80 mesh, or
3 parts, 16 mesh to 1 part, 90 mesh

4. If the above sand is not used, 30-mesh silica sand shall be used.

2.02 MIXES

A. Where approved by the Consultant, the Contractor may use a pre-placed aggregate technique. The ratio of binder to aggregate by volume shall be 0.8 or greater. Test data shall be submitted for conformance with the following:

1. Compressive strength by ASTM D695-76-8000 psi minimum
2. Compressive modulus by ASTM D695-76-2.75 x 10⁴ minimum

2.03 EQUIPMENT

A. The equipment used to inject the epoxy shall meet all of the following performance requirements:

1. Automatic proportioning of materials within the mix ratio tolerances set by the manufacturer of the epoxy material.
2. Mix the epoxy automatically and completely in line (batch mixing will not be permitted).
3. Inject the material under pressures recommended by the materials supplier.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION, INJECTION, AND DELIVERY SYSTEM

- A. The epoxy shall be injected into the cracks or joints only from the lower elevations of the members. The bottom, side, and top surfaces of cracked members must be sealed with a gelconsistency epoxy prior to injection, and must contain appropriate injection ports.
- B. The Contractor shall notify the Consultant of the start of the first injected cracks. In the event that unsound concrete is located in a zone along a crack, and this prevents the complete injection of the cracks, then the unsound concrete shall be removed prior to injection.
- C. The epoxy material injected into the cracks or joints shall be highly suited for this usage. The pressure injection system shall be capable of filling cracks as small as 0.002 inches in width.

- D. Where cracks to be injected have any existing sealant, waterproofing materials, or other debris in the cracks, these cracks shall be cleaned using low-pressure hot water or high-pressure water jet, as appropriate.
- E. The Contractor shall clean surfaces of excess epoxy by grinding or other appropriate means so that only the edge thickness of completed epoxy-injected cracks is noticeable. Injection ports shall not extend beyond the plane of the surfaces of the existing concrete.

3.02 PREPACKING LARGE CRACKS

- A. Where required in cracks of large thickness, the Contractor shall prepack the cracks with fine aggregates to minimize the effects of exotherm, or reduce tensile stresses caused by volume reduction during cooling of the injected epoxy.

3.03 FIELD QUALITY ASSURANCE

- A. The Contractor shall supply samples of the injection epoxy, non-sag epoxy, and epoxy mortar to the Testing Laboratory for the purpose of performing compression tests.
- B. A minimum of three samples per day of each epoxy formulation or use shall be made.
- C. Samples shall be made by placing epoxy into 3/8-in. inside diameter test tubes. The height of the sample shall be approximately 1 in. so that after trimming a cylinder of 3/8 in. diameter and 3/4" length can be obtained.
- D. The Contractor shall be responsible for drilling and removing two 1-in. diameter by 2-in. long cores into the side of injected members at the direction of the Consultant to determine whether the crack injection is complete. The contractor also shall provide samples of mixed epoxy for testing. If injection is incomplete (less than 90% of the injected crack filled), reinjection and additional cores may be required at the direction of the Consultant at no extra cost to the Owner.

END OF SECTION

SECTION 07 95 00

EXPANSION JOINT SEALS 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.

1.02 SCOPE OF WORK

- A. Furnish labor, materials, equipment and supervision to install watertight, traffic bearing expansion joint seals in accordance with these specifications and as shown on the drawings.

1.03 QUALITY ASSURANCE

- A. The manufacturer and approved applicator shall provide a 5 year guarantee that the joint seal will not leak or fail from normal vehicular traffic. Any type of failure of the new joint seal which occurs within the specified warranty period shall be repaired by the Contractor at no cost to the Owner.
- B. Consult the Manufacturer's representative and establish the minimum provisions required to ensure satisfactory work. A licensed applicator with a minimum of 5 years- experience on similar joints shall install the specified joint seal.

1.04 SUBMITTALS BY THE CONTRACTOR

- A. The Contractor shall submit shop drawings showing all the expansion joint details required for this particular project for approval by the Consultant in addition to Manufacturer's literature with an applicable portions deleted.
- B. Where required by jurisdiction, the Contractor shall submit test data showing that the expansion joint system (including fire barrier material) meets or exceeds fire rating requirements. Testing procedures shall be in accordance with requirements set forth or adopted by the local jurisdiction.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

All materials shall be delivered on the job and stored in a place protected from damage, moisture and exposure to the elements in exact accordance with manufacturer's instructions.

1.06 JOB CONDITIONS

Weather Conditions: Do not proceed with installation of expansion joints and sealants under adverse weather conditions, or when temperatures are below or above manufacturer's

recommended limitations for installation. Proceed with the work only when forecasted weather conditions are favorable for proper cure and strength development of the nosing material.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The expansion joint seal system shall be a complete system of compatible materials designed by the manufacturer to produce a waterproof, traffic-bearing expansion joint seal. The system shall also meet or exceed any fire rating requirements set forth by the local building code requirements.
- B. The gland elements shall be a continuous, factory extruded unit for the entire straight run length of the joint. Changes in direction or elevation shall be accomplished by factory molded elbows, tees, crosses and the like. The seal shall be turned up a minimum of 6 inches (vertically) unless otherwise shown on plans. The seal element shall not be mitered/jointed unless approved by the Consultant in writing and shall meet the following performance criteria.

Tensile Strength	ASTM D412	1,500 psi
Elongation at Break	ASTM D412	175 % (Min.)
Hardness, Type A durometer	ASTM D2240	64 ± 5

The premolded elements shall be a continuous, factory molded unit for the entire straight run length of the joint. Changes in direction or elevation shall be accomplished by factory molded elbows, tees, crosses and the like. The seal shall be turned up a minimum of 6 inches (vertically) unless otherwise shown on plans. The seal element shall be mitered/jointed at all changes in direction and shall meet the following performance criteria.

Tensile Strength	ASTM D412	250 psi
Elongation at Break	ASTM D412	500% (min)
Hardness, Type A Durometer	ASTM D2240	30+/-5

- C. Expansion joint systems approved for use in one or more applications are provided in the master list below. Due to variations in specific details of the locations, expected movement, expected traffic exposure, availability, ease of installation and existing blockout geometry, all systems are not suitable for one particular project. The Contractor shall reference the specific expansion joint detail on the specific project drawings and list of approved products shown on the drawings, including gland size, etc. for the respective condition.
- D. Approved Products –

East Garage (wing gland type):

1. “Wabocrete/Membrane 201 system,” manufactured by Watson Bowman Acme, (www.wbacorp.com).

2. "Iso-Flex Winged Expansion Joint Sealing System," as manufactured by LymTal International, Inc., (www.lymtal.com).
3. "Emseal Thermaflex," manufactured by Emseal Joint Systems, Ltd. (www.emseal.com).
4. "WF Elastomeric Expansion Joint System", manufactured by Conspec Systems, Inc., (www.c-sgroup.com).
5. "Zip Block Expansion Joint System", manufactured by Conspec Systems, Inc., (www.c-sgroup.com).
6. "Lokcrete Membrane System", manufactured by MM Systems Corporation, (www.mmsystemscorp.com).

West Garage (pressure gland type):

1. "Wabo Ureflex System," Textured, manufactured by Watson Bowman Acme, (www.wbacorp.com).
2. "Epoxy Bonded Sealing System", manufactured by MM Systems Corporation, (www.mmsystemscorp.com).
3. "DSM", manufactured by Emseal Joint Systems, Ltd. (508-836-0280).

Vertical Joint Locations

1. "DSM" manufactured by Emseal Joint Systems, Ltd., (508-836-0280).
2. "Wabo Weatherseal r", as manufactured by Watson Bowman Acme, (www.wbacorp.com).
3. "Wabo Weather Seam Exterior", as manufactured by Watson Bowman Acme, (www.wbacorp.com).
4. "Iso-Flex Precom", as manufactured by LymTal International, Inc. (www.lymtal.com).
5. "Iso-Flex VS Series," as manufactured by LymTal International, Inc. (www.lymtal.com).
6. "Emseal Colorseal", manufactured by Emseal Joint Systems, Ltd. (www.emseal.com.com). Note: A seismic model is available depending on movement requirements. Also specify single or double face design.
7. "Silicone Impregnated Foam System", manufactured by MM Systems Corporation, (www.mmsystemscorp.com).

8. "Veritcal Sealing System", manufactured by MM Systems Corporation, (www.mmsystemscorp.com).

E. Contractor shall review specific details on drawings for each project regarding products and model numbers approved for use.

Due to various joint width openings and overall block-out dimensions, the Contractor and expansion joint supplier should verify field condition prior to bid submission and execution of the work.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Preparatory Work

1. The block-out shall be provided to the specified dimensions and acceptable to the manufacturer. The licensed installer shall additionally verify that the 'as-built' configuration of the block-out for the expansion joint will allow the expansion joint to be installed such that elevation differences in the vicinity of the joint and across the joint will not exceed industry and ADA-related recommendations. Any edge raveling at the joint opening or spalls shall be repaired with a suitable compound to provide a solid, square block-out.
2. The block-out substrate shall be sandblasted clean of all contaminants and impurities immediately prior to the system installation to assure proper adhesion.
3. The membrane gland element shall be unpackaged and laid in a relaxed position to relieve any temporary set from shipment packaging prior to placement. The premolded element shall be wiped clean with a solvent solution such as toluene.
4. It is recommended that adjacent deck surfaces be taped off and protected to assure a clean, neat professional installation.

B. Installation

The entire installation shall be made in strict accordance with the manufacturer's written instruction.

1. Follow standard manufacturer's recommendation for installation of the material, taking into account block-out dimensions, joint width and ambient temperature conditions.

3.02 TESTING

All new expansion joint seals shall be water tested by the Contractor in the presence of the Engineer. Any leaking observed shall be rectified by the Contractor and the joint shall be retested until no leakage is observed. It is the responsibility of the Contractor to absolutely make certain that the joints are totally waterproofed.

END OF SECTION

DIVISION 09

FINISHES

SECTION 09 91 00

PAINTING 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.

1.02 DESCRIPTION OF WORK

- A. The extent of painting work is shown on the drawings and specified herein to include, but not be limited to, the following:
1. Paint parking lines, traffic markings, handicap symbols and curb/island edges using a specified pavement marking paint.
 2. Paint miscellaneous metals using a specified high-performance coating.

1.03 QUALITY ASSURANCE

- A. Paint Coordination:

Provide finish coats which are compatible with the prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of the total coatings system for the various substrates.

- B. Codes and Standards:

- SSPC-"Systems and Specifications", published by the Steel Structure Painting Council.
- Painting and Decorating Contractor's of America (PDCA) Technical Manual as a reference standard.

1.04 SUBMITTALS

- A. Manufacturer's Data:

1. Submit manufacturer's technical information in standard printed published form, including performance criteria and application instructions for each material proposed for use.
2. List each material and cross-reference to the specific paint and finish system and application. Identify by manufacturer's catalog number and general classification.

1.05 DELIVERY AND STORAGE

- A. Deliver all paint to site in manufacturer's sealed and labeled containers. Labels shall bear manufacturer's name, brand, type of paint, Federal spec. number (if applicable), color of paint, and instructions for reducing.
- B. Store materials and equipment in a designated storage space on the site. Keep storage space neat, clean and accessible at all times. Protect floors from paint spillage.

1.06 PROTECTION

- A. Place paint or solvent-soaked rags, waste, or other materials which might constitute a fire hazard in metal containers and remove from premises at the close of each day's work. Take every precaution to avoid damage by fire.
- B. Provide foam type 2-1/2 gallon capacity fire extinguishers for each paint storage space.
- C. Protect the work of all other trades against damage, marking or injury by suitable covering during the progress of the painting and finishing work.

1.07 JOB CONDITIONS

- A. Examine all surfaces to receive coatings and report to the Engineer any condition which is not acceptable. Commencement of work in any area constitutes acceptance of conditions and places the responsibility for a workmanlike job on this Section.
- B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and the surrounding air temperatures are between 50 degrees F. and 95 degrees F., unless otherwise permitted by the paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by the paint manufacturer's printed instructions.

PART 2 - PRODUCTS

2.01 MATERIAL QUALITY

- A. Provide only absolutely pure linseed oil, turpentine, shellac, and other like materials that are of the highest quality, with identifying labels intact and seals unbroken. Use no thinners other than those specified by the manufacturer.
- B. Use only primers and undercoaters that are suitable for each surface to be covered and that are compatible with the finish coat required.
- C. Use products of the same manufacturer for succeeding coats.

1. Where shop primed materials are to be finish painted and/or prime coat materials are by a different manufacturer than the finish coat materials, confirm compatibility of the primers with the manufacturer of the finish coat paints.
 2. Where existing previously painted surfaces are to be finish painted, confirm compatibility of existing painted surfaces with the manufacturer of the succeeding new paints.
- D. All materials shall comply with Environmental Protection Agency Pt. 59, Subpt. D, Table 1 of Section 40CFR Parts 53-59, Volume 5, 2004 Edition.

2.02 METALS

A. General:

1. For new metal surfaces not otherwise specified for shop prime painting and for touch-up painting of shop prime coats, provide one of the following metal primers as appropriate for the surface condition and finish coats of the metal.
 - a. Field touch-up painting shall be in accordance with SSPC-PA 1-64 and shall be of the same kinds and number of coats as applied in the shop.
 - b. Refer to other sections of these specifications for shop primed items

B. Structural Steel/Miscellaneous Metals (UNO): High Performance Coating:

1. Primer (bare metal locations same day as surface preparation)
 - a. Macropoxy 646 , Sherwin Williams
 - b. PPG Pitt-Guard 97-148 Series Epoxy
2. High Build Epoxy
 - a. Macropoxy 646; Sherwin Williams
 - b. PPG Pitt-Guard 97-148 Series Epoxy
3. Gloss Aliphatic Urethane Finish
 - a. Acrolon 218 HS; Sherwin Williams
 - b. PPG Pitthane Ultra 95-812 Series Gloss Urethane

2.03 PAVEMENT MARKING PAINT

- A. Parking lines, arrows, handicap symbols and curb edges shall be yellow pavement marking paint, conforming to U.S. Bureau of Public Roads colors, unless otherwise noted.
1. ZONELINE Traffic and Zone Marking Latex, 11-54 Yellow by PPG Industries;
 2. SETFAST Acrylic Latex Traffic Marking Paint, TM2161 Yellow by Sherwin Williams, 800-368-2026;

3. Hotline Fast Dry Latex Traffic Marking Paint – Yellow TM2153 as manufactured by Sherwin Williams, 800-368-2026;
4. Promar Low VOC Acrylic Copolymer Traffic Marking Paint – Yellow TM5713 as manufactured by Sherwin Williams, 800-368-2026.

2.04 PAINT SYSTEMS

A. Metals: Provide the following paint systems for the various substrates, as indicated.

1. Structural Steel/Miscellaneous Metals
 - a. 1st Coat - High Build Epoxy (3.0-5.0 mils dft)
 - b. 2nd Coat – High Build Epoxy (4.0-6.0 mils dft)
 - c. 3rd Coat – Gloss Aliphatic Urethane (3.0-5.0 mils dft)

C. Pavement Markings: Two coats-Traffic Paint as specified in Section 2.04; 14 to 15 mil wet film thickness each coat.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. General:

1. Perform all preparation and cleaning procedures in strict accordance with the paint manufacturer's instructions and as herein specified, for each particular substrate condition.
2. Clean surfaces to be completely dry prior to applying primers, paints or surface treatments. Remove oil and grease with clean cloths and cleaning solvents. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to the formation of a durable paint film.
3. Before applying succeeding coats, primers and undercoats shall be completely integral and shall perform the function for which they are specified. Properly prepare and touch up all scratches, abrasions or other disfigurements and remove any foreign matter before proceeding with the following coat. All spot-priming or spot-coating shall be featheredged into adjacent coatings to produce a smooth and level surface.

B. Metals:

1. For existing paint system being restored, power wash using approved cleaning solvents and minimum pressures of 2,500 to 5,000 PSI at a flow of 4 to 14 gallons per minute in accordance with SSPC-WJ4. Mechanical abrasion may be needed in order to ensure adhesion (i.e.sanding or powerwashing with sand injection)

2. For all other existing metals scheduled to be painted, sandblast clean to SSPC-SP6 or power tool according to SSPC SP 15 Commercial Grade Power Tool Cleaning.

C. Concrete:

1. Prepare surfaces of concrete to be painted by using approved cleaning solvents (if necessary) and high-pressure power washing with a 15 degree tip at 14" or less from surface with a minimum pressure of 300 to 600 PSI for an existing coating and 1,500 to 3,000 PSI for bare concrete substrate and in accordance with SSPC SP1 to thoroughly remove all efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required or provide sufficient bite on existing painted surfaces per the manufacturer's recommendation.

3.02 MATERIALS PREPARATION

- A. Mix and prepare painting materials in strict accordance with the manufacturer's directions.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage, mixing, and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir all materials before application to produce a mixture of uniform density, and as required during the application of the materials.

3.03 APPLICATION

- A. Apply paint with brush, roller, spray, or other acceptable practice in accordance with the manufacturer's directions.
- B. Paint directional arrows, parking stalls, marking lines, handicap symbols, etc., to be as detailed on the Drawings. Unless otherwise detailed, single line width to be four (4") inches wide. Striped areas shall be four (4) inch wide lines eighteen (18) inches on center. Lay out all painted lines and define with chalk markings for approval before proceeding with painting.

3.04 CLEAN-UP

- A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.
- B. Upon completion of painting work, clean paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

- C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

END OF SECTION