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SUMMARY OF THE WORK

PART 1 - GENERAL

1.01

1. The furnishing of all labor, materials, equipment, services, and transportation of Woodrow Wilson Middle School Concrete and Paving work at 1221 Monterey Rd, Glendale, CA 91206, as set forth in the Contraction Documents which is required for the completion of the project in accordance with the provisions of the contract

2 Article 3 of the Bid General Conditions requires preparation of a Cost-loaded time logic schedule with a single critical path. If the Board approved lowest responsive and responsible bid Contractor and the Project Manager, on behalf of the District, cannot agree on the contract construction schedule and the project single critical path within fifteen (15) days after Notice to Proceed, the District may terminate the Contract, for convenience, as outlined in the Project General Conditions. In the event this is necessary, compensation to the General Contractor and all subcontractors or materialmen shall be limited to Mobilization costs only.

3. The liquidated damages shown in the Supplementary General Conditions shall apply to each phase of the phased construction plan, as defined by and within the plans and specifications.

4 No warranties or guarantees shall go into effect, for any trade, regardless of when completed in the sequence of the project erection, until one (1) day after the Board of Education has accepted the project at a noticed meeting. Attention: Bidders. This will require certain trades to bid for, and provide, a warranty of longer than one (1) year in length from the time of installation or furnishing of their materials to the project, depending upon the sequencing of their work within the overall schedule.

5 All project close-out/punch list items, project record documents, submittals, and operations manuals and spare parts, warranties and guarantees and Contractor's Final Verified Report (DSA6) shall be reviewed and accepted prior to the Architect/District agreed upon authorization to file the Notice of Completion with the Los Angeles County Recorder.

6 In the event that any materials requiring DSA Inspection (steel, concrete, masonry grout, etc.) are manufactured in an area located more than one hundred miles (100 miles) by air radius from the project site, all round-trip travel and all per diem costs incurred by the District on behalf of the Deputy Inspector who must perform on-site examination of the materials shall be borne 100% by the Contractor as an added expense. This charge shall be subtracted from the monthly "Application for Payment" submitted to the District on behalf of the project.

7 In the event the General Contractor or any subcontractor or materialman (on or off site) voluntarily accelerates the schedule for their own purposes, and/or voluntarily performs work in excess of eight (8) hours per day, or on the weekends or holidays, the additional cost of the Inspectors' overtime premiums which are required to inspect the work during these hours shall be paid 100% by the Contractor. This charge shall also be subtracted from the monthly "Application for Payment" submitted to the District on behalf of the project.

8 In the event that the Contractor fails to complete all punch list items and turn over all "deliverables, warranties, As-builts, etc." within sixty (60) days after acceptance of completion by the Board of Education, the full salary costs of one (1) construction Project Manager (16 hours per week @ $120.00/hour) and one DSA Inspector of record (actual hours spent @$80.00/hour) shall be back-charged to the Contractor, in addition to the liquidated damages, if any, imposed upon the Contractor for late performance. THIS PARAGRAPH WILL BE STRICTLY ENFORCED.

9. The intent of these contract documents is that the work of alteration, rehabilitation or construction is to be accordance with Title 24, California Code of Regulations. Should any existing conditions such as

deterioration or non-complying construction be discovered which is not covered by the Contract Documents wherein the finished work will not comply with Title 24, California Code of Regulations, a change order, or a separate set of plans and specifications, detailing and specifying the required repair work shall be submitted to and approved by DSA before proceeding with the repair work.

a.

RELATED SECTIONS

PART 2 – SCOPE OF WORK

2.01

A. Scope of Work: Contractor shall perform, within the time stipulated, the Contract including all of its component parts, and everything required to be performed, and to provide and furnish any and all of the labor, materials, tools, expendable equipment, and all applicable taxes, and all utility and transportation services necessary to perform the Contract and complete, in a workmanlike manner, all of the Work required in connection with the following titled Project in strict conformity with the Contract Documents:

2.02 A. Woodrow Wilson Middle School work at 1221 Monterey Rd, Glendale, CA 91206

A. Work area-Main quad area

1 Remove and Haul Away all asphalt approximately 7500 sq. feet of asphalt and pour new concrete
2 Remove and Haul Away all broken concrete approximately 3500 sq. feet of concrete and pour new concrete
3 Pour 6 inch concrete with #4 rebar in indicated dirt area in the dome area eliminating all the dirt and install drain lines indicated
4 Grade area with ADA compliance
5 3250psi city mix concrete mix is required
6 Center designated concrete to be in blue color approved by principal with a line pattern in the concrete
7 The quad area requires blue concrete and a pattern design in the concrete with stamp concrete
8 Install concrete benches seating along the entire designated perimeter 24 inches wide by 829 linear feet with a smooth finish texture
9 All 24 inch cast benches and other size benches will require multiple notches in the lips for preventing skaters using them. As shown in picture
10 Remove all in ground Benches and existing concrete benches and dispose
11 Install a stage the same area but extending back 5 feet to make a larger stage (30'x20')
12 Trim down the roots on the trees
13 Create tree wells or curbs around trees to protect the trees
14 Remove all old benches and pour in new concrete benches
15 Use #4 rebar at 24 inches at center and dowel into existing concrete to tie in
16 Raise or lower to level all in ground utility boxes to level with new concrete
17 Install approximately 21,000 sq. feet of 6 inch concrete
18 Install a 6 inch drain pipes with (8) 18x18 and (14) 12x12 traffic rated drains and tie into existing storm drain at specified locations to drain the water
19 Area is to be fenced off during construction
20 Removal and disposal of all dirt and concrete is the responsibility of the contractor

North
Wilson Concrete Layout

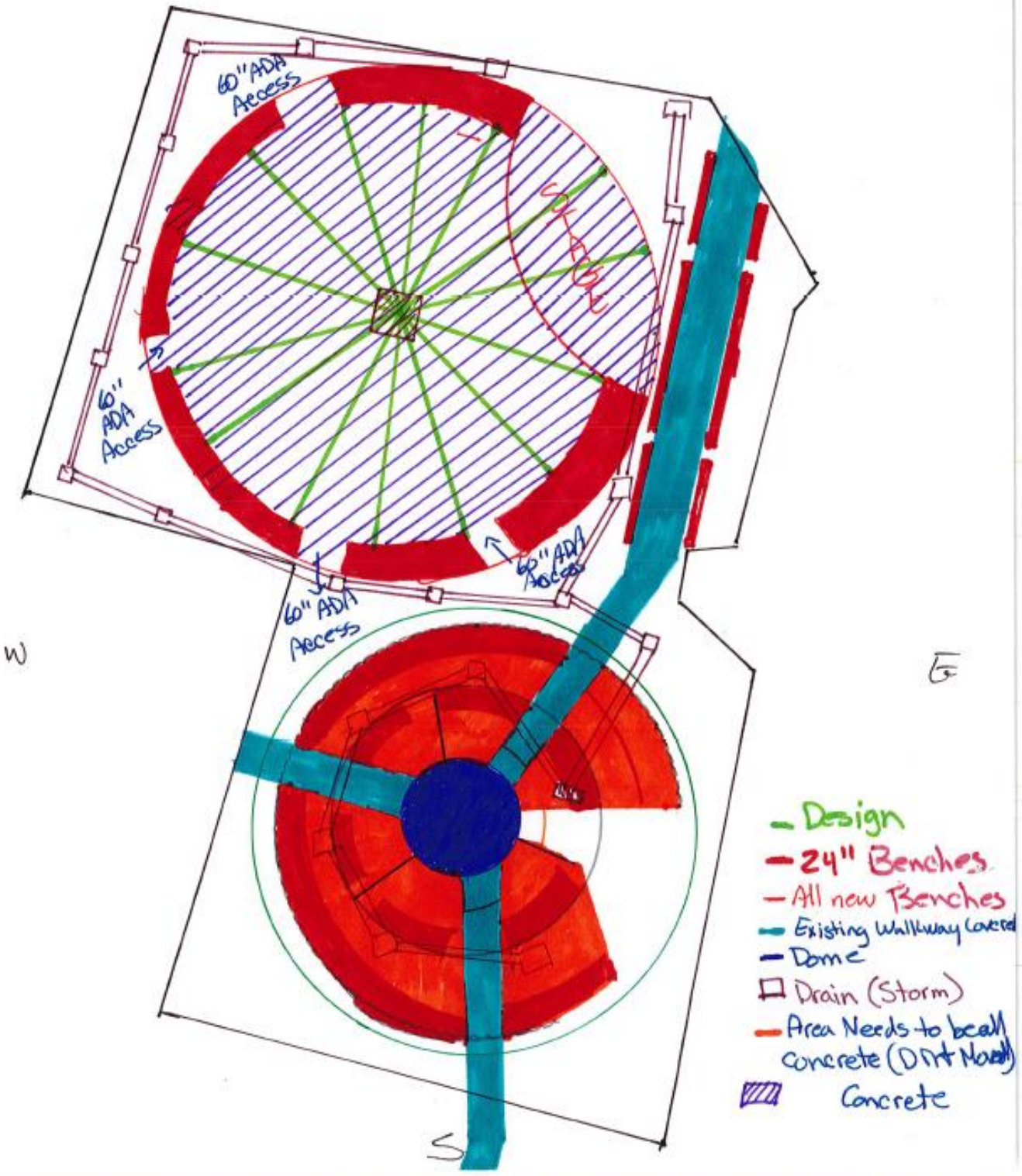

IMAGE OF BENCHES WITH ANTI SKATING CUTOUTS

SECTION 01730

DEMOLITION PROCEDURES

PART 5 - GENERAL

1.01 SECTION INCLUDES

A. General requirements for special project procedures pertaining to the alteration or modification of existing construction, and are complimentary to like requirements indicated or specified elsewhere. Principals items included are:

1. Removals, cutting, alterations and repairs to existing facilities as required to complete work.

2. Relocation and reinstallation of existing construction and finish.

3. Salvage, storage and protection of existing items to be reinstalled.

4. Salvage and delivery to the District of items so designated for removal and salvaged by Contractor, as directed.

1.02 RELATED SECTIONS

A. Requirements of other Sections of this Specification apply to this Section.

1.03 PROPERTY INVENTORY

A. District property that the District intends to remove, will be removed at no cost to Contractor, before a room or space is vacated for the Work. Before performing any Work in each room or space the District and Contractor shall prepare a detailed initial written inventory of District property remaining therein and condition thereof including equipment and telephone instruments, and each shall retain a copy of the inventory dated and signed by both. In same manner, prior to the District re-occupancy of each such room or space the parties shall again inventory District property therein and all discrepancies between the inventories shall be Contractor's responsibility as specified above.

1.05 JOB CONDITIONS

A. General: Coordinate the Work of all trades and with the District to assure correct sequence, limits, methods, and times of performance. Arrange the Work to impose minimum hardship on operation and use of the facilities. Install protection for existing facilities, contents, and new work against dust, dirt, weather, damage, and vandalism, and maintain and relocate as the Work progresses.

B. Access: Confine entrance and exit operations to access routes designated by the District.

C. Existing Conditions: Intent of Drawings is to indicate existing site and facility conditions with information developed from original construction documents, field surveys, and the District records, and to generally indicate amount and type of demolition and removals required to prepare existing areas for new work.

D. Verification of Conditions: Perform a detailed survey of existing site and building conditions pertaining of the Work before starting Work. Report to the District Inspector discrepancies or conflicts between Drawings and actual

conditions in writing for clarification and instructions and do not perform Work where such discrepancies or conflicts occur prior to receipt of the Architect's instructions.

E. Special Noise Restrictions: Use care to prevent generation of unnecessary noise and keep noise levels to minimum possible. When ordered by the District Inspector, immediately discontinue such methods that produce noise disruptive or harmful to facility functions and occupants, and employ unobjectionable methods. Equip air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with "residential" grade mufflers, and muffle the unloading cycle of compressors. Remove from site any equipment producing objectionable noise as determined by the District Inspector.

F. Shoring and Bracing: Provide supports, shoring, and bracing required to preserve structural integrity and prevent collapse of existing construction that is cut into or altered as a part of the Work.

G. Overloading: Do not overload any part of structures beyond safe carrying capacity by placing of materials, equipment, tools, machinery, or any other item thereon.

H. Building Security: Secure building entrances and exits with locking or other approved method in accordance with the District's instructions.

I. Safeguarding the District Property: Contractor shall assume care, custody, and responsibility for safeguarding all the District's property of every kind, whether fixed or portable, remaining in rooms and spaces vacated and turned over to the Contractor by the District for his exclusive use in performance of the Work until the Work therein or related thereto is completed and the rooms or spaces are reoccupied by the District. Furnish all forms of security and protection necessary to protect the District's property. Regardless of cause, Contractor shall repair or replace all of the District's property under the Contractor's care, custody, and safeguarding that is damaged, injured, missing, lost, or stolen from time each such room or space is turned over the Contractor for the Work until re-occupied by the District, at Contractor's expense and as directed by the District.

1. Covering and Cleaning: Cover and protect surfaces of rooms and spaces turned over for the Work, including the District's property remaining therein, as required to prevent soiling or damage by dust, dirt, water, fumes, or otherwise, and protect other areas where Work is performed in same manner, as deemed adequate by the District. Prior to District's re-occupancy of any such room or space, clean all surfaces including District's property in accordance with General Conditions and other cleaning instructions as may be specified in other Sections.

J. Use of District's Telephones: Do not use nor allow anyone other than District employees to use telephone in rooms and spaces turned over to Contractor for the Work except in the case of a bona fide emergency. Install temporary dial locks on telephone instruments to prevent all unauthorized use, or arrange and pay for temporary removal and reinstallation of instruments. Reimburse to the District all telephone toll charges originating from the telephones in such rooms and spaces except those arising from emergencies or use by District employees.

K. Welding: Conform to following requirements where welding is performed in or on existing facilities.

1. Protection During Welding: Conform to Title 8, CAC. Further protect occupants and the public with portable solid vision barricades around locations where welding is performed plus signs warning against looking at welding without proper eye protection, or equivalent.

2. Fire Extinguishers: Maintain a fully charged UL-labeled minimum 6 pound 40B:C dry chemical fire extinguisher at every location where welding is performed within or on the facilities.

3. Welding Smoke Control: Verify locations of existing smoke detectors. Perform welding operations by methods that produce the minimum feasible smoke and fumes. Furnish portable type smoke collection and ventilating equipment as required to prevent smoke and fume nuisances. Notify District at least 48 hours in advance if temporary deactivation of any smoke detector is required to prevent false alarms from the welding operations. The District's personnel will deactivate detectors only for the time welding is actually in progress.

4. Fire Prevention: Before welding, examine existing construction and backing for all combustible materials and finishes and for conditions where heat conduction in metals may bring adjoining materials to ignition temperature. Use positive fire prevention measures including temporary removal and reinstallation of combustible materials, installation of temporary shields and/or heat sinks, and other necessary means. When actual field conditions are such that positive fire prevention measures cannot be achieved, notify Architect and do not proceed with the involved work until receipt of Architect's instructions.

L. Protection of Floors: Use care to protect all floor surfaces and coverings from damage. Equip mobile equipment with pneumatic tires.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. General: When patching existing work in place, use materials that match existing materials in performance, thickness and finish.

PART 3 - EXECUTION

3.01 PROTECTION:

A. Glass: Provide such protection as may be required to prevent glass breakage for all glass to be reused or to remain. At no additional cost, replace in kind all broken glass.

B. Existing Work to Remain: Provide such forms of protection as may be necessary to prevent damage to and dust or dirt contamination of existing work and equipment to remain.

C. Items to be Reused: Exercise the greatest possible care when removing items scheduled for reuse. Use only mechanics skilled in the appropriate trades. Identify point of reuse, store and protect at locations directed.

D. If required due to damage, replace with new materials to match existing in same manner and technique originally utilized.

3.02 REMOVALS, ALTERATIONS, AND REPAIRS:

A. Basic Requirement: Restore and refinish all new and existing construction and improvements that are cut into, altered, damaged, relocated, reinstalled, or left unfinished by removals to original condition or to match adjoining work and finishes unless otherwise shown, specified, directed, or required. Workmanship and materials shall conform to applicable provisions of other Sections. Provide new fasteners, connectors, adhesives, and other accessory materials as required to fully complete approved reinstallations and restorations. Where restorations and refinishing are defective or are otherwise not acceptable to Architect, remove all the defective or rejected materials and provide new acceptable materials and finish at no extra cost to District.

B. Extent: Perform removals to extent required plus such additional removals as are necessary for completion even though not indicated or specified. More or less of the existing construction may be removed if such variation will expedite the work and reduce cost to the District, subject to prior approval in each case.

C. Removals: Carefully remove work to be salvaged or reinstall and store under cover.

3.03 MECHANICAL AND ELECTRICAL:

A. Demolish existing mechanical, plumbing and electrical items as indicated in the Drawings and Specifications.

3.04 REMOVED MATERIAL AND DEBRIS:

A. All removed material, not otherwise designated, and all debris becomes the property of the Contractor who shall remove it from the site and dispose of it in a legal manner.

B. Do not allow materials and debris generated by demolition activities to accumulate. Remove daily.

C. Leave all spaces broom clean with all ledges and corners properly cleaned.

END OF SECTION

SECTION 32 12 16 - ASPHALT PAVING

PART 4 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Hot-mix asphalt patching.
2. Hot-mix asphalt paving.
3. Asphalt surface treatments.
4. Pavement-marking paint.

B. Related Sections:

1. Division 02 Section "Structure Demolition" for demolition, removal, and recycling of existing asphalt pavements, and for geotextiles that are not embedded within courses of asphalt paving.
2. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
3. Division 32 Sections for other paving installed as part of crosswalks in asphalt pavement areas.
4. Division 32 Section "Concrete Paving Joint Sealants" for joint sealants and fillers at paving terminations.

1.3 DEFINITION

A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
2. Job-Mix Designs: For each job mix proposed for the Work.

B. Shop Drawings: Indicate pavement markings, lane separations, and defined parking spaces. Indicate, with international symbol of accessibility, spaces allocated for people with disabilities.

C. Samples: For each paving fabric, 12 by 12 inches (300 by 300 mm) minimum.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each paving fabric, 12 by 12 inches (300 by 300 mm) minimum.
2. Each type and color of preformed traffic-calming device.

E. Qualification Data: For qualified manufacturer.

F. Material Certificates: For each paving material, from manufacturer.

G. Material Test Reports: For each paving material.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of the Geotechnical Report and Standard Specifications for Public Works Construction.

C. Preinstallation Conference: Conduct conference at the site.

1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
   a. Review proposed sources of paving materials, including capabilities and location of plant that will manufacture hot-mix asphalt.
   b. Review condition of subgrade and preparatory work.
   c. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.
   d. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:

1. Prime Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
2. Tack Coat: Minimum surface temperature of 60 deg F (15.6 deg C).
3. Slurry Coat: Comply with weather limitations in ASTM D 3910.
4. Asphalt Base Course: Minimum surface temperature of 40 deg F (4.4 deg C) and rising at time of placement.
5. Asphalt Surface Course: Minimum surface temperature of 60 deg F (15.6 deg C) at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F (4.4 deg C) for oil-based materials or 55 deg F (12.8 deg C) for water-based materials, and not exceeding 95 deg F (35 deg C).

PART 2 - PRODUCTS

2.1 ASPHALT MATERIALS

A. Provide materials of the class, grade, or type indicated on the Drawings, conforming to relevant provisions of Section 203 – Bituminous Materials of the Standard Specifications for Public Works Construction.

2.2 HEADERS AND STAKES

A. Concrete: Per Specification Section 321313.

B. Redwood

1. Headers: Redwood, Construction Heart Grade, size 2 x 6, unless otherwise indicated.
2. Stakes: 2 x 4 redwood or 2 x 3 Douglas Fir, Construction Grade.
3. Nails: Common, galvanized, 12d minimum.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction**,** repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph (5 km/h).
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons (13.6 tonnes).
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Portland Cement Concrete Pavement: Break cracked slabs and roll as required to reseat concrete pieces firmly.

1. Pump hot undersealing asphalt under rocking slab until slab is stabilized or, if necessary, crack slab into pieces and roll to reseat pieces firmly.

2. Remove disintegrated or badly cracked pavement. Excavate rectangular or trapezoidal patches, extending into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Recompact existing unbound-aggregate base course to form new subgrade.

C. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

D. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and, while still hot, compact flush with adjacent surface.

E. Patching: Partially fill excavated pavements with hot-mix asphalt base mix and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer finished flush with adjacent surfaces.

3.3 REPAIRS

A. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.

1. Install leveling wedges in compacted lifts not exceeding 3 inches (75 mm) thick.

B. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).

1. Clean cracks and joints in existing hot-mix asphalt pavement.
2. Use emulsified-asphalt slurry to seal cracks and joints less than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
3. Use hot-applied joint sealant to seal cracks and joints more than 1/4 inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

3.4 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

1. Mix herbicide with prime coat if formulated by manufacturer for that purpose.

C. Prime Coat: Apply uniformly over surface of compacted unbound-aggregate base course at a rate of 0.15 to 0.50 gal./sq. yd. (0.7 to 2.3 L/sq. m). Apply enough material to penetrate and seal but not flood surface. Allow prime coat to cure.

1. If prime coat is not entirely absorbed within 24 hours after application, spread sand over surface to blot excess asphalt. Use enough sand to prevent pickup under traffic. Remove loose sand by sweeping before pavement is placed and after volatiles have evaporated.
2. Protect primed substrate from damage until ready to receive paving.

D. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.15 gal./sq. yd. (0.2 to 0.7 L/sq. m).

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.5 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at minimum temperature of 250 deg F (121 deg C).
4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.6 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150 mm).
3. Offset transverse joints, in successive courses, a minimum of 24 inches (600 mm).
4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.7 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F (85 deg C).

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:

1. Average Density: 96 percent of reference laboratory density according to ASTM D 6927 or AASHTO T 245, but not less than 94 percent nor greater than 100 percent.
2. Average Density: 92 percent of reference maximum theoretical density according to ASTM D 2041, but not less than 90 percent nor greater than 96 percent.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.

E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.8 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus 1/2 inch (13 mm).
2. Surface Course: Plus 1/4 inch (6 mm), no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:

1. Base Course: 1/4 inch (6 mm).
2. Surface Course: 1/8 inch (3 mm).
3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch (6 mm).

C. Traffic-Calming Devices: Compact and form asphalt to produce the contour indicated and within a tolerance of plus or minus 1/8 inch (3 mm) of height indicated above pavement surface.

3.9 SURFACE TREATMENTS

A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. (0.45 to 0.7 L/sq. m) to existing asphalt pavement and allow to cure. With fine sand, lightly dust areas receiving excess fog seal.

B. Slurry Seals: Apply slurry coat in a uniform thickness according to ASTM D 3910 and allow to cure.

1. Roll slurry seal to remove ridges and provide a uniform, smooth surface.

3.10 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils (0.4 mm).

1. Broadcast glass beads uniformly into wet pavement markings at a rate of 6 lb/gal. (0.72 kg/L).

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979 or AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

    a. One core sample will be taken for every 1000 sq. yd. (836 sq. m) or less of installed pavement, with no fewer than 3 cores taken.
    b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.12 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow milled materials to accumulate on-site.

END OF SECTION

SECTION 32 13 73 – PAVEMENT JOINT SEALANTS

PART 5 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.
2. Joints between cement concrete and asphalt pavement.

B. Related Sections include the following:
1. Division 02 Section "Cement Concrete Pavement" for constructing joints in concrete pavement.

1.2 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

B. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.

1. Use ASTM C 1087 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
2. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
3. Testing will not be required if joint-sealant manufacturers submit joint preparation data that are based on previous testing of current sealant products for adhesion to, and compatibility with, joint substrates and other materials matching those submitted.

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

1.5 PROJECT CONDITIONS

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

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products specified.

B. Or Equal: Where products are specified by manufacturers name and accompanied by the term "or equal", comply with provisions in Division 01 Section "Product Requirements", Part 2 "Product Substitutions" Article. Specific procedures must be followed before use of an unnamed product or manufacturer.

2.2 MATERIALS, GENERAL

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

B. Colors of Exposed Joint Sealants: As selected by Owner's Representative from manufacturer's full range.

2.3 COLD-APPLIED JOINT SEALANTS

A. Multicomponent Sealant for Concrete: Pourable, chemically curing elastomeric formulation complying with the following requirements for formulation and with ASTM C 920 for type, grade, class, and uses indicated:

1. Urethane Formulation: ASTM C-1247; ASTM C-920-98, Type M; Grade NS; Class 25; Uses T, M, and O.
   a. Products:
      1) Pecora Corporation; Dyna Tred.
      2) Or equal.

2. Coal-Tar-Modified Polymer Formulation: Type M; Grade P; Class 25; Uses T and, as applicable to joint substrates indicated, O.
   a. Products:
      1) Meadows, W. R., Inc.; Sealtight Gardox.
      2) Or equal.

3. Bitumen-Modified Urethane Formulation: Type M; Grade P; Class 25; Uses T, M, and, as applicable to joint substrates indicated, O.
   a. Products:

1) Tremco Sealant/Waterproofing Division; Vulkem 202.
2) Or equal.

B. Type NS Silicone Sealant for Concrete: Single-component, low-modulus, neutral-curing, nonsag silicone sealant complying with ASTM D 5893 for Type NS.

1. Products:
   a. Crafco Inc.; RoadSaver Silicone.
   b. Dow Corning Corporation; 888.
   c. Or equal.

C. Type SL Silicone Sealant for Concrete and Asphalt: Single-component, low-modulus, neutral-curing, self-leveling silicone sealant complying with ASTM D 5893 for Type SL.

1. Products:
   a. Crafco Inc.; RoadSaver Silicone SL.
   b. Dow Corning Corporation; 890-SL.
   c. Or equal.

D. Multicomponent Low-Modulus Sealant for Concrete and Asphalt: Proprietary formulation consisting of reactive petropolymer and activator components producing a pourable, self-leveling sealant.

1. Products:
   a. Meadows, W. R., Inc.; Sof-Seal.
   b. Or equal.

2.4 HOT-APPLIED JOINT SEALANTS

A. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

1. Products:
   a. Crafco Inc.; Superseal 444/777.
   b. Meadows, W. R., Inc.; Poly-Jet 3406.
   c. Or equal.

B. Sealant for Concrete and Asphalt: Single-component formulation complying with ASTM D 3405.

1. Products:
   a. Koch Materials Company; Product No. 9005.
   b. Koch Materials Company; Product No. 9030.
   c. Meadows, W. R., Inc.; Sealtight Hi-Spec.
   d. Or equal.

2.5 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

2.6 PRIMERS

A. Primers: Product recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

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

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses provided for each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealants from surfaces adjacent to joint.
2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions, unless otherwise indicated.

G. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.4 CLEANING

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

3.5 PROTECTION

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

END OF SECTION

SECTION 03 01 30 - MAINTENANCE OF CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Removal of deteriorated concrete and reinforcement and subsequent replacement and patching.
2. Floor joint repair.
3. Epoxy crack injection.
4. Corrosion-inhibiting treatment.
5. Polymer overlays.
6. Polymer sealers.
7. Steel structural reinforcement.
8. Composite structural reinforcement.

B. Related Sections include the following:

1. Section 03 10 00 - Concrete Forms and Accessories
2. Section 03 30 00 - Cast-in-place Concrete
3. Section 07 19 00 - Water Repellents

1.3 UNIT PRICES

A. Unit prices include the cost of preparing existing construction to receive the work indicated and costs of field quality-control testing required by the Work for which the unit price applies.

B. Concrete Removal and Replacement or Patching: Work will be paid for by the cubic foot computed on the basis of rectangular solid shapes approximating the actual shape of concrete removed and replaced with average depths, widths, and lengths, measured to the nearest inch.

1. Reinforcing bar replacement will be paid for separately by the pound of replacement steel with welded and mechanical splices paid for by the unit.

C. Epoxy Crack Injection: Work will be paid for by the linear foot of crack injected.

D. Polymer Overlays: Work will be paid for by the square foot of exposed overlay surface.

E. Composite Structural Reinforcement: Work will be paid for by the square foot of composite material applied.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include material descriptions, chemical composition, physical properties, test data, and mixing, preparation, and application instructions.

B. Formwork Drawings: Prepared by or under the supervision of a qualified professional engineer detailing formwork. Include schedule and sequence for erection and removal relative to removal of deteriorated concrete and reinforcement and subsequent repair and reinforcement.

C. Samples: Cured Samples of overlay and patching materials.

D. Qualification Data: For installers and manufacturers.

1. For products required to be installed by workers approved by product manufacturers, include letters of acceptance by product manufacturers certifying that installers are approved to apply their products.

E. Material Certificates: For each type of product indicated, signed by manufacturers.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for bonding agents, patching mortars, epoxy adhesives and composite structural reinforcement.

G. Rehabilitation Program: For each phase of rehabilitation process, including protection of surrounding materials and Project site during operations. Describe in detail materials, methods, equipment, and sequence of operations to be used for each phase of the Work.

1. If alternative materials and methods to those indicated are proposed for any phase of rehabilitation work, submit substitution request complying with Section 01 60 00 Product Requirements and provide a written description of proposed materials and methods, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Installer that employ workers trained and approved by manufacturer to apply corrosion-inhibiting treatments, concrete patching and rebuilding materials, epoxy crack injection materials, polymer overlays, polymer sealers, and composite structural reinforcement.

B. Manufacturer Qualifications: Manufacturer that employs factory-trained representatives who are available for consultation and Project-site inspection.

C. Source Limitations: Obtain concrete patching and rebuilding materials, epoxy crack injection materials, and composite structural reinforcement materials through one source from a single manufacturer.

D. Mockups: Build mockups for concrete removal and patching, floor joint repair, epoxy crack injection, polymer overlays, polymer sealers and composite structural reinforcement to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 Project Management and Coordination.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.

B. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.

C. Store cementitious materials off the ground, under cover, and in a dry location.

D. Store aggregates, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.

1.7 PROJECT CONDITIONS

A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.

1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within 8 hours.
2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within 8 hours.
3. Use only Class C epoxies when substrate temperatures are above and are expected to stay above 60 deg F for 8 hours.

B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless air temperature is above 40 deg F and will remain so for at least 48 hours after completion of Work.

C. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures:

1. When air temperature is below 40 deg F, heat patching material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair or provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.

D. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.

E. Environmental Limitations for High-Molecular-Weight Methacrylate Sealers: Do not apply when concrete surface temperature is below 55 deg F or above 90 deg F. Apply only to substrates that have been dry for at least 72 hours.

PART 2 - PRODUCTS

2.1 BONDING AGENTS

A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Euclid Chemical Company (The); Corr-Bond.
    b. Kaufman Products, Inc; Surepoxy HM EPL.

c. Sika Corporation; Armatec 110 EpoCem.
d. Sonneborn, Div. of ChemRex; Sonoprep.
e. Sto Corp., Concrete Restoration Division; Sto Bonding and Anti-Corrosion Agent.
f. Tamms Industries, Inc.; Duralprep A.C.

B. Epoxy Bonding Agent: ASTM C 881/C 881M.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Anti-Hydro International, Inc.; Poly-Epoxy Bonding #100.
b. ChemCo Systems; CCS Bonder Liquid.
c. Dayton Superior Corporation.
d. Euclid Chemical Company (The).
e. Kaufman Products, Inc.; SurePoxy HM EPL.
f. MBT Protection and Repair, Div. of ChemRex; Concresive Liquid LPL.
g. Meadows, W. R., Inc.
h. Sika Corporation.
i. Sonneborn, Div. of ChemRex.
j. Tamms Industries, Inc.; Duralbond.
k. ThoRoc, Div. of ChemRex; Epoxy Adhesive 24LPL.
l. Unitex.
m. US MIX Products Company.

3. Thin Film Open Time: Not less than six (6) hours.

C. Latex Bonding Agent: ASTM C 1059.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Latex Bonding Agent, Type I:

1) Euclid Chemical Company (The); Euco Weld.
2) Kaufman Products, Inc.; Sureweld.
3) Meadows, W. R. Inc.; Intralok.
4) Sika Corporation; Sikalatex.
5) US MIX Products Company; US Spec Bondcoat.

b. Latex Bonding Agent, Type II:

1) Dayton Superior Corporation; Day-Chem Ad Bond (J-40).
2) Euclid Chemical Company (The); Flex-Con.
3) Kaufman Products, Inc.; Surebond.
4) Meadows, W. R. Inc.; Sealtight Acry-Lok.
5) Sonneborn, Div. of ChemRex; Acrylic Additive.
6) US MIX Products Company; US Spec Acrylcoat.

D. Mortar Scrub-Coat: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 1 part fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 sieve.

2.2 PATCHING MORTAR

A. Patching Mortar, General:

1. Unless otherwise indicated, use any of the products specified in this Article.
2. Overhead Patching Mortar: For overhead repairs, use patching mortar recommended by manufacturer for overhead use and as specified in this Article.
3. Coarse Aggregate for Adding to Patching Mortar: Washed aggregate complying with ASTM C 33, Size No. 8, Class 5S. Add only as permitted by patching mortar manufacturer.

B. Job-Mixed Patching Mortar: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 2-1/2 parts fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 sieve.

C. Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cementitious Patching Mortar:

1) Kaufman Products, Inc.; Hicap.
2) MBT Protection and Repair, Div. of ChemRex.
3) Sika Corporation.
4) Sonneborn, Div. of ChemRex; Deep Pour Mortar.
5) Sto Corp., Concrete Restoration Division; Sto Full-Depth Repair Mortar.
6) ThoRoc, Div. of ChemRex; LA Repair Mortar.

b. Cementitious Patching Mortar, Rapid Setting:

1) CGM, Incorporated; Pro Patching Cement.
2) Dayton Superior Corporation.
3) Euclid Chemical Company (The); Euco-Speed.
4) Fox Industries, Inc.; FX-928 Rapid Hardening Mortar.
5) Kaufman Products, Inc.; Duracrete.
6) Meadows, W. R. Inc.
7) Sika Corporation; Sikaset Roadway Patch.
8) Sonneborn, Div. of ChemRex; Road Patch.
9) Sto Corp., Concrete Restoration Division; Sto Rapid Repair Mortar.
10) Tamms Industries, Inc.; Speed Crete 2028.
11) ThoRoc, Div. of ChemRex.
12) Unitex; Patch Set 928.
13) US MIX Products Company; US Spec Transpatch.
14) Watson Bowman Acme Corp., Degussa AG; Wabo Renew 100.

D. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. AQUAFIN, Inc.
b. CGM, Incorporated.
c. Dayton Superior Corporation.
d. Euclid Chemical Company (The).
e. Fox Industries, Inc.
f. Kaufman Products, Inc.
g. MBT Protection and Repair, Div. of ChemRex.
h. Meadows, W. R., Inc..
i. Sika Corporation.

j. Sonneborn, Div. of ChemRex.
k. Sto Corp., Concrete Restoration Division.
l. Tamms Industries, Inc.
m. ThorRoc, Div. of ChemRex, Inc.
n. US MIX Products Company.

E. Polymer-Modified, Silica-Fume-Enhanced, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains silica fume complying with ASTM C 1240 and a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Euclid Chemical Company (The).
b. Fox Industries, Inc.
c. MBT Protection and Repair.
d. Meadows, W. R., Inc.
e. Sika Corporation.
f. Sonneborn, Div. of ChemRex.
g. US Mix Products Company.

2.3 CONCRETE

A. Concrete Materials and Admixtures: Comply with Section 03 30 00 Cast-in-Place Concrete.

B. Steel and Fiber Reinforcement and Reinforcement Accessories: Comply with Section 03 30 00 Cast-in-Place Concrete.

C. Form-Facing Materials: Comply with Section 03 30 00 Cast-in-Place Concrete.

D. Preplaced Aggregate: Washed aggregate complying with ASTM C 33, Class 5S.

E. Fine Aggregate for Grout Used with Preplaced Aggregate: Fine aggregate complying with ASTM C 33, but with 100 percent passing a No. 8 sieve, 95 to 100 percent passing a No. 16 sieve, 55 to 80 percent passing a No. 30 sieve, 30 to 55 percent passing a No. 50 sieve, 10 to 30 percent passing a No. 100 sieve, 0 to 10 percent passing a No. 200 sieve, and having a fineness modulus of 1.30 to 2.10.

F. Grout Fluidifier for Grout Used with Preplaced Aggregate: ASTM C 937.

G. Portland Cement for Grout Used with Preplaced Aggregate: ASTM C 150.

H. Pozzolans for Grout Used with Preplaced Aggregate: ASTM C 618.

2.4 MISCELLANEOUS MATERIALS

A. Epoxy Joint Filler: 2-component, semirigid, 100 percent solids, epoxy resin with a Type A Shore durometer hardness of at least 80 per ASTM D 2240.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Anti-Hydro International, Inc.
b. ChemCo Systems; CCS Grout.

c. Euclid Chemical Company (The).
d. Kaufman Products, Inc.
e. MBT Protection and Repair.
f. Meadows, W. R., Inc.
g. Metzger/McGuire.
h. Sika Corporation. i.
Unitex.
j. US Mix Products Company.

B. Polyurea Joint Filler: 2-component, semirigid, 100 percent solids, polyurea resin with a Type A Shore durometer hardness of at least 80 per ASTM D 2240.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. ASTC Polymers.
b. ChemCo Systems; CCS Grout.
c. Dayton Superior Corporation.
d. Euclid Chemical Company (The).
e. MBT Protection and Repair, Div. of ChemRex.
f. Metzger/McGuire.
g. Sonneborn, Div. of ChemRex.

C. Epoxy Crack Injection Adhesive: ASTM C 881/C 881M.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. ChemCo Systems; CCS Grout.
b. Dayton Superior Corporation.
c. Euclid Chemical Company (The).
d. Kaufman Products, Inc.
e. MBT Protection and Repair, Div. of ChemRex.
f. Meadows, W. R., Inc.; Sealtight Rezi-Weld LV.
g. Sika Corporation.
h. Sonneborn, Div. of ChemRex.
i. Tamms Industries, Inc.; Duralcrete LV.
j. Thermal-Chem; Crack Injection.
k. ThorRoc, Div. of ChemRex, Inc.
l. Unitex.
m. US MIX Products Company; US Spec Maxi - Bond 500LV.

D. Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.

E. Corrosion-Inhibiting Treatment Materials: Water-based solution of alkaline corrosion-inhibiting chemicals that penetrates concrete by diffusion and forms a protective film on steel reinforcement.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Cortec Corporation.
b. Degussa Corporation; Protectosil CIT.
c. Fox industries, Inc.; FX-361 Migratory Corrosion Inhibitor.
d. Sika Corporation; Sika Ferrogard 903.
e. Sonneborn, Div. of ChemRex; Corrosion Inhibitor.

F. Polymer Overlay: Epoxy adhesive complying with ASTM C 881/C 881M, Type III.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Kaufman Products, Inc.
b. Meadows, W. R., Inc.; Sealtight Rezi-Weld Type III DOT.
c. Thermal-Chem; Flexgard T, Product 309.
d. Unitex; Pro-Poxy Type III D.O.T.
e. US MIX Products Company; US SPEC Type III Epoxy Binder.

G. Aggregate for Use with Polymer Overlay: Oven-dried, washed silica sand complying with ACI 503.3.

H. Polymer Sealer: Low-viscosity epoxy penetrating sealer recommended by manufacturer for application to exterior concrete traffic surfaces.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Epoxy Sealers:

1) ChemCo Systems; CCS Coating, Epoxy Healer Sealer.
2) Euclid Chemical Company (The); Euco #512 Epoxy Sealer.
3) Fox Industries, Inc.; FX-452 Epoxy Penetrating Sealer.
4) Kaufman Products, Inc.; SurePoxy Penetrating Sealer.
5) MBT Protection and Repair, Div. of ChemRex; Masterseal GP.
6) Thermal-Chem; Hairline Crack Sealer, Product 207.
7) Unitex; Pro-Seal HS.
8) US MIX Products Company; US Spec Eposeal LVS.

b. High-Molecular-Weight Methacrylate Sealers:

1) Meadows, W. R. Inc.; Sealtight Vocomp-25.
2) Sika Corporation; Sikapronto 19.
3) Transpo Industries, Inc.; Sealate T70.

I. Methylmethacrylate Sealer/Brighteners: Clear low-viscosity sealer recommended by manufacturer for sealing exterior exposed-aggregate concrete, and formulated to bring out color of aggregates and give concrete a wet look.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

a. Dayton Superior Corporation.
b. Kaufman Products, Inc.
c. Meadows, W. R., Inc.; Sealtight CS-309-25.
d. Tamms Industries, Inc.; Luster Seal 300.
e. Unitex; Bright Rock Sealer.
f. US MIX Products Company.

J. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. After fabricating, prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

2. After preparation, apply one coat of lead- and chromate-free, modified-alkyd primer complying with MPI#76 and one coat of alkyd-gloss enamel complying with MPI#96.
3. After preparation, apply two-coat high-performance coating system consisting of organic zinc-rich primer, complying with SSPC-Paint 20 or SSPC-Paint 29 and topcoat of high-build, urethane or epoxy coating recommended by manufacturer for application over specified zinc-rich primer. Comply with coating manufacturer's written directions and with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

    a. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    b. Products: Subject to compliance with requirements, provide one of the following:

        1) Benjamin Moore & Co.; Epoxy Zinc-Rich Primer CM18/19 and M74/M75 Aliphatic Acrylic Urethane Semi-Gloss.
        2) Carboline Company; Carbozinc 621 and Carboguard 890 2-Component Epoxy.
        3) ICI Devoe Coatings; Catha-Coat 313 and Devthane 378 Aliphatic Urethane Semi-Gloss Enamel
        4) International Coatings Limited; Interzinc 315 Epoxy Zinc-Rich Primer and Interthane 870.
        5) PPG Architectural Finishes, Inc; Aquapon Zinc-Rich Primer ABC 97-670 and Aquapon 97-130 Epoxy.
        6) Sherwin-Williams Company (The); Corothane I GalvaPac Zinc Primer and Macropoxy HS High Solids Epoxy.
        7) Tnemec Company, Inc.; Tneme-Zinc 90-97 and Series 27 Hi-Build Epoxy.

K. Bolts, Nuts, and Washers: Carbon steel; ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6), for bolts; ASTM A 563 (ASTM A 563M), Grade A, for nuts; and ASTM F 436 (ASTM F 436M) for washers; hot-dip or mechanically zinc coated.

L. Postinstalled Anchors: Expansion anchors, made from stainless-steel components complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Alloy Group A1 or A4) for bolts and nuts; ASTM A 666 or ASTM A 276, Type 304 or 316, for anchors, with capability to sustain, without failure, a load equal to four times the load imposed, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

M. Composite Structural Reinforcement: Manufacturer's system consisting of carbon or glass-fiber reinforcement in the form of preimpregnated sheets or tow sheet with field-applied saturant, and epoxy primers, fillers, adhesives, saturants, and topcoats, designed for use as external structural reinforcement for concrete.

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
2. Products: Subject to compliance with requirements, provide one of the following:

    a. Sika Corporation; Carbodur and Sikadur 30. b.
    Sumitomo Corporation of America; Replark. c.
    Thermal-Chem; Epic Systems.
    d. VSL (VStructural, LLC), a Structural Group Company; V-Wrap C100. e.
    VSL (VStructural, LLC), a Structural Group Company; V-Wrap EG50. f.
    Watson Bowman Acme Corp., Degussa AG; Wabo MBrace.

2.5 MIXES

A. Mix products, in clean containers, according to manufacturer's written instructions.

1. Add clean silica sand and coarse aggregates to products only as recommended by manufacturer.
2. Do not add water, thinners, or additives unless recommended by manufacturer.

3. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
4. Do not mix more materials than can be used within recommended open time. Discard materials that have begun to set.

B. Mortar Scrub-Coat: Mix with enough water to provide consistency of thick cream.

C. Dry-Pack Mortar: Mix with just enough liquid to form damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.

D. Concrete: Comply with Section 03 30 00 Cast-in-Place Concrete.

E. Grout for Use with Preplaced Aggregate: Proportion according to ASTM C 938. Add grout fluidifier to mixing water followed by cementitious materials and then fine aggregate.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Notify Architect seven days in advance of dates when areas of deteriorated or delaminated concrete and deteriorated reinforcing bars will be located.

B. Locate areas of deteriorated or delaminated concrete using hammer or chain drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries as directed by Architect. At columns and walls make boundaries level and plumb, unless otherwise indicated.

C. Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer, using depth of cover measurements, and verify depth of cover in removal areas using pachometer.

3.2 PREPARATION

A. Protect people, motor vehicles, equipment, surrounding construction, Project site, plants, and surrounding buildings from injury resulting from concrete rehabilitation work.

1. Erect and maintain temporary protective covers over pedestrian walkways and at points of entrance and exit for people and vehicles, unless such areas are made inaccessible during the course of concrete rehabilitation work. Construct covers of tightly fitted, 3/4-inch exterior-grade plywood supported at 16 inches o.c. and covered with asphalt roll roofing.
2. Protect adjacent equipment and surfaces by covering them with heavy polyethylene film and waterproof masking tape or a liquid strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
3. Neutralize and collect alkaline and acid wastes according to requirements of authorities having jurisdiction, and dispose of by legal means off Owner's property.
4. Dispose of runoff from wet operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
5. Collect runoff from wet operations and dispose of by legal means off District's property.

B. Shoring: Install temporary supports before beginning concrete removal.

C. Concrete Removal:

1. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcement.
2. Remove deteriorated and delaminated concrete by breaking up and dislodging from reinforcement.
3. Remove additional concrete, if necessary, to provide a depth of removal of at least 1/2 inch over entire removal area.
4. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar and to provide at least a 3/4-inch clearance around bar.
5. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound and disbonded concrete is completely removed.
6. Provide fractured aggregate surfaces with a profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level, unless otherwise directed.
7. Thoroughly clean removal areas of loose concrete, dust, and debris.

D. Reinforcing Bar Preparation: Remove loose and flaking rust from reinforcing bars by high-pressure water cleaning, abrasive blast cleaning or wire brushing until only tightly bonded light rust remains.

1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in 2 or more adjacent bars, cut bars and remove and replace as directed by Architect. Remove additional concrete as necessary to provide at least 3/4-inch clearance at existing and replacement bars. Splice replacement bars to existing bars according to ACI 318, by lapping, welding, or using mechanical couplings.

E. Preparation of Floor Joints for Repair: Saw-cut joints full width to edges and depth of spalls, but not less than 1 inch deep. Clean out debris and loose concrete; vacuum or blow clear with compressed air.

F. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete by low-pressure water cleaning, detergent scrubbing or sand blasting to remove dirt, oils, films, and other materials detrimental to treatment application. Allow surface to dry before applying corrosion-inhibiting treatment.

G. Surface Preparation for Overlays: Remove delaminated material and deteriorated concrete surface material. Roughen surface of concrete by shot blasting, high-pressure water jetting or milling to produce a surface profile matching CSP per ICRI 03732. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.

H. Surface Preparation for Sealers: Clean concrete by shot blasting, low-pressure water cleaning or detergent scrubbing to remove dirt, oils, films, and other materials detrimental to sealer application.

I. Surface Preparation for Sealers: Acid etch surface of concrete to produce a surface profile matching CSP 1 per ICRI 03732.

1. Remove excess acid solution, reaction products, and debris by squeegeeing or vacuuming.
2. Scrub surface with an alkaline detergent, rinse, and squeegee or vacuum.
3. Check acidity of surface with pH test paper and continue rinsing until pH is acceptable.
4. When pH is acceptable and surface is clean, vacuum dry.

J. Surface Preparation for Composite Structural Reinforcement: Remove delaminated material and deteriorated concrete surface material. Clean concrete where reinforcement and epoxy patching mortar is to be applied by low-pressure water cleaning or detergent scrubbing to remove dirt, oils, films, and other materials detrimental to epoxy application. Roughen surface of concrete by sand blasting.

3.3 APPLICATION

A. General: Comply with manufacturer's written instructions and recommendations for application of products, including surface preparation.

B. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.

C. Epoxy Bonding Agent: Apply to reinforcing bars and concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Apply to reinforcing bars in at least two coats, allowing first coat to dry before applying second coat. Apply patching mortar or concrete while epoxy is still tacky. If epoxy dries, recoat before placing patching mortar or concrete.

D. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface according to manufacturer's written instructions. Apply patching mortar or concrete while bonding agent is still wet. If bonding agent dries, recoat before placing patching mortar or concrete.

E. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.

F. Mortar Scrub-Coat: Dampen repair area and surrounding concrete 6 inches beyond repair area. Remove standing water and apply scrub-coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub-coat dries, recoat before applying patching mortar or concrete.

G. Patching Mortar: Unless otherwise recommended by manufacturer, apply as follows:

1. Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar into substrate, filling pores and voids.
2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
3. For vertical patching, place material in lifts of not more than 1 inch nor less than 1/8 inch. Do not feather edge.
4. For overhead patching, place material in lifts of not more than 1 inch nor less than 1/8 inch. Do not feather edge.
5. After each lift is placed, consolidate material and screed surface.
6. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
7. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth surface with a sponge float broom.
8. Wet-cure cementitious patching materials, including polymer-modified, cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.

H. Dry-Pack Mortar: Use for deep cavities and where indicated. Unless otherwise recommended by manufacturer, apply as follows:

1. Provide forms where necessary to confine patch to required shape.
2. Wet substrate and forms thoroughly and then remove standing water.
3. Place dry-pack mortar into cavity by hand, and compact into place with a hardwood drive stick and mallet or hammer. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.
4. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
5. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.

I. Concrete: Place according to Section 03 30 00 Cast-in-Place Concrete and as follows:

1. Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcement and concrete substrate.

2. Apply latex bonding agent to concrete substrate.
3. Use vibrators to consolidate concrete as it is placed.
4. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
5. Place concrete by form and pump method.

    a. Design and construct forms to resist pumping pressure in addition to weight of wet concrete. Seal joints and seams in forms and junctions of forms with existing concrete.
    b. Pump concrete into place, releasing air from forms as concrete is introduced. When formed space is full, close air vents and pressurize to 14 psi.

6. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
7. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.

J. Grouted Preplaced Aggregate Concrete: Use for column and wall repairs where indicated. Place as follows:

1. Design and construct forms to resist pumping pressure in addition to weight of wet grout. Seal joints and seams in forms and junctions of forms with existing concrete.
2. Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcement and concrete substrate.
3. Place aggregate in forms, consolidating aggregate as it is placed. Pack aggregate into upper areas of forms to achieve intimate contact with concrete surfaces.
4. Fill forms with water to thoroughly dampen aggregate and substrates. Drain water from forms before placing grout.
5. Pump grout into place at bottom of preplaced aggregate, forcing grout upward. Release air from forms at top as grout is introduced. When formed space is full and grout flows from air vents, close vents and pressurize to 14 psi.
6. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
7. Repair voids with patching mortar and finish to match surrounding concrete.

K. Joint Filler: Install in nonmoving floor joints where indicated.

1. Install filler to a depth of at least 1 inch. Use fine silica sand no more than 1/4 inch deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
2. Install filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.

L. Epoxy Crack Injection: Comply with manufacturer's written instructions and the following:

1. Clean areas to receive capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
2. Place injection ports as recommended by epoxy manufacturer, spacing no farther apart than thickness of member being injected. Seal injection ports in place with capping adhesive.
3. Seal cracks at exposed surfaces with a ribbon of capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
4. Inject cracks wider than 0.003 inch to a depth of 8 inches or to a width of less than 0.003 inch, whichever is less.
5. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
6. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.

M. Corrosion-Inhibiting Treatment: Apply by brush, roller, or airless spray in two coats at manufacturer's recommended application rate. Remove film of excess treatment by high-pressure washing before patching treated concrete.

1. Apply to areas indicated.

N. Polymer Overlay: Apply according to ACI 503.3.

1. Apply to traffic-bearing surfaces, including parking areas and walks.

O. Polymer Sealer: Apply by brush, roller, or airless spray at manufacturer's recommended application rate.

1. Apply to traffic-bearing surfaces, including parking areas and walks.

P. Methylmethacrylate Sealer/Brighteners: Apply by brush, roller, or airless spray at manufacturer's recommended application rate.

1. Apply to exterior concrete surfaces that are exposed to view, excluding traffic-bearing surfaces.

Q. Composite Structural Reinforcement Using Preimpregnated Fiber Sheet: Unless otherwise recommended by manufacturer, apply as follows:

1. Patch surface defects with epoxy mortar and allow to set before beginning reinforcement application.
2. Apply epoxy adhesive to a thickness of 1/16 inch to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
3. Clean preimpregnated fiber sheet with acetone or other suitable solvent, and apply epoxy adhesive to a thickness of 1/16 inch.
4. Apply adhesive-coated fiber sheet to adhesive-coated concrete within open time of epoxy adhesive, and roll with a hard rubber roller until fiber sheet is fully embedded in adhesive, air pockets are removed, and adhesive is forced out from beneath fiber sheet at edges.
5. Apply additional layers as indicated using same procedure.

R. Composite Structural Reinforcement Using Fiber Tow Sheet and Saturant: Unless otherwise recommended by manufacturer, apply as follows:

1. Apply epoxy primer using brush or short nap roller to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
2. After primer has set, patch surface defects with epoxy filler and allow to set before beginning reinforcement application.
3. Apply epoxy saturant to fiber tow sheet or primed and patched surface with 3/8-inch nap roller. Apply fiber tow sheet to primed and patched surface while saturant is still wet, using pressure roller to remove air pockets. Remove paper backing from fiber tow sheet and apply additional epoxy as needed to fully saturate tow sheet.
4. Apply additional layers as indicated, fully saturating each with epoxy.
5. After saturant has cured, apply protective topcoat by brush, roller, or spray.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to sample materials and perform tests as follows:

1. Patching Mortar, Packaged Mixes: Three (3) randomly selected samples tested according to ASTM C 928.
2. Patching Mortar, Field Mixed: Three (3) randomly selected samples tested for compressive strength according to ASTM C 109/C 109M.
3. Concrete: As specified in Section 03 30 00 Cast-in-Place Concrete.
4. Grouted Preplaced Aggregate: Tested for compressive strength of grout according to ASTM C 942.

a. Testing Frequency: One sample for each 25 cu. yd. of grout or fraction thereof, but not less than one sample for each day's work.

5. Joint Filler: Core drilled samples to verify proper installation.

   a. Testing Frequency: One sample for each 100 feet of joint filled.
   b. Where samples are taken, fill holes with joint filler.

6. Epoxy Crack Injection: Core drilled samples to verify proper installation.

   a. Testing Frequency: 3 samples from mockup and 1 sample for each 100 feet of crack injected.
   b. Where samples are taken, fill holes with epoxy mortar.

END OF SECTION

PART 1 – GENERAL COLORED CONCRETE

1.01 SECTION INCLUDES

A. Finishing concrete sidewalks.

B. Surface treatment with slip resistant finish.

1.02 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete: Prepared concrete sidewalks ready to receive finish; control and formed expansion and contraction joints and joint devices.

1.03 REFERENCES
ACI 301 - Structural Concrete for Buildings.

1.04 QUALITY ASSURANCE
Perform Work in accordance with ACI 301.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products to Site under provisions of Section 01 31 13 - Coordination.

B. Deliver materials in manufacturer's packaging including application instructions.

1.06 COORDINATION

A. Coordinate Work under provisions of Section 01 31 13 - Coordination.

B. Coordinate the Work with concrete sidewalk placement and concrete sidewalk curing.

PART 2 - PRODUCTS

2.01 COMPOUNDS - HARDENERS AND SEALERS
Sealer: Not Used.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify site conditions under provisions of Section 01 31 13 - Coordination.

B. Verify that sidewalk surfaces are acceptable to receive the work of this section.

3.02 SIDEWALK AND CONCRETE FLATWORK FINISHING:

A. General:
1. Finish concrete as specified herein, in lieu of typical finishes.
2. All work to match approved samples.
3. The Contractor is to limit pour areas and provide sufficient ratio of finishers to produce specified finishes.
4. Finish concrete sidewalk surfaces in accordance with ACI 301 and ACI 302.

B. Typical Finish: Moderate broom finish. Provide heavy broom finish at slopes of 6% or greater.

C. Control Joints:
1. Type; Typical: V-groove radius tool (as indicated on Drawings).
2. Patterns: Follow indicated patterns; where not indicated, mark as follows:
   a. Walks: Into squares, equal to walk width unless otherwise indicated on drawings.
   b. All areas 8' or wider: Into approximate squares, 8' maximum diameter unless otherwise indicated on drawings.
3. Tooling: Radius tool all exposed edges, edges adjacent to all permanent concrete headers, edges at each side of all metal joint screeds and at each side of all expansion joints.

D. Stained Concrete:
1. Apply concrete stain in areas shown on the Drawings.
2. Stain Product/Manufacturer:
   Lithochrome, L. M. Scofield Company, 323-720-3000
3. Apply stain per stain manufacturer's printed application instructions. Keep copy of manufacturer's printed application instruction at the project Site during all stain applications(s).
4. Construct four (4) foot by four (4) foot mock-up concrete stained panel, which is not a part of the permanent construction and obtain Architect's approval of mock-up panel before installing stain on any permanent Work. All stained concrete to match the Architect's approval of mock-up panel to be poured at the same time and cured in the same manner as the permanent Work.

5. All stained concrete work not installed per the stain manufacturer's printed installation instructions and/or not matching the Architect approved mock-up concrete stained panel will be rejected. All non-conforming concrete shall be replaced.

3.03 TOLERANCES

Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.01 Provisions of Divisions 01 apply to this section

1.02 SECTION INCLUDES

A. Formwork for cast-in-place concrete as indicated.

B. Installation of items to be embedded in concrete, such as anchor bolts, inserts, embeds, and sleeves.

1.03 RELATED REQUIREMENTS

A. Section 01 42 00: Testing and Inspection.

B. Section 03 20 00: Concrete Reinforcement.

C. Section 03 30 00: Cast-In-Place Concrete

1.04 SYSTEM DESCRIPTION

A. Work shall be in accordance with CBC, Chapter 19A, Concrete.

1.05 SUBMITTALS

A. Submit Shop Drawings indicating locations of forms, joints, embedded items, and accessories.

B. Submit manufacturer's product data for form materials and accessories.

1.06 QUALITY ASSURANCE

A. As a minimum requirement, conform to ACI 347, Chapter 1: Design and Chapter 3: Materials for Formwork; ACI 301, “Specifications for Structural Concrete for Buildings”, as applicable, and for plywood, conform to tables for form design and strength in APA Form V 345.

B. Provide mock-ups for architectural exposed finishes.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials for forms in timely manner to ensure uninterrupted progress.

B. Store materials by methods that prevent damage and permit inspection and identification.

PART 2 PRODUCTS

2.01 GENERAL

A. Form materials may be reused provided they are completely cleaned and reconditioned, recoated for each use, capable of producing formwork of required quality, and are structurally sound.

B. Form Lumber: WCLIB Construction Grade or Better, WWPA No. 1 or Better.

C. Plywood: PS 1 95, Group I, Exterior Grade B-B Plyform or better.

D. For exposed painted concrete, plastic overlaid plywood of grade specified above, factory coated with a form coating and release agent Noxcrete", or equal.

E. Tube Forms: Burke "SmoothTube,” Sonoco "Seamless Sonotubes,” or Alton Building Products "Sleek Seamless Standard Wall,” of the type leaving no marks in concrete.

F. Joist Forms: Code recognized steel or molded plastic types as required.

G. Special Forms: For exposed integrally-colored concrete, plywood as above with high density overlay, plywood with integral structural hardboard or fibrous glass reinforced plastic facing.
H. For Exposed Concrete Finish, material can be the following types: plywood, glass, steel and a combination plywood formwork types.
I. Form Ties: Prefabricated rod, flat band, wire, internally threaded disconnecting type.
J. Form Coating: Non-staining clear coating free from oil, silicone, wax, not grain-raising, or "Cast-Off".
K. Form Liner: Rigid or resilient type.
L. Void Forms: Forms shall be "WallVoid" for temporary support and "SlabVoid" for creating gaps. Void forms shall be fabricated of corrugated paper with moisture resistant exterior and shall be capable of withstanding working load of 1,500 psf.

PART 3 EXECUTION

3.01 GENERAL

A. Forms shall be constructed so as to shape final concrete structure conforming to shape, lines and dimensions of members. They shall be properly braced or tied together and their supports shall be designed so that previously placed structures will not be damaged.

3.02 ERECTION

A. Plywood shall be installed with horizontal joints level, vertical joints plumb and with joints tight. Reused plywood shall bethoroughly cleaned and repaired, nail plywood to maintain alignment and prevent warping.

B. Provide temporary openings at points in formwork to facilitate cleaning and inspection.

3.03 REMOVAL OF FORMS

A. Forms shall not be removed until concrete has sufficiently hydrated and shoring shall not be removed until member has acquired sufficient strength.

B. Compressive strength of in-place concrete shall be determined by testing field-cured specimens representative of concrete location or members, as specified in Cast-In-Place Concrete.

3.04 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.05 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCEMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete and concrete masonry units.

B. Supports and accessories for steel reinforcement.

1.2 RELATED SECTIONS

A. Section 03 10 00 - Concrete Forms and Accessories.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 03 45 00 - Architectural Precast Concrete: Reinforcement for precast concrete panels.

1.3 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.

B. ACI 318- Building Code Requirements For Reinforced Concrete and Commentary; American Concrete Institute International.

C. ACI SP-66 - ACI Detailing Manual; American Concrete Institute International.

D. ASTM A 82- Standard Specification for Steel Wire, Plain, for Concrete Reinforcement.

E. ASTM A 184/A 184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.

F. ASTM A 185- Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

G. ASTM A 497/A 497M- Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.

H. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel 1;3ars for Concrete Reinforcement.

I. ASTM A 704/A 704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

J. ASTM A 706/A 706M- Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement.

K. ASTM A 996/A 996M -Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement.

L. AWS D1.4 - Structural Welding Code- Reinforcing Steel; American Welding Society.

M. California Code of Regulations (CCR) Title 24 California Building Code (CBC). 2010 Edition.

N. CRSI (DA4)- Manual of Standard Practice; Concrete Reinforcing Steel Institute.

O. CRSI (P1)- Placing Reinforcing Bars; Concrete Reinforcing Steel Institute.

1.4 SUBMITTALS

A. Shop Drawings: Only when deviations are made from the contract documents, submit shop drawings under provision of Section 01 33 13 with deviations clearly identified.

1. Indicate sizes, spacings, locations and quantities of reinforcing steel, wire fabric, bending and cutting schedules, splicing, stirrup spacing, supporting and spacing devices.

B. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

C. Reports: Submit certified copies of mill test report of reinforcement materials analysis, indicate physical and chemical analysis.

D. Welders Certificates: Submit certifications for welders employed on the project, verifying AWS qualifications within the previous 12 months.

1.5 QUALITY ASSURANCE

A. Perform work of this section in accordance with CRSI (DA4), CRSI (P1), ACI 301, and ACI SP-66.

B. Tests of Reinforcing bars shall be in conformance with 2010 CBC Sections 1916A.2 and 1704A.4.1.

PART 2 - PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60.

1. Deformed billet-steel bars.

2. Unfinished.

B. Reinforcing Steel: ASTM A 706/A 706M, deformed low-alloy steel bars.

1. Unfinished.

C. Steel Welded Wire Reinforcement: ASTM A185/A 185M, plain type.

1. Welded Wire Mat Reinforcing: mesh size and gage as indicated on drawings.

D. Steel Welded Wire Reinforcement: ASTM A 497, deformed type.

1. Flat Sheets.

2. Mesh Size and Wire Gage: As indicated on drawings.

E. Reinforcement Accessories:

1. Tie Wire: Annealed, minimum 16 gage acceptable patented system.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement, including load bearing pad on bottom to prevent vapor barrier puncture.

3. Provide stainless steel, plastic, or plastic coated steel components for placement within 1 %" of weathering surfaces.

2.2 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4)- Manual of Standard Practice.

B. Welding of reinforcement, in conformance with 2010 CBC Section 1903A.7 with Table 1704A.3, is permitted only with the specific approval of Structural Engineer. Perform welding in accordance with AWS D1.4.

C. Obtain approval from the architect/engineer for additional reinforcing splices not indicated on drawings.

PART 3 - EXECUTION

3.1 PLACEMENT

A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.

D. Do not displace or damage vapor barrier.

E. Accommodate placement of formed openings.

3.2 FIELD QUALITY CONTROL

A. An independent testing agency, as specified in Section 01 40 00, will inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF
SECTION

CONCRETE TOPPING

PART 1 GENERAL

1.01 SUMMARY

A. This Section includes floor topping with integral color, applied over previously placed base slab at interior and exterior slabs.

1.02 REFERENCES

A. Comply with requirements of Section "Cast-In-Place Concrete" and as herein specified. B.

In addition to sample specified in “Cast-In-Place Concrete” submit 12” square samples of proposed concrete toppings with integral finish for preliminary review.

1.03 SUBMITTALS

A. Furnish laboratory test reports, and materials certificates as specified in Section “Cast-In-Place Concrete.”, submit product data for proprietary products and produce a mock-up of the concrete topping representing the specified color, finish, and joint detail and pattern.

PART 2 PRODUCTS

2.01 CEMENT AND AGGREGATES

A. Portland Cement: ASTM C150, Type I or Type III

B. Aggregate: Normal Weight, ASTM C33

C. Fly Ash will not be permitted

D. Integral Concrete Colorant is produced by natural and synthetic iron oxides and chromium oxides, compounded for use in ready-mix concrete. Mix, place, finish, cure and provide other activities to produce concrete of reasonably uniform color, texture and durability, as approved. Ready-mix concrete may be placed in 2 lifts after review of procedures to assure water-cementitious materials ratio and temperature of both lifts are identical and placement of top lift before initial set of lower lift.

E. Curing Compounds and Sealers are as recommended by colorant manufacturer.

2.02 TOPPING MIX

A. Design mix to produce topping material with f’c = 3000 psi at 28 days, slump and maximum W/C ratio as specified in Section 033000 and 150 lbs per cu. foot.

2.03 MIXING

A. Provide batch type mechanical mixer for mixing topping material at Project site and only use mixers that are capable of mixing aggregates, cement, and water into a uniform mix within specified time

B. Mix each batch after ingredients are in mixer. Ready-mixed topping may be used when acceptable to College’s Representative

PART 3 EXECUTION

3.01 CONDITION OF SURFACES

A. Remove contaminants, leaving a clean surface of hardened concrete. Roughen base slab surface of hardened concrete for acceptable bonding. Dampen slab surface prior to placing topping mixture, which should be placed after rewettable bonding compound has dried or epoxy

adhesive is still tacky.

3.02 PLACING AND FINISHING

A. Spread topping mixture evenly to the required elevation and strike off. After the topping has stiffened sufficiently and water sheen has disappeared, float the surface at least twice to a uniform sandy texture.

B. Trowel in joints as shown.

C. After floating, begin trowel finish operation using power driven trowels.

D. Perform operations as necessary to match mock-up and apply a light hand trowel finish followed by the finish indicated after final floating.

3.03 CURING AND PROTECTION

A. Cure concrete with curing compound recommended by the colorant material manufacturer.

B. Protect topping applications and finishes as specified in Section "Cast-In-Place Concrete."

3.04 PERFORMANCE

A. Failure of concrete topping to bond to substrate, or disintegration or other failure of topping to perform as a floor finish will be considered failure of materials and workmanship.

3.05 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 WORK INCLUDES:

A. Cast in place structural concrete.

B. Precast concrete.

C. Non-structural concrete.

1.2 RELATED SECTIONS:

A. Section 03 10 00 - Concrete Formwork and Accessories.

B. Section 03 20 00 - Concrete Reinforcement.

C. Section 03 45 00 - Precast Architectural Concrete.

D. Section 07 26 16 – Under Slab Vapor Retarders.

E. Section 07 92 05 – Joint Sealers.

F. Section 32 13 16 - Concrete Paving.

1.3 REFERENCES

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; American Concrete Institute International.

B. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete; American Concrete Institute International

C. ACI 301 - Specifications for Structural Concrete for Buildings; American Concrete Institute International.

D. ACI 302.1R - Guide for Concrete Floor and Slab Construction; American Concrete Institute International.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; American Concrete Institute International.

F. ACI 305R- Hot Weather Concreting; American Concrete Institute International.

G. ACI 306R- Cold Weather Concreting; American Concrete Institute International.

H. ACI 308R- Guide to Curing Concrete; American Concrete Institute International.

I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; American Concrete Institute International.

J. ASTM C 33- Standard Specification for Concrete Aggregates.

K. ASTM C 39/C 39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

L. ASTM C 94/C 94M - Standard Specification for Ready-Mixed Concrete.

M. ASTM C 143/C 143M- Standard Test Method for Slump of Hydraulic-Cement Concrete.

N. ASTM C 150 - Standard Specification for Portland Cement.

O. ASTM C 171 -Standard Specification for Sheet Materials for Curing Concrete.

P. ASTM C 173/C 173M- Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

Q. ASTM C 260 - Standard Specification for Air-Entraining Admixtures for Concrete.

R. ASTM C 309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

S. ASTM C 330 – Standard Specification for Lightweight Aggregates for Structural Concrete.

T. ASTM C 494/C 494M - Standard Specification for Chemical Admixtures for Concrete.

U. ASTM C 618- Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

V. ASTM C 685/C 685M – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing.

W. ASTM C 881/C 881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.

X. ASTM C 1059 - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete.

Y. ASTM C 1107/C 1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

Z. ASTM E 1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers.

AA. ASTM E 1155M - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers [Metric].

BB. California Code of Regulations (CCR) Title 24 California Building Code (CBC), 2010 Edition.

1.4 DEFINITIONS

A. Severe Exposure: Concrete which is in contact with moisture or deicing salts, such as pavements, sidewalks, parking garage floors, etc.

B. Moderate Exposure: Concrete which is occasionally exposed to moisture, such as exterior walls, beams, girders, and slabs not in contact with soil, etc.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01 33 13.

B. Shop Drawings: Submit drawings locating slab-on-grade construction joints, control joints, and isolation joints.

C. Product Data: Submit product data for proprietary products.

D. Sample: Provide 48 inch by 48 inch mock-up of each topping slab type, complete with integral color and finish as indicated on architectural color schedule. Sample to be reviewed and approved by architect prior to actual concrete placement of topping slab.

E. Mix Designs:

1. Submit proposed concrete mix designs for each class or use at least 30 days prior to required delivery.

2. Obtain Owner's Testing Laboratory approval prior to submitting mix designs for Architect/Engineer approval.

3. Mixes shall be prepared by a professional engineer licensed in the state in which the project is located.

4. Each concrete mixtures containing fly ash as replacement for Portland Cement or other Portland Cement replacements and for equivalent concrete mixtures that do not contain Portland Cement replacements.

5. Specifically indicate where each class of concrete is to be used.

6. Indicate individual and combined aggregate gradations and aggregate source and characteristics.

F. For concrete, accompany each load of materials or concrete with signed copy of batch plant's certificates stating quantity of each material, amount of water, admixtures, departure time and date.

1. When batch plant inspection is waived, provide affidavit in accordance with Title 24, Part 2, Section 1704A.4.3 to Owner's Testing Laboratory.

G. Test Reports: Submit aggregate and concrete mix test reports from independent testing laboratory as required by Division 1.

1.6 QUALITY ASSURANCE

A. Certifications:

1. Submit material certification for admixtures and aggregates, certifying their compliance with specifications.

2. Submit certified mill test reports for each lot of cement.

B. Perform work of this section in accordance with ACI 301 and ACI 318.

C. Acquire cement from same source and aggregate from same source for entire project.

D. Follow recommendations of ACI 305R for concreting during hot weather.

E. Follow recommendations of ACI 306R for concreting during cold weather.

F. Proportions of concrete shall conform to 2010 CBC, Sections 1905A.2, 1905A.3 and 1905A.4.

1.7 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 01 30 00.

PART 2 - PRODUCTS

2.1 FORMWORK

A. Comply with the requirements of Section 03 10 00.

2.2 REINFORCEMENT

A. Comply with the requirements of Section 03 20 00.

2.3 CONCRETE MATERIALS

A. Portland Cement:

1. ASTM C150, Type as indicated in the structural drawings and in conformance with 2010 CBC, Sections 1704A.4.1 and 1916A.1.

2. Air-entraining portland cement, as defined by ASTM C150, is prohibited.

B. Aggregate:

1. Coarse Aggregate in conformance with 2010 CBC, Sections 1704A.4.1 and 1903A.3:

a. ASTM C33 for normal weight aggregate.

b. ASTM C330 for lightweight aggregate.

2. Fine Aggregate: ASTM C33.

3. Exposed Aggregate: To match Architect's sample.

C. Water: Clean, fresh and potable.

D. Admixtures:

1. Calcium chloride, thiocyanates, or admixtures containing more than 0.05 percent chloride ions are not permitted unless approved by Architect.

2. Air Entraining: ASTM C260.

3. Water-reducing: ASTM C494, Type A.

4. High Range Water-reducing (Superplasticizer): ASTM C494, Type F or Type G.

5. Fly Ash: ASTM C 618, Class Nor F (Class Cis not permitted).

a. Maximum 15% by weight of fly ash or other pozzolan may be substituted for ASTM C-150 Portland Cement.

6. Water-reducing, Non-corrosive, Non-chloride Accelerator:

   a. ASTM C494, Type E.

   b. Submit long term non-corrosive test data from independent testing laboratory using accelerated test method such as electrical potential measure.

7. Water-reducing, Retarding: ASTM C494, Type D.

E. Bonding Admixture:

1. Acrylic or styrene butadiene, non re-emulsifiable.

2. Acceptable Products:

   a. Flex-Con or SBR Latex, Euclid Chemical Company, Cleveland, OH.

   b. Everbond, L&M Construction Chemicals, Inc., Omaha, NE.

   c. Intralok, W. R. Meadows, Inc., Elgin IL.

F. Bonding Grout:

1. Mix consisting of portland cement, part fine sand passing No. 30 mesh sieve, bonding admixture, and water in proportions as recommended by bonding admixture manufacturer.

2. Minimum 1:1 cement to sand ratio.

3. Mix to achieve consistency of thick cream.

2.4 CURING MATERIALS

A. Sheet Curing Materials: ASTM C171; white opaque polyethylene film, white polyethylene coated burlap sheeting, or regular waterproof paper.

B. Dissipating Resin Curing Compounds:

1. ASTM C309, Type 1 [1-D] clear or translucent [with fugitive dye] [Type 2 white pigmented at exterior locations], Class B, free of natural or petroleum waxes. Class A not acceptable.

2. Liquid, membrane forming, 100 percent resin based allowing maximum moisture loss in 72 hours of 0.11 lb/sq. ft..

3. Compatible with subsequent coatings and toppings.

4. Acceptable Products:

   a. Kurex, Cham-Masters Corporation, Madison, OH.

   b. Kurez DR, Euclid Chemical Company, Cleveland, OH.

   c. L&M Cure DR, L&M Construction Chemicals, Inc., Omaha, NE.

   d. 3100 Clear, W. R. Meadows, Inc., Elgin, IL.

   e. ABCO 1309 Resin Cure, Nox-Crete Chemicals, Omaha, NE.

   f. Kurez VOX, Euclid Chemical Co., Cleveland, OH.

g. L&M CureR, L&M Construction Chemicals, Inc,. Omaha, NE

h. 1100 Clear, W.R. Meadows, Elgin, IL.

C. Water Based Acrylic Curing/Sealing Compounds at areas to be left exposed:

1. ASTM C1315, Type I, Class A [B] [C], VOC compliant, free of natural or petroleum waxes. Dries clear with high [medium] gloss sheen.

2. Liquid, membrane forming, minimum 30 percent [20 percent] acrylic resin solids, allowing maximum moisture loss in 72 hours of 0.08 lb/sq. ft.

3. Compatible with subsequent coatings and toppings.

4. Acceptable Products:

a. Super Diamond Clear VOX, Euclid Chemical Company, Cleveland, OH.

b. Dress & Seal WB 30, L&M Construction Chemicals, Inc., Omaha, NE.

c. VOCOMP 30, W. R. Meadows, Inc., Elgin, IL.

2.5 PATCHING AND REPAIR MATERIALS

A. Epoxy Adhesive:

1. 100 percent solids, two component material suitable for use on dry or damp surfaces, conforming to ASTM C881.

2. Acceptable Products and Manufacturers:

a. Concresive Liquid LPL, Master Builders, Inc., Cleveland, OH.

b. Sikadur Hi-Mod 32, Sika Corporation, Lyndhurst, NJ.

c. Euco 452 or 620 System, Euclid Chemical Company, Cleveland, OH.

B. Patching Compound:

1. Polymer modified cementitious mortar.

2. Acceptable Products and Manufacturers:

a. Thin Coat, Concrete Coat, or Verticoat, Euclid Chemical Company, Cleveland, OH.

b. Duratop, L&M Construction Chemicals, Inc., Omaha, NE.

c. Sikatop 121, 122, or 123, Sika Corporation, Lyndhurst, NJ.

C. Patching Mortar:

1. Comprised of same materials and approximately same proportions as used for surrounding concrete, except with coarse aggregate omitted.

2. Consisting of not more than 1 part cement to 2-1/2 parts sand.

3. Substitute white portland cement for portion of gray portland cement to match color of surrounding exposed concrete.

4. Limit mixing water to no more than necessary for handling and placing. Maximum water/cement ratio of 0.50.

D. Bonding Agent:

1. Acrylic, ASTM C1059, Type II, Non redispersable.

2. Acceptable Products and Manufacturers:

a. Everbond, L&M Construction Chemicals, Inc., Omaha, NE.

b. Daraweld-C, Grace Construction Products, Cambridge, MA.

c. lntralok, W. R. Meadows, Inc., Elgin IL.

E. Evaporation Retardants:

1. Eucofilm, Euclid Chemical Co., Cleveland, OH.

2. E-Con, L&M Construction Chemicals, Inc., Omaha, NE.

3. Confilm, Master Builders, Inc., Cleveland, OH.

2.6 CONCRETE MIXES

A. Proportioning shall be in conformance with 2010 CBC Sections 1905A.2, 1905A.3 and 1905A.4.

1. Proportioning shall be by weight of loose, dry material.

a. 94 pounds of cement shall be considered 1 cubic foot.

b. Fine aggregate volume shall be at least 35%, with maximum of 50%, of sum of separate fine and coarse aggregate volumes.

c. Weighing equipment shall be accurate to within 1 pound and be adjustable for varying aggregate moisture content. Beam auxiliary shall register any part of last 100 pounds of each aggregates; aggregate hopper shall have volume adjustment.

2. Lightweight Coarse Aggregate: Measure by volumetric batching.

3. Accurately control proportions, water content, and air content.

a. Admixtures: Conform to type specified.

b. Quantity per sack of cement and method of using admixture shall be in accordance with recommendations of manufacturer and laboratory furnishing mix design.

c. Cement Grout: One part by volume Portland cement and 2-1/2 parts fine aggregate.

d. Mix dry; add just enough water to make mixture flow under its own weight.

e. Patching Mortar: Mix liquid

f. Combine dry mix with liquid and add water in proportions recommended by manufacturer.

B. Mix Design:

1. Submit design mixes for each type and class of concrete based on laboratory trial batch method or field experience methods described in ACI-318, Chapter 5.

2. If trial batch method is used, employ an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs. Mix designs are to be prepared by a professional engineer licensed in the state in which the project is located. Contractor employed testing agency shall not be same firm as Owner employed testing agency;

3. Use concrete of approved mix designs only.

4. The proportioning of ingredients shall provide a concrete readily worked into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.

5. Do not place concrete until design mix for that class and type of concrete is reviewed by Architect.

6. Indicate locations in structure where each mix design is to be used.

7. Identify each mix design with code number which will be used on batch tickets.

C. Design Compressive Strengths: As indicated on Structural Drawings.

1. Normal Weight Concrete:

   a. Compressive strength, when tested in accordance with ASTM C 39/C 39M, strength at 7 days shall be at least 60% of the minimum required 28 day strength unless noted otherwise on drawings.

   b. Maximum slump 4 inches.:!: 1".

2. Lightweight Weight Concrete:

   a. Compressive strength, when tested in accordance with ASTM C 39/C 39M, strength at 7 days shall be at least 60% of the minimum required 28 day strength unless noted otherwise on drawings.

   b. Maximum slump 4 inches.:!: 1".

   c. The air dry unit weight shall be determined by ASTM C567, except that the drying time shall be 90 days.

D. Maximum Size of Coarse Aggregate:

1. 1/5 narrowest dimension between form sides.

2. 1/3 depth of slabs.

3. 3/4 of minimum clear distance between reinforcing bars, wires, or bundles of bars.

4. 1 inch maximum for normal weight concrete or 5/8 inch maximum for light weight concrete.

E. Concrete Slump at Point of Discharge:

1. Ramps and Sloping Surfaces: Not more than 3 inches.

2. Reinforced Foundations: Not less than 1 inch and not more than 4 inches.

3. Concrete Containing Superplasticizer: Not more than 9 inches after addition of superplasticizer. Slump before addition of superplasticizer: 2 to 3 inches

4. Other Concrete: Not less than 1 inch and not more than 4 inches.

5. Allowable tolerances of up to 1 inch above maximum indicated provided average of 10 most recent batches tested is less than maximum.

F. Minimum Cement Content: Not less than 470 pounds of total cementitious material per cubic yard of concrete. Not more than 15% flyash or pozzolan cement substitute and not less than 385 pounds of cement per cubic yard of concrete.

G. Water-Cement Ratios for Concrete (by weight):

1. Maximum permissible water cement ratio: 0.50 unless noted otherwise on drawings.

H. Admixtures:

1. Only use admixtures which have been tested and approved in mix designs.

2. Air entraining Admixture:

a. Use in concrete exposed to freezing and thawing at any time during construction or in completed structure.

b. Use in concrete placed at ambient temperatures below 40 degrees F.

c. Tolerance on air content as delivered: Plus or minus 1-1/2 percent.

3. Conform to air content requirements indicated on Drawings.

I. Maximum water soluble chloride ion concentrations in hardened concrete at ages from 28 to 42 days contributed from all ingredients, expressed as percent by weight of cement as follows:

1. Concrete over galvanized deck: 0.06 percent.

2. Concrete exposed to chloride in service: 0.15 percent.

3. Other concrete: 1.00 percent.

J. Shrinkage Tests:

1. Prior to placing any concrete for walls or horizontal surfaces, a trial batch of each mix design of structural concrete shall be prepared using the aggregates, cement and admixture (if any) proposed for the project. From each trial batch at least 3 specimens for determining drying shrinkage shall be prepared. The drying shrinkage specimens shall be a 4" x 4" x 11" prisms fabricated, cured, dried, and measured in accordance with the requirements of Tentative Method of Test for Length Change of Cement Mortar and Concrete, ASTM C157. The measurements shall be made and reported separately for 7 and 28 days of drying after 7 days of moist curing. The effective gage length of the specimens shall be 10", and except for the foundation concrete, the average drying shrinkage at 35 days shall not exceed .054%.

2. Previous Test: Ready-mixed concrete manufacturer may furnish certified test reports from approved Testing Laboratory as proof of meeting shrinkage requirements, provided aggregate used and concrete covered by such test report conform to mix design approved for use on this project. Method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs.

K. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold weather placement requirements.

2.7 MIXING

A. Ready-Mix Concrete:

1. Comply with ASTM C 94/C 94M.

2. Before using trucks for batching, m1x1ng, and transporting concrete, thoroughly clean trucks and equipment of materials capable of contaminating concrete.

3. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 is required.

4. When air temperature is between 85 degrees F and 90 degrees F, reduce mixing and delivery time from 90 minutes to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

5. Do not add water to ready-mix concrete at Project site except when slump is below specified limits and total water does not exceed the design water-cement ratio; inject added water into mixer and mix thoroughly before discharging.

B. Provide certificate signed by authorized official of supplier with each load of concrete stating following:

1. Time truck left plant.

2. Mix of concrete, identify with code number of mix design.

3. Amount of water and cement in mix.

4. Amount and type of admixtures.

5. Amount of water added at project site.

6. Time truck is unloaded at project site.

C. Truck mixers without batch tickets will be rejected.

D. Retain certificates at Project site. Submit to Architect for review upon request.

2.8 PRODUCTION

A. Ready Mixed Concrete

1. Except as otherwise provided in these specifications, ready mixed concrete shall be batched, mixed, and transported in accordance with ASTM C94 "Specification for Ready Mixed Concrete."

B. Lightweight Concrete

1. Lightweight concrete shall be batched and mixed as recommended by the concrete supplier to achieve accurate volume and the necessary quality.

2. Aggregate storage conditions, batching, and mixing procedures shall prevent premature slump loss of the concrete during delivery and discharge.

C. Mixing Water Control

1. Concrete which arrives at the jobsite with slump below that specified for placement may be adjusted by the addition of water to increase slump, provided the maximum slump is not exceeded and the maximum water content of the design mix is not exceeded. Following any such water addition, the concrete shall be mixed at mixing speed for at least 30 revolutions of the drum.

2. After adjustment is made to the proper slump, the concrete shall be discharged as long as it retains its placeability without the further addition of water.

3. Concrete shall be placed within one and one half hours after mixer is charged in average conditions. Time shall be reduced to one hour during hot weather concreting.

2.9 SOURCE QUALITY CONTROL

A. Testing will be performed under the provisions of Section 01 40 00, except as otherwise specified.

B. Independent Testing Laboratory, approved by Architect and employed by Contractor, is responsible for:

1. Testing aggregate as follows at start of work and whenever change in aggregate source occurs:

a. Gradation and fineness modulus: ASTM C136.

b. Specific gravity: ASTM C127 for coarse aggregate, ASTM C128 for fine aggregate.

c. Organic impurities: ASTM C40.

d. Effect of organic impurities on strength: ASTM C87 for effect of organic impurities on strength.

e. Potential reactivity of aggregate: ASTM C295, petrographic examination.

f. Soundness: ASTM C88.

g. Reports of tests conducted on aggregates from the same source within the past 12 months will be acceptable.

2. Testing concrete mixes as follows at start of work and whenever change in materials source occurs:

a. Prepare mix designs, test concrete strength, and report results if trial batch method is used to establish design mix proportions. Mix design shall be reviewed, approved, sealed and stamped by a Licensed Professional Engineer in the state where the project is located.

C. Independent Testing Laboratory, employed by Owner, is responsible for observing and evaluating the following at batch plant at start of Work and at other times as requested by the Architect:

1. Condition of batching equipment.

2. Conformance with design mix proportions.

3. Storage of materials.

4. Mixing equipment.

5. Mixing and transporting equipment.

6. Other testing to verify compliance if requested by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 01 70 00.

B. Verify forms, reinforcement, anchors, plates, joint materials, vapor retarder and other items to be cast into concrete are accurately placed and held securely.

C. Verify forms are free of debris and water.

D. Verify excavations are free of loose material and water.

3.2 TESTING

A. Concrete materials and operations shall be tested and inspected for compliance with the specifications and requirements. Strength Tests of concrete shall be in conformance with 2010 CBC, Sections 1905A.1.1 and 1905A.6.

3.3 TESTING AGENCY

A. The testing agency shall be designated by the Owner. Ample time shall be allowed for preliminary tests as required prior to concreting operations.

B. All testing agency personnel shall meet the requirements of ASTM E329, "Recommended Practice of Inspecting and Testing Agencies for Concrete and Steel in Construction."

C. All testing agency personnel shall have the knowledge and ability to perform the necessary tests equivalent to the minimum guideline for Certification of Concrete Field Testing Technicians, Grade 1 in accordance with ACI CP-2.

3.4 DUTIES AND SERVICES

A. The duties and responsibilities of the testing agency and the contractor and services to be performed by each are as designated in ACI 301, Chapter 16, "Specifications for Structural Concrete for Buildings."

3.5 EVALUATION AND ACCEPTANCE

A. Test results of standard cylinders, molded, cured, and tested according to ASTM C31 and C39 should be evaluated separately for each concrete mix according to ACI 214, "Recommended Practice for Evaluation of Concrete Compression Test Results of Field Concrete."

B. The criteria for acceptance of concrete shall be as detailed in ACI 318, Chapter 5, Section 5.6, "Evaluation and Acceptance of Concrete" or as per ASTM C94, Section 17 "Strength" and Section 18 "Failure to Meet Strength Requirements."

C. As referenced in ASTM C94 – Section 4.4, "When the strength of concrete is used as a basis for acceptance, the manufacturer shall be entitled to copies of all test reports."

3.6 PREPARATION

A. Construction Joints:

1. Clean previously placed concrete of laitance.

2. Clean reinforcement and accessories of mortar from previous concrete placement operations.

3. Apply bonding agent in accordance with manufacturer's recommendations.

4. Moisten surface of previously placed concrete.

3.7 PLACEMENT

A. Place concrete according to ACI 301 and 304R, except as modified and supplemented on Drawings or in this Section.

B. Notify Architect, Inspector of Record, and Owner's testing laboratory in writing according to Inspection request documents a minimum of 72 hours prior to commencement of placing operations.

C. Cold Weather Concreting:

1. Comply with requirements of ACI 306.1.

2. Do not place concrete when ambient air temperature is expected to fall below 40 degrees F within 24 hours, except with prior written approval of Architect.

3. Remove frost, ice, and snow from formwork, reinforcing, and accessories prior to placing concrete.

4. Do not place concrete foundations, footings or slabs on frozen ground.

5. Limit concrete temperature at time of discharge to 55 degrees F for sections less than 12 inches in any dimension and to 50 degrees F for other sections.

D. Hot Weather Concreting:

1. Comply with requirements of ACI 305R when ambient air temperature exceeds 75 degrees F.

2. Use water-reducing, retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions to extend setting time to limits specified as approved by Architect.

3. Cool aggregates, cool mixing water, substitute ice for part of mixing water, or take other measures to limit concrete temperature at time of discharge to 90 degrees F.

4. Cover reinforcing steel and steel forms with water soaked burlap or use fog spray to limit temperature of steel to 120 degrees F immediately prior to concrete placement.

5. Use evaporation retardant between finishing passes.

E. At time of placement, provide concrete temperature between 50 degrees F and 90 degrees F.

F. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

G. Repair underslab vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

H. Separate slabs on grade from vertical surfaces with joint filler.

I. Place joint filler in floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

J. Extend joint filler from bottom of slab to within 1/2 inch of finished slab surface. Conform to Section 07 90 05 for finish joint sealer requirements.

K. Install joint devices in accordance with manufacturer's instructions.

L. Install construction joint devices in coordination with floor slab pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

M. Apply sealants in joint devices in accordance with Section 07 90 05.

N. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

O. Place concrete continuously between predetermined expansion, control, and construction joints.

P. Do not interrupt successive placement; do not permit cold joints to occur.

Q. Place floor slabs in pattern indicated.

R. Saw cut joints within 12 hours after placing.

S. Screed floors level, maintaining surface flatness of maximum 1/4 inch in 10ft.

T. Maintain surfaces receiving concrete at approximately same temperature as concrete being placed.

U. Maintain surface of hardened concrete below 100 degrees F.

V. Convey concrete from mixer to place of deposit by method that will prevent segregation or loss of material, and that will not require addition of water to produce desired slump at point of placement. Do not use supported reinforcing as runway base for concrete conveying equipment.

W. Depositing:

1. Deposit concrete as nearly as practicable to its final location.

2. Place concrete continuously between construction joints.

3. Deposit concrete in layers not exceeding 24 inches in depth.

4. Avoid inclined layers.

5. Place each layer while preceding layer is still plastic.

6. Do not allow free fall of concrete to exceed 4 feet. Do not allow free fall of concrete containing high-range water reducing admixture to exceed 10 feet.

7. Drop concrete in vertical direction, not at incline.

8. If forms and reinforcing above level of concrete already in place become coated with accumulations of hardened or partially hardened concrete, remove accumulations before proceeding.

9. Place concrete without displacing reinforcing and accessories.

X. Consolidation:

1. Vibrate concrete to eliminate formation of surface air voids, honeycombs and sand streaks.

2. Use mechanical, internal vibrators with proper frequency, rpm, and spud size. Select spud for size and spacing of reinforcement and clearance to formwork. Supplement vibration by hand-spading, rodding, or tamping.

3. Insert and withdraw vibrator vertically at spacing not to exceed 1-1/2 times radius of action of vibrator, maximum of 24 inch centers.

4. Insert vibrators into placed layer and at least 6 inches into preceding layer.

5. Do not allow vibrator to touch form face or embedded items.

6. Do not use mechanical vibration for slabs less than 4 inches thick. Use hand spading and tamping in these locations.

Y. Placing Concrete Slabs:

1. Deposit and consolidate concrete slabs in continuous operation, in single layer, within limits of construction joints, until placing of panel or section is completed.

2. Bring slab surfaces to correct level with straightedge and strike-off.

3. Use bull floats, highway straight edges, or darbies to produce smooth surface, free of humps or hollows before bleed water appears on surface.

4. Do not disturb slab surfaces prior to beginning finishing operations.

Z. Non-Structural Concrete Topping:

1. Placement on same day:

a. Place and consolidate base slab.

b. Screed to elevation to allow for topping slab thickness.

c. After bleed water has disappeared and surface will support worker's weight without indentation, place topping mixture, compact, float and finish.

2. Placement after one day:

a. Place and consolidate base slab.

b. Brush partially set surface with wire broom to remove laitance and scratch surface.

c. Wet cure base slab at least three days.

d. Immediately, prior to placing topping, clean base slab and dampen surface.

e. Scrub bonding grout into base slab surface, or apply bonding agent in accordance with manufacturer's recommendations.

f. Rewettable bonding agent may be used only in areas not subject to wet conditions.

g. Place topping slab before grout has set or dried, compact, float and finish.

M. Curbs and Equipment Pads:

1. Form curbs and equipment pads in areas indicated.

2. Placement on same day:

a. Place and consolidate base slab.

b. Screed to elevation to allow for curb/pad thickness.

c. After bleed water has disappeared and surface will support worker's weight without indentation, place curb/pad concrete mixture, compact, and float.

3. Placement after one day:

a. Place and consolidate base slab.

b. Brush partially set surface with wire broom to remove laitance and scratch surface.

c. Wet cure base slab at least three days.

d. Immediately, prior to placing curb/pad concrete, clean base slab and dampen surface.

e. Scrub bonding grout into base slab surface, or apply bonding agent in accordance with manufacturer's recommendations.

f. Place curb/pad concrete before grout has set or dried, compact and float.

4. Finish interior curbs and pads by stripping forms while concrete is still green and steel trowel surfaces to hard, dense finish with corners, intersections and terminations slightly rounded.

3.8 DEPOSITING

A. Concrete shall be continuously deposited. When continuous placement is not possible, construction joints shall be located as approved by the Architect. Concrete shall be deposited as close to its final point of placement as possible.

B. Concrete shall be consolidated by vibration, spading, rodding or forking. Work concrete around reinforcements, embedded items and into corners. Eliminate all air or rock pockets and other causes of honeycombing, pitting or planes of weakness.

C. Internal vibration shall have a minimum frequency with amplitude to consolidate the concrete effectively. See ACI 309, "Recommended Practice for Consolidation of Concrete."

1. Vibrators shall be operated by experienced and competent workmen.

2. Use of vibrators to transport concrete shall not be allowed.

3. Vibrators shall be vertically inserted every 18 inches for 5 to 15 seconds and then withdrawn.

3.9 FINISHING

A. General: Provide finishes at specified locations, unless indicated otherwise.

B. Finishing Formed Surfaces:

1. Rough Form Finish:

a. Leave surfaces with texture imparted by forms, except patch tie holes and defects.

b. Remove fins and other projections exceeding 1/4 inch in height.

c. Locations: Concrete surfaces not exposed to view.

2. Smooth Form Finish:

a. Provide smooth, hard, uniform surface with minimum number of seams.

b. Repair and patch defective areas, fill tie holes, remove fins and other projections completely.

c. Locations: Exposed concrete surfaces or concrete surfaces designated to receive coatings applied directly to concrete, such as waterproofing, dampproofing, plaster, painting, and other similar applied finishes.

3. Smooth Rubbed Finish:

a. Provide smooth rubbed finish to newly hardened concrete, which has already received smooth form finish, not later than one day after form removal.

b. Moisten concrete surfaces and rub with carborundum brick or other abrasive device until uniform color and texture is produced.

c. Do not use cement grout other than cement paste drawn from concrete by rubbing process.

d. Locations: Where scheduled or indicated on Architectural Drawings.

4. Grout Cleaned Finish:

a. Provide grout cleaned finish to smooth form finished concrete which are complete and accessible.

b. Blend one part portland cement with 1-1/2 parts fine sand and mix with 1:1 ratio of bonding admixture and water to achieve consistency of thick paint. Match color of surrounding concrete.

c. Wet surface of concrete sufficiently to prevent absorption of water from grout and apply grout uniformly with brushes or spray.

d. Immediately after applying grout, scrub surface vigorously with cork float or stone to coat surface and fill air bubbles and holes.

e. While grout is still plastic, remove excess grout by working surface with rubber float, sack or other means.

f. After surface becomes white from drying, rub vigorously with clean burlap.

g. Keep surface damp for minimum 36 hours after final rubbing.

h. Locations: Where scheduled or indicated on Architectural Drawings.

5. Cork Float Finish:

a. Remove forms at early stage, not later than 3 days after placement of concrete; ream control joints as indicated on Architectural Drawings.

b. Provide cork float finish to concrete which has already received smooth form finish.
   1) Mix one part portland cement and one part fine sand with sufficient water to produce stiff mortar.
   2) Dampen wall surface.
   3) Apply mortar with firm rubber float or trowel, filling voids.
   4) Compress mortar into voids using slow-speed grinder or stone.
   5) If mortar surface dries too rapidly to permit proper compacting and finishing, apply small amount of water with fog sprayer.
   6) Produce final texture with cork float using swirling motion.
   7) Locations: Where [scheduled] indicated on Drawings.

C. Finishes for Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces, strike-off smooth and finish with texture matching adjacent formed surfaces.

D. Slab Finishes:

1. Floor flatness/levelness tolerances:

a. FF defines maximum floor curvature allowed over 24 inches. Computed on basis of successive 12 inch elevation differentials, FF is commonly referred to as "flatness F-Number."
   FF = 4.57
   Maximum difference in elevation, in inches, between successive 12 inch elevation differences.

b. FL defines relative conformity of floor surface to horizontal plane as measured over 10 feet distance. FL is commonly referred to as "levelness F-Number."
   FL = 12.5
   Maximum difference in elevation, in inches, between two points separated by 120 inches.

c. Measure floors in accordance with ASTM E1155.

d. Ensure slabs achieve specified overall tolerances. Minimum local tolerance (1/2 bay or as designated by Architect) is 2/3 of specified tolerance unless noted otherwise.

2. Float Finish:

a. After screeding, consolidating, and leveling concrete slabs, do not work surface until ready for floating.

b. Begin floating when surface water has disappeared and when concrete has stiffened sufficiently to permit operation of power-driven floats.

c. Cut down high spots and fill low spots.

d. Immediately after leveling, re-float surface to uniform, sandy texture and a FF20/FL17 tolerance.

e. Locations: Surfaces requiring trowel finish [, broom finish] [, slab surfaces covered with insulation] [, waterproofing membrane] [, exposed aggregate finish] [, and] [sand bed terrazzo].

3. Trowel Finish:

a. After float finish, follow by power troweling and then hand troweling.

b. Begin final troweling when surface produces ringing sound as trowel is moved over surface.

c. Finish surface free of trowel marks, uniform in texture and appearance, and to FF25/FL20 elevated slab tolerance.

d. Grind surface smooth to remove defects which may telegraph through applied finish.

e. Locations: Slabs left exposed to view, slabs covered with resilient flooring [,carpet] [, paint] and other similar applied finish.

4. Medium Broom Finish:

a. After float finish, while surface is still plastic, draw fiber bristle broom uniformly over surface to provide texture perpendicular to main traffic or at right angles to floor slope [to match Architect's sample].

b. Locations: Sidewalks, ramps, exterior steps, landings, and platforms.

E. Construction and Control Joints in Slab-on-grade:

1. Construction joints to coincide with planned control joint pattern.

2. Provide joints in at column lines and as indicated on Drawings.

3. Tooling Control Joints and Construction Joints:

a. Slabs Exposed to Vie: Tool joints after finishing slab.

b. Concealed Slabs:
1) Provide joints immediately after final finishing.
2) Use dry-cut sawing system (Soft-Cut) to depth of 1 inch unless noted otherwise; without dislodging aggregates by sawing. Complete sawing no later than two hours after finishing at each control joint location.

3.10 CURING

A. General:

1. Comply with ACI-308, except as modified or supplemented.

2. Start immediately after placing and finishing concrete.

3. Protect from premature drying, temperature extremes, temperature variations, rain, flowing water, and mechanical injury.

4. Cure continuously, without allowing to dry, for minimum period required for hydration of cement and hardening of concrete.

5. Maintain temperature of concrete above 50 degrees F for curing period.

6. Minimum Length of Curing Period:

   a. High Early Strength Concrete: 3 days.

   b. Other Concrete: 7 days.

B. Acceptable Curing Methods:

1. Concrete to receive Waterproofing, Dampproofing, or Membrane Roofing: Moist curing, moisture-retaining sheet covering, or chemical curing compounds.

2. Concrete to receive Hardeners or Sealers: Moist curing, moisture-retaining sheet covering, dissipating resin compounds, or chemical curing compounds; acceptable to manufacturer of hardener or sealer.

3. Concrete to receive Cement Setting Beds, Bonded Toppings: Moist curing, moisture-retaining sheet covering, or chemical curing compounds.

4. Concrete to receive Adhered Finishes: Moist curing, moisture-retaining sheet covering, acrylic curing/sealing compounds, dissipating resin compounds, or chemical curing compounds; acceptable to manufacturer of applied finish.

5. Concrete exposed to Direct Sun when Ambient Temperature Exceeds 75 degrees F: Where permitted, use white pigmented liquid compounds.

6. Other Concrete: Moist curing, moisture-retaining sheet covering, liquid membrane-forming compounds, or chemical curing compounds.

C. Acceptable Curing Procedures:

1. Moist Curing Unformed Surfaces:

   a. Ponding: Maintain 100 percent coverage of water continuously.

   b. Fog Spraying or Sprinkling: Maintain continuously moist with nozzles or sprayers.

   c. Fabric Mats: Cover surfaces with wet burlap or other absorptive material which will not discolor concrete; keep continuously wet.

   d. Sand: Minimum 2 inch thick layer, kept continuously saturated with water, free from deleterious materials which would stain concrete.

2. Sheet Curing Unformed Surfaces:

   a. Wet surface of concrete with fine spray of water prior to applying sheet.

   b. Immediately cover surface with polyethylene sheeting, waterproof paper, or burlap-polyethylene sheet.

   c. Lap edges of sheeting minimum of 12 inches.

   d. Repair damaged sheet.

   e. Ballast sheet to prevent movement and blow-off.

3. Liquid Membrane-forming Compound Curing of Unformed Surfaces:

a. Apply in accordance with manufacturer's recommendations.

b. Protect surfaces from foot and vehicular traffic.

c. Curing compounds used must be compatible with adhesives used in setting carpet, resilient tile or sheeting flooring, and other similar finishes.

4. Curing of surfaces which are moist cured for first 24 hours may be cured by other acceptable methods for remaining curing period provided they are not allowed to become dry.

3.11 FIELD QUALITY CONTROL

A. Field testing will be performed under the provisions of Section 01 45 00.

B. Independent testing laboratory, employed by Owner, is responsible for:

1. Sampling Fresh Concrete: ASTM C172, sample at point of discharge from mixer and additionally at point of discharge from end of pipe for concrete conveyed by pumping methods; if water is added at Project site, obtain another sample for testing.

2. Concrete Temperature: Test each time slump and air content are tested and each time set of compressive strength test specimens is made.

3. Slump: ASTM C143; one test from first truck at point of discharge each day, one test each time set of compressive strength test specimens is made, and when change in consistency occurs.

4. Air Content of Plastic Mix:

a. For Normal Weight, Air Entrained Concrete: ASTM C231, pressure method or ASTM C173, volumetric method.

b. For Lightweight, Air Entrained Concrete: ASTM C173, volumetric method.

c. Make one test each time a set of compressive strength test specimens is made.

5. Compressive Strength Tests:

a. Make and cure test specimens in accordance with ASTM C31, from concrete sampled at point of discharge from mixer and additionally at point of discharge from end of pipe for concrete conveyed by pumping methods.

b. Make one set of 4 test cylinder specimens for every 100 cubic yards, or for every 5000 square feet of slabs and walls, or fraction thereof, of each class of concrete, with at least one set for each class each day.

c. Test cylinders in accordance with ASTM C39, 2 at 7 days for information, and 2 at 28 days for acceptance.

d. When frequency of testing will provide less than five strength tests for a given class of concrete, conduct testing from at least 5 randomly selected batches, or from each batch if fewer than 5 are used.

6. Environmental Conditions:

a. When ambient air temperature falls below 40 degrees F, record maximum and minimum air temperature in each 24 hour period; record air temperature inside protective enclosure; record minimum temperature of surface of hardened concrete.

b. When ambient air temperature rises above 85 degrees F, record maximum and minimum air temperature in each 24 hour period; record minimum relative humidity; record maximum wind velocity, and record maximum temperature of surface of hardened concrete.

7. Observe conveying, placement and consolidation of concrete for conformance to Specifications.

8. Observe condition of formed surfaces upon removal of formwork prior to repair of surface defects and observe repair of surface defects.

9. Observe curing procedures for conformance with Specifications, record dates of concrete placement, start of preliminary curing, start of final curing, end of curing period.

10. Observe Preparations for Placement of Concrete:

a. Inspect handling, conveying, and placing equipment, inspect vibrating and compacting equipment.

b. Inspect preparation of construction, expansion, and isolation joints.

11. Observe preparations for protection from hot weather, cold weather, sun, and rain and preparations for curing.

12. Observations of Concrete Mixing:

a. Monitor and record amount of water added at Project site.

b. Observe minimum and maximum mixing times.

13. Other Inspections:

a. Grouting under base plates.

b. Grouting anchor bolts and reinforcing steel in hardened concrete.

14. Verify slab flatness and levelness within 24 hours of placement for each slab finish at slab-on-grade and framed slabs in accordance with ASTM E1155. Perform minimum of 2 tests for each slab and finish; one at initial pour and second randomly chosen by testing laboratory.

C. Evaluation and Acceptance of Concrete:

1. Strength Test: Defined as average strength of two 28 day cylinder tests from each set of cylinders.

2. Acceptance Criteria Based on Strength Tests: Strength level of individual class of concrete is considered satisfactory if both:

a. Average of three consecutive strength test results equal or exceed required design compressive strength, and

b. No individual strength test results falls below required design compressive strength by more than 500 psi.

3. Acceptance Criteria Based on Field Tests:

a. Core Tests: Where strength tests indicate concrete of deficient strength, obtain and test cores in accordance with ASTM C42, ACI 318 and ACI-301, at locations directed by Architect.

b. Strength level of concrete in area represented by core test is considered adequate if complies with the requirements of ACI 318.

c. Fill core holes with low slump concrete or patching mortar used to repair surface defects.

4. Revise concrete mix proportions, curing procedures and protection as necessary to provide concrete conforming to Specifications.

D. Acceptance of Structure:

1. Acceptance of structure for dimensional tolerances, appearance, and strength will be based on ACI-301, Chapter 18.

2. Remove and replace concrete which does not meet acceptance criteria.

3.12 PATCHING AND REPAIRING DEFECTIVE CONCRETE

A. General:

1. Rewettable bonding agent may be used only in areas not subject to wet conditions.

2. Patching compound may only be used for concrete not exposed to view.

B. Repairing Formed Surfaces:

1. Surface Defects Requiring Repair:

a. Color and texture irregularities.

b. Honeycomb, air bubbles, rock pockets, and spalls.

c. Fins, burrs and other surface projections.

d. Cracks.

e. Stains and other discolorations that cannot be removed by cleaning.

2. Patch defective areas and tie holes immediately after removal of forms.

3. Cut out honeycomb, rock pockets, and voids over 1/4 inch down to solid concrete but not less than 1 inch depth.

4. Make edges of cuts perpendicular to concrete surface.

5. Clean and dampen area including 6 inches of surrounding surface with water.

6. Apply bonding grout by brushing into surface, after surface water has evaporated.

7. Place patching mortar or patching compound before grout has set or dried.

8. Compact patching material in place and strike off slightly higher than surrounding surface.

9. Finh after minimum of one hour to match surrounding surface.

10. Flush out form tie holes, fill with patching mortar, patching compound, or precast cement cone plugs secured in place with bonding compound.

11. Cure repair areas by same methods as surrounding concrete or keep continuously damp for 7 days.

C. Repairing Unformed Surfaces:

1. Surface Defects Requiring Repair:

a. Fine crazing cracks.

b. Cracks larger than 0.012 inch wide or cracks which penetrate to reinforcing.

c. Cracks penetrating completely through non-reinforced sections.

d. Spalling, popouts, honeycomb, and rock pockets.

e. High and low areas in slabs.

2. Correct high areas in hardened concrete by grinding after concrete has cured at least 14 days.

3. Correct high and low areas during, or immediately after, completion of initial floating operations by cutting high areas and by placing fresh concrete in low areas.

4. Repair defective areas, except isolated random cracks and single holes not exceeding 1 inch diameter, by cutting out and replacing with patching mortar or patching compound.

a. Remove defective areas to sound concrete with clean, square cuts.

b. Dampen concrete surfaces in contact with patching material and apply bonding grout by brushing into surface, after surface water has disappeared.

c. Place patching mortar or patching compound before grout has set or dried.

d. Compact and finish to blend with adjacent finished concrete.

e. Cure in same manner as adjacent concrete.

5. Repair isolated random cracks and single holes not over 1 inch diameter with patching mortar.

a. Groove top of cracks and cut out holes to sound concrete and clean area.

b. Dampen cleaned surfaces and apply bonding grout by brushing into surface, after surface water has disappeared.

c. Place patching material before bonding grout is set or dry.

d. Compact in place and finish to match adjacent concrete.

e. Keep patched area continuously moist for not less than 72 hours.

D. Structural Repairs: Contractor shall proposed materials, methods, and procedures to the Architect for review and approval prior to proceed with structural repairs.

3.13 PROTECTION

A. Protect finished work in accordance with Section 01 70 00.

B. Protect concrete from construction traffic, weather, or mechanical damage for 14 days after placing.

C. Provide raised runways for traffic areas.

D. Protect concrete from staining.

END OF SECTION

SECTION 03 45 00

PRECAST ARCHITECTURAL CONCRETE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Architectural precast concrete wall caps.

B. Supports, anchors, and attachments.

C. Intermediate and perimeter joint seals.

D. Grouting under panels.

1.02 SUBMITTALS

A. See Section 01 33 13 - Submittal Procedures.

B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.

C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials.

1. Include details of mix designs.

D. Samples: Submit two cap samples, full size width and height by 16 inches long in size, illustrating surface finish, color and texture.

E. Fabricator qualifications.

1.03 QUALITY ASSURANCE

A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in California.

B. Fabricator Qualifications:

1. Firm having at least 5 years of documented experience in production of precast concrete of the type required.

C. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Handling: Lift and support precast units only from support points.

B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.

C. Protect units to prevent staining, chipping, or spalling of concrete.

D. Mark units with date of production in location that will be concealed after installation.

PART 2 PRODUCTS

2.01 PRECAST UNITS

A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI

MNL-123, PCI MNL-135, and ACI 318.

1. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as required by California Building Code.
2. Calculate structural properties of units in accordance with ACI 318.
3. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with strength and appearance requirements.
4. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
5. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.

B. Finish Type A: Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance.

2.02 REINFORCEMENT

A. Comply with requirements of Section 03 20 00.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I - Normal Portland type.

B. Lightweight Structural Aggregate: ASTM C330.

C. Water: Clean and not detrimental to concrete.

D. Fiber Reinforcement: Synthetic fiber shown to be resistant to long-term deterioration when exposed to moisture and alkalis; 1/2 inch length.

E. Admixtures: Air entrainment as specified in Section 03 30 00.

F. Grout:

1. Non-shrink, non-metallic, minimum 10,000 psi, 28 day strength.
2. Epoxy.

2.04 SUPPORT DEVICES

A. Connecting and Support Devices: ASTM A36/A36M steel; hot-dip galvanized in accordance with ASTM A153/A153M.

1. Clean surfaces of rust, scale, grease, and foreign matter.
2. Galvanize after fabrication in accordance with requirements of ASTM A123/A123M. B.

Bolts, Nuts, and Washers: ASTM A307 heavy hex bolts, Type A, hot-dip galvanized, with matching ASTM A563 (A 563M) nuts and matching washers.

C. Primer: Zinc rich type.

2.05 ACCESSORIES

A. Bearing Pads: High density plastic; Shore A Durometer as recommended by fabricator; 1/8 inch thick, smooth both sides.

B. Sealant: SJ-1 type specified in Section 07 90 05.

2.06 FABRICATION

A. Fabricate in conformance with PCI MNL-117 and PCI MNL-135.

B. Maintain plant records and quality control program during production of precast units. Make records available upon request.

C. Use rigid molds, constructed to maintain precast unit uniform in shape, size, and

finish. D. Use form liners in accordance with manufacturer's instructions.

E. Maintain consistent quality during manufacture.

F. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.

G. Cure units to develop concrete quality, and to minimize appearance blemishes such as non-uniformity, staining, or surface cracking.

H. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.

2.07 FABRICATION TOLERANCES

A. Conform to PCI MNL-117 and PCI MNL-

135. PART 3 EXECUTION

3.01 ERECTION

A. Erect units without damage to shape or finish. Replace or repair damaged

panels. B. Erect units level and plumb within allowable tolerances.

C. Align and maintain uniform horizontal and vertical joints as erection progresses.

D. When units require adjustment beyond design or tolerance criteria, discontinue affected work; advise tBP/Architecture.

E. Fasten units in place with mechanical

connections. F. Fasten units in place with mortar.

G. Exposed Joint Dimension: 1/2 inch. Adjust units so that joint dimensions are within

tolerances. H. Seal perimeter and intermediate joints in accordance with Section 07 90 05.

3.02 TOLERANCES

A. Erect members level and plumb within allowable tolerances. Conform to PCI MNL-135.

END OF
SECTION

SECTION 02300

EARTHWORK

PART 6 - GENERAL

1.01 SECTION INCLUDES:

A. Clearing and Grubbing.

B. Over-excavation and Re-compaction.

C. Excavation, Grading, Filling and Compaction of entire site.

D. Excavation, Backfilling, and compacting Backfill for pipe trenches.

E. Export of excess excavated materials.

F. Control of surface and ground water.

G. Clean up.

H. Testing and Inspection of Work of this Section.

1.02 RELATED WORK SPECIFIED ELSEWHERE:

A. Final preparation for asphaltic concrete paving areas.

B. Landscaping including planting and irrigation systems.

C. Storm Drainage, site water, sewer, and other site utilities.

1.03 QUALITY ASSURANCE

A. Codes and Standards: Perform work in this Section in compliance with all applicable requirements of governing authorities having jurisdiction.

1. Refer to Construction Safety Orders, Title 8, California Code of Regulations, Section 1503 and Article 6 (CCR); secure and pay for all required permits.

2. For off-site work, conform to all requirements of City of Glendale and any other agencies having jurisdiction. Coordinate and obtain all required permits and inspections.

3. Provide materials and perform work in compliance with the "Standard Specifications for Public Works Construction", current edition (PWC Specifications).

B. Professional Observation: A soils engineer will be retained by the Owner for purposes of inspection, testing and approval of all work under this section. Perform work of this Section under inspection and approval of the soils engineer. Give soils engineer not less than 48 hours advance notice of readiness for inspection.

C. Source Quality Control: Obtain written approval of the soils engineer of all imported fill material before material is brought to site. Obtain same approval of excavated material for use in fills or backfills prior to placing.

D. Comply with all requirements of permit for export of soil from site. Permit is to be obtained and paid for by Contractor. Furnish copies of all permits and licenses required by the City of Glendale to Owner's representative.

1.04 JOB CONDITIONS

A. Data: Maps, boring logs, geotechnical and foundation investigation reports, and like reference data, not included in Contract Documents but made available to Contractor by Architect or Owner are for information only, and the Architect and Owner assume no responsibility for any conclusions Contractor may draw from such information. Should questions or issues arise, contact Architect or Owner for clarification.

Contractor shall determine existing conditions under which the Contractor will operate in performing the Work.

B. Protection: Refer to CCR, Section 1503 and Article 6. Contractor shall secure permits. District will pay for all required permits. Provide and maintain protection as required by governing agencies to prevent injury to persons or damage to property.

1. Barricade open excavations and post with warning lights as recommended by authorities having jurisdiction.

2. Protect slopes, structures, utilities, sidewalks, pavement, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.

3. Noise and Dust Abatement: Exercise all reasonable and necessary means to abate dust and rising dirt. Perform necessary sprinkling and wetting of construction site to prevent nuisance. Exercise all reasonable and necessary means to abate undue noise.

C. Existing utilities: Locate existing underground utilities in all areas of work prior to excavation or commencement of work. If utilities are to remain in place provide adequate means of protection during earthwork operations.

1. Should uncharted, or incorrectly charted piping or other utilities be encountered during excavation, consult Utility Owner immediately for direction. Cooperate with Owner and Utility companies in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of Utility Company.

2. Do not interrupt existing utilities serving facilities occupied or used by Owner, or others, except when permitted in writing by Owner's Representative, and then only after acceptable temporary services have been provided.

3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut off of services if lines are active.

D. Water for Grading: Contractor shall obtain and pay for all water required for his grading operation. This may include, but is not limited to, payment of deposits to utility for construction meter, and payment of all monthly service and water charges. Construction meter shall be in place throughout construction period unless alternative arrangements are made with the Water Department to provide construction water for all purposes. Contractor shall be aware of water moratoriums and restrictions, and shall immediately advise Owner of effects on construction schedules.

E. Use of Explosives: The use of explosives is not permitted.

F. Existing Conditions: Prior to commencing work at site, verify agreement of existing conditions with indicated conditions. Notify Owner's Representative in writing of discrepancies found. Start of work without notification constitutes acceptance of conditions, without cause for extra compensation.

PART 2 - PRODUCTS

2.01 MATERIALS: Provide approved imported material, as required, if the quantity of approved site and excavated materials are insufficient to complete the work.

A. Earthwork Materials: The Soil Engineer shall evaluate Excavated soils for re-use during grading. Approved excavated or imported material shall be granular soil such as silty sand of the non-expansive type with a liquid limit of 25 or less, a plastic index of 12 or less and be uniformly graded, containing not more than 30% (by weight) of material passing the No. 200 sieve. All fill soil whether from on-site or imported shall be free from trash, roots, organic material, clay lumps, and rocks over 3" in size. Materials shall be from a legal export site only, in accordance with City of Glendale requirements. Materials shall be from a legal export site or obtain soils engineer's approval of material before bringing any of it onto project site.

B. Gravel Fill Material: Shall be from an approved source, having the following gradation: 90-100% passing a 3/4" sieve, 0% to 10% passing a No. 4 sieve, and 0% to 3% passing a No. 100 sieve.

C. Oversized Materials: Oversize material defined as rock or other irreducible material with a maximum dimension greater than 3" shall not be buried or placed in fills unless the location, materials and disposal methods are specifically approved by the soils engineer.

D. Topsoil: Friable loam, free of subsoil, roots, grass, weeds, stones larger than 1/2", and foreign matter. Topsoil, excavated or imported to be used in areas receiving planting, shall be of such quality as to support plant life. Refer to Section 01400 for required testing. Approval of topsoil by the Owner's representative will be required prior to placement.

PART 3 -EXECUTION

3.01 SITE CLEARING AND PREPARATION

A. Clearing and Grubbing:

1. Before starting grading/earthwork operations, remove trash including stairways, foundations pavements, underground utilities and strip all vegetation in work area, including roots, and remove all this debris to a legal offsite disposal area. Any buried debris or other contaminated material exposed during subsequent earthwork operations should also be removed.

2. For trees that are to be left standing, carefully and cleanly cut roots and branches that obstruct new construction. Use only hand methods for grubbing inside the drip lines of these trees. Excavations made for removal of any existing tree roots should be cleared of loose materials and backfilled with clean compacted soil.

3. All areas disturbed by clearing and grubbing operations or by surface soil removal shall be scarified to a minimum depth of 10" to 12" inches prior to placing new fill. The material shall be compacted to 90 percent maximum density, unless otherwise specified in accordance with ASTM Standard Test Material D-1557-S1.

4. The stripping work shall include the removal of loose fill that in the judgement of the Geotechnical Engineer, is compressible or contains significant voids. The stripping operation must expose a firm, non-yielding that is free of large voids. The exposed soils should be observed by the Geotechnical Engineer prior to the placement of any fill or sub-ballast.

5. All Oak Bay or Sycamore trees on the subject property and within 20 feet of all adjoining properties shall be identified on the site plans! The trees shall be identified by trunk diameter, 125% drip line and species. Call Parks, Recreation & Community Services at (818) 548-3736 for Tree fence inspection prior to commencing work.

Prohibit trenching or continuous digging, grading (removing or adding soil) or storage of equipment or building materials within the drip line of the Oak & Bay Sycamore tree(s). Piers and grade beam footings shall not be required within the drip line *plus 25%* of the Oak & Bay Sycamore tree(s). (The 125% Drip line shall be defined as that area where the branches stop or terminate *and* shall be equal to 125% of the distance of the line from the trunk to the farthest leaf drip point.) The leaf drip line for each tree shall be measured and confirmed by the contractor in the four major compass directions. The soil in the 125% drip line area under the trees shall remain fenced off from the construction work and shall remain undisturbed.)

B. Demolition:

1. Remove all structures indicated on the drawings as "To Be Removed", and dispose of debris in a legal offsite disposal area.

3.02 EXCAVATION

A. General:

1. Adverse Subsurface Conditions: Immediately notify District Inspector should unsuitable bearing soil or other adverse subsurface conditions be found which are not indicated by the Drawings or Specifications.

2. Engineered fill beneath and the upper two feet of sub-grade for pavement structural sections should be compacted to at least 95 percent relative compaction as per ASTM D1557. Engineered fill beneath slab-on-grade, pavements, walkways, and backfill along foundations and behind retaining walls should be compacted to at least 90 percent relative compaction. All fill and backfill, structural or non-structural should be placed in loose lifts less than 8 inches thick and moisture conditioned to 1 to 2 percent above optimum moisture content prior to compaction. Compaction tests should be performed every 2 to 18 vertical inches and/or 500 cubic yards of fill, or as determined necessary by the field engineer to verify adequate compaction and ensure proper soil-water content.

   All fill and backfill in the vicinity of structures and retaining walls should consist of on-site soils, excluding clay fills with high plasticity and/or moderate to high expansion potential. For planning purposes of estimating earthwork quantities, the existing soil will compress an average of approximately 10 percent when water conditioned and placed in as an engineering fill.

3. Unauthorized Excavation: If excavations are carried below the elevations indicated without written authorization, the Contractor shall provide satisfactory construction and compaction if necessary to correct the fault as approved by the Soils Engineer at no extra cost to Owner.

4. Excavations and Cut-slopes: Excavations and Cut-slopes shall be examined during grading by the soils engineer. If required, further excavation, over-excavation and refilling, and/or remedial grading of cut slopes shall be performed as directed by the Soils Engineer. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slopes shall be made and approved by the Soils Engineer prior to placement of materials for construction of the fill portions of the slopes. Care should be taken to avoid spillage of loose material down the face of slopes. All loose material shall be removed from the face and toe of slopes prior to completion.

5. Construct all slopes in a workmanlike manner so that they are positioned at their design orientation and slope ratio. Achieving a uniform slope surface by subsequent thin wedge filling will not be allowed. Any add-on correction to a fill slope shall be conducted under the direction and recommendation of the Soils Engineer. The completed face of all exposed fill slopes shall be either overfilled then cut back to a firm compacted surface or, compacted by track rolling or some other acceptable method.

6. Contractor will take care to avoid erosion or unwanted runoff of slopes or debris due to existing irrigation systems or adverse weather.

B. Structures:

1. Perform excavation to a minimum depth of 60” below the depth of foundations and to the dimensions and elevations indicated on drawings within a tolerance of 0.10 feet. Provide additional space as required for the installation of services, the performance of other construction work as required, the inspection of the various types of work, and the installation and stripping of forms, except where approval may be given by the Owner's Representative to deposit certain miscellaneous concrete directly against earth banks. Avoid loosening of soils in bottoms and sides of excavations.

2. Foundations shall be placed at a minimum depth of 18” below the adjacent grade for both interior and exterior footings (bottom of slab at interior). Continuous footings shall have a minimum width of 18”. The foundations shall bear on a minimum of five feet of engineered fill.

C. Retaining Walls:

1. Retaining wall foundations shall be a minimum of 24” into competent material and shall be a minimum of 24” in width.

D. Existing Utilities:

1. Excavations made for the removal of existing underground structures, etc., should be cleared of loose material and backfilled with clean, approved, compacted soil in accordance with these specifications.

E. Protection:

1. Provide adequate cribbing, sheathing and shoring as necessary to safely retain the earth sides of all excavations and trenches from caving and other damage resulting from excavating and/or erosion. Provide suitable forms of protection against property damage and bodily injury to personnel employed on the work and the general public.

The design, installation and maintenance of required cribbing and shoring shall be entirely that of the Contractor and shall meet the approval of the State Division of Occupational Safety and Health, and the local governing agencies.

2. It shall be the Contractor's full responsibility to furnish and maintain all temporary barricades, warning lights, and other types of protection and prevent accidental injury to the general public and all personnel employed on the project.

3.03 GRADING, GENERAL:

A. Uniformly grade all areas within the limits of this project, including adjacent transition areas. Smooth grade the finished surfaces within the tolerances specified in this Section, and grade with uniform slopes between points where elevations are shown, or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding. Where grades are not indicated, grade uniformly level or slope between points for which elevations are given. In absence of more specific grading information, ground shall slope away from building for a minimum distance of 20 feet and a minimum slope of 2 percent. Grade trenches and other drainage flow lines to slope uniformly to avoid standing water.

C. Finished surfaces shall be free from irregular surface changes and shall be constructed to the line, grade and cross section as shown on the plans or as specified herein. Tolerances for these finished surfaces are as follows:

1. Lawn or unpaved areas: 0.10' above or below required elevation; playfields and contour-graded landscape areas may be finished to looser tolerances where required to balance earthwork or blend finished areas, subject to approval by Owner's representative.

2. Walks, Pavements and Building Pads: .05' above or below required sub-grade.

3.04 FILL/BACKFILL, GENERAL

A. The Contractor shall backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp proofing, water proofing, and perimeter installation.

2. Inspection, testing, approval, and recording locations of underground utilities.

3. Removal of concrete formwork.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structure or utilities, if required.

5. Removal of trash and debris.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

B. Placement and Compaction: Place fill or backfill materials in layers not more than 8" in loose depth and compacted to at least 90% of maximum dry density.

1. Before compaction, moisten or aerate each layer as necessary to provide a moisture content above 1 to 2 percent of optimum.

2. The upper 24” of pavement sub-grade shall be compacted to at least 95% of relative compaction per ASTM D1557.

3. Engineered fill beneath foundations shall be compacted to at least 95% relative compaction per ASTM D1557.

4. Place backfill materials evenly, adjacent to structures, piping, or conduit. Take care to prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping or conduit to approximately same elevation in each lift.

C. Compaction and Moisture Testing: The soils engineer will perform field tests to check the moisture content and the degree of compaction. The locations and frequency of the test will be taken at the soils engineer's discretion.

3.05 TRENCH EXCAVATION AND BACKFILL: Trenching operations for all underground conduits, and related systems shall be performed under the provisions of this Section. Provide trench shoring, sheeting and bracing in conformance with Title 8 of the California Code of Regulations.

A. Trenches: Excavate trenches to width required for proper installation of underground systems with banks as nearly vertical as practical. Bring bottoms of trenches to required depth, all accurately graded to provide

uniform bearing on undisturbed soils for the entire length of each section of piping or conduit, except where necessary to excavate for pipe bells or for pipe bedding indicated or specified in other sections.

B. Remove soft or moving trench bottom soils down to firm native ground, and replace with crushed rock or pea gravel as approved by the soils engineer to provide firm, stable sub-grade. Trench width shall include a minimum clearance on both sides of pipe or conduit of one half the pipe diameter, unless otherwise specified.

C. Where rock is encountered, carry excavation 6" below required elevation and backfill with a 6" layer of crushed rock or pea gravel as approved by the soils engineer prior to installation of pipe.

D. Where utility trenches fall within the zone of influence of footings as defined on the Structural plans, contractor shall deepen footings, relocate piping, or, if approved by the Soils Engineer, modify trench/backfill conditions, materials, or methods, all at no additional cost.

E. The pipe haunches shall be carefully backfilled with bedding material (clean sand, approved granular soil, or other material specified). This bedding material shall be brought to a depth of at least one foot over the top of pipe. The bedding material shall be uniformly tamped and compacted to 90% Maximum Relative Density. Jetting or water flooding will not be allowed unless specifically approved by the Owner's Representative. Refer to specific utility sections for additional or more restrictive bedding requirements.

F. On-site materials or other soils approved for backfill by the soils engineer shall be watered and mixed as required to obtain a moisture content within 2% of optimum prior to placement in lifts over the bedding material. All backfill shall be done under the supervision of soils engineer and shall be compacted to at least 90% of the Maximum Relative Density as determined by ASTM D1557. The backfill shall be placed in lifts appropriate to the type of compaction equipment being utilized. Trench backfill compaction by jetting or flooding is not permitted unless approved in advance by the Owner's Representative and provided that all excess water can be safely and completely removed from the work area.

G. Field density tests and inspection of the backfill procedures shall be made by the soils engineer during backfilling to see that the proper moisture content and uniform compaction is maintained. The Contractor shall provide test holes and exploratory pits as required by the soils engineer to enable sampling and testing.

H. Cracking or settlement of paving and finish materials over utility trench locations shall be conclusive proof of trench failure. The Contractor at no additional cost to the Owner shall complete removal and re-compaction of the trench and replacement of damaged paving as required.

I. Temporary excavations with vertical side slopes within the onsite soils are expected to be generally stable to a maximum height of 5 feet provided they are free of adverse geologic conditions. Excavations deeper than 4 feet should be shored or sloped back to 1 to 1 or flatter if construction workers are to enter such excavations. Excavations below the ground water table will likely require special equipment and/or techniques (i.e. shoring, dewatering, etc.).

3.06 SUB-GRADE PREPARATION

A. General: Contours shown on the plans are finished grades. Contractor shall therefore allow for thickness of subsequent paving materials.

B. Areas to receive proposed slab-on-grade and other concrete site-work, AC pavement and retaining wall(s) shall be excavated to a minimum depth of two feet below the existing grade or proposed sub-grade level, whichever is lower. These excavations should extend at least five feet beyond the improvement limits.

C. The soil surface exposed by stripping and excavation activities shall be scarified to a minimum depth of eight inches, moisture condition to produce a soil-water content of about two percent above optimum moisture content and compacted to a minimum of 90 percent relative compaction, based on ASTM Test D1557.

D. Concrete driveways, sidewalks, slabs, curbs & gutters, etc.: Bring areas to required elevations and grades as shown on the plans. The top 12" inches of sub-grade shall be scarified and moisture conditioned to within 2% of optimum and re-compacted to a relative density of 95%. The paving contractor just prior to placing the aggregate base should perform this scarification and compaction effort.

E. Asphaltic Concrete (AC) Paving Areas: Bring areas to required elevations and grades as shown on the plans. Scarify the top 12 inches and moisture condition to within 2 percent of optimum and re-compact to a relative density of 90%. The paving contractor just prior to placing the aggregate base should perform this scarification and compaction effort. Proof-roll all areas with a 3-wheel or 10-ton roller or approved equal. Excavate soft or moving soils revealed by proof-rolling and replace with compacted fill as specified above. Additional sub-grade preparation shall be done in accordance with Section 02700.

F. After AC and PCC pavement areas have been brought to sub-grade, the soils engineer shall test the subbase to verify the design R Value used.

G. Landscape Areas: In areas to be landscaped only, the top 12 inches shall be placed and/or scarified to provide a relative density of 85%. Fine grade to lines and grades shown. Finish with smoothly curving contours avoiding abrupt grade changes. Blend cut and fill slopes into flat ground at top and toe of slope as detailed on the plans. Provide sub-grade for thickness of topsoil fill as required. Avoid excessive compaction in all landscape areas.

3.7 DEWATERING: Prevent surface water, subsurface or ground water from flowing into excavations and from flooding project site and surrounding area. Do not allow water to flow into City storm drains unless designated as approved disposal point for water runoff. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.

3.8 CLEAN UP: Clean up and remove all trash, debris, waste, and surplus and rejected earthwork materials from the Owner's property to a legal disposal area. Conform to pertaining laws, codes and regulations, obtain and pay for hauling and dumping permits, pay all dumping charges, and furnish receipts to Owner's Representative upon demand. Remove planks used to protect surfaces subject to public traffic at finish of each day's operations. Maintain public streets and sidewalks in broom clean condition.

A. Comply with all Environmental Agency regulations relating to the spillage of oil-based products and other environmentally hazardous materials.

3.9 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve sub-grades, foundation excavations, utility trenches, and fill layers before further construction work is performed.

1. Perform field density tests in accordance with ASTM D 1556 or ASTM D 2922, as applicable.

2. The maximum dry density of each soil type should be determined in accordance with ASTM Test Method D-1557, Method A or C.

3. Contractor shall coordinate and assist compaction tests at the locations and intervals recommended by the Soils Engineer.

B. If in opinion of Architect, based on testing service reports and inspection, sub-grade or fills that have been placed are below specified density, provide at Contractor's expense additional compaction effort and testing thereof.

3.10 MAINTENANCE

A. Install and maintain all erosion control devices, including sandbag and gravel bag dikes, silt fences, de-silting basins, inlet barricades, vehicle wash traps, and other features called for on the storm water pollution prevention plan (SWPPP) required per Section 01055. Maintain a copy of the approved SWPPP on jobsite, and make it available for inspection by authorized individuals at all times.

B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape to required tolerances, and compact to required density prior to further construction.

3.11 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Waste Material:

1. Remove waste materials, including unacceptable excavated material, trash and debris, and dispose of it in a legal disposal site away from Owner's property. Advise Owner's representative of dump location, and provide receipts for each load of material leaving site.

B. Excess Material:

1. The contractor shall export all excess materials excavated from project site.

2. Contractor will be responsible for delivering acceptable **imported** material to the site stockpile and placing it as directed by the Soil Engineer.

END OF SECTION

PART 7- EXECUTION

4.01 USE OF PREMISES

A. CONTRACTOR shall coordinate Work of all trades, Subcontractors, utility service providers, with OWNER and/or Separate Work Contract. CONTRACTOR shall sequence, coordinate, and perform the Work to impose minimum hardship on the operation and use of the existing facilities and/or Project site. CONTRACTOR shall install all necessary protection for existing improvements, Project site, property, and new Work against dust, dirt, weather, damage, vandalism, and maintain and relocate all protection to accommodate progression of the Work.

B. CONTRACTOR shall confine entrance and exiting to the Project site and/or facilities to routes designated by the DISTRICT

C. Within existing facilities, OWNER will remove portable equipment, furniture, and supplies from Work areas prior to the start of Work. CONTRACTOR shall cover and protect remaining items in areas of the Work

D. CONTRACTOR is advised school may be in session during performance of the Work. CONTRACTOR shall utilize all available means to prevent generation of unnecessary noise and maintain noise levels to a minimum. When required by the DISTRICT, CONTRACTOR shall immediately discontinue noise-generating activities and/or provide alternative methods to minimize noise generation. CONTRACTOR shall install and maintain air compressors, tractors, cranes, hoists, vehicles, and other internal combustion engine equipment with mufflers, including unloading cycle of compressors. CONTRACTOR shall discontinue operation of equipment producing objectionable noise as required by the DISTRICT.

E. CONTRACTOR shall furnish, install, and maintain adequate supports, shoring, and bracing to preserve structural integrity and prevent collapse of existing improvements and/or Work modified and/or altered as part of the Work.

F. CONTRACTOR shall secure building entrances, exits, and Work areas with locking devices as required by the DISTRICT.

G. CONTRACTOR assumes custody and control of OWNER property, both fixed and portable, remaining in existing facilities vacated during the Work.

H CONTRACTOR shall cover and protect surfaces of rooms and spaces in existing facilities turned over for the Work, including OWNER property remaining within as required to prevent soiling or damage from dust, dirt, water, and/or fumes. CONTRACTOR shall protect areas adjacent to the Work in a similar manner. Prior to OWNER occupancy, CONTRACTOR shall clean all surfaces including OWNER property.

I. CONTRACTOR shall not use or allow anyone other than OWNER employees to use facility telephones and/or other equipment, except in an emergency. CONTRACTOR shall reimburse OWNER for telephone toll charges originating from the facility except those arising from emergencies or use by OWNER employees.

J. CONTRACTOR shall protect all surfaces, coverings, materials, and finished Work from damage. Mobile equipment shall be provided with pneumatic tires.

K. CONTRACTOR is advised OWNER will award Separate Work Contracts at this Project site.

L. CONTRACTOR shall not permit the use of portable and/or fixed radio's or other types of sound producing devices including walk mans and similar devices.

4.02 PROPERTY INVENTORY

A. Property, OWNER intends to remove; will be removed by OWNER before a room or space is vacated for the Work. Before performing Work in each room or space, DISTRICT and CONTRACTOR shall prepare a detailed initial written inventory of OWNER property remaining within, including equipment and telephone instruments and the condition thereof. DISTRICT and CONTRACTOR shall retain a signed copy of the inventory dated and signed by both parties. Prior to subsequent OWNER occupancy of each such room or space, DISTRICT and CONTRACTOR shall perform a final inventory of OWNER property and all discrepancies between the initial inventory and final inventory shall be the responsibility of CONTRACTOR.

4.03 FURNITURE, FIXTURES AND EQUIPMENT (MATERIALS) OWNER FURNISHED CONTRACTOR INSTALLED (OFCI)

A. Certain materials identified in the Contract Documents as OWNER Furnished CONTRACTOR Installed, OFCI, will be delivered to the Project site by the OWNER.

B. If designated in the Contract Documents to be OWNER furnished CONTRACTOR installed, (OFCI), and **CONTRACTOR** shall unload, store, uncrate, assemble, install, and connect OWNER supplied materials.

C. Forty Eight (48) hours before the date the CONTRACTOR needs to have the OFCI materials on site, CONTRACTOR shall notify OWNER of the scheduled date for needed OFCI materials. Upon delivery to Project site, CONTRACTOR shall store OFCI materials inside rooms and/or protected spaces and will be responsible for security of OFCI materials until Substantial Completion. DISTRICT will sign receipt or bill of lading as applicable.

D. CONTRACTOR shall, within one (1) day after delivery, uncrate and/or unpack OFCI materials in presence of OWNER who shall inspect delivered items. OWNER shall prepare an inspection report listing damaged or missing parts and accessories. OWNER shall transmit one (1) copy of the report to CONTRACTOR. OWNER will procure and/or replace missing and or damaged OFCI materials, as indicated in inspection report.

E. CONTRACTOR shall install OFCI materials in the locations and orientation as indicated in the Contract Documents. CONTRACTOR shall verify exact locations with DISTRICT before final installation of OFCI materials.

F. If required, DISTRICT will furnish setting and or placement drawings for OFCI materials.

G. CONTRACTOR shall install OFCI materials by proper means and methods to ensure an installation as recommended by the manufacturer. CONTRACTOR shall furnish and install all necessary fasteners and required blocking to properly install OFCI materials.

H. CONTRACTOR shall install OFCI materials with manufacturer recommended fasteners for the type of construction to which the OFCI materials are being fastened and/or anchored.

I. CONTRACTOR shall provide final connections of any electrical, signal, gas, water, waste, venting and/or similar items to OFCI materials. CONTRACTOR shall, prior to final connection, verify the operating characteristics of OFCI materials are consistent with the designated supply.

J. . General: All such work indicated in Contract Documents and/or specified herein.

k. Coordination:

1. Contractor shall schedule and coordinate Owner work with his work; give 5 days min. advance notice of all dates; verify that Owner work has been accomplished prior to beginning his work

L. Owner Furnished Items or Products (IF ANY):

1. Owner Responsibilities:

a. Delivery of items or products to site.

b. Schedule delivery date with supplier in accord with Contractor's schedule.

c. Obtain installation drawings and instructions.

d. Submit claims for transportation damages.

e. Arrange guarantees, warranties.

2. Contractor's Responsibilities:

a. Schedule required delivery date for each product, and inform Owner.

b. Promptly inspect delivered products, report damaged or defective items.

c. Unload; handle at site, including uncrating and storage.

d. Protect from exposure to elements, from damage.

e. Repair or replace items damaged as result of Contractor's operations.

f. Install, connect, finish products.

B. The Contractor shall provide adequate storage within his fenced staging area, to store the equipment. The Contractor is solely responsible for the storage of this equipment within his staging area and all subsequent movement of this equipment. The Contractor shall be solely responsible for the maintenance and protection of all material.

C. Bidders submitting under this Contract shall include the price for all necessary coordination with the District and the equipment manufacturer, as required for proper and complete coordination between all trades and all Contractors, within their bid.

4.04 WORK BY OTHERS

A. The District reserves the right to do other work in connection with the project or adjacent thereto by contract or otherwise, and Contractor shall at all times conduct the work so as to impose no hardship on District or others engaged in District's work nor to cause any unreasonably delay or hindrance thereto.

B. Where two or more Contractors are employed on related or adjacent work, each shall conduct their operation in such a manner as not to cause delay or additional expense to the other.

C. Contractor shall be responsible to others engaged in the related or adjacent work for all damage to work, to persons, or for loss by failure to finish the work within the specified time for completion. Contractor shall coordinate his work with the work of others so that no discrepancies shall result in the project.

PART 8 – GENERAL NOTES

5.01 GENERAL NOTES

A. Work areas and detailed scope of work are shown under PART 2.01.

B. It is the responsibility of the contractor to examine the site of the work and after investigation to decide for himself the character of materials, equipment and utilities to be encountered and all other conditions affecting the work. It is also his responsibility to provide sufficient costs to cover the provisions of all items of work under the existing conditions referred to herein.

C. CONTRACTOR is responsible to review the AHERA – Inspection reports for any presence of asbestos containing materials (ACM). CONTRACTOR shall immediately notify OWNER of the presence or suspected presence of any ACM found during the course of the work, prior to the disturbance of the subject materials. At the sole direction of the OWNER, contractor may be required to stop all work on all or any portion of the project until ACM materials are properly abated by OWNER.

C. All work areas have available access. The Contractor will be issued keys for the sites through the District Facilities and Support Operations Department to allow access at the sites. Contractor will ensure they secure all areas that are accessed by their personnel to ensure the security of the site.

D. Contractor shall provide trash bins and storage facilities for use at the site. The contractor shall not use school facilities for these purposes. It will be the contractor's responsibility to maintain and keep those facilities neat and clean at all times.

E. There may be other contractors or District workers working at the job site. Contractor will be responsible to coordinate his work with their schedules.

F. The Representative will have the right to stop the work immediately in case he sees a discrepancy or work not following the specifications. The contractor will not be let to continue to work until corrections are made and approval and permission given by the District Representative.

5.02 RESTRICTIONS

A. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the work areas in which the work is indicated. Allow for Owner occupancy and use by the public.

B. Use of the Existing Buildings: Repair damages caused by construction operations. Take all precautions necessary to protect the existing buildings and their occupants during the construction period.

C. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, other contractors working, and emergency vehicles at all times.

D. Full Owner Occupancy: The Owner may occupy the site and existing buildings during the entire construction period. Cooperate with the owner during construction operations to minimize conflicts and facilitate owner usage. Perform the work so as not to interfere with the Owner's operations.

5.03 PERMISSIBLE WORKING DAYS AND HOURS

A. Work may be conducted as follows:

B. This school is on a traditional school year calendar, August through June. During the period of this contract, school events and educational requirements will limit or prevent access, and will affect Contractor work hours for a portion or all of the school building (s) pertinent to the contract. Contractor shall maintain schedule with full knowledge of these times and dates to be determined. A site-specific calendar will include currently known dates of limited access, or times of the school day that noise will have to be limited, or ceased. These shall include during the time of the project, but not be limited to:

1. No work after 6:00 p.m. on six (6) weekday evenings for back-to-school, open house, and other events per school year at each school site.

2. No work between 8:00 a.m. and 10:00 a.m. on five (5) student attendance weekdays for assembly events per school year.

3. NO NOISE/WORK will be allowed on an Elementary school site between 8:00 a.m. and 12:30 p.m. on twelve (12) student attendance weekdays for testing (four (4) consecutive weekdays, three times) per school year. Second shift work may be accommodated with the request pre-approved by the District Project Manager.

4. NO NOISE/WORK will be allowed on a Middle School or High School site between 8:00 a.m. and 1:30 p.m. on twenty (20) student attendance weekdays for testing (four (4) consecutive weekdays during the first semester; sixteen (16) consecutive weekdays during the second semester) per school year. Second shift work may be accommodated with the request pre-approved by the District Project Manager.

C. It shall be noted that there are students in the Early and Extended Education Learning Program in attendance on the Elementary school sites from 6:00 a.m. through 6:00 p.m. on a daily basis throughout the school year, and on each day that Classified Staff are assigned working hours (see specific EEELP calendar for each site, per each school year).

D. Work hours for the Project shall be from 7:00 a.m. until 10:00 p.m. Monday through Saturday, unless advance permission to deviate from these hours is obtained from the City of Glendale per Glendale Municipal Code, Title 8, Chapter 36, and this request is also approved in writing five working days beforehand by the District Project Manager.

E. Subject to local ordinances, CONTRACTOR may work any hours on Saturdays, Sundays, and any non-school session days, when written notification to the District has been submitted and the anticipated schedule of work has been approved.

SECTION 01 74 10

CLEANING

PART 9 - GENERAL

10.01 SECTION INCLUDES:

A. Maintain premises and adjacent public and private properties free from accumulations of waste, debris, and rubbish, caused by operations during the project.

B. At completion of Work, remove waste materials rubbish, tools, equipment, machinery and surplus materials, and clean all exposed surfaces; leave project clean and ready for occupancy.

PART 10.2 - PRODUCTS

10.2.01 MATERIALS:

A. Use only cleaning materials recommended by the manufacturer of surface to be cleaned.

B. Use cleaning materials only on proper surfaces recommended by the manufacturer.

PART 10.3 - EXECUTION

10.3.01 DURING CONSTRUCTION:

A. Execute daily cleaning plans from each trade to ensure that buildings, grounds, and public and private properties are maintained free from accumulations of waste materials, rubbish and trash on a daily basis.

B. Wet down dry materials and rubbish to prevent blowing dust and debris on and from the construction work.

C. Daily, during progress of work, clean construction site and utilized public properties, and dispose of waste materials, debris and rubbish.

D. Provide on-site steel dump containers and appropriately sized trash containers for collection of waste materials, debris and rubbish. DO NOT USE SITE CONTAINERS.

E. Remove waste materials, debris and rubbish from site and legally dispose of at public or private dumping areas off the District's property.

F. Vacuum clean and wet wipe interior building walls, floors, doors, windows, and hardware in preparation for and when ready to receive finish preparation and painting. Continue vacuum cleaning on an as-needed basis until building is ready final inspection by the Architect, Inspector, and Project Manager and determined to be ready for substantial completion and occupancy.

G. Handle materials in a controlled manner to minimize any unnecessary waste or debris emanating from the construction areas. Do not drop or throw materials from heights: rather, a closed chute shall be used, to minimize unnecessary dust, waste or debris from the construction area.

A. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not migrate into new equipment or furniture, or onto wet, newly painted, or finished surfaces.

10.3.02 FINAL CLEANING:

A. Employ experienced workmen, or professional cleaners, for final cleaning.

B. Exterior: Clean surfaces of the construction and site including, but not limited to, fixtures, walls, soffits, floors, hardware, roofs, window and opening ledges and sills, horizontal projections, steps and platforms, walkways, rails and all like surfaces, and adjoining private and public property to the extent soiled by the Contractor's operations.

C. Interior: Leave all horizontal and vertical surfaces in vacuum cleaned, wet-wiped condition with all dust, dirt, stains, hand marks, paint spots, droppings, and other blemishes and defects completely removed, and conform to the following requirements:

1. Hard Floors: Freshly administer specified product sealants, and Wet mop/wash and dry, concrete, Portland cement flooring, tile, elastomeric, epoxy, refinished and colored concrete, and similar hard floor surfaces free of dust, streaks or stains.

2. Resilient Flooring: Freshly wax and buff as specified in Section 09 65 00.

3. Wood Flooring: Remove defects and blemishes by sanding surface and painting according to Section 09 90 00.

4. Resilient Bases: Clean off adhesive smears and wipe clean with wet-wipe methods.

5. Unpainted and Painted Surfaces: Clean of dust, lint, streaks or stains, utilizing wet-wipe methods as necessary.

6. Tile Walls: Clean and polish per manufacturer's specifications.

7. Hardware and Metal Surfaces: Clean and polish all exposed surfaces using non-corrosive and nonabrasive materials.

8. Glass: Wash and polish both sides, and leave free of dirt, spots, streaks, and labels. Clean and polish mirrors.

9. Ceilings: Clean and free of stains, hand marks, and defacing.

10. Replace air conditioning filters as specified in Mechanical Specifications.

11. Clean ducts, blowers and coils, if air conditioning units are found to have been operated without filters during construction, and after final inspection.

12. Lighting fixtures: Replace lamps and clean fixtures and lenses if fixtures or lamps are dirty or have smudges or dust.

13. Fixtures and Equipment: Clean and polish mechanical and electrical fixtures and like items. Leave lighting fixtures free of dust, dirt, stains or waste material. Clean and service equipment and machinery, leaving ready for use.

14. Surfaces Not Mentioned: Clean according to the intent of this Section and as required for Architect's approval.

E. Contaminated Earth: Final clean-up operation includes the removal and disposal of earth that is contaminated or unsuitable for support of plant life in planting areas, and filling the resulting excavations with suitable soil as directed and approved by the Architect, Inspector, and/or Project Manager.

Contaminated areas include those used for disposal of waste concrete, mortar, plaster, masonry, paints, and similar materials, and areas in which washing out of concrete and plaster mixers or washing of tools and like cleaning operations have been performed, and all areas and adjacent areas that have been oiled, paved, or chemically treated.

Do not dispose of waste, oil, solvents, paints, solutions, or like penetrating material by depositing or burying on School property; dispose of such material in a lawful manner.

END OF SECTION