SECTION 02721

AGGREGATE BASE COURSE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 02310 - Grading: Preparation of site for base course.

B. Section 02316 - Fill and Backfill: Compacted fill under base course.

C. Section 02317 - Trenching for Site Utilities: Compacted fill over utility trenches under base course.

D. Section 02741 - Bituminous Concrete Paving: Binder and finish asphalt courses.

E. Section 02751 - Portland Cement Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; American Association of State Highway and Transportation Officials.

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; American Association of State Highway and Transportation Officials.

C. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)).

E. ASTM D 1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.

F. ASTM D 1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)).

G. ASTM D 2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

H. ASTM D 2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).

I. ASTM D 2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

J. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

K. ASTM D 4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Aggregate Composition Test Reports: Results of laboratory tests on actual materials used.

D. Compaction Density Test Reports.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.01 MATERIALS

A. Aggregate: Class II Aggregate Base or better.

2.02 SOURCE QUALITY CONTROL

A. See Section 01450 - Testing and Inspection, for general requirements for testing and analysis of aggregate materials.

B. Where aggregate materials are specified using ASTM D 2487 classification, test and analyze samples for compliance before delivery to site.

C. Where aggregate materials are specified using ASTM D 2487 classification, testing of samples for compliance will be provided before delivery to site.

D. If tests indicate materials do not meet specified requirements, change material and retest.

E. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 FIELD QUALITY CONTROL

A. See Section 01410 - Testing and Inspection, for general requirements for field inspection and testing.

3.04 CLEANING

A. Leave unused materials in a neat, compact stockpile.

B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION

SECTION 02741

BITUMINOUS CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Single course bituminous concrete paving.

B. Double course bituminous concrete paving.

C. Surface sealer.

1.02 RELATED REQUIREMENTS

A. Section 02310 - Grading: Preparation of site for paving and base.

B. Section 02316 - Fill and Backfill: Compacted subgrade for paving.

C. Section 02765 - Pavement Markings: Pavement markings.

D. Section 02843 - Parking Bumpers: Concrete bumpers.

E. Section 02721 - Aggregate Base Course: Aggregate base course.

1.03 REFERENCE STANDARDS

A. County of Orange Standard Plans for Public Works Construction

B. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; The Asphalt Institute.

C. AI MS-19 - A Basic Asphalt Emulsion Manual; The Asphalt Institute.

D. ASTM D 946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction.

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with County of Orange Standard Plans For Public Works Construction.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 BASE COURSE

A. Place and compact base course.

B. Section 02721 - Aggregate Base Course.

3.02 PREPARATION - TACK COAT

A. Apply tack coat to contact surfaces of curbs, gutters and swales.

3.03 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with County of Orange Standard Plans For Public Works Construction.

3.04 SEAL COAT

A. Apply seal coat to surface course in accordance with County of Orange Standard Plans For Public Works Construction.

3.05 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for two days or until surface temperature is less than 140 degrees F.

END OF SECTION

SECTION 02751

PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete sidewalks, stair steps, integral curbs, gutters, median barriers, parking areas, roads, and driveway.

1.02 RELATED REQUIREMENTS - SECTIONS

A. Section 02310 - Grading: Preparation of site for paving and base and preparation of subsoil at pavement perimeter for planting.

B. Section 02316 - Fill and Backfill: Compacted subbase for paving.

C. Section 02741 - Bituminous Concrete Paving: Asphalt wearing course.

D. Section 02783 - Concrete Pavers.

E. Section 03300 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. County of Orange Standard Plans For Public Works Construction

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

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

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

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

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

G. ASTM A 185/A 185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

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

I. ASTM A 615/A 615M - Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.

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 150 - Standard Specification for Portland Cement.

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

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

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

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

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

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

T. ASTM D 1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (non-extruding and Resilient Bituminous Types).

U. ASTM D 1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Product Data:
   1. Provide data on joint filler, admixtures, and curing compound.
   2. Six (6) copies of the manufacturer's printed instructions, bulletins and specifications for color additive.

C. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

D. Samples: A 2 ft. x 2 ft. square sample of each concrete finish with color for the Architect's approval prior to the start of concrete work. Sample to be delivered to job site and remain until pavement work is completed. The finished concrete sample shall reflect the personnel, procedures, and materials to be used, and shall match the color and finish of the colored concrete to be installed by the Contractor.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: Conform to ACI 301.

B. Wood form material, profiled to suit conditions.

C. Joint Filler: Preformed; non-extruding bituminous type (ASTM D 1751) or sponge rubber or cork (ASTM D 1752).
   1. Thickness: 1/2 inch.

2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A 615/A 615M Grade 60 (420); deformed billet steel bars; unfinished finish.

B. Steel Welded Wire Reinforcement: Plain type, ASTM A 185/A 185Mcoiled rolls unfinished.

C. Dowels: ASTM A 615/A 615M Grade 60 (420); deformed billet steel bars; unfinished finish.

2.03 CONCRETE MATERIALS

A. Concrete Materials: As specified in Section 03300.

B. Color Additives:
   1. Manufacturer: Davis Colors, Tel: (800) 356-4848, Email: www.daviscolors.com.
   2. Type: Integral. Where shown on plans
   3. Colors:
      a. Field: Sandstone No. 5237. Contractor shall provide field sample, 2'x2' size.
      b. Accent: Kailua No. 677. Contractor shall provide field sample, 2'x2' size.

4. Finish: Grade "Top-Cast" Finish Number Code 03, acid etch finish top-surface retarder. Tel: (877) 423-6491. Email: www.graceconstruction.com.
5. Sealer: Color Seal II, manufactured by David Colors, Tel: (800) 356-4848, Email: www.daviscolors.com. Colored sealer to match integral concrete color.

2.04 ACCESSORIES

A. Curing Compound: ASTM C 309, Type 1, Class A.

B. Joint Sealer: As specified in Section 07900.

2.05 CONCRETE MIX DESIGN

A. Contractor shall submit concrete mix design for all concrete work to Alexander + Hibbs AIA, Inc.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.

C. Notify Alexander + Hibbs AIA, Inc. minimum 24 hours prior to commencement of concreting operations.

3.03 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.04 REINFORCEMENT

A. Place reinforcement at midheight of slabs-on-grade.

B. Place reinforcement as indicated.

C. Interrupt reinforcement at contraction joints.

D. Place dowels to achieve pavement and curb alignment as detailed.

3.05 PLACING CONCRETE

A. Place concrete as specified in Section 03300.

B. Place concrete in accordance with County of Orange Public Works standards.

C. Do not place concrete when base surface is wet.

D. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

E. Place concrete continuously over the full width of the panel and between predetermined construction joints.

F. The colored concrete shall be installed in the locations shown on the plans, and shall be subject to approval by the Architect. Work not conforming to color and finish, appearance, or otherwise not complying with the Specifications shall be removed and replaced at no additional cost to the County.
   1. Colored concrete and finishing shall be placed, formed, and cured in conformance with the printed instructions specifications, and technical bulletins issued by the manufacturer of the color additive system.
   2. After curing the minimum calendar days noted on the manufacturer's specifications, Contractor shall pressure clean the concrete to remove residual dust. After concrete is cleaned, it shall be sealed with clear sealant (nonslip type).

3.06 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Provide scored joints, unless shown on drawings:
   1. At 3 feet intervals.
   2. Between sidewalks and curbs.
   3. Between curbs and pavement.

C. Provide keyed joints as indicated.

3.07 FINISHING

A. Area Paving: Wood float.

B. Sidewalk Paving: Wood float with troweled and radiused edge 1/4 inch radius. Where integral color concrete paving is noted on drawings, refer to Article 2.03B.

C. Median Barrier: Wood float with troweled and radiused edge.

D. Landscape Planter: Per Landscape Architect.

E. Curbs and Gutters: Light broom, texture parallel to pavement direction.

F. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

3.08 JOINT SEALING

A. See Section 07900 for joint sealer requirements.

3.09 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01410.
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Submit proposed mix design of each class of concrete to Alexander + Hibbs AIA, Inc. for review prior to commencement of concrete operations.
   3. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

B. Compressive Strength Tests: ASTM C 39/C 39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 75 cu yd or less of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   2. Perform one slump test for each set of test cylinders taken.

C. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.10 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement for 7 days minimum after finishing.

END OF SECTION

SECTION 02765

PAVEMENT MARKINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Parking lot markings, including parking bays, crosswalks, arrows, handicapped symbols, and curb markings.

B. "No Parking" curb painting.

1.02 RELATED REQUIREMENTS

A. Section 02741 - Bituminous Concrete Paving.

B. Section 02751 - Portland Cement Concrete Paving.

1.03 REFERENCE STANDARDS

A. County of Orange Standard Plans For Public Works Construction.

B. FS TT-B-1325 - Beads (Glass Spheres); Retro-Reflective.

C. FS TT-P-1952 - Paint, Traffic Black, and Airfield Marking, Waterborne.

D. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association.

E. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual.

F. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; http://mutcd.fhwa.dot.gov.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

1.05 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI No. 97 Latex Traffic Marking Paint; color(s) as indicated.
   1. Parking Lots: White.
   2. Handicapped Symbols: Blue.

B. Temporary Marking Tape: Preformed, pressure sensitive adhesive tape in color(s) required; Contractor is responsible for selection of material of sufficient durability as to perform satisfactorily during period for which its use is required.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Alexander + Hibbs AIA, Inc. of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Allow new pavement surfaces to cure for a period of not less than 14 days before application of marking materials.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.
   2. Completely remove rubber deposits, existing paint markings, and other coatings adhering to the pavement, by scraping, wire brushing, sandblasting, mechanical abrasion, or approved chemicals.

D. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

E. Temporary Pavement Markings: When required or directed by Alexander + Hibbs AIA, Inc., apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.
   2. At Contractor's option, temporary marking tape may used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to County of Orange/OC Public Works.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on the drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Length Tolerance: Plus or minus 3 inches.
   4. Width Tolerance: Plus or minus 1/8 inch.

G. Parking Lots: Apply parking space lines, entrance and exit arrows, painted curbs, and other markings indicated on drawings.
   1. Mark the International Handicapped Symbol at indicated parking spaces.
   2. Hand application by pneumatic spray is acceptable.

H. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to County of Orange/OC Public Works.

END OF SECTION

SECTION 02783

CONCRETE PAVERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Interlocking concrete paver units.

B. Sand setting bed.

C. Sand joint filler.

D. Edge restraints.

1.02 RELATED REQUIREMENTS

A. Section 02310 - Grading: Preparation of subsoil for pavers.

B. Section 02316 - Fill and Backfill: Compacted fill for pavers.

C. Section 02741 - Bituminous Concrete Paving: Subbase for pavers.

D. Section 02751 - Portland Cement Concrete Paving: Subbase for pavers.

1.03 REFERENCE STANDARDS

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

B. ASTM C 936 - Standard Specification for Solid Concrete Interlocking Paving Units.

C. ASTM C 1319 - Standard Specification for Concrete Grid Paving Units.

D. ASTM D 5268 - Standard Specification for Topsoil Used for Landscaping Purposes.

1.04 SUBMITTALS

A. See Section 01350 - Submittals, for submittal procedures.

B. Product Data: Provide characteristics of paver unit, dimensions, and special shapes.

C. Samples: Submit two samples of each paver type, illustrating style, size, color range and surface texture of units being provided.

D. Manufacturer's Installation Instructions: Indicate substrate requirements and installation methods.

E. Maintenance Materials: Provide the following for County of Orange/OC Public Works's use in maintenance of project.
   1. Extra pavers: 10.

PART 2 PRODUCTS

2.01 MATERIALS

A. Interlocking Concrete Pavers: Hydraulically pressed concrete, configured for interlocking with adjacent units and complying with ASTM C 936 as manufactured by Orco Block Company or equal.
   1. Compressive Strength: 8000 psi average, with minimum of 7200 psi.
   2. Absorption: 5 percent average, with maximum of 7 percent.
   3. Size: 7.8" x 3.9".
   4. Thickness: 3-1/8 inches.
   5. Style: Holland.
   6. Color: Manor (B3).
   7. Pattern: Runner.

B. Sand for Setting Bed: Clean washed natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregates.

C. Sand for Joints: Fine washed sand with 100 percent passing No. 16 sieve and not more than 10 percent passing No. 200 sieve.

D. Edging: Concrete curb, as detailed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate is level or to correct gradient, smooth, capable of supporting pavers and imposed loads, and ready to receive work of this Section.

B. Verify gradients and elevations of substrate are correct.

3.02 INSTALLATION OF SOLID PAVER UNITS

A. Spread sand evenly over prepared substrate surface to a thickness of 1-1/2 inch.

B. Dampen and roller compact sand to level and even surface.

C. Screed and scarify top 1/2 inch of sand.

D. Place paver units in pattern indicated on the drawings.

E. Cut paver units at edges with masonry saw.

F. Place half units at edge and interruptions. Maintain tight joints.

G. Sprinkle sand over surface and sweep into joints. Moisten joints and recover with additional sand until firm joints are achieved. Remove excess sand.

H. Tamp and level paver units with mechanical vibrator until units are firmly bedded, level, and to correct elevation and gradients. Do not tamp unrestrained edges.

END OF SECTION