SECTION 32 14 00 - UNIT PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:.
   1. Concrete pavers set in aggregate and mortar setting beds.
   2. Porcelain Pavers
   3. Aluminum edge restraints.

1.2 SUBMITTALS

A. Product Data: For the following:
   1. Pavers.
   2. Mortar and grout materials.
   3. Edge restraints.

B. Samples for Initial Selection: For the following:
   1. Each type of unit paver indicated.
   2. Joint materials involving color selection.
   3. Exposed edge restraints involving color selection.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups for each form and pattern of unit paver to demonstrate aesthetic effects and set quality standards for the materials and execution.
   1. Build mockups of full-thickness sections of decorative concrete paving to demonstrate typical joints, color, pattern, texture and standard of workmanship.
   2. Build mockups where directed by Landscape Architect and not less than 96 inches by 96 inches.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 PROJECT CONDITIONS

A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

B. Weather Limitations for Bituminous Setting Bed:
   1. Install bituminous setting bed only when ambient temperature is above 40 deg F and when base is dry.

C. Weather Limitations for Mortar and Grout:
   1. Cold-Weather Requirements: Protect unit paver work against freezing when ambient temperature is 40 deg F and falling.

2. Hot-Weather Requirements: Protect unit paver work when temperature and humidity conditions produce excessive evaporation of setting beds and grout.

PART 2 - PRODUCTS

2.1 CONCRETE UNIT PAVER - PEDESTRIAN

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
1. Basis-of-Design Product: The design for Concrete Unit Paver - Pedestrian is based on Hanover Architectural Products Traditional Prest Brick.
2. Thickness: 2-3/8 inches.
3. Face Size and Shape: 4 inches by 8 inches.
4. Color: Hickory.
5. Finish: Natural.

2.2 CONCRETE UNIT PAVER - BANDING

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
1. Basis-of-Design Product: The design for Concrete Unit Paver - Pedestrian is based on Hanover Architectural Products Traditional Prest Brick.
2. Thickness: 2-3/8 inches.
3. Face Size and Shape: 4 inches by 8 inches.
4. Color: Hickory.
5. Finish: Natural.

2.3 CONCRETE UNIT PAVER - VEHICULAR

A. Concrete Pavers: Solid interlocking paving units complying with ASTM C 936 and resistant to freezing and thawing when tested according to ASTM C 67, made from normal-weight aggregates.
1. Basis-of-Design Product: : The design for Concrete Unit Paver - Vehicular is based on Hanover Architectural Products Traditional Prest Brick.
2. Thickness: 3 inches.
3. Face Size and Shape: 4 inches by 8 inches.
4. Color: Hickory.
5. Finish: Natural.

2.4 PORCELAIN PAVER

A. Porcelain Pavers: Paving units complying with ASTM C1026 for freezing and thawing, ASTM C 373 for water absorption, ASTM C 648 for flexible strength, and ANSI 137.1 (DCOF) for slip resistance.
1. Basis-of-Design Product: The design for Porcelain Paver is based on Hanover Architectural Products Porcelain Pavers.

2. Thickness: 3/4 inch.
3. Face Size and Shape: 24 inches by 24 inches.
4. Color: Copper Creek.

2.5 ACCESSORIES

A. Aluminum Edge Restraints: L-shaped, 3/16-inch thick by 2-inch high extruded-aluminum edging with loops pressed from face to receive stakes at 12 inches o.c., and aluminum stakes 12 inches long for each loop.
1. Basis of Design: The design for Aluminum Edge Restraint is based on Sure-Loc Aggregate L-Edge A36228.
2. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

a. BRICKSTOP Corporation.
b. Curv-Rite, Inc.
c. Permaloc Corporation.
d. Sure-Loc Edging Corporation.

2.6 DECOMPOSED GRANITE

A. Decomposed Granite: Particles that are clean, hard, angular, and durable. Gradation is accordance with ASTM C136.
1. Basis-of-Design Product: Triangle Landscape Supply Chapel Hill Grit.
2. Color: Tan/Brown.

2.7 DECOMPOSED GRANITE STABILIZER

A. Decomposed Granite Stabilizer: Stabilizer shall be integrated as a blend with decomposed granite aggregate material.
1. Basis-of-Design Product: Organic-Lock Stabilized Aggregate.

2.8 AGGREGATE SETTING-BED MATERIALS

A. Graded Aggregate for Base: Sound, crushed stone or gravel complying with requirements in Division 31 Section "Earth Moving" for Base Course.

B. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements in ASTM C 33 for fine aggregate, except with no more than 1% passing the No. 200 sieve.

C. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 sieve and no more than 10 percent passing No. 200 sieve.

D. Drainage Geotextile: Nonwoven needle-punched geotextile complying with requirements in Division 31 Section "Earth Moving" for Subsurface Drainage Geosynthetic Materials.

2.9 MORTAR SETTING-BED MATERIALS

A. Portland Cement: ASTM C 150, Type I or II.

B. Hydrated Lime: ASTM C 207, Type S.

C. Sand: ASTM C 144.

D. Latex Additive: Acrylic-resin water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement mortar bed, and not containing a retarder.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering latex additives that may be incorporated into the Work include, but are not limited to, the following:

    a. Boiardi Products Corporation.
    b. Bonsal, W. R. Company.
    c. Bostik Findley Inc.
    d. C-Cure.
    e. Custom Building Products.
    f. DAP Inc.
    g. Jamo Inc.
    h. Laticrete International, Inc.
    i. MAPEI Corp.
    j. SGM.
    k. Summitville Tiles, Inc.
    l. TEC Incorporated; H. B. Fuller Company.

2.10 GROUT MATERIALS

A. Latex-Portland Cement Grout: ANSI A118.6, composition as follows:

1. Packaged, dry grout mix consisting of portland cement, graded aggregate, and ethylene vinyl acetate in the form of a reemulsifiable powder to which only water is added at Project site.
2.
    a. Dry Grout Mixture: Factory-mixed, sanded grout complying with ANSI A118.6 and recommended by latex-additive manufacturer: Color to match granite. Use latex additive without retarder with dry-set grout.

        a) Colored Aggregate: Ground marble, granite, or other sound stone; selected to produce required grout color.

3. Colored Mortar Pigments for Grout: Natural and synthetic iron and chromium oxides, compounded for use in mortar and grout mixes. Use only pigments that have proved through testing and experience to be satisfactory for use in portland cement grout.

B. Water: Potable.

2.11 JOINT SEALANT

A. Sealant: Comply with ASTM C 920, Type S, Grade NS, Class 12-1/2, use T.

2.12 PANEL DRAIN

A. Panel Drain: Panel drain to be HDPE geonet drainage core with filter fabric bonded to both sides. Panel drains to be rated for heavy vehicular traffic. Panels to be 12” wide and ½” thick and located over drainage weeps as indicated on drawings.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

B. Cut unit pavers with motor-driven masonry saw equipment to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible.
1. For concrete pavers, a block splitter may be used.

C. Joint Pattern: As indicated.

D. Tolerances: Do not exceed 1/16-inch unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches and 1/4 inch in 10 feet from level, or indicated slope, for finished surface of paving.

E. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.

3.2 AGGREGATE SETTING-BED APPLICATIONS

A. Prepare subgrade according to Division 31 Section "Earth Moving”.

B. Place drainage geotextile over compacted subgrade, overlapping ends and edges at least 12 inches.

C. Place aggregate base, compact by tamping with plate vibrator, and screed to depth indicated.

D. Place leveling course and screed to a thickness of 1 inch, taking care that moisture content remains constant and density is loose and constant until pavers are set and compacted.

E. Treat leveling course with herbicide to inhibit growth of grass and weeds.

F. Set pavers with a minimum joint width of 1/16 inch and a maximum of 1/8 inch, being careful not to disturb leveling base. If pavers have spacer bars, place pavers hand tight against spacer bars.

G. Vibrate pavers into leveling course with a low-amplitude plate vibrator capable of a 3500- to 5000-lbf compaction force at 80 to 90 Hz.

H. Spread dry sand and fill joints immediately after vibrating pavers into leveling course. Vibrate pavers and add sand until joints are completely filled, then remove excess sand. Leave a slight surplus of sand on the surface for joint filling.

3.3 BITUMINOUS SETTING-BED APPLICATIONS

A. Apply primer to concrete slab or binder course immediately before placing setting bed.

B. Place bituminous setting bed where indicated, in panels. Strike setting bed smooth, firm, even, and not less than 3/4 inch thick. Add fresh bituminous material to low, porous spots after each pass of striking board.
   1. Roll setting bed with power roller to a nominal depth of 3/4 inch. Adjust thickness as necessary to allow accurate setting of unit pavers to finished grades indicated. Complete rolling before mix temperature cools to 185 deg F.

C. Apply neoprene-modified asphalt adhesive to cold setting bed by squeegeeing or troweling to a uniform thickness of 1/16 inch. Proceed with setting of paving units only after adhesive is tacky and surface is dry to touch.

D. Place pavers carefully in straight courses, maintaining accurate alignment and uniform top surface.

E. Joint Treatment: Place unit pavers with hand-tight joints. Fill joints by sweeping sand over paved surface until joints are filled. Remove excess sand after joints are filled.

3.4 MORTAR SETTING-BED APPLICATIONS

A. Saturate concrete subbase with clean water several hours before placing setting bed. Remove surface water about one hour before placing setting bed.

B. Apply mortar-bed bond coat over surface of concrete subbase about 15 minutes before placing setting bed. Limit area of bond coat to avoid its drying out before placing setting bed. Do not exceed 1/16-inch thickness for bond coat.

C. Apply mortar bed over bond coat immediately after applying bond coat. Spread and screed setting bed to uniform thickness at subgrade elevations required for accurate setting of pavers to finished grades indicated.

D. Mix and place only that amount of mortar bed that can be covered with pavers before initial set. Cut back, bevel edge, remove, and discard setting-bed material that has reached initial set before placing pavers.

E. Place pavers before initial set of cement occurs. Immediately before placing pavers on setting bed, apply uniform 1/16-inch thick, slurry bond coat to bed or to back of each paver with a flat trowel.

F. Tamp or beat pavers with a wooden block or rubber mallet to obtain full contact with setting bed and to bring finished surfaces within indicated tolerances. Set each paver in a single operation before initial set of mortar; do not return to areas already set or disturb pavers for purposes of realigning finished surfaces or adjusting joints.

G. Spaced Joint Widths: Provide 3/8-inch nominal joint width with variations not exceeding plus or minus 1/8 inch.

H. Grout joints as soon as possible after initial set of setting bed.
1. Force grout into joints, taking care not to smear grout on adjoining surfaces.
2. Clean pavers as grouting progresses by dry brushing or rubbing with dry burlap to remove smears before tooling joints.
3. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
4. If tooling squeezes grout from joints, remove excess grout and smears by dry brushing or rubbing with dry burlap and tool joints again to produce a uniform appearance.

I. Cure grout by maintaining in a damp condition for seven days, unless otherwise recommended by grout or liquid-latex manufacturer.

3.5 REPAIRING, POINTING, AND CLEANING

A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

B. Pointing: During tooling of joints, enlarge voids or holes and completely fill with grout. Point up joints at sealant joints to provide a neat, uniform appearance, properly prepared for sealant application.

C. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean.

END OF SECTION 321400