

## **SECTION 517 – UNIT PAVERS**

### **517.01      DESCRIPTION**

This work shall consist of the furnishing and installation of unit pavers.

### **517.02      REFERENCE STANDARDS**

- ANSI 118.3    Chemical Resistant, Water Cleanable Tile-Setting, Grouting Epoxy, and Epoxy Adhesive
- ANSI 118.4    Modified Dry-Set Cement Mortar
- ANSI 118.7    High Performance Cement Grouts for Tile Installation
- ASTM C33     Standard Specification for Concrete Aggregates
- ASTM C67     Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
- ASTM C902    Standard Specification for Pedestrian and Light Traffic Paving Brick.
- ASTM C936    Standard Specification for Solid Concrete Interlocking Paving Units.
- ASTM C1193   Standard Guide for Use of Joint Sealants.
- ASTM C1319   Product Standard for Concrete Grid Paving Units.
- ASTM D1073   Standard Specification for Fine Aggregate for Asphalt Paving Mixtures.
- ASTM D2028   Standard Specification for Cutback Asphalt (Rapid-Curing Type).

### **517.03      DEFINITIONS**

- A. Unit Paver: A segmental concrete pavement which, due to the size, shape and pattern of the units and the use of joint material between the units, has a high degree of surface interlock. A system of paving consisting of discrete, paving units with either rectangular or dentated shapes manufactured from concrete. Either type of shape is placed in an interlocking pattern.
- B. Joint Material: Sand (in non-permeable applications) or small aggregate (in permeable applications) used to fill the joints between concrete pavers or slabs and provides interlock between the units.

### **517.04      MATERIALS**

- A. Brick Pavers: Must meet ASTM C902-15 standard specification for pedestrian and light traffic paving brick. Provide brick without frogs or cores in surfaces exposed to view in completed work. Thickness is 2 ¼” and face size 4”x8” unless specified in construction documents. Brick shall be rated “not effloresced” when tested according to ASTM C67
- B. Solid Concrete Interlocking Paving Units: Must meet ASTM C936 Standard Specification for Solid Concrete Interlocking Paving Units.
- C. Bituminous Setting-Bed Materials:

1. Graded aggregate for subbase will be sound, crushed stone or gravel size no. 57.
2. Primer for base must meet ASTM D2028, cutback asphalt, grade as recommended by unit paver manufacturer.
3. Fine aggregate for setting bed is ASTM D1073, No. 2 or No. 3.

D. Bedding and Joint Sand:

1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
2. Do not use limestone screenings, stone dust, or sand for the bedding sand material that do not conform to the grading requirements of ASTM C33.
3. Do not use mason sand or sand conforming to ASTM C144 for the bedding sand.
4. Where concrete pavers are subject to vehicular traffic, utilize sands that are as hard as practically available.

E. Mortar:

1. Verify the compatibility of the selected mortar with the pavers before proceeding with mortaring. Consult with the mortar manufacturer's representative for recommendations.
2. Mortar bed or thin-set mortar: Meets ANSI 118.4, Specifications for latex-portland cement mortar.
3. Use epoxy mortars when application is subject to freeze-thaw conditions or deicing salts. Must meet ANSI 118.3 for specification for chemical resistant, water cleanable tile-setting, and tile grouting epoxy and water cleanable tile setting epoxy adhesive.

4. Grout:

1. Verify the compatibility of the selected pigmented grout with the pavers before proceeding with the grouting. Consult with the grout manufacturer's representative for recommendations.
2. Meets ANSI 118.7, polymer modified cement grouts for tile installation.
3. Use epoxy grouts in when application is subject to freeze-thaw conditions and deicing salts.
4. Meets ANSI 118.3, Specifications for chemical resistant, water cleanable tile-setting, and-tile grouting epoxy and water cleanable tile-setting epoxy adhesive.]

**517.05            SUBMITTALS**

A. Provide information for five (5) previous installation including references and photographs of at least two (2) installations.

B. Product Data:

1. Pavers
2. Setting Materials
3. Edging (if required)
4. Expansion Joint Materials
5. Mortar and grout materials
6. Concrete

C. Samples for M-NCPPC CM approval:

1. Full-size units of each type of unit paver indicated. Sample units provided should include full spectrum of any colors indicated on the plans.
2. Expansion joint material
3. Edging

D. Product Maintenance and Warranty information for all items.

**517.06            QUALITY ASSURANCE**

- A. The Contractor must supply evidence of having performed five (5) installations of unit pavers of the type specify within last 5 (five) years.
- B. Source Limitations: Obtain each type of unit paver, joint material, and setting material from one (1) source with resources to provide materials and products of consistent quality in appearance and physical properties.
- C. Mockups: Build 4'-0" x 4'-0" mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution including any patterns. (Approved mockups may become part of completed work if approved and is undisturbed at time of substantial completion.
- D. All spacing, both horizontal and vertical, must meet the 2010 ADA Standards for Accessible Design (ADA), the Maryland Accessibility Code, Montgomery Parks ADA Compliance Manual, and Updates

**517.07            CONSTRUCTION**

A. Delivery, Storage, and Handling:

1. Store pavers on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.
2. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use if it becomes damp.
3. Store asphalt cement and other bituminous materials in tightly closed containers.

B. Project Conditions:

1. 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 bed. Remove and replace unit paver work damaged by freezing or frost.
2. Apply asphalt adhesive only when ambient temperature is above 50°F and when temperature has not been below 35°F for 12 hours immediately before application and nor if expected to below 35 F within 8 hours after application. Do not apply when setting bed is wet or contains excess moisture.
3. Install bituminous setting bed only when ambient temperature is above 40°F and when base is dry.
4. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

#### C. Preparation

1. Remove substances from concrete substrates that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
2. Clean concrete substrates to remove dirt, dust, debris, and loose particles.
3. Proof-roll prepared subgrade according to identify soft pockets and areas of excess yielding. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase and base course for unit pavers.
4. Contractor to review the manufacturer's installation specification for each type of paver used. Any discrepancies shall be brought to the attention of the M-NCPPC CM prior to the commencement of construction.

#### D. Installation

1. Pavers: Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable. For concrete pavers, a block splitter may be used.
5. Tolerances: Do not exceed 1/32" unit-to-unit offset from flush (lippage) nor 1/8" in 24" from level, or indicated slope, for finished surface of paving.
6. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Recess joint filler 3/8" from the finish surface of paving.
5. Apply primer to binder course immediately before placing setting bed.
6. Setting Bed (See Construction Details for information on the type of subbase including aggregate and concrete:
  - a. Prepare for setting-bed placement by locating 3/4-inch- deep control bars approximately 11 feet apart and parallel to one another, to serve as guides for striking board. Adjust bars to subgrades required for accurate setting of paving units to finished grades indicated.

- b. Place bituminous setting bed where indicated, in panels, by spreading bituminous material between control bars. Spread mix at a minimum temperature of 250° F. 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. After each panel is completed, advance first control bar to next position in readiness for striking adjacent panels. Carefully fill depressions that remain after removing depth-control bars.
  - c. 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°F.
  - d. 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.
7. Placement: Place pavers carefully by hand in straight courses, maintaining accurate alignment and uniform top surface. Protect newly laid pavers with plywood panels on which workers can stand. Advance protective panels as work progresses, but maintain protection in areas subject to continued movement of materials and equipment to avoid creating depressions or disrupting alignment of pavers. If additional leveling of paving is required, and before treating joints, roll paving with power roller after sufficient heat has built up in the surface from several days of hot weather.
  8. 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. Repeat joint-filling process 30 days later.
  9. Expansion Joints:
    - a. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
    - b. Provide mock-up of all expansion joint conditions to demonstrate color compatibility and workmanship for approval by M-NCPPC CM prior to proceeding with the commencement of the installation of expansion joints.
    - c. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
    - d. Install sealant backings of kind 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.
      - i. Do not leave gaps between ends of sealant backings.
      - ii. Do not stretch, twist, puncture, or tear sealant backings.
      - iii. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
    - e. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
    - f. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
      - i. Place sealants so they directly contact and fully wet joint substrates.
      - ii. Completely fill recesses in each joint configuration.
      - iii. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

- g. Installation of Preformed Silicone-Sealant System: Comply with the following requirements:
  - i. Apply masking tape to each side of joint, outside of area to be covered by sealant system.
  - ii. Apply silicone sealant to each side of joint to produce a bead of size complying with preformed silicone-sealant system manufacturer's written instructions and covering a bonding area of not less than 3/8 inch. Hold edge of sealant bead 1/4 inch inside masking tape.
  - iii. Within 10 minutes of sealant application, press silicone extrusion into sealant to wet extrusion and substrate. Use a roller to apply consistent pressure and ensure uniform contact between sealant and both extrusion and substrate.
  - iv. Complete installation of sealant system in horizontal joints before installing in vertical joints. Lap vertical joints over horizontal joints. At ends of joints, cut silicone extrusion with a razor knife.
- h. 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.
- i. 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.
- j. Cleaning: Remove excess grout from exposed paver surfaces; wash and scrub clean. Remove temporary protective coating from brick pavers as recommended by protective coating manufacturer and as acceptable to unit paver and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- k. 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 so installations with repaired areas are indistinguishable from original work.

## **517.08            MEASUREMENT AND PAYMENT**

Payment will be full compensation for all material, labor, equipment, tools and incidental items necessary to complete the work. Payment shall be made on a unit rate or lump sum basis as shown in the bid proposal.