

**SECTION 13 – SURFACE TREATMENTS (REVISED MAY 2020)**  
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## **SECTION 13 – SURFACE TREATMENTS (REVISED MAY 2020)**

### **DESIGN CRITERIA**

#### **13.01 SCOPE**

- .1 For the purpose of this specification the following definitions shall apply:
  - (a) Alternative Surface Treatments refer to alternate hardscaping treatments that include, but are not limited to: concrete pavers, stamped concrete, and any other treatment deemed appropriate by the design engineer and approved by the City Engineer.
  - (b) Concrete pavers refer to concrete pre-manufactured for the purpose of hardscaping a lateral space.
  - (c) Stamped Concrete refers to concrete stamped once poured, to achieve a decorative appearance.
- .2 All alternative surface treatments must be designed in accordance to the design criteria within this section, while also following the design criteria, specifications, and installation requirements captured throughout all sections of the MoESS.

#### **13.02 OBJECTIVES**

- .1 Alternative surface treatments shall be used within a streetscape or park to add visual and artist interest to the public realm through colours, patterns, and textures.
- .2 Applications include, but are not limited to:
  - (a) Pedestrian realm including, but not limited to, sidewalks, walkways, plazas, open spaces, and parklets.
  - (b) Vehicle surfaces including, but not limited to, mountable truck aprons and crosswalks.
  - (c) Buffers to provide visual and textural separation of travel modes.
  - (d) Universal and accessible design features including, but not limited to, Tactile Warning Service Indicators (TWSIs).
- .3 For any application where vehicular traffic is anticipated within road right-of-way, concrete pavers are to be avoided and stamped concrete is to be used.

#### **13.03 EDGE RESTRAINTS**

- .1 Edge restraints shall include:
  - (a) Concrete curbs, as per Section 8.0 - Transportation.
  - (b) Concrete grade beams with a minimum width of 200 mm that conform to concrete specifications within Section 11.0 – Cast In Place Concrete Works.

#### **13.04 THICKNESS**

- .1 Concrete pavers shall have a minimum thickness of 60 mm, when used within the pedestrian realm absent of vehicular traffic.

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### **DESIGN CRITERIA**

- .2 Stamped concrete is to meet the specified thicknesses outlined within the Section 8.0 – Transportation Standard Drawings.

#### **13.05 BASE AND SUB-BASE**

- .1 Sub-base beneath concrete pavers shall be crushed or pit-run aggregate compacted to a minimum thickness of 150 mm or as specified in Section 9.0 – Aggregates and Granular Materials.
- .2 Concrete paver base shall be from one of the three categories:
  - (a) FLEXIBLE BASE - consists of compacted crushed stone, gravel, or coarse sand. Joint sand shall be used when laying concrete pavers on a Flexible Base.
  - (b) SEMI-RIGID BASE - consists of asphalt. Joint sand shall be used when laying concrete pavers on a Semi-Rigid Base.
  - (c) RIGID BASE - consists of a reinforced or unreinforced concrete slab on grade.
- .3 All concrete pavers in the pedestrian realm are to be grouted in place.

#### **13.06 PATTERNS**

- .1 All patterns or design features require prior approval by the City Engineer.
- .2 Patterns for non-standard concrete pavers shall conform to the manufacturer's specifications.
- .3 Truck aprons within the road right-of-way shall be stamped concrete with a red brick pattern.
- .4 Banding/buffer on either side of the bike path shall be stamped concrete with transverse score lines at 0.3m intervals.

#### **13.07 UTILITY SURROUNDS**

- .1 Covers and grates are to be avoided in walking areas, but when they are necessary, they shall be installed flush with the surrounding surface and slip-resistant.
- .2 The maximum opening on any grate or cover should be 13 mm, and if elongated, placed at right angles to the predominant direction of travel.
- .3 Metal rims and covers up to 300 mm in diameter shall have a minimum 150 mm thick concrete surround.

## **SECTION 13 – SURFACE TREATMENTS (REVISED MAY 2020)**

### **SPECIFICATIONS**

#### **13.20 SCOPE**

- .1 Only those products approved by the City Engineer will be accepted for installation.
- .2 These specifications apply to, alternative surface treatments, in addition to the specifications as outlined within all sections of the MoESS, including:
  - (a) Section 4.0 – Excavation, Trenching, and Backfill.
  - (b) Section 8.0 – Transportation.
  - (c) Section 9.0 – Aggregates and Granular Materials.
  - (d) Section 11.0 – Cast In Place Concrete Works.
  - (e) Section 12.0 - Asphaltic Concrete Paving.
  - (f) Section 14.0 – Landscape.

#### **13.21 CONCRETE PAVERS**

- .1 Concrete pavers refer to precast concrete units manufactured and supplied by a member of the Concrete Paver Institute. Concrete pavers must conform to the following requirements.
  - (a) Concrete pavers shall have an average compressive strength of 55 MPa (8000 psi), with no individual paver under 50 MPa (7250 psi) in accordance with ASTM C579 or CSA A231.1/A231.2.
  - (b) Concrete pavers shall have an average absorption of 5% with no paver having a greater absorption than 7% when tested in accordance with ASTM C140.
  - (c) Concrete pavers must be shown to be resistant to fifty (50) freeze-thaw cycles when tested in accordance with ASTM C67 or in accordance with CSA A231.1/A231.2.

#### **13.22 BEDDING AND JOINT SANDS**

- .1 Sands to be used for concrete paving shall be clean, non-plastic and free from detrious or foreign matter. Bedding and Joint Sands may be natural or manufactured from crushed rock.

## SECTION 13 – SURFACE TREATMENTS (REVISED MAY 2020) SPECIFICATIONS

- .2 For Bedding Sand the material shall conform to ASTM C33 as follows:

| <b>Grading Requirements for Bedding Sand (ASTM C33)</b> |                        |
|---|------------------------|
| <b>Sieve Size</b>                                       | <b>Percent Passing</b> |
| 9.5 mm (3/8 in)   | 100                    |
| 4.75 mm (No. 4)   | 95 to 100              |
| 2.36 mm (No. 8)   | 85 to 100              |
| 1.18 mm (No. 16)  | 50 to 85               |
| 0.600 mm (No. 30)                                       | 25 to 60               |
| 0.300 mm (No. 50)                                       | 10 to 30               |
| 0.150 mm (No. 100)                                      | 2 to 10                |

- .3 For Joint Sand the material shall conform to ASTM C33 as follows:

| <b>Grading Requirements for Joint Sand (ASTM C144)</b> |                        |
|--|------------------------|
| <b>Sieve Size</b>                                      | <b>Percent Passing</b> |
| 4.75 mm (No. 4)  | 100                    |
| 2.36 mm (No. 8)  | 95 to 100              |
| 1.18 mm (No. 16)                                       | 70 to 100              |
| 0.600 mm (No. 30)                                      | 40 to 75               |
| 0.300 mm (No. 50)                                      | 10 to 35               |
| 0.150 mm (No. 100)                                     | 2 to 15                |
| 0.075 mm (No. 200)                                     | 0                      |

- .4 Bedding Sand may be used as a replacement for Joint Sand, but Joint Sand shall not be used to replace Bedding Sand as a laying base.
- .5 Geotextile used to prevent the migration of bedding sand shall meet the requirements as described in AASHTO M288 Class 2.

### 13.23 SUB-BASE

- .1 Select granular Sub-base shall conform to Section 9.0 – Aggregates and Granular Materials.

### 13.24 BASE MATERIALS

.1 Flexible Base:

- (a) The minimum thickness of a compacted aggregate base is 100 mm. A compacted aggregate base shall have a 25 to 50 mm compacted sand setting bed placed between the base and the pavers.

.2 Semi-Rigid Base:

- (a) For any paving application, semi-rigid bases consist of a minimum 100 mm thickness of asphalt base, with a 19 to 25 mm asphalt setting bed on top. Semi-Rigid bases may be installed using existing asphalt pavement at the base.

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.3 Rigid Base:

- (a) The setting bed shall be compacted sand approximately 13 mm thick.
- (b) Rigid bases shall have a minimum thickness of 100 mm of concrete base. Rigid bases shall be used in areas of heavy traffic and where surface drainage is necessary. A rigid base shall have a 10 to 13 mm mortar setting bed to seat the concrete pavers.

## **SECTION 13 – SURFACE TREATMENTS (REVISED MAY 2020)**

### **INSTALLATION**

#### **13.40 SCOPE**

- .1 These installation specifications apply to alternative surface treatments, in addition to the installation specifications as outlined within all sections of the MoESS.

#### **13.41 EDGE RESTRAINTS**

- .1 Edge restraints shall be formed not extruded. Reinforcement shall be used as required.
- .2 Edge restraints must be in place prior to laying concrete pavers.
- .3 Edge restraints shall not be installed on top of bedding sand.

#### **13.42 BEDDING SAND**

- .1 Bedding sand shall be spread evenly over the base course and screeded to plan thickness. Screeds shall be standard lumber, having minimum length as required by the edge restraints. Screeded sand shall not be disturbed.
- .2 Depressions in the base course shall be filled with base course material and compacted.
- .3 The maximum thickness of bedding sands shall not be exceeded.

#### **13.43 CONCRETE PAVERS**

- .1 Concrete pavers, when used, must be laid in a smooth, uniformed manner, have a small chamfer edge 2 – 6 mm.
- .2 Joints between concrete pavers shall be as per manufacturer's specifications and shall not exceed 5 mm.
- .3 Gaps at the edge of the paved area shall be filled with cut or edge pavers.
- .4 Pavers shall be cut using double bladed splitter or masonry saw to achieve a smooth cut. No pieces shall be smaller than 10 mm; smaller gaps shall be filled with sand. Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized.

#### **13.44 COMPACTION**

- .1 A low amplitude vibrator capable of 22 kN with 75-100 Hz frequency shall be used to vibrate and compact the concrete pavers into the bedding sand. Vibrators shall not be used within 1 m of an unrestrained edge of the concrete pavers.
- .2 Joint sand shall be swept in between the concrete pavers during vibration.
- .3 Mechanical - laying machines require prior to approval of the City Engineer.

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### **INSTALLATION**

#### **13.45 TOLERANCES**

- .1 Final surface elevation of concrete pavers shall be 3 to 6 mm above adjacent drainage inlets, concrete collars or channels.
- .2 The final surface elevation shall not deviate more than 10 mm under a 3 m long straightedge.
- .3 Ensure all joints are as flush as possible with a maximum tolerance of 6 mm, as per the BC Building Access Handbook 2014.

#### **13.46 MOISTURE PROTECTION**

- .1 Stockpiled material shall be covered with a waterproof covering to prevent exposure to rainfall.
- .2 Concrete pavers shall not be installed during rainfall or over wet base and Sub-base materials.

#### **13.47 CLEANUP**

- .1 At the end of each day, all work within 1 m of the laying face shall be left fully compacted and shall have sand filled joints.
- .2 All excess sand shall be swept off the laid pavers.