

## **PART 1 - GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 31 00 99 – Earthworks for Minor Works.
- .2 Section 32 92 23 – Sodding.

### **1.2 REFERENCES**

- .1 ASTM International
  - .1 ASTM C136-14, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
  - .2 ASTM C979 / C979M-10, Standard Specification for Pigments for Integrally Colored Concrete.
- .2 CSA Group
  - .1 CSA A23.1 / A23.2-09 (R2014), Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
  - .2 CSA A231.1-14 / A231.2-14, Precast Concrete Paving Slabs/Precast Concrete Pavers.
  - .3 CSA A283-06 (R2011), Qualification Code for Concrete Testing Laboratories.

### **1.3 SUBMITTALS**

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for precast concrete unit pavers. Include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Indicate on drawings layout, pattern and relationship of paving joints to fixtures and project details.
- .4 Test and Evaluation Reports:
  - .1 Submit following sampling and testing data:
    - .1 Sieve analysis for gradation of bedding and joint material.
    - .2 Unit paver sampling and testing.
    - .3 Evaluation of [cleaning] [sealing] compound.
  - .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
  - .3 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties.

#### **1.4 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
  - .1 Store materials off ground, in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
  - .2 Store and protect precast concrete units from damage.
  - .3 Replace defective or damaged materials with new.
- .4 Packaging Waste Management: remove for reuse as per requirements of Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

### **PART 2 - PRODUCTS**

#### **2.1 PRECAST CONCRETE PAVERS**

- .1 Precast concrete pavers: to CSA A23.1/A23.2 and as follows:
  - .1 Size: 610 mm x 610 mm x 51 mm height.
  - .2 Type: reinforced diamond patterned units.
  - .3 Physical Properties:
    - .1 Compressive strength: 55 MPa at 28 days
      - .1 Minimum (MPa): 50 MPa at 28 days.
    - .2 Durability:
      - .1 Absorption: 6% maximum.
      - .2 Freeze Thaw: Not exceed 1% weight loss.
    - .3 Dimensional Tolerances:
      - .1 Length: -3 to + 3 mm.
      - .2 Width: -1 to + 2 mm.
      - .3 Height: -1 to + 2 mm.
  - .4 Colour: natural.
- .2 Manufactured in moulds, with spacers, suitable for installation and delivered on site in cubes of laying panels, in protective wrapping.
- .3 Pigment in concrete pavers: to ASTM C979/C979M.

## **2.2 PRECAST CONCRETE STEPS**

- .1 Precast concrete steps: to CSA A23.1/A23.2 and as follows:
  - .1 Size: 1200 mm. L. x 400 mm. W. x 152 mm height.
  - .2 Physical Properties:
    - .1 Compressive strength: 55 MPa at 28 days
      - .1 Minimum (MPa): 50 MPa at 28 days.
    - .2 Durability:
      - .1 Absorption: 6% maximum.
      - .2 Freeze Thaw: Not exceed 1% weight loss.
  - .3 Colour: Gray.
- .2 Manufactured in moulds and delivered on site in protective wrapping.
- .3 Pigment: to ASTM C979/C979M.

## **2.3 PRECAST CONCRETE SPLASH PAD**

- .1 Precast concrete splashpad: to CSA A23.1/A23.2 and as follows:
  - .1 Size: 610 mm. L. x 305 mm. W. x 76 mm height.
  - .2 Physical Properties:
    - .1 Compressive strength: 55 MPa at 28 days
      - .1 Minimum (MPa): 50 MPa at 28 days.
    - .2 Durability:
      - .1 Absorption: 6% maximum.
      - .2 Freeze Thaw: Not exceed 1% weight loss.
  - .3 Dimensional Tolerances:
    - .1 Length: -3 to + 3 mm.
    - .2 Width: -1 to + 2 mm.
    - .3 Height: -1 to + 2 mm.
  - .4 Colour: natural.
- .2 Manufactured in moulds and delivered on site in protective wrapping.
- .3 Pigment: to ASTM C979/C979M.

## **2.4 BEDDING AND JOINT MATERIAL**

- .1 Determine bedding sand hardness as follows:
  - .1 Randomly select single 1.4 kg sample from sand source.
  - .2 Dry sample for 24 hours at 115 degrees C to 121 degrees C.
  - .3 Obtain 3 sub-samples each weighing 0.2 kg by passing original sample several times through riffle box.
  - .4 Carry out sieve analysis test on each sub-sample in accordance with CSA A23.1/A23.2.
- .2 Remix each sub-sample and place in nominal litre capacity porcelain jar with two 2 - 25 mm diameter steel ball bearings weighing 75 +/-5 g each. Rotate each jar at 50 rpm for six 6 hours. Repeat sieve analysis. Record individual and average sieve analysis.

- .3 For each sample tested, maximum increase in percentages passing each sieve and maximum individual percent passing is in accordance with table as follows:

Sieve Size	Maximum Increase	Maximum Passing
0.075 mm	2%	2%
0.150 mm	5%	15%
0.300 mm	5%	35%

- .4 Bedding and joint sand: clean, non-plastic, free from deleterious or foreign matter, natural or manufactured from crushed rock or gravel. Do not use limestone screenings or stone dust.
- .5 Gradation: to CSA A23.1/A23.2, Table 4 - Grading Limits for Fine Aggregate, and CAN/CSA-A179 as follows:

Sieve Designation	% Passing for Bedding Sand	Joint Sand
10 mm	100	
5 mm	95-100	100
2.5 mm	80-100	95-100
1.25 mm	50-90	60-100
630 microns	25-65	
600 microns	35-80	
315 microns	10-35	
300 microns	15-20	
160 microns	2-10	
150 microns	2-15	

## 2.5 EDGE RESTRAINTS

- .1 Edge restraints shall be aluminum.
- .2 Aluminum Association alloy 6063 T-5 hardness, 78 x 140 mm edging, complete with line and splice stakes of Aluminum Association alloy 6061 T-6 hardness, manufactured for use in paver installations.
- .1 Anchoring: to manufacturer's instructions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for precast concrete unit paving installation in accordance with manufacturer's written instructions.
- .1 Visually inspect substrate in presence of Departmental Representative.
- .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

### **3.2 INSTALLATION OF EDGE RESTRAINTS**

- .1 Install edge restraints true to grade, in accordance with manufacturer's recommendations.

### **3.3 PLACING OF BEDDING MATERIAL**

- .1 Ensure bedding material is not saturated or frozen at all times until installation is complete.
- .2 Spread and screed material on substrate to achieve 25 mm compacted thickness after vibrating pavers in place. Do not use joint sand for bedding sand.
- .3 Do not disturb screeded material. Do not use bedding material to fill depressions in structural surface.

### **3.4 INSTALLATION OF PRECAST CONCRETE PAVERS**

- .1 Lay pavers to pattern indicated. Joints between pavers: as recommended by manufacturer.
- .2 Saw cut pavers to fit around obstructions and at abutting structures.
- .3 Use a low amplitude, high frequency plate compactor capable of at least 22 kN centrifugal compaction force to vibrate pavers into bedding sand.
- .4 Inspect, remove, and replace chipped, broken and damaged pavers.
- .5 Sweep dry joint sand material into joints.
- .6 Settle sand by vibrating pavers with plate compactor.
- .7 Continue application of joint material and vibrating of pavers until joints are full. Do not vibrate within 1 m of unrestrained edges of pavers.
- .8 Complete installation to within 1 m of laying face, with sand-filled joints, at completion of each work day.
- .9 Sweep off excess joint material when installation is complete.
- .10 Proof roll street pavements with at least two passes of a 10 T rubber-tired roller.
- .11 Final surface elevations not to exceed plus or minus 10 mm under 3 m long straightedge.
- .12 Surface elevation of pavers: 3 to 4 mm above adjacent drainage inlets, concrete collars or channels.
- .13 Ensure conformance of final elevations.

### **3.5 INSTALLATION OF PRECAST CONCRETE SPLASHPAD**

- .1 Install splashpad in accordance with manufacturer's instructions where indicated on drawings.

### **3.6 INSTALLATION OF PRECAST CONCRETE STEPS**

- .1 Install precast concrete steps in accordance with manufacturer's instructions where indicated on drawings.

**3.7 CLEANING**

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
  - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.
  - .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

**END OF SECTION**