

LS 2518

CONCRETE PAVERS

- A. Section Includes**
- B. References**
- C. Quality Assurance**
- D. Submittals**
- E. Delivery, Storage and Handling**
- F. Environmental Conditions**
- G. Concrete Pavers**
- H. Bedding and Joint Sand**
- I. Edge Restraints**
- J. Base Preparation**
- K. Installation of Sand and Concrete Pavers**
- L. Field Quality Control**
- M. Method of Measurement**
- N. Basis of Payment**

- A. Section Includes**
 - Concrete paver units

Bedding and joint sand

- B. References**
 - American Society of Testing and Materials (ASTM):
 - C 33, Specification for Concrete Aggregates.
 - C 136, Method for Sieve Analysis for Fine and Coarse Aggregate.
 - C 140, Sampling and Testing Concrete Masonry Units.
 - C 144, Standard Specification for Aggregate for Masonry Mortar.
 - C 936, Specification for Solid Interlocking Concrete paving Units.
 - C 979, Specification for Pigments for Integrally Colored Concrete.
 - D 698, Test Methods for Moisture Density Relations of Soil and Soil Aggregate Mixtures Using a 5.5-lb (2.49 kg) Rammer and 12-in. (305 mm) drop.

- D 1557, Test Methods for Moisture Density Relations of Soil and soil Aggregate Mixtures Using a 10-lb (4.54 kg) Rammer and 18-in. (305 mm) drop.
- D 2940, Graded Aggregate Material for Bases or Subbases for Highways or Airports.

Canadian Standards Association (9CSA):

- CSA-A231.2-95, Precast Concrete Pavers.

C. Quality Assurance

Installation shall be by a contractor and crew with at least one year of experience in placing interlocking concrete pavers on projects of similar nature or dollar cost.

Contractor shall conform to all local, state/provincial licensing and bonding requirements.

D. Submittals

Submit shop or product drawings and product data.

Submit full size samples of concrete paving units to indicate color and shape selections. Color will be selected by the City from manufacturer's available colors.

Submit sieve analysis for grading of bedding and joint sand.

Submit test results from an independent testing laboratory for compliance of paving unit requirements to ASTM C 936 or other applicable requirements.

Indicate layout, pattern and relationship of paving joints to fixtures and project formed details.

E. Delivery, Storage and Handling

Deliver concrete pavers to the site in steel banded, plastic banded or plastic wrapped cubes capable of transfer by forklift or clamp lift. Unload pavers at job site in such a manner that no damage occurs to the product.

Sand shall be covered with waterproof covering to prevent exposure to rainfall or removal by wind. The covering shall be secured in place.

Coordinate delivery and paving schedule to minimize interference with normal use of buildings adjacent to paving.

F. Environmental Conditions

Do not install sand or pavers during heavy rain or snowfall.

Do not install sand and pavers over frozen base materials.

Do not install frozen sand.

G. Concrete Pavers

Concrete pavers shall be supplied by a member of the Interlocking Concrete Pavement Institute (ICPI).

Product name(s)/shape(s), color(s), overall dimensions and thickness of the paver(s) shall be 4" x 8" x 4½" rectangular concrete pavers shall be used. Color shall be approved by the Engineer, prior to ordering the pavers.

Pavers shall meet the following requirements set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units:

- Average compressive strength of 8,000 psi (55 Mpa) with no individual unit under 7,200 psi (50 Mpa).
- Average absorption of 5% with no unit greater than 7% when tested in accordance with ASTM C 140.
- Resistance without damage to 50 freeze-thaw cycles when tested in accordance with ASTM C 67.

H. Bedding and Joint Sand

Note: The type of sand used for bedding is often called "concrete sand". Screenings and stone dust can be unevenly graded and have an excess amount of material passing the No. 200 (75 m) sieve. Bedding sands with these characteristics shall not be used. The Contractor shall submit sand gradation to the City Engineer for approval. The submittal shall contain a list of projects where this gradation has been successfully used.

D. Bedding and joint sand shall be clean, non-plastic, free from deleterious or foreign matter. The sand shall be natural or manufactured from crushed rock. Limestone screenings or stone dust that do not conform to the grading requirements in Table 1 shall not be used. The sands shall be as hard as practically available.

Note: If the hardness of the bedding sand is not sufficient or questionable for the application, contact the ICPI for information and specifications on assessing bedding sand durability under heavy traffic loads.

Grading of sand samples for the bedding course and joints shall be done according to ASTM C 136. The bedding sand shall conform to the grading requirements of ASTM C 33 as shown in Table 1.

Table 1	
Grading Requirements for Bedding Sand	
ASTM C 33	
Sieve Size	Percent Passing
3/8 in. (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10

Note: Bedding sand may be used for joint sand. However, extra effort in sweeping and compacting the pavers may be required in order to completely fill the joints. If joint sand other than bedding sand is used, the gradations shown in Table 2 are commended. Joint sand should never be used for bedding sand.

The joint sand shall conform to the grading requirements of ASTM C 144 as shown in Table 2 below:

Table 2 Grading for Joint Sand ASTM C 144		
	Natural Sand	Manufactured Sand
Sieve Size	Percent Passing	Percent Passing
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 100
No. 50 (0.300 mm)	10 to 35	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075 mm)	0	0 to 10

I. Edge Restraints

Concrete curbs will be used as edge restraints on each side of the streets.

Transverse edge restraints shall be concrete, as detailed in the plans.

J. Base Preparation

Note: For installation on a compacted aggregate base, be aware that the top surface of the pavers may be 1/8 to 1/4 in. (3 to 6 mm) above the final elevations after compaction. This difference in initial and final elevation is to compensate for possible minor settling.

E. Verify that subgrade preparation, compacted density and elevations conform to section 02300, Earthwork.

F. Verify that aggregate base materials, thickness, compaction, surface tolerances and elevations conform to Section 02300, Earthwork specifications.

G. Install edge restraints per the drawings at the indicated elevations.

H. Verify that base is dry, uniform, even and ready to support sand, pavers and imposed loads.

K. Installation of Sand and Concrete Pavers

Spread the sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1 in. (40 mm) thickness. The screeded sand should not be disturbed. Place sufficient sand to stay ahead of the laid pavers. Do not use the bedding sand to fill depressions in the base surface.

Ensure that pavers are free of foreign material before installation.

Lay the pavers in a running bond pattern with the short axis of the pavers parallel to the street centerline. A soldier course of pavers shall be installed along the curbs. Maintain straight pattern lines.

Joints between the pavers on average shall be between 1/16 in. and 3/16 in (2 mm to 5 mm) wide.

Fill gaps at the edges of the paved area with cut pavers or edge units.

Note: Units cut no smaller than one-third of a whole paver are to be used along edged subject to vehicular traffic.

Cut pavers to be placed along the edge with a double blade paver splitter or masonry saw.

Use a low-amplitude, high-frequency plate vibrator to vibrate the pavers into the sand. Use Table 3 below to select size of compaction equipment:

<u>Paver Thickness</u>	<u>Compaction Force</u>
60 mm	3000 lbs. (13 kN)
80 mm	5000 lbs. (22 kN)

Vibrate the pavers, sweeping dry joints sand into the joints and vibrating until they are full. This will require at least two or three passes with the vibrator. Do not vibrate within 3 ft. (1 m) of the unrestrained edges of the paving units.

All work to within 3 ft (1 m) of the laying face must be left fully compacted with sand-filled joints at the completion of each day.

Sweep off excess sand when the job is complete.

The final surface elevations shall not deviate more than 3/8 in. (10 mm) under a 10 ft. (3 m) long straight edge.

The surface elevation of pavers shall be 1/8 to 1/4 in. (3 to 6 mm) above adjacent drainage inlets, concrete collars or channels.

Positive gutter line drainage to catch basins is mandatory.

All sand and debris shall be removed from catch basins at completion of project.

L. Field Quality Control

After removal of excess sand, check final elevations for conformance to the drawings.

M. Method of Measurement

The City of Lakewood will measure and pay for concrete pavers by the actual number of square yards installed.

N. Basis of Payment

Item	Unit	Description
LS 2518	SY	Concrete Pavers

END OF SECTION LS 2518