

LS 2519
CONCRETE PAVER PAVEMENT RECONSTRUCTION

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- 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.

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.

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

D. Submittals

Submit shop or product drawings and product data.

Submit full size sample(s) of replacement concrete paving unit(s) 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.

Provide a layout, pattern and relationship drawing of paving joints to existing pavement fixtures within each removal and replacement area.

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 roadway and 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. Summary

Reconstruction of indicated paver pavement area(s) shall consist of careful diamond saw cutting through the existing pavers where indicated by the City, removal of the indicated pavers from the existing sand leveling course, salvage of intact pavers for re-use, supply new pavers to replace damaged pavers, placement and compaction of sand leveling course, installation of salvaged and new pavers to conform with pavement line and grade, and installation of joint sand. Sweeping, disposal and general site clean-up shall also be included.

H. 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 3.15" 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.

I. 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.

- 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

J. Edge Restraints

New and re-installed pavers shall be restrained by adjacent pavers to remain in-place, existing street castings and/or concrete curbs or header beams.

K. Demolition

The City and the Contractor shall agree on the pavement areas(s) to be reconstructed.

The perimeter lines shall be diamond saw cut using the wet process along existing paver joints.

All pavers inside the perimeter shall be removed. All pavers cut by the sawing shall also be removed.

All intact pavers, as agreed by the City, shall be salvaged for re-use. All damaged pavers and pavers with saw cuts shall be disposed of.

L. 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.

- Verify that base is dry, uniform, even and ready to support sand, pavers and imposed loads. Perform all required base repairs as directed by the City.

M. Installation of Sand and Concrete Pavers

Final sand leveling or base course shall be carefully established using string lines or other method approved by the City.

Place sand or base, level and compact as required.

Place pavers to match existing running bond pattern. Saw cut pavers as required for street castings, pavement edge, etc. Units cut no smaller than one-third of a whole paver are to be used along edged subject to vehicular traffic. Pavers should be placed somewhat proud of the final surface grade. Joints between the pavers on average shall be between 1/16 in. and 3/16 in (2 mm to 5 mm) wide.

Use a low-amplitude, high-frequency plate vibrator to vibrate the pavers into the sand to final surface grade. 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.

N. Field Quality Control

After removal of excess sand, check final elevations for conformance to the drawings. All work that does not conform to the noted requirements shall be removed and re-done.

O. Method of Measurement

City of Lakewood will measure and pay by the total square yards of paver pavement removed and replaced for salvaged and new pavers. The area of all street castings shall be deducted from the area of reconstructed paver pavement.

P. Basis of Payment

Item	Unit	Description
LS 2519	SY	Concrete Pavement Reconstruction

END OF SECTION LS 2519