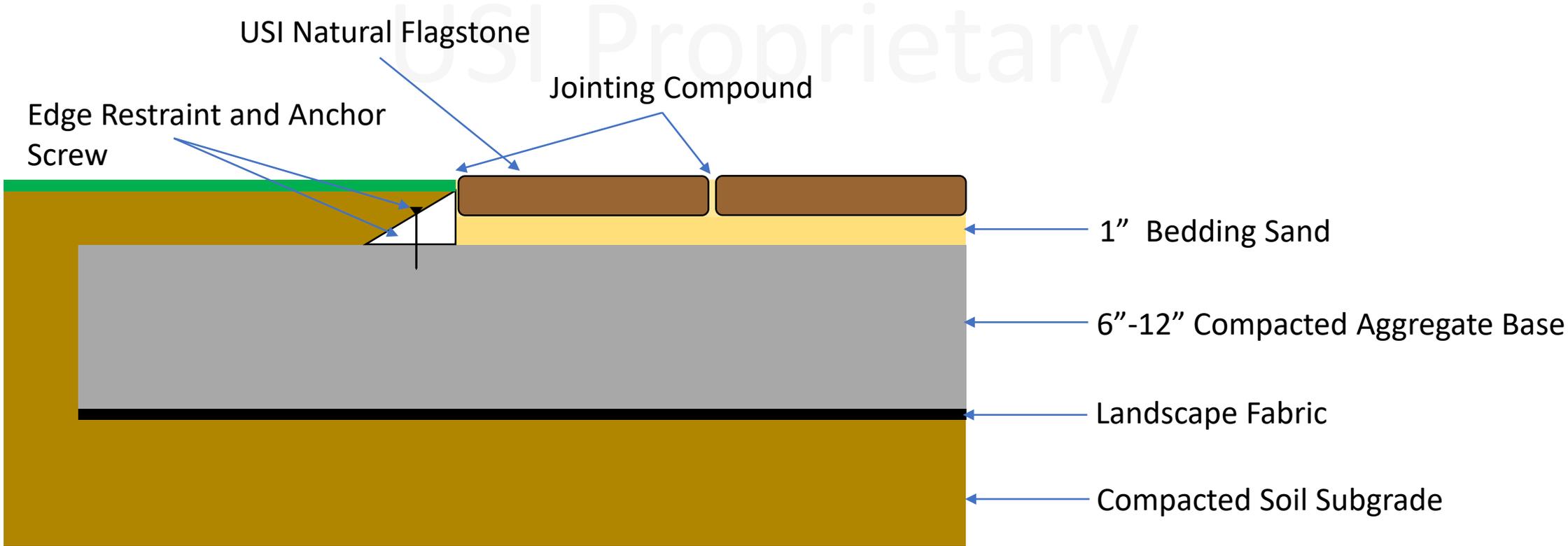


USI Natural Stone - Dry Lay



USI Natural Stone - Dry Lay

Advantages

- Less Expensive
- Installs faster than a wet lay application.
- Can be easily lifted and re-laid if ever needed.

Preparing the Base

1. Sub-base shall be virgin or compacted soil.
2. Lay geotextile over compacted area.
3. Provide a 6"-12" deep compacted gravel base (washed 2B, #67 or similar). A thicker base is recommended to achieve better stability.
4. Screed a 1" thick bed of concrete sand (ASTM C33 / C33M-13) or crushed fines (1B or #8). If the base is not properly graded and smooth, imperfections may be noticeable.

Dry Laying the Stone

1. USI natural stone shall be laid in specified pattern. Refer to attached Pattern Layouts (3 Size Pattern and Pattern 2)
2. Make sure bedding is smooth and flat. Set stone in place then tap a few times with rubber mallet to level surface.

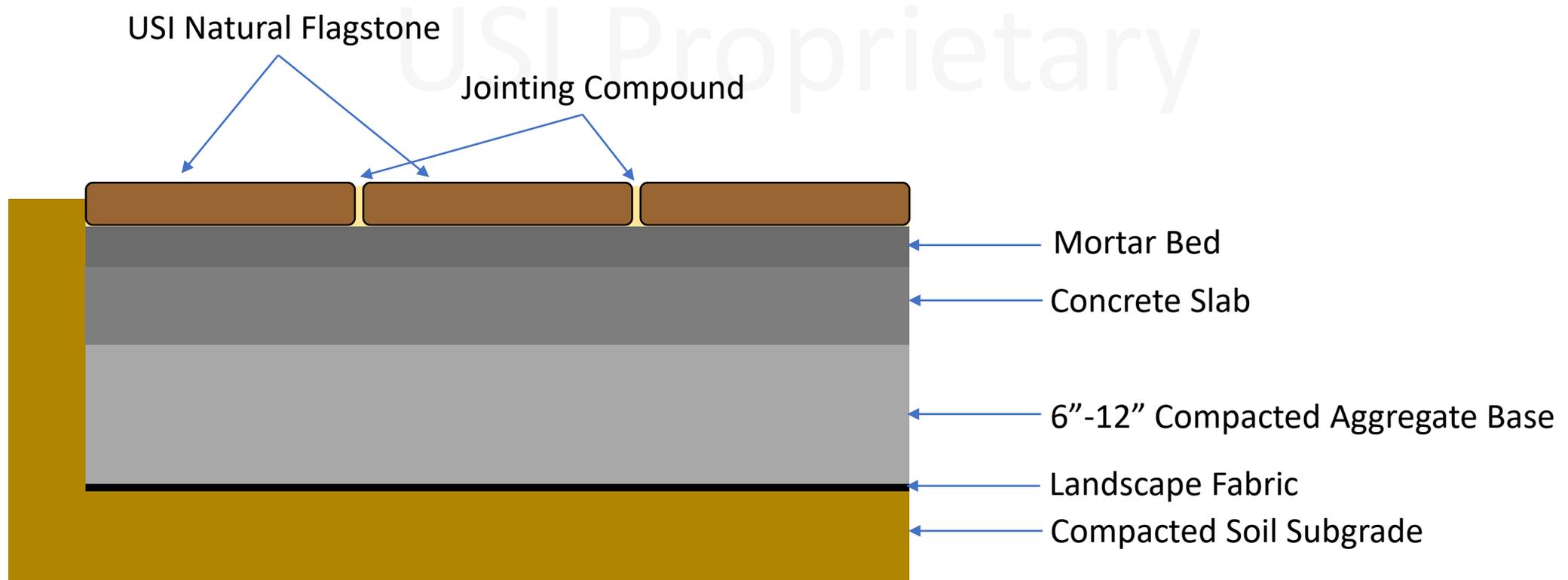
Joints

1. Spread poly sand or jointing compound over surface of stone and sweep into joints until completely full. **Follow recommended guidelines from manufacturer on how to properly install poly sand or jointing compound on natural stone surfaces in regards to vibrating.**
2. Use an air blower to remove any fine dust particles.
3. Wet surface with fine spray.

Cleaning

1. Sweep surface of stone to remove loose sand and debris. Stone can also be sprayed with a hose or pressure washed to remove any residual sand or debris.

USI Natural Stone Wet Lay Installation



USI Natural Stone Wet Lay Installation

Advantage

- Provides a stronger more permanent structure.
- Weeds will not grow between the joints.

Preparation

1. Sub-base shall be virgin or compacted soil.
2. Lay geotextile over compacted area (optional).
3. Provide minimum 6" deep compacted gravel base.
4. Pour concrete slab per standard concrete sidewalk practice and let set for 24 hours.

Laying the Stone

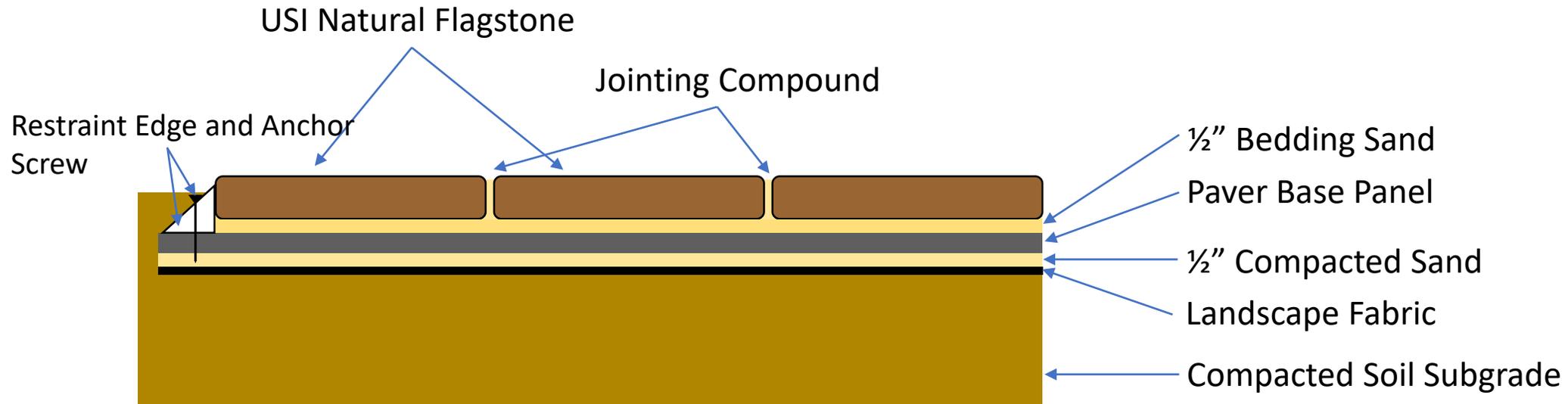
1. After concrete is set, use trowel and add approximately 1" of mortar onto the concrete slab. Check that the material is level.
2. USI natural stone shall be laid in specified pattern. Refer to attached Pattern Layouts (3 Size Pattern and Pattern 2)
3. Use a grout bag or hand tool to fill mortar between joints. Make sure to keep the surface of the stone clean of mortar.
4. Joints should then be cleaned as soon as possible with a damp sponge before the mortar has time to dry on the surface of the stone.
5. When joints have hardened for 24 hours, clean stone with stiff brush and clean with water.

Cleaning

1. Sweep surface of stone to remove loose sand and debris. Stone can also be sprayed with a hose or pressure washed to remove any residual sand or debris.

USI Natural Stone Installation Using a paver base panel

USI Proprietary



USI Natural Stone Installation w/ Paver Base Panel

Advantages

- Save 6 inches of excavation
- Save 6 inches of crushed stone
- Save on labor costs
- Save overall installation time

Preparation

1. Excavate desired area 3" deep and at least 6" wider than the final paved area. Level the excavated area with a rake and compact to desired slope.
2. Lay down the geotextile.
3. Spread an even layer of sand to the bedding layer.
4. Install the paver base panel in a staggered pattern ensuring the locking of the tongue and groove system.
5. Add an additional thin layer of bedding sand on top of the paver base panel.
6. Install edging on paver base panel and set anchor screw to ensure lateral support.

Laying the Stone

1. USI natural stone shall be laid in specified pattern. Refer to attached Pattern Layouts (3 Size Pattern and Pattern 2)
2. Make sure bedding is smooth and flat. Set stone in place then tap a few times with rubber mallet to level surface.

Joints

1. Spread poly sand or jointing compound over surface of stone and sweep into joints until completely full. **Follow recommended guidelines from manufacturer on how to properly install poly sand or jointing compound on natural stone surfaces in regards to vibrating.***
2. Use an air blower to remove any fine dust particles.
3. Wet surface with fine spray.

Cleaning

1. Sweep surface of stone to remove loose sand and debris. Stone can also be sprayed with a hose or pressure washed to remove any residual sand or debris.

ICPI Paver Installation Guidelines

ICPI provides construction guidelines to design professionals and installers of interlocking concrete pavements. Several resources are available on this website that review the steps necessary for constructing interlocking concrete pavements.

This pavement structure is commonly used for both pedestrian and vehicular applications. Pedestrian areas, driveways, and areas subject to limited vehicular use are paved with units 2 3/8 in. (60 mm) thick. Streets and industrial pavements should be paved with units at least 3 1/8 in. (80 mm) thick.

Compaction of the soil subgrade and aggregate base materials are essential to the long-term performance of interlocking concrete pavements.

Installation steps typically include job planning, layout, excavating and compacting the soil subgrade, applying geotextiles (optional), spreading and compacting the sub-base and/or base aggregates, constructing edge, restraints, placing and screeding the bedding sand, placing concrete pavers, compacting concrete pavers, sweeping in jointing sand and final compaction.

Installation Basics

Note: Compaction of the soil subgrade is recommended to at least 98% standard Proctor density per ASTM D 698 for pedestrian areas and residential driveways. Compaction to at least 98% modified Proctor density per ASTM D 1557 is recommended for areas subject to heavy vehicular traffic. Stabilization of the subgrade and/or base material may be necessary with weak or saturated subgrade soils.

Note: Local aggregate base materials typical to those used for highway flexible pavements are recommended, or those conforming to ASTM D 2940. Compaction of aggregate is recommended to not less than 98% Proctor density in accordance with ASTM D 698 is recommended for pedestrian areas and residential driveways. 98% modified Proctor density according to ASTM D 1557 is recommended for vehicular areas. Mechanical tampers are recommended for compaction of soil subgrade and aggregate base in areas not accessible to large compaction equipment. Such areas can include that around lamp standards, utility structures, building edges, curbs, tree wells and other protrusions.

Note: Prior to screeding the bedding sand, the recommended base surface tolerance should be $\pm 3/8$ in. (± 10 mm) over a 10 ft. (3 m) straight edge. See ICPI Tech Spec 2, Construction of Interlocking Concrete Pavements for further guidance on construction practices.

Note: The elevations and surface tolerance of the base determine the final surface elevations of concrete pavers. The paver installation contractor cannot correct deficiencies in the base surface with additional bedding sand or by other means. Therefore, the surface elevations of the base should be checked and accepted by the General Contractor or designated party, with written certification to the paving subcontractor, prior to placing bedding sand and concrete pavers.

Acceptance of Site Verification of Conditions:

General Contractor shall inspect, accept and certify in writing to the paver installation subcontractor that site conditions meet specifications for the following items prior to installation of interlocking concrete pavers.

Verify that subgrade preparation, compacted density and elevations conform to specified requirements.

Verify that geotextiles, if applicable, have been placed according to drawings and specifications.

Verify that [Aggregate] [Cement-treated] [Asphalt-treated] [Concrete] [Asphalt] base materials, thickness, [compacted density], surface tolerances and elevations conform to specified requirements.

Provide written density test results for soil subgrade, [aggregate] [cement-treated][asphalt-treated][asphalt] base materials to the Owner, General Contractor and paver installation subcontractor.

Verify location, type, and elevations of edge restraints, [concrete collars around] utility structures, and drainage inlets.

Do not proceed with installation of bedding sand and interlocking concrete pavers until [subgrade soil and] base conditions are corrected by the General Contractor or designated subcontractor.

PREPARATION

A. Verify base is dry, certified by General Contractor as meeting material, installation and grade specifications.

B. Verify that base [and geotextile] is ready to support sand, [edge restraints,] and, pavers and imposed loads.

C. Edge Restraint Preparation:

Install edge restraints per the drawings [and manufacturer's recommendations] [at the indicated elevations].

Note: Retain the following two subparagraphs if specifying edge restraints that are staked into the base with spikes.

Mount directly to finished base. Do not install on bedding sand.

The minimum distance from the outside edge of the base to the spikes shall be equal to the thickness of the base.

INSTALLATION

A. Spread bedding sand evenly over the base course and screed to a nominal 1 in. (25 mm) thickness, not exceeding 1 1/2 in. (40 mm) thickness. Spread bedding sand evenly over the base course and screed rails, using the rails and/or edge restraints to produce a nominal 1 in. (25 mm) thickness, allowing for specified variation in the base surface.

Do not disturb screeded sand.

Screeded area shall not substantially exceed that which is covered by pavers in one day.

Do not use bedding sand to fill depressions in the base surface.

Note: When initially placed on the bedding sand, manually installed pavers often touch each other, or their spacer bars if present. Joint widths and lines (bond lines) are straightened and aligned to specifications with rubber hammers and pry bars as paving proceeds.

B. Lay pavers in pattern(s) shown on drawings. Place units hand tight without using hammers. Make horizontal adjustments to placement of laid pavers with rubber hammers and pry bars as required.

Note: Contact manufacturer of interlocking concrete paver units for recommended joint widths.

C. Provide joints between pavers between [1/16 in. and 3/16 in. (2 and 5 mm)] wide. No more than 5% of the joints shall exceed [1/4 in. (6 mm)] wide to achieve straight bond lines.

D. Joint (bond) lines shall not deviate more than ±1/2 in. (±15 mm) over 50 ft. (15 m) from string lines.

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

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

Note: Specify requirements for edge treatment in paragraph below.

G. [Adjust bond pattern at pavement edges such that cutting of edge pavers is minimized. All cut pavers exposed to vehicular tires shall be no smaller than one-third of a whole paver.] [Cut pavers at edges as indicated on the drawings.]

H. Keep skid steer and forklift equipment off newly laid pavers that have not received initial compaction and joint sand.

I. Use a low-amplitude plate compactor capable of at least minimum of 4,000 lbf (18 kN) at a frequency of 75 to 100 Hz to vibrate the pavers into the sand. Remove any cracked or damaged pavers and replace with new units.

J. Simultaneously spread, sweep and compact dry joint sand into joints continuously until full. This will require at least 4 to 6 passes with a plate compactor. Do not compact within 6 ft (2 m) of unrestrained edges of paving units.

K. All work within 6 ft. (2 m) of the laying face must shall be left fully compacted with sand-filled joints at the end of each day or compacted upon acceptance of the work. Cover the laying face or any incomplete areas with plastic sheets overnight if not closed with cut and compacted pavers with joint sand to prevent exposed bedding sand from becoming saturated from rainfall.

L. Remove excess sand from surface when installation is complete.

Note: Excess joint sand can remain on surface of pavers to aid in protecting their surface especially when additional construction occurs after their installation. If this is the case, delete the article above and use the article below. Designate person responsible for directing timing of removal of excess joint sand.

M. Allow excess joint sand to remain on surface to protect pavers from damage from other trades. Remove excess sand when directed by [Architect].

N. Surface shall be broom clean after removal of excess joint sand.

FIELD QUALITY CONTROL

A. The final surface tolerance from grade elevations shall not deviate more than ± 3/8 in. (±10 mm) under a 10 ft (3 m) straightedge.

B. Check final surface elevations for conformance to drawings.

Note: For installations on a compacted aggregate base and soil subgrade, 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 helps compensate for possible minor settling normal to pavements.

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

Note: For pedestrian access routes maximum elevation should not exceed ¼ in. (6 mm).

D. Lippage: No greater than 1/8 in. (3 mm) difference in height between adjacent pavers.

Note: Cleaning and sealing may be required for some applications. See ICPI Tech Spec 5, Cleaning and Sealing Interlocking Concrete Pavements for guidance on when to clean and seal the paver surface, and when to stabilize joint sand. Delete article below if cleaners, sealers, and or joint sand stabilizers are not applied.

CLEANING, SEALING, JOINT SAND STABILIZATION

A. Clean, seal, apply joint sand stabilization materials between concrete pavers in accordance with the manufacturer's written recommendations.

PROTECTION

A. After work in this section is complete, the General Contractor shall be responsible for protecting work from damage due to subsequent construction activity on the site.