

**SECTION 342**  
**DECORATIVE PAVEMENT**  
**INTERLOCKING CONCRETE PAVER INSTALLATIONS-PAVING STONE**

Formatted: Font: Bold

**342.1 GENERAL:**

The Contractor shall furnish all necessary labor, material, tools and equipment to complete the proper installation of decorative interlocking concrete pavers used in medians, crosswalks, intersections or as otherwise and other locations noted in the Contract Documents. This includes furnishing a 10-foot straightedge to accomplish the level testing when required by this specification.

~~The decorative pavement shall be true in line and grade and installed to coincide and align with the adjacent work elevation. All edges shall be retained to secure the pavers and sand laying course.~~

Comment [RTH1]: This requirement is included in Section 342.3.7.

~~The Contractor shall construct a sample panel 10 feet by 10 feet for inspection and approval by the Engineer, prior to the actual installation for the project. Once approved, the panel shall be used as a standard for the remainder of the work. The panel shall remain undisturbed throughout the construction of the pavers and final approval by the Engineer.~~

Comment [RTH2]: Why is a sample needed prior to project installation?

Comment [RTH3]: Why should the sample be the standard? This is typical of architectural specifications but not appropriate for MAG specifications. This specification is to identify acceptability standards. Suggest this entire paragraph be deleted.

**342.2 MATERIALS:**

**342.2.1 Aggregate Base Course:** Aggregate Base Course shall be per Table 702-1.

**342.2.2 Portland Cement Concrete:** ~~When the pavers are For installations~~ subject to vehicular traffic, pPortland cConcrete used for headers or underlying base slabs for pavers shall be Class A per Section 725. ~~All other At~~ locations not subject to vehicle traffic loads, the pPortland cConcrete shall be a minimum of Class B per Section 725.

**342.2.3 Sand:** Sand used for laying course shall conform to ASTM C33 except for the gradation. The gradation shall comply with Table 342-1.

TABLE 342-1								
SAND GRADATION								
Sieve Size	3/8 inch	No. 4	No. 8	No. 16	No.30	No. 50	No. 100	No. 200
Percent Passing	100	95-100	85-100	15-85	25-60	10-30	2-10	0-1

**342.2.4 Concrete Pavers:** Pavers shall have a minimum ~~of~~ thickness of 80 mm (3.15 inches) when installed in vehicular traffic bearing areas and 60 mm (2.36 inches) ~~When when~~ installed in ~~non-non~~ traffic bearings areas. Pavers shall be of an interlocking design conforming to ASTM C936-82. Pavers shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. The Contractor shall submit two samples of each type of pavers used on the project for review and approval by the Engineer prior to any work. The pavers and materials used in their manufacture shall conform to the following:

- (A) Compressive Strength: Pavers shall have a minimum compressive strength of 8,000 psi in accordance with ASTM C140.
- (B) Absorption: The average absorption shall not be greater than 5 percent, with no individual unit absorption greater than 7 percent.
- (C) Portland Cement: Cement shall comply with Section 725.2, Type II.
- (D) Aggregates: Aggregates shall conform to ASTM C33 (washed, graded sand and rock, no expanded shale or lightweight aggregates).
- (E) Other Constituents: Coloring pigments shall be applied integrally to the concrete. Air entraining admixtures, coloring pigments, integral water repellents, and finely ground silica shall be previously established as suitable for use in concrete and either shall conform to ASTM standards where applicable, or shall be shown by test or experience not to be detrimental to the concrete.
- (F) Physical Properties: The size, shape, design and color of the pavers shall be as noted in the Contract Documents.

## SECTION 342

**342.2.5 Expansion Joint Filler:** Expansion joint filler material shall be 1/2-inch premolded ~~joint filler and comply that complies~~ with Section 729 and ASTM D1751.

**342.2.6 Joint Sealant:** Joint sealant shall be elastomeric joint sealant conforming to ASTM C920, Type S, Grade NS, Class 25.

### 342.3 CONSTRUCTION PROCEDURES:

**342.3.1 Subgrade:** The subgrade shall be constructed true to grades and lines shown on the plans in compliance with subgrade tolerances and compaction requirements compacted to a minimum dry density of 95% as specified in MAG-Section 301.

**342.3.2 Aggregate Base Course:** When aggregate base course is specified, the aggregate base course shall be constructed true to grades and lines shown on the plans in compliance with grade and cross-section tolerances and compaction requirements of and compacted to a minimum dry density of 100% per Section 301-310 ~~with the surface of the aggregate base course not varying by more than +1/8 inch in 10 feet.~~

**342.3.3 Concrete Header and Base Slab:** Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil, or other releasing agent of a type which will not discolor the portland cement concrete.

The portland cement concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. Compacted by mechanical vibrators may be used when approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate has been tamped below the surface.

All edges shall be shaped with a suitable tool to form a rounded edge of radius as shown on the referenced detail directed in Detail 225.

The portland cement concrete header face form shall not be removed before the concrete has taken the initial set and has sufficient strength to carry its own weight. The concrete header outer form shall not be removed until the concrete has hardened sufficiently to prevent any damage to the concrete. Any porting of concrete damaged while stripping forms shall be repaired or if the damage is severe, replaced at no additional cost to the Contracting Agency. The face and top of the concrete header shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface. Any deviation in excess of 1/4-inch in 10-feet shall be corrected at no additional cost to the Contracting Agency.

Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the Contracting Agency.

Finishing and curing of the concrete shall be done in the manner specified in Section 340.

**342.3.4 Expansion Joints:** Expansion joints in the concrete base slab shall be constructed to the full depth and width of the concrete base slab with the top of the filler material recessed one-half inch below the top surface of the concrete base slab as depicted in Detail 225 unless otherwise specified. After the concrete is cured, the top one-half inch shall be filled to the surface of the concrete with a ~~premium-grade, high-performance, moisture-cured, single-component, polyurethane-based, non-sag elastomeric joint sealant, ASTM C920, Type S, Grade NS, Class 25, Sikaflex IA or equal.~~

Expansion joints in the concrete base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane-plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they ~~will~~ shall be constructed along the radial lines of the header. Expansion joints shall be located at 50-foot maximum intervals. ~~In the case of base slabs, p~~avers shall be placed continuously over the expansion joints.

**Comment [RTH4]:** Compaction requirement in section 301.3 is 95% for areas subject to vehicle traffic and 85% for areas not subject to vehicle traffic. Subgrade tolerance is 1/4" under concrete structures and 3/4" aggregate base material.

**Comment [RTH5]:** Section 310.2 provides ± 1/2 inch tolerance

**Comment [RTH6]:** Section 310.3 requires 95% compaction under concrete and 85% compaction for areas not subject to vehicle traffic.

**Comment [RTH7]:** Specifications should avoid referencing specific details.

**Comment [RTH8]:** premium-grade and high-performance are undefined and therefor deleted.

**Comment [RTH9]:** This is Type S

**Comment [RTH10]:** I do not know why polyurethane-based was written into the specification.

**Comment [RTH11]:** This is Grade NS

## SECTION 342

**342.3.5 Contraction Joints:** Contraction joints in the base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they ~~will~~ shall be constructed along the radial lines of the header. ~~They~~ Contraction joints in the concrete base slab shall be constructed one-half inch in width to a depth of one inch ~~with rounded edges and placed located~~ at 10-foot maximum intervals. Contraction Joints shall be filled to the top surface of the ~~surrounding~~ concrete base slab with elastomeric joint sealant specified in 342.3.3.

**342.3.6 Sand Laying Course:** The maximum thickness of the sand course shall be one-inch. Screeding boards shall be used to ensure a uniform thickness. The sand shall not be compacted, walked on or wet down.

**342.3.7 Concrete Paving Stones/Pavers:** The concrete pavers shall be clean and free of foreign materials before installation. Paving work shall be plumb, level and true to line and grade and shall be installed to properly coincide and align with adjacent work and elevations. All edges ~~must~~ shall be fixed or retained to secure the perimeter pavers and the sand laying course. The pavers shall be laid in such a manner that the desired pattern is maintained and joints between the pavers are as tight as possible.

The Contractor shall lay the pavers starting from the longest straight line and from a true 90-degree corner. The pavers shall be installed hand-tight and level on the undisturbed sand course in a manner that eliminates gaps between ~~the stones-pavers and between pavers and the edge retention~~ headers. The maximum gap between pavers shall not exceed 3/16-inch. String lines or other approved methods shall be used to hold all pattern lines true. ~~The~~ Gaps between pavers at headers exceeding 3/8-inch the edge of the paver surface shall be filled with pavers cut to fit. Cutting shall be accomplished using a masonry saw. ~~The cut paver shall be placed with the to leave a clean surface edge exposed~~ to the traffic (vehicular or pedestrian) ~~surface using a masonry saw cut.~~

After the pavers are in place, they shall be vibrated into the sand laying course, ~~using a vibrator capable of 3,000 to 5,000 pounds compaction force. This will require two passes at 90 degrees to each other.~~ After vibration, approximately 1/4-inch of clean masonry sand ~~containing at least 30 percent of 1/8 inch particles~~ shall be placed over the paver surface, allowed to dry, and vibrated into the joints with additional vibrator passes and brushing so as to completely fill joints. Excess sand shall be swept from the surface.

The finished paver surface shall be tested longitudinally and transverse to the concrete header or curb with a 10-foot straightedge along the surface. Any deviation in excess of 1/8-inch shall be corrected at no additional cost to the Contracting Agency.

Any broken or damaged pavers shall be removed and replaced. Replacement pavers shall be tamped into place and the joints filled with masonry sand as specified herein. The completed installation shall be cleaned of all debris, surplus material and equipment.

### **342.4 MEASUREMENT-AND-PAYMENT:**

~~Measurement will be the square foot surface area of pavers and headers. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic. Concrete paver installations of the various types as shown on the plans will be measured to the nearest square foot. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic.~~

Headers of the various types as shown on the plans will be measured by the linear foot to the nearest foot.

### **342.5 PAYMENT:**

Payment for concrete pavers in areas subject to vehicle traffic will be ~~made~~ at the contract unit ~~bid-price-per-square-foot set forth in the proposal.~~ ~~This p~~Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, construction of the concrete base slab, and installation of concrete pavers ~~to complete the work.~~

**Comment [RTH12]:** Why is this needed for areas not subject to vehicle traffic loading? WW - we need to discuss this question. 8/6/15 revised per Mtg. discussion.

**Comment [WW13]:** Removed per 8/6/15 meeting discussion.

**SECTION 342**

Payment for concrete pavers in areas not subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, installation of aggregate base and concrete pavers.

Payment for each type of header will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the construction complete in place in conformance with the contract documents.

*- End of Section -*

SECTION 342

CLEAN

INTERLOCKING CONCRETE PAVER INSTALLATIONS

342.1 GENERAL:

The Contractor shall furnish all necessary labor, material, tools and equipment to complete the proper installation of interlocking concrete pavers used in medians, crosswalks, intersections and other locations noted in Contract Documents. This includes furnishing a 10-foot straightedge to accomplish the testing required by this specification.

342.2 MATERIALS:

342.2.1 Aggregate Base Course: Aggregate Base Course shall be per Table 702-1.

342.2.2 Portland Cement Concrete: For installations subject to vehicular traffic, portland cement concrete used for headers or underlying base slabs for pavers shall be Class A per Section 725. At locations not subject to vehicle traffic loads, the portland cement concrete shall be a minimum of Class B per Section 725.

342.2.3 Sand: Sand used for laying course shall conform to ASTM C33 except for the gradation. The gradation shall comply with Table 342-1.

TABLE 342-1								
SAND GRADATION								
Sieve Size	3/8 inch	No. 4	No. 8	No. 16	No.30	No. 50	No. 100	No. 200
Percent Passing	100	95-100	85-100	15-85	25-60	10-30	2-10	0-1

342.2.4 Concrete Pavers: Pavers shall have a minimum thickness of 80 mm (3.15 inches) when installed in vehicular traffic bearing areas and 60 mm (2.36 inches) when installed in non-traffic bearings areas. Pavers shall be of an interlocking design conforming to ASTM C936. Pavers shall be sound and free of defects that would interfere with the proper placing of the unit or impair the strength or permanence of the construction. The Contractor shall submit two samples of each type of pavers used on the project for review and approval by the Engineer prior to any work. The pavers and materials used in their manufacture shall conform to the following:

(A) Compressive Strength: Pavers shall have a minimum compressive strength of 8,000 psi in accordance with ASTM C140.

(B) Absorption: The average absorption shall not be greater than 5 percent, with no individual unit absorption greater than 7 percent.

(C) Portland Cement: Cement shall comply with Section 725.2, Type II.

(D) Aggregates: Aggregates shall conform to ASTM C33 (washed, graded sand and rock, no expanded shale or lightweight aggregates).

(E) Other Constituents: Coloring pigments shall be applied integrally to the concrete. Air entraining admixtures, coloring pigments, integral water repellents, and finely ground silica shall be previously established as suitable for use in concrete and either shall conform to ASTM standards where applicable, or shall be shown by test or experience not to be detrimental to the concrete.

(F) Physical Properties: The size, shape, design and color of the pavers shall be as noted in the Contract Documents.

342.2.5 Expansion Joint Filler: Expansion joint filler material shall be 1/2-inch premolded joint filler that complies with Section 729 and ASTM D1751.

342.2.6 Joint Sealant: Joint sealant shall be elastomeric joint sealant conforming to ASTM C920, Type S, Grade NS, Class 25.

## SECTION 342

### 342.3 CONSTRUCTION PROCEDURES:

**342.3.1 Subgrade:** The subgrade shall be constructed true to grades and lines shown on the plans in compliance with subgrade tolerances and compaction requirements as specified in Section [301](#).

**342.3.2 Aggregate Base Course:** When aggregate base course is specified, the aggregate base course shall be constructed true to grades and lines shown on the plans in compliance with grade and cross-section tolerances and compaction requirements of Section [310](#).

**342.3.3 Concrete Header and Base Slab:** Forms shall be thoroughly cleaned each time they are used, and shall be coated with a light oil or other releasing agent of a type which will not discolor the portland cement concrete.

The portland cement concrete shall be thoroughly spaded away from the forms so that there will be no rock pockets next to the forms. Compacted by mechanical vibrators may be used when approved by the Engineer. Tamping or vibrating shall continue until the mortar flushes to the surface, and the coarse aggregate has been tamped below the surface.

All edges shall be shaped with a suitable tool to form a rounded edge of radius as shown on the referenced detail.

The portland cement concrete header face form shall not be removed before the concrete has taken the initial set and has sufficient strength to carry its own weight. The concrete header outer form shall not be removed until the concrete has hardened sufficiently to prevent any damage to the concrete. Any porting of concrete damaged while stripping forms shall be repaired or if the damage is severe, replaced at no additional cost to the Contracting Agency. The face and top of the concrete header shall be tested with a 10-foot straightedge or curve template, longitudinally along the surface. Any deviation in excess of 1/4-inch in 10-feet shall be corrected at no additional cost to the Contracting Agency.

Any section of the work deficient in depth or not conforming to the plans or specifications shall be removed and replaced by the Contractor at no additional cost to the Contracting Agency.

Finishing and curing of the concrete shall be done in the manner specified in Section [340](#).

**342.3.4 Expansion Joints:** Expansion joints in the concrete base slab shall be constructed to the full depth and width of the concrete base slab with the top of the filler material recessed one-half inch below the top surface of the concrete base slab unless otherwise specified. After the concrete is cured, the top one-half inch shall be filled to the surface of the concrete with joint sealant.

Expansion joints in the concrete base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they shall be constructed along the radial lines of the header. Expansion joints shall be located at 50-foot maximum intervals. Pavers shall be placed continuously over the expansion joints.

**342.3.5 Contraction Joints:** Contraction joints in the base slab and header shall be aligned. Joints shall be constructed in a straight line and vertical plane perpendicular to the longitudinal line of the concrete header, except in cases of curved alignment when they shall be constructed along the radial lines of the header. Contraction joints in the concrete base slab shall be constructed one-half inch in width to a depth of one inch and located at 10-foot maximum intervals. Contraction Joints shall be filled to the top surface of the concrete base slab with joint sealant.

**342.3.6 Sand Laying Course:** The maximum thickness of the sand course shall be one-inch. Screeding boards shall be used to ensure a uniform thickness. The sand shall not be compacted, walked on or wet down.

**342.3.7 Concrete Pavers:** The concrete pavers shall be clean and free of foreign materials before installation. Paving work shall be true to line and grade and shall be installed to properly coincide and align with adjacent work and elevations. All edges shall be fixed or retained to secure the perimeter pavers and the sand laying course. The pavers shall be laid in such a manner that the desired pattern is maintained and joints between the pavers are as tight as possible.

## SECTION 342

The Contractor shall lay the pavers starting from the longest straight line and from a true 90-degree corner. The pavers shall be installed hand-tight and level on the undisturbed sand course in a manner that eliminates gaps between pavers and between pavers and headers. The maximum gap between pavers shall not exceed 3/16-inch. String lines or other approved methods shall be used to hold all pattern lines true. Gaps between pavers at headers exceeding 3/8-inch shall be filled with pavers cut to fit. Cutting shall be accomplished using a masonry saw. The cut paver shall be placed with the clean surface edge exposed to the traffic (vehicular or pedestrian).

After the pavers are in place, they shall be vibrated into the sand laying course. After vibration, approximately 1/4-inch of clean masonry sand shall be placed over the paver surface, allowed to dry, and vibrated into the joints with additional vibrator passes and brushing so as to completely fill joints. Excess sand shall be swept from the surface.

The finished paver surface shall be tested longitudinally and transverse to the concrete header or curb with a 10-foot straightedge along the surface. Any deviation in excess of 1/8-inch shall be corrected at no additional cost to the Contracting Agency.

Any broken or damaged pavers shall be removed and replaced. Replacement pavers shall be tamped into place and the joints filled with masonry sand as specified herein. The completed installation shall be cleaned of all debris, surplus material and equipment.

### **342.4 MEASUREMENT:**

Concrete paver installations of the various types as shown on the plans will be measured to the nearest square foot. Separate measurements shall be made for areas subject to vehicle traffic and areas not subject to vehicle traffic.

Headers of the various types as shown on the plans will be measured by the linear foot to the nearest foot.

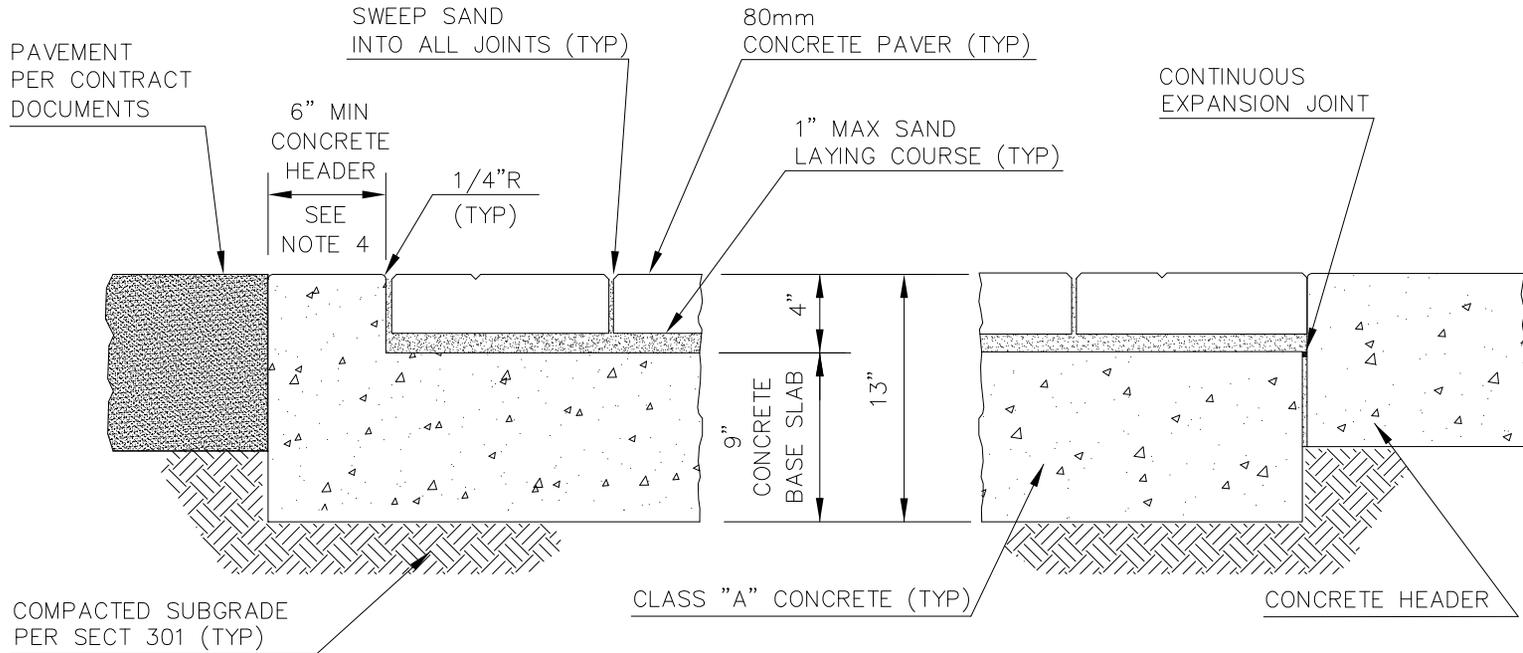
### **342.5 PAYMENT:**

Payment for concrete pavers in areas subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, construction of the concrete base slab, and installation of concrete pavers.

Payment for concrete pavers in areas not subject to vehicle traffic will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the subgrade preparation, installation of aggregate base and concrete pavers.

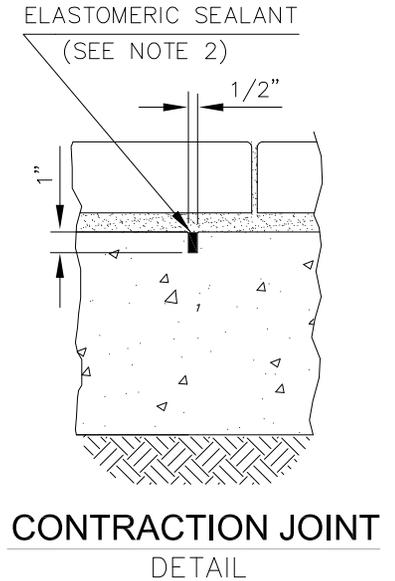
Payment for each type of header will be at the contract unit price set forth in the proposal. Payment shall be full compensation for all labor, materials, tools and equipment required for the construction complete in place in conformance with the contract documents.

*- End of Section -*



**TYPICAL SECTION**  
(AGAINST PAVEMENT)

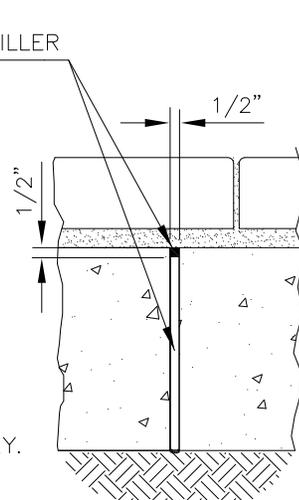
**TYPICAL AT END OR ALTERNATE SECTION**  
(AGAINST CONCRETE)



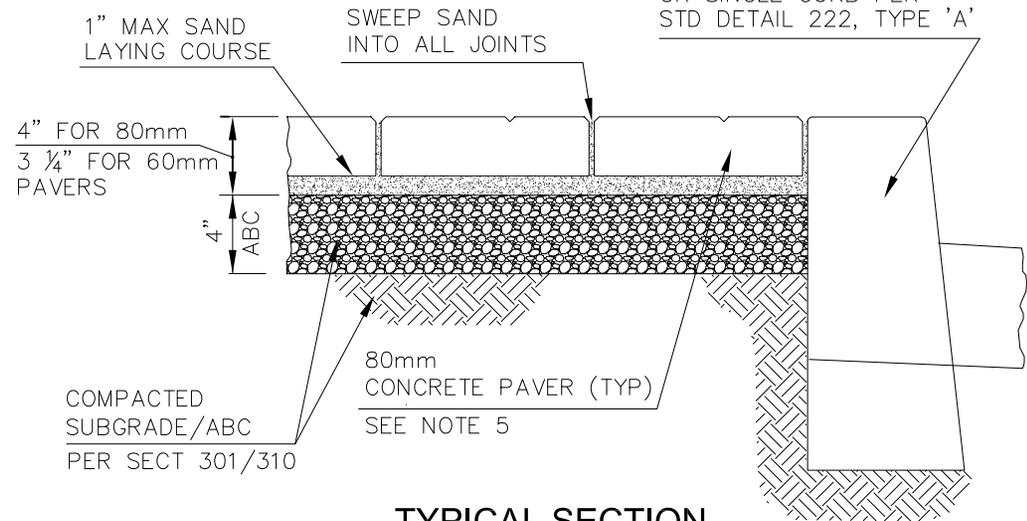
**CONTRACTION JOINT**  
DETAIL

NOTES:

1. EXPANSION JOINTS PER SECT 342, EVERY 50'.
2. CONTRACTION JOINTS PER SECT 342, EVERY 10'.
3. MATERIALS AND CONSTRUCTION PER SECT 342.
4. HEADERS SHALL BE 12" AT CROSSWALKS.
5. 60mm PAVERS MAY BE ACCEPTED WITH AGENCY APPROVAL IN NON TRAFFIC AREAS ONLY.



**EXPANSION JOINT**  
DETAIL



**TYPICAL SECTION**  
(RAISED MEDIAN)

CURB PER CONTRACT DOCUMENTS - VERT CURB & GUTTER PER STD DETAIL 220-1, TYPE A OR SINGLE CURB PER STD DETAIL 222, TYPE 'A'