Case 11-35

DATE: July 13, 2011

TO: MAG Specification and Details Committee Members

FROM: Brian Gallimore, Materials Working Group/AGC

RE: Section 310-Untreaded Base Course

PURPOSE: Change title to clarify meaning. Addressed construction and evaluation process conflicting.

REVISIONS:
a) Classified compaction guidelines
b) Updated deficiency, corrective action and construction methods

SECTION 310

~~UNTREATED~~ PLACEMENT AND CONSTRUCTION OF AGGREGATE BASE COURSE

310.1 DESCRIPTION:

~~Untreated base, i.e., select or a~~Aggregate base course~~,~~ shall comply with Subsection 702~~.2~~ unless the use of a different type of material is specifically authorized in the special provisions.

310.2 ~~PLACING~~PLACEMENT AND CONSTRUCTION:

The compacted lift thickness shall not exceed 6 inches, unless approved by the Engineer. Based on ~~Aggregate Untreated base course shall be placed in lifts the height of which shall not exceed that which can be effectively compacted depending on~~ the type of material, type of equipment and compaction methods used, the Contractor may propose a greater lift thickness. ~~6 inches or less in compacted thickness may be placednot to exceed 12" in a single layer. Lifts in excess ofand those more than 6 inches in thickness shall be built up in successive layers of approximately equal compacted thickness not to exceed a maximum thickness of 6 inches. . The requirements which follow are applicable to all types of material.~~

After distributing, the aggregate base course material shall first be watered and then ~~immediately~~ graded~~bladed~~ to a uniform layer that will net, after compacting~~rolling~~, the required thickness. ~~If the materials deposited are not uniformly blended together, t~~The grading~~blading~~ operation shall be continued to such extent as may be necessary to minimize~~eliminate~~ segregation. The quantity of water applied shall be that amount which will assure proper compaction resulting in the~~a relative~~ density ~~of not less than 100 percent as determined under Section 301as~~ required by Section 310.3.

~~Care shall be exercised in connection with watering operations to avoid wetting the subgrade or any lower base course to detrimental extent.~~

~~Upon completion~~After placement, the aggregate base course surface shall be true, even and uniform conforming to the grade and cross-section specified.

In no case shall the ~~Untreated~~a~~A~~ggregate base course ~~may~~ vary by~~not~~ more than ½ inch above or below required grade. ~~and cross-section.~~

310.3 COMPACTION

The contractor is responsible for providing appropriate equipment and techniques to achieve the compaction results required by this specification. The aggregate base course shall be compacted in lift thicknesses as allowed by Section 310.2.

~~The AASHTO procedures described in the section will be utilized unless the Engineer allows the corresponding ARIZ or ASTM procedure to be substituted.~~ The laboratory maximum dry density and optimum moisture content for the aggregate base course material shall be determined in accordance with ~~one of the following procedures: ARIZ 245, AASHTO T 99, or ASTM D698~~AASHTO T-99. Field 'one-point' maximum dry density and optimum moisture procedures shall only be allowed upon approval of the E~~e~~ngineer.

The in-place density shall be determined in the field by nuclear density testing in accordance with AASHTO T-310 ~~sandcone density testing and/or nuclear density testing. Sandcone density testing shall be performed in accordance with one of the following procedures: ARIZ 238, AASHTO T191, or ASTM D1556 and/~~or~~.~~ sandcone density testing in accordance with AASHTO T-191~~N~~nuclear density testing shall be performed in accordance with ARIZ 235, AASHTO T310, or ASTM D6938~~. In the event nuclear density testing is selected, a minimum of one sandcone correlation shall be performed for each 10 nuclear density tests.

A rock correction, to compensate for rock content larger than the #4 or ¾ inch sieves (as required by the laboratory maximum dry density and optimum moisture procedure selected), shall be performed in accordance with ~~one of the following procedures: ARIZ 227, AASHTO T224, or ASTM D4718~~AASHTO T-224. Care should be taken to account for the specific gravity of the oversize particles ~~especially~~particularly if recycled materials are utilized for aggregate base course. The specific gravity shall be determined –in accordance with ~~the one of the following procedures: ARIZ 210, AASHTO T85, or ASTM C127~~AASHTO T-85, as applicable.~~(How can you run C-127 on RAP or Asphalt Millings~~

~~One field density test shall be performed on each lift of aggregate base course. –~~For roadway construction, one field density test shall be performed ~~for~~per lift per~~ each~~ 6650 feet per lane~~ width (Is this consistent)~~. For other aggregate base course applications, a minimum of 1 field density test shall be performed for each 800 square yards. ~~More or less frequent testing may be performed at the approval of the Engineer.~~

Unless otherwise noted in the project plans or project specifications, the moisture content of the aggregate base course at the time of compaction shall be the optimum moisture content ~~to~~ +/- ~~2~~3% ~~of optimum moisture content~~.

SECTION 310

The following percent compaction is required:

(A) Below asphalt concrete pavement 100%

(B) Below Portland cement concrete pavement, curb & gutter, attached sidewalk, roadway Shoulders, and other areas of the right-of-way subject to vehicular traffic 95%

(C) ~~Below detached sidewalk or other flatwork~~All other areas not subject to vehicular traffic ~~85~~85~~90~~%

Areas which fail initial ~~field density~~ testing for density and/or moisture content shall be reworked until passing tests for density and/or moisture content are achieved. L~~l~~ower moisture content percentages at the time of field density testing may~~-~~ be allowed if significant time has passed since the time of compaction and the required density has been achieved.

310.~~43~~ THICKNESS AND/OR PLASTICITY INDEX DEFICIENCY:

When in the opinion of the Engineer there is reason to believe that a deficiency in thickness, or an excess of plasticity exists, measurements or samples will be taken in the same pattern as that defined in Section 321. If the base has been covered or it is otherwise impractical to correct the deficiency, the corrective measures in Table 310-1 shall be taken by the Contractor at no additional cost to the Contracting Agency.

TABLE 310-1

THICKNESS AND PLASTICITY DEFICIENCY

Type	Deficiency	Corrective Measure
I	Less than ½ inch of the required thickness	No corrective measure required.
II	½ inch or more but less than 1inch of the required thickness	~~Place asphalt chip seal using precoated chips in accordance with Section 330 for the full roadway width over the area involved but for not less than 660 feet or one City block in length.~~(1) The contractor may choose to add additional material and rework the grade to meet the specification requirements. ~~An Engineering Analysis (EA) shall be prepared by the contractor to evaluate the expected performance of the reduced aggregate base course layer. The EA may provide mitigation options for the Engineer to consider. If the Engineer accepts the in-place thickness as a result of the EA, a penalty of $1/ton shall be applied to the subject aggregate base coursethe Contractor shall reimburse the Agency for reduced aggregate base course quantities.~~ (2) The contractor may choose to ~~i~~increase the thickness of asphalt concrete by the amount of the aggregate base course thickness deficiency at no additional cost to the Owner. Required grade shall be met.
III	~~1 inch or more in t~~Thickness deficiency by greater than 1 inch	~~Place an additional asphalt concrete overlay, a 9.5 mm mix, of ½ the thickness of the deficiency in thickness for the full roadway width over the area involved, not less than 660 feet or one City block in length.~~(1) The contractor will remove the ~~A~~aggregate base course ~~removed~~ and regrade the sub~~b~~grade ~~regraded~~ to

		allow the required aggregate base course layer thickness to be constructed. (2) If grades allow, the ~~Engineer~~ contractor may propose that~~allow~~ the thickness of asphalt concrete ~~to~~ be increased by the amount of the aggregate base course deficiency at no additional cost to the Owner.
IV~~III~~	A plasticity index of 6 to 7 inclusive~~*~~	~~Place an asphalt concrete overlay ½ inch in thickness over the same total area as required for Type I and II.~~ (1) An Engineering Analysis (EA) ~~shall~~may be prepared by the contractor to evaluate the expected performance of the aggregate base course layer. The EA may provide mitigation options for the Engineer to consider. If the Engineer accepts the plasticity index as a result of the EA, the material will be accepted at full payment. If the Engineer rejects the EA, the contractor will perform either option 2 or 3 below. (2) The contractor may choose to reprocess or treat the existing material to bring it within specification limits or remove deficient material from affected area and replace with material complying with the specifications. (3) If grades allow, the contractor may increase the thickness of asphalt concrete by ½-inch at no additional cost to the Owner.~~If the Engineer accepts the in-place thickness as a result of the EA, a penalty of $1/ton shall be applied to the subject aggregate base course.~~
~~I~~V	A plasticity index of over 7~~*~~	(1) The contractor may choose to reprocess or treat the existing material to bring it within specification limits or ~~R~~remove deficient material from affected area and replace with material complying with the specifications.

~~* The plasticity index shall be in accordance with AASHTO T 146 Method A (wet preparation), T 89 and T 90.~~

310.4 PAYMENT:

Payment for aggregate ~~untreated~~ base course will be made on the basis of the contract unit price per ton unless an alternate basis of payment is provided in the proposal.