SECTION 02513

ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Additional information concerning asphalt paving may be found on the civil drawings, in the project geotechnical report and University of Colorado construction standards. In case of conflict between the drawings, jurisdictional criteria and the information specified herein, the more stringent requirements shall govern.

1.2 SUMMARY:

A. Section Includes:

1. Hot-mixed Asphaltec Concrete Pavement.
2. Hot-mixed asphalt patching.
3. Hot-mixed asphalt paving overlay.
4. Asphalt surface treatments.
5. Cold Milling of existing hot-mixed asphalt pavement.
6. Field Quality Control.
7. Weed Control.

B. Related Sections:

1. Section 01400 - Quality Control.
2. Section 02200 - Earthwork.
3. Section 02580 - Pavement Marking.

C. References:

Colorado Department of Transportation’s Standard Specifications for Road and Bridge Construction, latest edition and all appropriate standard special provisions.

1.3 DEFINITIONS:
A. Hot-Mix Asphalt Paving Terminology: Refer to ASTM D 8 for definitions of terms.

B. CDOT: State of Colorado Department of Transportation.

C. CDOT Specifications: Colorado Department of Transportation Standard Specifications for Road and Bridge Construction, current edition and all appropriate standard special provisions.

1.4 SYSTEM DESCRIPTION:

A. Provide hot-mix asphalt paving in accordance with Section 401 of the CDOT Specifications.


2. Measurement and payment provisions and safety program submittals included in CDOT Specifications do not apply to this Project.

1.5 SUBMITTALS:

A. Product Data: For each type of product indicated, include technical data and tested physical and performance properties.

B. Traffic Control Plan: Provide 2 copies of a temporary traffic control plan for approval by the Engineer.

C. Weed Control Products:

1. Submit complete manufacturer's data for each product to be used, including:
   a. Manufacturer's safety data sheets.
   b. Method of application.
   c. Location of application.

D. Material Certificates:

1. Provide 2 copies of materials certificates signed by the material producer and the Contractor, certifying that each material item complies with, or exceeds, specified requirements.

2. Provide independent testing laboratory reports on aggregates and asphalt for sieve analysis, wear abrasion and other characteristics.

E. Design Mix: For each job mix to be used.

F. Material Test Reports: For each paving material to be submitted to the Owner

1.3 QUALITY CONTROL / QUALITY ASSURANCE:
A. Manufacturer and Installer Qualifications:

1. Manufacturer Qualifications: Engage a firm experienced in manufacturing hot-mix asphalt similar to that indicated for this Project and with a record of successful in-service performance.

2. Installer Qualifications: Engage an experienced installer who has completed hot-mix asphalt paving similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.

B. Testing and Inspection Service:

1. An independent testing and inspection agency to perform quality control testing during asphaltic concrete paving operations shall be employed by the CONTRACTOR. Any retesting required due to failed test shall be paid by the CONTRACTOR.

2. An independent testing and inspection agency to perform quality assurance testing during asphaltic concrete paving operations may be employed by the OWNER. Any retesting required due to failed test shall be paid by the CONTRACTOR.

C. Testing Requirements:

1. All testing and inspections required herein will be performed by an independent testing and inspection agency employed by the Contractor. All documentation, including the Compaction Test Reports shall be given to the Owner’s Representative at the end of each working day, specifying road names and termini. Three core drill samples shall be taken by the Contractor of each lot for quality control purposes. Contractor shall be responsible for any delay caused by the Contractor’s laboratory, which may affect the Contractor’s work performance on the project. Any retesting required due to failed test shall be paid by the Contractor.


3. Field-testing shall be performed by the paving contractor’s certified nuclear gauge operator and monitored by the Owner’s representative. The contractor’s nuclear gauge operator shall be on site at all times when paving operations occur. In addition, certified test results of density achieved shall be submitted by the paving contractor or representative to the Owner within 48 hours after placement of asphalt.

4. Notify the testing and inspection agency with adequate time in advance of all work requiring testing or inspection services. In addition, Work shall not be allowed to be placed if testing and inspection agency are not onsite for required services.

5. Preconstruction Conference: Conduct conference at Project site as directed by
Owner’s Representative. Contractor to comply with requirements, which may also be included in Division 1 Section "Project Management and Coordination."

6. Owner through project manager will provide Parking and Transportation Services (PTS) with testing results for impacted parking facilities.

D. Standards:


1.4 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp or if the following conditions are not met:

1. Tack Coats: Minimum surface or air temperature in the shade of 60 deg F (15 deg C).
2. Slurry Coat: Comply with weather limitations of ASTM D 3910.
3. Asphalt Base Course: Minimum surface or air temperature in the shade of 40 deg F and rising at time of placement.
4. Asphalt Surface Course: Minimum surface or air temperature in the shade of 50 deg F and rising at time of placement.

B. Coordination and Scheduling:

1. Cooperate with other trades and arrange scheduling to avoid damage to other work, including grading, site utilities and piping, exterior concrete, landscaping and irrigation systems.
2. Before commencing pavement operations, ascertain that utility lines, site lighting and wiring, piping, curb and gutter work, general grading and heavy trucking is complete so that such operations will not damage paving work.
3. Mask off and protect exposed building surfaces and abutting concrete from damage or staining by tack coat and paving operations.

1.5 Environmental Considerations:

LEED SSc7: Heat Island Effect
Specify the least amount of asphaltic concrete paving as possible.
Specify Light colored/high albedo materials instead of asphalt when feasible.
All new or modified asphalt surfaces included in a project are required to meet LEED SSc7.1 (i.e. 50% must be shaded).

PART 2 - PRODUCTS
2.0 DESIGN

A. The designer shall follow the recommendations of the geotechnical engineer with regard to pavement design, including but not limited to asphalt cement type, subgrade thickness, and pavement thickness. If a geotechnical engineer has not been retained for the work, then the minimum standards contained in this section shall be used.

B. Design Traffic: Shall be made based on specific traffic loadings or the geotechnical engineer’s recommendations. In the absence of such information, the following recommended EDLA values shall be used:

<table>
<thead>
<tr>
<th>Road types</th>
<th>EDLA Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCB campus collector streets</td>
<td>50</td>
</tr>
<tr>
<td>UCB campus drives</td>
<td>30</td>
</tr>
<tr>
<td>Parking lots and stalls</td>
<td>10</td>
</tr>
</tbody>
</table>

C. The asphalt material used shall be based on a SuperPave Gyratory Design Method

D. Asphalt pavements may not be used in loading docks and high turning stress areas.

2.1 AGGREGATES:

A. General: Use materials and gradations that have performed satisfactorily in previous installations meeting the requirements of the CDOT Specifications.

B. Base Course Aggregate: Per Section 703.03, Class 6, Colorado Department of Transportation Specifications.

1. Minimum Thickness: 6” (for parking lots and campus drives)

2. Minimum Thickness: 12” (for campus streets)

C. Asphalt Concrete Aggregate: Use clean, hard, durable particles of crushed stone, crushed slag, crushed gravel, or natural gravel, Per Section 703.04, Colorado Department of Transportation Specifications. Gradation SG (75) for Base Course S (75) for Surface Course. (Unless a different mix than previously specified is recommended for the project in which case owner approval is required.)

1. Minimum Thickness Over Aggregate Base: 4.5” (for parking lots and campus drives)

2. Minimum Thickness Over Aggregate Base: 5.5” (for campus streets)

D. Mineral Filler: Limestone dust, portland cement, or other inert material complying with ASTM D242 or AASHTO M17.

1. For Parking lots: Rock dust, slag dust, hydrated lime, hydraulic cement, or other
suitable mineral material conforming to the requirements of Subsection 703.06 of the CDOT Specifications. Item 703.06.

E. Asphalt Materials:

1. Asphalt Cement:
   a. For parking facilities: Use PG 64-22 conforming to the requirements of Section 702.01 of CDOT Specifications and ASTM D3381 or AASHTO M226 Table 1, Viscosity Grade AC-10 or AC-20 and be subject to approval by the Owner.
   b. For all other locations: Use PG 58-28 conforming to the requirements of Section 702 of CDOT Specifications and ASTM D3381 or AASHTO M226 Table 1, Viscosity Grade AC-10 or AC-20

2. Prime Coat: Cut-back asphalt type, ASTM D2027 or AASHTO M82, MC-30, MC-70 or MC-250.

3. Tack Coat: Emulsified asphalt, ASTM D977, D2397, AASHTO M140 or M208, SS-1, SS-1h, CSS-1 or CSS-1h, diluted with water 1 : 1.

4. Fog Seal: AASHTO M 140, emulsified asphalt or AASHTO M 208, cationic emulsified asphalt, slow setting, diluted at the factory in water, of suitable grade and consistency for application.


6. Reclaimed Asphalt Pavement (RAP): Contractor may elect to use crushed, recycled asphalt pavement material. The allowable percentage and it’s suitability for use shall be determined in accordance with the Colorado Asphalt Pavement Association CDOT Revised Section 401.

F. MIXES

1. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes. Furnish job-mix formulas for each pavement type, conforming to the requirements of Subsection 401.02 of the CDOT Specifications. Mix aggregates and bituminous materials in accordance with the requirements of Subsection 401.15 of the CDOT Specifications. Use approved job mix formulas. Mix to comply with the following requirements:
   a. Provide mixes with a history of satisfactory performance in geographical area where Project is located.
   b. Base Course: Grading SG (75). – (Unless a different mix than previously specified is recommended for the project in which case owner approval is required.)
   c. Surface Course: Grading S (75). – (Unless a different mix than previously specified is recommended for the project in which case owner approval is required.)

2. Emulsified-Asphalt: Shall conform to AASHTO M140 or M208 in accordance with
Subsection 702.03 of the CDOT Specifications.

3. Mixes shall be designed for an Equivalent Single Axle Loading (ESAL) range of 0.3 to < 3.0 million ESAL’s (compaction level 2) and a seven (7) Day Average Design Air Temperature # 39EC.

4. Crushed glass and roofing shingles shall not be used in the mixes unless approved by the Owner in writing.

PART 3 - EXECUTION

3.1 PREPARATION:

A. Proof Rolling:

1. Proof-roll subbase using heavy, pneumatic-tired rollers to locate areas that are unstable or that require further compaction. Scarify, regrade and recompact surface of subgrade that is pumping or deforming as required to provide true levels, uniform slopes and proper total thickness of paving as required in division 2 Section “Earthwork.”

B. Proceed with paving only after unsatisfactory conditions have been corrected.

C. Verify and maintain the existing drainage pattern(s) of each area to be milled, receive an overlay or patch including special attention to infrastructure such as tie-ins, inlets, chase drains and other identifiable patterns.

D. Verify that the subgrade is unfrozen; free of water, snow, and ice; or in anyway in an unsuitable condition to support paving and imposed loads.

E. Minimum temperature of surface or air shall be 60 degrees F and rising at the time of placement

3.2 WEED CONTROL:

A. If vegetation exists on subgrade, remove surface vegetation within 3 days prior to application of Casoron or apply "Roundup" at rates following manufacturer's instructions.

B. Apply Casoron weed control at rate of 2.4 lbs per 100 sq. yds. for G-10 or 4.0 lbs. for W-50. Apply by methods recommended by manufacturer.

C. Exercise care and be responsible for damage to vegetation outside area to be treated due to careless or improper handling or use of weed control.

D. Conform to State and local requirements for use of agricultural chemicals.
3.3 JOINING TO EXISTING WORK:

A. When joining to existing work, the contractor will mill a minimum of 2 feet into the existing asphalt to apply a 2-inch overlay. Apply tack coat to exposed asphalt surfaces before placing new pavement. Meet existing thickness of surface and base courses, but not less than specified for new work. Where new work joins existing asphaltic concrete paving on City of Boulder right-of-way, comply with the requirements of City of Boulder authorities for surface and base course thickness.

B. Asphalt cuts must be perpendicular to the flow of traffic and must be by whole lane widths.

3.4 COLD MILLING

A. Clean existing pavement surface of loose and deleterious material immediately before cold milling. Remove existing asphalt pavement by cold milling to grades and cross sections indicated.

B. Mill to a minimum depth of 1 ½-inches for all edge milling or as indicated on the plans. All other areas shall be a minimum 2” depth.

1. Edge milling shall provide for a smooth taper and transition with a minimum width of 8’ unless otherwise approved by Engineer.

2. Mill to a uniform finished surface free of gouges, grooves, and ridges.

3. Control rate of milling to prevent tearing of existing asphalt course.

4. Repair or replace curbs, manholes, and other construction damaged during cold milling.

5. Excavate and trim unbound-aggregate base course, if encountered, and keep material separate from milled hot-mix asphalt.

6. Transport milled hot-mix asphalt to asphalt recycling facility. Provide signed manifest from recycling facility on a daily basis.

7. Keep milled pavement surface free of loose material and dust.

3.5 PATCHING

A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches (300 mm) into adjacent sound pavement, unless otherwise directed by the Engineer or Owner’s Representative. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.

B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.2 gal./sq. yd. (0.2 to 0.8 L/sq. m).
1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.

2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

C. Patching: Partially fill excavated pavements with hot-mix asphalt base mix (SG) and, while still hot, compact. Cover asphalt base course with compacted, hot-mix surface layer (S) finished flush with adjacent surfaces. Full-depth patches shall be a minimum of 6” total depth and be completed after milling if milling is specified.

3.6 REPAIRS

A. Contractor shall protect the pavement against damage from all causes associated with construction activities. Any part of the pavement that is damaged shall be repaired or replaced by and at the expense of the Contractor.

B. Leveling Course: Install and compact leveling course consisting of hot-mix asphalt surface course to level sags and fill depressions deeper than 1 inch (25 mm) in existing pavements.

C. Crack and Joint Filling: Remove existing joint filler material from cracks or joints to a depth of 1/4 inch (6 mm).
   1. Clean cracks and joints in existing hot-mix asphalt pavement.
   2. Use emulsified-asphalt slurry to seal cracks and joints less than ¼ inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.
   3. Use hot-applied joint sealant to seal cracks and joints more than ¼ inch (6 mm) wide. Fill flush with surface of existing pavement and remove excess.

3.7 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
   1. Sweep loose granular particles from surface of unbound-aggregate base course. Do not dislodge or disturb aggregate embedded in compacted surface of base course.

B. Herbicide Treatment: Apply herbicide according to manufacturer's recommended rates and written application instructions. Apply to dry, prepared subgrade or surface of compacted-aggregate base before applying paving materials.

C. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.05 to 0.20 gal./sq. yd. (0.2 to 0.8 L/sq. m).
   1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
   2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
3.8 HYBRID GEOSYNTHETIC WATERPROOFING PAVING MAT INSTALLATION

A. In all cases, the Installation Procedures of the manufacturer shall apply and are incorporated herein by reference.

B. Apply asphalt binder uniformly to existing pavement surfaces at a rate specified by the paving mat manufacturer.

C. Place geosynthetic waterproof paving mat promptly according to manufacturer's written procedures. Broom or roll geotextile smooth and free of wrinkles and folds. Overlap longitudinal joints 2” inches minimum and transverse joints 3” inches minimum or as specified by the paving mat manufacturer.

1. Protect geosynthetic waterproof paving mat from traffic and other damage and place hot-mix asphalt paving overlay the same day.

3.9 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated on the plans or as directed by Geotechnical Report. Maximum lift thickness shall be 3-inches. Minimum lift thickness shall be 1½-inches for Grading SX and 2-inches for Grading S.

2. Place hot-mix asphalt surface course in single lift. Maximum lift thickness shall be 2-inches.

3. Spread mix at minimum temperature of 235 deg F (113 deg C) per in accordance with Subsection 401.15 of the CDOT Specifications, Table 401-4.

4. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes, unless otherwise indicated.

5. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt-paving mat.

B. Place paving in consecutive strips not less than 10 feet (3 m) wide unless infill edge strips of a lesser width are required.

1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.

C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand
tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.10 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.

2. Offset longitudinal joints, in successive courses, a minimum of 6 inches (150mm).

3. Offset transverse joints, in successive courses, 6 to 12 inches (150-300 mm).

4. Construct transverse joints as described in AI MS-22, "Construction of Hot Mix Asphalt Pavements."

5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.

6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.11 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or vibratory-plate compactors in areas inaccessible to rollers.

1. When paving surface temperature falls below 185 deg F (85 deg C) no further compaction effort will be permitted unless approved.

B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.

C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density in accordance with Subsection 401.17 of the CDOT Specifications.

1. Pavement shall be compacted to a density of 92% to 96% of the maximum theoretical density, determined according to Colorado procedure 51. Field density determination will be in accordance with Colorado Procedure 44 or 81.

D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.12 INSTALLATION TOLERANCES

A. Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base Course: Plus or minus ¼ inch (6 mm).

2. Surface Course: Plus ¼ inch (6 mm), no minus.

B. Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3-m) straightedge applied transversely or longitudinally to paved areas:

1. Base Course: ¼ inch (6 mm).

2. Surface Course: 3/16 inch (5 mm).

3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is ¼ inch (6 mm).

3.13 MANHOLE FRAME AND VALVE FRAME ADJUSTMENTS

A. Contractor shall adjust all manholes, water valves and other surface appurtenances to finished grade.

B. Set frames for manholes and other such units within areas to be paved to ¼-inch minimum to ½-inch maximum below final grade as part of this work. Include existing frames or new frames furnished under other sections of these specifications.

C. Set cover frames to ¼-inch minimum and ½-inch maximum below surface of adjacent pavement. Surround frames set to grade with a ring of compacted asphaltic concrete base prior to paving. Place asphaltic concrete mixture up to 1-inch below top of frame, slope to grade, and compact with hand tamping. Adjust frames as required for paving.

D. Provide temporary closures over openings until completion of rolling operations. Remove closures at completion of work.
E. Contractor shall provide manhole and valve risers.

3.14 ASPHALT CURBS

A. Construct hot-mix asphalt curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust. Spread mix at minimum temperature of 250 deg F (121 deg C).

1. Asphalt Mix: Same as pavement surface-course mix.

B. Place hot-mix asphalt to curb cross section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms after hot-mix asphalt has cooled.

3.15 SURFACE TREATMENTS

A. Fog Seals: Apply fog seal at a rate of 0.10 to 0.15 gal./sq. yd. (0.45 to 0.7 L/sq. m) to existing asphalt pavement and allow to cure. With a fine sand, lightly dust areas receiving excess fog seal.

B. Chip Seal: Apply emulsified asphalts in accordance with CDOT Section 702.03.

3.16 TESTING REQUIREMENTS:

A. All testing and inspections required herein will be performed by an independent testing and inspection agency employed by the Contractor to perform field tests and inspections and to prepare test reports. All documentation, including the Compaction Test Reports shall be given to the Owner’s Representative at the end of each working day, specifying road names and termini. Three core drill samples shall be taken by the Contractor of each lot for quality control purposes. Contractor shall be responsible for any delay caused by the Contractor’s laboratory, which may affect the Contractor’s work performance on the project. Any retesting required due to failed test shall be paid by the Contractor.

1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.

2. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

B. Asphalt paving shall be tested for gradation, asphalt content, and in-place density in accordance with the Colorado Department of Transportation’s "Standard Specifications for Road and Bridge Construction", Latest Edition, and the current edition of CDOT Field Materials Manual, whichever is more stringent.

C. Field-testing shall be performed by the paving contractor’s certified nuclear gauge operator and monitored by the Owner’s representative. The contractor’s nuclear gauge operator shall be on site at all times when paving operations occur.
D. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

E. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

F. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to ASTM D 979.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.

2. In-place density of compacted pavement will be determined by testing core samples according to ASTM D 1188 or ASTM D 2726.

   a. One core sample will be taken for every 350 sq. yd. or less of installed pavement, with no fewer than 3 cores taken.

   b. Field density of in-place compacted pavement may also be determined by nuclear method according to ASTM D 2950 and correlated with ASTM D 1188 or ASTM D 2726.

G. Asphalt Content and Gradation. Testing agency will take sample of uncompacted paving mixtures at a minimum frequency of every 1,000 tons according to Colorado Procedure – Laboratory CPL-5120 and Colorado Procedure CP-31.

H. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements. Conforming to the specified requirements will be in accordance with Subsection 105.03 of the CDOT Specifications.

I. All test results shall be submitted to the Owner within 48 hours of the test.

3.17 FIELD QUALITY ASSURANCE:

A. Owner may perform quality assurance testing for the in-place asphalt concrete course for compliance with requirements for thickness, compaction, and surface smoothness.

1. Owner through project manager will provide Parking and Transportation Services (PTS) with testing results for impacted parking facilities.

2. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness.

   a. Base Course: plus/minus 0.25"

   b. Surface Course: +0.25" (no minus)

3. Surface Smoothness: Owner will test finished surface of each asphaltic concrete
course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerance for smoothness.

Wearing Course Surface: 0.1875”.

4. Repair or remove and replace unacceptable paving as directed by the Architect / Engineer.

5. Owner will check compaction and compliance with design mix by cutting test plugs where directed in accordance with ASTM D1559. Patch core holes. Owner will test for compaction minimum of 95% of Marshall Design, aggregate gradation, voids and percent asphalt.

6. Remove and replace non-conforming work as directed.

7. Check surfaced areas at intervals as directed by the Architect.

3.17 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow excavated materials to accumulate on-site.

PART 4 - MEASUREMENT AND PAYMENT

4.1 MEASUREMENT AND PAYMENT

A. At any time during the period of the contract, the Owner and/or Owner’s Representative may increase, delete, or substitute tonnage and/or quantities listed herein.

B. Unless otherwise specified, payment will be made based upon the in-place quantities measured by the Owners Representative and rounded to the nearest unit.

C. Hot Mix Asphalt pavements will be measured and paid for at the Contract unit price bid per ton for the respective types of HMA. The payment will be full compensation for furnishing, hauling, placing, testing (including field and laboratory), tack coat, labor, temporary traffic control, equipment, tools and incidentals necessary to complete the Work. Payment for line striping and permanent pavement markings will be inclusive to the per ton price bid for HMA.

D. Geosynthetic waterproof paving mat will be measured and paid for at the Contract unit price per SY as measured to the nearest .1’ and rounded to the nearest SY. The payment will be full compensation for furnishing, hauling, placing, testing (including field and laboratory) tack coat/binders, labor, traffic control, equipment, tools and incidentals necessary to complete the Work.
END OF SECTION 02513