

SECTION 2200 – PAVING
CITY OF BELTON, MISSOURI
STANDARD SPECIFICATIONS

The City of Belton hereby adopts Section 2200 of the Kansas City Metropolitan Chapter of APWA Construction and Material Specifications, current edition. The following additions, deletions and/or revisions are adopted as a part of Section 2200 for use within Belton.

2201 SUBGRADE PREPARATION:

Replace section 2201.3.E Roll Testing with the following:

Following the completion of subgrade preparation and prior to the placement of curb, curb & gutter, or any asphalt or concrete, the Contractor shall provide a loaded tandem dump truck, carrying a ticketed 72,000 lbs. gross weight, for use in proof rolling the subgrade. Tires shall be inflated to a minimum pressure of 70 pounds per inch and a maximum pressure of 90 pounds per square inch. The loaded dump truck will roll over the subgrade where the proposed concrete curb, shoulder, and roadway or trail is to be placed. The proof roll truck shall roll over areas being tested at two miles per hour. The width of proof roll area shall include 2' back of curb across the road bed to 2' back of curb, or in the case of a road or trail with shoulders, from outside shoulder edge to outside shoulder edge.

This testing will be done by the Contractor, and will be in addition to the applicable moisture and density testing.

The truck shall proceed slowly along each traffic lane, allowing the Engineer to walk alongside and observe the results. Subgrade that does not yield or pump is considered passing and suitable for concrete or asphalt placement. Any defective areas found pumping or rutting shall be corrected and then proof roll tested.

The Contractor shall give the inspector 48 hours' notice to schedule the proof roll test.

The Contractor will be required to trim trees that are in the way of the paving operation and responsible for any damage to the trees.

Add Section 2201.6 as follows:

2201.6 Subgrade Stabilization - Fly ash treated subgrade

When required, fly ash stabilization material shall meet the following specifications:

The minimum requirements for design and construction of all streets shall consist of subgrade stabilization.

Referenced standards: The following standards are referenced directly in this section. The latest version of these standards shall be used.

ASTM	Title of Section
C 125	Terminology Relating to Concrete and Concrete Aggregates
C 311	Test Methods for Sampling and Testing Fly Ash or Natural Pozzolans for Use in Portland-Cement Concrete
C 618	Standard Specification for Coal Fly Ash and Raw or Calcined Pozzolan for Use in Concrete
D 698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft ³)
D 1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
D 2922	Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

AASHTO	
T 26	Quality of Water to be Used in Concrete

A. Summary

This section consists of one or more courses of a mixture of soil, fly ash, and water in accordance with this specification, and in conformity with the lines, thicknesses, and typical cross sections.

B. Materials

1. Fly ash: Fly ash shall meet ASTM C 618, section 4.3 when sampled and tested in accordance with sections 5, 6 and 8, unless otherwise shown on the plans. Note 2 of section 3.1.2 of ASTM C 618 shall not apply. Fly ash shall be of the Class "C" designation containing a minimum of 22 percent CaO. The source of the ash shall be identified and approved in advance of stabilization operations in order that laboratory tests can be completed prior to commencing work. Fly ash shall be stored and handled in closed weatherproof containers until immediately before distribution. Fly ash exposed to moisture prior to mixing with soils shall be discarded.
2. Water. Water used for mixing or curing shall be reasonably clear and clean, free of oil, sewage, salt, acid, alkali, sugar, vegetable matter, or other substances injurious to the finished product. Water shall be tested in accordance with and shall meet the suggested requirements of AASHTO T 26. Water known to be potable may be used without testing.
3. Soil.

- a. The soil for this work shall consist of materials on the site or selected materials from other sources and shall be uniform in quality and gradation, and shall be approved by the Engineer. The soil shall be free of roots, sod, weeds, and stones larger than 1½ inches.
- b. Recycled asphalt pavement: Recycled asphalt pavement (RAP) may be produced from breaking up, pulverizing, or crushing asphalt pavement into individual pieces, the largest of which shall not be larger than 1½ inches. Recycled material shall be identified and approved prior to incorporation into the project.

C. Composition

1. Fly ash: Fly ash shall be applied at a rate of 15 percent by total dry weight for the depth of subgrade treatment (minimum 9 inches), or greater than 15 percent if specified by the Project Design Engineer.
2. Tolerances. At final compaction, the fly ash and water content for each course of subgrade treatment shall conform to the following tolerances:

Material	Tolerance
Fly Ash	+0.5%, -0%
Water	+2%, -0%

D. Equipment

The equipment required shall include all equipment necessary to complete this item such as: grading and scarifying equipment, a spreader for the fly ash, mixing or pulverizing equipment, sheepsfoot and pneumatic or vibrating rollers, sprinkling equipment, and trucks. The equipment for mixing or pulverizing fly ash and soil shall be equivalent to a BoMag type reclaimer. All machinery, tools, and equipment used shall be maintained in a satisfactory and workmanlike manner.

E. Weather limitations

The fly ash-treated subgrade shall not be mixed while the atmospheric temperature is below 40 degrees Fahrenheit or when conditions indicate that temperatures may fall below 40 degrees Fahrenheit within 24 hours, when it is foggy or rainy, or when soil or subgrade is frozen.

F. Construction methods

1. General: It is the primary requirement of this specification to secure a completed stabilized subgrade containing a uniform fly ash mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth, and with a smooth surface suitable for placing subsequent courses. It shall be the responsibility of the Contractor to regulate the sequence of his or her work, to use the proper amount of fly ash, maintain the work, and rework the courses as necessary to meet the above requirements.
2. Roadway areas: Prior to beginning any fly ash treatment the subgrade in the roadway subgrade areas shall be constructed and shaped to conform to the typical sections as shown on the plans. The Engineer has the option of requesting proof rolling of the subgrade prior to fly ash application. Proof rolling, if requested by the Engineer and/or authorized agent, shall consist of

the Contractor furnishing a single-axle front and dual-axle rear dump truck with a legal load limit of material. Number of passes and locations will be as directed by the Engineer and/or authorized agent.

3. Application: Fly ash shall only be spread on areas where the mixing and compaction operations can be completed within two hours. The amount of fly ash spread shall be the amount required to obtain 15 percent fly ash content when computed by dry weight of the combined materials in the layer of fly ash treated subgrade. ***Fly ash shall be incorporated to the subgrade a minimum of 9 inches in depth.***
 - a. The fly ash shall be spread uniformly over the top of the subgrade by an approved screw-type spreader box or other approved spreading equipment. The fly ash shall be distributed in such manner that scattering by wind will be minimal. Fly ash shall not be applied when wind conditions, in the opinion of the Engineer, or authorized agent, are detrimental to a proper application.
4. Mixing: The full depth of the treated subgrade shall be mixed with an approved pulvamixer. Fly ash shall not be left exposed for more than 30 minutes after application. The pulvamixer shall make the necessary passes to fully incorporate the fly ash into the soil. Water shall be added through use of a pulvamixer equipped with a spray bar in the mixing drum capable of applying sufficient quantities of water to achieve the required moisture content of the soil-fly ash mixture. The system shall be capable of being regulated to the degree as to maintain moisture contents within the specified range.
 - a. Specified moisture contents shall be established based on laboratory tests with the site soils, and the specific fly ash to be used for the treatment. Final moisture content of the mix, immediately prior to compaction, shall not be below nor more than two percent above the optimum moisture content for maximum density of the mix as determined in accordance with ASTM D 698. If moisture contents exceed the specified limits, additional fly ash may be added to lower the moisture content to the required limits. Lowering moisture contents by aeration following addition of the fly ash will not be permitted.
5. Compaction: Compaction of the soil-fly ash mixture shall begin immediately after mixing of the fly ash and be completed within two hours following incorporation of the fly ash. The field density of the compacted mixture shall be at least 95 percent of the maximum density of laboratory specimens prepared from samples taken from the material in place. The specimens shall be compacted and tested in accordance with ASTM D 698.
 - a. The in-place density of the fly ash-treated subgrade layer shall be determined in accordance with ASTM D 1556 or ASTM D 2922 at intervals so that each test shall represent no more than 350 square yards.
 - b. All irregularities, depressions, or weak spots, which develop, shall be corrected immediately by scarifying the areas affected, adding or removing material as required, and reshaping and recompacting. The surface of the course shall be maintained in a smooth condition, free from undulations and ruts, until other work is placed thereon or

the work is accepted. The Engineer and/or authorized agent has the option of requesting proof rolling of the fly ash treated subgrade prior to paving. Proof rolling, if requested by the Engineer and/or authorized agent, shall consist of the Contractor furnishing a single-axle front and dual-axle rear dump truck with a legal load limit of material. Number of passes and locations will be as directed by the Engineer and/or authorized agent.

- c. In addition to the requirements specified for density, the full depth of the material shown in the contract documents shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section is completed, tests will be made by the Engineer. If the material fails to meet the density requirements, it shall be reworked to meet these requirements. Throughout this entire operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and shall conform with the typical section shown on the plans and to the established lines and grades. Should the material, due to any reason or cause, lose the required stability, density, and finish before the next course is placed or the work is accepted, it shall be recompact and refinished at the sole expense of the Contractor.
6. Finishing and curing: After the final layer or course of the fly ash treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. The finished surface shall not vary more than three-eighths-inch when tested with a 16-foot straightedge applied parallel with and at right angles to the pavement centerline. Any variations in excess of this tolerance shall be corrected by the Contractor, at his or her own expense, in a manner satisfactory to the Engineer and/or authorized agent.
 - a. After the fly ash treated course has been finished as specified herein, the surface shall be protected against rapid drying and maintained in a thorough and continuously moist condition. The Engineer and/or authorized agent may require sprinkling for a period of not less than three days or until the pavement section is placed.
 7. Thickness: The thickness of the fly ash treated subgrade may be determined at the Owner's expense by depth tests or cores taken at intervals so that each test shall represent no more than 500 square yards. When the base deficiency is more than one-half-inch, the Contractor shall correct such areas in a manner satisfactory to the Engineer. The Contractor shall replace, at his or her expense, the base material where borings are taken for test purposes.
 8. Maintenance: The Contractor shall maintain the entire fly ash treated subgrade in good condition from the start of work until all the work has been completed, cured, and accepted by the Engineer.

Add section 2201.7 – Subgrade Repair

A. Description: This item shall consist of scarifying, loading and disposing of subgrade materials and the furnishing and placing of new subgrade material.

B. Materials: Subgrade replacement materials shall consist of AB-3 or MoDOT Type 5 materials meeting the following:

U.S. STANDARD SIEVE SIZE	TOTAL PERCENT RETAINED BY WEIGHT*
1"	0
3/4"	11
1/2"	29.5
3/8"	39.8
No. 4	59
No. 8	70.2
No. 40	82
No. 200	100

C. Construction Methods: The subgrade material shall be removed in four inch depth intervals and to the width and at the locations as directed by the Engineer. The subgrade shall be removed in such a manner as not to disturb the underlying soil.

The Contractor shall not excavate more area than he/she is capable of paving within the same working day. At the end of each working day all open street excavations must be either backfilled and compacted to within one inch below existing finish grade, or covered with steel plating in order to allow use by public traffic.

D. Measurement: See section 2205.9

E. Basis of Payment: Payment for accepted work shall be paid at the contract unit bid price for "Subgrade Repair". Prices shall be full compensation for saw-cutting or other approved cutting method, scarifying, removing, disposing of subgrade materials, preparation of subgrade, furnishing all materials, placing AB-3/MoDOT Type 5 material, compaction and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work.

2202 UNTREATED COMPACTED AGGREGATE

2202.2. Materials: Add the following sentence at the end.

MoDOT Type 5 aggregate may be used for untreated aggregate layer in lieu of the material specified in this paragraph.

2204 PRIME AND TACK COAT

2204.2 - Liquid Asphalt Material

Section 2204.2 is revised to state that asphalt emulsion grade SS-1h or SS-1hP shall be the material designated for application of tack coats on existing asphalt surfaces and between new courses of paving. However, tack coat materials may be adjusted to suit weather conditions or other variables which may be encountered at the time of construction.

Add the following provisions to Section 2204.2:

- A. Tack coat shall be applied to the existing asphalt streets and between each layer of new asphalt concrete to assure bond. Emulsified asphalt, Type SS-1h or SS-1hP, shall be diluted one (1) part water to one (1) part emulsion, mixed uniformly and heated to within the range of one hundred thirty to one hundred sixty degrees F, prior to application.
- B. The application rate of the diluted material shall be as required to provide proper coverage, and will generally be between 0.05 and 0.12 gallons per square yard. When weather conditions require, the Engineer may require that a different type of asphalt tack material be used.

2205 ASPHALTIC CONCRETE SURFACE AND BASE

Asphalt concrete materials and construction shall conform to standard specification APWA Section 2205 except as herein amended:

2205.3 Mixing and Proportioning

Delete the second sentence in subsection 2205.3 paragraph C.1 and **replace** with the following:

The asphaltic concrete mixture for asphalt overlay (or surface) shall consist of either Virgin Type 3 asphalt or 15 to 27 percent reclaimed Type 3 asphalt and meet the requirements of subsection 2205.3 Mixing and Proportioning. The asphaltic concrete mixture for asphalt base shall consist of 15 to 27 percent reclaimed Type 1 asphalt and meet the requirements of subsection 2205.3 Mixing and Proportioning.

Revise subsection 2205.3 paragraph D:

The Marshall Stability requirements shall be 1800 lbs minimum.

Add Section 2205.11 Base Repair with Hot Mix Asphaltic Concrete Base Course

A. Description: This item shall consist of scarifying, loading and disposing of existing asphaltic surface and base materials and the furnishing and placing of hot mix asphaltic concrete base (black base), on the approved subgrade.

B. Materials: The asphaltic concrete mixture for the asphalt base shall consist of 15 to 27 percent reclaimed Type 1 asphalt and meet the requirements of subsection 2205.3 Mixing and Proportioning.

C. Construction Methods: The existing asphaltic surface and flexible base material shall be removed for its full depth and to the width and at the locations directed by the Engineer. The surface and base material shall be removed in such a manner as not to disturb the underlying subgrade.

The Contractor shall not excavate more area than he/she is capable of paving within the same working day. At the end of each working day all open street excavations must be either

backfilled and compacted to within one inch below existing finish grade, or covered with steel plating in order to allow use by public traffic.

Unless directed by the Engineer, the Contractor shall not consider pitted (small surface failures) areas as base repair. These areas shall be cleaned out and leveled up with the level-up course. This work is considered subsidiary to this item and shall not be paid for separately.

Base repair shall consist of saw-cutting or other approved cutting method, scarifying and disposing of asphalt surface and base material to a depth equal to the existing asphaltic materials depth, but not less than eight inches (8"). The areas of repair shall be cut in square or rectangular shape with faces free of loose material. One pair of faces shall be at right angles to the alignment of the proposed roadway. Repair areas shall extend at least twelve-inches horizontally, into the existing base and/or subgrade.

The black base shall be placed and compacted in lifts not to exceed four (4) inches.

During the time period from April 15th to October 16th, of each year, the asphaltic material used for tack coat shall be either SS-1, anionic slow setting emulsion or CSS-1, cationic slow setting emulsion. During the remainder of the year, the asphaltic material shall be either RC-250 or RC-2, rapid curing cutback asphalt.

Tack coat shall be applied to the vertical faces at the rate of 0.10 gallons per square yard, or as directed by the Engineer.

D. Measurement: See section 2205.9

E. Payment: Base repair with hot mix asphaltic concrete base material, furnished and placed, and measured as provided above, shall be paid for at the contract unit bid prices for "**Base Repair Recycled Asphalt Base, APWA, Type 1-01**". This price shall be full compensation for tack coat, saw-cutting or other approved cutting method, scarifying, removing, disposing of pavement materials, preparation of subgrade, furnishing all materials, placing asphaltic concrete mixture, compaction and finishing and for all manipulations, labor, tools, equipment and incidentals necessary to complete the work.

2207 COLD MILLING

Cold milling materials, equipment, and construction shall conform to Standard Specification section 2207 except as herein amended:

2207.2 Equipment

Delete paragraph C and replace with the following:

Edge milling cutting width shall be a minimum of six (6) feet.

2207.3 Construction details

Add the following to paragraph A.3 in this section:

The Contractor will keep the millings provided they are properly hauled and disposed. All milling piles left on or beside the street will be cleaned up DAILY by the Contractor.

2207.5 Basis of payment

Add the following sentence to the section:

Payment for accepted work shall be paid at the contract total bid prices for Edge Milling or Full Milling.

2208 PORTLAND CEMENT CONCRETE PAVEMENT

2208.2 Materials: **Delete** sections A and B and **replace** with the following:

A. Concrete: Concrete shall conform to the specifications of the Kansas City Metro Materials Board (KCMMB) 4k mix. Mix designs shall be approved KCMMB mixes, and shall be submitted to and approved by the City Engineer before placement.

2209 CURBING

Delete Reference Standards and **replace** with the following:

Concrete shall conform to the specifications of the Kansas City Metro Materials Board (KCMMB) 4k mix. Mix designs shall be approved KCMMB mixes, and shall be submitted to and approved by the City Engineer before placement.

2209.3.B **Replace** paragraph 4 with the following:

If during reconstruction operations, additional fill material is needed beneath the curb, it shall be crushed limestone conforming to Section 2202.2 of this supplemental specification.

2209.4.A **Add** the following to the Isolation Joint subparagraph:

3/4" preformed expansion joints with three #4 x 2' smooth dowels shall be placed at radius points and at 150' maximum intervals. These dowel bars shall be greased and wrapped on one end with expansion tubes.

2209.4.B **Replace** the first sentence of the Contraction Joint subparagraph with the following:

2" deep contraction joints shall be installed at approximately 10' intervals. These joints shall pass across the entire curb section.

Add Section 2209.11 Asphalt Street Repair for Curb and Gutter Replacement

A. Six (6) inches of street in front of the Curb and Gutter shall be removed by saw-cutting or other approved cutting method, scarifying and disposing of asphalt surface and base material to a depth equal to the existing asphaltic materials depth, but not less than eight inches (8"). The areas of removal shall be cut in square or rectangular shape with faces free of loose material. The existing

asphaltic surface and flexible base material shall be removed for its full depth. The surface and base material shall be removed in such a manner as not to disturb the underlying subgrade.

- B. The Contractor shall coordinate with the City on the amount of curb and gutter to be removed and allow for safety of the traveling public. In general, coordination should involve replacing of removed curb and gutter within 24 hours. At the end of each working day all open street excavations must be either backfilled and compacted to within one inch below existing finish grade, or covered with steel plating in order to allow use by public traffic.
- C. The removed area shall be filled to within 2 inches of the surface with concrete conforming to the requirements of KCMMB-4K Mix. The remaining 2 inches shall be installed as per Section 2205 of this supplemental specification.
- D. During construction, care shall be taken to ensure public safety along the sidewalk.
- E. Method of Measurement: There will be no separate measurement of quantities for this work unless otherwise specified in the contract. All asphalt street improvements per this subsection are considered subsidiary to curb and gutter replacement quantity, unless otherwise specified in the contract.
- F. Basis of Payment: Payment for accepted work will be at the contract unit bid price for "24" PCC Curb, CG-1 and 24" PCC Curb, CG-2". Such payment and price shall constitute full compensation for saw cutting, removal of the existing curb and gutter and street patch, grading adjacent to the curb and gutter and grading for subgrade preparation, placing and finishing concrete, joints, joint sealer, expansion joint material, seeding and mulching disturbed areas adjacent to the curb and gutter, repair of the road in front of the curb and gutter, and for all labor, materials, and equipment necessary to complete the item.

2210 MEASUREMENTS AND PAYMENTS

Delete Sections 2210.4 and 2210.5 and substitute the following:

No separate measurement or payment shall be made for any item of work not specifically identified and listed in the contract, including but not limited to tack coat, traffic control, sweeping, final cleanup and testing.

Add the following section:

2212 TESTING

- A. General: This work shall consist of materials tested to ensure compliance with the plans and specifications.
- B. All costs associated with material testing, certification and the preparation of trial mixes to determine the job mix formula shall be the responsibility of the Contractor. The Contractor shall retain the services of a qualified testing laboratory as to provide the following testing services:
 1. Asphaltic Mix Design

2. Grain size analysis - ASTM D2172, C136 of belt sample and hot mix sample taken each day that asphalt is produced for the project.
3. Asphaltic content, extraction method - ASTM D2172 taken each day that asphalt is produced for the project.
4. Marshall characteristics - ASTM D1159, D2726 (average of 2 specimens) 50 compaction blows per side made each day asphalt is produced for the project.
5. In place density using a nuclear gauge of the compacted asphalt material taken as required to establish the rolling pattern and at 3000 ton intervals thereafter.

C. Measurement and Payment

Testing will not be a direct pay item and will be subsidiary to the project unless noted in the bid tab.

END OF SECTION