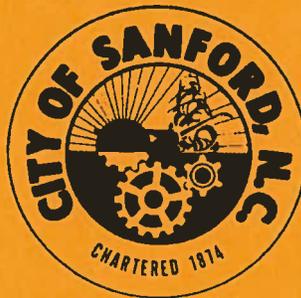


TECHNICAL SPECIFICATIONS

ASPHALT PATCHING



**CITY OF SANFORD
SANFORD, NORTH CAROLINA**

TECHNICAL SPECIFICATIONS

ASPHALT PATCHING

GENERAL

The Contractor shall furnish all labor, plant, materials, equipment, and all else required to construct the street improvements as shown on the plans and as called for in the specifications. The Engineer will furnish the Contractor with benchmark and baseline information necessary to stake out the work according to the plans and specifications. The Contractor shall furnish all stakes, templates, surveys, and lines required. Finished work, in all cases, shall conform with lines and grades as shown on the approved plans or as revised by the Engineer.

I. PAVING AND BASE COURSE

Scope of Work

Work done under this section will consist of the placement of stone base, priming, tacking, and asphalt course, as detailed on the plans and in the specifications. This shall include fine grading placement and compaction of the material.

A. TRAFFIC BOUND MACADAM BASE COURSE

This item shall consist of the construction of a base course consisting of graded crushed gravel or crushed stone material, and shall be constructed in accordance with these specifications and typical cross sections shown on the plans or as directed by the Engineer.

1. Materials

The coarse aggregate used shall consist of crushed stone or crushed gravel. Before any material is used, it shall be approved by the Engineer. The Contractor shall notify the Engineer of the source of the material and shall furnish samples as directed before any of the material is used.

The material passing the No. 4 sieve shall be known as "binder" and shall consist of screenings, sand, and clay, or other material of satisfactory binding value. The material passing the No. 40 sieve shall have a plasticity index not greater than six (6), and liquid limit

not greater than twenty-five (25), when tested in accordance with A.A.S.H.O. Method T-89, T-90, and T-91.

The aggregate, including the binder naturally present or added, shall meet the grading requirements as follows:

Sieve Designation	Percent by Weight Passing
1½ - inch	100
1 - inch	90-100
½ - inch	55-90
No. 4	35-60
No. 40	10-35
No. 200	5-20
Clay (-0.005 mm.)	0.3

2. Construction Materials

- a) Excavation - The Contractor shall remove any existing base course that does not conform to City specifications , as determined by the Engineer, and dispose of the material properly.

- b) Placing Base Course Material - In handling and placing the material, extreme care shall be taken to prevent segregation of the fine from the coarse material. Segregation shall be cause for rejection at the discretion of the Engineer. The material shall not be dumped in piles directly on the subgrade. The trucks shall be equipped with approved dumping gates so that material can be dumped in layers. The base course material shall be placed on the prepared subgrade in not less than two (2) layers, each layer being approximately one-half (½) of the total base thickness, in order to secure a finished compacted base course as called for on the typical cross section, or as specified by the Engineer. The contractor shall replace the existing depth of base course material plus two inches (2") or a minimum of six inches (6"). Where, in the opinion of the Engineer, subgrade conditions warrant thicker sections, additional material will be required to secure the depth of base designated. After each layer of material has been spread, it shall be sprinkled with water to it's approximate optimum moisture content and thoroughly mixed for it's full depth. It shall be continually machined until it becomes thoroughly compacted. Ring rollers or other compacting equipment,

satisfactory to the Engineer, shall be used during mixing and machining operations to obtain thorough compaction and bonding.

B. PLANT MIX ASPHALTIC CONCRETE SURFACE COURSE

This item shall consist of a surface course composed of aggregate and bituminous material mixed in an approved plant, and shall be constructed on the prepared subgrade or base course in accordance with these specifications and in conformity with the lines, grades, thickness, and typical cross section shown on the plans or as directed by the Engineer.

When called for on the plans or in the Special Conditions, this item shall be constructed in two courses, a binder course and a surface course.

The aggregate and bituminous material shall be combined in such proportions as to produce a mixture conforming to the composition limits by weight, as specified in the Special Conditions or plans.

If the Contractor should be unable to keep the mixture consistently uniform and within the specified limits, he shall discontinue operations until he can provide an operator of greater experience or until the necessary adjustments or repairs can be made to the plant.

Samples of the actual mixtures in use will be taken as many times as deemed necessary at the discretion of the Engineer. No change shall be made in the mix without the approval of the Engineer.

2. Materials

- a) Asphalt Cement - The bituminous material shall be asphalt made from petroleum. It shall be homogenous, free from water, and shall not foam when heated to 347°F, and shall meet the requirements given in the table below:

ASPHALT CEMENT "Grade AP-3"		
Test Requirements	A.A.S.H.O. Test Method	
Penetration at 77°F	T-49	85-100
Flash Point (open cup), °F	T-48	347 min.
Loss on Heating, Percent	T-47	1.0 max.
Pen. After heating % of original	T-49	60 min.
Ductility at 77°F	T-51	100 min.
Solubility in Carbon Disulfide, %	T-44	99.5 min.
Solubility in Carbon Tetrachloride, %	T-45	99.0 min.
Spot Test	T-102	neg.

- b) Prime Coat - The material used for the prime coat shall be medium-curing cut-back asphalt, grade MC-O or MC-I, as specified in the Special Conditions. The grade of asphalt used shall conform to the latest A.A.S.H.O. Specifications.
- c) Tack Coat - The material for the tack coat shall consist of the following.
- (1) Cut-back asphalt, grade RC-2, meeting the latest AASHO Specifications for the grade.
 - (2) Asphalt cement, grade AP-3, same as described in (1) above.
 - (3) Asphalt emulsion, grade AE-1, meeting the latest AASHO Specifications for that grade.
- d) Coarse Aggregate - The coarse aggregate shall be that portion retained on a No. 10 sieve and shall consist of crushed stone or crushed gravel. If crushed gravel is used, it shall have at least 70% of the particles with fractured faces. The coarse aggregate shall consist of clean, tough, durable fragments, free from an excess of flat, elongated, soft, or disintegrated pieces, and shall not contain clay, silt, vegetable, or other objectionable matter, and shall be graded from coarse to fine to meet the gradation requirements specified in the Special Conditions.

The coarse aggregate shall have a loss not more than 55% when tested in accordance with AASHO Method T-96.

- e) **Fine Aggregate** - The fine aggregate shall consist of clean, tough, rough surfaced grains, free from clay, loam, and other foreign matter, and shall be graded from coarse to fine to meet the gradation requirements specified in the Special Conditions. When it is necessary to use a mineral filler to meet the required gradation, the filler shall consist of thoroughly dry limestone dust, slag dust, slate dust, or Portland Cement.
- f) **Weights, Proportions, and Character of Materials** - For the verification of weights or proportions, and character of materials and determination of temperatures in the preparation of the mixture, the Engineer or his authorized representative shall have access, at any time, to all parts of the paving plant and may, at any time, check the loads of materials for weight, mixture, and temperature.

2. Construction Methods

- a) Prime Coat - In the event that the existing surface must be excavated, the Contractor shall dispose of the waste and replace it with a prime coat consisting of from 0.2 to 0.6 gallons per square yard, depending on surface texture, of medium curing asphalt, which shall be applied with a pressure distributor at a temperature between 80°F and 125°F. The base course shall be well compacted, clean, and free from loose or foreign materials. The surface of the base course shall be dry at the time of applying the prime coat. However, it may be applied, if the Engineer directs, when the base is slightly damp with no signs of free moisture on it's surface.

After the prime coat has been applied, the Contractor shall keep traffic off the road until, in the opinion of the Engineer, the prime coat has penetrated and dried out enough not to pick up under traffic. The surface shall be rolled until all loose material is thoroughly bonded before the wearing surface is replaced.

- b) Tack Coat - When the bituminous mix is to be placed on an old pavement, a tack coat shall be applied to the cleaned surface of the old pavement. The material for the tack coat shall consist of rapid curing asphalt, grade RC-2, and asphalt cement, grade AP-3, or an asphalt emulsion, grade AE-1, as stipulated herein before.

The tack coat shall be uniformly applied at a rate of 1/8 to 1/12 of a gallon per square yard, and the temperature at the time of application shall be between 125°F and 150°F for the cut-back asphalt, 100°F to 125°F for the asphalt, emulsion, and for the asphalt cement between 275°F and 350°F.

- c) Transportation and Delivery of Mixtures - The mixture shall be transported from the mixing plant to the point of use in vehicles having tight metal bodies previously cleaned of all foreign materials. When directed by the Engineer, each load shall be covered with canvas or other suitable material of sufficient size and thickness to protect it from the weather. Bodies shall be lightly oiled to prevent mixture from adhering thereto. No loads shall be sent out so late in the day as to prevent completion of the spreading and compaction of the mixture during daylight. The mixture shall be delivered at a

temperature between 225°F and 325°F and within 25°F of the temperature set at the mixing plant.

- d) Placing of Mixture - The mixture shall be spread and screened by hand to a depth equal to the existing depth plus two inches (2") (minimum replaced depth of 2"). Straight edging and back-patching shall be done after initial compaction while material is still workable.

Contact surfaces of headers, curbing, gutters, manholes, etc., shall be painted with an approved asphalt cement just before the base mixture is placed against them. All exposed longitudinal edges of the surface course shall be "set up" by tamping with a rake or lute at proper height and level to receive the maximum compression under rolling.

The Contractor shall provide and have ready for use at all times enough tarpaulins or covers for use in case of rain, chilly wind, or delay for the purpose of covering or protecting any material dumped but not spread.

- e) Compacting Surface Course - Rolling shall be started as soon as the mixture will bear the roller without undue displacement or hair cracking. Delays in rolling hand-raked mixture will not be tolerated.

To prevent adhesion of the mixture to the roller, the wheels shall be kept slightly oiled or moistened. Places not accessible to the roller shall be thoroughly compacted with hot tamps.

Bituminous mixture shall not be produced or placed during rainy weather, when the subgrade or base course shows excess moisture, or when the air temperature is less than 40°F in the shade, away from artificial heat, unless otherwise permitted by the Engineer. Should rain begin during paving operations, the City assumes no responsibility for asphalt left on the trucks at the time that paving operation is halted.

- f) Protection of Paving - When edges are to be protected, planks of the same thickness shall be placed adjacent to longitudinal or transverse joints until the surface course is completed. Sections of newly finished pavement shall be protected from traffic until they have become properly hardened by cooling.

B. METHOD OF MEASUREMENT

The quantities to be paid for under this item shall be the number of square feet of asphalt and base course replacement in place on the street, completed and accepted.

C. BASIS OF PAYMENT

Payment will be made for all items complete and accepted at the unit, or lump sum prices as stated in the proposal and measured as previously stated. The prices stated in the proposal shall cover all work required to make the street improvements in accordance with the plans and specifications. The sum of such payment shall be full compensation for all materials, labor, and other costs to the Contractor.

II. SUBGRADE REPLACEMENT

A. SCOPE OF WORK

Subgrade preparation shall consist of the removal and satisfactory disposal of all material excavated within the limits specified, including unsuitable material and the replacement with satisfactory materials, and the construction and preparation of the subgrade on that portion of the road bed on which the base course is to be placed. The subgrade shall be brought to the lines, grades, and typical cross sections shown on the plans and finished in accordance with these specifications.

B. CONSTRUCTION METHODS

The subgrade shall be properly shaped and thoroughly compacted so that it conforms to the lines and grades as shown, and shall be brought to a firm, unyielding condition before any base course is placed thereon. If the subgrade does not contain sufficient moisture for compaction, it shall be wetted as directed by the Engineer.

All soft and yielding material, boulders, loose stones, or any other unsuitable material in the subgrade which will not compact readily shall be removed and replaced with suitable material which shall be thoroughly compacted. All submerged roots, stumps, or other perishable matter encountered in the preparation of the subgrade shall be removed.

In subgrade construction, the materials shall be deposited and spread in successive, uniform layers of not more than six inches (6") in depth, loose measurement, for the full width of the cross section. Each layer of the subgrade, before starting the next, shall be thoroughly compacted by rolling as hereinafter specified.

1. Rolling of Subgrade

Backfill material shall be rolled with a sheepfoot tamping roller approved by the Engineer, of such weight to exert at least two hundred (200) pounds pressure per square inch of cross sectional area when in contact with a plane surface. Each layer of the embankment shall be rolled for its full width a minimum of two (2) trips of the roller for each inch in depth of the loose material placed in the layer. Special care shall be exercised by the Contractor for the proper filling and compaction of side ditches on the street to subgrade.

The rolling shall be done while the moisture content of the soil is as near as possible to optimum. If and when the materials are dried

out below optimum, it shall be sprinkled with water before rolling. Embankment material containing excess moisture, as determined by the Engineer, shall be required to dry to the proper consistency before being placed and compacted. Any portion of the subgrade inaccessible to rolling operations shall be thoroughly compacted with hand or mechanical tampers.

The Contractor shall maintain adequate drainage on the project being graded at all times. In the event water pockets are formed, they shall be drained by the Contractor, and all wet and unstable material shall be removed and disposed of, and the area backfilled and compacted with suitable material. Such work caused by the failure of the Contractor to keep the area adequately drained shall be performed at his expense.

2. Protection of Subgrade - In no case shall any base course of curbs and gutters be placed on frozen or muddy subgrade. Frost crystals or mud caused by freezing and thawing shall be removed and replaced with suitable material or allowed to dry before placing any base course or curb and gutters. If ruts are formed in the prepared subgrade, the subgrade shall be scarified and thoroughly compacted.

C. METHOD OF MEASUREMENT

The construction and preparation of the subgrade, including undercut, shall not be measured for direct payment. Where material is available at the job site for backfill, no measurement will be made for excavation. If borrowed material is needed for backfill, it will be measured on a cubic yard basis for payment.

D. BASIS OF PAYMENT

Payment will be made for all grading quantities on the unit or lump sum prices as stated in the proposal and measured as previously stated. The sum of each payment shall be full compensation for all materials, labor, and other costs to the Contractor.