

# BID SOLICITATION



**City of Chattanooga**  
 101 East 11th Street, Suite G13  
 Chattanooga, TN 37402

**BID OPENING DATE AND TIME:**

30-SEP-14 at 2:00 PM

**BID NUMBER: 303509**

**SEALED BIDS**

Mail or submit two (2) signed copies of bid form to this office in the enclosed envelope. Retain one copy for your file.

**BUYER:**

**PHONE #:** (423) 643-7230

**DELIVERY REQUIRED:**

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City of Chattanooga  
 101 East 11th Street, Suite G13  
 Chattanooga, TN 37402

Item	Class-Item	Quantity	Unit	Unit Price	Total
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Requisition No.: 100754  
 Ordering Dept.: Waste Resources  
 Buyer: Geoffrey Hipp 423-643-7233

**DESCRIPTION:**

This shall be a twelve (12) month blanket contract for New and Replacement Paving and Concrete for the Waste Resources Division. The contract may be renewed for two (2) additional twelve (12) month terms under the same Terms and Conditions by Mutual Agreement. The City of Chattanooga and the Contractor may bilaterally extend the contract by Written Confirmation by both parties at least 30 days prior to the contract's current expiration date into any successive term as provided herein.

**ATTACHMENTS:**

- Specifications
- Affirmative Action Plan
- Standard Terms and Conditions:  
 (<http://www.chattanooga.gov/purchasing/standard-terms-and-conditions>)

\*\*\* BIDS MUST BE RECEIVED NO LATER THAN \*\*\*  
 \*\*\*\*\* 2:00 PM ON SEPTEMBER 30, 2014 \*\*\*\*\*

PLEASE SUBMIT BIDS IN DUPLICATE INDICATING  
 BID NUMBER (303509) ON OUTSIDE PACKAGING

ALL ITEMS MUST BE QUOTED F.O.B. DESTINATION, FREIGHT ALLOWED.

NOTE: All bids received are subject to the terms and conditions contained herein and as listed in the above referenced website. The undersigned Bidder acknowledges having received, reviewed, and agrees to be bound to these terms and conditions, unless specific written exceptions are otherwise stated.

The City of Chattanooga reserves the right to reject any and/or all bids, waive any informalities in the bids received, and to accept any bid which in its opinion may be for the best interest of the city.

The City of Chattanooga will be non-discriminatory in the purchase of all goods and services on the basis of race, color, or national origin.

**PRICE ESCALATION CLAUSE:**

All prices under this contract shall remain fixed during each twelve (12) month contract period. If as a result of a general change in prices or discounts, the contractor has changed prices to all of its customers, then, at the time of contract renewal, the price under this contract may be adjusted accordingly after acceptance. All price increases must be justified by providing a copy of the prevailing labor wage or material cost increases. Prompt notice of price changes (increases or reductions) must be furnished to the Purchasing Agent at least 30 days prior to the requested effective date and the prices for these services/materials shall remain firm for twelve (12) months. The effective date of price increases shall be the date the Purchasing Agent accepts the price changes or the effective date of increase stated by contractor's notice to Purchasing Agent, whichever is later.

**PLEASE PROVIDE US WITH THE FOLLOWING INFORMATION:**

Company Name \_\_\_\_\_

Address \_\_\_\_\_

Phone/Toll-Free No. \_\_\_\_\_

Fax No. \_\_\_\_\_

E-Mail Address \_\_\_\_\_

Contact Person's Name \_\_\_\_\_

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Item	Class-Item	Quantity	Unit	Unit Price	Total
Estimated Delivery _____					
Minority-Owned Business ___ Small Business ___ Veteran ___					
Minority Woman Owned Business ___ Disabled Veteran ___					
Women-Owned Business ___					

**NOTE: ALL BIDS RECEIVED ARE SUBJECT TO THE TERMS AND CONDITIONS**

ALL BIDS MUST BE SIGNED – The undersigned offers the above quoted prices under the conditions contained herein.

The City is Exempt from all Federal and State Tax.  
 Bids will be received at the above mentioned address.

COMPANY: \_\_\_\_\_

TERMS OF PAYMENT: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

NAME AND TITLE: \_\_\_\_\_

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City of Chattanooga  
 101 East 11th Street, Suite G13  
 Chattanooga, TN 37402

Item	Class-Item	Quantity	Unit	Unit Price	Total
1	Common Excavation	1	Cubic Yard	_____	_____
2	Backfill/Borrow Excavation	1	Ton	_____	_____
3	Undercut and Remove Unsuitable Material	1	Cubic Yard	_____	_____
4	Mineral aggregate base, 100% Compaction Std. Proctor, Type 'A', Grading "D", 8" in depth, (Complete-in-place)	1	Ton	_____	_____
5	Flowable Fill Material, 4' Thickness	1	Ton	_____	_____
6	Saw Cutting	1	Linear Foot	_____	_____
7	4-inch thick Concrete Sidewalk (SD-202.01) - Includes Concrete portion of Handicap Ramps, Excavation up to 6" in Depth, Base stone, Expansion Joints, Caulk, etc. (Complete-in-Place)	1	Square Foot	_____	_____
8	City Standard Type 'A' Curb and Gutter (SD-202.01) - Includes excavation, backfill, stone, concrete, etc., (Complete-in-Place)	1	Linear Foot	_____	_____
9	City Standard Detached Curb (SD-201.01) - Includes excavation, backfill, stone, concrete, etc., (Complete-in-Place)	1	Linear Foot	_____	_____
10	Asphaltic concrete binder, Grading "B", 2.5" in depth, (Complete-in-place)	1	Ton	_____	_____

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Item	Class-Item	Quantity	Unit	Unit Price	Total
11	Asphaltic concrete surface, Grading "E", 1.5" in depth, (Complete-in-place)	1	Ton	_____	_____
12	Prime Coat, where required by Engineer, Complete-in-Place	1	Gallon	_____	_____
13	Tack Coat, Complete-in-Place	1	Gallon	_____	_____
14	Testing Allowance	1	Each	_____	_____
15	Erosion Control Inlet Protection - Silt-Saver, Siltsack, Gutterbuddy, or as directed by Engineer, (Complete-in-Place)	1	Each	_____	_____
16	Silt Soxx or approved equal (Complete-in-place)	1	Linear Foot	_____	_____
17	Other paving and concrete materials, supplies, and/or services not otherwise mentioned (_____ % markup or _____% discount)	1	Each	_____	_____

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COMPANY: \_\_\_\_\_

TERMS OF PAYMENT: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_

TELEPHONE NUMBER: \_\_\_\_\_

NAME AND TITLE: \_\_\_\_\_

**SPECIFICATIONS  
FOR  
ANNUAL BLANKET CONTRACT  
TO SUPPLY  
NEW AND REPLACEMENT PAVING & CONCRETE  
FOR THE WASTE RESOURCES DIVISION- INTERCEPTOR SEWER SYSTEM (ISS)  
CITY OF CHATTANOOGA, TENNESSEE  
(09/02/2014)**

**1.0 GENERAL**

**1.1 SCOPE OF SERVICES**

The Scope of Services included in these Specifications shall be for all labor, benefits, and any other related expenses necessary to provide the work for replacing existing pavement and sidewalks in paved streets, driveways, and parking areas where such curbing, sidewalks, and pavement has been removed for constructing sewers, manholes, water pipelines, fire hydrants, and all other water and sewer appurtenances and structures. It shall also include temporary paving, and new sidewalks and pavements where applicable for WASTE RESOURCES DIVISION projects including the Moccasin Bend Wastewater Treatment Plant (MBWWTP), 455 Moccasin Bend Road, Chattanooga, Tennessee 37405; the pump stations, and throughout the Interceptor Sewer System.

The purpose of this contract is for smaller roadway repairs therefore mobilization, traffic control and other incidental fees shall be incorporated into the cost of the bid items.

Any questions or comments related to the services described in these Specifications may be directed to the Collection System Engineer at Moccasin Bend Wastewater Treatment Plant, 455 Moccasin Bend Road, Chattanooga, Tennessee 37405 (423) 757-5026.

**1.2 BASIS OF BIDDING**

The Contractor shall submit one (1) bid on the City's Standard Bid Form. The Bid shall include the cost per hour for labor and percent markup on materials and specialized equipment that may be required by the Vendor. (Labor cost is to be included in each line item bid.)

The unit costs in the bid schedule shall include any and all, costs for wages, benefits, indirect costs, overhead and profit, insurance, and any other related direct or indirect cost.

Cost of these services shall be subject to all of the requirements of the Specifications.

The bid shall be awarded on the basis of the unit cost to provide the new and replacement paving and concrete services for the Waste Resources Division - ISS as well as an evaluation of the Vendor's qualifications, experience, capabilities and other factors specified in the City Code.

***The City of Chattanooga reserves the right to reject any and/or all bids, to waive any information in Bids received, and to accept any Bid which in its opinion may be in the best interest of the city.***

### **1.3 SUBMITTALS**

#### **1.3.1 Bid Bond**

Not Required

#### **1.3.2 Performance Bond**

In the amount of \$500,000.

#### **1.3.3 References**

The Vendor shall submit a list of three (3) customers for whom the Vendor has provided the new and replacement paving and concrete services during the past three- (3) years and provided labor to perform similar services.

The list shall include names, addresses, telephone numbers, and contact person who is knowledgeable of services provided.

#### **1.3.4 Experience**

The Vendor shall have a minimum of 15 years experience as a lead operator or foreman on new and replacement paving and concrete projects such as open cut repair and replacement, service lateral connections, trunk line interceptor large open cuts, easements, beneath geotechnical shoring, manhole bedding, process sewers and force mains, delicate landscapes, and other similar structures located in wastewater collection and treatment systems. This experience shall include the use of all type of excavating, paving, and concrete forming equipment

The materials to be installed, repaired, or replaced include all types of asphaltic bituminous binders and surfacing, binder and tack coatings, joining and expansion, backfill and road base aggregates, manhole frames and covers, inlets, and catch basins, lane marking paint, topsoil, miscellaneous, and special conditions recycled asphaltic paving where applicable.

The Vendor shall be experienced in working in roadway traffic and shall be thoroughly familiar with the TDOT traffic control rules, regulations, and use of the required associated equipment.

### **1.4 GENERAL CONDITIONS AND INSTRUCTIONS TO BIDDERS**

The Vendor shall comply with rules and conditions found in the City of Chattanooga, Purchasing Department's "General Conditions and Instructions to Bidders" that are apart of the invitation to Bid for the equipment or services specified herein.

### 1.5 LENGTH OF CONTRACT

The Contract for services described herein shall be for a period of one (1) year beginning the effective date of the award of the Contract. The Vendor shall provide firm unit pricing for the first year of the Contract.

Upon agreement of both parties, the City shall have the option of extending the Contract for two (2) additional one (1) year periods at the Vendor's unit pricing.

### 1.6 INSURANCE

The Vendor shall, proper to the award of the Contract, furnish proof and maintain in force the following types of insurance at the minimum limits specified below:

<u>COVERAGES</u>	<u>LIMITS OF LIABILITY</u>
Workmen's Compensation Employer's Liability	Statutory \$750,000
Bodily Injury Liability Except Automobile	\$750,000 each occurrence \$1,000,000 aggregate
Property Damage Liability Except Automobile	\$750,000 each occurrence \$750,000 aggregate
Automobile Bodily Injury Liability	\$750,000 each person \$1,500,000 each occurrence
Automobile Property Damage Excess Umbrella Liability	\$750,000 each occurrence \$3,000,000 each occurrence

Copies of the current insurance certificate(s) shall be provided to the City prior to any work being performed. Insurance shall be kept in force during the entire length of the contract.

### 1.7 WARRANTY

The Vendor shall warrant and guarantee the work performed for a period of one (1) year from the date of final acceptance by the City. The work shall be guaranteed and warranted against defective workmanship and materials.

### 2.0 SERVICES AND OTHER REQUIREMENTS

#### 2.1 GENERAL

### **2.1.1 Sole Vendor**

The Vendor shall not subcontract the services or assign the contract to others without the written consent of the City of Chattanooga.

### **2.1.2 Compliance with Applicable Regulations**

All of the services provided by the Vendor shall be completed in a good and workmanlike manner. All services provided shall be in compliance with all applicable statues, rules, ordinances and regulations of, but not limited to, the USEPA, TDOT, OHSA, and any similar federal, state, and local laws or regulations applicable to the Vendor or to the services described herein.

The Vendor's personnel shall comply with all City, Waste Resources Division - ISS, and Moccasin Bend WWTP work rules and regulations when on site.

### **2.1.3 Observation**

The services furnished by the Vendor shall be subject to observation and approval by the City's designated representative, but the manner and method of providing the services shall be the responsibility of the Vendor.

### **2.1.4 Failure to Provide Services and Termination of Contract**

In the event the Vendor:

- a. Fails to initiate services on the date specified or otherwise agreed to;
- b. Fails to provide all of the required documentation for his personnel, insurance, and any other documentation required by these Specifications at the specified times;
- c. After having begun services, abandons them for any reason;
- d. Suspends or refuses to continue services; or
- e. Defaults in any manner in the performance under the terms of the Contract for a period of two (2) consecutive working days (unless the Vendor is prevented from continuing for reasons beyond its control);

The City of Chattanooga shall have the right to terminate the Contract immediately upon the written notification by the City for the reasons listed above and the City shall complete the Contract or have the services completed by another vendor in any reasonable manner at the Vendor's expense.

The City shall have the right to terminate the Contract after giving a thirty-day (30) written notice to the Vendor.

## **2.2 DESCRIPTION OF CONTRACTED SERVICES**

### **2.2.1 General**

- A. The Vendor shall provide all labor, benefits and any other related expenses necessary to provide the new and replacement paving and concrete services described herein for the WASTE RESOURCES DIVISION – Interceptor Sewer System (ISS).
- B. The Vendor shall provide the services on an “as needed” basis as requested by the City performed according to the City’s standard drawings and specifications. The City will attempt to schedule the work to optimize the use of the Vendor’s operator when it is needed.
- C. Vendor shall perform work on straight time, i.e., non-emergency, unless otherwise noted. Overtime, weekend, or holiday work shall only be performed at the City’s direction.
- D. All work performed shall conform to the City standard specifications for construction and paving.

### **2.2.2 Vendor Services**

- A. The Vendor shall provide the trained and experienced labor required to provide the new and replacement paving and concrete services.
- B. The Vendor shall provide any specialty excavation, paving, and concrete equipment in order to complete work assigned by the City under these Specifications.
- C. The Vendor shall provide all services in accordance with the additional specifications provided in Appendix A of these specifications as well as all City of Chattanooga Standard Specifications.

## **3.0 EXECUTION**

### **3.1 GENERAL**

Pursuant to Section 1.1 of These Specifications, the purpose of this contract is asphalt pavement replacement above sewer extensions and sewer repairs. Work performance shall be as follows

#### **A. City Streets**

If work under this contract is performed in a City Street the work shall be performed in accordance with the City Standard Specifications in the Appendix attached to These Specifications. For City Street applications a

Structural Number (SN) of 2.88 shall be achieved through the following layer thicknesses

- 8" of Stone base
- 2.5" of hot mix binder
- 1.5" of asphalt topping

Unit weights and densities for the above layers are found in the Appendix as well as specifications for application rates for Tack Coat and Prime Coat layers. Prime Coat shall only be applied where work schedule dictates its usage or as directed by the Engineer.

Unless otherwise directed, Type B binder shall be used in City Street applications.

All asphalt pavement under this contract shall have a unit weight of 110 pounds per square yard per inch of thickness to achieve the desired SN of 2.88 in City Streets.

**B. State Roadways**

If work under this contract is performed in a State DOT roadway the work shall be performed in accordance with all applicable TDOT Specifications.

**3.2 CONTRACT STARTING DATE**

The Contract for the full services shall begin immediately on the effective date of the award of the Contract.

**3.3 PAYMENT OF SERVICES**

The City will make payment to the Contractor no later than the 30th of the month for the preceding month's service provided invoices are received by the first day of the month. Payment requests should be submitted to the Moccasin Bend Wastewater Treatment Plant, 455 Moccasin Bend Road, Chattanooga, Tennessee 37405.

**Bid Form  
Contract Number  
2014 WRD Paving Requirements Contract  
City of Chattanooga**

Item	Description	Approx. Quantity	Unit of Measure	Unit Price	Amount
1	Common Excavation	100	CY		
2	Backfill/Borrow Excavation	100	TON		
3	Undercut and Remove Unsuitable Material	100	CY		
4	Mineral aggregate base, 100% Compaction Std. Proctor, Type 'A', Grading "D", 8" in depth, (Complete-in-place).	1,000	TON		
4-Alt	Flowable Fill Material, 4' Thickness				
5	Saw Cutting	100	LF		
6	4-inch thick Concrete Sidewalk (SD-202.01) - Includes Concrete portion of Handicap Ramps, Excavation up to 6" in Depth, Base stone, Expansion Joints, Caulk, etc. (Complete-in-Place).	100	SF		
7	City Standard Type 'A' Curb and Gutter (SD-202.01) - Includes excavation, backfill, stone, concrete, etc., (Complete-in-Place).	100	LF		
8	City Standard Detached Curb (SD-201.01) - Includes excavation, backfill, stone, concrete, etc., (Complete-in-Place).	100	LF		
9	Asphaltic concrete binder, Grading "B", 2.5" in depth, (Complete-in-place).	500	TON		
10	Asphaltic concrete surface, Grading "E", 1.5" in depth, (Complete-in-place).	1,260	TON		
11	Prime Coat, where required by Engineer, Complete-in-Place.	1,300	GAL		
12	Tack Coat, Complete-in Place.	885	GAL		
	Testing Allowance	1	EA	\$10,000.00	\$10,000.00
13	Erosion Control Inlet Protection - Silt-Saver, Siltsack, Gutterbuddy, or as directed by Engineer, (Complete-in-Place).	20	EA		
14	Silt Sox or approved equal (Complete-in-place).	250	LF		
<b>Total Bid</b>					

## WRD-2014 Paving Contract

### Appendix

#### Contents:

Item 12:	ASPHALT PLANT MIX PAVEMENTS	2-17
Item 14:	MINERAL AGGREGATE BASE	18-23
Item 21:	PRIME COAT	24-26
Item 22:	TACK COAT	27-28
Item 26:	BITUMINOUS PLANT MIX BINDER	29-31
Item 27:	ASPHALTIC CONCRETE SURFACE	32-34
Item 33:	ADJUSTING MH FRAMES AND COVERS INLETS AND CATCH BASINS	35-37

## ITEM 12

### ASPHALT PLANT MIX PAVEMENTS (HOT & WARM MIX ASPHALT)

#### 12.01 DESCRIPTION

These Specifications include general requirements that are applicable to all types of asphalt pavements of the plant mix type irrespective of type and gradation of aggregate, type and amount of asphalt cement, and/or pavement use. Deviations from these general requirements shall be indicated in the specific requirements for each mix type.

This work shall consist of one or more courses of asphalt mixture constructed on the prepared foundation in accordance with these Specifications and the specific requirements of the mix type under contract, and in reasonably close conformity with the lines, grades, typical cross-sections, and application rate or thickness shown on the Plans or established by the Engineer.

In recognition of the City's Sustainable Development philosophy, Warm-Mix Asphalt (WMA) shall be the primary paving material. Conventional Hot-Mix Asphalt (HMA) may be an optional paving material for specific projects as directed by the Engineer.

WMA supplied for this project shall comply with the most current Tennessee Department of Transportation (TDOT) WMA specifications as described in the Section 400 and 900 series of specifications and applicable supplemental specifications. WMA may be produced by one or a combination of several technologies involving HMA plant foaming processes and equipment, mineral additives, or chemicals that allow the reduction of mix production temperatures to within 185°F to 275°F. (Note: The upper temperature range is appropriate for modified asphalt cements and WMA mixtures that include higher percentages of recycled asphalt pavement).

#### 12.02 MATERIALS

The individual materials shall meet the applicable requirements in the following table, Item Required Contract Provision, or as described in these Specifications:

Material	TDOT Section
Prime Coat	402
Tack Coat	403
Aggregates	903
Mineral Filler	903
Asphalt Cement	904

The mineral aggregates [virgin and Recycled Asphalt Pavement (RAP)] shall be accepted for quality at the paving plant stockpile. The aggregates shall be accepted for gradation immediately preceding addition of asphalt cement at the plant. This acceptance shall be based on periodic sampling of:

1. Aggregate taken as they are weighed from the bins,
2. Combined aggregate as it is fed to the plant, and/or
3. Batches to which the asphalt cement has not been added.

Performance Graded Asphalt Cement shall be approved from the source by submission of a Certification Letter that confirms the type and quality properties for each asphalt cement supplied for the project meet the minimum requirements set forth in ASTM D6373. The plant mixed material shall be accepted after blending and mixing at the plant.

### 12.03 COMPOSITION OF MIXTURES

The asphalt plant mix shall be composed of a mixture of aggregate (virgin and RAP), filler (if required), and asphalt cement. Prior to blending, RAP shall be fractionated in order to ensure proper asphalt mix gradation control and shall be limited to less than or equal to 40-percent ( $\leq 40\%$ ) of the aggregate blend. The aggregate fractions shall be sized, uniformly graded, and blended in such proportions that the resulting mixture meets the grading requirements of the Job-Mix Formula (JMF). The asphalt cement shall meet the specifications for PG 64-22 (ASTM D6373) unless otherwise specified by the Engineer.

The Contractor shall submit for the Engineer's approval a JMF for each asphalt mixture to be supplied for the project. The asphalt mixtures shall be proportioned to meet the following:

Asphalt Mix Property	Compacted Asphalt Mat Thickness (inches)					
	0.5	1.0	1.5	2.0	2.5	3.0
Design Method	50-Blow Marshall Mix Design @ 4% Air Voids					
Maximum Nominal Aggregate Size (inches)*	3/8	3/8	1/2	1	1½	1½
Minimum Voids in the Mineral Aggregate (%)	15	15	14	12	12	11
Marshall Stability (lbs)	2,000	2,100	2,100	2,100	2,100	2,100

\* - Nominal Aggregate Size as "one sieve size larger than the first sieve to retain more than 10 percent of the material"

The JMF shall establish the following target values for each:

1. Aggregate percentage passing each required sieve size, including fractionated RAP, if used.
2. Residual asphalt percentage contributed by RAP, if used.
3. Asphalt cement percentage to be added to the aggregate.
4. Optimum temperature at which the mixture is to be discharged from the plant.

Once approved, JMFs shall be in effect until modified in writing by the Engineer.

After the JMF is established, all mixtures furnished for the project shall conform within the following tolerance ranges:

- |  |                  |
|--|------------------|
| • Aggregate passing 3/8-inch sieve and larger        | +/- 7 percent    |
| • Aggregate passing No. 4 sieve                      | +/- 5 percent    |
| • Aggregate passing No. 8 to No. 50 sieves inclusive | +/- 4 percent    |
| • Aggregate passing No. 100 and No. 200 sieve        | +/- 2 percent    |
| • Asphalt Cement                                     | +/- 0.4 percent  |
| • Mix Temperature                                    | +/- 20 degrees F |

Should a change in materials source be made, a new JMF shall be established before the new material is used. When unsatisfactory results or other conditions make it necessary, the JMF shall be adjusted to the satisfaction of the Engineer.

## **12.04 EQUIPMENT**

### **12.04.01 ASPHALT MIXING PLANT**

Sufficient storage space shall be provided for each aggregate size. The different sizes shall be kept separated until they have been delivered to the cold elevator or belt feeding the dryer. The storage yard shall be maintained neat and orderly, and the separate stockpiles shall be readily accessible for sampling.

Plants used for the preparation of asphalt mixtures shall conform to all requirements under 12.04.01 (a). In addition, batch mixing plants shall conform to the requirements under 12.04.01 (b), and continuous mixing plants shall conform to the requirements under 12.04.01 (c).

#### **12.04.01(a) REQUIREMENTS FOR ALL PLANTS**

Mixing plants shall be of sufficient capacity and so coordinated to adequately handle the proposed asphalt construction.

##### **1. Equipment For Preparation Of Asphalt Material**

Tanks for the storage of asphalt materials shall be equipped to heat and hold the material at the required temperatures. The heating shall be accomplished by approved means so that no flame shall be in contact with the tank. The circulating system for the asphalt material shall be designed to assure proper and continuous circulation during the operating period. Provisions shall be made for measuring and sampling the contents of storage tanks.

## **2. Feeders For Dryer**

Separate feeders shall be provided for each size aggregate, and each size shall be fed onto the belt going to the dryer by mechanical feeders with separate adjustable gates. The feeders shall be capable of delivering the separate aggregates onto the belt in proper proportions and shall be provided with adjustment for total feed and proportional feed and be capable of being locked.

Adequate means shall be provided to assure a constant and uniform flow of material from each bin.

The Contractor shall not be permitted to blend or mix different aggregates or different sizes of the same aggregate with clam shells, bulldozers, high lifts or similar equipment.

The aggregate shall be fed uniformly into the dryer so that a uniform production and uniform temperature may be obtained.

## **3. Dryer**

The plant shall include a dryer or dryers which agitate the aggregate continuously during the heating and drying process. It shall be capable of heating and drying all aggregates to the temperature required and shall be capable of supplying the mixing unit continuously at its operating capacity. Dryers shall be constructed and operated so that aggregates are not contaminated with unburned fuel.

## **4. Screens**

Plant screens, capable of screening all aggregates to the specified sizes and proportions and having normal capacities in excess of full capacity of the mixer, shall be provided.

A consistent carry-over, but not to exceed 30 percent, shall be allowed on any screen. If any bin contains more than 20 percent of material which is undersized for that bin, the bin shall be drawn and correction of the cause for such condition shall be made.

## **5. Bins**

The plant shall include storage bins of sufficient capacity to supply the mixer when it is operating at full capacity. Bins shall be arranged to assure separate and adequate storage of appropriate fractions of the mineral aggregates. Each bin shall be provided with overflow pipes of such size and at such location as to prevent backing up of material into other compartments or bins. Each compartment shall be provided with an outlet gate constructed so that when closed, there shall be no leakage. The gates shall cut off quickly and completely. The bins shall be constructed to provide adequate and convenient approved facilities for obtaining representative samples of aggregate from the full flow of each compartment. When mineral filler is used, separate dry storage shall be provided, and the plant shall be equipped to feed the filler into the mixer.

#### Asphalt Control Unit

Satisfactory means, either by weighing or metering, shall be provided to obtain the proper amount of asphalt material in the mix within the tolerance specified. Means shall be provided for checking the quantity or rate of flow of asphalt material into the mixer.

#### 6. Thermometric Equipment

An armored thermometer of adequate range in temperature reading shall be fixed in the asphalt feed line at a suitable location near the charging valve at the mixer unit. The plant shall also be equipped with an approved thermometric instrument so placed at the discharge chute of the dryer, as to register automatically or indicate the temperature of the heated aggregates.

If temperatures are not regulated satisfactorily, the Engineer may require the installation of an approved temperature recording and regulating apparatus for better control of the temperature of the aggregates.

#### 7. Dust Collector

The plant shall be equipped with a dust collector constructed to waste or return uniformly to the hot elevator all or any part of the material collected, as directed.

#### 8. Safety Requirements

Adequate and safe stairways to the mixer platform and sampling points shall be provided, and guarded ladders to other plant units shall be placed at all points where accessibility to plant operations is required. Accessibility to the top of truck bodies shall be provided by a platform or other suitable device to enable the Engineer to obtain samples and mixture temperature data. A hoist or pulley system shall be provided to raise scale calibration equipment, sampling equipment and other similar equipment from the ground to the mixer platform and return. All gears, pulleys, chains, sprockets, and other dangerous

moving parts shall be thoroughly guarded and protected. Ample and unobstructed space shall be provided on the mixing platform. A clear and unobstructed passage shall be maintained at all times in and around the truck loading area. This area shall be kept free from drippings from the mixing platform.

#### **12.04.02 (b) REQUIREMENTS FOR BATCHING PLANTS**

##### **1. Plant Scales**

Dial scales shall be provided for weighing of all aggregates and mineral filler, in the suspended weigh box. Dial scales shall be of a standard make and of sufficient size that the numerals on the dial can be read at a distance of 25 feet. The dials shall be of the compounding type having a full complement of index pointers. The value of the gradation of scales used in weighing amounts of aggregates of less than 5,000 pounds shall not be greater than five pounds; amounts of aggregates from 5,000 to 10,000 pounds, not greater than 10 pounds; amounts of aggregates in excess of 10,000 pounds, not greater than 0.1 percent of the capacity of the scales. Pointers which give excessive parallax errors shall not be used. All dial scales shall be so located that they will be in plain view of the operator at all times. When asphalt material is measured by weight, the asphalt weigh bucket shall be equipped with a separate dial scale with a minimum gradation not greater than two pounds. All dial scales shall be accurate within a tolerance of 0.5 percent. Vibration shall be eliminated by setting the scales on a separate foundation, if required. Each installation of scales shall be provided with 10 standard 50-pound weights meeting the requirements of the U.S. Bureau of Standards for calibrating and testing weighing equipment. Scales shall be inspected as often as the Engineer may deem necessary to assure their continued accuracy.

The Contractor may provide an approved automatic printer system which will print the weights of the material delivered, provided the system is used in conjunction with an approved automatic batching and mixing control system. Such weights shall be evidenced by a weigh ticket for each load.

##### **2. Weigh Box Or Hopper**

The equipment shall include a means for accurately weighing each size of aggregate and mineral filler in a weigh box or hopper suspended on scales and of ample size to hold a full batch without hand raking or running over. The gate shall close tightly so that no material is allowed to leak into the mixer while a batch is being weighed.

##### **3. Asphalt Control**

The asphalt material bucket shall be a non-tilting type. The length of the discharge opening or spray bar shall be not less than three-fourths the length of the mixer. The

asphalt material bucket, its discharge valve or valves, and spray bar shall be adequately heated. Steam jackets, if used, shall be efficiently drainable and all connections shall be so constructed that they will not interfere with the efficient operation of the asphalt scales. The capacity of the asphalt material bucket shall be at least 15 percent in excess of the weight of asphalt material required in any batch. The plant shall have an adequately heated quick-acting, non-drip, charging valve located directly over the asphalt material bucket. When the asphalt material is metered, the indicator dial shall have a capacity of at least 15 percent in excess of the quantity of asphalt material used in a batch. The meter indicator dial shall have a scale with divisions measuring in gallons equivalent to a weight sensitivity of 0.04 percent of the total batch weight. The meter shall be accurate within a tolerance of 0.5 percent. The controls shall be so constructed that they may be locked at any dial setting and will automatically reset to that reading after the addition of asphalt material to each batch. The dial shall be in full view of the mixer operator. The flow of asphalt material shall be automatically controlled so that it will begin when the dry-mixing period is over. All of the asphalt material required for one batch shall be discharged in not more than 15 seconds after the flow has started. The size and spacing of the spray bar openings shall provide a uniform application of asphalt material the full length of the mixer. The section of the asphalt line between the charging valve, and the spray bar shall be provided with a valve and outlet for checking the meter when a metering device is substituted for an asphalt material bucket.

#### **4. Mixer**

The batch mixer shall be an approved twin pugmill type, steam or hot oil jacketed, and shall be capable of producing a uniform mixture within the JMF tolerances. The mixer shall be so constructed as to prevent leakage of its contents. It shall be equipped with a sufficient number of paddles or blades set in the "run around" order and operated at such speed as to produce a properly and uniformly mixed batch. The depth of the material in the pugmill shall not be above the tops of the paddles. If not enclosed, the mixer box shall be equipped with a dust hood to prevent loss of dust.

The clearance of blades from all fixed and moving parts shall not exceed one inch unless the maximum diameter of the aggregate in the mix exceeds 1¼ inches, in which case the clearance shall not exceed 1½ inches.

#### **5. Control of Mixing Time**

The mixer shall be equipped with an accurate time lock to control the operations of a complete mixing cycle. It shall lock the weigh box gate after the charging of the mixer until the closing of the mixer gate at the completion of the cycle. It shall lock the asphalt material bucket throughout the dry-mixing period and shall lock the mixer gate through the dry- and wet-mixing periods. The dry-mixing period is defined as the interval of time

between the opening of the weigh box gate and the start of introduction of asphalt material. The wet-mixing period is the interval of time between the start of introduction of asphalt material and the opening of the mixer gate. The control of the timing shall be flexible and capable of being set at intervals of five seconds or less throughout a total cycle of up to three minutes. A mechanical batch counter shall be installed as a part of the timing device and shall be so designed as to register only batches that have been mixed for the full time interval. The setting of time intervals shall be performed in the presence of and at the direction of the Engineer, who shall then lock the case covering the timing device until such time as a change is to be made in the timing periods.

#### **12.04.01 (c) REQUIREMENTS FOR CONTINUOUS MIXING PLANTS**

##### **1. Aggregate Proportioning**

The plant shall include means for accurately proportioning each size of aggregate.

The plant shall have a feeder mounted under each compartment bin. Each compartment bin shall have an accurately controlled individual gate to form an orifice for measuring volumetrically the material drawn from each compartment. Bins shall be equipped with adequate tell-tale devices to indicate the position of the aggregates in the bins at the lower quarter points.

The feeding orifice shall be rectangular with one dimension adjustable by positive mechanical means provided with a lock. Indicators shall be provided for each gate to show the respective gate opening in inches.

Mineral filler shall be fed into the mixer continuously and uniformly in the proportion set out in the JMF, and in a manner satisfactory to the Engineer.

##### **2. Weight Calibration Of Aggregate Feed**

The plant shall be equipped with an approved revolution counter in satisfactory working condition. The plant shall include a means for calibration of gate openings by weighing test samples. Provision shall be made so that materials fed out of individual orifices may be bypassed to individual test boxes. The plants shall be equipped to handle conveniently individual test samples weighing not less than 200 pounds. Accurate scales shall be provided by the Contractor to weigh such test samples.

##### **3. Synchronization Of Aggregate Feed And Asphalt Material Feed**

Satisfactory means shall be provided to afford positive interlocking control between the flow of aggregate from the bins and the flow of asphalt material from the meter or other

proportioning device. This control shall be accomplished by interlocking mechanical means or by any other positive method satisfactory to the Engineer.

#### **4. Mixer**

The plant shall include a continuous mixer of an approved twin pugmill type, adequately heated and capable of producing a uniform mixture within the JMF tolerances. The paddles shall be adjustable for angular position on the shafts and reversible to retard the flow of the mix. The mixer shall have a manufacturer's plate giving the net volumetric contents of the mixer at the several heights inscribed on a permanent gauge. Charts shall be provided showing the rate of feed of aggregate per minute for the aggregate being used. Mixing time shall be sufficient to ensure complete aggregate coating and shall be specified in the JMF.

#### **5. Surge Hopper**

The mixer shall be equipped with a discharge hopper with dump gates which will permit rapid and complete discharge of the mixture and of such size and design that no segregation of the mixture occurs.

#### **6. Platform Truck Scales**

Platform truck scales shall have a standard brand of scales and shall have a manufacturer's rated capacity equal to or greater than the maximum gross load being weighed. The scale shall be accurate within a tolerance of 0.5 percent, and the value of the minimum gradation on the scale shall not be greater than 50 pounds. When weighing a truck and trailer combination on a scale with a platform not large enough to weigh the entire hauling unit at one time, the approaches at both ends of the scale shall have a level grade at the same elevation as the scale platform for a distance of not less than 50 feet on each end of the scale. The truck and trailer shall be weighed with no brakes set on any wheel. The scale shall be set on concrete or other approved foundations. The recording mechanism of the platform scale shall be housed in a suitable shelter that shall be furnished with adequate light and heat for the convenience of the weigh man. The scale shall be provided, maintained, and repaired at the Contractor's expense.

Scale equipment shall be approved by submission and acceptance of a Certification Letter that documents the date and successful calibration for each applicable scale component to be used on this project. Equipment calibration shall be conducted annually.

### **12.05 HAULING EQUIPMENT**

Trucks used for hauling asphalt mixtures shall have tight, clean, smooth metal beds which have been thinly coated with a minimum amount of paraffin oil lime solution or other approved

material to prevent the mixture from adhering to the beds. Each truck shall have a cover of canvas or other suitable material of such size as to protect the mixture from the weather. When necessary, so that the mixture will be delivered on the road at the specified temperature, truck beds shall be insulated and covers shall be securely fastened.

#### **12.06 ASPHALT PAVERS**

Asphalt pavers shall be self-contained, power-propelled units, provided with an activated screed or strike-off assembly, equipped to be heated, and capable of spreading and finishing courses of asphalt plant mix material in land widths applicable to the specified typical section and thicknesses shown on the Plans. Materials for shoulders and similar construction shall be placed by means of approved mechanical spreading equipment.

The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The hopper shall be equipped with a distribution system to place the mixture uniformly in front of the screed.

The screed or strike-off assembly shall produce effectively a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture. The paver shall be equipped with adjustable hydraulic screed extensions.

When placing mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory placement of the mixture.

All asphalt paving machines shall be equipped with automatic grade and slope controls. Both the grade and slope controls shall be in working order at all times, except that in the event of mechanical failure of the automatic controls, the Contractor shall be permitted to finish the day's work using manual controls but will not be allowed to resume work the following day until both the grade and slope controls are in first class working order.

#### **12.07 ROLLERS**

Rollers shall be of self-propelled steel-wheel and pneumatic-tire types and shall be in good condition, capable of reversing without backlash, and shall be operated at speeds slow enough to avoid displacement of the asphalt mixture. The rollers shall be of the number and weights required to compact the mixture to the specified density while it is still in a compactable condition. The use of equipment which results in excessive crushing of the aggregate will not be permitted.

#### **12.08 SMALL TOOLS**

The Contractor shall provide all necessary small tools and suitable means for keeping them clean and free from accumulations of asphalt materials.

## **12.09 CONSTRUCTION REQUIREMENTS**

### **12.09.01 WEATHER LIMITATIONS**

The subgrade and the surface upon which the asphalt plant mix is placed shall be free of excessive moisture and/or frost.

### **12.09.02 TEMPERATURE LIMITATIONS**

Asphalt mixtures shall be placed only between March 1<sup>st</sup> and December 1<sup>st</sup>, unless otherwise permitted by the Engineer in writing.

The asphalt plant mix shall be placed in accordance with temperature limitations as set forth by the Engineer in writing.

Cool/cold weather paving may be authorized provided the Contractor can show that an adjustment to paving operation timing can be made to facilitate the required compaction. Computer modeling tools such as the following should be used to show the compaction time adjustment due to low air and substrate temperatures:

#### **MultiCool**

([http://www.hotmix.org/index.php?option=com\\_content&task=view&id=178&Itemid=273](http://www.hotmix.org/index.php?option=com_content&task=view&id=178&Itemid=273))

#### **PaveCool**

(<http://www.dot.state.mn.us/app/pavecool/index.htm>)

## **12.10 CONDITIONING OF EXISTING SURFACE**

Conditioning of an existing surface shall consist of minor grading, clipping edges of roadways, and other minor incidental construction, not itemized in these Specifications, and not involving hauling of excavated materials for the purpose of bringing the roadway to a uniform width and cross-section and blending the new pavement to the existing surface as directed by the Engineer.

## **12.11 PREPARATION OF ASPHALT CEMENT**

The asphalt cement for asphalt mixes shall be heated to a temperature between 275° F and 325° F, in a manner that will avoid local overheating and provide a continuous supply of the asphalt material to the mixer at a uniform temperature at all times.

## **12.12 PREPARATION OF AGGREGATES**

The aggregates for asphalt mixes shall be dried and heated to a uniform temperature between 225° F and 325° F. Flames used for drying and heating shall be properly adjusted to avoid damage to the aggregate and to avoid soot on the aggregate.

Immediately after heating and drying, the aggregates shall be screened into two or more fractions as specified and conveyed into separate compartments ready for batching and mixing with asphalt material.

### **12.13 MIXING**

The dried aggregates shall be combined within the mixer in the amount of each fraction of aggregates required to meet the JMF. The asphalt cement shall be measured or gauged and introduced into the mixer in the amount specified by the JMF.

After the required amounts of aggregate and asphalt cement have been introduced into the mixer, the materials shall be mixed until a complete and uniform coating of the particles, and a thorough distribution of the asphalt cement throughout the aggregate is achieved. Wet-mixing time shall be included in the JMF and approved by the Engineer for each plant and for each JMF, but in no case shall the wet-mixing time be less than 25-seconds for batch mix plants and 40-seconds for continuous mix plants.

WMA may be produced by one or a combination of several technologies involving HMA plant foaming processes and equipment, mineral additives, or chemicals that allow the reduction of mix production temperatures to within 185°F to 275°F. (Note: The upper temperature range is appropriate for modified asphalt cements and WMA mixtures that include higher percentages of recycled asphalt pavement).

For HMA, the temperature of the completed mixture shall be not less than 275° F, except that the temperature of mixtures made with aggregates containing absorbed moisture that causes foaming or boiling in the completed mixtures at these higher temperatures shall be not less than 225° F.

The aggregate shall be introduced into the mixer within the temperature range specific to the asphalt mix process.

### **12.14 SPREADING AND FINISHING**

Unless otherwise specified or permitted, asphalt mixtures shall be delivered and spread on the roadway in ample time to secure thorough compaction during daylight hours. Its temperature at the time of depositing in the paver hopper shall be not more than 25° F less than the temperature at which it is discharged from the mixer. The mixture shall be laid upon an approved surface, spread and struck off to the established line, grade, and elevation by means of approved asphalt paving machines in echelon or by one paver equipped with an approved type joint heater. Echelon paving shall not be permitted on two-lane projects where traffic is being maintained. Alignment of the outside edges of the pavement shall be controlled by present control string lines. Where multi-course pavements are placed, the longitudinal joint in one layer shall offset that in the preceding layer by approximately one foot; however, the joint in the top layer shall be at the center line of the pavement if the roadway is more than two lanes in width.

Grade reference systems for automatic screed controls may be either the string line or ski type on all work. Pavement lanes previously placed with automatic controls or to form grade may serve as longitudinal control reference for laying adjacent lanes by utilizing a ski or joint matching shoe.

The Contractor shall furnish all materials, equipment, labor, and incidentals required to construct the pavement to the lines and grades as described in these contract documents and shall maintain same until its use is no longer required.

Automatic screed controls shall not be required on sections of projects where service connections and other conditions interfere with their efficient operation.

The cost of erecting and maintaining a string line reference system shall be included in the unit price bid for other Items of Construction. The Contractor shall be required to utilize a string line reference system only as directed on Plans or ordered in writing by the Engineer.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be taken from the hopper of the spreading machine or dumped on approved steel dump sheets outside of the area on which it is to be spread and shall be distributed immediately into place by means of suitable shovels and other tools and spread with rakes and lutes in a uniformly loose layer as such depth as will result in a completed course having the weight per square yard required.

Driveways, parking areas, and other such facilities shall be blended to the new surface within the right-of-way as directed by the Engineer. The price per ton for asphalt plant mix shall include this work. No extra payment shall be made for blending said facilities to the new surface.

#### **12.15            **COMPACTION****

After the asphalt mixture has been spread, struck off and surface irregularities adjusted, it shall be thoroughly and uniformly compacted by rolling.

The surface shall be rolled immediately when the mixture is in the proper condition and when the rolling does not cause undue displacement, cracking or shoving.

Unless otherwise directed, rolling shall begin at the sides and proceed longitudinally parallel to the road center-line, each trip overlapping one-half the roller width, gradually progressing to the crown of the road. When paving in echelon or abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. On super-elevated curves or tilted pavements, the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the center-line.

Alternate trips of the roller shall be terminated in stops approximately 2-feet distant from any preceding stop. When paving in echelon, rollers shall not compact within 6-inches of an edge where an adjacent lane is to be placed.

Rollers shall move at a slow, but uniform speed with the drive wheels nearest the paver and shall be kept as nearly as practicable in continuous operation. Rolling shall continue until all roller marks are eliminated and until each of the placements have been compacted to a **minimum 91-percent of maximum theoretical density (MTD)**.

When surface courses are placed at a rate of  $\leq 60$  pounds per square yard, **the density requirements shall be waived**.

Any displacement occurring as the result of the reversing of the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture when required. Care shall be exercised in rolling so as not to displace the line and grade of the edges of the asphalt mixture.

To prevent adhesion of the mixture to the rollers, the wheels shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excessive liquid shall not be permitted.

Along forms, curbs, headers, walls and other places not accessible to the rollers, the mixture shall be compacted thoroughly with hot hand tampers, smoothing irons or with mechanical tampers. On depressed areas, a trench roller may be used or cleated compression strips may be used under the roller to transmit compression to the depressed areas.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture, which shall be compacted to conform to the surrounding area. Any area showing an excess or deficiency of asphalt material shall be removed and replaced.

#### **12.16 JOINTS**

Placing of asphalt pavement shall be as continuous as possible. Rollers shall not pass over the unprotected end of a freshly laid mixture unless authorized by the Engineer. Transverse joints shall be formed by cutting back a vertical face on the previous run to expose the full depth of the course. When directed by the Engineer, a tack coat shall be used on contact surfaces of transverse joints just before additional mixture is placed against the previously rolled material.

#### **12.17 PAVEMENT SAMPLES**

When directed, the Contractor shall cut samples from the compacted pavement for testing by the Engineer. Samples of the mixture shall be taken for the full depth of the course locations

selected by the Engineer. The samples shall be cut with a power saw or core drill and shall have a top surface area of at least ten square inches.

Holes formed by taking samples shall be filled with a functionally equivalent or superior material to the asphalt mixture that was used to construct the sampled course, and compacted/cured to conform to the surrounding pavement. Cutting samples and repairing sample holes shall be at the Contractor's expense. Materials used to repair sample holes shall be measured for payment in accordance with the provisions of the Tennessee Department of Transportation Standard Specifications, Item 407.19.

## **12.18 SURFACE REQUIREMENTS**

The surface shall be tested with a 12-foot straight edge applied parallel to the center-line of the pavement. The deviation of the surface from the testing edge of the straight edge shall not exceed that specified for the respective types of asphalt construction under the applicable Subsection of these Specifications.

The transverse slope of tilted pavements shall be tested with a string line and string level applied at right angles to the center-line of the pavement, and the percent of slope, when computed for the full width of the pavement, shall not deviate more than five-tenths of one percentage point from that specified on the plans.

The crown in crowned pavements shall be tested with a string line applied at right angles to the center-line of the pavement, and the crown shall not deviate more than one-half inch from that specified on the Plans. Deviations greater than the specified tolerances shall be corrected by methods best suited for the purpose. Pavement that cannot be corrected to comply with the specified tolerances shall be removed and replaced at the Contractor's expense.

## **12.19 COMPENSATION**

### **12.19.01 METHOD OF MEASUREMENT (IF APPLICABLE)**

Asphalt concrete plant mixes shall be measured by the unit(s) specified in the bid schedule and shall be weighed on batch plant scales meeting the requirements of Item 12.04 (b) (1). The transporting vehicles shall be numbered, and a record shall be maintained showing the mixture accepted and used each day. This record shall also show: rejected mixture; mixture used otherwise than indicated or directed; mixture used to replace defective or condemned construction; and mixture wasted after having been weighed.

No allowance will be made for unaccepted material, for material furnished or used in excess of the amount indicated or directed, for materials used in replacing defective or condemned construction, or for materials wasted in handling, hauling, or otherwise.

No allowance will be made for the partial or total removal and replacement of shoulder material as may be deemed necessary during construction to facilitate temporary drainage, etc.

**12.19.02 BASIS OF PAYMENT (IF APPLICABLE)**

Asphalt concrete plant mixes shall be paid for at the contract unit price specified in the bid schedule for the respective Items, complete-in-place, which price shall be full compensation for the construction of asphalt-concrete plant mixes including all aggregates, asphaltic cements, mineral fillers, chemical additives as directed, in accordance with the conditions, stipulations, provisions, and requirements contained herein; for completing all incidentals thereto; and for furnishing all materials, equipment, tools, labor and incidentals required to complete the item.

## ITEM 14

### MINERAL AGGREGATE BASE

#### 14.01 SCOPE OF WORK

This work shall consist of furnishing and placing one or more courses of aggregate, plus additives if required, on a prepared subgrade in accordance with these specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross-sections shown on the Plans or established by the Engineer.

Mineral aggregate base shall be Type A or Type B, whichever is shown on the Plans and called for in the Bid Schedule.

#### 14.02 MATERIALS

##### A. Aggregate

The mineral aggregate shall meet the requirements of Item 73.05 for Class A or Class B aggregate, depending upon whether Type A or Type B base is required in the construction. Type A Base will require the use of Class A aggregate, Grading D. Either Class A or Class B aggregate may be used for Type B Base.

When the stationary plant method for mixing is used, the aggregate will be accepted immediately following mixing or immediately prior to mixing, based on periodic samples taken from the pugmill output, or from the belt feeding the pugmill.

When two or more materials are blended on the road by means of mechanical mixers, the aggregate will be accepted after mixing and before compaction, based on samples taken from each layer of base material. Aggregate that does not require blending will be accepted at the aggregate production plant, based on samples taken from stockpiles or plant production immediately prior to delivery to the road.

##### B. Calcium Chloride

Calcium chloride shall meet the requirements of Item 74.02 for Type 1 or Type 2, except that the requirements for "total alkali chlorides" and "impurities" shall not apply.

##### C. Sodium Chloride

Sodium chloride shall meet the requirements of Item 74.03.

#### 14.03 EQUIPMENT

All equipment necessary for satisfactory performance of this construction shall be on the project and approved before work will be permitted to begin. Such equipment shall include a stationary mixing plant or mechanical road mixers, whichever is applicable to the type of work to be performed, as specified under Item 14.04(b).

**A. Stationary Mixing Plant**

The mixing unit shall be an approved twin-shaft pug-mill capable of producing a constant, uniform mixture. The mixer shall be equipped with a suitable truck-loading hopper with gate which will prevent segregation of the material when dumped into the truck. A spray bar capable of assuring an even wetting of the aggregate shall be mounted at the entrance of or above the pug-mill. The flow of water through the spray bar shall be controlled by a meter, valve or other approved type of regulating device to maintain uniform moisture content in the mixture. The mixing plant shall be equipped with adjustable feeders for each size material capable of regulating a constant, uniform flow of material.

**B. Mechanical Mixer (for Road Mixing)**

The mechanical mixer shall be of the pugmill or rotary type capable of producing a uniform blend of all materials to the full depth of the course being placed. The mixer shall be either a self-propelled or trailer type.

**14.04 CONSTRUCTION REQUIREMENTS**

**A. General**

1. Mineral aggregate base, Type A or Type B, shall be constructed in layers, the compacted thickness of which shall 8 inches.

2. The subgrade shall be checked and approved by the Engineer not more than five hundred feet (500') in advance of spreading any mineral aggregate. This distance may be shortened by the Engineer to as little as two hundred feet (200') between November first and April first or during periods of prolonged wet weather.

3. Mineral aggregate shall not be spread on a subgrade that is frozen or contains frost.

4. Hauling over material already placed will not be permitted until it has been spread, mixed, shaped and compacted.

**B. Mixing**

1. Unless otherwise specified, Contractor shall mix the base course material, including an additive if required, on the Plans, by one of the following methods:

a. For mineral aggregate base, Type A, the stationary plant method will be required.

b. For mineral aggregate base, Type B, requiring the blending of two or more materials, either the stationary plant method or the road mix method (mechanical mixer) shall be used.

c. For mineral aggregate base, Type B, requiring additive, stationary plant mixing or mechanical road mixing shall be used.

d. For mineral aggregate base, Type B, requiring neither blending of materials nor additives, either stationary plant mixing, mechanical road mixing or mixing by motor grader on the road may be used.

2. Detailed requirements for the three types of mixing operation are as follows:

a. Stationary Plant Method

The base course material and water shall be mixed in an approved stationary mixing plant as described in Item 14.03(a). Water shall be added during the mixing operation in the amount necessary to provide a moisture content satisfactory for compacting. If combining materials is required to meet the grading requirements, the blending shall be performed as provided for in Item 73.05, prior to mixing.

b. Road Mix Method (Mechanical Mixer)

After the material for each layer of base course has been placed through an aggregate spreader or windrow-sizing device, the material shall be mixed by means of approved mechanical mixing machines as described in Item 14.03(b).

c. Road Mix Method (Motor Grader)

After material for each layer of base course has been deposited and spread uniformly, it shall be sprinkled with water in sufficient quantity to moisten all particles, but not in such quantity that segregation of sizes or softening of subgrade will occur. Immediately following the application of water, the material shall be thoroughly mixed by windrowing and spreading with motor graders until the mixture is uniform throughout.

**C. Spreading**

1. Stationary Plant Mixing

After mixing, material for each layer of base shall be transported to the job site while it contains the proper moisture content, and shall be spread to the required thickness and cross- section by means of an approved mechanical spreader.

## 2. Road Mixing (Mechanical Mixer)

Material to be mixed by mixing method b shall be spread prior to mixing with an approved mechanical spreader. If the blending of two or more materials is to be performed on the road, each material shall be spread separately with an approved mechanical spreader capable of being adjusted to spread the materials in the proper proportions.

## 3. Road Mixing (Motor Grader)

a. After the aggregate and water have been thoroughly mixed, the base material shall be spread while at optimum moisture content in layers of specified thickness and cross-section by means of approved motor graders.

b. If the required compacted depth of base course exceeds six inches (6"), the base shall be constructed in two or more layers of approximate equal thickness. The maximum compacted thickness of any one layer shall not exceed six inches except when vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer of base course may be increased to eight inches upon approval of the Engineer.

c. In some cases, the plans show the base as extending for the full width of the roadbed. In other cases, the edges of the base are shown as coinciding with the inside edges of the shoulders. In the latter case, shoulder material shall be placed to a minimum width of three feet (3') prior to the spreading of each layer of base material in order to confine the base material and to permit proper compaction.

d. Any base material used for constructing detours, for maintenance of traffic, for backfilling rock cuts and capping rock fills may be spread and mixed using this method.

## D. Shaping and Compaction

1. Except where mechanical aggregate spreading equipment is used to place the base material, final shaping of each layer prior to compaction shall be accomplished by motor grader. In the event that mechanical spreading equipment fails to shape the base material properly, final shaping shall be done by motor grader or other approved means.

2. Immediately following spreading and final shaping, each successive layer shall be compacted with pneumatic-tire rollers described under Subsection 205.02 of Tennessee Department of Transportation Standard Specifications and any other types of compacting equipment, provided the required density and the required degree of uniformity and smoothness are attained. If the density requirement does not apply as

provided for below, the base may be compacted with pneumatic-tire rollers meeting the requirements of Subsection 205.03 of Tennessee Department of Transportation Standard Specifications as directed by the Engineer. Compaction shall progress gradually from the edges of the base to the center, parallel with the center-line of the road, and shall continue until the base layer has been compacted to its full width. Where lifts of shoulder materials are placed to confine the base material, the initial pass of the compacting equipment shall overlap the shoulder to a width of not less than twelve inches (12").

3. Compaction of each layer shall continue until a density of not less than eighty-three percent (83%) of the solid volume has been achieved. The density determination will be based on the bulk specific gravity, AASHTO Designation T 84, "Standard Method of Test for Specific Gravity and Absorption of Fine Aggregate," and T 85, "Standard Method of Test for Specific Gravity and Absorption of Coarse Aggregate," and the dry weight of the aggregate. Unless otherwise specified, density requirements will not apply to base construction on projects that do not include the construction of a surface upon the base. The compaction of each layer shall be approved before material for the next successive layer is placed. Placing and compacting areas shall be kept separate.

4. The surface of each layer shall be so constructed that the aggregates become firmly keyed and a uniform texture produced and shall be maintained in that condition until covered by the following stage of construction or until final acceptance of the project. Any irregularities that develop shall be corrected by loosening the material at those places and adding or removing material as required.

5. Approved distributors shall be used to apply water uniformly over the base materials during compaction in sufficient quantity for proper compaction. Softening of the underlying subgrade resulting from the use of excess water is especially to be avoided.

#### **E. Testing**

The vendor shall employ an approved geotechnical engineer for the testing of each compacted lift of mineral aggregate base. 1 test shall be conducted each lift for every 150 linear feet of roadway.

#### **F. Flowable Fill Material**

For individual roadway repairs or patches consisting of 25 linear feet or less of roadway, flowable fill shall be used in lieu of mineral aggregate base. The flowable fill shall be a minimum of 4 feet in thickness. If 4 feet thickness is unattainable due to the depth of the sewer repair beneath the road, the flowable fill shall extend from the lowest layer of bituminous material to 1 foot above the top of the pipe.

#### **G. Maintenance**

After construction of the base has been completed satisfactorily, it shall be maintained, under traffic if required, smooth and uniform until covered by the following stage of construction or until the project has been completed and accepted.

#### **H. Thickness Requirements**

The thickness of the completed base shall be in reasonably close conformity to the thickness shown on the Plans. The thickness shall be measured at such frequency as established by the Engineer by means of test holes or other approved methods.

#### **I. Surface Requirements**

The surface of the finished base shall be in reasonably close conformity to the lines, grades and cross-sections shown on the Plans or established by the Engineer and shall have a satisfactorily smooth riding quality.

### **14.05 COMPENSATION (IF APPLICABLE)**

#### **A. Method of Measurement**

Mineral aggregate base, unless otherwise stipulated, shall refer to Type A, Grading D mineral aggregate meeting the requirements of Item 73.05. Mineral aggregate base shall be measured by the unit(s) specified in the bid schedule.

#### **B. Basis of Payment**

The accepted quantities of mineral aggregate base of the type specified will be paid for at the contract unit price specified in the bid schedule.

**ITEM 21**  
**PRIME COAT**

**21.01 SCOPE OF WORK**

This work shall consist of an application of bituminous material, and cover material if required, on a designated base, in accordance with the requirements of these Specifications and in reasonably close conformity with the lines shown on the Plans or established by the Engineer.

**21.02 MATERIALS**

Materials shall meet the requirements of the following items of these Specifications:

- ITEM 67.02 CUT-BACK ASPHALT, GRADE RC-70 OR RC 250
- ITEM 67.03 EMULSIFIED ASPHALT, GRADE AE-P
- ITEM 67.05 TAR, GRADE RT-2 OR RT-3
- ITEM 73.12 AGGREGATE FOR COVER MATERIAL, SIZE 78 OR 8

When the particular type and grade of bituminous material to be used is not shown on the Plans or otherwise designated, the Contractor shall select the type and the Engineer will designate the grade. Bituminous material may be conditionally accepted at the source. The ranges of application temperatures in degrees Fahrenheit shall be as follows:

RT-2 and RT-3 (60 -130 )	RC 70 (80 -150 )
RC 250 (100 -175 )	AE-P (60 -140 )

**21.03 EQUIPMENT**

All equipment necessary for the satisfactory performance of this construction shall be on hand and approved before Contractor will be permitted to begin work. The equipment shall include a power broom or other mechanical sweeping equipment, bituminous heating equipment, a pressure distributor, a water sprinkler and such other equipment and small tools as may be required to perform the work in a satisfactory manner.

**21.04 LIMITATIONS**

Bituminous material shall be applied only between March first and December first, and only when the air temperature in the shade, away from artificial heat, is above 60 degrees Fahrenheit. Bituminous material may be applied to a surface that is slightly damp, but never to a wet surface.

**21.05 PREPARATION OF SURFACE**

The surface to be primed shall be prepared in accordance with the provisions of Item 14. When delays in the priming operation occur, the prepared surface shall be satisfactorily maintained or reworked to meet the requirements of Item 14 before the priming operation is resumed.

#### **21.06 APPLICATION OF PRIME**

All areas to be treated shall be approved by the Engineer before application of the treatment. Bituminous material shall be applied to the width of the section to be primed by means of a pressure distributor at a uniform, continuous spread. The rate of application shall be 0.5 gallons per square yard. Application temperatures shall be within the ranges specified under Item 21.02. Any areas containing an excess or deficiency of priming material shall be corrected by the addition of blotter material or bituminous material, as directed by the Engineer.

The Contractor shall protect all structures and concrete surfaces from the bituminous material during the construction.

#### **21.07 APPLICATION OF COVER MATERIAL**

All areas to be treated shall be approved by the Engineer before application of the treatment. Bituminous material shall be applied to the width of the section to be primed by means of a pressure distributor at a uniform, continuous spread. The Engineer will designate the rate of application within the extreme limits indicated on the Plans. Application temperatures shall be within the ranges specified under Item 21.02. Any areas containing an excess or deficiency of priming material shall be corrected by the addition of blotter material or bituminous material, as directed by the Engineer.

The Contractor shall protect all structures and concrete surfaces from the bituminous material during the construction.

#### **21.08 APPLICATION OF COVER MATERIAL**

If, after the bituminous material has been applied, it fails to penetrate before the time that the roadway must be used by traffic, dry cover material shall be spread at a rate established by the Engineer, between eight (8) and twelve (12) pounds per square yard, to prevent damage to the primed surface. An excess of cover material shall be avoided.

#### **21.09 MAINTENANCE AND PROTECTION**

(a) The Contractor shall maintain the prime coat and the surface intact until it has been covered by the wearing surface or until the project is completed. No succeeding stage of construction shall be placed upon the prime coat until it is properly cured.

(b) The Contractor shall clean out any spots where the prime coat may have failed due to disintegration of the underlying surface material or for any other reasons.

The exposed areas so produced shall be lightly dampened, refilling with approved material and thoroughly compacted to conform with the surrounding surface, after which bituminous prime shall be applied thereto with a hand spray. If satisfactory repairs cannot be accomplished by the above method, the Contractor shall fill the depressions with approved mixtures of bituminous material and fine aggregate, and compact them to conform to the surrounding surface.

(c) Any mineral aggregate and bituminous material used for repairs will be paid for at their contract unit prices, providing the cause of repair is beyond the Contractor's control.

#### **21.10 METHOD OF MEASUREMENT (IF APPLICABLE)**

Bituminous prime coat will be measured by the number of gallons (or the unit(s) specified in the bid schedule) of material used in the accepted work, as determined by the Engineer, at the temperature of application.

#### **21.11 BASIS OF PAYMENT (IF APPLICABLE)**

This item will be paid for at the contract unit price per gallon (or the unit(s) specified in the bid schedule) for prime coat complete-in-place, which price shall be full compensation for all bituminous prime coat as indicated or directed and in accordance with the conditions, stipulations, provisions and requirements contained herein; for completing all incidentals thereto; and for furnishing all materials, equipment, tools, labor and incidentals required to complete the item.

**ITEM 22**  
**TACK COAT**

**22.01 SCOPE OF WORK**

This work shall consist of furnishing and applying bituminous material to a previously prepared base or surface, to provide bond for a superimposed course, in accordance with the requirements of these Specifications.

**22.02 MATERIALS**

- (a) Bituminous materials shall conform to the requirements of the following Items of these Specifications:

Materials

AC-20 Asphalt

When the particular type and grade of bituminous material to be used is not shown on the Plans or otherwise designated, the Contractor shall select the type and the Engineer will designate the grade. Bituminous material may be conditionally accepted at the source.

- (b) The ranges of application temperatures in degrees Fahrenheit shall be as follows:

AC-20 325° to 400°

**22.03 EQUIPMENT**

All equipment necessary for the satisfactory performance of this construction shall be on hand and approved before work will be permitted. The required equipment shall include a power broom, equipment for heating bituminous material, a pressure distributor meeting the requirements of Item 21.03, and such other equipment and small tools as may be required to perform the work in a satisfactory manner.

**22.04 PREPARATION OF SURFACE**

The designated surface shall be prepared in accordance with the applicable provisions of Item 12. The surface shall be dry at the time the tack coat is applied.

**22.05 APPLICATION OF BITUMINOUS MATERIAL**

- (a) Immediately after cleaning the surface, bituminous material shall be applied with the pressure distributor at a rate directed by the Engineer, but not to exceed 0.10

gallons per square yard. If the bituminous material is to be placed on a milled surface, the rate of application shall be 0.12 gallons per square yard.

- (b) The surfaces of trees and structures adjacent to the areas being treated shall be protected in such a manner as to prevent their being spattered or marred.
- (c) The tacked surfaces shall be allowed to dry until it is in a proper condition to receive the surface course. Tack coat shall be applied only so far in advance of surface course placement as is necessary to obtain this proper condition of tackiness. The Contractor shall protect the tack coat from damage until the surface course is placed.

#### **22.06 METHOD OF MEASUREMENT (IF APPLICABLE)**

- (a) Bituminous tack coat will be measured by the number of gallons of material used in the accepted work, as determined by the Engineer, at the temperature of application.

#### **22.07 BASIS OF PAYMENT (IF APPLICABLE)**

This item will be paid for at the contract unit price per gallon in the bid schedule for "Tack Coat" complete-in-place, which price shall be full compensation for all bituminous tack coat as indicated or directed and in accordance with the conditions, stipulations, provisions, and requirements contained herein for completing all incidentals thereto and for furnishing all materials, equipment, tools, labor and incidentals required to complete this Item.

## ITEM 26

### BITUMINOUS PLANT MIX BINDER (HOT MIX)

#### 26.01 SCOPE OF WORK

This work shall consist of a foundation composed of a hot mixture of aggregate and asphalt prepared in a hot bituminous mixing plant. It shall be constructed in one or more layers, on a prepared subgrade, granular subbase, or base, in accordance with these Specifications and in reasonably close conformity with the lines, grades, thicknesses and typical cross-sections shown on the Plans or as directed by the Engineer. Each course shall have a thickness after compaction of not more than four inches. This construction shall include a leveling course if specified on the Plans.

The provisions of Item 12 of these Specifications shall apply to this construction unless otherwise stipulated.

#### 26.02 MATERIALS

A. The materials used in this construction shall conform to the requirements of the following Items.

ITEM 67.01 ASPHALT CEMENT  
PENETRATION GRADE 60-70, OR 85-100 OR AC20

ITEM 73.06 AGGREGATE FOR MIXTURE  
GRADING A, B, C1 OR C2

ITEM 73.16 INSULATION COURSE MATERIAL

B. The specific grade of asphalt cement to be used will be decided by the Engineer. The specific grading of aggregate to be used will be specified in the Contract or shown on the Plans. Mineral aggregate, bituminous material and plant mix will be accepted as provided for in Item 12.02.

#### 26.03 COMPOSITION OF MIXTURES

A. The specified mineral aggregate and asphalt cement shall be combined in such proportions as to produce mixtures within the following master composition limits:

**Proportion of Total  
Mixture by Weight**

Pay Item Number	Description	Aggregate Gradation	Combined Mineral Aggregate	Asphalt Cement
26A	Binder Type "A"	A	94%-97.5%	2.5%-6%
26B	Binder Type "B"	B	94%-97.5%	2.5%-6%
26C1	Binder Type "C1"	C1	94%-97.5%	2.5%-6%
26C2	Binder Type "C2"	C2	94%-97.5%	2.5%-6%

- B. The bituminous base and/or leveling course shall be composed of aggregate and bituminous materials. The hot plant mixes shall comply with the applicable requirements of Item 12.03.

**26.04 EQUIPMENT**

All equipment necessary for the satisfactory performance of this construction shall be on the project, and approved before work will be permitted to begin. The equipment shall meet the requirements of Item 12.04 through 12.17 of these Specifications.

**26.05 GENERAL CONSTRUCTION REQUIREMENTS**

The construction requirements shall be as prescribed in Item 12.11 through Item 12.17, Item 21.09, Item 26.06 and Item 26.07 of these Specifications.

**26.06 PREPARATION OF SUBGRADE, SUBBASE, OR SURFACE**

- A. The Plans will indicate whether the plant-mixed base is to be constructed on a treated or untreated subgrade or subbase, on a granular base, or insulation course, or on an existing surface. Conditioning of existing surface, when called for on the Plans, shall be in accordance with the provisions of Item 12.10. Prime coat or tack coat, when specified on the Plans, shall be constructed in accordance with the provisions of Item 21 or Item 22, respectively.
- B. Bituminous plant-mix base mixture shall be placed only upon a surface that is dry, and cleaned of loose particles and other undesirable materials.

**26.07 THICKNESS AND SURFACE REQUIREMENTS**

- A. Thickness shall be controlled during the spreading operation by frequent measurements taken on the freshly spread mixture to establish the relationship

between the uncompacted mixture and the completed course. Thickness or pounds per square yard shall be within reasonably close conformity with that specified on the Plans.

- B. The surface of the bases shall meet the requirements specified under Item 12.18 and then tested in accordance with the provisions of that Item. The deviation of the surfaces from the testing edge of the straight-edge shall not exceed the amounts shown below for the several types of mixtures:

Grading A Mixture	1/2 Inch
Grading B Mixture	3/8 Inch
Grading C Mixture	3/8 Inch

#### **26.08 METHOD OF MEASUREMENT (IF APPLICABLE)**

- A. "Bituminous Plant Mix Binder" will be measured by the unit(s) specified in the bid schedule, accepted and placed as indicated on the Plans and/or Specifications or as directed by the Engineer.
- B. No allowance will be made for unacceptable materials; for material furnished or used in excess of the amount indicated on the Plans and/or Specifications or as directed by the Engineer; no allowance will be made for material used in replacing defective or condemned construction; and no allowance will be made for material wasted in handling, hauling, or otherwise.

#### **26.09 BASIS OF PAYMENT (IF APPLICABLE)**

"Bituminous plant mix binder" shall be paid for at the contract unit price specified in the bid schedule for Binder Type "A", Binder Type "B", Binder Type "C1" or Binder Type "C2", complete-in-place, which price shall be full compensation for the construction of a bituminous plant mix binder, as indicated or directed, and indicated on the Plans and/or Specifications or as directed by the Engineer, and in accordance with the conditions, stipulations, provisions, and requirements contained herein; for completing all incidentals thereto; and for furnishing all materials, equipment, tools, labor, and incidentals required to complete this Item.

## ITEM 27

### ASPHALTIC CONCRETE SURFACE (HOT MIX)

#### 27.01 SCOPE OF WORK

- A. This work shall consist of an asphaltic concrete pavement composed of a mixture of coarse aggregate, fine aggregate, mineral filler if specified or required, and asphalt cement, constructed on a prepared roadbed in accordance with these Specifications and in reasonably close conformity with the lines, grades, typical cross-section and rate of application shown on the Plans, or established by the Engineer.
- B. The provisions of Item 12 of these Specifications shall apply to his construction unless otherwise stipulated.

#### 27.02 MATERIALS

- A. Materials used in this construction shall meet the requirements of the following items of these Specifications:
  - ITEM 14.09(b)      CHEMICAL ADDITIVE
  - ITEM 67.01        ASPHALT CEMENT, VISCOSITY GRADE AC-20  
                         PENETRATION GRADE 60-70 OR 85-100
  - ITEM 73.11        MINERAL AGGREGATE
  - ITEM 73.17        MINERAL FILLER
- B. Asphalt cement used with aggregate Gradings D and F in the preparation of asphaltic concrete surface mixtures shall be treated with an anti-stripping additive as specified in Item 74.09.

#### 27.03 COMPOSITION OF MIXTURES

- A. Composition of mixtures in this construction shall meet all applicable requirements of Item 12.03.
- B. The specified mineral aggregate and asphalt cement shall be in such proportions as to produce mixtures within the following master composition ranges:

Pay Item Number	Description	Proportion of Total Mixture by Weight		
		Aggregate Gradation	Combined Mineral Aggregate	Asphalt Cement
27D	Surface Course "D"	D	92.0%-95.0%	5.0%- 8.0%
27E	Surface Course "E"	E	92.0%-95.0%	5.0%- 8.0%
27F	Surface Course "F"	F	90.0%-93.0%	7.0%-10.0%

#### **27.04 EQUIPMENT**

The equipment used in this construction shall meet the requirements of Items 12.04 through 12.08. All equipment necessary for the satisfactory performance of this construction shall be on the project, and approved, before work will be permitted to begin.

#### **27.05 CONSTRUCTION REQUIREMENTS**

The construction requirements for this work shall be as prescribed in Item 12.09, Item 12.11, Item 12.12, Items 12.14 through 12.17, and Items 27.06 through 27.08.

#### **27.06 PREPARING THE DESIGNATED SURFACE**

Preparation of the designated surface upon which the material is to be placed shall be performed in accordance with the applicable provisions of these Specifications.

#### **27.07 MIXING**

Requirements for mixing shall be as prescribed in Item 12.13. In addition, the mixing cycle for surface course mixtures shall include a dry-mixing period of at least five seconds.

#### **27.08 SURFACE REQUIREMENTS**

The surface shall meet the requirements specified under Item 12.18, and when tested in accordance with the provisions of that Item, the deviation of the surface from the testing edge of the straightedge shall not exceed one-fourth inch (1/4").

#### **27.09 COMPENSATION (IF APPLICABLE)**

- A. "Asphaltic Concrete Surface (Hot Mix)" will be measured by the unit(s) specified in the bid schedule, accepted and placed as indicated on the Plans and/or Specifications, or as directed by the Engineer.
- B. No allowance will be made for: unacceptable materials; for materials furnished or used in excess of the amount indicated on the Plans and/or the Specifications, or as directed by the Engineer; for material used in replacing defective or condemned construction; or for material wasted in handling, hauling, or otherwise.

**BASIS OF PAYMENT (IF APPLICABLE)**

"Asphaltic Concrete Surface (Hot Mix)" shall be paid for at the contract price specified in the bid schedule for Item 27D, Item 27E, or Item 27F, complete-in-place, which price shall be full compensation for the construction of an asphaltic concrete surface as indicated on the Plans or on the Specifications or as directed by the Engineer and in accordance with the conditions, stipulations, provisions, and requirements contained herein; for completing all incidentals thereto; and for furnishing all materials, equipment, tools, labor, and incidentals required to complete this Item.

## ITEM 33

### ADJUSTING MANHOLE FRAMES AND COVERS INLETS, AND CATCH BASINS

#### 33.01 SCOPE OF WORK

This item shall consist of reconstructing and/or adjusting manholes, inlets, or catch basins and furnishing all materials and labor necessary to bring them to the locations and grades as shown on the Plans or as designated by the Engineer. The Contractor shall be responsible for raising to grade all city manholes, whether or not visible to the naked eye. Sewer Plans showing locations of manholes shall be made available to the Contractor as construction progresses for the purpose of locating manholes which are not visible at street level.

#### 33.02 RESETTING

All manholes, covers, inlets, and catch basins shall be reset in accordance with these Specifications when the existing manholes, inlets, or catch basins are more than one-quarter inch (1/4") over or under the grade shown on the Plans for the finished pavement or construction. They shall be accurately set to line and grade by removing the frame and cover, and raising or lowering the masonry top of the structure and resetting on a cushion of cement mortar; or, in the case of manholes, American Highway Prod's manhole risers or equal shall be used when possible. Riser heights shall be in 1/4 inch increments from 1 inch through 3 inches with turnbuckle or toggle linkage.

#### 33.03 EXCAVATION

Excavation shall be performed wherever necessary to bring the manholes, inlets, and catch basins to grade as shown on the Plans and as designed by the Engineer.

#### 33.04 MATERIALS

- (a) Building brick shall be number one, hard grade brick. These brick, when made from clay or shale, shall conform to AASHTO, "Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)," Serial Designation M114. When made of concrete, they shall conform to ASTM "Standard Specification for Concrete Building Brick," Serial Designation C 55.
- (b) Concrete shall be Class A concrete which meets all requirements of Section 604 of the Tennessee Department of Transportation Standard Specifications.

(c) Masonry Mortar

1. Mortar shall be composed of the following mixture: one part Portland Cement, two parts sand, hydrated lime not to exceed ten percent of the cement used. Water shall be added to the mixture in such quantity as to form a stiff paste.
2. The mortar shall be hand-mixed or machine-mixed. In the preparation of hand-mixed mortar, the sand, cement and hydrated lime shall be thoroughly mixed together in a clean, tight, mortar mix until the mixture is of uniform color, after which water shall be added. Machine-mixed mortar shall be prepared in an approved mixer, and shall be mixed not less than 1 1/2 minutes.
3. Mortar shall be used within thirty minutes after mixing. Re-tempering of mortar will not be permitted.
4. Materials used shall conform to the following Specifications:

a. Portland Cement, Type I	AASHTO M 85
b. Hydrated Lime	ASTM C 6
c. Sand	Item 73.02
d. Water	Item 74.01

- (d) Backfill material shall conform to the existing material in the subgrade and base course, and thoroughly tamped in place until no further displacement occurs.
- (e) Adjustable manhole frames shall consist of not less than four circular segments connected by diameter adjustment screws with locking apparatus. Each segment shall contain no less than two grade-adjustment set-screws with locking apparatus. The cover seat portion of the frame shall be covered with a plastic gasket. The frame shall be capable of being adjusted to fit the existing manhole frame in such a manner that no vibration or movement of the manhole cover will occur. Adjustable frames shall be approved by the Engineer prior to placement.

**33.05 CLEANING**

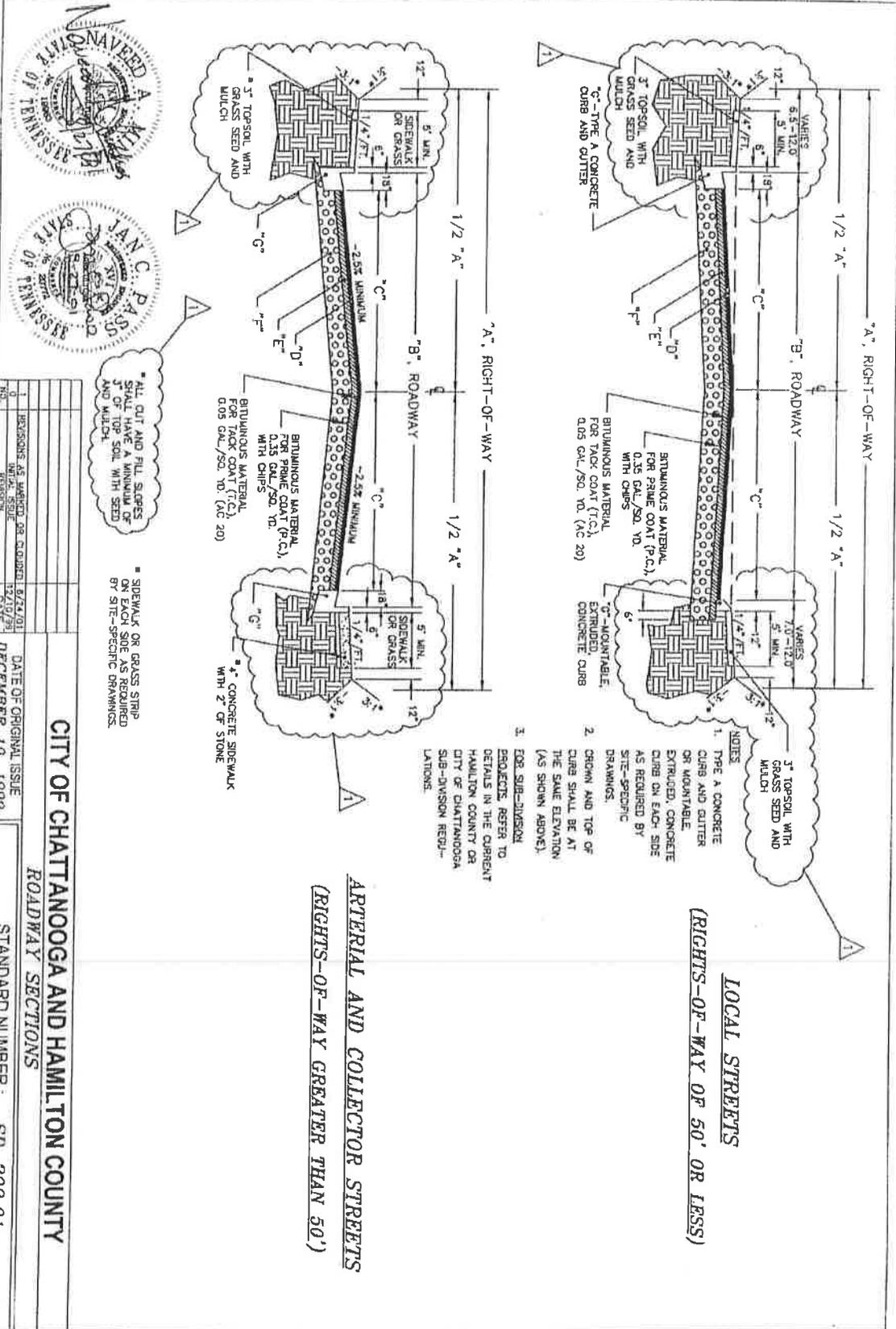
All manholes, inlets, and catch basins shall be thoroughly cleaned of all excess mortar and accumulations of silt, clay, debris, or foreign matter of any kind and shall be free from such at the time pavement is to be laid.

**33.06 MEASUREMENT (IF APPLICABLE)**

The number of manholes, inlets, and catch basins paid for will be the actual number of each type ordered reset, completed and accepted by the Engineer, except that extra payment shall be made at a price per inch for adjustment in excess of four inches.

**33.07 PAYMENT (IF APPLICABLE)**

The accepted number of each manhole, inlet or catch basin adjusted by not more than four inches (4") will be paid for at the respective contract unit price bid for each type. Adjustment in excess of four inches (4") shall be paid for at the contract unit price per vertical inch for "Excess Manhole Adjustment." Payment shall be payment in full for furnishing all materials, excavation, form work when necessary, backfilling, disposal of surplus materials, and for all labor, equipment, tools, and incidentals necessary to complete the work herein specified.



NO.	REVISIONS AS MARKED OR COUNDED	DATE OF ORIGINAL ISSUE
1	ISSUANCE AS MARKED OR COUNDED	8/27/01
2	REVISED	12/10/01
3	REVISED	12/10/01
4	REVISED	12/10/01
5	REVISED	12/10/01
6	REVISED	12/10/01
7	REVISED	12/10/01
8	REVISED	12/10/01
9	REVISED	12/10/01
10	REVISED	12/10/01

**CITY OF CHATTANOOGA AND HAMILTON COUNTY**  
**ROADWAY SECTIONS**  
 STANDARD NUMBER: SD-200.01

**ARTERIAL AND COLLECTOR STREETS**  
 (RIGHTS-OF-WAY GREATER THAN 50')

**LOCAL STREETS**  
 (RIGHTS-OF-WAY OF 50' OR LESS)

\* ALL CUT AND FILL SLOPES SHALL HAVE A MINIMUM OF 3" OF TOP SOIL WITH SEED AND MULCH.

\* SIDEWALK OR GRASS STRIP ON EACH SIDE AS REQUIRED BY SITE-SPECIFIC DRAWINGS.

1. THE A CONCRETE CURB AND GUTTER OR MOUNTABLE EXTRUDED CONCRETE CURB ON EACH SIDE AS REQUIRED BY SITE-SPECIFIC DRAWINGS.
2. CROWN AND TOP OF CURB SHALL BE AT THE SAME ELEVATION (AS SHOWN ABOVE).
3. FOR SUB-DIVISION PROJECTS, REFER TO DETAILS IN THE CURRENT HAMILTON COUNTY OR CITY OF CHATTANOOGA SUB-DIVISION REGULATIONS.

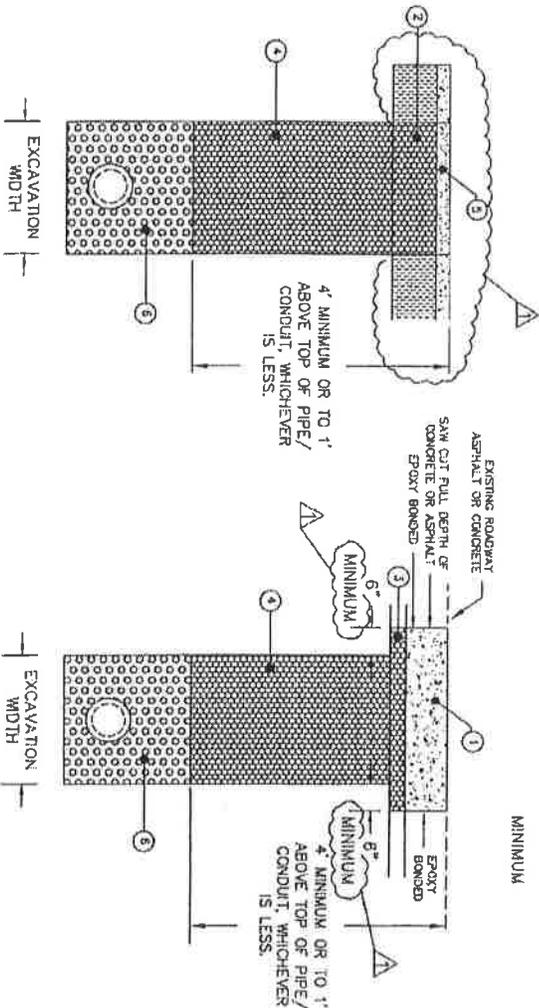
**DIMENSIONS FOR  
ROADWAY SECTIONS**

ROADWAY CLASSIFICATION	"A" RIGHT-OF-WAY	"B" ROADWAY WIDTH	"C" 1/2 PAVED SECTION	"D" ASPHALTIC CONCRETE SURFACE CONCRETE GRADING E (SEE NOTE 1 BELOW.)	"E" ASPHALTIC CONCRETE BINDER GRADING B, C, OR B MODIFIED (SEE NOTE 2 BELOW.)	"F" MINERAL AGGREGATE BASE TYPE A (SEE NOTE 3 BELOW.)	"G" CONCRETE CURB / CURE AND CUTTER
PRINCIPAL ARTERIAL	100'	84'	40'-6"	1.5"	3.5"	15"	TYPE A
MINOR ARTERIAL	80'	60'	28'-6"	1.5"	3.5"	15"	TYPE A
COLLECTOR STREET	60'	36'	16'-6"	1.5"	2.5"	8"	TYPE A
LOCAL STREET	50'	26'	11'-6"	1.5"	2.5"	8"	SEE NOTE 1 WITH TYPICAL SECTION.

1. ASPHALTIC CONCRETE SURFACE SHALL BE GRADING E, CITY OF CHATTANOOGA SPECIFICATIONS, CONTAINING AT LEAST 45% RIVER SAND.
2. ASPHALTIC CONCRETE BINDER SHALL BE GRADING B MODIFIED OR GRADING C, CITY OF CHATTANOOGA SPECIFICATIONS; OR GRADING B, TENNESSEE D.O.T. SPECIFICATIONS.
3. MINERAL AGGREGATE BASE SHALL BE COMPACTED 303-01, TYPE A, GRADING D ("33-P"), TENNESSEE D.O.T. SPECIFICATIONS.



<b>CITY OF CHATTANOOGA AND HAMILTON COUNTY</b>	
<b>ROADWAY SECTIONS</b>	
0	REVISIONS AS MARKED OR DULLED
1	INITIAL ISSUE
NO.	DATE
	12/10/99
DATE OF ORIGINAL ISSUE <b>DECEMBER 10, 1999</b>	
STANDARD NUMBER : <b>SD-200.02</b>	



**DRAWING NOTES**

- ① CLASS "A" CONCRETE PAVEMENT (4000 P.S.I. MINIMUM) 6" MINIMUM THICKNESS. COARSE BROOK FINISH - THE CONCRETE SHALL BE COLORED AND STAMPED TO MATCH THE ADJACENT CONCRETE AS REQUIRED.
- ② MINERAL AGGREGATE BASE - TYPE A, GRADING D (33-P<sup>3</sup>) - COMPACTED TO A DENSITY OF 95% STANDARD PROCTOR. THE THICKNESS SHALL BE THE GREATER OF FOUR INCHES (4") OR THE EXISTING DEPTH OF BASE MATERIAL.
- ③ MINERAL AGGREGATE BASE - TYPE A, GRADING D (33-P<sup>3</sup>) - COMPACTED TO A DENSITY OF 95% STANDARD PROCTOR. THE THICKNESS SHALL BE THE GREATER OF FOUR INCHES (4") OR THE EXISTING DEPTH OF BASE MATERIAL.
- ④ MINERAL AGGREGATE BACKFILL, TYPE A, GRADING D (33-P<sup>3</sup>) - COMPACTED TO EIGHT INCH (8") LIFTS AND TO A DENSITY OF 95% STANDARD PROCTOR.
- ⑤ COLD MIX ASPHALT - WHEN A TEMPORARY ASPHALT PATCH IS USED, IT SHALL BE PLACED IMMEDIATELY AFTER THE CRUSHED STONE BACKFILL IS PLACED.
- ⑥ BEDDING MATERIAL - SEE SD-367.01.

**GENERAL REQUIREMENTS**

1. ALL STREET CUTS MUST BE REPAIRED IMMEDIATELY AFTER BACK-FILLING AND ACCORDING TO THIS STANDARD.
2. A RIGHT-OF-WAY PERMIT AND AN APPROVED TRAFFIC CONTROL PLAN ARE REQUIRED FOR ALL CUTS IN CITY STREETS.
3. WHERE LONGITUDINAL CUTS ARE MADE, THE OWNER RESERVES THE RIGHT TO REQUIRE ADDITIONAL REPAIRS BEYOND THE LIMITS OF THE PERMIT TO ENSURE THE PROPER FINISH CHARACTERISTICS AND THE STABILITY OF THE PAVEMENT.
4. ALL REFERENCES TO MATERIALS ARE DESCRIBED IN DETAIL IN THE CITY OF CHATTANOOGA'S STANDARD SPECIFICATIONS. THESE SPECIFICATIONS MUST BE USED AS A REFERENCE WHEN ORDERING MATERIALS.
5. EXISTING CONCRETE STREETS THAT HAVE BEEN OVERLAID WITH ASPHALT SHALL BE REPAIRED WITH CONCRETE HAVING A DEPTH EQUAL TO THE EXISTING CONCRETE PLUS THE ADJACENT EXISTING ASPHALT OVERLAY.
6. WHERE EXISTING CONSTRUCTION AND EXPANSION JOINTS ARE ENCOUNTERED IN CONCRETE PAVEMENT CUTS, THE ENGINEER SHALL DESIGNATE LOCATION, SIZE AND MATERIALS TO CONSTRUCT JOINTS IN THE NEW CONCRETE SURFACE.

**TEMPORARY REPAIR**

**COMPLETED REPAIR**

\*33-P (RUG) - 303-01, TYPE A, GRADING B (33-P<sup>3</sup>), TENNESSEE D.O.T. SPECIFICATIONS



1	REVISIONS AS AWARDED OR REQUIRED	02/24/01
0	INITIAL ISSUE	12/10/99
NO.	REVISION	DATE

DATE OF ORIGINAL ISSUE  
**DECEMBER 10, 1999**

**CITY OF CHATTANOOGA AND HAMILTON COUNTY**  
**REPAIR DETAILS (ROADWAY)**

STANDARD NUMBER: **SD-700.01**

## Affirmative Action Plan

The City of Chattanooga is an equal opportunity employer and during the performance of this Contract, the Contractor agrees to abide by the equal opportunity goals of the City of Chattanooga as follows:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer, recruitment or recruitment advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
3. The Contractor will send to each labor union or representative of workers with which he/she has a collective bargaining agreement or other contract or understanding, a notice advising said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
4. During the term of all construction contracts or subcontracts in excess of \$10,000 to be performed for the City of Chattanooga, the following non-discriminatory hiring practices shall be employed to provide employment opportunities for minorities and women:
  - a. All help wanted ads placed in newspapers or other publications shall contain the phrase "Equal Employment Opportunity Employer".
  - b. Seek and maintain contracts with minority groups and human relations organizations as available.
  - c. Encourage present employees to refer qualified minority group and female applicants for employment opportunities.
  - d. Use only recruitment sources which state in writing that they practice equal opportunity. Advise all recruitment sources that qualified minority group members and women will be sought for consideration for all positions when vacancies occur.

5. Minority statistics are subject to audit by City of Chattanooga staff or other governmental agency.
6. The Contractor agrees to notify the City of Chattanooga of any claim or investigation by State or Federal agencies as to discrimination.

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(Signature of Contractor)

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(Title and Name of Company)

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(Date)