INVITATION FOR BID DOCUMENTS

FOR

EAST ATLANTIC STREET (BUSINESS U.S. ROUTE 58) IMPROVEMENTS

USDOT Project No. U000-109-180, UPC No. 93307

Original June 2014
Re-Issue January 2015

PREPARED BY:
City of Empoira
201 South Main Street Emporia, Virginia 23847

Table of Contents

List of Tables 7
Description of Project 8
Invitation for Bids 9
Instruction to Bidders 10
Form C-48 Subcontractor/Supplies Solicitation and Utilitzation Form 11
Form C-49 DBE Good Faith Efforts Documentation 12
Form C-111 Minimum Bid Requirements 21
Form C-112 Certification of Binding Agreement With Disadvantaged Business Enterprise Firms 22
Class of License Definitions 25
Bid Form 28
Bid Schedule 31
Bid Bond 33
Agreement 34
Notice of Award 38
Notice to Proceed 40
Change Order 41
Bonds 43
Form C-104 48
Form C-105 49
Insurance 51
Instructions Regarding Insurance Certificates 52
Emporia City General Conditions 53
Supplemental General Conditions 70
Federal Aid Specifications 75
C100LL2-0112 VDOT Supplemental Specifications (sss), Special provisions (sps) 76
And Special Provision Copied Notes (SPCNs) 76
C103I00 – E-Verify Work Authorization 78
C105HF1 – Subcontracting (Fed Funded) 81
SF001AF - Predetermined Minumum Wage Rates 82
SF010DF – FHWA 1273 86
SF030AF- Notice of Required – Affirm Action EEO 109
S107HF1- DBE Requirements (Fed Funds) 115
S102CF2- Domestic Material (Fed Funds) 135
Division I GENERAL PROVISIONS 138
SECTION 101—Definitions of Abbreviations, Acronyms, And Terms 139
101.01—Abbreviations and Acronyms 139
101.02—Terms 141
Division II – MATERIALS 152
SECTION 200—GENERAL 153
200.01—Description 153
200.02—Conformance with Specifications 153
200.03—General Sampling and Testing Procedures 153
200.04—Acceptance Procedures for Aggregates 154
200.05—Handling and Storing Aggregates 155
200.06—Technician and Batcher Certification 155
SECTION 203—COARSE AGGREGATE 157
203.01—Description 157
203.02—Materials 157
203.03—Detail Requirements 157

SECTION 207—SELECT MATERIAL 161
207.01—Description 161
207.02—Detail Requirements 161
207.03—Job-Mix Formula for Select Material, Type I 163
207.04—Mixing 163
207.05—Acceptance of Select Material, Type I 163
207.06—Referee System for Select Material, Type I 164
207.07—Payment Adjustment System for Select Material, Type I 164
SECTION 208—SUBBASE AND AGGREGATE BASE MATERIAL 166
208.01—Description 166
208.02—Materials 166
208.03—Detail Requirements 166
208.04—Job-Mix Formula 168
208.05—Mixing 168
208.06—Acceptance 168
208.07—Referee System 169
208.08—Payment Adjustment System 170
SECTION 210—ASPHALT MATERIALS 172
210.01—Description 172
210.02—Materials 172
210.03—Detail Requirements 172
210.04—Payment Adjustment System 173
SECTION 211—ASPHALT CONCRETE 174
211.01—Description 174
211.02—Materials 174
211.03—Job-Mix Formula 177
211.05—Testing 183
211.06—Tests 184
211.07—Plant Inspection 185
211.08—Acceptance 185
211.09—Adjustment System 186
211.09—Referee System 188
211.10—Handling and Storing Aggregates 188
211.11—Asphalt Concrete Mixing Plant 189
211.13—Preparation of Mixture 192
211.14—Storage System 192
211.15—Initial Production 193
SECTION 244—ROADSIDE DEVELOPMENT MATERIALS 194
244.01—Description 194
244.02—Detail Requirements 194
SECTION 245—GEOSYNTHETICS 202
245.01—Description 202
245.02—Detail Requirements 202
245.03—Testing and Documentation 202
SECTION 246—PAVEMENT MARKING 207
246.01—Description 207
246.02—Detail Requirements 207
DIVISION III ROADWAY CONSTRUCTION 217
SECTION 301—CLEARING AND GRUBBING 218
301.01—Description 218
301.02—Procedures 218

301.03—Measurement and Payment 219
SECTION 302—DRAINAGE STRUCTURES 220
302.01—Description 220
302.02—Materials 220
302.03—Procedures 220
302.4—Measurement and Payment 229
SECTION 303—EARTHWORK 234
303.01—Description 234
303.02—Materials 234
303.03—Erosion and Siltation Control 234
303.04—Procedures 237
303.05—Tolerances 246
303.06—Measurement and Payment 246
SECTION 305—SUBGRADE AND SHOULDERS 254
305.01—Description 254
305.02—Materials 254
305.03—Procedures 254
305.04—Measurement and Payment 257
SECTION 308—SUBBASE COURSE 259
308.01—Description 259
308.02—Materials 259
308.03—Procedures 259
308.04—Tolerances 260
308.05—Measurement and Payment 260
SECTION 310—TACK COAT 262
310.01—Description 262
310.02—Materials 262
310.03—Procedures 262
310.04—Measurement and Payment 263
SECTION 311—PRIME COAT 264
311.01—Description 264
311.02—Materials 264
311.03—Procedures 264
311.04—Measurement and Payment 265
SECTION 315—ASPHALT CONCRETE PAVEMENT 266
315.01—Description 266
315.02—Materials 266
315.03—Equipment 266
315.04—Placement Limitations 267
315.05—Procedures 268
315.06—Pavement Samples 276
315.07—Pavement Tolerances 276
315.08—Measurement and Payment 278
DIVISION V INCIDENTAL CONSTRUCTION 280
SECTION 502—INCIDENTAL CONCRETE ITEMS 281
502.01—Description 281
502.02—Materials 281
SECTION 508—DEMOLTION OF PAVEMENT AND OBSCURING ROADWAY 282
508.01—Description 282
508.02—Procedures 282
508.03—Measurement and Payment 283

SECTION 512—MAINTAINING TRAFFIC 284
512.01—Description 284
512.02—Materials 284
512.03—Procedures 285
512.04—Measurement and Payment 298
SECTION 513—MOBILIZATION 302
513.01—Description 302
513.02—Measurement and Payment 302
SECTION 515—PLANING PAVEMENT 303
515.01—Description 303
515.02—Procedures 303
515.03—Measurement and Payment 303
DIVISION VI ROADSIDE DEVELOPMENT 305
SECTION 602—TOPSOIL 306
602.01—Description 306
602.02—Materials 306
602.03—Procedures 306
602.04—Measurement and Payment 306
SECTION 603—SEEDING 306
603.01—Description 307
603.02—Materials 307
603.03—Procedures 307
603.04—Measurement and Payment 308
SECTION 606—SOIL RETENTION COVERINGS 310
606.01—Description 310
606.02—Materials 310
606.03—Procedures 310
603.04—Measurement and Payment 310
DIVISION VII TRAFFIC CONTROL DEVICES 312
SECTION 700—GENERAL 313
700.01—Description 313
700.02—Materials 313
700.03—Working Drawings 315
700.04—Procedures 316
700.05—Measurement and Payment 325
SECTION 704 – PAVEMENT MARKINGS AND MARKERS 328
704.01—Description 328
704.02—Materials 328
704.03—Procedures 328
704.04—Measurement and Payment 334

List of Tables

II –3 – Sizes and Open – Graded Coarse Aggregates 158

II –4 – Soundness 159

II–5–Abrassion 159

II–6 – Design Range: Select Material, Type I 161

II–7 – Process(P) and Range(R) Tolerance: Select Material, Type I 162

II–8 – Atterberg Limits: Select Material Type I 163

II–9 – Design Range for Dense-Graded Aggregatea 166

II–10 – Process Tolerances for Each Labaroty Sieve (%) 167

II–11 – Atterberg Limits 167

II–12 – Standard Deviation 171

II–12A – Aggregate Properties 176

II–13 – Asphalt Concrete Mixtures: Design Range 178

II–14 – Mix Design Criteria 179

II–14A – Recommended Performance Grade of Asphalt 182

II–15 – Process Tolerance 186

II–16 – Standard Division 187

III–1 – Liquid Asphalt Application Temperature 262

III–2 – Cold Weather Paving Limitations 269

III–3 – Density Requirements 272

III–4 – Payment Schedule for Lot Densities 274

III–5 – Payment Schedule for Surface, Intermediate and Base Courses 275

VII–1 – Pavement Markings 330

Description of Project
Emporia, City Virginia
East Atlantic Street (Business US Route 58)

EAST ATLANTIC STREET(BUSINESS US ROUTE 58) IMPROVEMENTS:

This project involves the rehabilitation of East Atlantic Street from the intersections with Route 58 westward to Southampton Street. Project improvements consist of approximately 0.834 miles of mill and overlay, and construction of two (2) 12' wide by 1,500' long right turn lanes into the Emporia Georgia Pacific facility in accordance with current VDOT standards. The work will include clearing, grading, asphalt paving, drainage structures, erosion & sediment control, signage, pavement markings and other items necessary for the completion of the work. Contractors, sub-contractors, and suppliers must be on VDOT's current Pre-qualified list in order to be eligible for this contract.

The power, duties, and responsibilities conferred hereto to the Engineer shall be construed to be those of the Owner or its authorized representative. Where the terms "Department", "Engineer" and "Contract Engineer" appear in Virginia Department of Transportation Road and Bridge Specifications, Supplemental Specifications (SSs), Special Provisions (SPs), Special Provision Copied Notes (SPCNs), and Road and Bridge Standards used in this contract, and in the Virginia Department of Transportation publication(s) that each references, the authority identified shall be construed to be those of the Owner or its authorized representative. This project is to be constructed in accordance with VDOT Road and Bridge Specifications (2007), VDOT Road and Bridge Standards (2008), the Virginia Work Area Protection Manual (2011), VDOT Specifications (SPCN's, SP's & SS's) and the Manual on Uniform Traffic Control Devices (MUTCD) (2009)".

EMPORIA CITY, VIRGINIA

Invitation for Bids

EAST ATLANTIC STREET (BUSINESS US ROUTE 58)
Improvements

Sealed bids are invited for the construction of the East Atlantic Street (Business US Route 58) Improvements project which consists of approximately 0.834 miles of mill and overlay, and construction of two (2) 12′ wide by 1,500′ long right turn lanes into the Emporia Georgia Pacific facility in accordance with current VDOT standards.

Sealed bids will be received at the office of the City Manager, no later than **2:00 p.m., local prevailing time, on Wednesday, March 18, 2015**, after which they will be publicly opened and read aloud. Bid surety in the amount of 5% of the total bid is required.

Bid documents which include drawings, specifications and bid forms may be obtained from Jeff Robinson and Associates for **a nonrefundable fee of $100.00**. Electronic copies will be made available at the same offices for a non-refundable fee of $30.00. Bid documents can be delivered via UPS overnight delivery for an additional fee of $30.00 per set (for a total of $130.00 pre-paid).

All questions about the meaning or intent of the Bid documents are to be submitted to the Engineer in writing no later than 4:00 p.m., local prevailing time, on Wednesday, March 4, 2015. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda to plan holders.

Bidders are required to comply with Title 54.1, Chapter 11, *Code of Virginia*, to show evidence of certification of registration before their bid may be considered.

Emporia City reserves the right to waive informalities and reject any and/or all bids. The offering of substitute materials and equipment shall be governed by Section 11-49 of the Code of Virginia, as well and the General and Supplementary Conditions of the contract.

Bids to be returned to:
Brian S. Thrower
City Manager
201 South Main Street
Post Office Box 511
Emporia, Virginia 23847

Bids May be Obtained From:
Jeff Robinson & Associates
1175 Grassy Pond Road
Emporia, Virginia 23847
434-634-8665
robinsonj@jrallpc.com
M-F 9:0AM-5:00PM
Or Shipped via UPS Ground Delivery

Instruction to Bidders

DATE AND PLACE OF BID OPENING. Sealed bids, subject to the specifications and conditions contained herein and attached hereto, will be received in the Office of the Emporia City Manager, 201 South Main Street, Emporia, Virginia 23847 no later than 2:00 p.m. local time prevailing, Wednesday, March 18, 2015, and then publicly opened and read immediately thereafter for the following:

East Atlantic Street (Business US 58 Route 58) Improvements.

Invitation for Bid Documents may be obtained from Jeff Robinson and Associates, between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, for a nonrefundable fee of $100.00. Bid documents can be delivered via UPS Ground delivery for an additional $30.00 (for a total of $130.00 pre-paid). Electronic copies will be made available at the same office for a non-refundable fee of $30.00. Only complete sets will be issued. Order documents by calling the office of Jeff Robinson and Assocaiates and allow one business day for pickup and two business days for UPS delivery.

The power, duties, and responsibilities conferred hereto to the Engineer shall be construed to be those of the Owner or its authorized representative. Where the terms "Department", "Engineer" and "Contract Engineer" appear in Virginia Department of Transportation Road and Bridge Specifications, Supplemental Specifications (SSs), Special Provisions (SPs), Special Provision Copied Notes (SPCNs), and Road and Bridge Standards used in this contract, and in the Virginia Department of Transportation publication(s) that each references, the authority identified shall be construed to be those of the Owner or its authorized representative. This project is to be constructed in accordance with VDOT Road and Bridge Specifications (2007), VDOT Road and Bridge Standards (2008), the Virginia Work Area Protection Manual (2011), VDOT Specifications (SPCN's, SP's & SS's) and the Manual on Uniform Traffic Control Devices (MUTCD) (2009)".

Contractors, sub-contractors, and suppliers must be on VDOT's current Pre-qualified list in order to be eligible for this contract. http://www.virginiadot.org/business/resources/prequalified-list.pdf

A Disadvantage Business Enterprise (DBE) Requirement of at least 4% is mandated for this project. Bidders are to select DBE participants from the link. http://www.dmbe.virginia.gov/DBESearchSub.html

Attention is drawn to the Bid Form and Bid Bond for this Invitation for Bids. Failure to do so may result in rejection of your bid.

All questions about the meaning or intent of the Bid documents are to be submitted to the Engineer (Jeff Robinson) in writing no later than 4:00 p.m., local prevailing time, on Wednesday, March 4, 2015. Questions may be submitted via email to Jeff Robinson, PE at robinsonj@jrallpc.com. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda to plan holders.

There will not be a Pre-Bid Conference for this bid.

CONTRACTOR BUSINESS LICENSE.
In accordance with the Code of Virginia §54.1-1100, contractors that for a fixed price, commission, fee, or percentage undertake to bid upon, or accepts, or offers to accept, orders or contracts for performing, managing, or superintending in whole or in part, the construction, removal, repair or improvement of any building or structure permanently annexed to real property owned, controlled, or leased by him or another person or any other improvement to such real property, are required to hold a business license issued by the Virginia Board for Contractors, phone (804)367-8511.

Form C-48

Rev. 2-23-11

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
Subcontractor/Supplies Solicitation and Utilitzation Form
(ALL BIDDERS)

PROJECT NO. _____ **CONTRACT I.D. NO._____**

FHWA NO. _____ **DATE SUBMITTED _____**

All bidders, including DBEs bidding as Prime Contractors, shall complete and submit the following information as requested in this form within ten (10) business days after the opening of bids.

The bidder certifies this form accurately represents its solicitation and utilization or non-utilization, as indicated, of the firms listed below for performance of work on this contract. The bidder also certifies he/she has had direct contact with the named firms regarding participation on this project.

BIDDER_____ **SIGNATURE_____**

TITLE_____

SUBCONTRACTOR/SUPPLIER SOLICITATION AND UTILIZATION (ALL)

VENDOR NUMBER	NAME OF SUBCONTRACTOR/SUPPLIER	TELEPHONE NUMBER	DBE OR NON-DBE	UTILIZED (Y/N)

NOTE: ATTACH ADDITIONAL PAGES, IF NECESSARY.

BIDDER MUST SIGN EACH ADDITIONAL SHEET TO CERTIFY ITS CONTENT AND COMPLETION OF FORM.

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

--DO NOT DETACH--

THIS INFORMATION MUST BE SUBMITTED WITH YOUR BID PROPOSAL IF YOUR BID DOES NOT MEET THE PROJECT DBE REQUIREMENTS, OR WHEN REQUESTED BY VDOT

CONTRACT I.D. NUMBER_____

PROJECT NUMBER_____

FHWA NUMBER_____

DISTRICT_____

DATE BID SUBMITTED_____

BIDDER'S NAME_____

SIGNATURE_____

TITLE _____

VENDOR NUMBER_____

DBE GOAL FROM BID PROPOSAL_____

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO._____ DATE SUBMITTED_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER_____ SIGNATURE_____

TITLE_____

NAMES OF CERTIFIED DBEs AND THE DATES ON WHICH THEY WERE SOLICITED TO BID ON THIS PROJECT

INCLUDE THE ITEMS OF WORK OFFERED AND THE DATES AND METHODS USED FOR FOLLOWING UP INITIAL SOLICITATIONS TO DETERMINE WHETHER OR NOT DBEs WERE INTERESTED.

NAMES AND VENDOR NUMBERS OF DBEs SOLICITED	DATE OF INITIAL SOLICITATION	ITEM(S) OF WORK	FOLLOW-UP METHODS AND DATES

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY
ATTACH COPIES OF SOLICITATIONS, TELEPHONE RECORDS, FAX CONFIRMATIONS, ELECTRONIC INFORMATION, ETC.

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO._____ DATE SUBMITTED_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER _____SIGNATURE_____

TITLE_____

TELEPHONE LOG

DBE(s) CALLED	TELEPHONE NUMBER	DATE CALLED	TIME CALLED	CONTACT PERSON OR VOICE MAIL STATUS

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY

Form C-49

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO. _____**DATE SUBMITTED**_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER_____ **SIGNATURE**_____

TITLE_____

ITEM(S) OF WORK THAT THE BIDDER MADE AVAILABLE TO DBE FIRMS

IDENTIFY THOSE ITEMS(S) OF WORK THAT THE BIDDER MADE AVAILABLE TO DBE FIRMS OR THOSE ITEMS(S) THE BIDDER IDENTIFIED AND DETERMINED TO SUBDIVIDE INTO ECONOMICALLY FEASIBLE UNITS TO FACILITATE DBE PARTICIPATION. FOR EACH ITEM LISTED, SHOW THE DOLLAR VALUE AND PERCENTAGE OF THE TOTAL CONTRACT AMOUNT. IT IS THE BIDDER'S RESPONSIBILITY TO DEMONSTRATE THAT SUFFICIENT WORK TO MEET THE GOAL WAS MADE AVAILABLE TO DBE FIRMS.

ITEM(S) OF WORK MADE AVAILABLE	BIDDER NORMALLY PERFORMS ITEM(S) (Y/N)	ITEM(S) BROKEN DOWN TO FACILITATE PARTICIPATION (Y/N)	AMOUNT IN DOLLARS	PERCENTAGE OF CONTRACT

NOTE: INFORMATION REQUIRED FOR THIS SECTION CONTINUED ON SHEET 5
ATTACH ADDITIONAL PAGES IF NECESSARY

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO._____ DATE SUBMITTED_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER _____SIGNATURE_____

TITLE_____

ADDITIONAL INFORMATION REGARDING ITEM(S) OF WORK THAT THE BIDDER MADE AVAILABLE TO DBE FIRMS (Continued From Sheet 4)

ITEM(S) OF WORK MADE AVAILABLE, NAMES OF SELECTED FIRMS AND DBE STATUS, DBEs THAT PROVIDED QUOTES, PRICE QUOTE FOR EACH FIRM, AND THE PRICE DIFFERENCE FOR EACH DBE IF THE SELECTED FIRM IS NOT A DBE.

ITEM(S) OF WORK MADE AVAILABLE(CONT.)	NAME OF SELECTED FIRM AND VENDOR NUMBER	DBE OR NON-DBE	NAME OF REJECTED FIRM(S)	QUOTE IN DOLLARS	PRICE DIFFERENCE IN DOLLARS

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY.
IF THE FIRM SELECTED FOR THE ITEM IS NOT A DBE, PROVIDE THE REASON(S) FOR THE SELECTION ON A SEPARATE PAGE AND ATTACH.

PROVIDE NAMES, ADDRESSES, AND TELEPHONE NUMBERS FOR THE FIRMS LISTED ABOVE.

Form C-49

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO._____ **DATE SUBMITTED**_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER _____**SIGNATURE**_____

TITLE_____

ADVERTISEMENTS OR PROOFS OF PUBLICATION.

NAMES AND DATES OF EACH PUBLICATION IN WHCH A REQUEST FOR DBE PARTICIPATION FOR THE PROJECT WAS PLACED BY THE BIDDER. ATTACH COPIES OF PUBLISHED ADVERTISEMENTS OR PROOFS OF PUBLICATION.

PUBLICATIONS	DATES OF ADVERTISEMENT

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY

Form C-49

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO._____DATE SUBMITTED_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER_____ SIGNATURE_____

TITLE_____

NAMES OF AGENCIES CONTACTED TO PROVIDE ASSISTANCE

NAMES OF AGENCIES (SEE SPECIAL PROVISION FOR 110.04) AND THE DATES THESE AGENCIES WERE CONTACTED TO PROVIDE ASSISTANCE IN CONTACTING, RECRUITING, AND USING DBE FIRMS. IF THE AGENCIES WERE CONTACTED IN WRITING, ATTACH COPIES OF SUPPORTING DOCUMENTS.

NAME OF AGENCY	METHOD AND DATE OF CONTACT	RESULTS

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO. _____**DATE SUBMITTED**_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT EQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER _____**SIGNATURE**_____

TITLE_____

TECHNICAL ASSISTANCE AND INFORMATION PROVIDED TO DBEs

EFFORTS MADE TO PROVIDE INTERESTED DBEs WITH ADEQUATE INFORMATION ABOUT THE PLANS, SPECIFICATIONS, AND REQUIREMENTS OF THE BID DOCUMENTS TO ASSIST THE DBEs IN RESPONDING TO A SOLICITATION.

IDENTIFY THE DBEs ASSISTED, THE INFORMATION PROVIDED, AND THE DATE OF CONTACT. ATTACH COPIES OF SUPPORTING DOCUMENTS.

DBEs ASSISTED	INFORMATION PROVIDED	DATE OF CONTACT

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY.

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO. _____DATE SUBMITTED_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER_____SIGNATURE_____

TITLE_____

EFFORTS MADE TO ASSIST DBEs OBTAIN BONDING, LINES OF CREDIT, INSURANCE, ETC.

EFFORTS MADE TO PROVIDE INTERESTED DBEs IN OBTAINING BONDING, LINES OF CREDIT, INSURANCE, NECESSARY EQUIPMENT, SUPPLIES, MATERIALS, OR RELATED ASSISTANCE OR SERVICES, EXCLUDING SUPPLIES AND EQUIPMENT THE SUBCONTRACTOR PURCHASES OR LEASES FROM THE PRIME CONTRACTOR OR ITS AFFILIATES.

IDENTIFY THE DBEs ASSISTED, THE ASSISTANCE OFFERED, AND THE DATES OF SERVICES OFFERED AND PROVIDED. ATTACH COPIES OF SUPPORTING DOCUMENTS.

DBEs ASSISTED	ASSISTANCE OFFERED	DATES SERVICES OFFERED AND/OR PROVIDED

NOTE: ATTACH ADDITIONAL PAGES IF NECESSARY.

Form C-49

COMM0NWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
DBE Good Faith Efforts Documentation

CONTRACT I.D. NO. _____ **DATE SUBMITTED**_____

IF THE DBE GOAL ESTABLISHED FOR THIS CONTRACT HAS NOT BEEN MET OR VDOT REQUESTS THE SUBMITTAL THEREOF, THE BIDDER IS REQUIRED TO SUBMIT GOOD FAITH EFFORTS AS OUTLINED IN THIS DOCUMENT.

THE BIDDER ACKNOWLEDGES AND CERTIFIES THAT THIS FORM ACCURATELY REPRESENTS THE INFORMATION CONTAINED HEREIN.

BIDDER_____ **SIGNATURE**_____

TITLE_____

ADDITIONAL DATA TO SUPPORT DEMONSTRATION OF GOOD FAITH EFFORTS

ADDITIONAL DATA TO SUPPORT DEMONSTRATION OF GOOD FAITH EFFORTS

NOTE: ATTACH ADDITIONAL PAGES, IF NECESSARY

Form C-111

Rev. 2-15-11

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
Minimum Bid Requirements

PROJECT NO._____

FHWA NO._____

*** * * INSTRUCTIONS * * ***

THIS FORM CAN BE USED BY THE CONTRACTOR TO SUBMIT THE NAMES OF DBE FIRMS TO BE UTILIZED ON THE PROJECT. THE CONTRACTOR SHALL INDICATE THE DESCRIPTION OF THE CATEGORY (S, M, SP or H) AND THE TYPE OF WORK THAT EACH DBE WILL PERFORM AND THE ALLOWABLE CREDIT PER ITEM(S). ADDITIONAL SHEETS TO SHOW THE ALLOWABLE CREDIT PER ITEM MAY BE ATTACHED IF NECESSARY. **PLEASE NOTE:** THE AMOUNT OF ALLOWABLE CREDIT FOR A DBE SUPPLIER IS 60% OF THE TOTAL COST OF THE MATERIALS OR SUPPLIES OBTAINED AND 100% FOR A DBE MANUFACTURER OF THE MATERIALS AND SUPPLIES OBTAINED. A CONTRACTOR MAY COUNT 100% OF THE FEES PAID TO A DBE HAULER FOR THE DELIVERY OF MATERIALS AND SUPPLIES TO THE PROJECT SITE, BUT NOT FOR THE COST OF THE MATERIALS AND SUPPLIES THEMSELVES.

DBE REQUIREMENT _____ **%**

PERCENT ATTAINED BY BIDDER _____ **%**

NAMES(S) AND CERTIFICATION NO. OF DBE(S) TO BE USED	USED AS SUBCONTR. (S) MFG. (M) SUPPLIER (SP) HAULER (H)	TYPE OF WORK AND ITEM NO(S)	$ AMOUNT OF ALLOWABLE CREDIT PER ITEM

TOTAL $ _____

TOTAL CONTRACT VALUE $_____ x REQUIRED DBE_____% = $_____

I/WE CERTIFY THAT THE PROPOSED DBE(S) SUBMITTED WILL BE USED ON THIS CONTRACT AS STATED HEREON AND ASSURE THAT DURING THE LIFE OF THE CONTRACT. I/WE WILL MEET OR EXCEED THE PARTICIPATION ESTABLISHED HEREON BY THE DEPARTMENT.

_____ BY _____
BIDDER SIGNATURE

_____
TITLE DATE

Form C-112

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION

CERTIFICATION OF BINDING AGREEMENT
WITH
DISADVANTAGED BUSINESS ENTERPRISE FIRMS

Project No.:

Federal Project No.:

This form is to be submitted in accordance with the Department's Special Provision for Section 107.15.

It is hereby certified by the below signed Contractors that there exists a written quote, acceptable to the parties involved preliminary to a binding subcontract agreement stating the details concerning the work to be performed and the price which will be paid for the aforementioned work. This document is not intended to, nor should it be construed to, contain the entire text of the agreement between the contracting parties. This document does not take the place of, nor may it be substituted for, an official subcontracting agreement in those situations that may require such an agreement. A copy of the fully executed *subcontract agreement* shall be submitted to the Engineer within fourteen (14) business days after contract execution.

It is further certified that the aforementioned mutually acceptable quote and fully executed subcontract agreement represent the entire agreement between the parties involved and that no conversations, verbal agreements, or other forms of non-written representations shall serve to add to, delete, or modify the terms as stated.

The prime Contractor further represents that the aforementioned mutually acceptable quote and fully executed subcontract agreement shall remain on file for a period of not less than one year following completion of the prime's contract with the Department or for such longer period as provisions of governing Federal or State law or regulations may require. For purposes of this form, the term Prime Contractor shall refer to any Contractor utilizing a DBE subcontractor, regardless of tier, in which they are claiming DBE credit toward the contract goal.

Contractors further jointly and severally represent that said binding agreement is for the performance of a "commercially useful function" as that term is employed in 49 C.F.R. Part 26.55 (c), (d).

TO BE SIGNED BY THE SUBCONTRACTOR TO THE PRIME CONTRACTOR, AND ANY LOWER TIER SUBCONTRACTORS HAVING A CONTRACT WITH THE BELOW NAMED DBE FIRM

Prime Contractor _____

By:_____ _____
Signature Title
Date:_____

First Tier Subcontractor
if Applicable _____

By:_____ _____
Signature Title
Date:_____

Second Tier Subcontractor
if Applicable _____

By:_____ _____
Signature Title
Date:_____

Third Tier Subcontractor if
Applicable

By:_____ _____
Signature Title
Date: _____

DBE Contractor _____

By:_____ _____
Signature Title
Date:_____

Class of License Definitions:

Class A Contractor – perform or manage construction, removal, repair, or improvements when (i) the total value referred to in a single contract or project is $120,000 or more, or (ii) the total value of all such construction, removal, repair, or improvements undertaken by such person within any 12-month period is $750,000 or more.

Class B Contractor – perform or manage construction, removal, repair, or improvements when (i) the total value referred to in a single contract or project is $10,000 or more, but less than $120,000, or (ii) the total value of all such construction, removal, repair or improvements undertaken by such person within any 12-month period is $150,000 or more, but less than $750,000.

Class C Contractor – perform or manage construction, removal, repair, or improvements when (i) the total value referred to in a single contract or project is over $1,000 but less than $10,000, or (ii) the total value of all such construction, removal, repair, or improvements undertaken by such person within any 12-month period is less than $150,000. The Board shall require a master tradesmen license as a condition of licensure for electrical, plumbing and heating, ventilation and air conditioning contractors.

The Contractor license shall have the appropriate specialty classification that is predominant for the respective work.

Contractor is required to possess a Class A Contractor's Business License for this project.

1. **RESPONSIBILITY OF BIDDER.** The Bidder shall make a careful examination of the project site, shall familiarize himself with existing conditions, and shall satisfy himself as to the quantity and quality of materials and workmanship required for the Work. He shall carefully and thoroughly examine the Plans, General Conditions, Technical Specifications, Bid Form, Agreement, Forms of Bonds and all other documents included in the Invitation for Bid before submitting a Bid.

   Request for interpretation of plans and specifications should be sent in writing to the Engineer to be given consideration and must be received no later than 4:00 p.m., local prevailing time, on Wednesday, March 4, 2015. Any and all such interpretations and any supplemental instruction will be in the form of written addenda to the specifications which, if issued, will be mailed to all prospective bidders (at the respective addresses furnished for such purposes), not later than five days prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve such bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

   The submission of a Bid shall constitute a warranty by the Bidder that he has complied with the requirements of this paragraph. The Bidder is bound by his bid and his bid reflects an affirmative representation that he has examined the project thoroughly.

2. **FORM OF BID.** All Bids must be made on the Bid Form contained herein. The Bidder shall type or write in ink, both in words and in numerals, the price for which he proposes to furnish all materials, plant, equipment, tools, sheeting or bracing, scaffolds and other facilities; and to perform all labor and services necessary or proper for the completion of the work in strict accordance with the true intent of the Plans and Invitation for Bid Documents, and subject at all times to the approval of the Engineer. All bids shall be signed in the space provided for a signature on the cover sheet and returned. If the bidder is a partnership or corporation, the bidder shall show the title of the individual signing the bid, and if the individual is not the president or vice president of the partnership or corporation, if requested, the bidder shall submit proof that the individual has the authority to bind the partnership or corporation.

No interlineation, alteration or erasure of the Bid will be accepted. No oral, telegraphic, or telephonic proposals, modifications, or interpretations will be considered. Bids concerning separate bid invitations must not be combined on the same form or placed in the same envelope. Bids submitted in violation of this provision may not be considered.

3. **BID GUARANTY.** Each Bid must be accompanied by a Bid Bond or certified check for an amount not less than 5 percent of the total amount of the Bid, as evidence of good faith and as a guaranty that, if awarded the project, the Bidder will execute the Contract and furnish the required Bonds.

   If a Bid Bond is offered as guaranty, the Bond must be on a form acceptable to the Owner, and made by a Surety Company qualified and authorized to do business in the State of Virginia and must be signed or countersigned by an agent qualified for the execution of such instruments and must include necessary papers to show himself qualified, such as a current power of attorney. If a certified check is offered as guaranty, it shall be made payable to Treasurer, Emporia City, Virginia. The Owner will return all certified checks to the Bidders once the Contract has been executed by the successful Bidder.

4. **DELIVERY OF BID.** Bids shall be submitted in a sealed envelope with the due date and time written on the outside of the envelope. The time of receipt shall be determined by the time clock stamp in the Office of the Emporia City Manager. Bidders are responsible for ensuring that their bids are stamped by Office of the Emporia City Manager personnel before the deadline. Late bids shall be rejected.

   Bids or changes to a bid response shall not be accepted via fax or E-mail.

5. **OMISSIONS AND DISCREPANCIES.** Should a Bidder find discrepancies in, or omissions from, the plans or other Invitation for Bid Documents, or should he be in doubt as to their meaning, he should at once notify the Engineer who may issue a written instruction to all Bidders.

6. **REJECTION OF BID.** The Owner reserves the right to waive irregularities and technicalities and to reject any and/or all Bids. Without limiting the generality of the foregoing, any Bid which is incomplete, obscure, or irregular may be rejected; any Bid having interlineation, erasures or corrections may be rejected; any Bid accompanied by an insufficient or irregular certified check or Bid Bond may be rejected. Not more than one Bid from any individual, firm, partnership, or corporation, under the same or different names, shall be submitted. Reasonable grounds for believing that any Bidder is interested in more than one Bid on the same project will cause the rejection of all Bids in which the Bidder is interested.

7. **SUBCONTRACTORS.** The Bidder's attention is called to the requirement that not more than fifty (50) percent of the construction, labor and services necessary to construct the improvements defined in these Invitation for Bid documents shall be subcontracted. The amount of any subcontract proposed by any bidder shall be provided to the County upon request.

8. **ACCEPTANCE OF BID AND ITS EFFECT.** The Contract, if awarded, will be to the lowest responsive and responsible Bidder whose Bid complied with the requirements of the Owner. All bids submitted shall be binding for sixty (60) calendar days following the bid opening date. The Owner will either award the project or reject all Bids received within the sixty (60) calendar days after the formal opening of Bids. The acceptance of a Bid will be a written Notice of Award, signed by the Owner, and no other act shall constitute the acceptance of a Bid. The bid shall be deemed accepted by the County upon mailing of the Notice of Award.

   The successful Bidder shall execute four (4) copies of the Agreement and furnish satisfactory Performance Bond, Labor and Material Payment Bond, and necessary certificates of insurance within fifteen (15) days after Notice of Award. Failure to so execute the Agreement will result in forfeiture of the Bidder's claim to the work and his Bid

Bond or guarantee will be retained by the Owner to the extent necessary to make up the difference between the Bid and the second low bid.

9. **DISABILITY PROVISION.** If you are an individual with a disability and require a reasonable accommodation, please notify the Office of the Emporia City Manager at (434) 634-3332, three working days prior to need.

10. **QUALITY EXPECTATION STATEMENT.** Emporia City, through its quality initiative, is a recognized leader in providing quality products and services at the most effective cost possible. Therefore, the City fully expects, requires, and shall hold all Contractors, and all agents, staff, representatives, and subcontractors of the Contractor, responsible for, and accountable to, the highest quality standards of professional workmanship, products and services. In the spirit of the county's quality initiative, the Contractor shall be expected to become a member of the team and perform or provide all work, services and products with a target of "zero defects - zero rework".

11. **BIDDER QUALIFICATIONS/REFERENCES.** The City reserves the right to request bidder(s) to furnish a written statement of their qualifications and/or to provide a list of references. The City may contact all references furnished by bidder(s). The right is further reserved by the City to contact references other than, and/or in addition to, those furnished by the bidder.

12. **PROPRIETARY INFORMATION.** Section 2.2-4342(F) of the *Code of Virginia* states: "Trade secrets or proprietary information submitted by a bidder, offeror, or Contractor in connection with a procurement transaction or prequalification application submitted pursuant to subsection B of 2.2-4317 shall not be subject to the Virginia Freedom of Information Act (2.2-3700 et seq.); however, the bidder, offeror, or Contractor shall (i) invoke the protections of this section prior to or upon submission of the data or other materials, (ii) identify the data or other materials to be protected, and (iii) state the reasons why protection is necessary." If the exemption from disclosure provided by Section 2.2-4342(F) of the *Code of Virginia* is not properly invoked then the bids will be subject to disclosure pursuant to applicable law.

13. **OFFICE CLOSURE.** In the event that Emporia City government offices are not operating under normal staffing levels or if the location for bid submission, bid opening or pre-bid conference is inaccessible due to inclement weather or other emergencysituations at the published time, the bid submission, bid opening or pre-bid conference will default to the next regular business day at the same time.

14. **DISCREPANCIES BETWEEN WORDS AND NUMERALS.** Discrepancies between words and numerals will be resolved in favor of words. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum.

15. **AMENDMENTS OR REQUESTS TO WITHDRAW BIDS BY A BIDDER PRIOR TO OPENING.** A bidder may amend and/or withdraw their bid before the due date and time designated for receipt of bids. All requests from a bidder to return their bid shall be in writing, addressed to the Office of the Emporia City Manager, and signed by a person authorized to represent the person or firm that submitted the bid. The bidder may be contacted by telephone to verify the authorization of the return request and the signature involved if there is doubt as to the document's authenticity. All amendments to the bid are to be initialed by an individual authorized to represent the bidder.

Bid Form

To: Emporia City

For the Construction of: EAST ATLANTIC STREET (BUSINESS US ROUTE 58)

The undersigned Bidder has carefully examined the site of work, the Plans, the General Conditions, Technical Specifications, Supplemental General Conditions, the Agreement, the Form of Performance and Labor and Material Payment Bonds and all other documents included in the Invitation for Bid for the construction of the above named project, and in compliance with this Invitation for Bid Document will provide all the necessary machinery, tools, apparatus, and other means of construction, and do all the work and furnish all materials called for in accordance with the requirements of the City and the true intent of the Contract Documents, and with an anticipated Notice to Proceed date of Wednesday, April 15, 2015, will complete the project within 180 days of Notice to Proceed(NTP) date.

For the Total Lump Sum of: _____

_____( ) DOLLARS

The Bidder certifies the above bid amount is equal to the sum of unit items on page 33.

The undersigned Bidder further understands that all supplies and materials covered by this Bid shall be new and of the best quality and the highest grade workmanship. The Bidder certifies by the submission of this Bid that there has been no violation of copyrights or patent rights in manufacturing, producing, or selling the product or services shipped or ordered as a result of this Bid. The successful Bidder shall, at his own expense, defend any and all actions or suits charging such infringements, and will save Emporia City, its officers, employees, and agents harmless from any and all liability, loss, or expense occasioned by any such violation.

The Bidder acknowledges receipt of the following Addend_____Accompanying this Bid is a Bid Bond/certified check in the amount of_____payable to Treasurer, Emporia City, which is to be forfeited to the extent necessary to make up the difference between the Bid and the second low bid, or if the undersigned shall fail to execute the Agreement and furnish satisfactory Performance and Labor and Material Payment Bonds under the conditions and within the time specified. If the Bid Bond or guarantee is not sufficient to make up the difference between the Bid and the second low bid, together with any consequential damages, the undersigned Bidder agrees to pay the Owner any losses in excess of the bond or guarantee.

The undersigned Bidder agrees to begin the work not later than ten (10) days after the date specified in the Notice to Proceed and to prosecute the work in such manner as to complete it within the time limit as set forth above. In the event the said work is not completed within the time limit above stated, Bidder shall be liable and hereby agrees to pay the Owner as liquidated damages and not as a penalty the sum of **$600.00 per calendar day** for each and every day that the said work remains incomplete after the expiration of the completion date (Substantial Acceptance).

Va. Contractor License Number _____

If determined to be the successful low bidder(s), and the project cost exceeds $200,000, the bidder elects to utilize the escrow account procedure, a copy of which will be furnished with the contract.

_____
Write "yes" or "No" on above line

Award of this bid shall be made to the lowest responsive and responsible bidder based upon the total lump sum provided on Page 00300-1.

CONTRACTOR'S AUTHORIZATION TO TRANSACT BUSINESS

In accordance with the Virginia State Corporation Commission Registration requirement in paragraph 63 of the General Conditions, the bidder shall check one of the following. The bidder is:

- a corporation or other business entity with the following SCC identification number: _____ **-OR-**

- not a corporation, limited liability company, limited partnership, registered limited liability partnership, or business trust **-OR-**

- an out-of-state business entity that does not regularly and continuously maintain as part of its ordinary and customary business any employees, agents, offices, facilities, or inventories in Virginia (not counting any employees or agents in Virginia who merely solicit orders that require acceptance outside Virginia before they become contracts, and not counting any incidental presence of the bidder in Virginia that is needed in order to assemble, maintain, and repair goods in accordance with the contracts by which such goods were sold and shipped into Virginia from bidder's out-of-state location) **-OR-**

- an out-of-state business entity that is including with this bid an opinion of legal counsel which accurately and completely discloses the undersigned bidder's current contacts with Virginia and describes why those contacts do not constitute the transaction of business in Virginia within the meaning of § 13.1-757 or other similar provisions in Titles 13.1 or 50 of the *Code of Virginia*.

****NOTE**** Check the following box if you have not completed any of the foregoing options but currently have pending before the SCC an application for authority to transact business in the Commonwealth of Virginia and wish to be considered for a waiver to allow you to submit the SCC identification number after the due date for bids. No award shall be issued to a bidder who fails to provide the required information unless a waiver of these requests is granted by the chief executive of the local governing body (the City reserves the right to determine in its sole discretion whether to allow such waivers):

CERTIFICATION OF NON-COLLUSION AND SIGNATURE SHEET
This sheet must be signed and submitted with bid in order for bid to be considered.

My signature below certifies that:

- I agree to abide by all conditions of this bid and that I am authorized to sign this bid;
- the accompanying bid is not the result of, or affected by, any unlawful act of collusion with another person or company engaged in the same line of business or commerce, or any act of fraud punishable under § 18.2-498 of the *Code of Virginia*. Furthermore, I understand that fraud and unlawful collusion are crimes under the Virginia Governmental Frauds Act, the Virginia Government Bid Rigging Act, the Virginia Antitrust Act, and Federal Law, and can result in fines, prison sentences, and civil damage awards; and
- the accompanying bid is in compliance with applicable provisions of the State and Local Government Conflict of Interests (§ 2.2-3100 et. seq. of the *Code of Virginia*). Specifically, without limitation, no County/School Board employee or a member of the employee's immediate family shall have a proscribed personal interest in a contract.
- the accompanying bid is in accordance with applicable provisions of the Virginia Public Procurement Act, Art. 6 Ethics in Public Contracting (§§ 2.2-4367 et. seq. of the *Code of Virginia*), and any other applicable law as set forth therein.

Complete Legal Name of Firm: _____

Check One:_____**Individual**_____**Partnership**_____**Corporation**_____**LLC**_____**Joint Venture**

Mailing Address: _____

_____

Remit To Address: _____

_____

EMAIL Address: _____

Signature: _____

Name (type/print):_____**Title:**_____

Fed ID No.:_____**Phone (_____)**_____**Fax (_____)**_____

We hereby provide the following information to Emporia City regarding our business. We understand that it is provided for statistical purposes only and all firms submitting bids will receive equal consideration.

Minority-Owned Business:	**Yes ___**	**No ___**
Women-Owned Business:	**Yes ___**	**No ___**
Southampton Business:	**Yes ___**	**No ___**

Bid Schedule

Bids shall be LUMP SUM and shall include ALL WORK necessary to complete the project to the full intent of the plans. In the event of additions or deductions to the work required by the Invitation for Bid Documents, the Contractor will be paid extra or shall credit the Owner, as the case may be, on the basis of the unit prices quoted herein. Prices shall include all overhead, profit, labor, materials, equipment and incidental work and shall be the sum total compensation payable or creditable for such items of work in place. These unit prices shall be good for the duration of the contract.

Bids will be considered irregular and may be rejected if the unit prices contained in the bid are obviously unbalanced so that they are substantially in excess of the cost analysis values as determined by the VDOT Hampton Roads (Suffolk) District Averages. Emporia City reserves the right to reject an individual unit price included herein. Items listed in this bid schedule may or may not be on the bid plans. Bids may be rejected if a unit price is not provided for every item listed on the bid form.

Item		Unit	Quantity	Unit Price	Item Price
1.	Mobilization	LS	-	$	$
2.	Construction Staking	LS	-	$	$
3.	2" Asphalt Milling	SY	13,686	$	$
4.	Clearing & Grubbing / Site Preparation	LS	-	$	$
5.	Sawcut Existing Paving	LF	1,795	$	$
6.	Grading	LS	-	$	$
7.	Regular Excavation	CY	2,500	$	$
8.	Undercut Excavation	CY	2,809	$	$
9.	Select Borrow Material, Min CBR = 10	CY	2,809	$	$
10.	Demolition of Existing Curb & Gutter	LF	206	$	$
11.	Demolition of Existing Pavement (Flexible)	SY	366	$	$
12.	24" Class III RCP	LF	20	$	$
13.	24" End Section ES-1	EA	1	$	$
14.	CG-6 Curb & Gutter	LF	241	$	$
15.	Asphalt Concrete Type SM-9.5A	TON	1,926	$	$
16.	Asphalt Concrete Type BM-25.0	TON	839	$	$
17.	Aggregate Base Material Type I, No. 21B	TON	2,257	$	$
18.	Geo-textile Fabric	SY	867	$	$
19.	Geo-synthetic Paving Mat	SY	13,686	$	$
20.	Private Driveway Repair, No. 26	TON	40	$	$
21.	4" Pavement Line Marking	LF	16,500	$	$
22.	24" Pavement Line Marking	LF	60	$	$
23.	Pavement Marking Right Turn Arrow	EA	6	$	$
24.	VDOT R/W Flagger Service	LS	-	$	$
25.	2" Topsoil Class B	AC	0.65	$	$
26.	Regular Seed	LB	163	$	$
27.	10-10-10 Fertilizer	TON	0.16	$	$
28.	Lime	TON	1.30	$	$
29.	Erosion Control Mulch	AC	0.65	$	$
30.	Outlet Protection EC-1	SY	8	$	$
31.	Erosion Control Blankets EC-2	SY	2,623	$	$
32.	Type II Rock Check Dam EC-4	EA	6	$	$
33.	Filter Barrier EC-5	LF	60	$	$
		Total Bid		$	$

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned,

_____as Principal, and

_____as Surety, are hereby held and firmly bound unto City of Emporia, Virginia as owner in the penal sum of for payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns. Signed this_____day of_____,2015. The Condition of the above obligation is such that whereas the Principal has submitted to City of Emporia, Virginia a certain BID, attached hereto and hereby made a part hereof to enter into an Agreement in writing, for the construction of East Atlantic Street (US Business Route 58) IMPROVEMENTS.

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver an Agreement in the form attached hereto (properly completed in accordance with said BID) and shall furnish a BOND for his faithful performance of said Agreement, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all respects perform the Agreement created by the acceptance of said BID, then this obligation shall be void; otherwise, the same shall remain in force and effect, it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____
Principal

_____
Surety

By: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

Agreement

THIS AGREEMENT, made this_____ by and between the City of Emporia, Virginia, hereinafter called "OWNER" and_____ _____doing business as_____ (an Individual) or (a Partnership) or (a Corporation) hereinafter called "CONTRACTOR".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The CONTRACTOR will commence and complete construction of:
   East Atlantic Street (US Business Route 58) IMPROVEMENTS

2. The CONTRACTOR shall furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the PROJECT described herein.

3. The CONTRACTOR will commence the work required by the CONTRACT DOCUMENTS within Ten(10) calendar days after the date of the NOTICE TO PROCEED and will obtain Substantial Acceptance of the project not later than (based on a notice to proceed on) unless the date for completion is extended otherwise by the CONTRACT DOCUMENTS.

4. The CONTRACTOR shall perform all of the WORK described in the CONTRACT DOCUMENTS and shall comply with the terms therein for the sum of $_____or as show in the BID DOCUMENTS.

5. The term "CONTRACT DOCUMENTS" means and includes the following:

   (A) Instructions to BIDDERS
   (B) BID FORM
   (C) BID BOND
   (D) Agreement
   (E) Emporia City General Conditions
   (F) Supplemental General Conditions
   (G) VDOT – 2007 Road and Bridge Specifications, 2008 Road and Bridge Standards, 2011 Work Area Protection Manual
   (H) VDOT SPECIFICATIONS (SPCN's, SP's & SS's)
   (I) 2009 Manual on Uniform Traffic Control Devices
   (J) Storm Water Pollution Prevention Plan (SWPPP)
   http:// cfpub.epa.gov/npdes/stormwater/swppp.cfm
   (K) Labor and Material Payment BOND
   (L) Performance BOND

(M) Notice of Award

(N) Notice to Proceed

(O) Change Order

(P) DRAWINGS prepared by Jeff Robinson and Associates and titled "East Atlantic Street (US Business Route 58) Improvements"

(Q) ADDENDA:

No._____, dated_____, 2015

No._____, dated_____, 2015

6. The OWNER shall pay to the CONTRACTOR in the manner and at such times as set forth in the General Conditions such amounts as required by the CONTRACT DOCUMENTS.

7. The undersigned Contractor shall indemnify and hold the City of Emporia, Virginia (the "City"), and its officers, agents, and employees, and the Virginia Department of Transportation (VDOT) harmless from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance or nonperformance of the work, including but not limited to any such claim, damage, loss or expense, that is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including the loss of use resulting therefrom, or to economic loss; provided, however, that the Contractor's indemnification obligation under this agreement shall be limited to claims, damages, losses, and expenses caused in whole or in part by any act or omission of the Contractor, or any Subcontractor (a "Subcontractor") performing work required by the Contractor's Contractor or any Subcontractor may be liable, regardless of whether or not such claims, damages, losses, and expenses are caused in part by a party indemnified hereunder.

   The Contractor's indemnification obligation hereunder with respect to any and all claims against the City or any of its officers, agents or employees, or VDOT by any employee or statutory employee of the Contractor, or of any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts the Contractor or Subcontractor may be liable, shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under Worker's Compensation Acts, Disability Benefit Acts or other Employee Benefit Acts.

   The Contractor's indemnification obligation hereunder shall not extend to the liability of the Engineer, his agent or employees arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, agents or employees provided such giving or failure to give is the primary cause of the injury or damage. The Contractor's indemnification obligation contained in this paragraph is in addition to any other indemnification obligation of the Contractor set forth within the Contract Documents.

8. This Agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors, and assigns.

9. During the performance of the Contract, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or any other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

B. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

C. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section. The Contractor shall include the provisions of the foregoing paragraphs A, B, and C in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

CONTRACTOR

BY_____
(Signature)

NAME_____
(Typed or Printed)

TITLE _____

ADDRESS _____

_____

(SEAL) ATTEST:

_____
(Secretary)

NAME_____
(Please Type)

(Affix Corporate Seal)

Emporia City

BY_____
(Signature)

NAME_____
(Typed or Printed)

TITLE_____

(SEAL) ATTEST:

NAME_____
(Please Type)

TITLE_____

Notice of Award

TO: _____ DATE: _____

_____ CONTRACT # _____

_____

PROJ. NAME: EAST ATLANTIC STREET (BUSINESS US ROUTE 58) IMPROVEMENTS

Dear_____:

Emporia City has reviewed the bid submitted by you for the above described work in response to its Advertisement for Bids dated_____, 2015, and Information for Bidders. On_____2015, the City Council awarded this project to_____in the amount of $_____.

You are required by the Information for Bidders to execute the Agreement and furnish the required Contractor's Performance Bond, Payment Bond and Certificates of Insurance within fifteen (15) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said Insurance Certificate(s) and Bond within fifteen (15) calendar days from the date of this Notice, we may consider all your rights arising out of our acceptance of your Bid as abandoned and as a forfeiture of your Bid Bond. We will be entitled to such other rights as may be granted by law.

By copy of this letter, we are requesting that the Engineer submit to you four (4) copies of the Contract Documents for execution. After execution of the Contract Documents, please return to the Office of the Emporia City Manager, attention Brian Thrower.

Please acknowledge and return a signed copy of this Notice of Award within five (5) calendar days from the date of this letter. Also, please include a signed copy of this notice in the four (4) contract documents being forwarded to you for execution.

Dated this_____day of_____, 2015.

City of Empoira

By _____

Title _____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

By_____

this the_____day of_____, 2015.

By_____

Title _____

cc: Jeff Robinson, Jeff Robinson and Assocaiates (Engineer)

Notice to Proceed

TO: _____ DATE: _____

_____ CONTRACT # _____

_____ PROJ. NAME: EAST ATLANTIC STREET (US BUSINESS ROUTE 58) IMPROVEMENTS

Dear _____:

You are hereby notified to commence WORK in accordance with the Agreement dated _____ , 2015, within ten (10) calendar days from the date of this NOTICE TO PROCEED, and you are to obtain Substantial Acceptance by no later than based on a notice to proceed date of .

Prior to commencing work on the EAST ATLANTIC STREET (US BUSINESS ROUTE 58 IMPROVEMENTS, you are required to schedule a pre-construction meeting. This meeting shall be scheduled by contacting the following project stakeholders:

1. Emporia City Manager, Brian S. Thrower (434) 634-3332
2. Project Engineer,Jeff Robinson (434) 634-8665
3. VDOT Paul Moose (757-925-1509)
4. VDOT Dave Matthews (757-494-5470)
5. VDOT Joe Lomax (757-346-3065)

Please acknowledge and return a copy of this NOTICE TO PROCEED within five (5) days from the date of this letter.

City of Emporia

By_____

Title_____

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____

this the_____day of_____, 2015

By_____

Title_____

Cc: Jeff Robinson, Jeff Robinson and Associates (Engineer)

Change Order

Project No.#_____

Date:

NAME OF PROJECT: EAST ATLANTIC STREET(US BUSINESS ROUTE58) IMPROVEMENTS

OWNER: **Emporia City**

CONTRACTOR:

The following changes are hereby made to the CONTRACT DOCUMENTS: **DESCRIPTION OF CHANGES**:

JUSTIFICATION:

CHANGE TO CONTRACT PRICE:	Decrease in Contract Price	Increase in Contract Price
1.	$	$
2.	$	$
3.	$	$
(continue on separate sheet if necessary)		
TOTALS	$_____	$ _____
NET CHANGE IN CONTRACT PRICE		$ _____
Original Contract Price		$ _____
Previously Approved Change Orders		$ _____
Current Adjusted Contract Price		$ _____

The contract price due to this Change Order will be (Increased)

(Decreased) by $ _____

The new adjusted contract price including this Change Order $ _____

CHANGE TO CONTRACT TIME:

Original Contract Date _____

Previously Approved Change Orders _____

Current Adjusted Contract Date _____

The contract time due to this Change Order will be (Unchanged)

(Increased)

(Decreased) by _____Days

The new adjusted contract date including this Change Order will be _____

This document will become a supplement to the Contract and all provisions will apply hereto.

Requested by: _____ _____
(Date)

Recommended by _____ _____
(Engineer) (Date)

Accepted by _____ _____
(Contractor) (Date)

Approved by _____ _____
(Emporia City) (Date)

Note: Contractor and City agree that this work order resolves and settles all claims, demands, or damages of any kind relating to or arising out of the work set forth in this work order, including, but not limited to delay, impact, home and field office overhead and acceleration.

Note: By signing this change order, the Engineer hereby certifies that he has checked the math in this change order and that it adds up the amounts depicted within the change order.

Bonds

A Bid Bond, made payable to the Owner, will be required of all Bidders in the amount specified in the "Instructions to Bidders."

A Labor and Material Payment Bond and a Performance Bond, each in the amount of 100% of the Contract Price, including additions or deductions, with a corporate surety authorized to do business in the State of Virginia, rated no less than A VII by A.M. Best, and otherwise acceptable in all respects to the Owner's Attorney will be required for the faithful performance of the Contract. VDOT shall be listed as a Dual Obligee Rider on the Performance Bond to meet the VDOT Land Use permitting requirements. The Bonds shall be on the forms included in these Specifications. The Contractor shall show satisfactory evidence of compliance with all bond requirements before entering into any agreement to sublet any of the work to be done under this Contract. The bonds shall protect the Owner from claims from persons or firms performing labor or furnishing materials and from claims for damages, claims, losses or other expenses to the Owner, including any attorney's fees, arising from failure of the Contractor to perform the Contract, or to correct defective materials or workmanship. Such bonds shall remain in force for a period of at least twelve months after the completion and final acceptance of the project by the Owner. Executed copies of the Labor and Material Payment and Performance Bonds shall be bound with, and become a part of, all copies of the Contract. Prior to the issuance of any bond required by this Contract, the Contractor or Subcontractor shown as principal on the bond shall furnish the insurance company issuing the bond with a copy of the Contract.

Attorneys-in-fact who sign Bid Bonds, Labor and Material Payment Bonds and Performance bonds must file with each bond a certified and effective dated copy of their power of attorney. Each Bid Bond and the accompanying power of attorney should bear the same date. Each Labor and Material Payment Bond and each Performance Bond and the accompanying power of attorney should bear the same date as the date of the Contract.

The party to whom the Contract is awarded will be required to execute the Contract and obtain the Labor and Material Payment Bond and the Performance bond within fifteen calendar days from the date when the Notice of Award together with the Contract is delivered to the Bidder for execution. In case of the failure of the Bidder to execute the Contract within the prescribed time, the Owner may, at his option consider the Bidder in default, in which case the Bid Bond accompanying the Bid shall be forfeited as allowed by law.

Performance Bond

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____, hereinafter called PRINCIPAL, and
(Corporation, Partnership or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

Emporia City
(Name of Owner)

201 South Main Street, PO Box 511, Emporia, Virginia 23847
(Address of Owner)

hereinafter called OWNER, in the penal sum of_____Dollars, ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal entered into a certain contract with the OWNER, dated the_____day of_____, 2015, a copy of which is hereto attached and made a part hereof, for the construction of:

EAST ATLANTIC STREET (US BUSINESS ROUTE 58) IMPROVEMENTS

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions which may be granted by the OWNER, with or without notice to the Surety and during the one year guarantee period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that the said Surety for value received hereby stipulates and agrees that its obligation on this bond shall extend and apply to said Contract dated the day of_____ 2015, and to such Contract as it may be amended or otherwise modified by any change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the SPECIFICATIONS accompanying same, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in_____counterparts one of which shall be
(number)

deemed an original, this the_____day of_____, 2015.

ATTEST:

_____ (Principal Secretary)

_____ (Principal)

(SEAL)

BY_____

_____ (Address)

_____

_____ Witness as to Principal

_____ (Address)

_____

ATTEST:

_____ Surety

BY_____ (Attorney-In-Fact)

_____ Witness as to Surety

_____ (Address)

_____ (Address)

_____

IMPORTANT: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

Labor and Material Payment Bond

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____, hereinafter called PRINCIPAL, and
(Corporation, Partnership or Individual)

_____
(Name of Surety)

_____
(Address of Surety)

hereinafter called SURETY, are held and firmly bound unto _____

Emporia City
(Name of Owner)

201 South Main Street, PO Box 511, Emporia, Virginia 23847
(Address of Owner)

hereinafter called OWNER, in the penal sum of _____Dollars, ($_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas the Principal entered into a certain contract with the OWNER, dated the_____day of_____, 2015, a copy of which is hereto attached and made a part hereof, for the construction of:

EAST ATLANTIC STREET (US BUSINESS ROUTE 58) IMPROVEMENTS

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of WORK, and all insurance premiums on said WORK, and for all labor performed in such WORK whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that the said Surety for value received hereby stipulates and agrees that its obligation on this bond shall extend and apply to said Contract dated the_____ day of_____, 2015, and to such Contract as it may be amended or otherwise modified by any

change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the SPECIFICATIONS accompanying same, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the WORK or to the SPECIFICATIONS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in_____counterparts one of which
(number)
shall be deemed an original, this the_____day of_____,2015.

ATTEST:

_____ (Principal Secretary)

_____ (Principal)

BY_____

_____ (Address)

_____

_____ Witness as to Principal

_____ (Address)

_____

ATTEST:

_____ Surety

BY_____ (Attorney-In-Fact)

_____ Witness as to Surety

_____ (Address)

_____ (Address)

_____

_____

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

Form C-104
Rev. 7-13-05

COMMONWEALTH OF VIRGINIA DEPARTMENT OF TRANSPORTATION

PROJECT:
FHWA:

This form must be completed, signed and returned with bid; and failure to do so may result in the rejection of your bid. **THE CONTRACTOR SHALL AFFIRM THE FOLLOWING STATEMENT EITHER BY SIGNING THE AFFIDAVIT AND HAVING IT NOTARIZED OR BY SIGNING THE UNSWORN DECLARATION UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES.** A SEPARATE FORM MUST BE SUBMITTED BY EACH PRINCIPAL OF A JOINT VENTURE BID.

STATEMENT. In preparation and submission of this bid, I, the firm, corporation or officers, agents or employees thereof did not, either directly or indirectly, enter into any combination or arrangement with any persons, firm or corporation or enter into any agreement, participate in any collusion, or otherwise take any action in the restraint of free, competitive bidding in violation of the Sherman Act (15 U.S.C. Section 1) or Article 1.1 or Chapter 12 of Title 18.2 (Virginia Governmental Frauds Act), Sections 59.1-9.1 through 59.1-9.17 or Sections 59.1-68.6 through 59.1-68.8 of the Code of Virginia.

AFFIDAVIT

The undersigned is duly authorized by the bidder to make the foregoing statement to be filed with bids submitted on behalf of the bidder for contracts to be let by the Commonwealth Transportation Board.

Signed at _____, this _____ day of _____, 20 _____
County (City), STATE

_____ By: _____ _____
(Name of Firm) (Signature) Title (print)

STATE of _____ COUNTY (CITY) of _____

To-wit:

I _____, a Notary Public in and for the State and County (City) aforesaid, hereby certify that this day _____ personally appeared before me and made oath that he is duly authorized to make the above statements and that such statements are true and correct.

Subscribed and sworn to before me this _____ day of _____, 20 _____
_____ My Commission expires _____
Notary Public *OR*

UNSWORN DECLARATION

The undersigned is duly authorized by the bidder to make the foregoing statement to be filed with bids submitted on behalf of the bidder for contracts to be let by the Commonwealth Transportation Board.
Signed at _____, this _____ day of _____, 20 _____
County (City), STATE

By: _____ _____ _____
(Name of Firm) (Signature) Title (print)

Form C-105
Rev. 7-13-05

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

AFFIDAVIT:
PROJECT:
FHWA:

This form must be completed, signed, notarized and returned with bid; and failure to do so, may result in the rejection of your bid. A separate form must be submitted by each principal of a joint venture bid.

1. I, the firm, corporation or officers, agents or employees thereof have neither directly nor indirectly entered into any combination or arrangement with any person, firm or corporation or entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such contract, the effect of which is to prevent competition or increase the cost of construction or maintenance of roads or bridges.

   During the preceding twelve months, I (we) have been a member of the following Highway Contractor's Associations, as defined in Section 33.1-336 of the Code of Virginia (1970). (If none, so state).

NAME	Location of Principal Office
_____	_____
_____	_____
_____	_____

2. I (we) have _____, have not _____, participated in a previous contract or subcontract subject to the equal opportunity clause, as required by Executive Orders 10925, 11114, or 11246, and that I/We have _____, have not _____, filed with the joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filing requirements.

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor [41 CFR 60-1.7(b)(1)], and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contract or subcontracts of $10,000 or under are exempt.) Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations. Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contract and subcontract unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

(Continued)

ORDER NO.:
CONTRACT ID. NO.:

3. The bidder certifies to the best of its knowledge and belief, that it and its principals:

(a) Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any Federal department or agency;

(b) Have not within a three year period preceding this proposal been convicted of or had a civil judgement rendered against them for commission of fraud or a criminal offence in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated above; and

(d) Where the biddersis unable to certify to any of the statements in this certification, the bidder shall show an explanation below.

Explanations will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any explanation noted, indicate below to whom it applies, initiating agency, and dates of action. Providing false information may result in federal criminal prosecution or administration sanctions. The bidder shall provide immediate written notice to the Department if at any time the bidder learns that its certification was erroneous when submitted or has become erroneous by reason of change circumstances.

The undersigned is duly authorized by the bidder to make the foregoing statements to be filed with bids submitted on behalf of the bidder for contracts to be let by the Commonwealth Transportation Board.

Signed at_____ , this day_____ of_____, 20 _____
County (City), STATE

_____ By: _____ _____
(Name of Firm) (Signature) Title (print)
STATE of_____COUNTY (CITY) of_____

To-wit:
I_____, a Notary Public in and for the State and County (City) aforesaid, hereby certify that this day_____ personally appeared before me and made oath that he is duly authorized to make the above statements and that such statements are true and correct.

Subscribed and sworn to before me this_____day of _____ , 20 _____

_____ My Commission expires _____
Notary Public

Insurance

The Contractor shall purchase and maintain in force, at his own expense, such insurance as will protect him, the City, and VDOT from claims which may arise out of or result from the Contractor's execution of the work, whether such execution be by himself, his employees, agents, subcontractors, or by anyone for whose acts any of them may be liable. The insurance coverage(s) shall be such as to fully protect the Contractor, City, VDOT, the Engineer and the general public from any and all claims for injury and damage resulting by any actions on the part of the Contractor, or his forces enumerated above. Cost of said coverage shall be at the Contractor's expense.

The Contractor shall furnish insurance in satisfactory limits, and on forms and of companies which are acceptable to the Owner's Attorney and/or Risk Management and shall require and show evidence of insurance coverage(s) on behalf of any subcontractors (if applicable) before entering into any agreement to sublet any part of the work to be done under this contract.

The Contractor shall maintain during the initial term and any additional terms of this contract the following equivalent coverage and minimum limits:

1. Commercial General Liability $1,000,000 Combined Single Limit per occurrence

    a. The Contractor shall name as additional insureds on the Commercial General Liability police those property owners requesting this, if the work will take place on their property. The Contractor shall provide Certificates of Insurance evidencing this to the property owners and Owner's Risk Management Director
    b. The Contractor shall be responsible for continuing in force completed operations, bodily injury and property damage coverage for a minimum of two (2) years after completion and acceptance of the work.

2. Automobile Liability $1,000,000 Combined Single Limit per occurrence

3. Workers' Compensation Virginia Statutory limits

4. Employers' Liability $100,000 each accident

5. Umbrella Liability Insurance $2,000,000 Each Occurrence

If an insurance certificate is used as evidence of the required insurance the insurance certificate:

a. Must reflect that the Commercial General Liability policy names Emporia City as an additional insured by endorsement to the policy;

b. Must reflect that the policies are endorsed to require no less than 30 days notice of cancellation or other change in coverage to the City;

c. Must have an authorized signature;

d. The Certificate Holder should be listed as:

    Emporia City
    201 South Main Street, PO Box 511
    Emporia, Virginia 23847

Instructions Regarding Insurance Certificates

The Contractor and his insurance company should carefully review the insurance requirements applicable to this job. All requirements must be met before the County will execute the contract. In particular, we would call your attention to the following:

1. Please note that the Insurance Certificate must state that the Commercial General Liability Policy names **Emporia City** and the **Virginia Department of Transportation** as additional insured by endorsement to the policy. This requirement may be met by placing the following language on the Certificate. Many Certificates have a space headed **"Description"** where the language may be inserted as follows:

    (a) **Emporia City and the Virginia Department of Transportation by endorsement to the policy are additional insureds**; *or th*at
    (b) **Emporia City and the Virginia Department of Transportation by endorsement to the policy are additional insureds with respects to General policy**; *or*
    (c) **The Contractor may provide a copy of the actual endorsement to the policy.**

2. The insurance policies must be endorsed to require notice of cancellation or other change in coverage to the City. The Certificate statement which is required by the contract documents, shall read as follows:

    (a) **"By endorsement to the policies, the insurers will provide 30-day written cancellation notice to Emporia City"**; or
    (b) **The contractor may attach a copy of the endorsement to the certificate**.

Emporia City General Conditions

1. **DEFINITIONS**

A. **AGREEMENT**
The agreement covering the performance of the Work and the furnishing of the materials for the proposed construction. The terms "Agreement" and "Contract" are synonymous and include all Contract Documents as that term is defined in the General Conditions.

B. **BID**
The proposal submitted by a Bidder on the Bid Form consistent with the Instructions to Bidders, to complete the Work for a specified sum of money and within a specified period of time.

C. **BIDDER**
An individual, firm, partnership or corporation qualified in accordance with the Virginia Public Procurement Act, and approved by the Owner, that submits a Bid for the Work, either directly or through a duly authorized representative.

D. **BID BOND**
The bond, with corporate surety, supplied by a Bidder to the Owner on a form acceptable to the Owner that guarantees the Bidder's compliance with the Instructions to Bidders. A certified check payable to the owner, delivered with the Bid, may also constitute a Bid Bond.

E. **BID DOCUMENTS**
All Invitation for Bid Documents that the Owner or Engineer provides to potential Bidders before the time established for the submission of Bids.

F. **CHANGE ORDER**
An amendment or modification to the Agreement, properly executed by authorized representatives of the Owner and the Contractor on the form provided in the Contract Documents.

G. **COMPLETION OF THE WORK**
Final completion shall be defined as the event that occurs when (1) the Work has been completed, successfully tested and approved in accordance with the Contract Documents, (2) all submittals required by the Contract Documents (including Operation and Maintenance Manuals) have been made, (3) all Punch List items and restoration Work required by the Contract Documents has been completed; and (4) Work is complete and the City has issued Final Acceptance.

H. **CONTRACT BONDS**
The Performance Bond and Labor and Material Payment Bond executed by the Contractor, with corporate surety, on the forms provided in the Contract Documents.

I. **CONTRACT DOCUMENTS**

The Advertisement, Instructions to Bidders, Bid Form, Bid Bond, Bond Requirements, Agreement, General Conditions, Supplemental General Conditions, Insurance Provisions (Including Instructions Regarding Insurance Certificates), Labor and Material Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Escrow Agreement (when used), Change Orders, Drawings, Specifications and Addenda, Special Provisions and any other document incorporated by reference into one of these documents.

J. **CONTRACT PRICE**

The amount of money which the Owner and the Contractor have agreed that the Owner will pay to the Contractor for performing and completing the Work.

K. **CONTRACTOR**

The party that has contracted to perform and complete the Work.

L. **ENGINEER**

The consulting engineer who has been designated by the County as engineer for the project, and the Engineer's authorized agents, inspectors or representatives.

M. **FINAL INSPECTION**

The inspection conducted by the Engineer to determine what items of the Work must be completed by the Contractor in order for Completion of the Work to occur. After the Final Inspection is conducted, the Engineer shall provide the Contractor with a Punch List that the Contractor must complete in order for Completion of the Work to occur. The Owner may perform the Final Inspection instead of, or together with, the Engineer.

N. **FORCE ACCOUNT - EXTRA WORK**

Work not within the Scope of Work as described in Paragraph 17 of the General Conditions that is determined to be necessary by the owner and Engineer.

O. **INSPECTOR**

The person appointed by the Owner to carry out instructions given by the Owner and to inspect the Work performed and the materials supplied by the Contractor pursuant to this Agreement.

P. **OWNER**

Emporia City, Virginia, a political subdivision of the Commonwealth of Virginia, and its duly authorized officials, agents and employees.

Q. **PLANS**

All drawings or reproductions of drawings that depict or relate to the Work. A pictorial representation of the Work or some portion of the Work, showing design, location and dimensions.

R. **PUNCH LIST**

The list provided to the Contractor by the Engineer or owner after Final Inspection that includes all items that the Contractor must complete in order for Completion of the Work to occur.

S. **SPECIAL PROVISIONS**

Virginia Department of Transportation and/or Federal Aid requirements and any Supplemental General Conditions included in the Contract Documents.

T. **SPECIFICATIONS**

The directions, provisions and requirements contained in the Contract Documents relating to the method or manner of performing the Work, or to the quantity or quality of materials to be furnished under the Contract Documents.

U. **SUBCONTRACTOR**

Any individual, firm or corporation having a direct contract with the Contractor for the performance of any part of the Work.

V. **SUPERINTENDENT**

The person appointed by the Contractor who is in direct charge of the Work for the Contractor.

W. **TIME OF COMPLETION**

The time agreed upon by the Owner and the Contractor in the Agreement by which the Contractor is required to accomplish Completion of the Work, plus any extensions of time granted to the Contractor by the Owner pursuant to the Contract Documents.

X. **THE WORK**

The whole and any part of the construction, labor, materials, equipment, incidentals or services necessary for the Contractor to achieve Completion of the Work as required by the Contract Documents.

2. **AGREEMENT CONSTRUED UNDER VIRGINIA LAWS**

The Agreement and Contract Bonds shall be executed in the State of Virginia and shall be construed in accordance with the laws of the State of Virginia, excepting the law governing conflicts of laws. Any action at law, suit in equity or other adjudicatory proceeding instituted as a result of the performance, non-performance or alleged breach of this Agreement shall be brought in the Circuit Court of the Emporia City, Virginia, to the express exclusion of any other judicial forum.

3. **ASSIGNMENT OF AGREEMENT**

Neither the Agreement, nor any part thereof, nor any monies due or that become due to the Contractor pursuant to the Agreement, may be assigned by Contractor without the prior written approval of the Owner.

4. **SERVING OF NOTICE**

When the Owner is required by the Contract Documents to give written notice, demand or other communication to the Contractor, the Owner's notice, demand or communication shall be deemed to be given when it is deposited in the United States mail, postage pre- paid, and addressed to the address of the Contractor stated in the Agreement or at such other address as the Contractor designates in writing to the Owner.

5. **LAWS AND REGULATIONS**

The Contractor shall comply with all State and Federal laws, local ordinances, other regulations

and orders or decrees of bodies or tribunals having jurisdiction over the Contractor or the Work and that affect the performance of the Work or the people who are employed or engaged in performing the Work.

The Contractor shall defend, indemnify and hold harmless the owner and its officers, agents and employees against any claim, liability or judgment arising from or based on the violation of such laws, ordinances, regulations, orders or decrees, whether the violation is committed by the Contractor or by its agents, employees, subcontractors or suppliers.

For questions or additional information regarding environmental requirements for the City, please contact City of Emporia Department of Community Development and Planning at (434) 634-6315.

6. **COMPLIANCE WITH SAFETY AND HEALTH LAWS**

The Contractor shall comply with the Rules and Regulations Governing the Safety and Health of Employees Engaged in Construction and all revisions thereto, as adopted by the Safety and Health Codes Commission of the Commonwealth of Virginia and issued by the Virginia Department of Labor and Industry.

The Contractor shall perform all construction operations in accordance with all laws, rules, and regulations of the U. S. Occupational Safety and Health Act of 1970, the Standards of the U. S. Department of Labor, Occupational Safety and Health Administration and the latest amendments thereto.

7. **JOB SAFETY**

The Contractor is responsible for maintaining and implementing appropriate safety measures performing of the Work. The Engineer has not been retained to provide construction review services relating to the Contractor's safety precautions or to means, methods, techniques, sequences or procedures required for the Contractor to perform the Work.

8. **SANITARY PROVISIONS**

The Contractor shall provide and maintain in a neat and sanitary condition sufficient portable toilets and sanitary facilities for the use of its employees and the employees of subcontractors.

9. **USE OF WATER**

The Contractor shall not withdraw water from the Owner's facilities for any purpose unless suitable arrangements for withdrawal have been made with the Owner through the Inspector.

10. **FIRE PREVENTION**

The Contractor shall take all necessary precautions to prevent the outbreak of fire on the job site and to immediately suppress any fire which does occur.

11. **CLEAN UP OF JOB SITE**

The Contractor shall clean up the job site as the Work progresses. If the Contractor fails to keep the job site clean, the Owner may require the Contractor to stop all or any portion of the Work until the job site is clean.

12. **DESIGNATION OF WORK AREAS**

The Owner reserves the right to designate the order in which the Contractor performs the Work.

13. **PERMITS**

The Contractor is responsible for ensuring that all permits required to perform the work are obtained and that all conditions of those permits are met throughout the duration of the project. Permits for this project that have been obtained by the county, will be obtained by the county, will be transferred to the Contractor and/ or must be obtained by the Contractor are identified in the Supplemental Conditions. Any other permits not identified in the Supplemental Conditions, but required to perform the work, will be the responsibility of the Contractor to obtain. Unless explicitly stated otherwise in the Supplemental Conditions, all charges and expenses associated with obtaining permits or meeting the conditions of the permits shall be the responsibility of the Contractor.

14. **PATENTS, FEES, ROYALTIES AND LICENSES**

If the Contractor uses any device, material or process covered by trademark, patent or copyright, it shall obtain permission to use the device, material or process by executing a suitable legal agreement with the owner of the trademark, patent or copyright, and a copy of the agreement shall be filed with the owner before the Contractor uses the device, material or process.

The Contractor shall protect, indemnify and hold harmless the Owner and its officers, agents and employees from all claims or suits for infringement resulting from Contractor's use of any patented device, design, material or process or the Contractor's use of any trademark or copyright in connection with the Work. The Contractor shall protect, indemnify and hold harmless the Owner and its officers, agents and employees from any costs, expenses or damages, including reasonable attorney's fees which the Owner may suffer or incur at any time by reason of any alleged or actual patent, trademark or copyright infringement.

15. **CONTRACT BONDS**

Contract Bonds shall be executed on the form provided by the Owner in the Contract Documents and shall be in an amount not less than the full Contract amount, including any increases in the Contract amount that may be agreed upon between the Owner and Contractor pursuant to the Contract Documents.

16. **PRE-CONSTRUCTION CONFERENCE**

Representatives of the Owner, the Engineer, the Contractor and other appropriate parties shall meet and conduct a pre-construction conference at least three (3) days before the Contractor begins to perform the Work. A summary of the conference shall be prepared by the Engineer and distributed to the Owner and the Contractor. The Contractor shall acknowledge receipt of the Engineer's summary in writing to the Owner. Reference the Supplemental General Conditions for a list of appropriate parties pertaining to the Work.

17. **SCOPE OF WORK**

The Contractor shall perform in a workmanlike manner all work described in or reasonably implied by the Contract Documents; all additional or incidental work that is necessary to complete the Work to the finished lines and grades; and all Work necessary to connect the Work with adjoining work or facilities. The Contractor shall furnish all implements, machinery, equipment, tools, material, labor, and construction expertise necessary to perform the Work.

18. **FAMILIARITY WITH PROPOSED WORK**

The Contractor has made a thorough examination of the Contract Documents and has fully informed itself of the quality of materials and character of the workmanship required to perform and

complete the Work.

19. **RESPONSIBILITY FOR ACTIONS OF WORKMEN**

All employees of the Contractor and subcontractors are servants of the Contractor and subcontractors. They are not employees of the Owner. The Contractor shall not be relieved from responsibility or liability on account of any fault or delay in the execution of the Work, or any part thereof, resulting from the actions or inaction of any such employee or any material supplier.

20. **INSPECTOR**

The Inspector is authorized by the Owner to inspect and approve all Work and materials. In case of any dispute arising between the Contractor and the Inspector over materials furnished or the manner of performing the Work, the Inspector has the authority to reject material or suspend Work until the dispute is resolved by the Engineer. The Inspector is not authorized to revoke, alter, enlarge, relax or waive any requirements of the Contract Documents or to approve or accept any portion of the Work or issue instructions contrary to the Contract Documents.

The Engineer and Inspector shall have access at all times to all of the Work.

21. **SUPERINTENDENT**

The Contractor shall supervise the Work and shall be represented by a Superintendent who shall have full authority to act on behalf of the contractor as the Contractor's agent and representative. The Superintendent or Contractor shall be on duty at all times while the Work is being done.

22. **MATERIALS AND WORKMANSHIP**

The Contract Documents describe the character and features of the materials and workmanship required to perform the Work. The Contract Documents require first class work and materials in all particulars. In case of any disagreement between the Owner and the Contractor about the meaning and intent of the Contract Documents, the Engineer shall determine the meaning and intent, and the Engineer's determination shall be binding on the Contractor.

23. **NO DEVIATION FROM CONTRACT DOCUMENTS BY THE CONTRACTOR**

In performing the Work, the Contractor shall not deviate from the Contract Documents without the written consent of the Engineer and the Owner. If the Contractor does deviate from the Contract, it shall correct the deviation at its expense in a manner satisfactory to the Engineer and the Owner.

24. **INTERPRETATION OF CONTRACT DOCUMENTS**

In case of discrepancy between or among the Contract Documents, the Engineer shall make all interpretations that are necessary to fulfill the intent of the Contract Documents. The Engineer's interpretation shall be binding on the Contractor.

The Contractor shall verify all figures on the Plans and shall be responsible for the proper coordination of all dimensions as well as all different parts of the Work.

25. **DISCREPANCIES**

The Contractor shall immediately report to the Engineer, in writing, all discrepancies, that it finds between the Contract Documents and site conditions and any inconsistencies or ambiguities in the Contract Documents. The Engineer shall promptly correct such discrepancies, inconsistencies or ambiguities in writing. Work done by the Contractor after it discovers such discrepancies, inconsistencies, or ambiguities, but before the Engineer has provided a written correction, shall be

performed at the Contractor's risk.

26. **CONFLICTS WITH LAWS, RULES OR REGULATIONS**

If any requirement of the Contract Documents conflicts with the requirements of any governmental authority having jurisdiction over the project or the job site, then to the extent of such conflict, the Contract Documents shall be superseded by the applicable law, rule, or regulation.

27. **CONTRACTOR'S RESPONSIBILITY FOR THE WORK**

The Contractor shall be responsible for the Work, and shall take all precautions to prevent injuries to persons and property on or about the Work. The Contractor shall bear all losses resulting from any difference in the amount or character of the Work from what the Contractor estimated or expected, or from any difference in the nature of the land in which or on which the Work is done from what the Contractor expected. The Contractor shall defend, indemnify and hold harmless, the Owner, its officers, and agents from all claims relating to labor and materials furnished for the Work; from all claims for violation of patents, trademarks and copyrights used in performing the Work; from injuries to any person performing the Work; from improper materials, implements or labor used; and from any act, omission or neglect of the Contractor, any subcontractor or their employees.

Until Final Acceptance of the Work, the Work shall be under the charge of the Contractor, and the Contractor shall take all necessary precautions against injury or damage to the Work or to any part of the Work from any cause whatsoever, whether arising from the execution or the non-execution of the Work.

The Contractor shall rebuild, repair, restore and make good, at his expense, all injuries or damage to the Work occasioned by any of the above causes before Final Acceptance of the Work.

28. **CHARACTER OF WORKMEN AND EQUIPMENT**

The Contractor and all subcontractors shall employ competent superintendents, foremen and workmen who shall perform the Work in a workmanlike manner. The Owner may demand that the Contractor discharge or remove from the project any employee the Contractor or any subcontractor who is incompetent or negligent in the performance of his duties, or who refuses or neglects to comply with the directions of the Owner, Engineer or Contractor. Any person so discharged from the project shall not be employed again without written consent of the Owner.

29. **INCREASED OR DECREASED WORK**

The Owner may increase or decrease the value of the Work at any time, with or without the agreement of the Contractor. The Owner may increase or decrease the Work by adding, omitting or relocating sections, whether shown on the Plans or not.

If the increase, decrease, or relocation of the Work is substantially the same in nature as the remainder of the Work, then the Contract Price shall be adjusted based on the unit prices contained in the Contract Documents. Whenever additional work involves a substantial change in the nature of the design of the Work or in the type of construction, the additional Work shall be performed in accordance with the specifications and as directed by the Engineer, provided, however, that before the Contractor begins to perform the additional Work, a Change Order shall be executed by the parties.

30. **CHANGE OF PLANS**

The Engineer, with the approval of the Owner, may make alterations for line, grade, plan positions, dimensions, materials or any other part of the Work either before or after commencement of the Work.

31. **CORRECTION OF WORK**

The Contractor shall promptly remove from the premises all work rejected by the Engineer or Inspector for failure to comply with the Contract Documents, whether the rejected work is incorporated into the Work or not. After removing the rejected work, the Contractor shall promptly replace and re-execute the work in accordance with the Contract Documents, without expense to the Owner. The Contractor shall repair, at its own expense, all work of other contractors that is destroyed or damaged by the Contractor or any subcontractor.

All removal and replacement work shall be performed at the Contractor's expense. If the Contractor does not remove rejected work within ten (10) calendar days after it receives written notice from the Owner or Engineer to remove it, the Owner may remove the rejected work, and store the materials, at the expense of the Contractor.

32. **EXISTING STRUCTURES**

The location of existing sewers, water and gas pipes, conduits and other structures across, along or under the area of the Work are not necessarily shown on the Contract Documents, and if shown, the description, composition, location, depth and dimensions of those structures may not be correct. The Owner shall not be responsible to the Contractor for any delays or extra costs incurred by the Contractor as a result of any discrepancy between the actual location of existing structures and the Contract Documents or as built drawings. The Contractor shall have a working pipe locator on the job at all times.

The Contractor shall dig such test holes as are needed to locate existing underground structures. The contractor shall dig such test holes only after giving 48 hours prior notice to the Owner and to the owner of the underground structure.

33. **CARE FOR EXISTING STRUCTURES**

The Contractor shall be liable for all damage to any existing structure or property arising from its negligence or carelessness. The Contractor shall protect and maintain all underground, overhead or surface utilities encountered while performing the Work. The Contractor shall locate and adjust water valve boxes on existing water lines in order to facilitate turning water off so that appropriate tie-ins can be made.

Forty-eight (48) hours prior to commencing work, the Contractor shall contact the Utility Information Center ("Miss Utility"), telephone number 1-800-552-7001, for assistance in locating existing underground utilities.

The Contractor shall not kill, deface or cut down trees unnecessarily, both within and outside of project work areas or easements. The Contractor shall be responsible for all damage to property not in the Work area or easements.

34. **SUBSURFACE CONDITIONS**

The Contractor shall promptly, and except in an emergency, before such conditions are disturbed, notify the Owner in writing of subsurface or latent physical conditions at the site differing materially

from those indicated in the Contract Documents; or of physical conditions at the site, either unknown or differing from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents.

35. **INDEPENDENT TESTING**

The Contractor shall provide all material testing required in accordance with **current edition** of the VDOT Inspection Manual; however, the Owner may employ an independent testing laboratory to conduct tests of materials, supplies, machinery, tools, or other equipment supplied by the Contractor when the Owner believes it to be necessary to assure compliance with the Contract Documents. The Contractor shall cooperate with the Owner in facilitating these tests. All test results shall be furnished to the Inspector and the Engineer upon completion of the individual tests such that records can be kept up to date throughout the project. The Contractor shall notify the Inspector immediately upon receipt of a failing test result.

36. **EXTRA WORK**

Any work that is necessary for Completion of the Work that is not described in the Scope of Work (Paragraph 17 of the General Conditions) is Extra Work and shall be paid for in one of the following manners:

A. At a price agreed upon in writing between the Contractor and Owner.

B. In the event of work covered by unit prices included in the Bid Schedule, at a price derived from application of unit prices to the quantities necessary to complete the extra work.

Change Orders shall be agreed upon prior to beginning Extra Work. No Change Order shall in any manner or to any extent relieve the Contractor or his Surety of any obligation under the contract. All Change Orders given in accordance with the Agreement are a part of the Agreement and are subject to each and every term or requirement of the Agreement.

The Contractor is responsible for all damages caused by the carelessness or lack of skill of the Contractor, the subcontractors, or employees of the Contractor or subcontractor in doing Extra Work.

37. **PROGRESS OF THE WORK**

The Contractor shall provide an adequate force of labor and equipment to prosecute the Work to insure the Completion of the Work within the time limit for Completion as set forth in the Agreement.

If required by Owner or Engineer, the Contractor shall furnish a progress schedule to the Owner and Engineer in a form acceptable to the Engineer within ten (10) calendar days after the request is made. The Contractor shall provide all manpower and equipment necessary to meet the progress schedule. In the event periodic estimates indicate that the schedule progress is not being met, the Owner or Engineer may require the Contractor to furnish in writing to the Engineer the method the Contractor proposes to employ to bring the project into compliance with the progress schedule. The Owner may withhold payments if the Work is behind the progress schedule or otherwise not being performed in accordance with the terms of the Contract Documents.

38. **TIME OF COMPLETION**

Time is of the essence in performing this Contract. The Contractor shall perform and complete the Work in accordance with the Contract Documents before the expiration of the time limit stipulated in the Bid, the Agreement and any extensions of time that are agreed upon pursuant

to the procedure for granting extensions of time set forth in the Contract Documents. The amount of time permitted for Completion of the Work contemplates ordinary delays to construction work of a similar character. The Contractor shall not be entitled to an extension of time or additional compensation for ordinary delays in the Completion of the Work or for delays occasioned by inclement weather or accidents. Such delays will not relieve the Contractor from maintaining the rate of progress specified herein or from completing the Work within the stipulated time limit.

If delays are caused by acts of God, acts of government, unavoidable strikes, Extra Work, or other causes or contingencies not enumerated in the preceding paragraph and if they are beyond the control or responsibility of the Contractor, the Contractor may request the Owner to allow additional time to perform and complete the Work. If the Owner determines that the delay is properly excusable, the Owner will, in writing, extend the time for completion of the Work by the amount of time that the Owner believes to be appropriate. The Contractor agrees that such extension of time shall constitute his sole remedy against the Owner for such delays. Contractor shall not have or assert any claim for, nor shall he be entitled to any additional compensation or damages on account of such delays. If the delay is due solely to the negligence of the Owner, or any of its officers or employees, the Contractor may also request from the Owner an adjustment in the Contract Price for actual costs incurred by the Contractor to perform and complete the Work. The Contractor shall be entitled to an adjustment in Contract Price only for actual costs, as that term is defined in Paragraph 36, in the General Conditions, entitled Extra Work. If the owner determines that the delay is of the nature described in this subparagraph and that an adjustment in price is warranted, the owner may, in writing, grant an adjustment in the price for the Work in amount deemed appropriate by the Owner.

Within ten (10) calendar days from the beginning of any delay for which Contractor is entitled to an extension of time or additional compensation, the Contractor shall submit in writing to the Owner, with a copy to the Engineer, its request for adjustment in price or extension of time for the completion of the Work. Any such request shall set forth the cause and particulars of the delay, the details of the delay, and documentation supporting the extension or adjustment requested. The Owner shall review the information and documentation submitted by the Contractor and shall respond to the Contractor in writing. If the Contractor fails to comply with any requirement of this subparagraph the Contractor shall be precluded from making any claim for an adjustment in the Contract Price or extension of time for Completion of Work due to the delay. In no event shall the Owner's officers, agents or employees have any liability to the Contractor, any subcontractors, or any agents, servants or employees of the Contractor or sub-contractors with respect to or arising out of any actual or alleged delay in the Contractor's performance.

The Owner may delay the beginning of the Work or any part thereof because it has not obtained a necessary property interest in the land on which the Work or some portion of the Work, is to be performed. The Contractor shall have no claim for additional compensation or damages on account of such delay, but shall be entitled to request an extension of time as herein provided.

39. **TERMINATION FOR BREACH OF NON-PERFORMANCE**

If the Contractor fails to perform the Work promptly and diligently, or if the Contractor breaches the Agreement in any other way, the Owner may:

1) After providing the Contractor with fifteen (15) days written notice, supply any workmen, equipment or materials necessary to ensure that the Work is performed promptly and diligently. The Owner may deduct the cost of supplying additional workmen, equipment or materials from payments due to the Contractor;

2) Terminate the Agreement, enter upon the premises, take possession of all equipment, materials, or appurtenances, and employ any person or persons to finish the Work.

In case of termination of the Agreement by the Owner pursuant to this paragraph, the Contractor shall not be entitled to receive any further payment from the Owner until Completion of the Work has occurred. After completion of the Work, the Owner shall pay to the Contractor the amount of the unpaid balance due to the Contractor at the time the Agreement was terminated minus the cost incurred by the Owner to complete the Work. If the cost incurred by the Owner to complete the Work exceeds the unpaid balance due to the Contractor, the Contractor shall be due no money from the Owner and, instead, the Contractor shall pay to the Owner the difference between the unpaid balance due and the Owner's cost to complete the Work.

The cost incurred by the Owner to complete the Work shall be audited by the Engineer. The Engineer's certification of the Owner's cost shall be binding upon the Contractor.

40. **WAIVER OF ONE BREACH NOT WAIVER OF OTHERS**

No waiver by the Owner or its agents or employees of any breach of this Agreement by the Contractor shall be construed as a waiver of any other or subsequent breach of the Agreement by the Contractor. All remedies provided by this Agreement are cumulative, and in addition to each and every other remedy under the law.

41. **LIQUIDATED DAMAGES**

The rate of progress and the time for completion of the Work are essential conditions of the Agreement. The Work shall be prosecuted regularly, diligently, and without interruption at a rate that will ensure Completion of the Work in the time specified in the Contract Documents.

Time is of the essence under this Agreement.

If the Contractor fails to accomplish Final Completion of the Work in accordance with the Contract Documents within the time stated in the Agreement or in any progress schedule or within any time as extended in writing by the Owner, the Contractor shall pay to the Owner the sum specified as liquidated damages in the Supplemental Conditions for each and every calendar day after the date agreed upon by the parties for Final Completion has passed until Final Completion of the Work is accomplished.

The above sums are agreed upon by the parties as the liquidated damages, and not a penalty, that the Owner will suffer by reason of the delay by the Contractor in accomplishing Completion of the Work, resulting in the inability of the Owner to use the improvements at the time agreed upon the parties for Completion. The Owner may deduct and retain liquidated damages out of any monies which may be due, or become due, to the Contractor.

42. **SHOP DRAWINGS**

Contractor shall submit to the Engineer for its approval detailed Shop or Working Drawings ("Shop Drawings") when required to do so by the Engineer for the construction of any part of the Work. Any work done or materials ordered by the Contractor before the Engineer has approved the Shop Drawings relating to the Work or material shall be at the risk of the Contractor.

The Contractor shall bear the cost of preparing all Shop Drawings and blueprints. The Contractor shall supply three (3) copies of all Shop Drawings and blueprints to the Engineer.

All certifications, Shop Drawings and Working Drawings shall include for each product, the manufacturer's name, the type of product, the location of the manufacturer's plant, and the project name and number.

The Contractor shall furnish the Engineer with all blue prints, copies of Shop Drawings and material certifications that are required by the Engineer for approval. Upon Completion of the Work, the Contractor shall submit the original tracings to the Engineer, if the Engineer so requires.

The purpose of Shop Drawings is to demonstrate to the Engineer that the Contractor understands the design concept of the Work by indicating which equipment and material it intends to furnish and install and by detailing the fabrication and installation methods it intends to use. The Engineer's approval of Shop Drawings relates to the general concept and not the detail of the Work, and the Engineer's approval will not relieve the Contractor from responsibility for errors or omissions in dimensions or quantities. Approved Shop Drawings are not Change Orders.

The Contractor shall also submit to the Engineer and Inspector Shop Drawings for operation manuals for machinery and equipment installed by the Contractor in Pump Stations, Tanks, Pressure Reducing Vaults, Treatment Plants and when otherwise required by the Engineer. These Shop Drawings shall be provided to the Engineer at the earliest possible time and in no case less than 48 hours before the Contractor begins to perform the Work, in order to avoid any unnecessary delays in beginning the Work.

If approved Shop Drawings deviate from or conflict with the Contract Documents, the Contractor shall comply with the Contract Documents.

43. **FINAL INSPECTION**

Before Final Inspection of the Work, the Contractor shall clean up the site of the Work including all rights-of-way, and shall leave the site in a clean, neat and sanitary condition. Contractor shall remove all machinery, tools, surplus material, temporary buildings, and other structures from the site of the Work.

When the Work is complete and the area cleaned up, the Contractor shall request a Final Inspection of the Work by the Engineer and Owner. After the Final Inspection, the Engineer shall prepare a Punch List. After the Contractor has completed all Work on the Punch List, and the project is ready for Final Acceptance by the Owner, the Contractor shall request in writing an inspection for Final Acceptance of the Work by the Engineer and Owner.

44. **USE OF WORK**

Whenever in the opinion of the Engineer or Inspector any portion of the Work is completed or in acceptable condition for use, it may be used by the Owner for the purpose intended. However, such use by the Owner does not constitute acceptance of any portion of the Work, or a waiver of any of the provisions of the Contract Documents.

45. **PAYMENT**

If the Contractor performs properly all of the obligations of the Contract Documents, the Owner shall pay the Contractor for the performance of the Work in the manner and within the time specified in the Contract Documents. The Owner also agrees to pay the Contractor for Extra Work in accordance with the terms of the Contract Documents. The Contractor shall make requests for payment by submitting the original and one (1) copy of the monthly estimate for partial payment to the Owner on a form acceptable to the Owner, as set forth in Paragraph 47 of the General Conditions,

entitled Monthly Estimates.

46. **SALES AND USE TAXES**

The Owner shall make no payment to the Contractor for sales or use tax that is not included in the Contract Price at the time the Agreement is executed by the Owner.

47. **MONTHLY ESTIMATES**

On the 20th day of each month or at any other regular time agreed upon by the Owner and Contractor, the Contractor and the Inspector shall prepare and submit to the Owner a monthly estimate for Partial Payment. The monthly estimate shall cover items of work for which the Contractor is entitled to be paid since the last previous monthly estimate was submitted, including (1) the value of the Work done, (2) major items of equipment or materials delivered to the site of the project to be installed by the Contractor, as substantiated by submitted invoices and as approved by the inspector, and (3) materials incorporated into the Work.

The Owner shall pay to the Contractor all sums due under the monthly estimate within 30 days after of the approved monthly estimate by the owner, unless the Owner asserts a right to withhold some or all of the payment under the provisions of the Contract Documents.

The Contractor will be paid for materials delivered to and stored on the job site. Payment will be for actual cost of materials as evidenced by receipted invoices. The Contractor shall make a separate accounting of these materials and shall submit an accounting of them, with one (1) copy, along with the monthly estimate for partial payment.

48. **PARTIAL PAYMENT NO WAIVER OF RIGHTS**

Partial payments made under this Agreement by the Owner are not evidence of the proper performance of the Agreement by the Contractor either in whole or in part, and no payment made by the Owner shall be construed to be an acceptance of defective or improper work. No act of the Owner or the Engineer, or the representative of either of them, in superintending or directing the Work, no failure to disapprove or reject any material used in the Work, and no extension of time for the Completion of the Work shall be construed as acceptance of the Work either in whole or in part. Acceptance of the Work by the Owner shall occur only upon issuance of Final Acceptance in accordance with the General Conditions of the Contract.

Before Final Payment is made, the Contractor shall sign and attest to a statement accepting the Final Payment in full satisfaction and settlement of all claims on account of the Work done and materials furnished under the Agreement, and certifying that all claims of others against the Contractor for material provided or labor performed have been paid and satisfied in full.

49. **FINAL ACCEPTANCE**

Final Acceptance occurs when the County issues to the Contractor a written statement that the Contractor has completely performed all Punch List items, has made all necessary submittals to the Owner and Engineer and has satisfied all of the Contractor's obligations under the Contract Documents.

50. **FINAL PAYMENT**

After receiving satisfactory evidence from the Contractor that all labor and material bills have been paid and as soon as practicable after the completion of the Work, the Contractor and Inspector shall prepare a final estimate of the amount of the Work, and the value thereof, and the Owner shall,

within 30 days after such final estimate is made, pay to the Contractor the entire sum due after deducting therefrom all previous payments, and all deductions to be retained by the Owner under any of the provisions of the Contract Documents. All prior estimates and payments shall be subject to correction in the final estimate of payment.

51. **RIGHT TO AUDIT PROVISION**

Contractor's records, which shall include but not be limited to accounting records, written policies and procedures, subcontract files (including proposals of successful and unsuccessful bidders), original estimates, estimating worksheets, correspondence, change order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to the Agreement (all the foregoing hereinafter referred to as "records") shall be open to inspection and subject to audit and/or reproduction, during normal working hours, by Owner's agent or its authorized representative to the extent necessary to adequately permit evaluation and verification of any invoices, payments or claims submitted by the Contractor or any of his payees pursuant to the Contract Documents. The records subject to examination shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with the Agreement.

For the purpose of such audits, inspections, examinations and evaluations, the Owner's agent or authorized representative shall have access to the records from the effective date of the Agreement, for the duration of the Work, and until two (2) years after the date of Final Payment by Owner to Contractor pursuant to the Contract Documents.

Owner's agent or its authorized representative shall have access to the Contractor's facilities, shall have access to all necessary records, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this article. Owner's agent or its authorized representative shall give Contractor reasonable advance notice of intended audits.

Contractor shall require all subcontractors, insurance agents, and materials suppliers (collectively referred to as "payees") to comply with the provisions of this article by insertion of the requirements hereof in a written contract agreement between Contractor and payee. Failure to obtain such written contracts which include such provisions shall be reason to exclude some or all of the related payees' costs from amounts payable to the Contractor pursuant to the Agreement.

If an audit inspection or examination performed pursuant to this paragraph, discloses overcharges of any nature by the Contractor to the Owner in excess of five percent (5%) of the total billings made by the Contractors pursuant to the Contract Documents, the actual cost of the Owner's audit shall be paid by the Contractor.

52. **WARRANTY PERIOD**

The Contractor guarantees the quality and workmanship of the Work beginning on the date of Final Acceptance. The Warranty Period shall be one year.

53. **NOTIFICATION TO PROPERTY OWNERS**

Contractor shall properly notify all property owners in writing prior to the start of any construction (including land clearing).

54. **DRUG FREE WORKPLACE**

During the performance of this contract, the contractor agrees to:

A. Provide a drug-free workplace for the contractor's employees

B. Post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition.

C. State in all solicitations or advertisements for employees placed by or on behalf of the contractor that the contractor maintains a drug-free workplace.

D. Include the provisions of the foregoing clauses in every subcontract or purchase order over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

55. **UNBALANCED BIDS**

The County reserves the right to reject any bid determined by the County to contain unbalanced unit prices.

56. **FAITH-BASED ORGANIZATIONS**

City of Emporia does not discriminate against faith-based organizations in accordance with the *Code of Virginia*, Section 2.2-4343.1.

57. **PROCEDURES FOR CLAIMS AND DISPUTES**

A claim is a demand or assertion by the Contractor seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract. The responsibility to substantiate claims shall rest with the Contractor. Claims must be initiated by by the Contractor with a written Notice of Intent to File a Claim within 21 days after occurrence of the event giving rise to such claim or within 21 days after the claimant first recognizes the condition giving rise to the claim, whichever is later. Among other things, the Intent to File a Claim shall include: (a) the assumptions the Contractor made during the preparation of its bid that form the basis for its allegation, (b) an explanation of the defect, error, or inconsistency in the plans or other contract documents that the Contractor could not have reasonable identified prior to the date the Agreement for the project is signed, and (c) an estimated impact that the alleged defect, error, or inconsistency has had on the Contractor's price or time to perform the work. Impacts to the Contractor's price shall be supported by breaking down any alleged Extra Work into the items and unit prices included in the Bid Schedule to the greatest extent possible. Impacts to the Contractor's time shall be supported with a critical path method (CPM) schedule that specifically identifies delays to the Contractor's critical path to complete the work. A n Intent to File a Claim must be initiated by written letter to the Owner.

Submittal of an Intent to File a Claim by the Contractor must be submitted within the time limits and include the supporting documentation prescribed by this paragraph as a condition precedent to the institution of litigation by the Contractor with respect to the subject matter of that claim. The Contractor is required to submit any additional supporting documentation requested by the city in regards to an Intent to File a Claim within 21 days of the county's request.

Within 60 days upon issuance of Final Payment, the Contractor may submit to the city a written Claim for which it properly submitted an Intent to File a Claim while performing the work required for the project. Such claim shall be submitted to the Director of Transportation. Only one such claim shall be submitted, and it shall include all matters for which the Contractor seeks additional compensation and/or time. The Contractor shall not be entitled to any additional compensation or time for any matter that is not submitted as part of such a claim, within the 60 days allowed pursuant to this Section.

58. **PROGRESS MEETINGS**

Engineer shall hold a progress meeting at a time, date and frequency set forth in the pre- construction meeting to review progress to date and resolve all questions for the upcoming progress meeting. Engineer is responsible for the preparation of the progress meeting agenda and minutes. Engineer will forward progress meeting agenda to the Contractor for any additions to agenda.

59. **CONTRACTOR BACKGROUND CHECKS**

In order to preserve the integrity and security of county government operations, contract workers may be required to undergo a criminal background check conducted by Emporia City. The City will conduct these checks for any worker it believes will have unsupervised access to City designated Security Sensitive areas. Contract workers providing goods, services or construction in these designated areas are required to confine themselves to the area of the work. Based on the results of the background check, the contract worker may be disqualified from providing work/services for Emporia City.

60. **SENSITIVE INFORMATION HANDLING**

Any information in the possession of the county/schools which is specific to a student, citizen, county/school business function, private business entity or other government entity which is not generally available to the public shall be designated Sensitive Information. Contract workers will under no circumstances remove Sensitive Information from county facilities. Any Sensitive Information which must reside temporarily on a hard drive or portable storage device (USB Key, CD ROM, memory card, etc.) for processing must remain within the county facility. No Sensitive Information may be remotely accessed by contract workers by dial in, VPN, web interface or other means without expressed consent of the department head and the Information Security Manager (county) or Director of Technology (schools). Any access to county/schools information by contract workers from outside the county intranet shall be in accordance with existing Information Systems Technology (IST) Southampton County Public Schools (CCPS) Technology department security policies and procedures. Contract worker network connected computer equipment will be subject to all applicable IST/CCPS policies and procedures. Any exception to this application of policies shall be approved by the CCPS Department of Technology/county Information Security Manager and Chief Information Officer or designees.

61. **VENDOR REWARDS/GIFT PROGRAMS**

It is the policy of the City not to participate in any rewards programs offered by vendors and not to accept any gifts or gift cards, or other rewards from vendors for purchases made

by the County. If you customarily provide, or if you plan to provide, rewards programs, gifts or gift cards, or other rewards to your customers for purchases made by such customers, you must identify this fact in your bid and demonstrate in the bid how you have applied the value of such rewards to a reduction in the price of the goods and/or services being offered to the City.

62. **ILLEGAL ALIENS**

In compliance with SECTION 2.2-4311.1 of the *CODE OF VIRGINIA*, the Contractor agrees that he does not, and shall not during the performance of this contract, knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

63. **CONTRACTOR'S AUTHORIZATION TO TRANSACT BUSINESS**

In accordance with §2.2-4311.2 of the *Code of Virginia*, any bidder organized as a stock or nonstock corporation, limited liability company, business trust, or limited partnership or registered as a registered limited liability partnership shall be authorized to transact business in the Commonwealth as a domestic or foreign business entity if so required by Title 13.1 or Title 50 of the *Code of Virginia*, or as otherwise required by law. Any bidder organized or authorized to transact business in the Commonwealth of Virginia pursuant to Title 13.1 or Title 50 of the *Code of Virginia* shall include in its bid the identification number issued to it by the State Corporation Commission. Any bidder that is not required to be authorized to transact business in the Commonwealth as a foreign business entity under Title 13.1 or Title 50 of the *Code of Virginia*, or as otherwise required by law, shall include in its bid a statement describing why the bidder is not required to be so authorized. This information shall be provided on the Bid Form where noted. Failure to provide the required information may result in the rejection of the bid. The Contractor shall not allow its existence to lapse or its certificate of authority or registration to transact business in the Commonwealth of Virginia, if so required under Title 13.1 or Title 50 of the *Code of Virginia*, to be revoked or cancelled at any time during the term of the contract. The City may void any contract with a Contractor if the Contractor fails to remain in compliance with the provisions of this section.

Supplemental General Conditions

1. This is a state funded project being administered by Emporia City in accordance with the VDOT Locally Administered Projects Manual.

2. English units of measure shall be used for the construction of the project.

3. Construction of this project shall be in conformance with the latest revisions to the *VDOT Road and Bridge Specifications dated 2007*, *VDOT Road and Bridge Standards dated 2008*, and the *VDOT Work Area Protection Manual dated 2011*, and the latest editions of the *Virginia Erosion and Sediment Control Handbook*, *Virginia Erosion and Sediment Control Regulations*, *FHWA Manual on Uniform Traffic Control Devices (MUTCD) dated 2009*, and *Emporia City Stormwater Management Ordinance*, including all subsequent revisions. In the event of conflict between any of these standards, specifications, or project drawings, the most stringent shall govern.

4. Prior to the start of any construction activation the contractor shall coordinate a pre-construction meeting with the Engineer, representatives of the City of Emporia, VDOT, and Georgia Pacific.

5. The power, duties, and responsibilities conferred hereto to the Engineer shall be construed to be those of the Owner or its authorized representative. Where the terms "Department", "Engineer" and "Contract Engineer" appear in Virginia Department of Transportation Road and Bridge Specifications, Supplemental Specifications, SpecialProvisions, Special Provision Copied Notes, and Road and Bridge Standards used in this contract, and in the Virginia Department of Transportation publication(s) that each references, the authority identified shall be construed to be those of the Owner or its authorized representative.

6. All construction truck traffic pertinent to the construction of this project shall access the project site (work limits) via Route 58. This includes both ingress and egress. Contractor shall consider this limitation when scheduling project work, implementing detour measures.

7. The Contractor shall submit a progress schedule, in a format acceptable to the Engineer, setting forth the best estimate of the time required for the completion of the contract. The schedule shall be submitted no later than 10 days after the notice to proceed and prior to the first estimate. The progress schedule shall be duly executed by the Contractor after acceptance by the Engineer. Should conditions change which requires a change in the Contractor's operations, a revised progress schedule, mutually agreed upon, shall be submitted within 10 days from a written request from the County.

8. Within 10 days after the notice to proceed, and prior to the first estimate, the Contractor shall furnish the Engineer a complete and practicable plan of operations which will provide for the orderly prosecution of the work. The plan of operations shall be in such form and in such detail to show clearly the sequence of operations and the period of time required for completion of each item or group of like items in the contract.

   It is expressly understood that the review and acceptance by the Engineer of the Contractor's progress schedule and plan of operations shall in no way serve to relieve the contractor of his responsibility to complete the work within the contract time.

9. The Contractor shall attend monthly progress meetings at the offices of the Owner or other designated location for purpose of reporting progress, problems or otherwise expediting the work. Subcontractors

shall also attend this meeting when required to resolve specific issues or problems.

10. Delays to the Contractor's schedule caused solely by the actions (or lack thereof) by the utility companies involved shall not be considered for an extension of time in accordance with Section 38 of the General Conditions unless the Contractor can demonstrate that he cannot work in other areas of the project.

11. The contractor shall hire an independent materials testing agency acceptable to the Owner to perform all quality control inspection services as required by current edition of the VDOT Inspection Manual. All materials technicians shall be VDOT-certified and testing shall be performed in accordance with VDOT specifications and certification manuals of inspection. The Owner shall provide a full-time Project Inspector to oversee the work of the Contractor, but this shall in no way relieve the Contractor of his responsibilities required under the contract or VDOT specifications. All tests results shall be furnished to the Inspectors and the Engineer upon completion of the individual tests such that records can be kept up to date throughout the project. The contractor shall notify the Inspector immediately upon receipt of a failing test result. Source of materials are required.

12. Construction staking shall be done only by a professional engineer or land surveyor registered in the Commonwealth of Virginia. The engineer/surveyor employed by the Contractor shall be responsible for preparation of a detailed staking plan and having that plan reviewed and approved prior to start of work by the Engineer. The Engineer, or his designated representative, shall review the staked location of all concrete items for line and grade prior to construction.

13. The Contractor shall furnish and install all signage (temporary and permanent) required for the project. Whenever the Contractor's operations affect vehicular or pedestrian traffic, the Contractor shall be responsible for furnishing, installing and maintaining any and all safety control devices in accordance with the VDOT 2011 *Work Area Protection Manual* and as deemed necessary by VDOT and the Engineer.

14. The Contractor shall develop and furnish work zone layouts for approval by the County and VDOT prior to beginning work if they differ from the MOT plans included in the contract documents. Any work zone modifications shall be stamped by a Professional Engineer registered in the Commonwealth of Virginia. Work zone layouts shall comply with the VDOT 2011 *Work Area Protection Manual*.

15. The Contractor shall be responsible for all clearing and grubbing in those areas needed for construction. No trees or shrubs in ungraded areas shall be cut without the permission of the Engineer unless otherwise denoted in the plans. Prior to performing any clearing operations, the proposed clearing limits shall be flagged by the Contractor and reviewed by the Engineer. The Engineer shall be given at least 48 hours notice of the time that the Contractor wants to have the Engineer review the clearing limits.

16. The Contractor shall schedule his work such as to maintain access to adjacent properties at all times, and minimize the disturbed areas left uncompleted and unstabilized.

17. The Contractor shall be required to provide adequate and positive site drainage throughout construction. Any subgrade soils which have been weakened due to inadequate drainage, saturation and/or disturbance by construction shall be undercut and replaced with compacted structural fill at no additional cost to the Owner.

18. The Contractor shall be responsible for the disposal of all excess materials (including but not limited to concrete, landscaping, mulch, reinforcing steel, asphalt, undercut, root mat, topsoil and/or fill), obtaining borrow material, and the suitability of all on-site material above subgrade. No extra payment will be made for disposal or importing of soils to the project site regardless of the suitability or unsuitability of on-site soils.

19. Normal working hours for the project are **7:00 A.M. to 6:00 P.M., Monday through Saturday**, unless approved otherwise by the Owner. Work involving traffic on existing East Atlantic Street shall be performed 5:00PM-9:00PM Monday-Friday; 7:00AM-9:00PM Saturday. Contractor may request permission to close the street in whole or in part when necessary.

20. The Contractor is reminded that bids shall be **LUMP SUM** and shall include **ALL WORK** necessary to complete the project to the full intent of the plans. In the event of additions or deductions to the work required by the Contract Documents, the Contractor will be paid extra or shall credit the Owner, as the case may be, in one of the following manners:

    a. At a price agreed upon in writing between the Contractor and Owner; or

    b. In the event of work covered by unit prices included in the Bid Schedule, at a price derived from application of unit prices to the quantities reflective of the additional or deducted work.

    No other criteria (such as pay items shown on the plans, or text in the "Measurement and Payment" sections included in VDOT Specifications, VDOT Special Provisions, VDOT Special Provisions Copied Notes, etc.) will be used to determine the value of the work.

21. The Contractor shall include in his Lump Sum Bid an allowance for the removal, disposal and replacement of **2,809 CY** of unsuitable material below the subgrade of the proposed turn lane improvements. All undercut material shall be removed and disposed of off-site, and replaced with approved Borrow Excavation with a minimum CBR 10 and compacted to the project specifications. If the undercut and/or backfill required on this project is greater (or less) than that included in the allowance, the contract price shall be adjusted up (or down) based on the pertinent unit prices included on the Bid Form. Calculations for undercut shall not include the first 12" of topsoil to be stripped away (and backfilled) from any proposed fill sections. The unit price for removal and off-site disposal of unsuitable material shall be provided on the Bid Form under item Undercut Excavation. The unit price for replacement of unsuitable material shall be provided on the Bid Form under item Select Borrow Material. The allowance items will be **2,809 CY** for each of these quantities. In addition, the Contractors Lump Sum Bid shall assume that all of this undercut will be realized during the length of the contract. Consideration for time extensions due to undercut shall only be considered after the allowance quantity is exceeded.

22. Permits for this project that have been obtained by the city, will be obtained by the city, will be transferred to the Contractor and/ or must be obtained by the Contractor are identified below. Any other permits not identified herein, but required to perform the work, will be the responsibility of the Contractor to obtain.

    a. City Land Disturbance Permit - A City Land Disturbance Permit shall be required for this project. The Contractor shall be responsible for obtaining a Emporia City Land Disturbance Permit from the Department of Community Development and Planning. In addition, the Contractor shall ensure that all operations shall be performed in a manner that minimizes erosion and

sedimentation of the adjacent properties, street, and storm drainage systems.

All work shall be performed in accordance with the latest edition of the Virginia Erosion and Sediment Control Handbook and the phased sequencing outlined in the plans. The Contractor shall have a DCR Certified Responsible Land Disturber (RLD) on the project site at all times during the construction project where land is being disturbed. The RLD will be responsible for ensuring that all aspects of the VESCH are adhered to during this project.

b. VDOT Land Use Permit - The Contractor shall be responsible for obtaining a VDOT Land Use Permit from the VDOT Hampton Roads District Office, for performing work within the VDOT Right of Way. There shall be no fee associated with this permit nor shall there be separate bond required for this work. However, VDOT shall be identified as a "Dual Obligee Rider" on the Performance Bond. A copy of the VDOT Land Use Permit is a prerequisite for obtaining the County Land Disturbance Permit.

c. VSMP Permit - A VSMP permit is required for this project and has been obtained by the County. The Contractor will be required to sign a certification statement to comply with all conditions of the VSMP permit. A copy of the VSMP permit can be obtained from the Engineer.

The Contractor shall ensure that all special and general conditions of all permits required to complete the work are complied with during all phases of construction. All costs of complying with permit conditions shall be borne by the Contractor and under no circumstances shall any such costs be considered Extra Work for which the Contractor is entitled to additional compensation.

23. The Contractor shall be responsible for contacting Miss Utility and obtaining a clear ticket prior to beginning any work.

24. In the event that it is determined that removal of a tree root system would potentially damage existing underground utilities, the contractor may (with the permission of the engineer) grind the stumps a minimum of 4" below the finished grade and place topsoil and seed. All debris resulting from the removal of trees and/or stumps must be hauled off site.

25. The contractor shall be required to establish an acceptable stand of grass on all disturbed areas that are not finished off with asphalt or concrete before final acceptance.

26. The contractor shall use caution working in the vicinity of existing utilities.

27. To be considered for award of this contract, the Contractor must be on VDOT's current Pre- qualified list at the time/ date set for the opening of bids.

28. Very limited geotechnical investigations have been performed for this project. If so desired, the Contractor (at his own expense) may make, prior to bidding, independent exploration, tests, and analyses. All applicable VDOT permits for work inside existing right of way must be secured by the Contractor for performance of exploratory investigations. In addition, the Owner must be notified in writing at least 2 business days prior to the Contractor making exploratory investigations involving digging or land disturbance.

    a. A report was prepared by Geo Solutions, titled "East Atlantic Street Turn Lane, City of Emporia" and dated February 4, 2013. This report is not part of the Contract Documents, but can be made available in digital format (PDF) for transmittal via email upon written request to the Engineer.

29. Unless otherwise altered by addenda, the last official addendum shall be issued by 5:00 PM on March 11**,** 2015. Any and all questions must be received by Jeff Robinson at robinsonj@jrallpc.com by 4:00 PM March 4, 2015, so that they can be considered in the addendum.

30. The Contractor will be required to pothole and expose any and all existing utility lines and to fully expose and identify any and all existing utility lines that may be within the areas of construction.

31. Excavation and Earthwork:

    a. Excavation for this project is **unclassified**, and includes excavation to subgrade and/or subsoil elevations indicated, **regardless of character of materials and obstructions encountered.**

    b. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.

    c. "Excavation" consists of removal of material encountered to required subgrade and/or subsoil elevations indicated, and the subsequent disposal of materials removed. "Subgrade" is defined as the undisturbed earth, or the compacted soil layer, immediately below granular subbase, drainage fill, or topsoil materials. "Subsoil" is defined as the undisturbed earth immediately below the existing topsoil layer. "Proofrolling" is defined to be the act whereby the subgrade shall be proofrolled with a standard loaded tandem dump truck. The Contractor's Geotechnical Engineer, the Inspector and the VDOT Inspector, as applicable, will monitor the proofrolling and determine areas of unsuitable bearing material, with inspection report/results given to Engineer and Owner.

    d. Suitability of Materials: The Contractor shall be responsible for the disposal of excess material (including but not limited to undercut, root mat and excess topsoil and fill material), obtaining borrow material and the suitability of all on-site material above subgrade. No extra payment will be made, regardless of the suitability or unsuitability of on-site soils for the disposal or importing of soils to the project site.

32. Contractor shall be advised that cleaning of existing driveway culverts and cleaning and regrading of existing roadside ditches hsall be considered incidental to VDOT specifications Section 303-Earthwork. Contractor shall be advised that estimated quantities of same are as follows: clean existing driveway culverts=20 EA and clean and re-grade existing roadside ditches=800LF.

Federal Aid Specifications

(**c100ll2-0112**)

VDOT Supplemental Specifications (SSs), Special Provisions (SPs)
And Special Provision Copied Notes (SPCNs)

Where Virginia Department of Transportation (VDOT) Supplemental Specifications, Special Provisions and Special Provision Copied Notes are used in this contract, the references therein to "the Specifications" shall refer to the Virginia Department of Transportation Road and Bridge Specifications, dated 2007 for both imperial and metric unit projects. References to the "Road and Bridge Standard(s)" shall refer to the Virginia Department of Transportation Road and Bridge Standards, dated 2008 for both imperial and metric unit projects. References to the "Virginia Work Area Protection Manual" shall refer to the 2011 edition of the Virginia Work Area Protection Manual for imperial and metric unit projects. References to the "MUTCD" shall refer to the 2009 edition of the MUTCD and the current Virginia Supplement to the MUTCD for imperial and metric unit projects.

Where the terms "Department", "Engineer" and "Contract Engineer" appear in VDOT Supplemental Specifications, Special Provisions and Special Provision Copied Notes used in this contract and the VDOT publication(s) that each references, the authority identified shall be in accordance with the definitions in Section 101.02 of the Virginia Department of Transportation Road and Bridge Specifications, dated 2007. Authority identified otherwise for this particular project will be stated elsewhere in this contract.

VDOT Supplemental Specifications, Special Provisions and Special Provision Copied Notes used in this contract and the VDOT publication(s) that each reference are intended to be complementary to the each other. In case of a discrepancy, the order of priority stated in Section 105.12 of the Virginia Department of Transportation Road and Bridge Specifications, dated 2007 shall apply.

VDOT Special Provision Copied Notes in this contract are designated with "(SPCN)" after the date of each document. VDOT Supplemental Specifications and Special Provision Copied Notes in this contract are designated as such above the title of each document.

The information enclosed in parenthesis "( )" at the left of each VDOT Special Provision Copied Note in this contract is file reference information for VDOT use only. The information in the upper left corner above the title of each VDOT Supplemental Specification and VDOT Special Provision in this contract is file reference information for VDOT use only.

The system of measurement to be used in this project is stated elsewhere in this contract. VDOT Supplemental Specifications, Special Provisions and Special Provision Copied Notes containing imperial units of measure with accompanying expressions in metric units shall be referred to hereinafter as "dual unit measurement" documents. Such a "dual unit measurement" is typically expressed first in the imperial unit followed immediately to the right by the metric unit in parenthesis "( )" or brackets "[ ]" where parenthesis is used in the sentence to convey other information. Where a "dual unit measurement" appears in VDOT documents, the unit that applies shall be in accordance with the system of measurement as stated elsewhere in this contract. The unit shown that is <u>not</u> of the declared unit of measurement is not to be considered interchangeable

and mathematically convertible to the declared unit and shall not be used as an alternate or conflicting measurement. Where VDOT Specifications are used for metric unit projects and only imperial units of measurement appear the document, the provision(s) in this contract for imperial unit to metric unit conversion shall apply.

12-1-11 (SPCN)

(**c103i00-1213**)

Section 103—Award and Execution of Contracts
of the Specifications is amended as follows:

Section 103.09—Execution of Contract is amended to include the following:

According to Section 2.2-4308.2 of the Code of Virginia, any employer with more than an average of 50 employees for the previous 12 months entering into a contract in excess of $50,000 with the Department to provide work or provide services pursuant to such contract shall register and participate in the U.S. Department of Homeland Security's "E-Verify" system to verify information and work authorization of its newly hired employees performing work pursuant to such contract.

Contractors are not required to be enrolled with "E-Verify" at the time bids are submitted, however, prior to award, the lowest responsive and responsible bidder must be enrolled with "E-Verify". Contractors may use the following website to enroll in "E-Verify", http://www.uscis.gov/e- verify.

Contractors shall expressly require any subcontractors performing work or providing services pursuant to the Contract to likewise utilize the U.S. Department of Homeland Security's "E-Verify" system to verify the employment eligibility of all new employees hired by the subcontractor during the Contract term.

Bidders or Contractors who fail to comply with the provisions of this section shall be debarred from contracting with any agency of the Commonwealth for a period up to one year. Such debarment shall cease upon registration and participation in the "E-Verify" program.

11-20-13 (SPCN)

cu105000a

Personnel Requirements For Work Zone Traffic Control – Section 105 and 512 of the Specifications are amended as follows:

Section 105.14—Maintenance During Construction is amended to add the following:

The Contractor shall provide at least one person on the project site during all work operations who is currently verified either by the Department in Intermediate Work Zone Traffic Control, or by the American Traffic Safety Services Association (ATSSA) as a Traffic Control Supervisor (TCS). This person must have the verification card with them while on the project site. This person shall be responsible for the oversight of work zone traffic control within the project limits in compliance with the contract requirements involving the plans, specifications, the VWAPM, and the MUTCD. This person's duties shall include the supervision of the installation, adjustment (if necessary), inspection, maintenance and removal when no longer required of all traffic control devices on the project.

If none of the Contractor's on-site personnel responsible for the supervision of such work has the required verification with them or if they have an outdated verification card showing they are not currently verified either by the Department in Intermediate Work Zone Traffic Control, or by the American Traffic Safety Services Association (ATSSA) as a Traffic Control Supervisor (TCS) all work on the project will be suspended by the Engineer.

The Contractor shall provide at least one person on site who is, at a minimum, verified by the Department in Basic Work Zone Traffic Control for each construction and\or maintenance operation that involves installing, maintaining, or removing work zone traffic control devices. This person shall be responsible for the placement, maintenance and removal of work zone traffic control devices.

In the event none of the Contractor's on-site personnel of any construction/maintenance operation has, at a minimum, the required verification by the Department in Basic Work Zone Traffic Control, that construction/maintenance operation will be suspended by the Engineer until that operation is appropriately staffed in accordance with the requirements herein.

Section 512.03 Procedures **is amended to add (r) Work Zone Traffic Control as the following**:

(r) **Work Zone Traffic Control**: The Contractor shall provide individuals trained in Work Zone Traffic Control in accordance with the requirements of Section 105.14 of the Specifications.

Section 512.04 Measurement and Payment **is amended to add the following:**

Basic Work Zone Traffic Control – Separate payment will not be made for providing a person to meet the requirements of Section 105.14 of the Specifications. The cost thereof shall be included in the price of other appropriate pay items.

Intermediate Work Zone Traffic Control - Separate payment will not be made for providing a person to meet the requirements of Section 105.14 of the Specifications. The cost thereof shall be included in the price of other appropriate pay items.

6-11-09a (SPCN)

(**c105hf1-0309**)

Section 105.06 Subcontracting
<u>of the Specifications is amended to include the following:</u>

Any distribution of work shall be evidenced by a written binding agreement on file at the project site. Where no field office exists, such agreement shall be readily available upon request to Department inspector(s) assigned to the project.

The provisions contained in Form FHWA-1273 specifically, and other federal provisions included with the prime Contract are generally applicable to all Federal-aid construction projects and must be made a part of, and physically incorporated into all contracts, as well as, appropriate subcontracts for work so as to be binding in those agreements.

12-19-08 (SPCN)

SF001AF

Predetermined Minumum Wage Rates

General Decision Number: VA140137 01/24/2014 VA137

Superseded General Decision Number: VA20130148

State: Virginia

Construction Type: Highway

Counties: Accomack, Amelia, Brunswick, Caroline, Emporia*, Essex, Franklin*, Greensville, King And Queen, King William, Lancaster, Louisa, Lunenburg, Madison, Mecklenburg, Middlesex, Northampton, Northumberland, Nottoway, Orange, Poquoson*, Rappahannock, Richmond, Southampton, Surry, Sussex and Westmoreland Counties in Virginia.

*INDEPENDENT CITIES

HIGHWAY CONSTRUCTION PROJECTS (excluding tunnels, building structures in rest area projects & railroad construction; bascule, suspension & spandrel arch bridges designed for commercial navigation, bridges involving marine construction; and other major bridges).

Modification Number	Publication Date
0	01/03/2014
1	01/24/2014

SUVA2013-002 01/01/2012

	Rate	Fringes
ASBESTOS WORKER	$ 14.79	
CARPENTER (STRUCTURE)	$ 17.00	
CEMENT MASON/CONCRETE FINISHER	$ 19.32	
ELECTRICIAN	$ 30.45	
FORM SETTER	$ 19.43	
IRONWORKER, REINFORCING	$ 19.73	
IRONWORKER, STRUCTURAL	$ 17.00	
LABORER		
Asphalt Raker	$ 16.30	
Blaster	$ 17.14	
Construction Worker I (Skilled Laborer)	$ 16.91	
Construction Worker II (Laborer)	$ 13.09	
Deckhand	$ 13.33	
Fence Erector	$ 15.33	
Flagger	$ 10.22	
Grade Checker	$ 15.25	
Guardrail Erector	$ 16.47	
Landscape Worker	$ 12.29	
Pipe Layer	$ 14.00	
Power Tool Operator	$ 17.00	

MASON (Structure)	$ 20.00
PAINTER	$ 30.00
POWER EQUIPMENT OPERATOR:	
Air Compressor	$ 8.88
Asphalt Distributor	$ 17.42
Asphalt Paver	$ 17.07
Backhoe	$ 16.45
Boom/Auger Operator	$ 24.00
Bulldozer, Utility	$ 11.50
Bulldozer	$ 14.85
Concrete Finish Machine Screed (Bridge)	$ 13.28
Concrete Finish Machine	$ 15.50
Concrete Paving Machine	$ 21.00
Concrete Pump	$ 16.00
Concrete Saw	$ 25.00
Crane, Derrick, Dragline (1 cm & under)	$ 22.30
Crane, Derrick, Dragline(over 1 cm)	$ 31.46
Crusher Tender	$ 13.38
Drill Operator	$ 24.00
Excavator (Gradall)	$ 18.18
Front End Loader	$ 16.08
Fuel & Lubricant Service	
Truck Driver	$ 12.60
Hydro Seeder	$ 16.00
Log Skidder	$ 10.00
Mechanic	$ 19.29
Motor Grader (Fine Grade)	$ 19.00
Motor Grader (Rough Grade)	$ 18.50
Oiler/Greaser	$ 15.50
Pavement Marking Operator	$ 15.39
Pavement Marking Truck Operator	$ 17.37
Pavement Planing Groundman	$ 12.36
Pavement Planing Operator	$ 15.87
Pile Driver Operator	$ 25.00
Pile Driver, Leadsman	$ 18.22
Plant Operator	$ 16.07
Roller (Finish)	$ 16.17
Roller (Rough)	$ 14.41
Scraper Pan	$ 15.25
Shot Blast Machine	$ 13.22
Shovel Operator (over 2 yds)	$ 11.50
Slip-Form Paver	$ 14.00
Slurry Seal Paver Machine	$ 18.00
Slurry Seal Paver Truck	$ 16.82
Stabilizer	$ 14.75
Stone-Spreader	$ 19.22
Subgrade Machine	$ 21.00

Tractor Operator (Crawlers)	$ 11.50
Tractor Operator (Utility)	$ 13.92
Trenching Machine	$ 27.82
Vacuum Machine	$ 18.43
TRAFFIC SIGNALIZATION:	
Traffic Signal Installation	$ 30.00
TRUCK DRIVER	
Transit Mix Truck Driver	$ 12.00
Truck Driver (Multi-Rear Axle)	$ 16.16
Truck Driver (Single Rear and Tandem Rear Axle)	$ 15.32
Truck Driver, Heavy Duty (7 c.y. & under)	$ 14.00
Truck Driver, Heavy Duty(over 7 c.y.)	$15.97
WATERPROOFER	$ 18.00
WELDER	$ 19.20

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
==========
Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters , PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable , i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rates.

0000/9999: weighted union wage rates will be published annually each January.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union majority rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

==========

END OF GENERAL DECISION

USDOT 1050.2 Appendix A

U.S. DEPARTMENT OF LABOR
OFFICE OFTHE SECRETARY WASHINGTON
DECISION OF THE SECRETARY

This case is before the Department of Labor pursuant to a request for a wage predetermination as required by law applicable to the work described.

A study has been made of wage conditions in the locality and based on information available to the Department of Labor the wage rates and fringe payments listed are hereby determined by the Secretary of Labor as prevailing for the described classes for labor in accordance with applicable law.

This wage determination decision and any modifications thereof during the period prior to the stated expiration date shall be made a part of every contract for performance of the described work as provided by applicable law and regulations of the Secretary of Labor, and the wage rates and fringe payments contained in this decision, including modifications, shall be the minimums to be paid under any such contract and subcontractors on the work.

The contracting officer shall require that any class of laborers and mechanics which is not listed in the wage determination and which is to be employed under the contract, shall be classified or reclassified conformably to the wage determination, and a report of the action taken shall be sent by the Federal agency to the Secretary of Labor. In the event the interested parties cannot agree on the proper classification or reclassification of a particular class of laborers and mechanics to be used, the question accompanied by the recommendation of the contracting officer shall be referred to the Secretary for determination.

Before using apprentices on the job the contractor shall present to the contracting officer written evidence of registration of such employees in a program of a State apprenticeship and training agency approved and recognized by the U.S. Bureau of Apprenticeship and Training. In the absence of such a State agency, the contractor shall submit evidence of approval and registration by the U.S. Bureau of Apprenticeship and Training.

The contractor shall submit to the contracting officer written evidence of the established apprentice- journeyman ratios and wage in the project area, which will be the basis for establishing such ratios and rates for the project under the applicable contract provisions.

Fringe payments include medical and hospital care, compensation for injuries or illness resulting from occupational activity, unemployment benefits, life insurance, disability and sickness insurance, accident insurance (all designated as health and welfare), pensions, vacation and holiday pay, apprenticeship or other similar programs and other bona fide fringe benefits.

By direction of the Secretary of Labor

E. Irving Manger, Associate Administrator
Division of Wage Determinations
Wage and Labor Standards Administration

SF010DF-0712 May 1, 2012

The following Form FHWA-1273 titled Required Contract Povisions, Federal-Aid Construction Contracts shall apply to this contract:

==========

FHWA-1273 – Revised May 1, 2012

REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS

I. General
II. Nondiscrimination
III. Non-segregated Facilities
IV. Davis-Bacon and Related Act Provisions
V. Contract Work Hours and Safety Standards Act Provisions
VI. Subletting or Assigning the Contract
VII. Safety: Accident Prevention
VIII. False Statements Concerning Highway Projects
IX. Implementation of Clean Air Act and Federal Water Pollution Control Act
X. Compliance with Government-wide Suspension and Debarment Requirements
XI. Certification Regarding Use of Contract Funds for Lobbying

ATTACHMENTS

A. Employment and Materials Preference for Appalachian Development Highway System or Appalachian Local Access Road Contracts (included in Appalachian contracts only)

I. GENERAL

1. Form FHWA-1273 must be physically incorporated in each construction contract funded under Title 23 (excluding emergency contracts solely intended for debris removal). The contractor (or subcontractor) must insert this form in each subcontract and further require its inclusion in all lower tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services).

   The applicable requirements of Form FHWA-1273 are incorporated by reference for work done under any purchase order, rental agreement or agreement for other services. The prime contractor shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Form FHWA-1273 must be included in all Federal-aid design-build contracts, in all subcontracts and in lower tier subcontracts (excluding subcontracts for design services, purchase orders, rental agreements and other agreements for supplies or services). The design-builder shall be responsible for compliance by any subcontractor, lower-tier subcontractor or service provider.

   Contracting agencies may reference Form FHWA-1273 in bid proposal or request for

proposal documents, however, the Form FHWA-1273 must be physically incorporated (not referenced) in all contracts, subcontracts and lower-tier subcontracts (excluding purchase orders, rental agreements and other agreements for supplies or services related to a construction contract).

2. Subject to the applicability criteria noted in the following sections, these contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

3. A breach of any of the stipulations contained in these Required Contract Provisions may be sufficient grounds for withholding of progress payments, withholding of final payment, termination of the contract, suspension / debarment or any other action determined to be appropriate by the contracting agency and FHWA.

4. Selection of Labor: During the performance of this contract, the contractor shall not use convict labor for any purpose within the limits of a construction project on a Federal-aid highway unless it is labor performed by convicts who are on parole, supervised release, or probation. The term Federal-aid highway does not include roadways functionally classified as local roads or rural minor collectors.

II. NONDISCRIMINATION

The provisions of this section related to 23 CFR Part 230 are applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more. The provisions of 23 CFR Part 230 are not applicable to material supply, engineering, or architectural service contracts.

In addition, the contractor and all subcontractors must comply with the following policies: Executive Order 11246, 41 CFR 60, 29 CFR 1625-1627, Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The contractor and all subcontractors must comply with: the requirements of the Equal Opportunity Clause in 41 CFR 60-1.4(b) and, for all construction contracts exceeding $10,000, the Standard Federal Equal Employment Opportunity Construction Contract Specifications in 41CFR 60-4.3.

Note: The U.S. Department of Labor has exclusive authority to determine compliance with Executive Order 11246 and the policies of the Secretary of Labor including 41 CFR 60, and 29 CFR 1625-1627. The contracting agency and the FHWA have the authority and the responsibility to ensure compliance with Title 23 USC Section 140, the Rehabilitation Act of 1973, as amended (29 USC 794), and Title VI of the Civil Rights Act of 1964, as amended, and related regulations including 49 CFR Parts 21, 26 and 27; and 23 CFR Parts 200, 230, and 633.

The following provision is adopted from 23 CFR 230, Appendix A, with appropriate revisions to conform to the U.S. Department of Labor (US DOL) and FHWA requirements.

1. **Equal Employment Opportunity:** Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, 29 CFR 1625-1627, 41 CFR60 and 49 CFR 27) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The provisions of the Americans with Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

   a. The contractor will work with the contracting agency and the Federal Government to ensure that it has made every good faith effort to provide equal opportunity with respect to all of its terms and conditions of employment and in their review of activities under the contract.

   b. The contractor will accept as its operating policy the following statement:
   "It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: 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, pre- apprenticeship, and/or on-the-job training."

2. **EEO Officer:** The contractor will designate and make known to the contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively administering and promoting an active EEO program and who must be assigned adequate authority and responsibility to do so.

3. **Dissemination of Policy:** All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

   a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

   b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.
   c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minorities and women.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. **Recruitment:** When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minorities and women in the area from which the project work force would normally be derived.

The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minorities and women. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority and women applicants may be referred to the contractor for employment consideration.

In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, the contractor is expected to observe the provisions of that agreement to the extent that the system meets the contractor's compliance with EEO contract provisions. Where implementation of such an agreement has the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Federal nondiscrimination provisions.

The contractor will encourage its present employees to refer minorities and women as applicants for employment. Information and procedures with regard to referring such applicants will be discussed with employees.

5. **Personnel Actions:** Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to insure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with its obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of their avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minorities and women who are applicants for employment or current employees. Such efforts should be aimed at developing full journey level status employees in the type of trade or job classification involved.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision. The contracting agency may reserve training positions for persons who receive welfare assistance in accordance with 23 U.S.C. 140(a).

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of employees who are minorities and women and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use good faith efforts to obtain the cooperation of such unions to increase opportunities for minorities and women. Actions by the contractor, either directly or through a contractor's association acting as agent, will include the procedures set forth below:

a. The contractor will use good faith efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minorities and women for membership in the unions and increasing the skills of minorities and women so that they may qualify for higher paying employment.

b. The contractor will use good faith efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the contracting agency and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of

referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minorities and women. The failure of a union to provide sufficient referrals (even though it is obligated to provide exclusive referrals under the terms of a collective bargaining agreement) does not relieve the contractor from the requirements of this paragraph.

e. In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the contracting agency.

8. Reasonable Accommodation for Applicants / Employees with Disabilities: The contractor must be familiar with the requirements for and comply with the Americans with Disabilities Act and all rules and regulations established there under. Employers must provide reasonable accommodation in all employment activities unless to do so would cause an undue hardship.

9. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The contractor shall take all necessary and reasonable steps to ensure nondiscrimination in the administration of this contract.

a. The contractor shall notify all potential subcontractors and suppliers and lessors of their EEO obligations under this contract.

b. The contractor will use good faith efforts to ensure subcontractor compliance with their EEO obligations.

10. Assurance Required by 49 CFR 26.13(b):

a. The requirements of 49 CFR Part 26 and the State DOT's U.S. DOT-approved DBE program are incorporated by reference.

b. The contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The contractor shall carry out applicable requirements of 49 CFR Part 26 in the award and administration of DOT-assisted contracts. Failure by the contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the contracting agency deems appropriate.

11. Records and Reports: The contractor shall keep such records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following the date of the final payment to the contractor for all contract work and shall be available at reasonable times and places for inspection by authorized representatives of the contracting agency and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number and work hours of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women; and

(3) The progress and e fforts being made in locating, hiring, training, qualifying, and upgrading minorities and women;

b. The contractors and subcontractors will submit an annual report to the contracting agency each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391.The staffing data should represent the project work force on board in all or any part of the last payroll period preceding the end of July. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data. The employment data should reflect the work force on board during all or any part of the last payroll period preceding the end of July.

III. NONSEGREGATED FACILITIES

This provision is applicable to all Federal-aid construction contracts and to all related construction subcontracts of $10,000 or more.

The contractor must ensure that facilities provided for employees are provided in such a manner that segregation on the basis of race, color, religion, sex, or national origin cannot result. The contractor may neither require such segregated use by written or oral policies nor tolerate such use by employee custom. The contractor's obligation extends further to ensure that its employees are not assigned to perform their services at any location, under the contractor's control, where the facilities are segregated. The term "facilities" includes waiting rooms, work areas, restaurants and other eating areas, time clocks, restrooms, washrooms, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing provided for employees. The contractor shall provide separate or single-user restrooms and necessary dressing or sleeping areas to assure privacy between sexes.

IV. Davis-Bacon and Related Act Provisions

This section is applicable to all Federal-aid construction projects exceeding $2,000 and to all related subcontracts and lower-tier subcontracts (regardless of subcontract size). The requirements apply to all projects located within the right-of-way of a roadway that is functionally classified as Federal-aid highway. This excludes roadways functionally classified as local roads or rural minor collectors, which are exempt. Contracting agencies may elect to apply these requirements to other projects.

The following provisions are from the U.S. Department of Labor regulations in 29 CFR 5.5 "Contract provisions and related matters" with minor revisions to conform to the FHWA-1273 format and FHWA program requirements.

5. **Minimum Wages**

a. All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b) (2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph 1.d. of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph 1.b. of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

b. (1) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(I) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(II) The classification is utilized in the area by the construction industry; and

(III) The proposed wage rate, including any bona fide fringe benefits,

bears a reasonable relationship to the wage rates contained in the wage = determination.

(2) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(3) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. The Wage and Hour Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(4) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs 1.b.(2) or 1.b.(3) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

c. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

d. If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis- Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

6. **Withholding**

The contracting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract, or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be

considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the contracting agency may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. **Payrolls and basic records**

a. Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b) (2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

b. (1) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the contracting agency. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH– 347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the contracting agency for transmission to the State DOT, the FHWA or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the contracting agency.

(2) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the

persons employed under the contract and shall certify the following:

(I) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(II) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(III) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(3) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 3.b.(2) of this section.

(4) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

c. The contractor or subcontractor shall make the records required under paragraph 3.a. of this section available for inspection, copying, or transcription by authorized representatives of the contracting agency, the State DOT, the FHWA, or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the FHWA may, after written notice to the contractor, the contracting agency or the State DOT, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

8. **Apprentices and trainees**

a. Apprentices (programs of the USDOL).

Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has

been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice.

The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.
In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

b. Trainees (programs of the USDOL).

Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration.

The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration.

Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the

corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

d. Apprentices and Trainees (programs of the U.S. DOT).

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

9. **Compliance with Copeland Act requirements.** The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

10. **Subcontracts.** The contractor or subcontractor shall insert Form FHWA-1273 in any subcontracts and also require the subcontractors to include Form FHWA-1273 in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

11. **Contract termination: debarment.** A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

12. **Compliance with Davis-Bacon and Related Act requirements.** All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

13. **Disputes concerning labor standards.** Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of

Labor, or the employees or their representatives.

14. **Certification of eligibility.**

a. By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

b. No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

c. The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

V. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

The following clauses apply to any Federal-aid construction contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by 29 CFR 5.5(a) or29 CFR4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

1. **Overtime requirements.** No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

2. **Violation; liability for unpaid wages; liquidated damages**. In the event of any violation of the clause set forth in paragraph (1.) of this section, the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1.) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1.) of this section.

3. **Withholding for unpaid wages and liquidated damages.** The FHWA or the contacting agency shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other

federally- assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2.) of this section.

4. **Subcontracts.** The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (1.) through (4.) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (1.) through (4.) of this section.

VI. SUBLETTING OR ASSIGNING THE CONTRACT

This provision is applicable to all Federal-aid construction contracts on the National Highway System.

15. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the contracting agency. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635.116).

    a. The term “perform work with its own organization” refers to workers employed or leased by the prime contractor, and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor or lower tier subcontractor, agents of the prime contractor, or any other assignees. The term may include payments for the costs of hiring leased employees from an employee leasing firm meeting all relevant Federal and State regulatory requirements. Leased employees may only be included in this term if the prime contractor meets all of the following conditions:

        (1) the prime contractor maintains control over the supervision of the day-to-day activities of the leased employees;

        (2) the prime contractor remains responsible for the quality of the work of the leased employees;

        (3) the prime contractor retains all power to accept or exclude individual employees from work on the project; and

        (4) the prime contractor remains ultimately responsible for the payment of predetermined minimum wages, the submission of payrolls, statements of compliance and all other Federal regulatory requirements.

    b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid or propose on the contract

as a whole and in general are to be limited to minor components of the overall contract.

16. The contract amount upon which the requirements set forth in paragraph (1) of Section VI is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

17. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the contracting officer determines is necessary to assure the performance of the contract.

18. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the contracting agency has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

19. The 30% self-performance requirement of paragraph (1) is not applicable to design-build contracts; however, contracting agencies may establish their own self-performance requirements.

VII. SAFETY: ACCIDENT PREVENTION

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 3704).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the

Contract Work Hours and Safety Standards Act (40 U.S.C.3704).

VIII. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding regarding the seriousness of these and similar acts, Form FHWA-1022 shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

18 U.S.C. 1020 reads as follows:

> "Whoever, being an officer, agent, or employee of the United States, or of any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or
>
> Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or
>
> Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;
> Shall be fined under this title or imprisoned not more than 5 years or both."

IX. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts.

By submission of this bid/proposal or the execution of this contract, or subcontract, as appropriate, the bidder, proposer, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any person who is or will be utilized in the performance of this contract is not prohibited from receiving an award due to a violation of Section 508 of the Clean Water Act or Section 306 of the Clean Air Act.

2. That the contractor agrees to include or cause to be included the requirements of paragraph (1) of this Section X in every subcontract, and further agrees to take such action as the contracting agency may direct as a means of enforcing such requirements.

X. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

This provision is applicable to all Federal-aid construction contracts, design-build contracts, subcontracts, lower-tier subcontracts, purchase orders, lease agreements, consultant contracts or any other covered transaction requiring FHWA approval or that is estimated to cost $25,000 or more – as defined in 2 CFR Parts 180 and 1200.

1. Instructions for Certification – First Tier Participants:

a. By signing and submitting this proposal, the prospective first tier participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective first tier participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective first tier participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the contracting agency determined to enter into this transaction. If it is later determined that the prospective participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the contracting agency may terminate this transaction for cause of default.

d. The prospective first tier participant shall provide immediate written notice to the contracting agency to whom this proposal is submitted if any time the prospective first tier participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

f. The prospective first tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective first tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transactions," provided by the department or contracting agency, entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require the establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of the prospective participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph (f) of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

* * * * *

2. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion – First Tier Participants:

a. The prospective first tier participant certifies to the best of its knowledge and belief, that it and its principals:

(1) Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency;

(2) Have not within a three-year period preceding this proposal been convicted

of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

(3) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph (a)(2) of this certification; and

(4) Have not within a three-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

b. Where the prospective participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Participants:

(Applicable to all subcontracts, purchase orders and other lower tier transactions requiring prior FHWA approval or estimated to cost $25,000 or more - 2 CFR Parts 180 and 1200)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department, or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "participant," "person," "principal," and "voluntarily excluded," as used in this clause, are defined in 2 CFR Parts 180 and 1200. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations. “First Tier Covered Transactions” refers to any covered transaction between a grantee or subgrantee of Federal funds and a participant (such as the prime or general contract). “Lower Tier Covered Transactions” refers to any covered transaction under a First Tier Covered Transaction (such as subcontracts). “First Tier Participant” refers to the participant who has entered into a covered transaction with a grantee or subgrantee of Federal funds (such as the prime or general contractor). “Lower Tier Participant” refers any participant who has entered into a covered transaction with a First Tier Participant or other Lower Tier Participants (such as subcontractors and suppliers).

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions exceeding the $25,000 threshold.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant is responsible for ensuring that its principals are not suspended, debarred, or otherwise ineligible to participate in covered transactions. To verify the eligibility of its principals, as well as the eligibility of any lower tier prospective participants, each participant may, but is not required to, check the Excluded Parties List System website (https://www.epls.gov/), which is compiled by the General Services Administration.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

* * * * *

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Participants:

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participating in covered transactions by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

* * ** *

XI. CERTIFICATION REGARDING USE OF CONTRACT FUNDS FOR LOBBYING

This provision is applicable to all Federal-aid construction contracts and to all related subcontracts which exceed $100,000 (49 CFR 20).

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

    a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation,renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

    b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by U.S.C. 1352. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

3. The prospective participant also agrees by submitting its bid or proposal that the participant shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such recipients shall certify and disclose accordingly.

VIRGINIA DEPARTMENT OF TRANSPORTATION SPECIAL PROVISION FOR
Notice of Requirement For Affirmative Action to Ensure
Eual Emplyement Oportunity (Eexecutive Order 11246)

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Opportunity Construction Contract Specifications" set forth herein.

2. The goals for female and minority participation, expressed in percentage terms of the Contractor's aggregate work force in each trade on all construction works in the covered area, are as follows:

   Females – 6.9%
   Minorities – 4%

   The goals are applicable to all the Contractor's construction work performed in the covered area, whether or not it is Federal or federally assisted. If the Contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the Contractor also is subject to the goals for both its federally involved and non-federally involved construction.

   The Contractor's compliance with the Executive Order and the regulations in 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications, set forth in 41 CFR 60-4.3(a), and its efforts to meet the goals established herein. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the Contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executives Order and the regulations in 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification to the Director of the Office of Federal Contract Compliance Programs <u>within 10 workings days</u> the award of any construction subcontract in excess of $10,000 at any tier for construction works under this contract. The notification shall list the name, address and telephone number of the subcontractor, employer identification number, estimated dollar amount of the subcontract, estimated starting and completion dates of the subcontract and the geographical area in which the contract is to be performed.

STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)

1. As, used in this provision:

   a. "Covered area" means the geographical area described in the solicitation from which this contract resulted;

   b. "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor or any person to whom the Director delegates authority;

   c. "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U. S. Treasury Department Form 941;

   d. "Minority" includes:

      (i) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

      (ii) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South American or other Spanish Culture or origin, regardless of race);

      (iii) Asian and Pacific Islander (all persons having origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

      (iv) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

2. Whenever the Contractor, or any Subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of $10,000 the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation.

3. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U. S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in and compliance with the provisions of any such Hometown Plan. Each Contractor or Subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors and Subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or Subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

4. The Contractor shall implement the specific affirmative action standards provided in paragraphs 7 a through p of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the coverer area. Covered construction Contractors performing construction work in geographical areas where they do not have a Federal or federally assisted construction contract shall

apply the minority and female goals established for the geographical area where the work is being performed. Goals are published periodically in the Federal Register in notice form, and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

5. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.
6. In order for the nonworking training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U. S. Department of Labor.

7. The Contractor shall take specific affirmative actions to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

   a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. <u>The Contractor, where possible, shall assign two or more women to each construction project.</u> The Contractor shall specifically ensure that all foreman, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites in such facilities.

   b. Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organizations'responses.

   c. Maintain a current file of the names, addresses and telephone numbers of each minority and female off the street applicant and minority or female referral from a union, a recruitment source or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union, or if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

   d. Provide immediate written notification to the Director when the union or unions which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or women sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

   e. Develop on-the-job training opportunities and/or participate in training programs for the area which expressly include minorities and women, including upgrading programs and apprenticeship

and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources complied under 7b above.

f. Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper or annual report; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on bulletin boards accessible to all employees at each location where construction work is performed.

g. Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with onsite supervisory personnel such as Superintendents and General Foremen prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed and disposition of the subject matter.

h. Disseminate the Contractor's EEO policy externally by including in any news media advertisement that the Contractor is "An Equal Opportunity Employer" for minority and female, and providing written notification to and discussing the Contractor's EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

i. Directs its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for the acceptance of applications for apprenticeship or other training by recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures and tests to be used m the selection process.

j. Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer and vacation employment to minority and female youth both on the site and in other areas of Contractor's workforce.

k. Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

l. Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for such opportunities through appropriate training or other means.

m. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

n. Ensure that all facilities and company activities are non-segregated, except that separate or

single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

o. Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitations to minority and female contractor associations and other business associations.

p. Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

8. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (7a through p). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under 7a through p of these Specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's and failure of such a group to fulfill an obligation shall not be a defense for the Contractor's noncompliance.

9. Goals for women have been established. However, the Contractor IS required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner that is even thought the Contractor has achieved its goals for women, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized.

10. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any person because of race, color, religion, sex or nation origin.

11. The Contractor shall not enter into any Subcontract with any person or firm debarred from Government contracts pursuant to Executive Order 11246.

12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and the Equal Opportunity Clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Executive Order 11246, as amended, and its implementing regulations by the Office of Federal Contract Compliance Programs. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Executive Order 11246. as amended.

13. The Contractor, in fulfilling its obligations under these specifications shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph 7 of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director will proceed in accordance with 41 CFR 60-4.8.

14. The Contractor shall designate and make known to the Department a responsible official as the EEO Officer to monitor all employment related activity, to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the Government and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status (e.g., mechanic, apprentice, trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors will not be required to maintain separate records.

15. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application of requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977 and the Community Development Block Grant Program).

S107HF1-**0211**

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION FOR

SECTION 107.15

December 10, 2010

Section 107.15 of the Specifications is replaced by the following:

Section 107.15—Use of Disadvantaged Business Enterprises (DBEs)

Disadvantaged Business Enterprise (DBE) Program Requirements

Any Contractor, subcontractor, supplier, DBE firm, and contract surety involved in the performance of work on a federal-aid contract shall comply with the terms and conditions of the United States Department of Transportation (USDOT) DBE Program as the terms appear in Part 26 of the Code of Federal Regulations (49 CFR as amended), the USDOT DBE Program regulations; and the Virginia Department of Transportation's (VDOT or the Department) Road and Bridge Specifications and DBE Program rules and regulations.

For the purposes of this provision, Contractor is defined as the Prime Contractor of the contract; and sub-contractor is defined as any DBE supplier, manufacturer, or subcontractor performing work or furnishing material, supplies or services to the contract. The Contractor shall physically include this same contract provision in every supply or work/service subcontract that it makes or executes with a subcontractor having work for which it intends to claim credit.

In accordance with 49 CFR Part 26 and VDOT's DBE Program requirements, the Contractor, for itself and for its subcontractors and suppliers, whether certified DBE firms or not, shall commit to complying fully with the auditing, record keeping, confidentiality, cooperation, and anti-intimidation or retaliation provisions contained in those federal and state DBE Program regulations. By bidding on this contract, and by accepting and executing this contract, the Contractor agrees to assume these contractual obligations and to bind the Contractor's subcontractors contractually to the same at the Contractor's expense.

The Contractor or subcontractor shall not discriminate on the basis of race, color, national origin, or sex in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award, administration, and performance of this contract. Failure by the Contractor to carry out these requirements is a material breach of this contract, which will result in the termination of this contract or other such remedy, as VDOT deems appropriate.

All administrative remedies noted in this provision are automatic unless the Contractor exercises the right of appeal within the required timeframe(s) specified herein. Appeal requirements, processes, and procedures shall be in accordance with guidelines stated herein and current at the time of the proceedings. Where applicable, the Department will notify the Contractor of any changes to the appeal requirements, processes, and procedures after receiving notification of the Contractor's desire to appeal.

All time frames referenced in this provision are expressed in business days unless otherwise indicated. Should the expiration of any deadline fall on a weekend or holiday, such deadline will automatically be extended to the next normal business day.

A. DBE Certification

The only DBE firms eligible to perform work on a federal-aid contract for DBE contract goal credit are firms certified as Disadvantaged Business Enterprises by the Virginia Department of Minority Business Enterprise (DMBE) or the Metropolitan Washington Airports Authority (MWAA) in accordance with federal and VDOT guidelines. DBE firms must be certified in the specific work listed for DBE contract goal credit. A directory listing of certified DBE firms can be obtained from the Virginia Department of Minority Business Enterprise and the Metropolitan Washington Airports Authority Internet websites: http://www.dmbe.virginia.gov/; http://mwaa.com/362.htm

B. Bank Services

The Contractor and each subcontractor are encouraged to use the services of banks owned and controlled by socially and economically disadvantaged individuals. Such banking services and the fees charged for services typically will not be eligible for DBE Program contract goal credit. Such information is available from the VDOT's Internet Civil Rights Division website: http://insidevdot/C7/Civil%20Rights/default.aspx

C. DBE Program-Related Certifications Made by Bidders\Contractors

By submitting a bid and by entering into any contract on the basis of that bid, the bidder/Contractor certifies to each of the following DBE Program-related conditions and assurances:

1. That the management and bidding officers of its firm agree to comply with the bidding and project construction and administration obligations of the USDOT DBE Program requirements and regulations of 49 CFR Part 26 as amended, and VDOT's Road and Bridge Specifications and DBE Program requirements and regulations.

2. Under penalty of perjury and other applicable penal law that it has complied with the DBE Program requirements in submitting the bid, and shall comply fully with these requirements in the bidding, award, and execution of the contract.

3. To ensure that DBE firms have been given full and fair opportunity to participate in the performance of the contract. The bidder certifies that all reasonable steps were, and will be, taken to ensure that DBE firms had, and will have, an opportunity to compete for and perform work on the contract. The bidder further certifies that the bidder shall not discriminate on the basis of race, color, age, national origin, or sex in the performance of the contract or in the award of any subcontract. Any agreement between a bidder and a DBE whereby the DBE promises not to provide quotations for performance of work to other bidders is prohibited.

4. As a bidder, good faith efforts were made to obtain DBE participation in the proposed contract at or above the goal for DBE participation established by VDOT. It has submitted as a part of its bid true, accurate, complete, and detailed documentation of the good faith efforts it performed to meet the contract goal for DBE participation. The bidder, by

signing and submitting its bid, certifies the DBE participation information submitted within the stated time thereafter is true, correct, and complete, and that the information provided includes the names of all DBE firms that will participate in the contract, the specific line item(s) that each listed DBE firm will perform, and the creditable dollar amounts of the participation of each listed DBE. The specific line item must reference the VDOT line number and item number contained in the proposal.

5. The bidder further certifies, by signing its bid, it has committed to use each DBE firm listed for the specific work item shown to meet the contract goal for DBE participation. Award of the contract will be conditioned upon meeting these and other listed requirements of 49 CFR Part 26.53 and the contract documents. By signing the bid, the bidder certifies on work that it proposes to sublet; it has made good faith efforts to seek out and consider DBEs as potential subcontractors. The bidder shall contact DBEs to solicit their interest, capability, and prices in sufficient time to allow them to respond effectively, and shall retain on file proper documentation to substantiate its good faith efforts. Award of the contract will be conditioned upon meeting these and other listed requirements of 49 CFR Part 26.53 and the contract documents.

6. Once awarded the contract, the Contractor shall make good faith efforts to utilize DBE firms to perform work designated to be performed by DBEs at or above the amount or percentage of the dollar value specified in the bidding documents. Further, the Contractor understands it shall not unilaterally terminate, substitute for, or replace any DBE firm that was designated in the executed contract in whole or in part with another DBE, any non-DBE firm, or with the Contractor's own forces or those of an affiliate of the Contractor without the prior written consent of VDOT as set out within the requirements of this provision.

7. Once awarded the contract, the Contractor shall designate and make known to the Department a liaison officer who is assigned the responsibility of administering and promoting an active and inclusive DBE program as required by 49 CFR Part 26 for DBEs. The designation and identity of this officer need be submitted only once by the Contractor during any twelve (12) month period at the preconstruction conference for the first contract the Contractor has been awarded during that reporting period. The Department will post such information for informational and administrative purposes at VDOT's Internet Civil Rights Division website.

8. Once awarded the contract, the Contractor shall comply fully with all regulatory and contractual requirements of the USDOT DBE Program, and that each DBE firm participating in the contract shall fully perform the designated work items with the DBE's own forces and equipment under the DBE's direct supervision, control, and management. Where a contract exists and where the Contractor, DBE firm, or any other firm retained by the Contractor has failed to comply with federal or VDOT DBE Program regulations and/or their requirements on that contract, VDOT has the authority and discretion to determine the extent to which the DBE contract regulations and\or requirements have not been met, and will assess against the Contractor any remedies available at law or provided in the contract in the event of such a contract breach.

9. In the event a bond surety assumes the completion of work, if for any reason VDOT has terminated the prime Contractor, the surety shall be obligated to meet the same DBE contract terms and requirements as were required of the original prime Contractor in accordance with the requirements of this specification.

D. Disqualification of Bidder

Bidders may be disqualified from bidding for failure to comply with the requirements of this Special Provision, the contract specifications, and VDOT Road and Bridge Specifications.

E. Bidding Procedures

The following bidding procedures shall apply to the contract for DBE Program compliance purposes:

1. **Contract Goal, Good Faith Efforts Specified:** All bidders evidencing the attainment of DBE goal commitment equal to or greater than the required DBE goal established for the project must submit completed Form C-111, Minimum DBE Requirements, and Form C-48, Subcontractor/Supplier Solicitation and Utilization, as a part of the bid documents.

   Form C-111 may be submitted electronically or may be faxed to the Department, but in no case shall the bidder's Form C-111 be received later than 10:00 a.m. the next business day after the time stated in the bid proposal for the receipt of bids. Form C-48 must be received within ten (10) business days after the bid opening.

   If, at the time of submitting its bid, the bidder knowingly cannot meet or exceed the required DBE contract goal, it shall submit Form C-111 exhibiting the DBE participation it commits to attain as a part of its bid documents. The bidder shall then submit Form C- 49, DBE Good Faith Efforts Documentation, within two (2) business days after the bid opening.

   The lowest responsive and responsible bidder must submit its properly executed Form C-112, Certification of Binding Agreement, within three (3) business days after the bids are received. DBEs bidding as prime contractors are not required to submit Form C-112 unless they are utilizing other DBEs as subcontractors.

   If, after review of the apparent lowest bid, VDOT determines the DBE requirements have not been met, the apparent lowest successful bidder must submit Form C-49, DBE Good Faith Efforts Documentation, which must be received by the Contract Engineer within two (2) business days after official notification of such failure to meet the aforementioned DBE requirements.

   Forms C-48, C-49, C-111, and C-112 can be obtained from the VDOT website at: http://vdotforms.vdot.virginia.gov/

   Instructions for submitting Form C-111 can be obtained from the VDOT website at: http://www.virginiadot.org/business/resources/const/Exp_DBE_Commitments.pdf

2. **Bid Rejection:** The failure of a bidder to submit the required documentation within the timeframes specified in the **Contract Goal, Good Faith Efforts Specified** section of this Special Provision may be cause for rejection of that bidder's bid.

   If the lowest bidder is rejected for failure to submit the required documentation in the specified time frames, the Department may award the work to the next lowest bidder, or readvertise the proposed work at a later date or proceed otherwise as determined by the Commonwealth.

3. **Good Faith Efforts Described:** In order to award a contract to a bidder that has failed to meet DBE contract goal requirements, VDOT will determine if the bidder's efforts were adequate good faith efforts, and if given all relevant circumstances, those efforts were made actively and aggressively to meet the DBE requirements. Efforts to obtain DBE participation are not good faith efforts if they could not reasonably be expected to produce a level of DBE participation sufficient to meet the DBE Program and contract goal requirements.

   Good faith efforts may be determined through use of the following list of the types of actions the bidder may make to obtain DBE participation. This is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts of similar intent may be relevant in appropriate cases:

   (a) Soliciting through reasonable and available means, such as but not limited to, attendance at pre-bid meetings, advertising, and written notices to DBEs who have the capability to perform the work of the contract. Examples include: advertising in at least one daily/weekly/monthly newspaper of general circulation, as applicable; phone contact with a completely documented telephone log, including the date and time called, contact person, or voice mail status; and internet contacts with supporting documentation, including dates advertised. The bidder shall solicit this interest no less than five (5) business days before the bids are due so that the solicited DBEs have enough time to reasonably respond to the solicitation. The bidder shall determine with certainty if the DBEs are interested by taking reasonable steps to follow up initial solicitations as evidenced by documenting such efforts as requested on Form C-49, DBE Good Faith Efforts Documentation.

   (b) Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Contractor might otherwise prefer to completely perform all portions of this work in its entirety or use its own forces;

   (c) Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner, which will assist the DBEs in responding to a solicitation;

   (d) Negotiating for participation in good faith with interested DBEs;

      1. Evidence of such negotiation shall include the names, addresses, and telephone numbers of DBEs that were considered; dates DBEs were contacted; a description of the information provided regarding the plans, specifications, and requirements of the contract for the work selected for subcontracting; and, if insufficient DBE participation seems likely, evidence as to why additional agreements could not be reached for DBEs to perform the work;

      2. A bidder using good business judgment should consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and should take a firm's price, qualifications, and capabilities, as well as contract goals, into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not sufficient reason for a bidder's failure to meet the contract goal for DBE participation, as long as such costs are reasonable and

comparable to costs customarily appropriate to the type of work under consideration. Also, the ability or desire of a bidder to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make diligent good faith efforts. Bidders are not, however, required to accept higher quotes from DBEs if the price difference can be shown by the bidder to be excessive, unreasonable, or greater than would normally be expected by industry standards;

(e) A bidder cannot reject a DBE as being unqualified without sound reasons based on a thorough investigation of the DBE's capabilities. The DBE's standing within its industry, membership in specific groups, organizations, associations, and political or social affiliations and union vs. non-union employee status are not legitimate causes for the rejection or non-solicitation of bids in the bidder's efforts to meet the project goal for DBE participation;

(f) Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by VDOT or by the bidder/Contractor;

(g) Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services subject to the restrictions contained in these provisions;

(h) Effectively using the services of appropriate personnel from VDOT and from DMBE; available minority/women community or minority organizations; contractors' groups; local, state, and Federal minority/ women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and utilization of qualified DBEs.

F. Documentation and Administrative Reconsideration of Good Faith Efforts

During Bidding: As described in the **Contract Goal, Good Faith Efforts Specified** section of this Special Provision, the bidder must provide Form C-49, DBE Good Faith Efforts Documentation, of its efforts made to meet the DBE contract goal as proposed by VDOT within the time frame specified in this provision. The means of transmittal and the risk for timely receipt of this information shall be the responsibility of the bidder. The bidder shall attach additional pages to the certification, if necessary, in order to fully detail specific good faith efforts made to obtain the DBE firms participation in the proposed contract work.

However, regardless of the DBE contract goal participation level proposed by the bidder or the extent of good faith efforts shown, all bidders shall timely and separately file their completed and executed forms C-111, C-112, C-48, and C-49, as aforementioned, or face potential bid rejection.

If a bidder does not submit its completed and executed forms C-111, or C-112, when required by this Special Provision, the bidder's bid will be considered non-responsive and may be rejected. Where the Department upon initial review of the bid results determines the apparent low bidder has failed or appears to have failed to meet the requirements of the **Contract Goal, Good Faith Efforts Specified** section of this Special Provision and has failed to adequately document that it made a good faith effort to achieve sufficient DBE participation as specified in the bid proposal, that firm upon notification of the Department's initial determination will be offered the opportunity for administrative reconsideration before VDOT rejects that bid as non-

responsive. The bidder shall address such request for reconsideration in writing to the Contract Engineer within five (5) business days of receipt of notification by the Department and shall be given the opportunity to discuss the issue and present its evidence in person to the Administrative Reconsideration Panel. The Administrative Reconsideration Panel will be made up of VDOT Division Administrators or their designees, none of who took part in the initial determination that the bidder failed to make the goal or make adequate good faith efforts to do so. After reconsideration, VDOT shall notify the bidder in writing of its decision and explain the basis for finding that the bidder did or did not meet the goal or make adequate good faith efforts to do so.

If, after reconsideration, the Department determines the bidder has failed to meet the requirements of the contract goal and has failed to make adequate good faith efforts to achieve the level of DBE participation as specified in the bid proposal, the bidder's bid will be rejected.

If sufficient documented evidence is presented to demonstrate that the apparent low bidder made reasonable good faith efforts, the Department will award the contract and reduce the DBE requirement to the actual commitment identified by the lowest successful bidder at the time of its bid. The Contractor is still encouraged to seek additional DBE participation during the life of the contract.

However, such action will not relieve the Contractor of its responsibility for complying with the reduced DBE requirement during the life of the contract or any administrative sanctions as may be appropriate.

During the Contract: If a DBE, through no fault of the Contractor, is unable or unwilling to fulfill his agreement with the Contractor, the Contractor shall immediately notify the Department and provide all relevant facts. If a Contractor relieves a DBE subcontractor of the responsibility to perform work under their subcontract, the Contractor is encouraged to take the appropriate steps to obtain a DBE to perform an equal dollar value of the remaining subcontracted work. In such instances, the Contractor is expected to seek DBE participation towards meeting the goal during the performance of the contract.

If the Contractor fails to conform to the schedule of DBE participation as shown on the progress schedule, or at any point at which it is clearly evident that the remaining dollar value of allowable credit for performing work is insufficient to obtain the scheduled participation, and the Contractor has not taken the preceding actions, the Contractor and any aforementioned affiliates may be subject to disallowance of DBE credit until such time as conformance with the schedule of DBE participation is achieved.

Project Completion: If the Contractor fails upon completion of the project to meet the required participation, the Contractor and any prime contractual affiliates, as in the case of a joint venture, may be enjoined from bidding as a prime Contractor, or participating as a subcontractor on VDOT projects for a period of 90 days.

Prior to enjoinment from bidding or denial to participate as a subcontractor for failure to comply with participation requirements, as provided hereinbefore, the Contractor may submit documentation to the State Construction Engineer to substantiate that failure was due solely to quantitative underrun(s), elimination of items subcontracted to DBEs, or to circumstances beyond their control, and that all feasible means have been used to obtain the required participation. The State Construction Engineer upon verification of such documentation shall make a determination whether or not the Contractor has met the requirements of the contract.

If it is determined that the aforementioned documentation is insufficient or the failure to meet required participation is due to other reasons, the Contractor may request an appearance before the Administrative Reconsideration Panel to establish that all feasible means were used to meet such participation requirements. The decision of the Administrative Reconsideration Panel shall be administratively final. If the decision is made to enjoin the Contractor from bidding on other VDOT work as described herein, the enjoinment period will begin upon the Contractor's failure to request a hearing within the designated time frame or upon the Administrative Reconsideration Panel's decision to enjoin, as applicable.

G. DBE Participation for Contract Goal Credit

DBE participation on the contract will count toward meeting the DBE contract goal in accordance with the following criteria:

1. Cost-plus subcontracts will not be considered to be in accordance with normal industry practice and will not normally be allowed for credit.

2. The applicable percentage of the total dollar value of the contract or subcontract awarded to the DBE will be counted toward meeting the contract goal for DBE participation in accordance with the **DBE Program-Related Certifications Made by Bidders\Contractors** section of this Special Provision for the value of the work, goods, or services that are actually performed or provided by the DBE firm itself or subcontracted by the DBE to other DBE firms.

3. When a DBE performs work as a participant in a joint venture with a non-DBE firm, the Contractor may count toward the DBE goal only that portion of the total dollar value of the contract equal to the distinctly defined portion of the contract work that the DBE has performed with the DBE's own forces or in accordance with the provisions of this Section. The Department shall be contacted in advance regarding any joint venture involving both a DBE firm and a non- DBE firm to coordinate Department review and approval of the joint venture's organizational structure and proposed operation where the Contractor seeks to claim the DBE's credit toward the DBE contract goal.

4. When a DBE subcontracts part of the work of the contract to another firm, the value of that subcontracted work may be counted toward the DBE contract goal only if the DBE's subcontractor at a lower tier is a certified DBE. Work that a DBE subcontracts to either a non- DBE firm or to a non-certified DBE firm will not count toward the DBE contract goal. The cost of supplies and equipment a DBE subcontractor purchases or leases from the prime Contractor or the prime's affiliated firms will not count toward the contract goal for DBE participation.

5. The Contractor may count expenditures to a DBE subcontractor toward the DBE contract goal only if the DBE performs a Commercially Useful Function (CUF) on that contract.

6. A Contractor may not count the participation of a DBE subcontractor toward the Contractor's final compliance with the DBE contract goal obligations until the amount being counted has actually been paid to the DBE. A Contractor may count sixty (60) percent of its expenditures actually paid for materials and supplies obtained from a DBE certified as a regular dealer, and one hundred (100) percent of such expenditures actually paid for materials and supplies obtained from a certified DBE manufacturer.

(a) For the purposes of this Special Provision, a regular dealer is defined as a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials, supplies, articles, or equipment required and used under the contract are bought, kept in stock, and regularly sold or leased to the public in the usual course of business. To be a regular dealer, the DBE firm shall be an established business that regularly engages, as its principal business and under its own name, in the purchase and sale or lease of the products or equipment in question. Packagers, brokers, manufacturers' representatives, or other persons who arrange or expedite transactions will not be considered regular dealers.

(b) A DBE firm may be a regular dealer in such bulk items as petroleum products, steel, cement, gravel, stone, or asphalt without owning, operating, or maintaining a place of business where it keeps such items in stock if the DBE both owns and operates distribution equipment for the products it sells and provides for the contract work.

Any supplementation of a regular dealer's own distribution equipment shall be by a long- term lease agreement and not on an ad hoc or contract-by-contract basis to be eligible for credit to meet the DBE contract goal.

(c) If a DBE regular dealer is used for DBE contract goal credit, no additional credit will be given for hauling or delivery to the project site goods or materials sold by that DBE regular dealer. Those delivery costs shall be deemed included in the price charged for the goods or materials by the DBE regular dealer, who shall be responsible for their distribution.

(d) For the purposes of this Special Provision, a manufacturer will be defined as a firm that operates or maintains a factory or establishment that produces on the premises the materials, supplies, articles, or equipment required under the contract and of the general character described by the project specifications. A manufacturer shall include firms that produce finished goods or products from raw or unfinished material, or purchase and substantially alter goods and materials to make them suitable for construction use before reselling them.

(g) A Contractor may count toward the DBE contract goal the following expenditures to DBE firms that are not regular dealers or manufacturers for DBE program purposes:

1. The entire amount of fees or commissions charged by a DBE firm for providing a bona fide service, such as professional, technical, consultant or managerial services, or for providing bonds or insurance specifically required for the performance of the federal- aid contract, if the fee is reasonable and not excessive or greater than would normally be expected by industry standards for the same or similar services.

2. The entire amount of that portion of the construction contract that is performed by the DBE's own forces and equipment under the DBE's supervision. This includes the cost of supplies and materials ordered and paid for by the DBE for contract work, including supplies purchased or equipment leased by the DBE, except supplies and equipment a DBE subcontractor purchases or leases from the prime Contractor or its affiliates.

(h) A Contractor may count toward the DBE contract goal one hundred (100) percent of the fees paid to a DBE trucker or hauler for the delivery of material and supplies required on the project job site, but not for the cost of those materials or supplies themselves,

provided that the trucking or hauling fee is determined by VDOT to be reasonable, as compared with fees customarily charged by non-DBE firms for similar services. A Contractor shall not count costs for the removal or relocation of excess material from or on the job site when the DBE trucking company is not the manufacturer of or a regular dealer in those materials and supplies. The DBE trucking firm shall also perform a Commercially Useful Function (CUF) on the project and not operate merely as a pass through for the purposes of gaining credit toward the DBE contract goal. Prior to submitting a bid, the Contractor shall determine, or contact the VDOT Civil Rights Division or its district Offices for assistance in determining, whether a DBE trucking firm will meet the criteria for performing a CUF on the project. See section on **Miscellaneous DBE Program Requirements; Factors used to Determine if a DBE Trucking Firm is Performing a CUF**.

(i) The Contractor will receive DBE contract goal credit for the fees or commissions charged by and paid to a DBE broker who arranges or expedites sales, leases, or other project work or service arrangements provided that those fees are determined by VDOT to be reasonable and not excessive as compared with fees customarily charged by non-DBE firms for similar services. For the purposes of this Special Provision, a broker is defined as a person or firm that regularly engages in arranging for delivery of material, supplies, and equipment, or regularly arranges for the providing of project services as a course of routine business but does not own or operate the delivery equipment necessary to transport materials, supplies, or equipment to or from a job site.

H. Performing a Commercially Useful Function (CUF)

No credit toward the DBE contract goal will be allowed for contract payments or expenditures to a DBE firm if that DBE firm does not perform a CUF on that contract. A DBE performs a CUF when the DBE is solely responsible for execution of a distinct element of the contract work and the DBE actually performs, manages, and supervises the work involved with the firm's own forces or in accordance with the provisions of the **DBE Participation for Contract Goal Credit** section of this Special Provision. To perform a CUF the DBE alone shall be responsible and bear the risk for the material and supplies used on the contract, selecting a supplier or dealer from those available, negotiating price, determining quality and quantity, ordering the material and supplies, installing those materials with the DBE's own forces and equipment, and paying for those materials and supplies. The amount the DBE firm is to be paid under the contract shall be commensurate with the work the DBE actually performs and the DBE credit claimed for the DBE's performance.

Monitoring CUF Performance: It shall be the Contractor's responsibility to ensure that all DBE firms selected for subcontract work on the contract, for which he seeks to claim credit toward the contract goal, perform a CUF. Further, the Contractor is responsible for and shall ensure that each DBE firm fully performs the DBE's designated tasks with the DBE's own forces and equipment under the DBE's own direct supervision and management or in accordance with the provisions of the **DBE Participation for Contract Goal Credit** section of this Special Provision. For the purposes of this provision the DBE's equipment will mean either equipment directly owned by the DBE as evidenced by title, bill of sale or other such documentation, or leased by the DBE, and over which the DBE has control as evidenced by the leasing agreement from a firm not owned in whole or part by the prime Contractor or an affiliate of the Contractor under this contract.

VDOT will monitor the Contractor's DBE involvement during the performance of the contract. However, VDOT is under no obligation to warn the Contractor that a DBE's participation will not count toward the goal.

DBEs Must Perform a Useful and Necessary Role in Contract Completion: A DBE does not perform a commercially useful function if the DBE's role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation.

DBEs Must Perform The Contract Work With Their Own Workforces: If a DBE does not perform and exercise responsibility for at least thirty (30) percent of the total cost of the DBE's contract with the DBE's own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involve, VDOT will presume that the DBE is not performing a CUF and such participation will not be counted toward the contract goal.

VDOT Makes Final Determination On Whether a CUF Is Performed: VDOT has the final authority to determine whether a DBE firm has performed a CUF on a federal-aid contract. To determine whether a DBE is performing or has performed a CUF, VDOT will evaluate the amount of work subcontracted by that DBE firm or performed by other firms and the extent of the involvement of other firms' forces and equipment. Any DBE work performed by the Contractor or by employees or equipment of the Contractor shall be subject to disallowance under the DBE Program, unless the independent validity and need for such an arrangement and work is demonstrated.

I. Verification of DBE Participation and Imposed Damages

Within fourteen days after contract execution, the Contractor shall submit to the Responsible Engineer, with a copy to the District Civil Rights Office (DCRO), a fully executed subcontract agreement for each DBE used to claim credit in accordance with the requirements stated on Form C-112. The subcontract agreement shall be executed by both parties stating the work to be performed, the details or specifics concerning such work, and the price which will be paid to the DBE subcontractor. Because of the commercial damage that the Contractor and its DBE subcontractor could suffer if their subcontract pricing, terms, and conditions were known to competitors, the Department staff will treat subcontract agreements as proprietary Contractor trade secrets with regard to Freedom of Information Act requests. In lieu of subcontract agreements, purchase orders may be submitted for haulers, suppliers, and manufacturers. These too, will be treated confidentially and protected. Such purchase orders must contain, as a minimum, the following information: authorized signatures of both parties; description of the scope of work to include contract item numbers, quantities, and prices; and required federal contract provisions.

The Contractor shall also furnish, and shall require each subcontractor to furnish; information relative to all DBE involvement on the project for each quarter during the life of the contract in which participation occurs and verification is available. The information shall be indicated on Form C-63, DBE and SWAM Payment Compliance Report. The department reserves the right to request proof of payment via copies of cancelled checks with appropriate identifying notations. Failure to provide Form C-63 to the District Civil Rights Office (DCRO) within five (5) business days after the reporting period may result in delay of approval of the Contractor's monthly progress estimate for payment. The names and certification numbers of DBE firms provided by the Contractor on the various forms indicated in this Special Provision shall be exactly as shown on

the DMBE's or MWAA's latest list of certified DBEs. Signatures on all forms indicated herein shall be those of authorized representatives of the Contractor as shown on the Prequalification Application, Form C-32 or the Prequalification/Certification Renewal Application, Form C-32A, or authorized by letter from the Contractor. If DBE firms are used which have not been previously documented with the Contractor's bid and for which the Contractor now desires to claim credit toward the project goal, the Contractor shall be responsible for submitting necessary documentation in accordance with the procedures stipulated in this Special Provision to cover such work prior to the DBE beginning work.

Form C-63 can be obtained from the VDOT website at: http://vdotforms.vdot.virginia.gov/

The Contractor shall submit to the Responsible Engineer its progress schedule with a copy to the DCRO, as required by Section 108.03 of the Specifications or other such specific contract scheduling specification that may include contractual milestones, i.e., monthly or VDOT requested updates. The Contractor shall include a narrative of applicable DBE activities relative to work activities of the Contractor's progress schedule, including the approximate start times and durations of all DBE participation to be claimed for credit that shall result in full achievement of the DBE goal required in the contract.

On contracts awarded on the basis of good faith efforts, narratives or other agreeable format of schedule information requirements and subsequent progress determination shall be based on the commitment information shown on the latest Form C-111 as compared with the appropriate Form C- 63.

Prior to beginning any major component or quarter of the work, as applicable, in which DBE work is to be performed, the Contractor shall furnish a revised Form C-111 showing the name(s) and certification number(s) of any current DBEs not previously submitted who will perform the work during that major component or quarter for which the Contractor seeks to claim credit toward the contract DBE goal. The Contractor shall obtain the prior approval of the Department for any assistance it may provide to the DBE beyond its existing resources in executing its commitment to the work in accordance with the requirements listed in the **Good Faith Efforts Described** section of this Special Provision. If the Contractor is aware of any assistance beyond a DBE's existing resources that the Contractor, or another subcontractor, may be contemplating or may deem necessary and that have not been previously approved, the Contractor shall submit a new or revised narrative statement for VDOT's approval prior to assistance being rendered.
If the Contractor fails to comply with correctly completing and submitting any of the required documentation requested by this provision within the specified time frames, the Department will withhold payment of the monthly progress estimate until such time as the required submissions are received VDOT. Where such failures to provide required submittals or documentation are repeated the Department will move to enjoin the Contractor and any prime contractual affiliates, as in the case of a joint venture, from bidding as a prime Contractor, or participating as a subcontractor on VDOT projects until such submissions are received.

J. Documentation Required for Semi-final Payment

On those projects nearing completion, the Contractor must submit Form C-63 marked "Semi-Final" within twenty (20) days after the submission of the last regular monthly progress estimate to the DCRO. The form must include each DBE used on the contract work and the work performed by each DBE. The form shall include the actual dollar amount paid to each DBE for the accepted creditable work on the contract. The form shall be certified under penalty of perjury,

or other applicable law, to be accurate and complete. VDOT will use this certification and other information available to determine applicable DBE credit allowed to date by VDOT and the extent to which the DBEs were fully paid for that work. The Contractor shall acknowledge by the act of filing the form that the information is supplied to obtain payment regarding a federal participation contract. A letter of certification, signed by both the prime Contractor and appropriate DBEs, will accompany the form, indicating the amount, including any retainage, if present, that remains to be paid to the DBE(s).

K. Documentation Required for Final Payment

On those projects that are complete, the Contractor shall submit a final Form C-63 marked "Final" to the DCRO, within thirty (30) days of the final estimate. The form must include each DBE used on the contract and the work performed by each DBE. The form shall include the actual dollar amount paid to each DBE for the creditable work on the contract. VDOT will use this form and other information available to determine if the Contractor and DBEs have satisfied the DBE contract goal percentage specified in the contract and the extent to which credit was allowed. The Contractor shall acknowledge by the act of signing and filing the form that the information is supplied to obtain payment regarding a federal participation contract.

L. Prompt Payment Requirements

The Contractor shall make prompt and full payment to the subcontractor(s) of any retainage held by the prime Contractor after the subcontractor's work is satisfactorily completed.

For purposes of this Special Provision, a subcontractor's work is satisfactorily completed when all the tasks called for in the subcontract have been accomplished, documented, and accepted as required by the contract documents by VDOT. When VDOT has made partial acceptance of a portion of the prime contract, the Department will consider the work of any subcontractor covered by that partial acceptance to be satisfactorily completed. Payment will be made in accordance with the requirements of Section 107.01, Section 109.08, and Section 109.09 of the Specifications.

Upon VDOT's payment of the subcontractor's portion of the work as shown on the monthly progress estimate and the receipt of payment by the Contractor for such work, the Contractor shall make compensation in full to the subcontractor for that portion of the work satisfactorily completed and accepted by the Department. For the purposes of this Special Provision, payment of the subcontractor's portion of the work shall mean the Contractor has issued payment in full, less agreed upon retainage, if any, to the subcontractor for that portion of the subcontractor's work that VDOT paid to the Contractor on the monthly progress estimate.

The Contractor shall make payment of the subcontractor's portion of the work within seven (7) days of the receipt of payment from VDOT in accordance with the requirements of Section 107.01, Section 109.08, and Section 109.09 of the Specifications.

If the Contractor fails to make payment for the subcontractor's portion of the work within the time frame specified herein, the subcontractor shall contact the Responsible Engineer and the Contractor's bonding company in writing. The bonding company and VDOT will investigate the cause for non-payment and, barring mitigating circumstances that would make the subcontractor ineligible for payment, ensure payment in accordance with the requirements of Section 107.01, Section 109.08, and Section 109.09 of the Specifications.

By bidding on this contract, and by accepting and executing this contract, the Contractor agrees to assume these contractual obligations, and to bind the Contractor's subcontractors contractually to those prompt payment requirements.

Nothing contained herein shall preclude the Contractor from withholding payment to the subcontractor in accordance with the terms of the subcontract in order to protect the Contractor from loss or cost of damage due to a breach of agreement by the subcontractor.

M. Miscellaneous DBE Program Requirements

Loss of DBE Eligibility: When a DBE firm has been removed from eligibility as a certified DBE firm, the following actions will be taken:

1. When a Bidder/Contractor has made a commitment to use a DBE firm that is not currently certified, thereby making the Contractor ineligible to receive DBE participation credit for work performed, and a subcontract has not been executed, the ineligible DBE firm does not count toward either the contract goal or overall goal. The Contractor shall meet the contract goal with a DBE firm that is eligible to receive DBE credit for work performed, or must demonstrate to the Contract Engineer that it has made good faith efforts to do so.

2. When a Bidder/Contractor has executed a subcontract with a certified DBE firm prior to official notification of the DBE firm's loss of eligibility, the Contractor may continue to use the firm on the contract and shall continue to receive DBE credit toward its DBE goal for the subcontractor's work.

3. When VDOT has executed a prime contract with a DBE firm that is certified at the time of contract execution but that is later ruled ineligible, the portion of the ineligible firm's performance on the contract before VDOT has issued the notice of its ineligibility shall count toward the contract goal.

Termination of DBE: If a certified DBE subcontractor is terminated, or fails, refuses, or is unable to complete the work on the contract for any reason, the Contractor must promptly request approval to substitute or replace that firm in accordance with this section of this Special Provision.

The Contractor, as aforementioned in **DBE Program-Related Certifications Made by Bidders/Contractors**, shall notify VDOT in writing before terminating and/or replacing the DBE that was committed as a condition of contract award or that is otherwise being used or represented to fulfill DBE contract obligations during the contract performance period. Written consent from the Department for terminating the performance of any DBE shall be granted only when the Contractor can demonstrate that the DBE is unable, unwilling, or ineligible to perform its obligations for which the Contractor sought credit toward the contract DBE goal. Such written consent by the Department to terminate any DBE shall concurrently constitute written consent to substitute or replace the terminated DBE with another DBE. Consent to terminate a DBE shall not be based on the Contractor's ability to negotiate a more advantageous contract with another subcontractor whether that subcontractor is, or is not, a certified DBE.

1. All Contractor requests to terminate, substitute, or replace a certified DBE shall be in writing, and shall include the following information:

(a) The date the Contractor determined the DBE to be unwilling, unable, or ineligible to perform.

(b) The projected date that the Contractor shall require a substitution or replacement DBE to commence work if consent is granted to the request.

(c) A brief statement of facts describing and citing specific actions or inaction by the DBE giving rise to the Contractor's assertion that the DBE is unwilling, unable, or ineligible to perform;

(d) A brief statement of the affected DBE's capacity and ability to perform the work as determined by the Contractor;

(e) A brief statement of facts regarding actions taken by the Contractor which are believed to constitute good faith efforts toward enabling the DBE to perform;

(f) The current percentage of work completed on each bid item by the DBE;

(g) The total dollar amount currently paid per bid item for work performed by the DBE;

(h) The total dollar amount per bid item remaining to be paid to the DBE for work completed, but for which the DBE has not received payment, and with which the Contractor has no dispute;

(i) The total dollar amount per bid item remaining to be paid to the DBE for work completed, but for which the DBE has not received payment, and over which the Contractor and/or the DBE have a dispute.

2. Contractor's Written Notice to DBE of Pending Request to Terminate and Substitute with another DBE.

The Contractor shall send a copy of the "request to terminate and substitute" letter to the affected committed DBE firm, in conjunction with submitting the request to the DCRO. The affected DBE firm may submit a response letter to the Department within two (2) business days of receiving the notice to terminate from the Contractor. The affected DBE firm shall explain its position concerning performance on the committed work. The Department will consider both the Contractor's request and the DBE's response and explanation before approving the Contractor's termination and substitution request, or determining if any action should be taken against the Contractor.

If, after making its best efforts to deliver a copy of the "request to terminate and substitute" letter, the Contractor is unsuccessful in notifying the affected DBE firm, the Department will verify that the affected, committed DBE firm is unable or unwilling to continue the contract. The Department will immediately approve the Contractor's request for a substitution.

3. Proposed Substitution of Another Certified DBE

Upon termination of a DBE, the Contractor shall use reasonable good faith efforts to replace the terminated DBE. The termination of such DBE shall not relieve the Contractor of its obligations pursuant to this section, and the unpaid portion of the terminated DBE's contract will not be counted toward the contract goal.

When a DBE substitution is necessary, the Contractor shall submit an amended Form C-111 with the name of another DBE firm, the proposed work to be performed by that firm, and the dollar amount of the work to replace the unfulfilled portion of the work of the originally committed DBE firm. The Contractor shall furnish all pertinent information including the contract I.D. number, project number, bid item, item description, bid unit and bid quantity, unit price, and total price. In addition, the Contractor shall submit documentation for the requested substitute DBE as described in this section of this Special Provision.

Should the Contractor be unable to commit the remaining required dollar value to the substitute DBE, the Contractor shall provide written evidence of good faith efforts made to obtain the substitute value requirement. The Department will review the quality, thoroughness, and intensity of those efforts. Efforts that are viewed by VDOT as merely superficial or pro-forma will not be considered good faith efforts to meet the contract goal for DBE participation. The Contractor must document the steps taken that demonstrated its good faith efforts to obtain participation as set forth in the **Good Faith Efforts Described** section of this Special Provision.

Factors Used to determine if a DBE Trucking Firm is performing a CUF:

The following factors will be used to determine whether a DBE trucking company is performing a CUF:

1. To perform a CUF the DBE trucking firm shall be completely responsible for the management and supervision of the entire trucking operation for which the DBE is responsible by subcontract on a particular contract. There shall not be a contrived arrangement, including, but not limited to, any arrangement that would not customarily and legally exist under regular construction project subcontracting practices for the purpose of meeting the DBE contract goal;

2. The DBE must own and operate at least one fully licensed, insured, and operational truck used in the performance of the contract work. This does not include a supervisor's pickup truck or a similar vehicle that is not suitable for and customarily used in hauling the necessary materials or supplies;

3. The DBE receives full contract goal credit for the total reasonable amount the DBE is paid for the transportation services provided on the contract using trucks the DBE owns, insures, and operates using drivers that the DBE employs and manages;
4. The DBE may lease trucks from another certified DBE firm, including from an owner-operator who is certified as a DBE. The DBE firm that leases trucks from another DBE will receive credit for the total fair market value actually paid for transportation services the lessee DBE firm provides on the contract;
5. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit for the total value of the transportation services provided by non-DBE lessees, not to exceed the value of transportation services provided by DBE-owned trucks on the contract. For additional participation by non- DBE lessees, the DBE will only receive credit for the fee or commission it receives as a result of the lease arrangement.

EXAMPLE

DBE Firm X uses two (2) of its own trucks on a contract. The firm leases two (2) trucks from DBE Firm Y and six (6) trucks from non-DBE Firm Z.

Firm X		**Value of Trans. Serv.** *(For Illustrative Purposes Only)*
Truck 1	Owned by DBE	$100 per day
Truck 2	Owned by DBE	$100 per day
Firm Y		
Truck 1	Leased from DBE	$110 per day
Truck 2	Leased from DBE	$110 per day
Firm Z		
Truck 1	Leased from Non DBE	$125 perday
Truck 2	Leased from Non DBE	$125 per day
Truck 3	Leased from Non DBE	$125 per day
Truck 4	Leased from Non DBE	$125 per day
Truck 5	Leased from Non DBE*	$125 per day
Truck 6	Leased from Non DBE*	$125 per day

DBE credit would be awarded for the total transportation services provided by DBE Firm X and DBE Firm Y, and may also be awarded for the total value of transportation services by four (4) of the six (6) trucks provided by non-DBE Firm Z (not to exceed the value of transportation services provided by DBE-owned trucks).

Credit = 8 Trucks

Total Value of Transportation Services = $820

In all, full DBE credit would be allowed for the participation of eight (8) trucks (twice the number of DBE trucks owned and leased) and the dollar value attributable to the Value of Transportation Services provided by the8 trucks.

* With respect to the other two trucks provided by non-DBE Firm Z, DBE credit could be awarded only for the fees or commissions pertaining to those trucks that DBE Firm X receives as a result of the lease with non- DBE Firm Z.

6. For purposes of this section, the lease must indicate that the DBE firm leasing the truck has exclusive use of and control over the truck. This will not preclude the leased truck from working for others during the term of the lease with the consent of the DBE, provided the lease gives the DBE absolute priority for and control over the use of the leased truck. Leased trucks must display the name and identification number of the DBE firm that has leased the truck at all times during the life of the lease.

Data Collection: In accordance with 49CFR Section 26.11, all firms bidding on prime contracts and bidding or quoting subcontracts on federal-aid projects shall provide the following information to the Contract Engineer annually.

- Firm name
- Firm address
- Firm's status as a DBE or non DBE

- The age of the firm and
- The annual gross receipts of the firm

The means of transmittal and the risk for timely receipt of this information shall be the responsibility of the bidder. However, the above information can be submitted by means of the Annual Gross Receipts Survey as required in the Prequalification/Certification application.

All bidders, including DBE prime Contractor bidders, shall complete and submit to the Contract Engineer the Subcontractor/Supplier Solicitation and Utilization Form C-48 for each bid submitted; to be received within ten (10) business days after the bid opening. Failure of bidders to submit this form in the time frame specified may be cause for disqualification of the bidder and rejection of their bid in accordance with the requirements of this Special Provision, the contract specifications, and VDOT Road and Bridge specifications.

N. Suspect Evidence of Criminal Behavior

Failure of a bidder, Contractor, or subcontractor to comply with the Virginia Department of Transportation Road and Bridge Specifications and these Special Provisions wherein there appears to be evidence of criminal conduct shall be referred to the Attorney General for the Commonwealth of Virginia and/or the FHWA Inspector General for criminal investigation and, if warranted, prosecution.

Suspected DBE Fraud

In appropriate cases, VDOT will bring to the attention of the U. S. Department of Transportation (USDOT) any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g., referral to the Department of Justice for criminal prosecution, referral to the USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49CFR Part 31.

O. Summary of Remedies for Non-Compliance with DBE Program Requirements

Failure of any bidder\Contractor to comply with the requirements of this Special Provision for Section 107.15 of the Virginia Road and Bridge Specifications, which is deemed to be a condition of bidding, or where a contract exists, is deemed to constitute a breach of contract shall be remedied in accordance with the following:

1. Disadvantaged Business Enterprise (DBE) Program Requirements

The Contractor shall carry out applicable requirements of 49 CFR Part 26 in the award, administration, and performance of this contract. Failure by the Contractor to carry out these requirements is a material breach of this contract, which will result in the termination of this contract or other such remedy, as VDOT deems appropriate.

All administrative remedies noted in this provision are automatic unless the Contractor exercises the right of appeal within the required timeframe(s) specified herein.

2. DBE Program-Related Certifications Made by Bidders\Contractors

Once awarded the contract, the Contractor shall comply fully with all regulatory and

contractual requirements of the USDOT DBE Program, and that each certified DBE firm participating in the contract shall fully perform the designated work items with the DBE's own forces and equipment under the DBE's direct supervision, control, and management. Where a contract exists and where the Contractor, DBE firm, or any other firm retained by the Contractor has failed to comply with federal or VDOT DBE Program regulations and/or their requirements on that contract, VDOT has the authority and discretion to determine the extent to which the DBE contract requirements have not been met, and will assess against the Contractor any remedies available at law or provided in the contract in the event of such a contract breach.

3. Disqualification of Bidder

Bidders may be disqualified from bidding for failure to comply with the requirements of this Special Provision, the contract specifications, and VDOT Road and Bridge Specifications.

4. Bidding Procedures

The failure of a bidder to submit the required documentation within the timeframes specified in the **Contract Goal, Good Faith Efforts Specified** section of this Special Provision may be cause for rejection of that bidder's bid. If the lowest bidder is rejected for failure to submit required documentation in the specified time frames, the Department may either award the work to the next lowest bidder, or re-advertise and construct the work under contract or otherwise as determined by the Commonwealth.

In order to award a contract to a bidder that has failed to meet DBE contract goal requirements, VDOT will determine if the bidder's efforts were adequate good faith efforts, and if given all relevant circumstances, those efforts were to the extent a bidder actively and aggressively seeking to meet the requirements would make. Regardless of the DBE contract goal participation level proposed by the bidder or the extent of good faith efforts shown, all bidders shall timely and separately file their completed and executed Forms C-111, C-112, C-48, and Form C-49, as aforementioned, or face potential bid rejection. If a bidder does not submit it's completed and executed C-111, or C-112, when required by this Special Provision, the bidder's bid will be considered non- responsive and may be rejected. If, after reconsideration, the Department determines the bidder has failed to meet the requirements of the contract goal and has failed to make adequate good faith efforts to achieve the level of DBE participation as specified in the bid proposal, the bidder's bid will be rejected. If sufficient documented evidence is presented to demonstrate that the apparent low bidder made reasonable good faith efforts, the Department will award the contract and reduce the DBE requirement to the actual commitment identified by the lowest successful bidder at the time of its bid. The Contractor is encouraged to seek additional participation during the life of the contract.

If the Contractor fails to conform to the schedule of DBE participation as shown on the progress schedule, or at any point at which it is clearly evident that the remaining dollar value of allowable credit for performing work is insufficient to obtain the scheduled participation, the Contractor and any aforementioned affiliates may be enjoined from bidding for 60 days or until such time as conformance with the schedule of DBE participation is achieved. In such instances, the Contractor is expected to seek DBE participation towards meeting the goal during the prosecution of the contract.

If the Contractor fails upon completion of the project to meet the required participation, the Contractor and any prime contractual affiliates, as in the case of a joint venture, may be enjoined from bidding as a prime Contractor, or participating as a subcontractor on VDOT projects for a period of 90 days.

Prior to enjoinment from bidding or denial to participate as a subcontractor for failure to comply with participation requirements, as provided hereinbefore, the Contractor may submit documentation to the State Construction Engineer to substantiate that failure was due solely to quantitative underrun(s) or elimination of items subcontracted to DBEs, and that all feasible means have been used to obtain the required participation. The State Construction Engineer upon verification of such documentation shall make a determination whether or not the Contractor has met the requirements of the contract.

If it is determined that the aforementioned documentation is insufficient or the failure to meet required participation is due to other reasons, the Contractor may request an appearance before the Administrative Reconsideration Panel to establish that all feasible means were used to meet such participation requirements. The decision of the Administrative Reconsideration Panel shall be administratively final. The enjoinment period will begin upon the Contractor's failure to request a hearing within the designated time frame or upon the Administrative Reconsideration Panel's decision to enjoin, as applicable.

5. Verification of DBE Participation and Imposed Damages

If the Contractor fails to comply with correctly completing and submitting any of the required documentation requested by this provision within the specified time frames, the Department will withhold payment of the monthly progress estimate until such time as the required submissions are received by VDOT. Where such failures to provide required submittals or documentation are repeated the Department will move to enjoin the Contractor and any prime contractual affiliates, as in the case of a joint venture, from bidding as a prime Contractor, or participating as a subcontractor on VDOT projects until such submissions are received.

In addition to the remedies described heretofore in this provision VDOT also exercises its rights with respect to the following remedies:

Suspect Evidence of Criminal Behavior

Failure of a bidder, Contractor, or subcontractor to comply with the Virginia Department of Transportation Road and Bridge Specifications and these Special Provisions wherein there appears to be evidence of criminal conduct shall be referred to the Attorney General for the Commonwealth of Virginia and/or the FHWA Inspector General for criminal investigation and, if warranted prosecution.

In appropriate cases, VDOT will bring to the attention of the U. S. Department of Transportation (USDOT) any appearance of false, fraudulent, or dishonest conduct in connection with the DBE program, so that USDOT can take the steps, e.g., referral to the Department of Justice for criminal prosecution, referral to the USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules provided in 49CFR Part 31.

S102CF2-0813

Virginia Department of Transportation
Special Provision for Use of Domestic Material

July 26, 2013

SECTION 102.05 PREPARATION OF BID of the Specifications is amended to include the following:

In accordance with the provisions of Section 635.410(b) of Title 23 CFR, hereinafter referred to as "Buy America", except as otherwise specified, all iron and steel products (including miscellaneous steel items such as fasteners, nuts, bolts and washers) to be permanently incorporated for use on federal aid projects shall be produced in the United States of America regardless of the percentage they exist in the manufactured product or final form they take. Therefore, "Domestically produced in the United States of America" means all manufacturing processes must occur in the United States of America, to mean, in one of the 50 States, the District of Columbia, Puerto Rico or in the territories and possessions of the United States. Manufacturing processes are defined as any process which alters or modifies the chemical content, physical size or shape or final finish of iron or steel material) such as rolling, extruding, bending, machining, fabrication, grinding, drilling, finishing, or coating whereby a raw material or a reduced iron ore material is changed, altered or transformed into a steel or iron item or product which, because of the process, is different from the original material. For the purposes of satisfying this requirement "coating" is defined as the application of epoxy, galvanizing, painting or any other such process that protects or enhances the value of the material. Materials used in the coating process need not be domestic materials.

For the purposes herein the manufacturing process is considered complete when the resultant product is ready for use as an item in the project (e.g. fencing, posts, girders, pipe, manhole covers, etc.) or is incorporated as a component of a more complex product by means of further manufacturing. Final assembly of a product may occur outside of the United States of America provided no further manufacturing process takes place.

Raw materials such as iron ore, pig iron, processed, pelletized and reduced iron ore, waste products (including scrap, that is, steel or iron no longer useful in its present form from old automobiles, machinery, pipe, railroad rail, or the like and steel trimmings from mills or product manufacturing) and other raw materials used in the production of steel and\or iron products may, however, be imported. Extracting, handling, or crushing the raw materials which are inherent to the transporting the materials for later use in the manufacturing process are exempt from Buy America. The use of foreign source steel or iron billet is not acceptable under the provisions of Buy America. For the purposes of this provision all steel or iron material not meeting the criteria as domestically produced in the United States of America will be considered as "foreign" material. All iron and steel items will be classified hereinafter as "domestic" or "foreign", identified by and subject to the provisions herein.

Domestically produced iron or steel ingots or billets shipped outside the United States of America for any manufacturing process and returned for permanent use in a project would not comply with "Buy America" requirements.

Buy America provisions do not apply to iron or steel products used temporarily in the construction of a project such as temporary sheet piling, temporary bridges, steel scaffolding, falsework or such temporary material or product or material that remains in place for the Contractor's convenience.
Section 635.410(b) of Title 23 CFR permits a minimal amount of steel or iron material to be

incorporated in the permanent work on a federal-aid contract. The cost of such materials or products must not exceed one-tenth of one percent of the contract amount or $2500, whichever is greater. The cost of the foreign iron or steel material is defined as its monetary value delivered to the job site and supported by invoices or bill of sale to the Contractor. This delivered to site cost must include transportation, assembly, installation and testing.

In the event the total cost of all "foreign" iron and steel product or material does not exceed one-tenth of one percent of the total contract cost or $2,500, whichever is greater, the use of such material meeting the limitations herein will not be restricted by the domestic requirements herein. However, by signing the bid, the Bidder certifies that such cost does not exceed the limits established herein.

Waivers:

With prior concurrence from Federal Highway Administration (FHWA) headquarters, the Federal Highway Division Administrator may grant a waiver to specific projects provided it can be demonstrated:

1. that the use of domestic steel or iron materials would be inconsistent with the public interest; or
2. materials or products requested for use are not produced in the United States in sufficient or reasonably available quantities and are of satisfactory quality for use in the permanent work.

The waiver request shall be submitted with supportive information to include:

1. Project number\description, project cost, waiver item, item cost, country of origin for the product, reason for the waiver, and
2. Analysis of redesign of the project using alternative or approved equal domestic products

In order to grant such a waiver the request for the waiver must be published in the Federal Register for a period not less than 15 days or greater than 60 days prior to waiving such requirement. An initial 15 day comment period to the waiver will be available to the public by means of the FHWA website: http://www.fhwa.dot.gov/construction/contracts/waivers.cfm. Following that initial 15 day period of review and comment the request for waiver will be published by the FHWA in the Federal Register. The effective date of the FHWA finding, either to approve or deny the waiver request, will be 15 days following publication in the Federal Register.

Only the FHWA Administrator may grant nationwide waivers which still are subject to the public rulemaking and review process.

Alternative Bidding Procedures:

An alternative bidding procedure may be employed to justify the use of foreign iron and\or steel. To qualify under this procedure the total project is bid using two alternatives, one based on the use of domestic products and the other, the use of corresponding foreign source steel and\or iron materials.

In accordance with the provisions of Section 103.02 the Contract will be awarded to the lowest responsive and responsible bidder who submits the lowest total bid based on furnishing domestic iron or steel unless such total exceeds the lowest total bid based on furnishing foreign iron and\or steel by more than 25 percent, in which case the award will be made to the lowest responsive and responsible bidder furnishing foreign iron and\or steel based upon furnishing verifiable supportive data. The bidder shall submit a bid based on permanently incorporating only domestic iron and\or steel in the construction of the project. The bidder

may also submit a bid for the same proposed contract based on being allowed to permanently incorporate corresponding foreign iron and\or steel materials meeting the other contract requirements into the work on the contract. If he chooses to submit such a bid, that alternate bid shall clearly indicate which foreign iron and\or steel items will be permanently installed in the work as well as contain prices for all other items listed in the corresponding domestic proposal to complete a total "Foreign" bid.

In the event the contract is awarded to the bidder furnishing foreign iron and\or steel materials or items the provision for price adjustment of steel items will be permitted, however, price fluctuations shall use the U.S. index as stated in the Special Provision for Price Adjustment For Steel. The Contractor must indicate which corresponding eligible steel items he chooses price adjustment to apply. In the event the contract is awarded to a bidder furnishing foreign iron and\or steel items and during the life of that contract the Contractor discovers he cannot furnish foreign iron and\or steel material as originally anticipated and agreed upon, he shall be responsible to honor the total bid price and furnish such iron and\or steel materials meeting the contract requirements from other sources as necessary to complete the work.

In the event the Contractor proposes to furnish "foreign" iron and steel and can verify a savings in excess of 25 percent of the overall project cost if bid using domestic materials, the Contractor shall submit a second complete paper bid proposal clearly marked "Foreign" including Form C-7 and supportive data supplement on all sheets. Supportive data shall list, but not be limited to, origin of material, best price offer, quantity and complete description of material, mill analysis, evidence or certification of conformance to contract requirements, etc. The "Foreign" bid shall be completed using the best price offer for each corresponding bid item supplying foreign material in the alternative bid and submit the same with the Contractor's "Domestic" bid. The Contractor shall write the word "Foreign" by the bid total shown on Form C-7 as well as last page of Schedule of Items showing the total bid amount. The bidder shall also contact the State Contract Engineer to inform him that he is also submitting an alternate "Foreign" paper bid.

The information listed on the supportive data sheet(s) will be used to provide the basis for verification of the required cost savings. In the event comparison of the prices given, or corrected as provided in Section 103.01 of the Specifications, shows that use of "foreign" iron and steel items does not represent a cost savings exceeding the aforementioned 25 percent, "domestic" iron and\or steel and prices given there for shall be used and the "100 percent Domestic Items Total" shall be the Contractor's bid.

Certification of Compliance:
Where domestic material is supplied, prior to incorporation into the Work, the Contractor shall furnish to the Department a certificate of compliance (such as may be furnished by steel mill test reports) that all steel and\or iron products supplied to the project except as may be permitted (one-tenth of one percent of the total contract cost or $2,500, whichever is greater) and permanently incorporated into the work satisfies the domestic requirements herein. This certification shall contain a definitive statement about the origin of all products covered under the provisions of Buy America as stated herein.

In lieu of the Contractor providing personal certification, the Contractor may furnish a stepped certification in which each handler of the product, such as supplier, fabricator, manufacturer, processor, etc. furnishes an individual certification that their step in the process was domestically performed.

Division I GENERAL PROVISIONS

SECTION 101—Definitions of Abbreviations, Acronyms, And Terms

101.01—Abbreviations and Acronyms

In these Specifications and other Contract Documents, the following abbreviations and acronyms shall be interpreted as follows:

AAR	Association of American Railroads
AASHTO	American Association of State Highway and Transportation Officials
ABS	Acrylonitrilebutadienestyrene (an elastomer)
AC	Alternating current
ACI	American Concrete Institute
ADT	Annual average daily traffic
AED	Associated Equipment Distributors
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APA	Engineered Wood Association
API	American Petroleum Institute; American Pipe Institute
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American wire gage
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BOCA	Building Officials and Code Administrators
C	Celsius, when preceded by “degree(s)”
CABB	Contractor Advertisement Bulletin Board
CBR.	California bearing ratio
CRSI	Concrete Reinforcing Steel Institute
DBE	Disadvantaged Business Enterprise
DC	Direct current
DHV	Design hourly volume
EEI	Edison Electric Institute
EEO	Equal employment opportunity
EIA	Electronic Industries Alliance
EPA	Environmental Protection Agency
EPDM	Ethylenepropylenediene monomer (an elastomer)
ESCCC	Erosion and Sediment Control Contractor Certification
F	Fahrenheit, when preceded by “degree(s)”
F/A	Filler/asphalt ratio
FHWA	FederalHighwa y Administration
FS	Federal Specifications, General Services Administration
ICEA	Insulated Cable Engineers Association
IMSA	International Municipal Signal Association
ITE	Institute of Transportation Engineers
LCD	Liquid crystal display
LPG	Liquid Petroleum Gas

MBE	Minority Business Enterprise
MEKP	Methyl ethyl ketone peroxide
MIL	Military specifications
MSDS	Materials Safety Data Sheet
MUTCD	*Manual on Uniform Traffic Control Devices for Streets and Highways* and the Virginia supplement to same
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NIST	National Institute of Standards and Technology
NOAA	National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
PCI	Precast / Prestressed Concrete Institute
PE	Polyethylene
PTL	Plywood Testing Laboratory
PVC	Polyvinylchloride
PVF	Polyvinylfluoride
SAE	Society of Automotive Engineers
SP	Special Provision
SPCN	Special Provision Copied Note
SPIB	Southern Pine Inspection Bureau
SSPC	Society for Protective Coatings
SWPPP	Storm Water Pollution Prevention Plan
TAPPI	Technical Association of the Pulp and Paper Industry
TFE	Polytetrafluoroethylene
TIE	Ticket Information Exchange (Miss Utility)
UL	Underwriters' Laboratories, Inc.
VAC	Volts alternating current
VDC	Volts direct current
VDOT	Virginia Department of Transportation
VEP	Value engineering proposal
VFA.	Voids filled with asphalt
VMA	Voids in mineral aggregate
VOSH	Virginia Occupational Safety and Health
VTM	Virginia Test Methods; voids in total mix
VWAPM	Virginia Work Area Protection Manual
WBE	Women Business Enterprise

101.02—Terms

In these Specifications and other Contract Documents, the following terms and pronouns used in place of them shall be interpreted as follows:

–A–

Advertisement, Notice of. A public announcement, as required by law, inviting bids for work to be performed or materials to be furnished that indicates approximate principal quantities, location of work to be performed, character and quantity of materials to be furnished, and time and place for opening bids.

Affiliate. Any business entity that is closely associated to another business entity so that one has the power to control the other either directly or indirectly; or, where one business entity systematically shares resources, officers and/or other management with another business entity to the extent that a business relationship legally exists or is publicly perceived to exist; or, when a third party has the power to control both; or, where one business entity has been so closely allied with another through an established course of dealings, including but not limited to the lending of financial wherewithal or engaging in joint ventures, so as to cause a public perception that the two firms are one entity.

Alkali soil. Soil in which total alkali chlorides calculated as sodium chloride are more than 0.10 per- cent based on total solids.

Award. The decision of the Board or Commissioner to accept the bid of the lowest responsive and re- sponsible bidder for the work. The award is subject to the execution and approval of a satisfactory Contract therefor, and such conditions as may be specified or required by law.

Award date. The date on which the decision is made by the Board or Commissioner to accept the bid of the lowest responsive and responsible bidder.

–B–

Backfill. Material used to replace or the act of replacing material removed during construction; may also denote material placed or the act of placing material adjacent to structures.

Balance point. The approximate point, based on estimated shrinkage or swell, where the quantity of earthwork excavation and borrow, if required, is equal to the quantity of embankment material plus any surplus excavation material.

Base course. A layer of material of specified thickness on which the intermediate or surface course is placed.

Base flood. The flood or tide having a one percent chance of being exceeded in any given year.

Bid. The offer of a bidder, submitted by electronic proposal (or on paper if so specified in the propos- al) to perform the work and furnish the materials and labor at the prices set forth therein; valid only when properly signed and guaranteed.

Bidder. Any individual, partnership, corporation, or joint venture that formally submits a bid for the work contemplated, or for any portion thereof, acting directly or through a duly authorized representa- tive.

Bids, Invitation for. See **Advertisement, Notice of. Board.** Commonwealth Transportation Board.

Borrow. Suitable material not available from designated Regular Excavation or other sources of useable materials on-site that is used primarily for embankment.

Brackish water. Water in which total alkali chlorides calculated as sodium chloride are more than 0.10 percent based on total solids.

Bridge. A structure, including supports, that is erected over a depression or an obstruction, such as water, a highway, or a railway, that has a track or passageway for carrying traffic.

Bridge lift. A layer of fill material placed in excess of standard depth over an area that does not support the weight of hauling equipment and for which compaction effort is not required.

–C–

Calendar day. Any day shown on the calendar.

Camber. A vertical curvature induced or fabricated into beams or girders and a deck slab or slab span formwork; a vertical curvature set in the grade line of a pipe culvert to accommodate differential settlement.

Channel. A watercourse or drainage way.

Commissioner. Commonwealth Transportation Commissioner.

Commonwealth. Commonwealth of Virginia.

Composite hydrograph. A graph showing the mean daily discharge versus the calendar day, indicating trends in high and low flow for a one-year period.

Construction area. The area where authorized construction occurs.

Construction limits (On-Site). The disturbed area required for the construction of a Project including the intersection of side slopes, with the original ground, plus slope rounding and slopes for drainage ditches, bridges, culverts, channels, temporary or incidental construction, and identified by the surface planes as shown and/or described within the Contract Documents.

Contract. The written agreement executed between the Department and the Contractor that sets forth the obligations of the parties thereunder, including, but not limited to, the performance of the work, furnishing of materials and labor, and the method of measurement and basis of payment of the work, as identified in the Contract Documents.

Contract Documents. The edition of the *Road and Bridge Specifications* cited in the Bid Proposal and Contract, which include addenda or Revisions issued prior to the Bid Date, the Supplemental

Specifications, Special Provisions, Special Provision Copied Notes, the Plans, the Edition of the *Road and Bridge Standard Drawings* cited on the title sheet of the plans which include Addendum's or Re- visions issued prior to the Bid Date, Change Orders and/or Work Orders issued subsequent to the Contract Execution date and Written Directives, Agreements or Clarification. Oral representations or promises will not be considered a part of the Contract.

Contract item. A specifically described unit of work for which a price is provided in the Contract.

Contract time limit. The number of calendar days or fixed calendar date or that specifies the time allowed for completion of the work described in the Contract, including authorized extensions.

Contractor. Any individual, partnership, corporation, or joint venture that contracts with the Department to perform the prescribed work as an independent contractor and not as an agent for the Department, Commissioner or Commonwealth Transportation Board.

Corporation. A body of persons granted a charter legally to conduct business recognizing them as a separate entity having its own rights, privileges, and liabilities distinct from those of its members.

Cul-de-sac. An area at the terminus of a dead-end street or road that is constructed for the purpose of allowing vehicles to turn around.

Culvert. A structure that is not classified as a bridge which provides an opening under any roadway.

Cut. When used as a noun with reference to earthwork, that portion of a roadway formed by excavating below the existing surface of the earth and limited by design or the direction of the Engineer.

Cut Slope. See also Fill Slope**.** A surface plane generally designated by design or the direction of the Engineer which is formed during excavation below existing ground elevations that intersects with existing ground at its termini.

–D–

Day. Unless otherwise stated, a calendar day.

Deflection. The vertical movement occurring between the supports of a bridge superstructure or its components (beams, girders, and slabs) that results from their own weight and from dead and live loads. Although all parts of a structure are subject to deflections, usually only those deflections that occur in the superstructure are of significance during construction.

Department. Virginia Department of Transportation.

Design flood. The magnitude of flood that a given structure can convey without exceeding a designated flood level.

Digital Identification (I.D.). An encrypted signature that is the legal equivalent of a written signature thus allowing for the digital signing of the bid.

Disincentive. A verifiable monetary deterrent used to discourage the Contractor from failing to meet a contract milestone and/or the contract time limit that is identified and defined by specific Contract

language.

Disposable material. Material generally found to be unsuitable for roadway construction or material that is surplus.

Disposal areas. Areas generally located outside of the Construction Limits identified in the Contract Documents where unsuitable or surplus material is deposited.

Drainage ditch. An artificial depression constructed to carry off surface water.

–E–

Earthwork. The work consisting of constructing roadway earthwork in conformity with the specified tolerances for the lines, grades, typical sections, and cross sections shown on the plans or as established by the Engineer. Earthwork shall include regular, borrow, undercut and minor structure excavation; constructing embankments; disposing of surplus and unsuitable material; shaping; grading, compaction; sloping; dressing; and temporary erosion control work.

Easement (Right of way). A grant of the right to use property for a specific use.

Embankment. A structure of soil, soil aggregate, soil-like materials, or broken rock between the existing ground and subgrade.

Employee. Any person working on the project specified in the Contract who is under the direction or control of or receives compensation from the Contractor or subcontractor.

Engineer. The Chief Engineer, as designated by the Commonwealth Transportation Commissioner, who acts directly or through his duly authorized representative(s) and who is responsible for highway design, construction, and maintenance. The Engineer, or his representative(s), acts within the scope of the particular duties assigned to him or the authority given to him by the Code of Virginia, the Commonwealth Transportation Commissioner, these Specifications, supplemental specifications, and the Contract Documents.

Engineer, Contract. The Chief Engineer's authorized representative for administering theadvertisement of work, receiving bids for such, and awarding such work as contracts for the Department.

Equipment. Machinery, tools, and other apparatus, together with the necessary supplies for upkeep and maintenance, that are necessary for acceptable completion of the work.

Excavation (**Excavate).** The act of creating a man-made cavity in the existing soil for the removal of material necessary to obtain a specific elevation or to install a structure, material, component or item necessary to complete a specific task or form a final surface or subsurface.

Execution date. The date on which the contract is signed by the Chief Engineer.

Extra work. An item of work that was not provided for in the Contract as awarded but that is found to be essential to the satisfactory fulfillment of the Contract within its intended scope and is identified in a written authorized Work Order or Force Account directive for its execution subject to the limitations, exceptions and provisions in Sections 104.02 and 104.03 and 109.05.

–F–

Falsework. A temporary framework used to support work in the process of constructing permanent structural units.

Federal agencies or officers. An agency or officer of the federal government and any agency or officer succeeding in accordance with the law to the powers, duties, jurisdictions, and authority of the agency or officer mentioned.

Fill Slope. See also Cut Slope**.** A surface plane formed during embankment above existing ground elevations that intersects with existing ground at its termini.

Firm. A commercial partnership of two or more persons formed for the purpose of transacting business.

Flood frequency. A statistical average recurrence interval of floods of a given magnitude.

Force account work. Prescribed work of a contractual status performed by the Contractor and compensated for as specified in Section 109.05. A Force Account agreement is made with the Contractor when neither the Engineer nor the Contractor can firmly establish an applicable estimate for the cost of the work, because the scope of the work is not defined or quantifiable at the time of discovery or start of execution. Force account is used when what is to be done is known, but the level of effort or quantity of materials that will be necessary to accomplish that task is unknown but will be determined as the work progresses. In these cases the rates for the labor, equipment, and materials to be used are agreed upon in advance, and daily records are kept by the Engineer in order to track the eligible expenditures.

Formwork. A temporary structure or mold used to retain the plastic or fluid concrete in its designated shape until it hardens. Formwork shall be designed to resist the fluid pressure exerted by plastic concrete and additional fluid pressure generated by vibration and temporary construction loads.

Frontage street or road. A local street or road auxiliary to and located on the side of a highway for service to abutting property and adjacent areas and control of access.

–G–

Gage. U.S. Standard Gage.

Grade separation. Any structure that provides a traveled way over or under another traveled way or over a body of water.

–H–

Highway. The entire right of way reserved for use in constructing or maintaining the roadway and its appurtenances.

Historical flood level. The highest flood level that is known to have occurred at a given location.
Holidays. The days specifically set forth in Section 108.02 or in the Contract Documents.

Hydrologic data sheet. A tabulation of hydrologic data for facilities conveying a 100-year discharge equal to or greater than 500 cubic feet per second.

–I–

Incentive. A verifiable monetary amount used to encourage the Contractor to complete work prior to the milestone dates and/or the time limit specified in the Contract.

Inspector. The Engineer's authorized representative who is assigned to make detailed inspections of the quality and quantity of the work and its conformance to the requirements and provisions of the Contract.

Invert. The lowest point in the internal cross-section of a pipe or other drainage structure.

–J–K–

Joint venture. Two or more individuals, partnerships, corporations, or combinations thereof that join together for the purpose of bidding on and constructing a project.

–L–

Laboratory. The testing laboratory of the Department or any other testing laboratory that may be designated by provisions in the Contract or by the Engineer.

Liquidated damages. Compensatory damages as set forth in the Contract, paid by the Contractor to the Department when the Contractor fails to complete the project within the time frame specified in the Contract. These damages include, but are not limited to, additional costs associated with administration, engineering, supervision and inspection of the project.

–M–

Major Item. Any pay item specifically indicated as such in the Contract Documents.

Material. Any substance that is used in the work specified in the Contract

Median. The portion of a divided highway that separates the traveled ways.

–N–

Non-Contract item. Item(s) of work that is required to permit completion of the specified work in an acceptable manner, located within the Limits of Construction, but is not included in the Contract Documents and will be completed by others prior to or during the construction of the Project.

No Plan and Minimum Plan Concept project. Generally a project of very limited scope and dura- tion that requires few details to describe the proposed work,

Notice to Proceed. The date of contract execution or a specified date identified as such and set forth in the Contract Documents on which the Contractor may begin the work.

–O–

Ordinary high water. A water elevation based on analysis of all daily high waters that will be exceeded approximately 25 percent of the time during any 12 month period.

Overtopping flood. The magnitude of flood that just overflows the traveled way at a given structure and/or on the approach traveled way of such structure.

–P–

Pavement structure. The combination of select or stabilized materials, subbase, base, and surface courses, described in the Typical Pavement Section in the Plans that is placed on a subgrade to support the traffic load and distribute it to the roadbed.

Pay item. A specifically described unit of work for which a price is provided in the Contract.

Phase inspection. The inspection of work at predetermined stages in lieu of continuous inspection.

Plans. The approved project plans and profiles, which may include Standard Drawings, survey data, typical sections, summaries, general notes, details, plan and profile views, cross-sections, special design drawings, computer output listings, supplemental drawings or exact reproductions thereof, and all subsequently approved revisions thereto which show the location, character, dimensions, and details of the work specified in the Contract.

Prequalification. The procedure used by the Department to assure itself of the Contractor's ability to perform the work with attention to quality and safety including his experience in similar work, and sufficiency of equipment to accomplish the work and that the Contractor's financial resources will permit financing the cost in accordance with the Rules Governing Prequalification Privileges.

Profile grade. The line of a vertical plane intersecting the top surface of the proposed wearing surface, usually along the longitudinal centerline of the roadbed.

Project. The total scope of work specified to be performed in the Contract Documents.

Project showing. The scheduled event at which the Department's representative meets with prospective bidders to describe and answer questions regarding the proposed work.

Proposal: The document provided by the Department to prospective bidders or personally obtained by prospective bidders that describes the work for which bids will be accepted which includes the electronic forms on which the Department requires bids to be submitted for the work described.

–Q–

–R–

Ramp. A connecting roadway between two highways or traveled ways or between two intersecting highways at a grade separation.

Right of way. A general term denoting land, property, or interest therein, usually in the form of a strip, that is acquired for or devoted to transportation facilities but is not meant to denote the legal nature of ownership.

Road. A general term denoting a public way for purposes of vehicular travel including the entire area within the right of way; the entire area reserved for use in constructing or maintaining the roadway and its

appurtenances.

Road and Bridge Specifications. The specifications contained herein and generally recognized as the standard specifications for all contracts awarded by the Commonwealth Transportation Board or the Transportation Commissioner.

Roadbed. The graded portion of a highway within the top and side slopes that is prepared as a foundation for the pavement structure and shoulders.

Roadbed material. The material below the subgrade in cuts, embankments, and embankment foundations that extends to a depth and width that affects the support of the pavement structure.

Roadside. A general term that denotes the area within the right of way that adjoins the outer edges of the roadway; extensive areas between the roadways of a divided highway.

Roadside development. Items that are necessary to complete a highway that provide for the preservation of landscape materials and features; rehabilitation and protection against erosion of areas disturbed by construction through placing seed, sod, mulch, and other ground covers; and such suitable plantings and other improvements as may increase the effectiveness, service life and enhance the appearance of the highway.

Roadway. The portion of a highway within the limits of construction and all structures, ditches, chan- nels, and waterways which are necessary for the correct drainage thereof.

–S–

Seawater. Water in which total alkali chlorides calculated as sodium chloride are more than 0.10 percent of total solids.

Select borrow. Borrow material that has specified physical characteristics.

Select material. Material obtained from roadway cuts, borrow areas, or commercial sources that is designated or reserved for use as a foundation for the subbase, subbase material, shoulder surfacing, or other specified purposes designated in the Contract Documents.

Shoulder. The portion of the roadway contiguous with the traveled way that is for the accommodation of stopped vehicles, emergency use, and lateral support of the base and surface courses.

Sidewalk. The portion of the roadway constructed primarily for the use of pedestrians.

Skew. The acute angle formed by the intersection of a line normal to the centerline of the roadway with a line parallel to the face of the abutments or, in the case of culverts, with the centerline of the culverts.

Special Provision (SP). A document that sets forth specifications or requirements for a particular project that is not covered by the standard Specifications.

Special Provision Copied Note (SPCN). A document that sets forth specific specifications or requirements, usually limited in scope, for a particular project.

Specialty item. An item of work designated as "Specialty Item" in the proposal that is limited to work that requires highly specialized knowledge, craftsmanship, or equipment that is not ordinarily available in contracting organizations prequalified to bid and is usually limited to minor components of the overall Contract.

Specifications. A general term that includes all directions, provisions, and requirements contained herein and those that may be added or adopted as supplemental specifications, special provisions, or special provision copied notes. All are necessary for the proper fulfillment of the Contract.

Standard drawings. Unless otherwise specified, applicable drawings in the Department's *Road and Bridge Standards* and such other standard drawings as are referred to on the plans.

State. Commonwealth of Virginia.

Station. When used as a definition or term of measurement, 100 linear feet.

Street. A general term denoting a public way for purposes of vehicular travel including the entire area within the right of way; the entire right of way reserved for use in constructing or maintaining the roadway and its appurtenances.

Structures. Bridges, culverts, catch basins, inlets, retaining walls, cribs, manholes, end walls, buildings, steps, fences, sewers, service pipes, underdrains, foundation drains, and other features that may be encountered in the work and are not otherwise classed herein.

Subbase. A layer(s) of specified or selected material of designed thickness that is placed on a subgrade to support a base course.

Subcontractor. Any individual, partnership, corporation, or joint venture to which the prime Contractor, with the written consent of the Department, subcontracts part of the Contract.

Subgrade. The top earthwork surface of a roadbed, prior to application of Select or Stabilized material courses, shaped to conform to the typical section on which the pavement structure and shoulders are constructed, or surface that must receive an additional material layer, such as Topsoil, Stone or other Select Material.

Subgrade stabilization. The modification of roadbed soils by admixing with stabilizing or chemical agents that will increase the load bearing capacity, firmness, and resistance to weathering or displacement.

Subletting. Subcontracting

Substructure. The part of a structure that is below the bearings of simple and continuous spans, skewbacks of arches, and tops of footings of rigid frames, together with the back walls, wingwalls, and wing protection railings.

Superintendent. The Project representative of the Contractor who is authorized to receive and fulfill instructions from the Engineer and who supervises and directs the construction.

Superstructure. The portion of a structure that is not defined as substructure.

Supplemental specifications. Additions and revisions to the *Road and Bridge Specifications* identified in the Contract Documents

Surety. A corporate entity bound with and for the Contractor for full and complete fulfillment of the Contract and for payment of debts pertaining to the work. When applied to the proposal guaranty, it refers to the corporate body that engages to be responsible in the execution by the bidder, within the specified time, of a satisfactory Contract and the furnishing of an acceptable payment and contract bond.

Surface course. One or more top layers of a pavement structure designed to accommodate the traffic load, which is designed to resist skidding, traffic abrasion, and disintegrating effects of weather. Also see wearing course.

Surplus material. Material that is present on a project as a result of unbalanced earthwork quantities, excessive swell, slides, undercutting, or other conditions beyond the control of the Contractor

Suspension. A written notice issued by the Engineer to the Contractor that orders the work on a project to be stopped wholly or in part as specified. The notice will include the reason for the suspension.

–T–

Temporary structure. Any structure that is required to maintain traffic while permanent structures or parts of structures specified in the Contract are constructed or reconstructed. The temporary structure shall include earth approaches.

Theoretical maximum density. The maximum compaction of materials that can be obtained in accordance with the values established VTM-1.

Tidewater, Virginia. Areas within the Commonwealth as defined in the Department of Conservation and Recreation Erosion and Sediment Control Manual.

Topsoil: The uppermost original layer of material that will support plant life and contains more than 5 percent organic material reasonably free from roots exceeding 1 inch in diameter, brush, stones larger than 3 inches in the largest dimension and toxic contaminants.

Ton. A short ton; 2,000 pounds avoirdupois.

Top of earthwork. The uppermost surface of the regular or embankment excavation, not including select material that is shaped to conform to the typical section shown in the plans or directed by the Engineer.

Traveled way. The portion of the roadway for the movement of vehicles, not including shoulders.

–U–

Unsuitable Material. Any material which contains more than 5 percent by weight organic matter, or which has unstable bearing capacity, excessive moisture content, plasticity indexes or liquid indexes, or other

characteristics defined by the Engineer or the Contract Documents as unsuitable for the use intended.

Utilities. Private, county, city, municipal or public facility, designed, owned and maintained for public use, such as electricity, water, sanitary sewer, storm sewer, drainage culverts, telecommunications, conduits, gas, oil, fiber optics, cable television, that is not identified as a Pavement Structure, Roadway, Highway, Street or Traveled Way.

–V–

Vouchered. The action of approval by the Department; constitutes the date of release to the State Comptroller for payment.

–W–X–Y–Z–

Wearing course. (See **Surface course**) The top and final layer of any pavement

Work. The furnishing of all materials, labor, tools, equipment, and incidentals necessary or convenient for the successful completion of the project and the carrying out of the duties and obligations specified in the Contract.

Working drawings. Stress sheets, shop drawings, erection plans, falsework plans, framework plans, cofferdam plans, bending diagrams for reinforcing steel, or any other supplementary plans or similar data the Contractor is required to submit to the Engineer for review.

Work Order. A written agreement made between the Contractor and the Engineer in order to establish changes to the contract. A work order may be used to add, modify, or delete: pay items, contract time, or other terms of the contract. Work orders may be issued on a bilateral or unilateral basis.

Work Order, Bilateral. A written change order to the Contract where the Engineer and Contractor agree upon scope cost and time estimation for the proposed work. The process uses Form C-10 to perform, communicate and integrate the required and approved change. This type of work order is what is typically meant when the term *work order* is used elsewhere in Department publications.

Work Order, Unilateral. A written directive to the Contractor signed only by the Engineer used to effect a contract change when the Contractor and the Department cannot agree upon the cost and time estimation of the change or where due to issues of emergency, safety, environmental damage, other similar critical factors the Department must act quickly and unilaterally to effect the change. In these cases, the Department must act unilaterally to establish a cost or time adjustment for additional work to the Contract. The process uses Form C-10 to perform, communicate and integrate the required and approved change.

Division II – MATERIALS

SECTION 200—GENERAL

200.01—Description

These specifications cover general sampling and testing procedures, certifications for aggregate acceptance, and technicians and batchers for asphalt and hydraulic cement concrete.

200.02—Conformance with Specifications

Materials shall conform to these specifications in accordance with the requirements of Section 106.06. Whenever a reference to a material is followed by a reference to a specification, the material shall conform to the referenced specification.

Material that is required to conform to these specifications shall not be used until it has been approved by the Engineer.

Where maximum and minimum limits are given for a characteristic of a material, material whose specified characteristic approximates the mean value shall be furnished. The specified limits shall not be exceeded.

When a material is fabricated of or treated with another material or when any combination of materials is assembled to form a product, the failure of any component to comply with the applicable specification shall be sufficient cause for rejection of the whole unless the combination of components will produce a product satisfactory to the Engineer.

If the Contractor desires to substitute another material for that specified, he shall submit proof that the substitute material is equal in all respects to the material specified. Proof shall be in the form of specifications for the proposed substitution that may be readily compared with the specifications for the original material.

200.03—General Sampling and Testing Procedures

Materials shall be tested in accordance with the requirements of standard AASHTO, ASTM, or federal methods or methods devised by the Department as specified in the applicable specifications or as approved by the Engineer. At the discretion of the Engineer, the Contractor may furnish a certification of conformity from the manufacturer in lieu of testing.

The Engineer reserves the right to retest any material that has previously been tested or accepted on certification and reject that material if it is found to be defective.

The Department has developed test methods for the evaluation of certain materials or their properties. These test methods are identified by the prefix *VTM* (Virginia Test Method) followed by a number that will identify the specific VTM to be used. Copies of the Department's test methods may be obtained from the Department's Materials Division.

Sampling of materials shall be performed in accordance with the standard methods of the Department. When required, samples submitted to the Department's laboratory shall be accompanied by an MSDS. Failure by the Contractor to submit an MSDS will be cause for rejection of the material.

When a material is to be tested prior to delivery to the project, the Contractor shall furnish complete identification of the material and its specific intended use in the proposed construction, including references to the plans or specifications calling for the material.

Material will be inspected at the original or intermediate source of supply whenever it is economically advantageous to the Department. This inspection does not relieve the Contractor of the responsibility to furnish materials that conform to the specifications. The Department's representative shall have ready access to all parts of any processing plant furnishing material for a project. Access for sampling and inspecting materials or plant equipment shall include secure, sturdy platforms conforming to local, state, and federal safety regulations.

The Department may discontinue the use of a plant laboratory for acceptance testing in the event of a mechanical malfunction of the laboratory equipment and in cases of emergency involving plant inspection personnel. In such event, acceptance testing will be performed at the district or central office laboratory until the malfunction or emergency has been satisfactorily corrected or resolved.

200.04—Acceptance Procedures for Aggregates

Aggregates conforming to the requirements of Section 207 (for Type I) and Section 208 will be accepted under a quality assurance program that uses statistical concepts. Aggregate materials shall conform to such requirements prior to the addition of admixtures.

Acceptance procedures for other aggregates shall be in accordance with the requirements of an approved production control plan conforming to the policies of the Department with regard to sampling and testing. Shipments of aggregates accepted under such a production control plan shall be accompanied by the following certification:

Aggregate Certification

Aggregate shipped under this certification has been tested and conforms to VDOT's requirements.

_____

Signature and Title

The certification may be printed or stamped on the delivery ticket or affixed by a gummed label there- to. The certification shall be signed by an authorized representative of the aggregate supplier and given to the Engineer upon delivery of the aggregate.

The No. 10 sieve shall be the dividing sieve for soils, select material, aggregate subbase material, and aggregate base material. The No. 8 sieve shall be the dividing sieve for asphalt concrete aggregates. That portion of the total aggregate retained on the sieves is defined as *coarse aggregate,* and that portion passing the sieves is defined as *fine aggregate.* Soundness tests will be performed in accordance with the requirements of AASHTO T104 without regard to these definitions of fine and coarse aggregate. Fine and coarse aggregates for hydraulic cement concrete are distinguishable by their conformity to the series of grading requirements specified in Section 202 and Section 203, respectively.

The term *nonpolishing aggregate* shall mean aggregate that the Department has determined will result in a surface of acceptable skid resistance when it is used and exposed as part of a wearing surface. The Department reserves the right to evaluate and determine the acceptability of polishing characteristics of

aggregate proposed for use in pavement surfaces.

Crushed glass may be used for construction in drainage, embankment and backfilling applications, except for undercutting and foundation support for bridges, abutments, retaining walls and box culverts. The substitution of crushed glass will be permissive and limited to applications using material of size 3/8 inch and smaller where permitted for use in the Specifications.

200.05—Handling and Storing Aggregates

Stockpiles of aggregate shall be constructed on areas that are hard, well drained, and denuded of vegetation. The different sizes and kinds of aggregates shall be kept separate during handling and storage and until batched. Care shall be taken to prevent segregation of coarse and fine particles during handling and storing.

Aggregates placed directly on the ground shall not be removed from the stockpiles within 1 foot of the ground until final cleanup, and then only clean aggregate shall be used.

200.06—Technician and Batcher Certification

Certification for technicians and batchers will be awarded by the Department upon a candidate's satisfactory completion of an examination.

(a) **Central Mix Aggregate Technician:** A Central Mix Aggregate Technician designs and makes necessary adjustments in job mixtures at the plant based on an analysis of the specified material. The technician also samples materials and conducts any tests necessary to put the plant into operation and produce a mixture in accordance with the applicable Specifications.

(b) **Asphalt Plant Technician:** An Asphalt Plant Technician samples material and is capable of conducting any tests necessary to put the plant into operation.

(c) **Concrete Plant Technician:** A Concrete Plant Technician performs necessary adjustments in the proportioning of material used to produce the specified concrete mixtures

(d) **Concrete Batcher:** A Concrete Batcher performs the batching operation. The batcher implements adjustments only at the direction of a certified Concrete Plant Technician unless the batcher's certification authorizes otherwise.

(e) **Asphalt Field Technician:** An Asphalt Field Technician inspects asphalt concrete placement in accordance with applicable requirements.

(f) **Concrete Field Technician:** A Concrete Field Technician provides quality control of placement operations for hydraulic cement concrete in accordance with applicable requirements.

(g) **Asphalt Mix Design Technician:** An Asphalt Mix Design Technician is responsible for designing and adjusting mixes as needed, reviewing and approving all test results, having direct communication with the plant for making recommended adjustments and is capable of conducting any tests necessary to put the plant into operation.

(h) **Aggregate Properties Technician:** An Aggregate Properties Technician conducts all aggregate tests on aggregate used in asphalt concrete in accordance with applicable requirements

(i) **Slurry Surfacing Technician:** A Slurry Surfacing Technician inspects the placement of emulsified asphalt slurry seal and latex modified emulsion treatment (Micro-surfacing) in accordance with applicable requirements.

(j) **Surface Treatment Technician:** A Surface Treatment Technician inspects the placement of single seal and modified (blotted) seal coats in accordance with applicable requirements.

SECTION 203—COARSE AGGREGATE

203.01—Description

These specifications cover material for use as coarse aggregate in hydraulic cement concrete, asphalt concrete, asphalt surface treatments, and drainage.

203.02—Materials

Coarse aggregate shall consist of crushed stone, crushed slag, crushed or uncrushed gravel with clean, hard, tough, and durable pieces free from adherent coatings and deleterious amounts of friable, thin, elongated, or laminated pieces; soluble salts; or organic materials.

(a) **Crushed hydraulic cement concrete** will be permitted for use as a coarse aggregate provided it conforms to the physical requirements specified herein and shows no adverse chemical reaction. Crushed hydraulic cement concrete will not be permitted in the following: (1) reinforced cement concrete, (2) in combination with other materials in contact with geotextile fabric when such fabric is used as a drainage item, and (3) in backfill or bedding for perforated pipe.

(b) **Crushed gravel** shall consist of particles of which at least 80 percent by weight shall have at least one face fractured by artificial crushing. Tests will be performed in accordance with the requirements of VTM-15.

(c) **Blast furnace slag** shall be relatively free from foreign minerals and glassy or spongy pieces. It shall weigh at least 70 pounds per cubic foot, dry rodded, for size No. 68 and smaller and at least 65 pounds per cubic foot, dry rodded, for larger sizes. Tests will be performed in accordance with the requirements of AASHTO T19. When used in asphalt surface treatments, blast furnace slag shall contain not more than 10 percent nonporous material and shall have an absorption of at least 3 percent. Tests will be performed in accordance with the requirements of AASHTO T85.

(d) **Crushed glass** shall consist of particles of curbside-collected or waste glass. It shall be free from sources of glass that include automotive glass, lead crystal, TV monitors, lighting fixtures and electronics applications. Non-glassy material associated with curbside collection (paper, capping materials, etc.), excluding fragments of broken ceramics and pottery, shall be limited to 5 percent by weight using a gravimetric determination, and including loss on ignition performed in accordance with the requirements of ASTM D2974. One hundred percent of the crushed glass shall pass the 9.5 mm (3/8 inch) sieve with less than 5 percent passing the No. 200 sieve. Crushed glass shall not be used in hydraulic cement concrete, asphalt, base/subbase, or exposed shoulder applications.

203.03—Detail Requirements

(a) **Grading:** Open-graded aggregates shall conform to the requirements of Table II–3. Tests will be performed in accordance with the requirements of AASHTO T27.

TABLE II–3
Sizes of Open-Graded Coarse Aggregates

Amounts Finer Than Each Laboratory Sieve (Square Openings) (% by Weight)

Va. Size

No.	4in.	3 ½ in.	3 in.	2 ½ in.	2 in.	1 ½ in.	1 in.	¾ in.	½ in.	3/8 in.	No.4	No. 8	No.16	No. 50	No. 100
1	Min.100	90-100		25-60		Max.15		Max.5							
2			Min.100	90–100	35–70	Max.15		Max.5							
3				Min.100	90–100	35–70	0–15		Max.5						
357				Min.100	95–100		35–70		10–30		Max.5				
5						Min.100	90–100	20–55	Max.10	Max.5					
56						Min.100	90–100	40–85	10–40	Max.15	Max.5				
57						Min.100	95–100		25–60		Max.10	Max.5			
67							Min.100	90–100		20–55	Max.10	Max. 5			
68							Min.100	90–100		30–65	5–25	Max.10	Max.5		
7								Min.100	90–100	40–70	Max.15	Max.5			
78								Min.100	90–100	40–75	5–25	Max. 10	Max.5		
8									Min.100	85–100	10–30	Max. 10	Max.5		
8P									Min.100	75–100	5–30	Max. 5			
9										Min.100	85–100	10–40	Max.10	Max.5	
10										Min.100	85-100				10-30

TABLE II–4
Soundness

Use	Max. Soundness Loss (%) Magnesium Sulphate (5 Cycles)	Freeze and Thaw (100 Cycles)
Hydraulic cement concrete	12	5
Asphalt surface courses	15	6
Asphalt and aggregate bases	20	7
Select material (Type I) and subbase	30	12

TABLE II–5
Abrasion

Use	Max. Los Angeles Abrasion Loss (%) 100 Rev.	500 Rev.
Grade A stone	9	40
Grade B stone	12	45
Grade C stone	14	50
Slag	12	45
Gravel	12	45

(b) **Soundness:** Soundness shall conform to the requirements of Table II–4. Tests will be performed in accordance with the requirements of AASHTO T103 or T104. The requirement for soundness test for crushed glass is waived due to its preclusion from the applications shown in Table II–4.

(c) **Abrasion Loss:** Abrasion loss shall conform to the requirements of Table II–5. Tests will be performed in accordance with the requirements of AASHTO T96 on aggregate with a grading the most nearly identical with the grading to be used in the work.

(d) **Deleterious Material:** The amount of deleterious material shall be not more than the following:

Material	% by Weight	AASHTO Test Method
Coal and lignite	0.25	T113
Clay lumps	0.25	T112
Material passing No. 200 sieve by washing[1]	1.00	T11

[1] *When the material passing the No. 200 sieve by washing is dust of fracture, the percentage of dele- terious material may be increased to 1.50 percent.*

(e) **Flat and Elongated Particles:** Coarse aggregate to be used as a riding surface during construction activities or as the riding surface after construction shall contain not more than 30 percent

by mass of aggregate particles retained on and above the 3/8-inch sieve having a maximum to minimum dimensional ratio greater than 5 as determined in accordance with the requirements of ASTM D4791.

SECTION 207—SELECT MATERIAL

207.01—Description

These specifications cover nonplastic material obtained from roadway cuts, borrow areas, or commer- cial sources used as foundation for subbase, shoulder surfacing, fill, backfill, or other specific pur- poses.

TABLE II–6
Design Range: Select Material, Type I

% by Weight of Material Passing Sieve					
3 in	**2 in**	**No. 10**	**No. 40**	**No. 200**	**ASTM D4791 Flat & Elongated 5:1**
100	95–100	25–55	16–30	4–14	30% max.

207.02—Detail Requirements

Select material shall consist of approved local or commercial materials free from roots, muck, and de- bris.

(a) **Grading:**

1. **Type I:** Grading for Type I shall conform to the job-mix formula selected from within the design range specified in Table II–6, subject to the applicable tolerances specified in Table II–7 when tested in accordance with the requirements of VTM- 25.

2. **Type II and Type III:** Grading for Types II and III shall conform to the following when tested in accordance with the requirements of VTM-25:

% by Weight of Material Passing Sieve

Type	3 in	2 in	No. 200
II	Min. 100	Min. 100	Max. 25
III[1]			Max. 20

[1]*A maximum of 25 percent of material retained on the No. 200 sieve will be allowed for Type III if the liquid limit is less than 25 and the plasticity index is less than 6.*

TABLE II–7
Process (P) and Range (R) Tolerance: Select Material, Type I

No.	Tolerance on Each Laboratory Sieve (%)									
	3 in		2 in		No. 10		No. 40		No. 200	
Test	P	R	P	R	P	R	P	R	P	R
1	0.0		±4.0		±15.0		±10.0		±6.0	
2	0.0	0.0	±3.0	5.0	±10.5	18.5	±7.0	13.0	±4.0	8.5
3	0.0	0.0	±2.5	5.5	±8.5	22.0	±5.5	15.0	±3.5	10.0
4	0.0	0.0	±2.0	6.0	±7.5	23.5	±5.0	16.5	±3.0	10.5
8	0.0	0.0	±1.5	7.0	±5.5	26.5	±3.0	18.5	±2.0	12.0

(b) **Atterberg Limits:**

1. **Type I:** The mean of the Atterberg limits shall conform to the requirements in Table II–8 when tested in accordance with the requirements of VTM-7.

2. **Types II and III:** Atterberg limits shall conform to the following when tested in accor- dance with the requirements of VTM-7:

Type	Max. Liquid	Max. Plasticity
II	30	9
III	30	9

(c) **California Bearing Ratio (CBR):** Tests for CBR will be performed in accordance with the requirements of VTM-8 for conformance to the specified value.

(d) **Soundness:** Soundness for Type 1 shall conform to the requirements of Table II–4. Tests will be performed in accordance with the requirements of AASHTO T103 or T104.

(e) **Flat and Elongated Particles:** Select materials to be used as a riding surface during con- struction activities or as the riding surface after construction shall contain not more than 30 percent by mass of aggregate particles retained on and above the 3/8-inch sieve having a maximum to minimum dimensional ratio greater than 5 as determined in accordance with the requirements of ASTM D4791.

(f) **Crushed glass** that conforms to the physical requirements set forth in the Specifications shall be limited to Type II and Type III applications to exclude those applications listed in Section 203.02(d) of the Specifications.

207.03—Job-Mix Formula for Select Material, Type I

The Contractor shall submit or shall have the supplier submit a job-mix formula for the Engineer's ap- proval prior to starting work. The formula shall establish a single percentage of aggregate passing each required sieve size denoted in Table II–6 and shall be in effect until a modification is approved by the Engineer. If unsatisfactory results or other changed conditions make it necessary, the Contrac- tor shall prepare and submit a new formula for the Engineer's approval.

207.04—Mixing

The Contractor shall provide a laboratory as specified in Section 106.07. Select material shall be pro- duced at optimum moisture ±2 percentage points.

The Contractor shall have a certified Central Mix Aggregate Technician present at the plant during in- itial setup and subsequent production.

TABLE II–8
Atterberg Limits: Select Material Type I

No. Tests	Max. Liquid Limit	Max. Plasticity Index
1	25.0	6.0
2	23.9	5.4
3	23.2	5.1
4	23.0	5.0
8	22.4	4.7

207.05—Acceptance of Select Material, Type I

Sampling and testing for determination of grading and Atterberg limits shall be performed by the Contractor. The Contractor shall provide the Department copies of test results on forms furnished by the Department and shall maintain appropriate, current quality control charts. The Department will perform independent monitor tests. If there is a statistically significant difference between the two sets of results, an investigation will be made to determine the reason for the difference. If it is determined that the material does not conform to the requirements of the Contract, the material will be rejected or a payment adjustment will be made in accordance with the requirements of Section 207.07.

Determination of grading and Atterberg limits will be based on a mean of the results of tests performed on four samples taken in a stratified random manner for each 2,000-ton lot. Lots of 4,000 tons may be used when the normal daily production of the source from which the material is being obtained is more than 2,000 tons. If visual examination reveals that the material is obviously contaminated or segregated, the material will be rejected without additional sampling or testing. If it is necessary to determine the grading and Atterberg limits of the material in an individual location, one sample taken from the material in question will be tested and the results will be compared to the job mix formula with the tolerances specified in Table II–7 and Table II–8 for one test. The results obtained will apply only to the material in question.

A lot will be considered acceptable for grading if the mean of the results falls within the allowed deviation from the job-mix formula and the difference between the maximum and minimum results does not exceed the range values specified in Table II–7.

A lot will be considered acceptable for Atterberg limits if the mean of the test results is less than the maximum allowed for the liquid limit and plasticity index values specified in Table II–8.

If the liquid limit exceeds 30 or the plasticity index exceeds 9 on any individual sample, that portion of the lot from which the sample was taken will be considered a separate part of the lot and shall be removed from the road.

If the Contract specifies less than 2,000 tons of material, the amount of material necessary to complete the last lot is less than 2,000 tons (or 4,000 tons, if applicable), the job-mix formula is modified within a lot, or a portion of the lot is rejected on the basis of individual test results, the mean results of the tests on the samples taken will be compared to the job-mix formula with the applicable process tolerances specified in Table II–7 and Table II–8 for the number of tests performed.

207.06—Referee System for Select Material, Type I

If the test results obtained for one of the four samples or the mean of the four samples tested to evaluate a particular lot is questionable, the referee system as specified in Section 208.07 will be applied except that the final mean results will be compared to the job-mix formula with the tolerances given in Table II–7 and Table II–8 for the mean of eight tests.

207.07—Payment Adjustment System for Select Material, Type I

If a lot of material does not conform to the acceptance requirements stated herein, adjustment points, determined as follows, will be applied for each 1 percent or part thereof that the grading or Atterberg limits are outside the job-mix formula with the tolerances given in Table II–7 and Table II–8.

	Adjustment Points	
Sieve	**Process**	**Range**
3-in	1	1
2-in	1	1
No.10	1	1
No.40	3	3
No.200	5	5

Atterberg Limits	Adjustment Points
Liquid limit	3
Plasticity index	7

If the total adjustment (excluding the range adjustment) for the lot is more than 25 points, the failing material shall be removed from the road. If the total adjustment (excluding the range adjustment) is 25 points or less and the Contractor does not elect to remove and replace the material, the contract unit price for the material will be reduced by 1 percent for each adjustment point. The total adjustment will be applied to the tonnage represented by the sample(s).

SECTION 208—SUBBASE AND AGGREGATE BASE MATERIAL

208.01—Description

These specifications cover material used to form a foundation for base or surface pavement.

TABLE II–9
Design Range for Dense-Graded Aggregates

Amounts Finer Than Each Laboratory Sieve (Square Openings[1]) (% by Weight)							
Size No.	**2 in**	**1 in**	**3/8 in**	**No. 10**	**No. 40**	**No. 200**	**ASTM D4791 Flat & Elongated 5:1**
21A	100	94–100	63–72	32–41	14–24	6–12	30% max.
21B	100	85–95	50–69	20–36	9–19	4–7	30% max.
22	—	100	62–78	39–56	23–32	8–12	30% max.

[1]*In inches, except where otherwise indicated. Numbered sieves are those of the U.S. Standard Sieve Series.*

208.02—Materials

(a) **Subbase material** shall consist of mixtures of natural or crushed gravel, crushed stone or slag, and natural or crushed sand, with or without soil mortar.

(b) **Aggregate base material** will be designated as Type I or Type II as follows: **Type I** shall consist of crushed stone, crushed slag, or crushed gravel, with or without soil mortar or other admixtures. Crushed gravel shall consist of particles of which at least 90 percent by weight of the material retained on the No. 10 sieve shall have at least one face fractured by artificial crushing. **Type II** shall consist of gravel, stone, or slag screenings; fine aggregate and crushed coarse aggregate; sand-clay-gravel mixtures; or any combination of these mate- rials; with or without soil mortar or other admixtures.

208.03—Detail Requirements

(a) **Grading:** Grading shall conform to the requirements of the job-mix formula selected from within the design range specified in Table II–9, subject to the applicable tolerances specified in Table II–10 when tested in accordance with the requirements of VTM-25.

TABLE II–10
Process Tolerances for Each Laboratory Sieve (%)

No. Tests	Top Size	1 in	3/4 in	3/8 in	No. 10	No. 40	No. 200
1	0.0	±10.0	±14.0	±19.0	±14.0	±8.0	±4.0
2	0.0	±7.1	±10.0	±13.6	±10.0	±5.7	±2.9
3	0.0	±5.6	±7.8	±10.6	±7.8	±4.4	±2.2
4	0.0	±5.0	±7.0	±9.5	±7.0	±4.0	±2.0
8	0.0	±3.6	±5.0	±6.8	±5.0	±2.9	±1.4

TABLE II–11
Atterberg Limits

		Max. Liquid Limit	Max. Plasticity Index
No. Tests	**Subbase and Aggregate Base Type I and II**	**Subbase Sizes No. 21A, 22, and Aggregate Base Type II**	**Aggregate Base Type I and Subbase Size No. 19**
1	25.0	6.0	3.0
2	23.9	5.4	2.4
3	23.2	5.1	2.1
4	23.0	5.0	2.0
8	22.4	4.7	1.7

(b) **Atterberg Limits:** Atterberg limits shall conform to the requirements of Table II–11 when tested in accordance with the requirements of VTM-7.

(c) **Soundness:** Soundness shall conform to the requirements of Table II–4 when tested in accordance with the requirements of AASHTO T103 or T104.

(d) **Abrasion Loss:** Abrasion loss shall be not more than 45 percent when tested in accordance with the requirements of AASHTO T96.

(e) **Optimum Moisture:** Material shall be produced at optimum moisture □2 percentage points.

(f) **Admixtures:** Admixtures shall conform to the requirements of the applicable Specifications.

(g) **Flat and Elongated Particles:** Subbase and aggregate base materials to be used as a riding surface during construction activities or as the riding surface after construction shall contain not more than 30 percent by mass of aggregate particles retained on and above the 3/8-inch sieve having a maximum to minimum dimensional ratio greater than 5 as determined in ac- cordance with the requirements of ASTM D4791.

208.04—Job-Mix Formula

The Contractor shall submit, or shall have the source of supply submit, for the Engineer's approval, a job-mix formula for each mixture to be supplied for the project prior to starting work. The formula shall be within the design range specified in Table II–9. If unsatisfactory results or other conditions make it necessary, the Contractor shall prepare and submit a new job-mix formula for approval.

208.05—Mixing

Subbase or aggregate base materials shall be mixed in an approved central mixing plant of a pugmill or other mechanical type. Materials shall be blended prior to or during mechanical mixing in a manner than will ensure conformance to the specified requirements.

Preparation of subbase and aggregate base material will be subject to inspection at the plant. The Contractor shall provide a laboratory as specified in Section 106.07.

During the initial setup and subsequent production, the Contractor shall have a certified Central Mix Aggregate Technician present at the plant.

208.06—Acceptance

The Contractor shall provide the quality assurance necessary for the Engineer to determine conformance to the required grading and Atterberg limits of subbase and aggregate base material.

Sampling and testing for determination of grading and Atterberg limits shall be performed by the Contractor. The Contractor shall provide copies of test results to the Department on forms furnished by the Department and shall maintain appropriate current quality control charts. The Department will perform independent monitor tests at a laboratory of its choice. If there is a statistically significant difference between the two sets of results, an investigation will be made to determine the reason for the difference. If it is determined that the material does not conform to the requirements of the Contract, the material will be rejected or a payment adjustment will be made in accordance with the requirements of Section 208.08.

Determination of grading and Atterberg limits will be based on a mean of the results of tests performed on four samples taken in a stratified random manner from each 2,000-ton lot. Lots of 4,000 tons may be used when the normal daily production of the source from which the material being obtained is more than 2,000 tons. Unless otherwise approved, samples shall be obtained from the approximate center of truckloads of material. Any statistically acceptable method of randomization may be used to determine the time and location of the stratified random sample to be taken. The Department shall be advised of the method to be used prior to the beginning of production.

A lot will be considered acceptable for grading if the mean of the test results is within the deviation from the job-mix formula specified in Table II–10.

A lot will be considered acceptable for Atterberg limits if the mean of the test results is less than the maximum for the liquid limit and plasticity index specified in Table II–11.

If the liquid limit exceeds 30 or the plasticity index exceeds 6 for Type I base material or No. 19 subbase material; or the plasticity index exceeds 9 for Type II base material or subbase materials No. 20, 21, 21A, 21B, or 22 on any individual sample; that portion of the lot from which the sample was taken will be considered a separate part of the lot and shall be removed from the road.

If either the amount of material in the lot is less than 2,000 tons (4,000 tons if applicable), the job-mix formula is modified within a lot, or a portion of the lot is rejected on the basis of individual test results, the mean test results of the samples taken will be compared to the job-mix formula with the tolerances given in Tables II–10 and II–11 for the number of tests performed.

If a visual examination reveals that material in any load is obviously contaminated or segregated, the load will be rejected without additional sampling or testing of the lot. If it is necessary to determine grading or Atterberg limits of material in an individual load, one sample (taken from the load) will be tested and the results compared to the job-mix formula with the tolerances given in Tables II–10 and II–11 for one test. Results obtained in the testing of a specific individual load will apply only to the load in question.

208.07—Referee System

If the test results obtained for one of the four samples taken to evaluate a particular lot are questionable, the Contractor may request that the results of the questionable sample be disregarded. The Contractor shall then perform tests on five additional samples taken from randomly selected locations in the roadway where the lot was placed. If the Engineer determines that one of the four test results is questionable, the Department will perform tests on five additional samples taken from randomly selected locations in the roadway where the lot was placed. The test results of the three original (un-questioned) samples will be averaged with the tests results of the five road samples, and the mean of the test values obtained for the eight samples will be compared to the jobmix formula with the toler- ances specified in Table II–10 and Table II–11 for the mean of eight tests.

If the Contractor questions the mean of the four original test results obtained for a particular lot, he may request approval to perform additional testing of that lot. If the Contractor requests further tests, he shall sample and test the material in accordance with procedures approved by the Engineer. If the Engineer determines that the mean of the four original test results is questionable, the Department will perform additional testing of that lot. The test results of the original four samples will be averaged with the test results of the four additional samples taken from randomly selected locations in the roadway where the lot was placed, and the mean of test values obtained for the eight samples will be com- pared to the jobmix formula with the tolerances specified in Tables II–10 and II–11 for the mean result of eight tests.

If the mean of the test values obtained for the eight samples conforms to the requirements for the mean of the results of eight tests, the material will be considered acceptable; if the mean does not conform, the lot will be adjusted in accordance with the payment adjustment rate specified in Section 208.08.
The provisions of this Section will not be applicable to mixtures containing cement or other admixtures

that alter the characteristics of the material.

208.08—Payment Adjustment System

If a lot of material does not conform to the acceptance requirements of Section 208.06, payment adjustment points will be determined as follows:

Adjustment Points for Each 1% Grading Is Outside

Sieve No.	Tolerance Permitted in Table II–10
2 in	1
1 in	1
3/4 in	1
3/8 in	1
10	1
40	3
200	5

Limits	Atterberg Adjustment Points for Each 1% Atterberg Limits Exceed Maximum Permitted in Table II–11
Liquid limit	3
Plasticity index	7

If the total adjustment for the lot is more than 25 points, the failing material shall be removed from the road. If the total adjustment is 25 points or less and the Contractor does not elect to remove and re- place the material, the unit price for the material will be reduced by 1 percent for each adjustment point. The adjustment will be applied to the tonnage represented by the sample(s).

The Contractor shall control the variability of his product in order to furnish a consistent, well-graded mixture. When the quantity of any one type of material furnished for a project exceeds 4,000 tons, the variability of the total quantity furnished will be determined on the basis of the standard deviation for each sieve size. If the standard deviation is within the limits specified in Table II–12, the contract unit price for the material will be adjusted as indicated hereinafter. Standard deviation computations will not be made separately on more than two job mixtures for the same type of material.

TABLE II–12
Standard Deviation

	No. of Payment Adjustment Points for Each Sieve Size		
Sieve Size	**1 Adjustment Point for Each Sieve Size**	**2 Adjustment Points for Each Sieve Size**	**3 Adjustment Points for Each Sieve Size**
2 in	0.6–1.5	1.6–2.5	2.6–3.5
1 in	4.6–5.5	5.6–6.5	6.6–7.5
3/4 in	5.6–6.5	6.6–7.5	7.6–8.5
3/8 in	7.1–8.0	8.1–9.0	9.1–10.0
No. 10	5.6–6.5	6.6–7.5	7.5–8.5
No. 40	3.6–4.5	4.6–5.5	5.6–6.5
No. 200	3.1–4.0	4.1–5.0	5.1–6.0

The contract unit price will be reduced by 0.5 percent for each adjustment point applied for standard deviation.

The disposition of material having standard deviations larger than those specified in Table II–12 will be as determined by the Engineer.

SECTION 210—ASPHALT MATERIALS

210.01—Description

These specifications cover asphalt material consisting of asphalt, asphalt cement, asphalt cutback, or asphalt emulsion as defined in ASTM D8.

210.02—Materials

Asphalt material shall be homogeneous and shall conform to the following:

(a) **Rapid curing and medium curing liquid asphalts used as surface treatments** shall con- tain a heat-stable additive conforming to the requirements of Section 211.

(b) **Liquid asphalt material** will be tested for coating ability in accordance with the require- ments of AASHTO T182, with the following modifications:

1. Material that can coat 95 percent of a shady dolomite will be classified Type I.

2. Material that can coat 95 percent of a siliceous gravel wetted with 2 percent water by weight will be classified Type II.

(c) **Rapid curing cutback asphalts** shall conform to the requirements of AASHTO M81.

(d) **Medium curing cutback asphalts** shall conform to the requirements of AASHTO M82.

(e) **Cements** shall be viscosity graded and shall conform to the requirements of AASHTO M226, Table 2, except that the loss on heating shall be not greater than 1.0 for AC-5, 0.8 for AC-20, and 0.5 for all other grades.

(f) **Emulsions** shall conform to the requirements of AASHTO M208 and shall be Type I as specified herein except that CRS-2 shall be Type II as specified herein. CRS-1h shall con- form to the requirements of AASHTO M208 for CRS-1 except that the penetration shall be 40 to 110. Emulsions will be sampled and tested in accordance with the requirements of AASHTO T59 except that viscosity will be tested in accordance with the requirements of VTM-64.

210.03—Detail Requirements

(a) **Shipping:** Shipments of asphalt material shall be made in transporting media that are free from contamination. Tank trucks or trailers shall be equipped with a sampling device ap- proved by the Engineer. The device shall have an inside diameter of 1/2 to 1 inch and a gate valve or petcock. The device shall be built into the tank or the recirculating or discharge line so that a sample can be drawn during circulation or discharge.

(b) **Storing:** Asphalt material to be stored shall be placed in storage tanks that are free from contamination.

210.04—Payment Adjustment System

If the material represented by any one sample does not conform to the requirements herein and the material is a pay item, the contract unit price for the item will be reduced by 4 percent for each property that does not conform to the Specifications for the quantity represented by the sample that was used on the project. Unused material represented by the failing sample will be rejected.

If the material represented by a failing sample was not a pay item, the material will be considered unacceptable and shall be subject to the requirements of Section 105.18 and Section 106.10.

SECTION 211—ASPHALT CONCRETE

211.01—Description

Asphalt concrete shall consist of a combination of mineral aggregate and asphalt material mixed mechanically in a plant specifically designed for such purpose.

An equivalent single-axle load (ESAL) will be established by the Engineer, and SUPERPAVE mix types may be specified as one of the types listed as follows:

Mix Type	Equivalent Single-Axle Load (ESAL) Range (millions)	Asphalt Performance Grade (PG)	Aggregate Nominal Maximum Size[1]
SM-9.0 A	0 to 3	64–22	3/8 in
SM-9.0 D	3 to 10	70–22	3/8 in
SM-9.0 E	Above 10	76–22	3/8 in
SM-9.5 A	0 to 3	64–22	3/8 in
SM-9.5 D	3 to 10	70–22	3/8 in
SM-9.5 E	Above 10	76–22	3/8 in
SM-12.5 A	0 to 3	64–22	1/2 in
SM-12.5 D	3 to 10	70–22	1/2 in
SM-12.5 E	Above 10	76–22	1/2 in
IM-19.0 A	Less than 10	64–22	3/4 in
IM-19.0 D	10 and above	70–22	3/4 in
BM-25.0 A	All ranges	64–22	1 in
BM-25.0 D	Above 10	70–22	1 in

[1]**Nominal maximum size** is defined as one sieve size larger than the first sieve to retain more than 10% aggregate.

Asphalt concrete shall conform to the requirements for the type designated.

211.02—Materials

(c) **Asphalt materials** shall conform to the requirements of Section 210 except asphalt cement materials shall be performance graded (PG) in accordance with the requirements of AASH-TO M320.In addition, asphalt mixtures with the E designation shall meet the asphalt cement requirements in Section 211.04(e)1.

(d) **Coarse aggregate** shall be Grade A or B, conforming to the requirements, except for grading, of Section 203 for quality. In addition, the coarse aggregate sizes retained on and above the No. 4 sieve shall comply with the coarse aggregate requirements in Table II–12A. Flat and elongated (F&E) particles shall be tested in accordance with the requirements of AST D4791, and coarse aggregate angularity (CAA) shall be tested on crushed gravel only in accordance with the requirements of ASTM D 5821.

(e) **Fine aggregate** shall conform to the requirements except for grading of Section 202 for quality and the fine aggregate requirements in Table II–12A. Fine aggregate angularity (FAA) shall be tested in accordance with the requirements of AASHTO T 304 (Method A) and sand equivalent (SE) shall be tested in accordance with the requirements of AASHTO T 176.

(f) After a gradation is performed:

1. If 10 percent or more of the material is retained on the No. 4 sieve, that portion will be tested in accordance with the requirements for coarse aggregate.

2. If 10 percent or more of the material passes the No. 4 sieve, that portion will be tested for SE.

3. If 10 percent or more of the material passes the No. 8 sieve, that portion will be tested for FAA.

(g) Fine or coarse aggregates that tend to polish under traffic will not be permitted in any final surface exposed to traffic except in areas where the two-way average daily traffic is less than 750 vehicles per day and as permitted elsewhere in these Specifications.

(h) **Mineral filler** shall conform to the requirements of Section 201.

(i) **Aggregate for asphalt concrete** shall be provided in sufficient sizes to produce a uniform mixture. The Contractor shall indicate on the proposed job-mix formula the separate ap- proximate sizes of aggregate to be used.

Where segregation or nonuniformity is evident in the finished pavement, the Engineer re- serves the right to require the Contractor to discontinue the use of crusher run or aggregate blends and to furnish separate sizes of open-graded aggregate material.

(j) An **antistripping additive** shall be used in all asphalt mixes. It may be hydrated lime or an approved chemical additive from the Department's approved list found in the Materials Di- vision's Manual of Instructions, or a combination of both.

The mixture shall produce a tensile strength ratio (TSR) not less than 0.80 for the design and production tests. The TSR shall be determined in accordance with AASHTO T283, in- cluding a freeze-thaw cycle (4-inch specimens compacted with a Marshall hammer or 3.5 by 6-inch specimens when compacted with a gyratory compactor), except that the 16-hour curing time requirement and the 72- to 96-hour storage period will be waived. Design tests shall use the same materials that are to be used in the production mix and shall be conducted in a laboratory approved by the Department.

TABLE II–12A

Aggregate Properties

Coarse Aggregate Properties CAA

Mix Type	1 fractured face	2 fractured faces	ASTM D4791F & E "(5:1)% by weight	SE	FAA
SM-9.0 A	85% min.	80% min.	10% max.[1]	40% min.	40% min.
SM-9.0 D	85% min.	80% min.	10% max.[1]	45% min.	45% min.
SM-9.0 E	95% min.	90% min.	10% max.[1]	45% min.	45% min.
SM-9.5 A	85% min.	80% min.	10% max.[1]	45% min.	45% min.
SM-9.5 D	85% min.	80% min.	10% max.[1]	45% min.	45% min.
SM-9.5 E	95% min.	90% min.	10% max.[1]	45% min.	45% min.
SM-12.5 A	85% min.	80% min.	10% max.[1]	45% min.	45% min.
SM-12.5 D	85% min.	80% min.	10% max.[1]	45% min.	45% min.
SM-12.5 E	95% min.	90% min.	10% max.[1]	45% min.	45% min.
IM-19.0 A	85% min.	80% min.	10% max.[1]	45% min.	45% min.
IM-19.0 D	95% min.	90% min.	10% max.[1]	45% min.	45% min.
BM-25.0 A	80% min.	75% min.	10% max.[1]	45% min.	45% min.
BM-25.0 D	80% min.	75% min.	10% max.[1]	45% min.	45% min.

[1] 10 percent measured at 5:1 on maximum to minimum dimensions

When a chemical additive is used, it shall be added to the asphalt cement prior to introduc- tion into the mix. Any chemical additive or particular concentration of chemical additive found to be harmful to the asphalt material or that changes the viscosity of the original as- phalt cement more than 400 poises or the penetration more than –4 or +10 shall be changed to obtain compliance with these values.

(k) **Hydrated lime** shall conform to the requirements of ASTM C977. Hydrated lime shall be added at a rate of not less than 1 percent by weight of the total dry aggregate.

A separate bin or tank and feeder system shall be provided to store and accurately proportion the lime into the aggregate in either dry or slurry form. The lime and aggregate shall be mixed by pugmill or other approved means to achieve a uniform lime coating of the aggregate prior to entering the drier. In the event lime is added in dry form, the aggregate shall contain at least 3 percent free moisture. The stockpiling of lime treated aggregate will not be permitted.

The feeder system shall be controlled by a proportioning device, which shall be accurate to within ±10 percent of the specified amount. The proportioning device shall have a convenient and accurate means of calibration. A flow indicator or sensor shall be provided with the proportioning device and interlocked with the plant controls, aggregate feed or weigh system, such that production of the mixture will be maintained and, if there is a stoppage of the lime feed, interrupted.

The method of introducing and mixing the lime and aggregate shall be subject to approval by the Engineer prior to beginning production.

(l) **Reclaimed Asphalt Pavement** (RAP) material may be used as a component material of asphalt

mixtures in conformance with the following:

1. Asphalt surface, intermediate, and base mixtures containing RAP shall use the PG grade of asphalt cement as indicated in Table II–14A.

2. The final asphalt mixture shall conform to the requirements for the type specified.

3. During the production process, RAP material shall not be allowed to contact open flame.

4. RAP material shall be handled, hauled, and stored in a manner that will minimize contamination. Further, the material shall be stockpiled and used in such manner that variable asphalt contents and asphalt penetration values will not adversely affect the consistency of the mixture.

5. RAP shall be processed in such a manner as to ensure that the maximum top size intro- duced into the mix shall be 2 inches. The Engineer may require smaller sized particles to be introduced into the mix if the reclaimed particles are not broken down or uniformly distributed throughout the mixture during heating and mixing.

211.03—Job-Mix Formula

The Contractor shall submit for the Engineer's approval a job-mix formula for each mixture to be supplied. The job-mix formula shall be within the design range specified. The job-mix formula shall establish a single percentage of aggregate passing each required sieve, a single percentage of asphalt material to be added to the aggregate, a temperature at which the mixture is to be produced, and a temperature at which the mixture is to be compacted for SUPERPAVE testing in accordance with the requirements of AASHTO R35. Each approved job-mix formula shall remain in effect, provided the results of tests performed on material currently being produced consistently comply with the requirements of the job-mix formula for grading, asphalt content, temperature, and SUPERPAVE compaction results and the requirements of Section 315.

(a) SUPERPAVE mixes shall be designed and controlled in accordance with the requirements of AASHTO R35 and as specified herein. The Contractor shall have available all of the equipment outlined in AASHTO T312 (section 4–6) and a Department-certified Asphalt Mix Design Technician. The SUPERPAVE mixture shall be compacted in a gyratory compactor with an internal angle of 1.16 ± 0.02 degrees. The internal angle shall be measured and calibrated using a cold (non-mix) device. The SUPERPAVE Gyratory Compactor (SGC) shall be one from the Department's approved list found in the Materials Division's Manual of Instructions The SUPERPAVE mixes shall conform to the requirements of Table II–13 and Table II–14. Section 7.1.2 of AASHTO R30 shall be modified such that the com- paction temperature is as specified in (d) 6 herein.

The mixture shall be designed and compacted at the N design gyrations specified in Table II–14. The N Max. requirement shall be verified as part of the design process by compacting a minimum of two specimens at the design asphalt content.

(b) In conjunction with the submittal of a job-mix formula, the Contractor shall submit complete SUPERPAVE design test data, ignition furnace calibration data in

accordance with VTM-102 prepared by an approved testing laboratory, and viscosity data or supplier temperature recommendations for the asphalt cement if different from (d) 6 herein.

(c) Three trial blends for gradation shall be run at one asphalt content. An aggregate blend that was previously developed and approved as a job-mix formula at a higher gyration level may be used for a subsequent year's mix designs that require a lower gyration level in lieu of de- veloping three new trial blends.

(d) The SUPERPAVE design test data shall include, but not be limited to, the following information:

1. Grading data for each aggregate component of three trial blends shall be submitted to the Department. The data for the mixture will show percent passing for the following sieves: 2 inch, 1 1/2 inch, 1 inch, 3/4 inch, 1/2 inch, 3/8 inch, No. 4, No. 8, No. 16, No. 30, No. 50, No. 100, and No. 200. The grading shall be reported to the nearest 1.0 per- cent except the No. 200 sieve shall be reported to the nearest 0.1 percent.

2. The test data shall include, but not be limited to, the percentage of each aggregate component as compared to the total aggregate in the asphalt mixture. The specific gravity and aggregate properties for coarse and fine aggregates defined in Section 211.02 (b) and (c), including flat and elongated properties, for each aggregate component or for the total aggregates used in the mixture shall be reported. Aggregate properties, except

TABLE II–13
Asphalt Concrete Mixtures: Design Range[1]
Percentage by Weight Passing Square Mesh Sieves

Mix Type	2 in	1 1/2 in	1 in	3/4 in	1/2 in	3/8 in	No. 4	No. 8	No. 30	No. 50	No. 200
SM-9.0 A,D,E					100[2]	90–100	90 max.	47–67			2–10
SM-9.5 A,D,E					100[2]	90–100	80 max.	38–67			2–10
SM-12.5 A,D,E				100	95–100	90 max.	–	34–50			2–10
IM- 19.0 A,D			100	90–100	90 max.	–	–	28–49			2–8
BM-25.0 A,D		100	90–100	90 max.	–	–	–	19–38			1–7
C(Curb Mix)					100	92–100	70–75	50–60	28–36	15–20	7–9

[1]SM = Surface Mixture; IM = Intermediate Mixture; BM = Base Mixture; C = Curb Mixture.
[2]A production tolerance of 1% will be applied to this sieve regardless of the number of tests in the lot.

TABLE II–14
Mix Design Criteria

Mix Type	VTM (%) Production (Note 1)	VFA (%) (%) Design	VFA (%) Production (Note 2)	Min. VMA (%)	Fines/Asphalt Ratio (Note 3)	N Design	N Initial	N Max.	Density(%) at N Initial
SM-9.0 A[Notes 1,2, 3]	2.0–5.0	75–80	70–85	16	0.6–1.3	65	7	100	≤ 90.5
SM-9.0 D[Notes 1,2,3]	2.0–5.0	75–80	70–85	16	0.6–1.3	65	7	100	≤ 89.0
SM-9.0 E[Notes 1,2,3]	2.0–5.0	75–80	70–85	16	0.6–1.3	65	7	100	≤ 89.0
SM-9.5 A[Notes 1,2,3]	2.0–5.0	73–79	68–84	15	0.6–1.2	65	7	100	≤ 90.5
SM-9.5 D[Notes1,2,3]	2.0–5.0	73–79	68–84	15	0.6–1.2	65	7	100	≤ 89.0
SM-9.5 E[Notes1,2,3]	2.0–5.0	73–79	68–84	15	0.6–1.2	65	7	100	≤ 89.0
SM-12.5 A[Notes1,2,3]	2.0–5.0	70–78	65–83	14	0.6–1.2	65	7	100	≤ 90.5
SM-12.5 D[Notes1,2,3]	2.0–5.0	70–78	65–83	14	0.6–1.2	65	7	100	≤ 89.0
SM-12. 5 E[Notes 1, 2,3]	2.0–5.0	70–78	65–83	14	0.6–1.2	65	7	100	≤ 89.0
IM-19.0 A[Notes1,2,3]	2.0–5.0	69–76	64–81	13	0.6–1.2	65	7	100	≤ 90.5
IM-19.0 D[Notes 1,2,3]	2.0–5.0	69–76	64–81	13	0.6–1.2	65	7	100	≤ 89.0
BM-25.0 A[Notes2,3,4]	2.0–5.0	67–75	62–83	12	0.6–1.3	65	7	100	≤ 89.0
BM-25.0 D[Notes2,3,4]	2.0–5.0	67–75	62–83	12	0.6–1.3	65	7	100	≤ 89.0

[1]SM = Surface Mixture; IM = Intermediate Mixture; BM = Base Mixture.

Note 1: Asphalt content should be selected at 4.0% air voids.

Note 2: During production of an approved job mix, the VFA shall be controlled within these limits.

Note 3: Fines-asphalt ratio is based on effective asphalt content.

Note 4: Base mix shall be designed at 3.5% air voids. BM-25.0 A shall have a minimum asphalt content of 4.4% unless otherwise approved by the Engineer. BM-25.0 D shall have a minimum asphalt content of 4.6% unless otherwise approved by the Engineer.

sand equivalent, shall be reported for RAP portions of a mixture. The aggregate specif- ic gravity of RAP shall be the effective aggregate specific gravity calculated from the results of tests conducted in accordance with AASHTO T 209 and VTM-102.

3. The aggregate grading in the asphalt mixture shall be determined by igniting or ex- tracting the asphalt from a laboratory-prepared sample. The laboratory sample shall be batched on the basis of component percentages as indicated in (d) 2. herein and at the proposed job-mix asphalt content. The aggregate shall be obtained in accordance with the requirements of VTM-102 or (VTM-36 when approved). Sieves specified in (d) 1. herein shall be reported, beginning with the top size for the mix.

4. The following volumetric properties of the compacted mixture, calculated on the basis of the mixture's maximum specific gravity determined in accordance with AASHTO T-209 shall be reported to the Engineer. The mixture shall be aged in accordance with AASHTO R30 and the bulk specific gravity of the specimens determined in accor- dance with AASHTO T-166, Method A, for each asphalt content tested. Properties shall be determined and reported in accordance with the requirements of AASHTO R35.

   a. Voids in total mix (VTM)

   b. Voids in mineral aggregate (VMA)

   c. Voids filled with Asphalt (VFA)

   d. Fines/Asphalt ratio (F/A)

5. The value of the maximum specific gravity of the asphalt mixture used in (c) 4. herein shall be reported to three decimal places.

6. The mixing and compaction temperature for testing shall be as follows:

   a. For mix designation A , the mix temperature shall be 300 degrees F to 310 degrees F and the compaction temperature shall be 285 degrees F to 290 degrees F.

   b. For mix designation D, the mix temperature shall be 310 degrees F to 320 degrees F and the compaction temperature shall be 295 degrees F to 300 degrees F.

   c. In cases involving PG 76–22 or modified binders, the temperatures shall be based on documented supplier's recommendations.

7. The field correction factor as determined by subtracting the bulk specific gravity of the aggregate from the effective specific gravity of the aggregate at the design asphalt con- tent.

8. Permeability test data shall be submitted in accordance with VTM-120 using either sin- gle point verification or the regression method for each surface mix having a different gradation. If the average of the permeability results from the single point verification method exceeds 150 x 10^{-5} cm/sec, or if the regression method predicts a permeability exceeding 150 x 10^{-5} cm/sec at 7.5% voids, the Contractor shall redesign the mixture to produce a permeability number less than 150 x 10^{-5} cm/sec.

(d) The SUPERPAVE design binder content test data shall be plotted on graphs as described in AASHTO R 35 and shall show that the proposed job-mix formula conforms to the require- ments of the mix type.

(e) A determination will be made that any asphalt concrete mixture being produced conforms to the job-mix formula approved by the Department. The Department and Contractor will test the mixture using samples removed from production. The following tests will be conducted to determine the properties listed:

Property	Test
Asphalt content	VTM-102, (VTM-36 when approved)
Gradation	AASHTO T-30
SUPERPAVE properties	AASHTO R35
Asphalt cement material	AASHTO T316 or T-201

At the discretion of the Engineer, the Department in accordance with VTM-110 will per- form rut testing. If the results of the rut testing do not conform to the following require- ments, the Engineer reserves the right to require adjustments to the job-mix formula:

Mix Designation	Maximum Rut Depth, mm
A	7.0
D	5.5
E, (M), (S)	3.5

In the event the Department determines that the mixture being produced does not conform to the approved job-mix formula and volumetric properties specified in Table II–14 based on the Department's or Contractor's test results, the Contractor shall immediately make cor- rections to bring the mixture into conformance with the approved job-mix formula or cease paving with that mixture.

Subsequent paving operations using either a revised or other job-mix formula that has not been verified as described herein shall be limited to a test run of 100 to 300 tons of mixture if such material is to be placed in Department project work. No further paving for the De- partment using that specific mixture shall occur until the acceptability of the mixture being produced has been verified using the 100 to 300 ton constraint.

Asphalt concrete mixtures used in surface, intermediate, and base courses shall conform to the following requirements when tested in accordance with the requirements of AASHTO R35:

TABLE II–14A
Recommended Performance Grade of Asphalt

	Percentage RAP in Mix	
Mix Type	**0.0–20.0**	**Over 20.0**
SM-9.0A, SM-9.5A, SM-12.5A	PG 64–22	PG 58–28
SM-9.0D, SM-9.5D, SM-12.5D	PG 70–22	PG 64–28
SM-9.0E, SM-9.5E, SM-12.5E	PG 76–22	PG 70–28
IM-19.0A	PG 64–22	PG 58–28
IM-19.0D	PG 70–22	PG 64–28
BM-25.0A	PG 64–22	PG 64–22[1]
BM-25.0D	PG 70–22	PG 70–22[1]

[1]BM-25.0A mixes using more than 25% RAP shall use PG 58–22, and BM-25.0D mixes using more than 25% RAP shall use PG 64–22.

Based on rut testing performed by the Department and/or field performance of the job mix, the Engineer reserves the right to require adjustments to the job-mix formula.

211.4—Asphalt Concrete Mixtures

Asphalt concrete mixtures shall conform to the requirements of Table II–14 and the following:

(a) **Types SM-9.0A, SM-9.0D, SM-9.0E, SM-9.5A, SM-9.5D, SM-9.5E, SM-12.5A, SM-12.5D, and SM-12.5E asphalt concrete** shall consist of crushed stone, crushed slag, or crushed gravel and fine aggregate, slag or stone screenings, or a combination thereof com- bined with asphalt cement.

NOTE: For all surface mixes, except where otherwise noted, no more than 5 percent of the aggregate retained on the No. 4 sieve and no more than 20 percent of the total aggregate may be polish susceptible. At the discretion of the Engineer, SM-9.5AL or SM-12.5AL may be specified and polish susceptible aggregates may be used (without percentage limits).

(b) **Types IM-19.0A and IM-19.0D asphalt concrete** shall consist of crushed stone, crushed slag, or crushed gravel and fine aggregate, slag or stone screenings, or a combination there- of combined with asphalt cement.

NOTE: At the discretion of the Engineer, an intermediate mix may be designated as either SM-19.0A or SM-19.0D. When designated as such, no more than 5 percent of the aggregate retained on the No. 4 sieve may be polish susceptible. All material passing the No. 4 sieve may be polish susceptible.

(c) **Types BM-25.0A and BM-25.0D asphalt concrete** shall consist of crushed stone, crushed slag, or crushed gravel and fine aggregate, slag or stone screenings, or a combination there- of combined with asphalt cement.

(d) **Type C (curb mix) asphalt concrete** shall consist of a blend of No. 78 or No. 8 crushed aggregate, No. 10 crushed aggregate, fine aggregate, mineral filler, and a stabilizing addi- tive from the Department's approved list found in the Materials Division's Manual of Instructions combined with 6.0 to 9.0 percent of PG 64–22. This mix does not require a volu- metric mix design or volumetric testing under the SUPERPAVE system.

(e) **Type SM-9.5**, **SM-12.5, IM-19.0, and BM-25.0 asphalt concrete** may be designated (M) for modified, (S) for stabilized, or (M) or (S) for Contractor's option. Asphalt mixtures with the E designation may be modified but shall not be stabilized.

1. **Type (M) asphalt mixtures** shall consist of mixes incorporating a neat asphalt mate- rial with polymer modification complying with the requirements of PG 76–22 and have a rolling thin film oven test residue elastic recovery at 77 degrees F of a minimum 70 percent. Modified mixtures shall be designated with an (M) following the standard mix designation. Type (M) asphalt mixtures shall not be permitted to exceed 15 percent re- claimed asphalt pavement (RAP) material.

2. **Type (S) asphalt mixtures** shall consist of mixes incorporating a stabilizing additive from the the Department's approved list found in the Materials Division's Manual of Instructions. These mixes shall be designated with an (S) following the standard mix designation. The minimum required additive shall be as specified on the Department's approved list found in the Materials Division's Manual of Instructions.

211.05—Testing

The Contractor shall provide the quality control and assurance necessary for the Department to determine conformance with the required grading, asphalt content, and temperature properties for asphalt concrete.

The Contractor shall have a Department-certified Asphalt Mix Design Technician for designing and adjusting mixes as necessary. The Asphalt Mix Design Technician or Asphalt Plant Technician may perform testing of asphalt mixes. The Asphalt Mix Design Technician shall be responsible for reviewing and approving the results of all testing. The Asphalt Mix Design Technician shall be available and have direct communication with the plant for making necessary adjustments in the asphalt concrete mixes at the mixing plant. The Asphalt Mix Design Technician and Asphalt Plant Technician shall each be capable of conducting any tests necessary to put the plant into operation; however, the As- phalt Mix Design Technician shall be responsible for producing a mixture that complies with the re- quirements of these Specifications. The Department will award certification.

The Contractor shall maintain all records and test results associated with the material production and shall maintain appropriate current quality control charts. Test results and control charts shall be available for review by the Engineer.

The Contractor shall execute a quality control plan of process inspections and tests, including the determination of SUPERPAVE properties. The results of the SUPERPAVE tests shall be used, along with the results of other quality control efforts, to control the quality of the mixture being produced.

The Contractor shall perform at least one field SUPERPAVE test per day per mix or per 1,000 tons per mix if more than 1,000 tons of a mix is produced per day. Aging as described in AASHTO R30 shall not

be performed. In the event less than 300 tons of asphalt mixture is produced under a single job-mix formula in a day, field SUPERPAVE testing will not be required. This tonnage shall be added to subsequent production. When the accumulated tonnage exceeds 300 tons, minimum testing frequency shall apply. Field SUPERPAVE test results shall be plotted and displayed in control chart form in the plant immediately following the completion of each individual test. The tests shall determine asphalt content, VTM, VMA, VFA, and F/A in percentages to the nearest 0.1 percent. The Department will conduct on-site inspections so the Contractor's Asphalt Mix Design Technician can demonstrate aknowledge of the SUPERPAVE mix design and production requirements on Department supplied mixture.

Aggregate specific gravity and aggregate property tests shall be conducted by a Department-certified Aggregate Properties Technician or Asphalt Mix Design Technician on each aggregate component (including RAP) or total aggregate mixture once at design and once prior to beginning production in each calendar year. Sand equivalent shall not be determined on RAP. In addition, for each 50,000 tons of each aggregate size used at each plant, aggregate specific gravity and the results aggregate property tests shall be reported for each aggregate component or the total aggregate mixture. Otherwise, if the total blend (cold feed) is used to determine aggregate specific gravity and aggregate properties, these tests shall be run for each 50,000 tons of the total blend.

Field SUPERPAVE tests shall be performed to N_{design} gyrations as specified in Table II–14. At the Engineer's discretion, the N_{max}. requirement may be verified.

211.06—Tests

The Department may sample materials entering into the composition of the asphalt concrete, the mixture, or the completed pavement. The Contractor shall cooperate with the Engineer in obtaining these samples. When samples are obtained from the pavement, the resulting voids shall be filled and refinished by the Contractor without additional compensation.

When asphalt cement is extracted and recovered in accordance with AASHTO T170, the recovered asphalt cement shall have the following penetration:

Mix Type	Recovered Penetration	Ductility at 77°F
SM-9.0A, 9.5A, 12.5A	Min. 35	Min 40 cm
SM-9.0D, 9.5D, 12.5D	Min. 25	Min 40 cm
IM-19.0A	Min. 35	Min 40 cm
IM-19.0D	Min. 25	Min 40 cm
BM-25.0A	Min. 35	Min 40 cm
BM-25.0D	Min. 25	Min 40 cm

NOTE: Penetration and Ductility tests on the recovered asphalt cement shall not be performed on SM-9.5E, 12.5E, and all (M) and (S) mixes.

Abson recovery samples that fail penetration shall be PG graded in accordance with AASHTO M320. If the samples comply with the required grade specified in Section 211.01, they will be deemed acceptable.

When the Department performs PG grading on the asphalt in a Contractor's liquid asphalt storage tank, the Engineer will notify the asphalt concrete producer and binder supplier if tests indicate that the binder

properties of the asphalt material differ from those of the approved job-mix. The asphalt concrete producer and binder supplier shall determine corrective action with the approval of the Engi- neer.

211.07—Plant Inspection

The preparation of asphalt concrete mixtures will be accepted under a quality assurance plan. The Contractor shall provide a laboratory as specified in Section 106.07.

In addition, the Contractor shall have all laboratory scales and gyratory compactors calibrated once a year by an independent source. The Contractor shall maintain the calibration records for 3 years.

211.08—Acceptance

Acceptance will be made under the Department's quality assurance program, which includes the testing of production samples by the Contractor and of monitor samples by the Department. Sampling and testing for the determination of grading, asphalt cement content, and temperature shall be performed by the Contractor, and the Department will perform independent monitor checks at a laborato- ry of its choosing. The Contractor shall provide copies of such test results to the Department on forms furnished by the Department. Where the Contractor's test results indicate that the mixture conforms to the gradation, asphalt cement content, and mix temperature requirements of the Specifications, the mixture will be acceptable for these properties; however, nothing herein shall be construed as waiving the requirements of Section 106.06, Section 200.02, Section 200.03, and Section 315 or relieving the Contractor of the obligation to furnish and install a finished functional product that conforms to the requirements of the Contract. In the event a statistical comparative analysis of the Contractor's test results and the Department's monitor tests indicate a statistically significant difference in the results and either of the results indicates that the material does not conform to the grading and asphalt cement content requirements of the Specifications, an investigation will be made to determine the reason for the difference. In the event it is determined from the investigation that the material does not conform to the requirements of the Contract, price adjustments will be made in accordance with the requirements of Section 211.09.

Acceptance for gradation and asphalt cement content will be based on a mean of the results of four tests performed on samples taken in a stratified random manner from each 2,000-ton lot (4,000-ton lots may be used when the normal daily production of the source from which the material is being ob- tained is in excess of 2,000 tons). Unless otherwise approved, samples shall be obtained from the approximate center of truckloads of material. Any statistically acceptable method of randomization may be used to determine the time and location of the stratified random sample to be taken; however, the Department shall be advised of the method to be used prior to the beginning of production.

A lot will be considered to be acceptable for gradation and asphalt content if the mean of the test results obtained is within the tolerance allowed for the job-mix formula as specified in Table II–15.

The temperature of the mixture at the plant shall be controlled to provide load-to-load uniformity during changing weather conditions and surface temperatures. The maximum temperature of mix designations A and D and base mixes shall not exceed 350 degrees F unless otherwise directed by the En- gineer. The maximum temperature as recommended by the supplier shall not be exceeded for a mix designated E, (M), or (S).

In the event the job-mix formula is modified within a lot, the mean test results of the samples taken will

be compared to the applicable process tolerance shown in Table II–15.

Asphalt content will be measured as extractable asphalt or weight after ignition.

TABLE II–15
Process Tolerance

		Tolerance on Each Laboratory Sieve and Asphalt Content: Percent Plus and Minus										
No. Tests	**Top Size**[1]	1 1/2 in	1 in	3/4 in	1/2 in	3/8 in	No. 4	No. 8	No. 30	No. 50	No. 200	A.C.
1	0.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	6.0	5.0	2.0	.60
2	0.0	5.7	5.7	5.7	5.7	5.7	5.7	5.7	4.3	3.6	1.4	0.43
3	0.0	4.4	4.4	4.4	4.4	4.4	4.4	4.4	3.3	2.8	1.1	0.33
4	0.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	3.0	2.5	1.0	0.30
8	0.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.1	1.8	0.7	0.21

[1]Defined as the sieve that has 100% passing as defined in Table II–13.

Field SUPERPAVE tests will be performed by the Department in accordance with the requirements of AASHTO R35 during the production of the approved job mixes designed by the SUPERPAVE meth- od. Aging, as described in AASHTO R30, shall not be performed. Should any field SUPERPAVE test fail with regard to the limits specified in Table II–14, the Department may require that production be stopped until necessary corrective action is taken by the Contractor. The Engineer will investigate and determine the acceptability of material placed and represented by failing field SUPERPAVE test re- sults.

Should visual examination by the Engineer reveal that the material in any load or portion of the paved roadway is obviously contaminated or segregated, that load or portion of the paved roadway will be rejected without additional sampling or testing of the lot. In the event it is necessary to determine the gradation or asphalt content of the material in any load or portion of the paved roadway, samples will be taken and tested and the results will be compared to the requirements of the approved job-mix for- mula. The results obtained in the testing will apply only to the material in question.

211.09—Adjustment System

In the event a lot of material does not conform to the acceptance requirements of Section 211.08, adjustment points will be determined as follows:

Adjustment Points for Each 1% the Gradation Is Outside the Process Tolerance Permitted In Table II–15

Sieve Size	(Applied in 0.1% increments)
1 1/2 in	1
1 in	1
3/4 in	1
1/2 in	1
3/8 in	1
No. 4	1
No. 8	1
No. 30	2
No. 50	2
No. 200	3

One adjustment will be applied for each 0.1 percent that the material is out of the process tolerance for asphalt content.

In the event the total adjustment for a lot is greater than 25 points, the failing material shall be removed from the road. In the event the total adjustment is 25 points or less and the Contractor does not elect to remove and replace the material, the unit price for the material will be reduced 1 percent of the unit price bid for each adjustment point. The adjustment will be applied to the tonnage represented by the sample(s). In the event adjustment points are applied against two successive lots, plant adjustment shall be made prior to continuing production.

The Contractor shall control the variability of his product in order to furnish a uniform mix. When the quantity of any one type of material furnished a project exceeds 4,000 tons, the variability of the total quantity furnished will be determined on the basis of the standard deviation for each sieve size and the asphalt content. In the event the standard deviation is within the ranges specified in Table II–16, the unit bid price for the material will be adjusted as indicated herein. Adjustments for standard deviation computations will not be made on more than two job mixes for the same type of material.

TABLE II–16
Standard Deviation

Sieve Size and A.C.	Standard Deviation 1 Adjustment Point for Each Sieve Size and A.C.	2 Adjustment Points for Each Sieve Size and A. C.	3 Adjustment Points for Each Sieve Size and A.C.
1/2 in.	3.8–4.7	4.8–5.7	5.8–6.7
3/8 in	3.8–4.7	4.8–5.7	5.8–6.7
No. 4	3.8–4.7	4.8–5.7	5.8–6.7
No. 8	3.0–3.9	4.0–4.9	5.0–5.9
No. 30	2.2–3.1	3.2–4.1	4.2–5.1
No. 50	1.5–2.4	2.5–3.4	3.5–4.4
No. 200	1.1–2.0	2.1–3.0	3.1–4.0
A.C.	0.27–0.36	0.37–0.46	0.47–0.56

A separate standard deviation will be determined by the Department for each calendar year's produc- tion of each mix type produced by a plant.

The unit bid price will be reduced by 0.5 percent for each adjustment point applied for standard devia- tion.
The Engineer will determine the disposition of material having standard deviations larger than those specified in Table II–16.

211.09—Referee System

(a) **In the event the test results obtained from one of the four samples taken to evaluate a particular lot appear to be questionable,** the Contractor may request in writing that the results of the questionable sample be disregarded, whereupon the Contractor shall have ei- ther an AASHTO-accredited labor Department lab perform tests on five additional samples taken from randomly selected locations in the roadway where the lot was placed. In the event the Engineer determines that one of the four tests results appears to be questionable, the Department will perform tests on five additional samples taken from randomly selected locations in the roadway where the lot was placed. The test results of the three original, i.e., unquestioned, samples will be averaged with the test results of the five road samples, and the mean of the test values obtained for the eight samples will be compared to the require- ments for the mean of eight tests as specified in Table II–15.

(b) **In the event the Contractor questions the mean of the four original test results ob- tained for a particular lot,** the Contractor may request in writing approval to have either an AASHTO-accredited labor Department lab perform additional testing of that lot. In the event the Engineer determines that the mean of the four original test results are question-able, the Department will perform additional testing of that lot. The test results of the original four samples will be averaged with the test results of the four additional samples taken from randomly selected locations in the roadway where the lot was placed, and the mean of test values obtained for the eight samples will be compared to the requirements for the mean result of eight tests as specified in Table II–15.

If the Contractor requests additional tests, as described in (a) or (b) herein, the Contractor shall sample the material and have either an AASHTO-accredited lab or Department lab test the material in accordance with Department-approved procedures. The Engineer reserves the right to observe the sampling and testing.

In the event the mean of the test values obtained for the eight samples conforms to the re- quirements for the mean results of eight tests, the material will be considered acceptable. In the event the mean of the test values obtained for the eight samples does not conform to the requirements for the mean result of eight tests, the lot will be adjusted in accordance with the adjustment rate specified in Section 211.09.

Samples of the size shown herein shall be saw cut by the Contractor for testing without the use of liquids:

Application Rate	Minimum Sample Size
125 lb/yd^2	8 by 8 in
150 lb/yd^2	7 by 7 in
200 lb/yd^2	6 by 6 in
300 lb/yd^2	5 by 5 in

211.10—Handling and Storing Aggregates

Aggregates shall be handled, hauled, and stored in a manner that will minimize segregation and avoid contamination. Aggregates shall be stockpiled in the vicinity of the plant and on ground that is denuded of vegetation, hard, well drained, or otherwise prepared to protect the aggregate from contamination. Placing

aggregate directly from the crusher bins into the cold feed may be permitted provided the material is consistent in gradation. When different size aggregates are stockpiled, the stockpiles shall be separated to prevent commingling of the aggregates.

211.11—Asphalt Concrete Mixing Plant

Plants used for the preparation of asphalt concrete mixtures shall conform to the following requirements:

(a) **Certification for Plant Operation and Sampling:** A Certified Asphalt Plant Technician shall sample material at the plant.

(b) **Plant Scales:** Scales shall be approved in accordance with the requirements of Section 109.01.

(c) **Drier:** The plant shall include a drier(s) that continuously agitates the aggregate during the heating and drying process. The aggregate shall be dried to a point at which the moisture content of the completed mixture does not exceed 1 percent as determined from samples taken at the point of discharge from the mixing operation.

(d) **Feeder for Drier:** The plant shall be equipped with accurate mechanical means for uniformly feeding the aggregate into the drier so that a uniform production and uniform temperature will be obtained. Where different size aggregates are required to comply with grad- ing specifications, they shall be proportioned by feeding into the cold elevator through a multiple compartment feeder bin, one bin for each size used, equipped with positive action gates that can be securely locked to maintain desired proportioning.

(e) **Bins:** When bins are used, adequate and convenient facilities shall be provided to make possible the sampling of representative aggregate material for each bin. Each compartment shall be provided with an overflow pipe of such size and at such location to prevent contamination of the aggregate in adjacent compartments and shall be provided with individual outlet gates that, when closed, will allow no leakage.

(f) **Thermometric Equipment:** The plant shall be equipped with a thermometric instrument so placed at the discharge chute of the drier as to register automatically or indicate the temperature of the heated aggregate or the completed mix if the drier drum mixing plant is used.

A thermometric device shall be fixed in the asphalt feed line at a suitable location near the charging valve at the mixer unit.

Thermometric devices shall be maintained in good working condition and shall be subject to checking against the laboratory thermometer. Any instruments that do not operate or register properly shall be removed and repaired or replaced.

(g) **Pollution Control:** Pollution control shall conform to the requirements of Section 107.16.

(h) **Equipment for Preparation of Asphalt Material:** Tanks for the storage of asphalt material shall be equipped with a heating system capable of heating and holding the material at the required temperatures. A separate storage tank or a storage tank having separate compartments shall be available for each grade of asphalt cement being used. The heating system shall be designed to

heat the contents of the tank by means of steam, electricity, or other ap- proved means so that no flame is in contact with the heating surface of the tank. The circu- lating system for the asphalt material shall be designed to assure proper and continuous cir- culation during the operating period and to minimize oxidation. Pipelines shall be steam jacketed or insulated to prevent undue loss of heat. Storage facilities for asphalt material shall be sufficient for at least one day's operation or an equivalent means of supply shall be provided that will ensure continuous operation. Provisions shall be made for measuring and sampling storage tanks. When asphalt material is proportioned by volume, the temperature of the asphalt material in storage shall be uniformly maintained at ±20 degrees F during op- eration of the plant by means of an automatic temperature control device. A sampling valve shall be provided for sampling of each asphalt storage tank used in production of the mix. If there are multiple storage tanks, a dedicated valve for each tank shall be provided.

(i) **Asphalt Control:** Asphalt material shall be accurately proportioned by volume or weight. When volumetric methods are used, measurements shall be made by means of meters or pumps, calibrated for accuracy. The section of the asphalt line between the charging valve and the spray bar shall be provided with an outlet valve for checking the meter.

When proportioned by weight, the asphalt material shall be weighed on approved scales. Dial scales shall have a capacity of not more than 15 percent of the capacity of the mixer. The value of the minimum graduation shall not be greater than 2 pounds.

Except when a drier-drum mixing plant is used, the asphalt material bucket and its valves and spray bar shall be steam jacketed or heated by other approved means. The bucket shall have a capacity of at least 115 percent of the weight of the asphalt material required in any mixture and shall be supported by fulcrums.

The asphalt shall be delivered to the mixer in multiple uniform streams for the full width of the mixer.

(j) **Proportioning Aggregates:** Mineral filler and any bag house fines the Contractor uses shall be metered or introduced by means of an approved device for uniform proportioning by weight or by volume.

The weigh hopper shall be of sufficient size to hold the maximum required weight of aggregate for one batch without hand raking or running over. Sufficient clearance between the weigh hopper and supporting devices shall be provided to prevent accumulation of foreign materials.

The discharge gate of the weigh hopper shall be situated in such a manner that the aggregates will not segregate when dumped into the mixer. Gates on the bins and weigh hopper shall be constructed to prevent leakage when closed.

(k) **Drum Mixer:** The aggregate shall be proportioned by a positive weight control at the cold aggregate feed by use of a belt scale that will automatically regulate the supply of material being fed and permit instant correction of variations in load. The cold feed flow shall be au- tomatically coupled with the asphalt flow to maintain the required proportions.

(l) **Batch Mixer:** The batch mixer shall be of a twin pugmill or other approved type, steam jacketed

or heated by other approved means, and capable of producing uniform mixtures within the specified tolerances. It shall be equipped with a sufficient number of paddles or blades, operated at such speeds as to produce a properly and uniformly mixed batch. The number and arrangement of the mixer paddles shall be subject to the approval of the Engi- neer. Worn or defective blades shall not be used in mixing operations.

The mixer shall be provided with an approved time lock that will lock the discharge gate after the aggregates and asphalt have been placed in the mixer and will not release the gate until the specified time has elapsed.

Batch-type mixing plants used to produce asphalt concrete shall be equipped with approved automatic proportioning devices. Such devices shall include equipment for accurately pro- portioning batches of the various components of the mixture by weight or volume in the proper sequence and for controlling the sequence and timing of mixing operations. The au- tomated system shall be designed to interrupt and stop the batching operation at any time batch quantities are not satisfied for each of the materials. A means shall be provided for observing the weight of each material during the batching operation.

The aggregate may be proportioned by cold feed controls in lieu of plant screens provided the cold aggregate feed conforms to the requirements specified in (j) herein.

Should the automatic proportioning devices become inoperative, the plant may be allowed to batch and mix asphalt materials for a period of not more than 48 hours from the time the breakdown occurs provided alternate proportioning facilities are approved by the Engineer.

Written permission of the Engineer will be required for operation without automatic proportioning facilities for periods longer than 48 hours.

(m) **Continuous Mixing Plant:** A continuous mixing plant shall include a means for accurately proportioning each size of aggregate either by weighing or volumetric measurement. When gradation control is by volume, the unit shall include a feeder mounted under the compartment bins. Each bin shall have an accurately controlled individual gate to form an orifice for volumetrically measuring the material drawn from each respective bin compartment. The orifice shall be rectangular, with one dimension adjustable by positive mechanical means, and shall be provided with a lock. Indicators shall be provided to show the individual gate opening in inches. The plant shall be equipped with a satisfactory revolution counter.

The plant shall include a means for calibrating gate openings by weight. The materials fed out of the bins through individual orifices shall be bypassed to a suitable test box, with each component material confined in a separate section. The plant shall be equipped to conve- niently handle test samples weighing up to 200 pounds per bin, and accurate platform scales shall be provided for this purpose.

Positive interlocking control shall be provided between the flow of aggregate from the bins and the flow of asphalt material from the meter or other proportioning device. This shall be accomplished by approved interlocking devices or other approved positive means.

Accurate control of the asphalt material shall be obtained by weighing, metering, or volumetric measurement.

The aggregate may be proportioned by cold feed controls in lieu of plant screens provided the cold aggregate feed conforms to the requirements specified in (j) herein.

The plant shall include a continuous mixer of an approved type that is steam jacketed or heated by other approved means. The paddles shall be of any adjustable type for angular position on the shafts and reversible to retard the flow of the mixture.

Interlock cutoff circuits shall be included to interrupt and to stop the proportioning and mixing operations when the aggregate level in the plant or the asphalt material in storage falls below that necessary to produce the specified mixture.

(n)**Trucks, Truck Scales, and Automatic Printer System:** These shall conform to the requirements of Section 109.01.

211.13—Preparation of Mixture

The asphalt and aggregate shall be introduced into the mixer at a temperature that will produce a mixture that conforms to the requirements of the job-mix formula.

After the required amounts of aggregate and asphalt material have been introduced into the mixer, the materials shall be mixed until a uniform coating of asphalt and a thorough distribution of the aggregate throughout the mixture are secured that comply with the requirements of the Ross count procedure in AASHTO T195. Wet mixing time, based on the procedures in AASHTO T195, shall be determined by the Contractor at the beginning of production and will be approved by the Engineer for each individual plant or mixer and for each type of aggregate used; however, in no case shall the wet mixing time be less than 20 seconds. The *wet mixing time* is the interval of time between the start of introduction of the asphalt material into the mixer and the opening of the discharge gate. A wet mixing time that will result in fully coating a minimum of 95 percent of the coarse particles, based on the average of the three samples is acceptable, provided that none of the three samples result has a coating less than 92 percent of the coarse particles shall be the minimum wet mixing time requirement. A dry mixing time of up to 15 seconds may be required by the Engineer to accomplish the degree of aggregate distribution necessary to obtain complete and uniform coating of the aggregate with asphalt.

211.14—Storage System

In the event the Contractor elects to use a storage system, the system shall be capable of conveying the mix from the plant to the storage bins and storing the mix without a loss in temperature, segregation, or oxidation of the mix. Storage time shall be limited by the ability of the bins to maintain the mix within the quality requirements specified herein with a maximum time limit not to exceed 10 days. Material may be stored in bins for no more than 24 hours without an approved heating system.

The conveyor system may be a continuous or skip bucket type. Continuous type conveyors shall be enclosed so that the mix temperature is maintained.

The storage bins shall be designed in a manner to prevent segregation of the mix during discharge from

the conveyor into the bins and shall be equipped with discharge gates that will not cause segregation of the mix while the mix is loaded into the trucks.

Approval for the use of storage bins may be withdrawn by the Engineer in the event the amount of heat loss, segregation, or oxidation of the mix is excessive.

211.15—Initial Production

At the start of production of a mix not previously used on a state roadway, the Contractor shall place 100 to 300 tons or up to one day's production as directed by the Engineer at an approved site, which may be the project site, so the Engineer can examine the process control of the mixing plant, the Contractor's placement procedures, surface appearance of the mix, compaction patterns of the Contractor's roller(s), and correlation of the nuclear density device. The material shall be placed at the specified application rate and will be paid for at the contract unit price for the specified mix type. The Engineer will determine the disposition of material that was not successfully produced and/or placed due to negligence in planning, production, or placement by the Contractor.

SECTION 244—ROADSIDE DEVELOPMENT MATERIALS

244.01—Description

These specifications cover the various materials, such as fertilizers, seeds, plants, sod, and mulch, for use in landscaping and materials used for soil retention to help prevent erosion.

244.02—Detail Requirements

(a) **Herbicides:** Herbicides shall be registered with the Virginia Department of Agriculture and Consumer Services in accordance with the Virginia Pesticide Law and shall be supplied in the manufacturer's containers clearly labeled as to the composition, brand, and name and address of the manufacturer.

1. **Herbicide for control of broadleaf weeds** shall contain at least 3 pounds of 2,4-D as an oil-soluble, water-emulsifiable amine salt. It shall have a shelf life of at least 2 years and shall be homogeneous with slight agitation. The type of amine salt and the actual acid equivalent per gallon shall be shown on the container.

2. **Herbicide for stump treatment** shall be dicamba CST and shall be applied in accor- dance with the manufacturer's registered label.

(b) **Topsoil:**

1. **Class A topsoil:** Class A topsoil shall be stockpiled topsoil that has been salvaged in accordance with the requirements of Section 303.04(a). It shall be the original layer of the soil profile formed under natural conditions, technically defined as the "A" horizon or as defined by the United States Department of Agriculture–Natural Resources Con- servation Service (USDA–NRCS) Soil Survey Division. It shall be free from refuse and any other materials toxic to plant growth and subsoil, stumps, viable noxious weeds, roots, brush, rocks, clay lumps, or similar objects larger than 3 inches in any di- mension.

2. **Class B topsoil:** Class B topsoil shall be topsoil furnished from sources outside the project limits and shall be the original top layer of a soil profile formed under natural conditions, technically defined as the "A" horizon or as defined by USDA–NRCS Soil Survey Division. It shall consist of natural, friable, loamy soil without admixtures of subsoil or other foreign materials and shall be free of viable noxious weed seed, plant propagules, brush, rocks or other litter, and rocks greater than 3 inches in any dimen- sion. It shall have demonstrated by evidence of healthy vegetation growing or having grown on it prior to stripping that it is well drained and does not contain substances toxic to plants. The Contractor shall submit a source of materials for topsoil on the project prior to use. The Department reserves the right to reject any topsoil material not complying with the requirements of this specification.

   The allowable pH range for Class B topsoil for use in establishing sod or turf shall be 5.5 to 7.0.

   Class B topsoil shall be a "sandy loam," "loamy sand," or "sandy clay loam" soil as defined by the USDA Soil Textural Classification System with an organic matter content between 1 and 8

percent or as approved in writing by the Engineer.

3. **Testing and documentation:** The Contractor shall submit the following test reports to the Engineer for Class B topsoil prior to use. Testing shall be completed by an independent commercial soils testing laboratory:

   a) **Soil analysis** of topsoil including pH factor, mechanical analysis (composition), salinity, percentage of organic content, and soil classification based thereon.

   b) **Recommendations** on type and quantity of additives required to establish a satisfactory pH and bring the supply of nutrients to a level satisfactory for sustaining turf and/or for use as a soil mix for planting if applicable.

(c) **Seeds:** Kinds and varieties of seeds shall be delivered to the project in separate sacks bearing a green seed label denoting that the seed was inspected and approved by the Virginia Crop Improvement Association. Open bags will not be accepted for use. Seeds shall be mixed under the observation of the Engineer on the project or at other approved locations. Seeds shall comply with applicable state and federal seed laws and contract requirements. Seed shall not be used until approved by the Engineer.

Seed shall be subject to inspection by Virginia State Seed Regulatory Inspectors of the Virginia Department of Agriculture and Consumer Services.

Seed tests shall be completed within the 9-month period prior to the beginning of the area scheduled seeding period during which the seed is to be used.

Seed shall not be or have been stored in an enclosure where herbicides, kerosene, or other material detrimental to seed germination is stored.

Noxious weed seeds, as defined by the rules and regulations adopted for enforcement of the Virginia Seed Law, will not be permitted. The number of restricted noxious weed seeds shall be not more than the number per ounce or per pound of noxious weed seeds specified in the rules and regulations of the Virginia Seed Law**.**

The tag from each sack of seed shall be signed by the Contractor and delivered to the Engineer after each sack is completely used.

(d) **Fertilizers:** Fertilizer shall be uniform in composition, free flowing, and suitable for application with approved equipment. The fertilizer shall be delivered to the project in bags or other convenient containers, each fully labeled, and shall conform to all applicable state and federal laws and regulations. Additional nutrients shall be added only when specified in the contract documents or in accordance with the provisions of Section 109.05. Fertilizer shall be subject to testing by the Virginia Department of Agriculture and Consumer Services. The Department reserves the right to reject fertilizer materials that do not comply with the requirements of these specifications or to be compensated in an amount as decided by the Engineer for failure of complying with the requirements of the Virginia Fertilizer Law**.** Other fertilizer products and rates may be substituted with the prior written approval from the Engineer.

A copy of the material safety data sheet (MSDS) shall be provided to the Department for each type of fertilizer supplied with each fertilizer delivery. Any fertilizer delivery that is not accompanied by the appropriate MSDS will be rejected.

1. **Fertilizer for seeding, sodding, sprigging, and plugging** shall have a guaranteed 1-2- 1 ratio and a nitrogen, phosphorous, and potassium (NPK) analysis as detailed in the plans with a minimum 30 percent of the nitrogen from a slow release or slowly soluble source with the remainder of the nitrogen from urea or ammonium nitrate. The follow- ing types of slow release or slowly soluble nitrogen fertilizers may be used: urea form- aldehyde (UF) (ureaform, methylene urea, and methylene diurea/dimethylene triurea); isobutylidene diurea (IBDU); sulfur-coated urea (SCU); and polycoated urea (PCU). UF products shall have a minimum activity index of 40 percent. The IBDU minimum size guide number shall be 230. All UF and IBDU products shall indicate the slow re- lease/slowly available nitrogen source on the fertilizer analysis label as water-insoluble nitrogen. PCU and SCU shall have a minimum 3-month release duration for the total product. The phosphorous content of the fertilizer shall be triple superphosphate or diamonnium phosphate. The potassium content of the fertilizer shall be potassium chloride, commonly known as muriate of potash. Slow release or slowly soluble fertil- izers may be applied with a hydraulic seeder except for SCU. Fertilizer shall be applied in accordance with the requirements of Section 603.

2. **Fertilizer for planting plants** shall have a guaranteed 1-2-1 ratio and a 15-30-15 anal- ysis with a minimum of 40 to 50 percent of the nitrogen from one of the following slow release or slowly soluble sources, with the remainder of the nitrogen from urea or ammonium nitrate:soluble UF, SCU, and PCU. The UF products shall have a mini- mum activity index of 40 percent. SCU and PCU shall have a minimum 3-month re- lease duration for the total product. Slow release or slowly soluble fertilizers shall be applied as a dry surface application as shown in the Department's *Road and Bridge Standards,* Volume II, Landscape Section.

(e) **Lime:** Lime shall be agricultural grade ground limestone. Agricultural grade pulverized or pelletized lime products may be substituted at no additional cost to the Department.

The material source shall be registered with and approved by the Virginia Department of Agriculture and Consumer Services in accordance with the Virginia Agricultural Lime Law and shall conform to the requirements of Section 240. All lime shall be subject to testing by the Virginia Department of Agriculture and Consumer Services. Other lime products may be substituted with approval from the Engineer.

(f) **Inoculating Bacteria for Treating Leguminous Seeds:** Bacteria shall be a pure culture of nitrogen-fixing bacteria selected for maximum vitality. Cultures shall be not more than 1 year old and shall be subject to the approval of the Engineer.

(g) **Mulch:** Mulch shall conform to the following unless otherwise approved in writing by the Engineer:

1. **Mulch for seeding** (vegetative) shall consist of dry straw or hay, free from noxious weeds. Mulch shall be reasonably bright in color and shall not be musty, moldy, caked, decayed, or dusty.

2. **Wood cellulose fiber mulch for hydraulic seeding** shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state. Mulch shall be dyed green or contain a green dye in the package that will provide an appropriate color to fa- cilitate visual inspection of the uniformly spread slurry. Mulch, including dye, shall not contain germination-inhibiting or growth-inhibiting factors. Mulch shall be manufac- tured and processed so that it will remain in uniform suspension in water under agita- tion and will blend with seed, fertilizer, and other additives to form a homogeneous slurry. Mulch shall form a blotterlike ground cover, on application, having moisture absorption and percolation properties and shall cover and hold grass seed in contact with the soil without inhibiting the growth of grass seedlings. Field and equipment per- formance determinations by the Department shall be prerequisites for the approval of a source of supply for mulch.

The manufacturer shall provide certification that the mulch conforms to the following:

Property	**Value**
Fiber or particle size	
Length	To approximately 0.39 inch (10 mm)
Thickness or diameter	Approximately 0.04 inch (1 mm)
Net dry weight content (VTM-47)	Minimum stated on bag pH range (TAPPI
T509 or ASTM D 778) 4.0 to 8.5	
Ash content (TAPPI T413 or ASTM D	Maximum 7.0% 586)
Water-holding capacity (VTM-46)	Minimum 90%

Mulch shall not contain elements or compounds at concentration levels that will be phytotoxic.

In addition to making field performance determinations, the Department may sample and perform such other tests on mulch to ensure that it conforms to these specifica- tions. Only those materials that have been evaluated by the Department and that appear on its list of approved sources of supply will be accepted.

Mulch shall be delivered in packages of uniform weight bearing the name of the manu- facturer, the net weight, and an additional statement of the net dry weight content.

3. **Wood chips** processed from clearing and grubbing operations may be used for mulch on seeded areas as directed by the Engineer. Wood chips shall be not more than 3/8 inch in thickness or 6 square inches in area.

4. **Mulch for individual planting pits and planting beds** shall be double-shredded hardwood mulch aged for at least 1 year and brown in color. A representative sample shall be submitted to the Engineer for approval prior to delivery to the work site.

(h) **Sod:** Sod shall be cultivated material conforming to the requirements of the State Board of Agriculture for state-approved sod or the State Sod Certification Agency for state-certified sod. Root development shall be such that standard size pads will support their own weight and retain their size and shape when suspended vertically from a firm grasp on the upper- most 10 percent of the area. The top growth of sod shall be mowed so that the height of the grass will be 2 to 3 inches at the time of the stripping

operation. Sod may be furnished in any standard pad width and length provided the dimensions do not vary from the average by more than 5 percent. Sod shall be machine stripped at a uniform soil thickness of at least 1 inch. Broken, torn, or irregularly shaped pads will be rejected.

(i) **Trees, Shrubs, Vines, and Other Plants:** The botanical and common name of plants shall be in accordance with the latest edition of *Standardized Plant Names*, prepared by the Editorial Committee of the American Joint Committee on Horticultural Nomenclature in effect on the date of the Notice of Advertisement.

1. **Quality and size:** Plants shall conform to the requirements of the current *American Standard for Nursery Stock* (ANSI Z-60.1) by the American Nursery and Landscape Association and these specifications.

   Plants shall be representative of their normal species and varieties; shall have well furnished branch systems and vigorous fibrous root systems characteristic of their respective kinds; shall be grown in a state-approved, certified nursery; and shall bear evidence of proper nursery care, including adequate transplanting and root pruning. Plants shall comply with state and federal laws governing inspection for plant diseases and insect infestation and shall be free from insect pests, plant diseases, disfiguring knots, stubs, sunscald, bark abrasions, or any other form of damage or objectionable disfigurements.

   When a minimum and maximum size or range is specified, an average size shall be furnished. Plants shall not be pruned before delivery or cut back from larger sizes to conform to the sizes specified. Sizes furnished shall be those specified at the time of delivery and before the usual pruning at the time of planting. Nursery-grown trees shall be free from cuts of limbs that are not healed and cuts more than 3/4 inch that have not completely callused over. Plants from cold storage will not be accepted. Deciduous plants, except those grown in containers, shall be dormant when planted.

2. **Digging and protection:** Digging shall be in accordance with the current *American Standards for Nursery Stock* and done in a manner that will avoid damage to or loss of roots, but roots that are cut shall be cleanly cut. Balled and burlapped plants shall be properly dug and protected to preserve the natural earth in contact with the roots. Manufactured balls or processed balls will not be accepted. Balls shall be firmly wrapped and tied with approved materials. Balled plants will not be accepted if the ball is broken, cracked, or loose. After plants are dug, their roots shall be protected from damage. Roots of bare root plants shall be kept moist at all times. Bare root plants shall be fur- ther protected by wrapping in wet straw, moss, burlap, or other approved material.

3. **Plantable pots:** In lieu of using burlap with balled plants, plants may be dug as specified herein and placed in plantable pots. Pots shall be constructed of organic, biode- gradable material that will readily decompose in soil and shall not be smaller in any dimension than the size specified for balled and burlapped root systems. At the time of planting, the lip or rim of pots shall be broken away, and drainage holes shall be provided as directed. Plants with balls that have been grown in pots or with loose stems will be rejected.

4. **Container-grown plants:** In addition to the requirements of the *American National Standard for Nursery Stock*, container-grown plants shall conform to the following:

    a. The space between the rim or top of the container and the soil line within the con- tainer shall not be more than 1 1/2 inches for the 1-gallon and 2-gallon sizes and not more than 2 ½ inches for the 5-gallon size.
    b. Encircling roots shall not have grown in such a manner that they will cause girdling of the trunk or stems.

    c. Roots shall have been grown in the soil medium for a minimum of 6 months ex- tending to the limits of the container on all sides and from top to bottom.

5. **Collected plants:** Collected plants from wild or native stands shall not be used without the written permission of the Engineer unless specified on the plans. Wild or native plants shall be clean, sound stock and free from injury, and the quality of the plants shall be similar to that specified for nursery-grown material. Stock shall have sufficient root systems to ensure successful transplanting. Balls, when specified, shall be tight and well formed.

6. **Clumps:** Clumps shall be dug from good soil that has produced a fibrous root system typical of the nature of the plant and shall have earth and incidental vegetation adhering to roots.

(j) **Miscellaneous Planting Materials:**

1. **Twine** for wrapping balled and burlapped trees shall be made of an organic material, biodegradable twine, at least two-ply.

2. **Composted yard waste** shall be dark brown or black in color and consist of decomposed leaves, branches, and grass clippings. Prior to delivery, the Contractor shall sub- mit to the Engineer for approval, a sample of the composted yard waste and a test report from an independent laboratory verifying that the material conforms to the follow- ing analysis:

    - pH = 5.5 dry–8.0 wet
    - Moisture Content = 35%–45%
    - Particle Size = Pass through a 1-inch screen or smaller
    - Stability = Stable to highly stable, thereby providing nutrients for plant growth
    - Maturity/Growth Screening = Aged (cured) for a minimum of 6 months, reach thermophilic (113–158 degrees F) temperature ranges following a minimum of two successive turnings of the compost, and pass maturity tests or demonstrate its ability to enhance plant growth
    - Soluble Salt Concentration = 3.0 dS/m (mmhos/cm) or less
    - Nutrient Content: Nitrogen = 0.5%–3.5%
    - Phosphorous = 0.2–4.0%
    - Potassium = 0.3%–2.0%
    - Density = Not more than 1,250 pounds per cubic yard.

    The Contractor shall submit the following information to the Engineer 30 days prior to the date the compost is shipped to the construction site:

a. A vendor's certificate or affidavit attesting that the "Composted Yard Waste" complies with the requirements of this specification.

b. A test report from an independent certified laboratory verifying that the material complies with the requirements for use as specified by the Virginia Department of Environmental Quality and United States Environmental Protection Agency/40 CFR Part 503 Regulations February 1993 with regard to heavy metal content and restrictive use of biosolids.

c. A 2-gallon sample of the material for visual inspection. In addition, the test report shall indicate that the compost material is free of viable weed seed, plant propagules, and harmful pathogens. Non-organic materials such as concrete, plastic, met- al, glass, paper products, chemically treated plywood, plywood, pressboard, and organic pine by-products will not be accepted. The Engineer reserves the right at any time to test and reject compost material that does not comply with the requirements of this specification. Other compost products may be substituted with the written approval of the Engineer.

3. **Hoticultural Grade Perlite** shall be a fine-to-medium grade, non-organic volcanic mineral identified as Perl-Lome having closed air cells and surface cavities, expanded to form a granular, snow-white material, 5 to 20 times its original volume. Perlite shall have a weight of 5 to 8 pounds per cubic foot. Prior to delivery, the Contractor shall submit to the Engineer for approval, a sample of the perlite and a manufacturer's test report or product certification verifying that the material complies with the following analysis and gradation:

   pH = 6.5 to 7.5
   Nutrient Content = Sterile.

Perlite Gradation

Standard Sieve or Micron	Fine	Medium
+16 mesh	10% maximum	60% maximum
+100 mesh	60% minimum	85% minimum

4. **Burlap used for wrapping the tree ball** shall be made of an organic biodegradable material.

5. **Water** used in watering plants shall be obtained from fresh water sources and shall be free from chemicals and other toxic substances harmful to plants. Brackish water shall not be used. The source of water will be subject to the approval of the Engineer.

6. **Staking and guying materials** shall be 14-gage galvanized steel wire. Hose shall be corded rubber, 1/2 inch or 3/4 inch, and solid green in color. Turnbuckles shall be gal- vanized steel or zinc-coated steel. Stakes for anchoring trees and shrubs shall be 2 inch by 2 inch rough dressed hardwood in the appropriate length and reasonably free of knots. Trees and shrubs shall be anchored in accordance with Section 1200 of the De- partment's *Road and Bridge Standards* unless otherwise indicated on the plans. Other staking, guying, and anchoring methods and materials specifically designed for secur- ing trees and shrubs may be substituted with prior approval in writing from the Engi- neer or as designated on the plans.

7. **Below-ground tree anchors** shall be below-grade steel stabilizers capable of fixing the root ball in place until the tree has established itself in place. Prior to ordering ma- terial, the Contractor shall furnish the Engineer manufacturer's product data for the type of anchoring system he proposes to supply for review.

8. **Tree protection tubes** shall be constructed from flexible UV-inhibited polyethylene, polypropylene, or similar material designed to speed photosynthesis, promote seedling growth, and reduce planting stress by trapping moisture, thereby raising relative humidity and ambient temperature inside the tube. Tree tubes shall protect the tree seedlings from animals, wind desiccation, small rodents, chemical sprays, and insects. The design of the tree tubes shall not be detrimental to the establishment and growth of the seedling or young tree. Tree tube designs shall be capable of accommodating tree growth for at least 3 years after planting.

(k) **Soil Retention Coverings:**

1. **Jute mesh** shall be a uniform, open, plain weave of undyed and unbleached single layer jute yarn. The yarn shall be loosely twisted and shall not vary in thickness by more than its normal diameter. Jute mesh shall be new, and its length shall be marked on each roll.

   Between strands lengthwise, openings shall be 0.60 inch ± 25 percent. Between strands crosswise, openings shall be 0.90 inch ± 25 percent. Jute mesh shall weigh 0.9 pound per square yard ± 5 percent.

2. **Soil retention mats** shall consist of a machine-produced mat of wood fibers, wood excelsior, or manmade fiber that shall intertwine or interlock. Matting shall be nontoxic to vegetation and germination of seed and shall not be injurious to the unprotected skin of the human body.

   Mats shall be of consistent thickness, with fiber evenly distributed over its entire area, and covered on the top and bottom side with netting having a high web strength or covered on the top side with netting having a high web strength and machine sewn on 2-inch centers along the longitudinal axis of the material. Netting shall be entwined with the mat for maximum strength and ease of handling.

3. **Soil stabilization mats** shall be from the Department's approved products list for the site conditional use(s) specified.

(l) **Fencing and Steel Posts for Protection of Landscape**: When specified on the plans, fencing to delineate areas of landscaping to be protected shall be 40 inches in height, international orange, high-visibility, plastic (polyethylene) web fencing. Fence posts shall be conventional metal "T" or "U" posts 6 feet in length. The plastic fencing shall be securely fas- tened to the posts in a manner approved by the Engineer. The plastic fencing shall have the following physical qualities:

Tensile Yield = Average 2,000 pounds per 4-foot width (ASTM D 638)
Ultimate Tensile Yield = Average 2,900 pounds per 4-foot width (ASTM D 638)
Elongation at Break (%) = Greater than 1000% (ASTM D 638)
Chemical Resistance = Inert to most chemicals and acids.

Other fencing materials may be specified for use in accordance with the requirements of Section 507 or as noted on the plans and specifications or as approved by the Engineer.

SECTION 245—GEOSYNTHETICS

245.01—Description

These specifications cover artificial fiber textile products to be used in transportation construction work.

245.02—Detail Requirements

Geosynthetics shall include a label that clearly shows the manufacturer or supplier name, style name, and roll number. The shipping document shall include documentation to comply with the requirements of Section 245.03.

Each geosynthetic roll shall be wrapped or otherwise packaged in a manner that will protect the geosynthetic, including the ends of the roll, from damage due to shipment, water, sunlight, and contaminants. The protective wrapping shall be maintained during periods of shipment and storage.

During storage, geosynthetics rolls shall be elevated off the ground and adequately covered to protect them from the following: site construction damage; precipitation; extended ultraviolet radiation including sunlight; chemicals that are strong acids or strong bases; flames including welding sparks; temperatures in excess of 160 degrees F; and other environmental conditions that may damage the physical property values of the geosynthetic. Geosynthetics that are not properly protected may be subject to rejection.

245.03—Testing and Documentation

Each geosynthetic material provided to the project shall be tested by the Contractor to determine conformance with the material properties specified herein within 24 months of submission. Test results reported from AASHTO's National Transportation Product Evaluation Program—Laboratory Results of Evaluations on Geotextile and Geosynthetics may be used. The Contractor shall provide certification of the material in accordance with the requirements of AASHTO M288, Section 4, Certification, and copies of the test results. The Contractor's testing, however, will not be the sole basis for acceptance.

The Department will sample and test the geosynthetics for acceptance to verify conformance with this specification. Sampling shall be performed in accordance with the requirements of ASTM D4354, Procedure C. In the absence of the Department's testing, acceptance may be based on the manufacturer's certifications as a result of testing by the manufacturer of quality assurance samples obtained using the procedure for ASTM D4354 Procedure B Sampling for Manufacturer's Quality Assurance (MQA) Testing. A lot size shall be considered to be the shipment quantity of the given product or a truckload of the given product, whichever is smaller.

Property values, with the exception of apparent opening size (AOS) and panel vertical strain, in these specifications represent minimum average roll values (MARV) in the weakest principal direction (i.e., average test results of any roll in a lot sampled for conformance or quality assurance testing shall meet or exceed the minimum values provided herein). Values for AOS and panel vertical strain represent maximum average roll values.

Tests shall be performed in accordance with the methods referenced in this specification for the indicated application. The number of specimens to test per sample is specified by each test method. Geotextile product acceptance shall be based on conformance to the requirements of ASTM D4759. Product acceptance

is determined by comparing the average test results of specimens in a given sample to the specification MARV.

(a) **Geotextile Fabric for Use in Silt Fences, Silt Barriers, or Filter Barriers:** Geotextile shall function as a vertical; permeable interceptor designed to remove suspended soil from overland water flow. Fabric shall filter and retain soil particles from sediment-laden water to prevent eroding soil from being transported off the construction site by water runoff. Fabric shall contain ultraviolet inhibitors and stabilizers to provide at least 6 months of expected, usable construction life at a temperature of 0 degrees F to 125 degrees F. The tensile strength of the material after 6 months of installation shall be at least 50 percent of the ini- tial strength.

Physical Property	Test Method	Requirements
Filtering efficiency	VTM-51	Min. 75%
Flow rate	VTM-51	Min. 0.2 gal/ft^2/min

In addition to these requirements, the geotextile shall comply with the requirements of AASHTO M288 for temporary silt fence property requirements, Table 6, for grab strength and ultraviolet stability.

(b) **Geotextile for Use as Riprap Bedding Material:** Geotextile shall comply with the requirements of AASHTO M288 for separation geotextile properties, Table 3, for apparent opening size and ultraviolet stability and geotextile strength property requirements, Table 1, Class 2, for grab strength and puncture strength.

(c) **Geotextile Fabric for Use in Drainage Systems (Drainage Fabric):** Drainage fabric shall be nonwoven and clog resistant, suitable for subsurface application, and thermally and biologically stable.

The geotextile shall retain at least 75 percent of its ultimate strength when subjected to substances having a pH of a minimum of 3 and a maximum of 12 for a period of 24 hours.

Physical Property	Test Method	Requirements
Permittivity	ASTM D4491	Min. 0.5 sec^{-1}
Apparent opening size	ASTM D4751	Max. No. 50 sieve

In addition to these requirements, the geotextile shall comply with the requirements of AASHTO M288 for strength requirements, Table 1, Class 3, for grab strength.

(d) **Geotextile for Use in Stabilization:** These are geotextiles used in saturated and/or unstable conditions to provide the functions of separation and reinforcement.

1. **Subgrade Stabilization Fabric:**

Physical Property	Test Method	Requirements
Apparent opening size	ASTM D 4751	Max. No. 20 sieve

In addition to this requirement, the geotextile shall comply with the requirements of AASHTO M 288 for strength property requirements, Table 1, Class 3, for grab strength, tear strength, and puncture strength.

2. **Embankment Stabilization Fabric Up to 6 Feet High:**

Physical Property	Test Method	Requirements
Apparent opening size	ASTM D 4751	Max. No. 20 sieve
Seam strength	ASTM D 4632	90% specified grab strength

In addition to this requirement, the geotextile shall comply with the requirements of AASHTO M288 for strength property requirements, Table 1, Class 1 for grab strength, tear strength, and puncture strength.

(e) **Prefabricated Geocomposite Pavement Underdrain:** Prefabricated geocomposite pavement underdrain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Prefabricated geocomposite pavement underdrain shall conform to the following:

1. **Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the pavement environment and shall have a thickness of not less than 3/4 inch.

Physical Property	Test Method	Requirements
Compressive strength panel vertical strain and core area change	ASTM D1621/D2412	Min. 40 psi at 20% deflection
Panel vertical strain and core area change at 22.7 psi	ASTM D6244	Max. 10% for core area and panel height
Water flow rate) after 100 hr at 10 psi normal confining pressure gradient of no more than 0.1)	ASTM D4716	Min. 15 gal/min/ft width for 12-in specimen length

The core shall retain at least 75 percent of its ultimate strength when subjected to temperatures of 0 degree F and 125 degrees F, respectively, for a period of 24 hours.

2. **Filter Fabric:** Geotextile shall be bonded to and tightly stretched over the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein.

(f) **Geocomposite Wall Drains:** Geocomposite wall drains may be used as an alternative to porous backfill when permitted by the Engineer. Geocomposite wall drains will not be permitted for use with walls considered critical by the Engineer. Critical walls shall include walls over 15 feet in height and walls supporting bridge abutments or other structures on spread footings.

Prefabricated geocomposite wall drain shall consist of a polymeric drainage core encased in a nonwoven filter fabric envelope having sufficient flexibility to withstand bending and handling without damage. Geocomposite wall drains shall conform to the following:

1. **Core:** The drainage core shall be made from an inert, polymeric material resistant to commonly encountered chemicals and substances in the roadway.

Physical Property	Test Method	Requirements
Compressive strength at 20% deflection	ASTM D1621/D2412	Min. 40 psi
Water flow rate (after 100 hr at 10 psi normal confining pressure and gradient of no more than 0.1)	ASTM D4716	Min. 15 gal/min/ft width (for 12-in specimen length)

The core shall retain at least 75 percent of its ultimate strength when subjected to temperatures of 0 degree F and 125 degrees F for a period of 24 hours.

2. **Filter Fabric:** Geotextile shall be bonded to and tightly stretched over the core. Geotextile shall not sag or block the flow channels, shall have a life equivalent to that of the core material, and shall conform to the requirements of (c) herein.

(g) **Geomembrane Moisture Barrier:** Geomembrane moisture barrier shall be resistant to biological attack. Geomembrane shall be constructed of PVC, shall have a thickness of 30 mils, and shall conform to the requirements of the PVC Geomembrane Institute 1197 material specification for PVC geomembrane or shall conform to the following requirements:

Physical Property	Test Method	Requirements
Thickness	ASTM D5199	Min. 30 mils
Tensile (1-in strip)	ASTM D882	Min. 130 kip/ft
Tear (Die C)	ASTM D1004	Min. 200 lbf
Puncture	ASTM D4833	Min. 620 lbf

(h) **Dewatering Bag:** A nonwoven geotextile sewn together to form a bag that can be used in lieu of a de-watering basin for the purpose of filtering out suspended soil particles. The bag shall be capable of accommodating the water flow from the pump without leaking at the spout and seams.

Physical Property	Test Method	Requirements
Grab strength @ >50%(CRE/Dry)	ASTM D4632	Min. 250 lb (min) Elongation
Seam strength	ASTM D4632	90% Specified grab strength
Puncture	ASTM D4833	Min. 150 lb
Mullen burst	ASTM D3786	Min. 450 psi
Flow rate	ASTM D4491	Min. 0.189 $ft^3/sec/ft^2$(min)
Permittivity	ASTM D4491	Min. 1.2 sec^{-1}
UV resistance	ASTM D4355	Min. 70% at 500 hr
AOS	ASTM D4751	Max. 100 sieve

(i) **Paving Geosynthetics:** Paving geosynthetics shall be used as an interlayer between pavement layers. Specific application of these paving geosynthetics shall be determined by the Engineer.

1. **Geotextile Paving Fabric:** The geotextile shall conform to the requirements of AASHTO M288 Paving Fabric Property Requirements, Section 9.

2. **Pavement Reinforcing Mat:** The geotextile shall meet the requirements of ASTM D7239 Geosynthetic Paving Mat, Type 1.

SECTION 246—PAVEMENT MARKING

246.01—Description

These specifications cover material for use in the various retro-reflective pavement-marking applications.

246.02—Detail Requirements

Materials that must be heated for application shall not exude fumes that are toxic or injurious to persons or property when heated to the application temperature.

Materials shall withstand air and roadway temperature variations from 0 degrees F to 140 degrees F without deforming, bleeding, staining, or discoloring and shall maintain their original dimensions and placement without chipping, spalling, or cracking. Material shall not deteriorate because of contact with sodium chloride, calcium chloride, mild alkalies and acids, or other ice control materials; oil in the pavement material; or oil and gasoline drippings from vehicles.

(a) **White and Yellow Pavement Marking Material:** White pavement marking material shall be equivalent in color to Federal Standard (FS) Color No. 595-17886, and yellow pavement marking material shall be equivalent in color to FS Color No. 595-33538.

Color determination will be made for markings, and the diffuse daytime color of the mark- ings shall conform to the International Commission on Illumination (CIE) chromaticity coordinate limits that follow. Color determination for liquid marking materials will be made without drop-on beads at least 24 hours after application. Color determination for thermo- plastic will be made in accordance with the requirements of AASHTO T250.

CIE Chromaticity Coordinate Limits (Initial without Drop-on Beads)

									Daytime Luminance Factor	
	1		2		3		4		Y (%)	
Color	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**	**Min.**	**Max.**
White (Types A; B, Classes I, II, III, F)	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375	80.0	—
Yellow (Types A; B, Classes II, III; F except thermoplastic)	0.493	0.473	0.518	0.464	0.486	0.428	0.469	0.452	50.0	60.0
Yellow (Types B, Class I; Type F if thermoplastic)	0.499	0.466	0.545	0.455	0.518	0.432	0.485	0.454	40.0	60.0

Color readings will be determined in accordance with the requirements of ASTM E1349 using CIE 1931, 2 degrees standard observer and CIE standard Illuminant D65.

The retained daytime color of markings shall conform to the following CIE chromaticity coordinate limits when measured on a beaded marking after a period of 90 days for construction pavement markings and 1 year for all other markings:

CIE Chromaticity Coordinate Limits (Retained)

	1		2		3		4	
Color	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**
White	0.355	0.355	0.305	0.305	0.285	0.325	0.335	0.375
Yellow	0.560	0.440	0.490	0.510	0.420	0.440	0.460	0.400

Retained color readings will be determined using a 0 degrees/45 degrees Hunter Labminis can Spectro-Colorimeter or equivalent instrument in accordance with the requirements of ASTM E1349 using CIE 1931, 2 degrees standard observer and CIE standard Illuminant D65.

The initial nighttime color of yellow thermoplastic and yellow epoxy pavement marking material shall conform to the following CIE chromaticity coordinate requirements when tested in accordance with VTM-111:

CIE Chromaticity Coordinate Limits (Initial with Drop-on Beads)

	1		2		3		4	
Color	**x**	**y**	**x**	**y**	**x**	**y**	**x**	**y**
Yellow	0.486	0.439	0.520	0.480	0.560	0.440	0.498	0.426

The marking material shall not be formulated with any compounds of the heavy metals list- ed in 40 CFR 261.24, Table 1, except that barium sulfate is allowed. Total heavy metal lev- els, with the exception of barium sulfate, shall not exceed 20 times the specified regulatory limits.

The amount and type of yellow pigment and inert filler for yellow material shall be at the discretion of the manufacturer provided the material complies with all other requirements of this specification.

(b) **Paint Pavement Marking Material (Type A):** Paint material shall be a fast drying waterbased, nonleaded, acrylic resin paint suitable for use on both asphalt and hydraulic cement concrete surfaces. Paint shall be selected from the Department's approved products list. Paint products will be included on the Department's approved products list after the Depart- ment determines conformance to the specifications on both asphalt and hydraulic cement concrete roadways. Determination of conformance will include, but not be limited to, the evaluation of test data from AASHTO's National Transportation Product Evaluation Pro- gram (NTPEP) or other Department approved facilities.

1. **Hiding power:** Paint shall show a dry hiding quality that will give a contrast ratio of at least 0.96 at 0.38 mm (15 mil) wet film thickness.

2. **Settling properties:** Settling shall be no less than a rating of 8 when tested in accordance with ASTM D869.

3. **Freeze-thaw and heat stability:** Paint shall show no coagulation or change in viscosity greater than +/- 5 KU.
4. **Water resistance:** Paint shall show no blistering, peeling, wrinkling, softening, or loss of

adhesion.

5. **VOC:** The VOC content shall be no greater than 150 grams/liter when tested in accordance with EPA Method 24.

6. **Flash point:** Paint shall have a flash point of at least 140 degrees F when tested in accordance with the requirements of ASTM D93, Pensky-Martens Closed Cup.

7. **No-track time:** Paint shall have a 60-second maximum vehicle no-track time when measured in accordance with the NTPEP Field Test Procedures.

8. **Maintained retroreflectivity and durability:** Maintained retroreflectivity and durability shall conform to the following requirements after the material has been installed on the test deck for 1 year:

   a. **Maintained Retroreflectivity:** The photometric quantity to be measured is the coefficient of retroreflected luminance (RL) in accordance with the requirements of ASTM E1743 for 15-meter geometry and ASTM E1710 for 30-meter geome- try. RL shall be expressed in millicandelas per square foot per foot-candle and shall be at least either 150 for 15-meter or 100 for 30-meter when measured in the skipline or centerline areas.

   b. **Durability:** Paint shall have a durability rating of at least 4 when determined in the wheel path area.

(c) **Thermoplastic Pavement Marking Material (Type B, Class I)**: Thermoplastic material shall be suitable for use on asphalt concrete surfaces, and yellow thermoplastic material shall be selected from the Department's approved products list. Yellow thermoplastic products will be included on the approved list after the Department determines their conformance to the specifications. Thermoplastic material shall have the pigment, beads, and filler well dispersed in the resin and shall be free from skins, dirt, and foreign objects.

1. **Composition:**

	White	**Yellow**
Component	**(Percent by Weight)**	
Binder	18.0 min.	18.0 min.
Glass beads	25.0 min.	25.0 min.
Titanium dioxide	8.0 min.	—
Calcium carbonate and inert fillers	49.0 max.	—

The binder shall be either alkyd or hydrocarbon. If an alkyd thermoplastic is used, the binder shall consist of synthetic resins, at least one of which is solid at room temperature, and high boiling plasticizers. At least one-half of the binder composition shall be a maleic modified

glycerol ester of resin and shall be at least 10 percent by weight of the entire material formulation.

2. **Physical requirements:**

   a. **Water absorption:** Materials shall have not more than 0.5 percent retained water by weight when tested in accordance with the requirements of ASTM D570, Procedure A.

   b. **Softening point:** Materials shall have a softening point of at least 194 degrees F as determined in accordance with the requirements of ASTM E28.

   c. **Specific gravity:** The specific gravity of the thermoplastic compound at 77 degrees F shall be from 1.7 to 2.2.

   d. **Impact resistance:** The impact resistance shall be at least 10 inch-pounds at 77 degrees F after the material has been heated for 4 hours at 400 degrees F and cast into bars of 1-inch cross-sectional area, 3 inches long, and placed with 1 inch extending above the vise in a cantilever beam, Izod-type tester conforming to the requirements of ASTM D256 using the 25 inch-pound scale.

   e. **Drying time:** Material shall set to bear traffic in not more than 2 minutes when the road temperature is 50 degrees F or above.

   f. **Durability and wear resistance:** Material shall be designed to provide a life expectancy of at least 3 years under an average daily traffic count per lane of ap- proximately 9,000 vehicles.

   g. **Glass beads:** Glass beads shall conform to the requirements of Section 234.

   h. **Flashpoint:** The material flashpoint shall be no less than 500 degrees F when tested in accordance with the requirements of ASTM D92.

(d) **Polyester-Resin Pavement Marking Material (Type B, Class II):** Polyesterresin is a two component pavement marking material suitable for use on hydraulic cement concrete surfaces.

1. **Composition (uncatalyzed material):**

Min.	**Max.**	
Pigment	36.0	40.0
Acrylic monomer	8.5	—
Polyester resin	—	55.5

2. **Physical requirements (uncatalyzed material):**

   a. **Viscosity:** Viscosity (25 degrees C) determined in accordance with the requirements of ASTM D562 shall be 80 to 90 Kreb units.
   b. **Weight per gallon:** The weight per gallon shall be at least 11.5 pounds.

c. **Drying time:** The catalyst/resin ratio shall be adjusted by the operator so that the applied line shall dry to a no-tracking condition in 15 minutes or less when ap- plied at an application temperature of 77 degrees F to 100 degrees F, a substrate temperature of at least 60 degrees F, a wet thickness of 15 to 25 mils, and with 10 to 15 pounds of glass beads conforming to the requirements of Section 234 ap- plied per gallon. No-track time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 25 to 35 mph in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 50 feet shall be considered to show "no track" and to conform to the requirements for time to "no track."

d. **Catalyst:** The catalytic component of the system shall be a commercially available type recommended by the manufacturer of the polyester. The peroxide shall not be exposed to any form of heat, such as direct sunlight, radiators, open flame, or sparks as heat may cause the organic peroxide to decompose violently or burn if ignited. The peroxide shall not come into contact with easily oxidized metals, such as copper, brass, mild steel, or galvanized steel as this can also initiate a vio- lent reaction.

e. **Weight loss:** Beaded catalyzed material shall have a weight loss of not more than 125 milligrams after 1,000 revolutions when abraded in accordance with the re- quirements of Federal Test Method Standard No. 141b, Method 6192, using CS- 17 wheels with a 1,000-gram load on each wheel.

f. **Shelf life:** The shelf life of uncatalyzed material shall be at least 6 months when stored in a cool area below 85 degrees F.

g. **Durability and wear resistance:** Material shall be designed to provide a life ex- pectancy of at least 3 years under an average daily traffic count per lane of ap- proximately 9,000 vehicles.

h. **Hiding:** The marking shall show a dry hiding quality that will yield a contrast ra- tio of at least 0.96 with the Morest Black and White Power Chart, Form 03B, when drawn down at a 15-mil wet film thickness. Readings will be determined in accordance with the requirements of ASTM E 1349 using CIE 1931, 2 degrees standard observer and CIE standard Illuminant D65.

(e) **Epoxy-Resin Pavement Marking Material (Type B, Class III):** Epoxy-resin is a two-component pavement marking material suitable for use on both asphalt and hydraulic ce- ment concrete surfaces. Pigment, beads, and filler shall be well dispersed in the resin. Mate- rial shall be free from skins, dirt, and foreign objects and shall conform to the following re- quirements:

1. **Composition**

Component	ASTM	White	Yellow
Epoxy resins	D1652	Max. 82%	Max. 77%

Titanium dioxide	D476, Type IV	Min. 18%	—
Pigments	—	—	Min. 23%

2. **Physical requirements:**

   a. **Hardness:** Hardness, Shore D, determined in accordance with the requirements of ASTM D2240, shall be 75 to 100.

   b. **Tensile strength:** Tensile strength, determined in accordance with the requirements of ASTM D638, shall be at least 6,000 pounds per square inch after the material has cured for 72 hours at 73 ± 4 degrees F.

   c. **Compressive strength:** Compressive strength, determined in accordance with the requirements of ASTM D695, shall be at least 12,000 pounds per square inch after the material has cured for 72 hours at 73 ± 4 degrees F.

   d. **Adhesion to concrete:** Adhesion, determined in accordance with the require- ments of ACI 503, shall be at 100 percent concrete failure after the material has cured for 72 hours at 73 ± 4 degrees F. Concrete used for the test shall have a tensile strength of at least 300 pounds per square inch and shall be 90 degrees F when the material is applied.

   e. **Drying time:** Material shall dry to a "no-track" condition in 15 minutes or less at pavement temperatures from 50 degrees F to 120 degrees F and under all humidity conditions providing the pavement is dry. No-track time shall be determined by passing over the line with a passenger car or pickup truck at a speed of 25 to 35 mph in a simulated passing maneuver. A line showing no visual deposition of the material to the pavement surface when viewed from a distance of 50 feet shall be considered to show "no-track" and to conform to the requirements for time to "no-track."

   f. **Weight per epoxy equivalent:** The weight per epoxy equivalent of Part A of the epoxy pavement marking material shall be within ±50 of the target value provided by the manufacturer when tested in accordance with the requirements of ASTM D1652.

   g. **Total amine value:** The total amine value of Part B of the epoxy pavement marking material shall be within □50 of the target value provided by the manufacturer when tested in accordance with the requirements of ASTM D2074.

   h. **Durability and wear resistance:** Material shall be designed to provide a life expectancy of at least 3 years under an average daily traffic count per lane of ap- proximately 9,000 vehicles.

   i. **Abrasion resistance:** The wear index shall be no greater than 80 when abrasion resistance is tested in accordance with the requirements of ASTM D4060.

   j. **Hiding:** The marking shall show a dry hiding quality that will yield a contrast ratio of at least 0.96 with the Morest Black and White Power Chart, Form 03B, when drawn down

at a 15-mil wet film thickness. Readings will be determined in accordance with the requirements of ASTM E 1349 using CIE 1931, 2 degrees standard observer and CIE standard Illuminant D65.

(f) **Plastic-Backed Preformed Tape Pavement Marking Material (Type B, Class IV):** Plastic-backed preformed tape shall conform to the requirements of ASTM D4505 for a Type I or VI, Grade B, C, D, or E, material and any additions and/or exceptions indicated herein. Tape shall be suitable for use on both asphalt and hydraulic cement concrete surfaces and shall be capable of being applied to previously applied marking material of the same composition under normal conditions of use. Tape shall be selected from the Department's ap- proved products list. Tape products will be included on the Department's approved products list after the Department determines conformance to the specifications on both asphalt and hydraulic cement concrete roadways. Determination of conformance will include, but not be limited to, the evaluation of test data from AASHTO's National Transportation Product Evaluation Program (NTPEP) or other Department-approved facilities.

1. **Thickness (no adhesive):** The thickness shall be at least 60 mils and no more than 90 mils.

2. **Skid resistance:** Skid resistance requirements for a Type I material shall be the same as those for a Type VI material.

3. **Initial retroreflectivity:** Initial retroreflectivity requirements for a Type VI material shall be the same as those for a Type I material.

4. **Maintained retroreflectivity, durability and adhesion:** Maintained retroreflectivity, durability, and adhesion shall conform to the following requirements after being in- stalled on the test deck for 1 year:

   a. **Maintained retroreflectivity:** The photometric quantity to be measured is the coefficient of retroreflected luminance (RL) in accordance with the requirements of ASTM E1743 for 15-meter geometry and ASTM E1710 for 30-meter geome- try. RL shall be expressed in millicandelas per square foot per foot-candle and shall be at least either 150 for 15-meter or 100 for 30-meter when measured in the skipline or centerline areas.

   b. **Durability:** Tape shall have a durability rating of at least 4 when determined in the wheel path area.

   c. **Adhesion:** No line shall be displaced, be torn or missing.

(g) **Construction Pavement Marking Materials:** Construction pavement markings shall consist of removable tape, non-retroreflective black removable tape, and temporary pavement marking material. Construction pavement marking materials shall be selected from the Department's approved products list. Products will be included on the Department's approved products list after the Department determines their conformance to the specifications on both asphalt and hydraulic cement concrete roadways and the manufacturer has supplied in- formation to the Department indicating conformance to the following warranty require- ments for the tape products except that Type E material will be

evaluated only for asphalt concrete roadways. Determination of conformance will include, but not be limited to, the evaluation of test data from AASHTO's National Transportation Product Evaluation Pro- gram (NTPEP) or other Department-approved facilities.

1. **Removable tape (Type D, Class I and II):** Removable tape shall be suitable for use on both asphalt and hydraulic cement concrete surfaces and shall conform to the following requirements:

   a. **Initial skid resistance:** The initial skid resistance value shall be at least 45 BPN.

   b. **Warranty:** The manufacturer shall provide a full manufacturer's warranty on its product that shall cover the retroreflectivity, removability, and adhesiveness. The warranty period shall be no less than 90 days, beginning on the date of installation, and shall include all material and labor costs when the material is installed in accordance with the manufacturer's recommendations.

   c. **Maintained retroreflectivity, removability, and adhesion:** Maintained retrore flectivity, removability, and adhesion shall conform to the following requirements after the material has been installed on the test deck for 90 days:

      (1) **Maintained retroreflectivity:** The photometric quantity to be measured is the coefficient of retroreflected luminance (RL) in accordance with the requirements of ASTM E1743 for 15-meter geometry and ASTM E1710 for 30-meter geometry. RL shall be expressed in millicandelas per square foot per foot-candle and shall be at least the following values for either 15-meter or 30-meter when measured in the wheel path area.

Coefficient of Retroreflected Luminance (RL)

Color	Type D, Class I (15 meter)	Type D, Class I (30 meter)	Type D, Class II (15 meter)	Type D, Class II (30 meter)
White	150	100	225	150
Yellow	100	65	150	100

      (2) **Removability:** The removability value shall be at least 8 for materials sub- mitted to NTPEP prior to the year 1998. For materials submitted to NTPEP in the year 1998 and later, the internal tape strength value shall be no greater than 3 and the adhesive bond value shall be no greater than 7. Values shall be the average of the three monthly readings for the transverse line.

      (3) **Adhesion:** No line shall be displaced, be torn or missing.

2. **Non-retroreflective black removable tape (Type E):** Non-retroreflective black removable tape shall be suitable for use on asphalt concrete surfaces and shall conform to the following:

   a. **Initial skid resistance:** The initial skid resistance value shall be at least 45 BPN.

b. **Warranty:** The manufacturer shall provide a full manufacturer's warranty on its product that shall cover removability and adhesiveness. The warranty period shall be no less than 90 days, beginning on the date of installation, and shall include all material and labor costs when the material is installed in accordance with the manufacturer's recommendations.

c. **Removability and adhesion:** Removability and adhesion shall conform to the following requirements after being installed on the test deck for 90 days:

(1) **Removability:** The removability value shall be at least 8 for materials submitted to NTPEP prior to the year 1998. For materials submitted to NTPEP in the year 1998 and later, the internal tape strength value shall be no greater than 3 and the adhesive bond value shall be no greater than 7. Values shall be the average of the three monthly readings for the transverse line.

(2) **Adhesion:** No line shall be displaced, from its original position or be torn or missing.

3. **Temporary pavement marking material (Type F, Classes I and II):** Temporary pavement marking material shall be suitable for use on asphalt and hydraulic cement concrete surfaces and shall conform to the following:

a. **Paint products:**

(1) **Settling properties:** The settling rating shall be at least 8 when tested in accordance with the requirements of ASTM D869.

(2) **Freeze-thaw and heat stability:** Paint shall show no coagulation or change in viscosity greater than ±5 KU when tested in accordance with the NTPEP test procedure.

(3) **Water resistance:** Paint shall show no blistering, peeling, wrinkling, softening, or loss of adhesion when tested in accordance with the NTPEP test pro- cedure.

(4) **VOC:** The VOC content shall be no greater than 150 grams/liter when tested in accordance with EPA Method 24.

b. **Tape products:**

(1) **Initial skid resistance:** The initial skid resistance value shall be at least 45 BPN.

(2) **Warranty:** The manufacturer shall provide a full manufacturer's warranty on its product that shall cover retroreflectivity, removability, and adhesive- ness. The warranty period shall be no less than 90 days, beginning on the date of installation, and shall include all material and labor costs when the materials is installed in accordance with the manufacturer's recommendations.

(3) **Adhesion:** No line shall be displaced, from its original position or be torn or missing after being installed on the test deck for 90 days.

c. **All products (including paint and tape products):**

(1) **Thickness:** The thickness shall be no greater than 40 mils.

(2) **Maintained retroreflectivity and durability:** Maintained retroreflectivity and durability shall conform to the following requirements after the material has been installed on the test deck for 90 days:

a) **Maintained retroreflectivity:** The photometric quantity to be measured is the coefficient of retroreflected luminance (RL) in accordance with the requirements of ASTM E1743 for 15-meter geometry and ASTM E1710 for 30-meter geometry. RL shall be expressed in millicandelas per square foot per foot-candle and shall be at least the following values for either 15-meter or 30-meter when measured in the wheel path area.

Coefficient of Retroreflected Luminance (RL)

Color	**Type F, Class I**	Type F, Class I	**Type F, Class II**	Type F, Class II (15 meter) **(30 meter)** (15 meter) **(30 meter)**
White	150	100	290	190
Yellow	100	65	190	125

b) **Durability:** Marking material shall have a durability rating of at least 4 when determined in the wheel path area.

Division III ROADWAY CONSTRUCTION

SECTION 301—CLEARING AND GRUBBING

301.01—Description

This work shall consist of clearing, grubbing, removing, and disposing of vegetation, debris, and other objects within the construction limits except for vegetation and objects that are designated to be preserved, protected, or removed in accordance with the requirements of other provisions of these specifications.

301.02—Procedures

If approved by the Engineer, the Contractor may clear and grub to accommodate construction equipment within the right of way up to 5 feet beyond the construction limits at his own expense. The Contractor shall install erosion and siltation control devices prior to beginning clearing or grubbing operations and such devices shall be functional before upland land-disturbing activities take place.

The surface area of earth material exposed by grubbing, stripping topsoil, or excavation shall be limited to that necessary to perform the next operation within a given area. Grubbing of root mat and stumps shall be confined to that area of land which excavation or other land disturbance activities shall be performed by the Contractor within 15 days following grubbing.

Stumps, roots, other perishable material, and nonperishable objects that will be less than 5 feet below the top of earthwork within the area directly beneath the pavement and shoulders shall be removed. However, such material and objects that will be 5 or more than 5 feet below the top of earthwork within the area directly beneath the pavement and shoulders and all such material and objects beneath slopes of embankments shall be left in place unless removal is necessary for installation of a structure. The top of stumps left in place shall be not more than 6 inches above the existing ground surface or low water level.

Branches of trees that overhang the roadway or reduce sight distance and that are less than 20 feet above the elevation of the finished grade shall be trimmed using approved tree surgery practices in accordance with the requirements of Section 601.03(b).

Vegetation, structure, or other items outside the construction limits shall not be damaged. Trees and shrubs in ungraded areas shall not be cut without the approval of the Engineer.

Combustible cleared and grubbed material shall be disposed of in accordance with the following:

(a) **Trees, limbs, and other timber having a diameter of 3 inches and greater** shall be disposed of as saw logs, pulpwood, firewood, or other usable material; however, treated timber shall not be disposed of as firewood. Not more than 2 feet of trunk shall be left attached to grubbed stumps. When specified that trees or other timber is to be reserved for the property owner, such ma- terial shall be cut in the lengths specified and piled where designated, either within the limits of the right of way or not more than 100 feet from the right-of-way line. When not reserved for the property owner, such material shall become the property of the Contractor.

(b) **Material less than 3 inches in diameter** shall be used to form brush silt barriers when located within 500 feet of the source of such material when specified on the plans or where directed by the Engineer. Material shall be placed approximately 5 feet beyond the toe of fill in a strip approximately 10 feet wide to form a continuous barrier on the downhill side of fills. Where selective clearing has been done, material shall be piled, for stability, against trees in the proper

location. On the uphill side of fills, brush shall be stacked against fills at approximately 100-foot intervals in piles approximately 5 feet high and 10 feet wide. Any such material not needed to form silt barriers shall be processed into chips having a thickness of not more than 3/8 inch and an area of not more than 6 square inches and may be stockpiled out of sight of any public highway for use as mulch.

(c) **Stumps and material less than 3 inches in diameter** that are not needed to form silt barri- ers and that are not processed into wood chips shall be handled in accordance with the requirements of Section 106 and Section 107.

301.03—Measurement and Payment

Clearing and grubbing will be measured and paid for in accordance with one of the following methods, as specified:

(a) **Lump sum basis:** No measurement of the area to be cleared and grubbed will be made.

(b) **Acre basis:** The work to be paid for will be the number of acres, computed to the nearest 1/10 of an acre, actually cleared and grubbed. Areas within the limits of any existing roadway or local material pit will not be measured.

(c) **Unit basis:** The work to be paid for will be determined by the actual count of trees, stumps, structures, or other obstructions removed.

These prices shall include disposing of cleared and grubbed material.

When clearing and grubbing is not a pay item, the cost thereof shall be included in the price for other appropriate pay items. Allowance will not be made for clearing and grubbing borrow pits or other lo- cal material pits.

Payment will be made under:

Pay Item	Pay Unit
Clearing and grubbing	Lump sum, acre, or unit

SECTION 302—DRAINAGE STRUCTURES

302.01—Description

This work shall consist of installing pipe culverts, endwalls, box culverts, precast concrete and metal arches, storm drains, drop inlets, manholes, spring boxes, junction boxes, and intake boxes and removing and replacing existing structures in accordance with these specifications and in conformity with the lines and grades shown on the plans or as established by the Engineer.

302.02—Materials

(a) **Pipe** shall conform to the requirements of Section 232 and shall be furnished in accordance with the diameter, wall thickness, class, and strength or corrugation specified for the maximum height of fill to be encountered along the length of the pipe culvert, storm drain, or sewer.

(b) **End sections** shall conform to the applicable requirements of Section 232. End sections used with rigid pipe shall be concrete. End sections used with asphalt coated or paved pipe shall not be asphalt coated or paved.

(c) **Pipe fittings,** such as tees, elbows, wyes, and bends, shall conform to the applicable requirements of Section 232. Fittings shall be of the same type, class, thickness, gage, and strength as the line in which they are used.

(d) **Steel grates, steel frames, and structural steel** shall conform to the requirements of Section 226 and shall be galvanized in accordance with the requirements of Section 233.

(e) **Concrete blocks** shall conform to the requirements of Section 222 for masonry blocks.

(f) **Brick** shall conform to the requirements of Section 222.

(g) **Hydraulic cement mortar** shall conform to the requirements of Section 218.

(h) **Cast-in-place concrete** shall conform to the requirements of Section 217 for Class A3.

(i) **Bedding material** shall conform to the requirements of Section 205.

(j) **Joint material and gaskets** shall conform to the requirements of Section 212.

(k) **Gray-iron castings** shall conform to the requirements of Section 224.

(l) **Reinforcing steel** shall conform to the requirements of Section 223, Grade 40 or 60.

(m) **Curing materials** shall conform to the requirements of Section 220.

302.03—Procedures

Excavation and backfill operations shall be performed in accordance with the requirements of Section 303. Foundation exploration shall be performed in accordance with the requirements of Section 401 unless otherwise provided herein. Concrete construction shall conform to the requirements of Section 404.

Reinforcing steel placement shall conform to the requirements of Section 406. Bearing pile operations shall be performed in accordance with the requirements of Section 403. When specified on the plans or directed by the Engineer, a temporary diversion channel shall be constructed to facilitate installation of a pipe or box culvert.

The Contractor shall be responsible for anticipating and locating underground utilities and obstructions in accordance with the requirements of Section 105.08.

When construction appears to be in close proximity to existing utilities, the trench(es) shall be opened a sufficient distance ahead of the work or test pits made to verify the exact locations and inverts of the utility to determine if changes in line or grade are required for the new work.

When lift holes are provided in concrete pipe or precast box culverts, the Contractor shall install a lift hole plug furnished by the manufacturer in accordance with the requirements of Section 232.02(a)1. After pipe installation and prior to backfilling, plugs shall be installed from the exterior of the pipe or box culvert and snugly seated.

(a) **Pipe Culverts:** Not more than one type of pipe shall be used in any one pipeline. When the proposal indicates that all types of pipe of one size are combined into one bid item, one bid price shall be submitted for each size of pipe to be used.

When field cutting corrugated metal pipe is permitted by the Engineer, damaged areas of the protective coating shall be repaired in accordance with the requirements of Section 233 for galvanized pipe and in accordance with the manufacturer's recommended procedures for all other metallic or polymer coatings.

1. **Jack and bore method:**

The Contractor shall submit to the Engineer a complete plan and schedule for jack and bore pipe installation prior to beginning such work. The submission shall include complete details for dewatering; soil stabilization; jacking and receiving pits; jacks; reaction block; boring equipment; sheeting, shoring, and bracing for protecting the roadbed; installation sequence; materials; and equipment. The Contractor shall not proceed with pipe installation until the plan has been reviewed and accepted by the Engineer.

The jack and bore method shall be applicable for installing concrete pipe 12 through 108 inches in diameter and smooth-wall steel pipe 12 3/4 through 48 inches in diameter.

Pipe shall have a design strength and wall thickness sufficient to withstand the jacking operation and maximum height of fill to be encountered along the length of the pipe.

Construction shall be performed in such a manner that the ground surface above the pipe line will not settle. The hole shall be bored mechanically with a suitable boring assembly designed to produce a smooth, straight shaft and so operated that the completed shaft shall be at the established line and grade. The size of the bored hole shall be of such diameter to provide ample clearance for bells or other joints. The holes shall be bored mechanically. The boring shall be done by using either a pilot hole or a dry bore method.

In operating jacks, even pressure shall be applied to all jacks used. Suitable bracing between jacks and the jacking head shall be provided so that pressure shall be applied to the pipe uniformly around the ring of the pipe. The jacking head shall be of such weight and dimensions that it shall not bend or deflect when

full pressure is applied at the jack. The jacking head shall be provided with an opening for the removal of exca- vated material as the jacking proceeds. The pipe to be jacked shall be set on guides that are straight and securely braced together in such manner as to support the section of pipe and to direct it in the proper line and grade.

Installation of the pipeline shall immediately follow heading or tunneling excavation. Voids occurring behind the pipe during installation shall be filled with hydraulic cement grout, placed under pressure, upon completion of the jack and bore operation.

Joint sealant material on concrete pipe shall be placed ahead of the jacking frame. The Contractor shall replace or repair, as directed by the Engineer, pipe that is damaged during jacking operations at his own expense. Joints of steel pipe shall be butt welded, watertight, as installation progresses.

When work is stopped, the heading shall be bulkheaded.

When the Contractor encounters an obstruction during the jacking and boring operation that stops the forward progress of the work for more than 60 minutes, the following procedure shall be followed:

a. The Contractor shall notify the Engineer immediately upon encountering an obstruction that stops the forward progress of the work. The Engineer shall verify that an obstruction has stopped the forward progress of the work in excess of 60 minutes and that the Contractor's efforts to remove or bore through the obstruc- tion have been deliberately and diligently pursued.

b. The Contractor shall consult with the Engineer and offer appropriate options for consideration. Upon authorization by the Engineer, the Contractor shall proceed with removal of the obstruction by other methods on a force account basis in accordance with the requirements of Section 109.05. Such alternative methods may include tunneling. In the event tunneling is determined to be necessary by the En- gineer, the Contractor shall detail a plan for such an operation including all neces- sary safety and health precautions for workers as required by local, state, and fed- eral regulations as required by the work being performed. Work shall not com- mence until this plan is received and authorized by the Engineer. The Contractor shall notify the Engineer before resuming work and afford the Engineer the op- portunity to witness all work performed by the Contractor. Payment for obstruction removal shall be from the start of removal operations until the successful removal of the obstruction.

c. Upon removal of the obstruction, the Engineer shall make a determination as to the method to use to proceed with the pipe installation.

2. **Open trench method:**

a. **Foundation:** The foundation shall be explored below the bottom of the excavation to determine the type and condition of the foundation. However, explorations need not be made for routine entrance or crossover pipe 12 through 30 inches in diameter that is to be installed under fills 15 feet or less in height. Foundation ex- ploration shall extend to a depth equal to 1/2 inch per foot of fill height or 8 inches, whichever is greater. The Contractor shall report the findings of the foun- dation exploration to the Engineer for approval prior to placing pipe.

Where unsuitable foundation is encountered at the established grade, as determined by the Engineer, such material shall be removed and replaced.
Backfill for areas where unsuitable material has been removed shall be placed and compacted in accordance with the requirements of Section 303.04(g).

b. **Bedding:** Bedding material for culvert foundations, including foundations in soft, yielding, or otherwise unsuitable material, shall be aggregate No. 25 or 26 con- forming to the requirements of Section 205. Where standing or running water is present in the pipe foundation excavation, pipe bedding material shall be aggre- gate No. 57 for the depth specified on the plans or as directed by the Engineer capped with 4 inches of aggregate No. 25 or 26. Where such conditions are dis- covered in the field and the Contractor is directed by the Engineer to use No. 57 stone, No. 57 stone will be paid for at the existing contract unit price or, if not in the contract, in accordance with the provisions of Section 109.05.

Pipe bedding shall be lightly and uniformly compacted and shall be carefully shaped so that the lower section of the pipe exterior is in contact with the bedding material for at least 10 percent of the overall height of the pipe. Bedding material shall be shaped to accommodate the bell when bell and spigot pipe is used. The depth of bedding material shall be at least 4 inches or as specified on the plans.

c. **Placing pipe:** Pipe shall be placed beginning at the downstream end of the pipe- line. The lower segment of pipe shall be in contact with the shaped bedding for its entire length. Bell or groove ends of rigid pipe shall be placed facing upstream.

Paved or partially lined pipe shall be placed so that the longitudinal centerline of the paved segment coincides with the flow line.

Pipe will be inspected before backfill is placed. Pipe found to be out of alignment, unduly settled, or damaged shall be taken up and reinstalled or replaced.

d. **Joining pipe:**

(1) **Rigid pipe:** The method of joining pipe sections shall be such that ends are fully entered and inner surfaces are reasonably flush and even so as to permit sealing as specified herein.

Joints shall be sealed with any one or combination of the following to form a leak-resistant joint: rubber, preformed plastic, or mastic gaskets from the De- partment's approved list; oakum and mortar; oakum and joint compound; or cold-applied pipe joint sealer.

Rubber ring gaskets shall be installed to form a flexible, leak-resistant seal. Where oakum is used, the joint shall be caulked with this material and then sealed with mortar or joint compound.

(2) **Flexible pipe:** Flexible pipe sections shall be aligned and firmly joined by approved coupling bands to form a leak-resistant joint.

e. **Structural plate pipe, pipe arches, and arches:** Erection shall be in accordance with the manufacturer's assembly diagrams and instruction sheets. Splices in the haunch areas of structural plate pipe arches shall be constructed using the reverse shingle method or the side

plates shall be provided without longitudinal seams in the haunch areas. The complete line shall be assembled before backfill is placed. Bolts shall be tightened to a torque of 150 to 250 foot-pounds. If spiraling occurs during installation, bolts shall be loosened and the pipe assembly adjusted to the correct position.

f. **Arch substructures:** Each side of an arch shall rest in a groove formed into the masonry or on a galvanized angle or channel securely anchored to or embedded in the substructure. Where the span of the arch is more than 15 feet or the skew an- gle is more than 20 degrees, a metal bearing surface having a width at least equal to the depth of the corrugation shall be provided.

Metal bearings for arches shall be cold-formed galvanized channel conforming to the requirements of ASTM A 569 at least 3/16 inch in thickness, with the horizon- tal leg securely anchored to the substructure at points spaced on centers of not more than 24 inches. When the metal bearing is not embedded in a groove in the substructure, one vertical leg shall be punched to allow bolting to the bottom row of plates.

g. **Backfilling:** Class I backfill material shall be crusher run aggregate, No. 25 or 26; aggregate base material, Size 21A or 21B; or flowable fill.

Class I backfill material shall be crusher run aggregate size No. 25 or 26, aggre- gate base material size 21A or 21B, flowable fill, or crushed glass conforming to the size requirements for crusher run aggregate size 25 and 26.

Regular backfill material outside the neat lines of the Class I areas shown on the Standard PB-1 drawings shall be regular excavation conforming to the require- ments of Section 303. Regular and classified backfill shall be placed in uniform layers not more than 6 inches in thickness, loose measurement, before compac- tion. Each layer of Class I and regular backfill material shall be thoroughly com- pacted as specified in Section 303.04(g) with the exception that Class I backfill material shall be placed and compacted at a moisture content of optimum to plus 2 percentage points of optimum. Class I backfill material shall be thoroughly compacted under the haunches of pipe culverts. Each layer of Class I and regular backfill material shall be compacted by rolling, tamping with mechanical ram- mers, or hand tamping with heavy metal tampers with a face of at least 25 square inches. If vibratory rollers are used in the backfill operations, vibratory motors shall not be activated until at least 3 feet of backfill has been placed and compact- ed over the pipe. Backfill and compaction shall be advanced simultaneously on both sides of the pipe. The fill above the top of the regular backfill shall be in- stalled and completed as specified for embankment construction.

Field density determinations will be performed in accordance with the requirements of VTM-1, VTM-10, or other methods approved by the Engineer.

Concrete pipe with a height of cover greater than that shown in the Standard PC-1 drawings, table for Class V pipe, shall be special design pipe with Method A bedding and backfill in accordance with the requirements of Standard PB-1.

Puddling will not be permitted. Rock more than 2 inches in its greatest dimension shall not be placed within 12 inches of pipe.

Backfill and compaction shall be advanced simultaneously on both sides of the pipe. The fill above the top of the pipe shall be completed as specified for embankment construction unless the induced trench method of installation is used.

3. **Tunneling operations:** The jacked tunneling method shall be applicable for installing concrete pipe 30 through 108 inches in diameter and smooth-wall steel pipe 30 through 48 inches in diameter. Where the plans specifically identify tunneling as the means of pipe installation, tunneling shall be performed by the Contractor as follows:

   The tunnel shall be excavated in such a manner and to such dimensions that shall permit placing of the proper supports necessary to protect the excavation. The Contractor shall take the proper precautions to avoid excavating earth or rock or shattering rock beyond the limits of excavation necessary for the safe and proper installation of the pipe. Damage from excavating and blasting, either to surface or subsurface structures, shall be repaired or replaced by the Contractor at his own expense. Adequate provi- sions shall be made for the safety and health of the workers required by the work being performed.

   No pipe shall be placed until the foundation is in a condition satisfactory to the Engineer. Tunnel dimensions shown on the plans are minimum dimensions. Any excess excavation and subsequent backfill, concrete or grout fill shall be at the Contractor's expense. The pipe shall be laid in the tunnel true to line and grade. If required by the plans or if required for safety, suitable steel or timber sheeting, shoring, and bracing shall be used to support the sides and roof of the excavation. Supports may be left in place provided they clear the encasement or carrier pipe. No separate payment shall be made for supports left in place. Installation of the pipeline shall immediately follow tunneling excavation.

   If indicated or specified, the entire void between the outside of the pipe and the tunnel walls or the inside face of the tunnel lining shall be grouted in accordance with ASTM C 476 unless the permanent sheeting, bottom, sides, and roof of the tunnel are in a condition satisfactory to the Engineer. The minimum thickness of grout backfill shall be maintained throughout. Grout required for backfill in excess of the excavation toler- ances specified herein shall be at the Contractor's expense.

   Any pipe damaged during construction operations shall be repaired, if approved by the Engineer, or removed and replaced by the Contractor at his expense.

   If corrugated galvanized metal pipe is used, joints may be made by field bolting or by connecting bands, whichever is feasible. When reinforced concrete pipe 24 inches and larger in diameter with tongue-and-groove joints is used for the encasement pipe, the interior joints for the full circumference shall be sealed, packed with mortar, and finished smooth and even with the adjacent section of pipe.

(b) **Precast Drainage Structures:** Submittal of designs for precast items included in the standard drawings will not be required provided fabrication is in accordance with the standard details. Submittal of designs for precast box culverts on the Department's approved list will not be required provided the Contractor submits a certification that the item will be fabricated in accordance with the preapproved design drawings.

   Requests for approval of a precast design shall include detailed plans and supporting computations that have been reviewed and approved by a registered Professional Engineer having at least 5 years experience in structural design of the type of precast structures or components proposed and licensed in the Commonwealth. Concrete shall conform to the re- quirements of Section 217 unless otherwise

specified and have a design strength at 28 days of at least 4,000 pounds per square inch and an air content of 6 ± 2 percent. The design of the concrete mixture and the method of casting, curing, handling, and erecting shall be sub- ject to review by the Engineer. Precast units may be shipped after reaching 85 percent of the design strength as determined by control cylinders tested in accordance with the requirements of Section 404. However, units shall retain their structural integrity during shipment and shall be subject to inspection at the job site. Approval to use precast units shall not be construed as waiving the size and weight hauling limitations specified in Section 107.21.

1. **Standard precast drainage units** shall conform to the material requirements of AASHTO M 199 and the following:

    a. If the grade on the adjacent gutter is less than 1.5 percent, the grade on the invert of the throat section of the inlet shall be at least 1.5 percent. Precast throats having flat inverts will be permitted in sag locations provided the total length of the required throat opening does not exceed 6 feet.

    b. Pipe openings in precast drainage units shall not exceed the outside cross-sectional dimensions of the pipes by more than a total of 8 inches regardless of the place- ment of the pipes, the angles of intersection, or the shapes of the pipes. Pipe openings shall be formed, drilled, or neatly cut.

    c. The Contractor shall use brick, masonry block, other standard masonry units, and sound local stone in conjunction with mortar to fill the void between the pipe culverts and the precast drainage structures. Stone or masonry units, areas of the pipe openings, and exterior walls of pipe shall be thoroughly wetted and then bonded with mortar by standard masonry practice in such a manner as to provide a contiguous masonry connection between the precast drainage structures and the pipe culverts. The remaining exterior and interior voids shall be filled with mortar and shaped to the contour of the precast structure.

    d. When precast units are to be located adjacent to the subbase or base course, units with chambers shall be provided with weep holes 3 inches in diameter and hardware cloth and shall be located to drain the subbase or base.

    e. Precast units located adjacent to cast-in-place concrete items, such as flumes, ditches, and gutters, shall be connected to the adjacent unit by means of No. 4 smooth steel dowels spaced on approximately 12-inch centers throughout the con- tact length and extending at least 4 inches into both the precast unit and the cast- in-place item. If holes to receive the dowels are provided in the precast unit, they shall be not more than 5/8 inch in diameter. Other methods of providing the connection, such as keyed joints, shall be approved by the Engineer prior to fabrication.

    f. The chamber section shall be installed in the plumb position. The throat and top sections shall have positive restraints, such as adjacent concrete, pavement, or soil, on all sides to prevent displacement and shall have a positive interlock, such as dowels, with the chamber section. The throat and top sections shall be installed to conform with the normal slope of the finished grade and may be canted up to a maximum grade of 10 percent. The chamber may be built up to a maximum of 12 inches at any point to provide for complete and uniform bearing of the throat and top sections on the chamber flat slab top or other approved top section. The built-up section shall be constructed using whole concrete spacer units where feasible and partial and whole sections of concrete block or brick with high-strength grout and mortar. High-strength grout shall be used to provide the final grade adjustment and uniform bearing. The width of the

built-up section shall match the wall thickness of the chamber section. The concrete block and brick shall be thoroughly bonded with mortar, and the inside and outside of the built-up section shall be plastered with mortar except that the concrete spacer unit shall not be plastered.

2. **Precast arches** shall conform to the applicable requirements of AASHTO's *Standard Specifications for Highway Bridges* with the following modifications:

   a. **Combination of loads:** For service load design: E: vertical loads: 1.00; lateral loads: 1.00 and 0.5 (check both loadings).

      For load factor design: E: vertical loads: 1.00; lateral loads: 1.30 and 0.5 (check both loadings).

   b. **Protection against corrosion:** The concrete cover of reinforcement shall be at least 1 1/2 inches.

      In corrosive or marine environments or other severe exposure conditions, reinforcement shall be epoxy coated in accordance with the requirements of Section 223.

      Exposed reinforcing bars, inserts, and plates intended for bonding with future extensions shall be protected from corrosion as directed by the Engineer.

      Reinforcement shall be designed and detailed in consideration of fabrication and construction tolerances so that the minimum required cover and proper positioning of reinforcement shall be maintained.

   c. **Anchorage:** Sufficient anchorage shall be provided at the terminus of lines of precast units. Anchorage may consist of a cast-in-place end section at least 3 feet in length with a headwall or collar around the precast unit(s) provided adequate connection can be made between the collar and units.

   d. **Joints:** Joints between units shall be sealed by preformed plastic or mastic gaskets or grout. When preformed gaskets are used, they shall be of a type listed on the Department's approved products list.

   e. **Pipe openings:** Pipe openings will not be allowed in the precast arch but may be provided through the wingwalls. When required, openings shall conform to the requirements of (b)1.b. herein.

3. **Precast box culverts** shall conform to the applicable requirements of AASHTO M 259 or M 273 and AASHTO's *Standard Specifications for Highway Bridges* with the following modifications:

   a. The combination of loads shall be as follows: For service load design or load factor design: E: new reinforced concrete boxes: vertical loads: 1.00; lateral loads: 1.00 and 0.5 (check both loadings).

   b. For protection against corrosion, the following minimum concrete cover shall be provided for reinforcement: For boxes with more than 2 feet of fill over the top slab: 1 1/2 inches. For boxes with less than 2 feet of fill over the top slab: top reinforcement of top slab: 2 1/2 inches; bottom reinforcement of top slab: 2 inches; all other reinforcement: 1 1/2 inches.

The minimum cover for reinforcement may be reduced by not more than 1/2 inch provided the reinforcement having reduced cover is epoxy coated or the concrete surfaces adjacent to the reinforcement are coated in accordance with the requirements of Section 416.

Reinforcing steel for box culverts used in 0 to 2 foot fills, used in corrosive or marine environments, or used in other severe exposure conditions shall be epoxy coated. When epoxy coated reinforcing steel is required due to these conditions, the minimum cover specified shall not be reduced.

c. The type of sealant used in joints between units shall be from the Department's Approved List of Preformed Plastic or Mastic Gaskets.

Where double or greater lines of precast units are used, a buffer zone of 3 to 6 inches between lines shall be provided. This buffer zone shall be backfilled with porous backfill conforming to the requirements of Section 204. The porous back- fill shall be drained by a 3-inch-diameter weep hole, formed by non-rigid tubing, located at the top of the bottom haunch, centered in the outlet end section and at approximately 50-foot intervals along the length of the box. Weep holes shall be covered with a 3-foot-square section of filter barrier cloth firmly attached to the outside of the box. A 3-foot width of filter barrier cloth shall also be centered over the buffer zone for the entire length of the structure after placement of the porous backfill material. Filter barrier cloth shall conform to the requirements of Section 245.

Forming weep holes and furnishing and placing of the filter barrier cloth shall be included in the price bid per linear foot for the precast box culvert.

d. At the terminus of precast units, sufficient anchorage shall be provided. This anchorage may consist of a cast-in-place end section at least 3 feet in length with a headwall and curtain wall or a collar cast-in-place around the units provided ade- quate connection can be made between the collar and units.

When the ends of precast units are skewed, the end section shall be cast monolithically. The skew may be provided by forming, saw cutting, or other methods ap- proved by the Engineer. Regardless of the method used, the variation in the precast unit from the exact skew shall be not greater than 1 1/2 inches at any point.

e. Pipe openings shall conform to the requirements of 1.b. herein.

f. Bedding and backfill shall be in accordance with Standard PB-1 for box culverts.

(c) **Drop Inlets, Manholes, Junction Boxes, Spring Boxes, Intake Boxes, and Endwalls:** Masonry construction shall not be initiated when the air temperature is below 40 degrees F in the shade.

The foundation shall be explored below the bottom of the excavation to determine the type and condition of the foundation. Foundation exploration shall extend to a depth equal to 1/2 inch per foot of fill height or 8 inches, whichever is greater. The Contractor shall report the findings of the foundation exploration to the Engineer for approval prior to placing struc- ture.

Where unsuitable foundation is encountered at the established grade, as determined by the Engineer, such material shall be removed and replaced.

Backfill for areas where unsuitable material has been removed shall be placed and compacted in accordance with the requirements of Section 303.04(g).

Bedding material shall be placed in accordance with the Standard Drawings and shall be aggregate No. 25 or 26 conforming to the requirements of Section 205 except where standing or running water is present in the foundation excavation; then, bedding material shall be aggregate No. 57 for the depth specified on the plans or as directed by the Engineer capped with 4 inches of aggregate No. 25 or 26. Where such conditions are discovered in the field and the Contractor is directed by the Engineer to use No. 57 stone, No. 57 stone will be paid for at the existing contract unit price or, if not in the Contract, in accordance with Section 109.05.

Bedding shall be lightly and uniformly compacted. The depth of bedding material shall be as specified on the standard drawings or in the plans.

Brick and concrete block masonry shall be placed so that each unit will be thoroughly bonded with mortar. Joints shall be full-mortar joints not more than 1/2 inch in width. Where brick masonry is used, headers and stretchers shall be arranged to bond the mass fully. Every seventh course shall be placed entirely with headers. Inside joints shall be neatly pointed, and the outside of such walls shall be plastered with mortar as they are placed.

Iron fittings entering the masonry shall be placed as the work is built up, thoroughly bonded, and accurately spaced and aligned.

Inlet and outlet pipe connections shall conform to the same requirements as the pipe to which they connect and shall be of the same size and kind. Pipe sections shall be flush on the inside of the structure wall and shall project outside sufficiently for proper connection with the next pipe section. Masonry shall fit neatly and tightly around the pipe.Immediately following finishing operations, hydraulic cement concrete shall be cured and protected in accordance with the requirements of Section 316.04(j).

Backfilling shall be performed in accordance with the requirements of Section 303.04(g). Surplus material shall be removed, and the site shall be left in a neat and orderly condition.

When grade adjustment of existing structures is specified, frames, covers, and gratings shall be removed and the walls shall be reconstructed as required. Cleaned frames shall be reset at the required elevation. Upon completion, each structure shall be cleaned of silt, debris, and foreign matter and shall be kept clear of such accumulation until final acceptance.

302.4—Measurement and Payment

Pipe culverts will be measured in linear feet. The quantity will be determined by counting the num- ber of sections and multiplying by the length of the section used. When a partial section is required, the actual length of the partial section will be measured in place.

Structural plate pipe and pipe arches will be measured in linear feet along the invert line.

Pipe tees and elbows will be measured in linear feet of pipe.

Pipe reducers will be measured in linear feet of pipe for payment at the larger pipe size.

Pipe shall be paid for at the contract unit price per linear foot. This price shall include excavating, when not paid for as minor structure excavation; sheeting; shoring; dewatering; disposing of surplus and unsuitable material; and restoring existing surfaces. The upper 4 inches of bedding material and the Class I backfill material within the neat lines shown for each foundation type on the Standard PB- 1 drawings shall be included in the price for the related pipe. When unit prices for extended pipelines are not specified, the unit price for new pipe of the same size shall apply. When not a pay item, the cost of the temporary relocation of a stream to facilitate the installation of the pipe shall be included in the price for the pipe. The cost of fittings, anti-seepage collars, and anchor blocks shall be included in the price for the pipe.

Jacked and bored pipe will be measured in linear feet to the nearest 1/10 of a foot along the center-line of completed jacked and bored pipe for the size indicated and will be paid for at the contract unit price per linear foot. This price shall include excavating and backfilling jacking and receiving pits, sheeting, shoring, bracing, jacking equipment, casing pipe, casing chocks, furnishing and installing carrier pipe, grout to install carrier pipe, drainage, safety equipment, and all other items necessary for this operation,

Tunneled pipe will be measured in linear feet to the nearest 1/10 of a foot along the centerline of completed tunnel for the size of lining and will be paid for at the contract unit price per linear foot. This item shall include equipment, materials, handling and disposal of all materials encountered, drainage, pumping and dewatering, tunnel support, lining, furnishing and installing pipe, grouting, ventilation, lighting and wiring, coordination and planning with the railroad or other specified entity, and all other appurtenances necessary to complete the work.

Reinstalled pipe will be measured in linear feet along a line parallel to the flow line and will be paid for at the contract unit price per linear foot of pipe and per cubic yard of minor structure excavation. This price shall include excavation involved in removing pipe, hauling, cleaning, relaying, backfilling, necessary cutting for joining to other sections of pipe, furnishing new coupling bands, disposing of surplus excavation, and replacing any otherwise usable sections damaged or broken because of the negligence of the Contractor.

End sections and pipe spillouts will be measured in units of each, complete-in-place, and will be paid for at the contract unit price per each.

Endwalls and arch substructures will be measured in cubic yards of concrete and pounds of reinforcing steel except that EW-12 endwalls will be measured in units of each, complete-in-place. End walls and arch substructures will be paid for at the contract unit price per cubic yard of miscellaneous concrete and per pound of reinforcing steel except that crack control bars shall be included in the price bid for miscellaneous concrete and Standard EW-12 endwalls will be paid for at the contract unit price per each.

Minor structure excavation will be measured and paid for in accordance with the requirements of Section 303.06.

Cast-in-place box culverts will be measured in cubic yards of concrete and pounds of reinforcing steel and will be paid for at the contract unit price per cubic yard of concrete and per pound of reinforcing steel. These prices shall include excavating, sheeting, shoring, dewatering, waterproofing, disposing of surplus and unsuitable material, restoring existing surfaces, the upper 6 inches of bedding material within the neat lines shown on the Standard PB-1 drawings, and all necessary work to key the bottom slab into an existing rock foundation. When not a pay item, the cost of the temporary relocation of a stream to facilitate the installation of the structure shall be included in the price for the concrete and steel.

If the Contractor elects to furnish and install precast box culverts or precast arches, payment will be made for the original quantities shown on the plans for cast-in-place units. No additional compensation will be made for casting, prestressing, or shipping precast units or performing additional work, such as waterproofing, epoxy coating, or joint sealing, required as a result of the substitution.

Precast box culverts will be measured in linear feet along the centerline of the barrel from face of curtain wall to face of curtain wall and will be paid for at the contract unit price per linear foot. This price shall include designing, casting, reinforcing, excavating, sheeting, shoring, dewatering, installing, waterproofing, sealing joints, anchoring, disposing of surplus and unsuitable material, restoring existing surfaces, the upper 6 inches of bedding material within the neat lines shown on the Standard PB-1 drawings, fittings, and providing buffer zones and porous backfill for multiple lines. When not a pay item, the cost of the temporary relocation of a stream to facilitate the installation of the structure shall be included in the price for the box culvert.

If the Contractor elects to furnish and install precast box culverts or precast arches, payment will be made for the original quantities shown on the plans for cast-in-place units. No additional compensation will be made for casting, prestressing, or shipping precast units or performing additional work, such as waterproofing, epoxy coating, or joint sealing, required as a result of the substitution.

Grates and frames will be measured in units of each and will be paid for at the contract unit price per each.

Pipe grate will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include fabricating, furnishing, galvanizing, and installing.

Drop inlets and intake boxes will be measured as complete units, including the frame and grate or cover, and will be paid for at the contract unit price per each. The contract unit price for drop inlets will be adjusted at the rate of 5 percent per foot for increases or decreases in the depth indicated on the plans except that no adjustment will be made for changes amounting to less than 6 inches in the height of a single drop inlet. Where curb or curb and gutter extend along the drop inlet, the contract unit price for drop inlets shall include that part of the curb or gutter within the limits of the structure. Bedding material, except aggregate No. 57, will be included in the price of the structure.

Base sections of pipe tee units used as drop inlets and manholes will be measured in linear feet horizontally and will be paid for at the contract unit price per linear foot of pipe specified. The riser section and additional costs for the tee shall be included in the price for the drop inlet or manhole.

Manholes will be measured in linear feet, vertical measure, from top of foundation slab to top of masonry on which the casting frame is placed. However, when manholes are constructed as tee sections, measurement will be made to the pay limits shown on the plans. Manholes will be paid for at the contract unit price per vertical linear foot exclusive of frame and cover. Bedding material, except aggregate No. 57, will be included in the unit price per foot for the manhole.

Concrete spring boxes will be measured in cubic yards of concrete, pounds of reinforcing steel, and linear feet of pipe and will be paid for at the contract unit price per cubic yard of concrete, per pound of reinforcing steel, and per linear foot of pipe.

Junction boxes will be measured in cubic yards of concrete, pounds of reinforcing steel, pounds of structural steel, and each complete frame and cover assembly and will be paid for at the contract unit price

per cubic yard of concrete, per pound of reinforcing steel, per pound of structural steel, and per each frame and cover assembly. Bedding material, except aggregate No. 57, will be included in the price of the structure.

Casting frames and covers will be measured in units of one complete frame and cover and will be paid for at the contract unit price per each.

Reconstructed manholes will be measured as a complete unit and will be paid for at the contract unit price per each.

Precast arches will be measured in linear feet along the centerline of the invert from face of headwall to face of headwall. When a pay item, precast arches will be paid for at the contract unit price per lin- ear foot. This price shall include designing, forming, casting, reinforcing, excavating, wingwalls, installing, waterproofing, sealing joints, anchoring and bedding, and providing buffer zones for multiple lines. The cost for cast-in-place work other than that specified on the plans shall be included in the price for precast arches.

Temporary diversion channel lining will be measured in square yards for the class specified and will be paid for at the contract unit price per square yard. This price shall include installing the channel lining and removal when no longer required.

Temporary diversion channel excavation will be measured in cubic yards and will be paid for at the contract unit price per cubic yard. This price shall include excavation, temporary pipe culverts, removal of pipe culverts when no longer required, backfilling, and site restoration including regrading and seeding.

Excavation, backfill, and disposal of unsuitable or surplus material for drop inlets, intake boxes, manholes both new and reconstructed, spring boxes, junction boxes, and base sections of pipe tee units used as drop inlets and manholes will not be measured for separate payment, and the cost thereof shall be included in the bid price for such items. In the event steps or invert shaping is required, the cost thereof shall also be included in the price for such items.

Storm water management drainage structure will be measured in linear feet, vertical measure, from top of concrete foundation to the top of the concrete cover. The price bid shall include Class A3 concrete; reinforcing steel; trash rack; debris rack; orifice; steps; steel plate; and, when required, polyethylene tubing, pipe hangers, and steel pipe.

Temporary sediment riser pipe will be measured in linear feet for the size specified and will be paid for at the contract unit price per linear foot. The price shall include the riser pipe, steel plate, perforated pipe, debris rack, orifice and Class A1 riprap, and anti-vortex device when required.

Storm water management dam will be measured and paid for at the contract unit price per cubic yard of concrete and pound of reinforcing steel.

Payment will be made under:

Pay Item	Pay Unit
Pipe (Size and type)	Linear foot
Structural plate arch (Size)	Linear foot
Jacked and bored pipe (Size)	Linear foot
Tunneled pipe (Size)	Linear foot
Reinstalled pipe	Linear foot
End section (Standard and size)	Each
Pipe spillout (Standard)	Each
Concrete (Class)	Cubic yard
Reinforcing steel	Pound
Endwall grate and frame (Standard)	Each
Precast box culvert (Size)	Linear foot
Endwall pipe grate (Type)	Linear foot
Drop inlet (Standard and length)	Each
Intake box (Standard)	Each
Structural steel (Type)	Pound
Manhole (Standard)	Linear foot
Frame and cover (Standard)	Each
Reconstructed manhole	Each
Precast arch (Size)	Linear foot
Temporary diversion channel lining (Class)	Square yard
Temporary diversion channel excavation	Cubic yard
Endwall, Standard EW-12	Each
Storm water management drainage structure (Type)	Linear foot Temporary
sediment riser pipe (Size)	Linear foot

SECTION 303—EARTHWORK

303.01—Description

This work shall consist of constructing roadway earthwork in accordance with these specifications and in conformity with the specified tolerances for the lines, grades, typical sections, and cross sections shown on the plans or as established by the Engineer. Earthwork shall include regular, borrow, undercut, and minor structure excavation; constructing embankments; disposing of surplus and unsuitable material; shaping; compaction; sloping; dressing; and temporary erosion and siltation control work.

303.02—Materials

(a) **Borrow excavation** shall consist of approved material required for the construction of the roadway and shall be obtained from approved sources outside the project limits. Borrow excavation shall conform to the requirements of AASHTO M57 and the requirements herein.

(b) **Materials for temporary silt fences, geotextile fabric silt barriers, and filter barriers** shall conform to the requirements of Sections 242.02(c) and 245.03(a).

(c) **Geotextile materials used for embankment stabilization** shall conform to the requirements of Section 245.03(e).

(d) **Mulch** shall conform to the requirements of Section 244.02(g).

303.03—Erosion and Siltation Control

Erosion and siltation shall be controlled through the use of the devices and methods specified herein or as is otherwise necessary. The Engineer reserves the right to require other temporary measures not specifically described herein to correct an erosion or siltation condition.

Erosion and siltation control devices and measures shall be maintained in a functional condition at all times. Temporary and permanent erosion and siltation control measures shall be inspected after each rainfall and at least daily during periods of prolonged rainfall. Deficiencies shall be immediately cor- rected. The Contractor shall make a daily review of the location of silt fences and filter barriers to en- sure that they are properly located for effectiveness. Where deficiencies exist, corrections shall be made immediately as approved or directed by the Engineer.

When erosion and siltation control devices function by using wet storage, sediments shall be removed when the wet storage volume has been reduced by 50 percent. Sediments shall be removed from dewatering basins when the excavated volume has been reduced by 50 percent. Sediments shall be removed from all other erosion and siltation control devices when capacity, height, or depth has been reduced by 50 percent. Removed sediment shall be disposed of in accordance with the requirements of Section 106.04 Sediment deposits remaining in place after the device is no longer required shall be dressed to conform with the existing grade, prepared, and seeded in accordance with the requirements of Section 603.

Geotextile fabric that has decomposed or has become ineffective and is still needed shall be replaced. Temporary erosion and sediment control devices except brush silt barriers shall be removed within 30 days after final site stabilization or after the temporary devices are no longer needed as determined by the Engineer.

(a) **Earth Berms and Slope Drains:** The top of earthwork shall be shaped to permit runoff of

rainwater. Temporary earth berms shall be constructed and compacted along the top edges of embankments to intercept runoff water. Temporary Berms and temporary dikes are to be stabilized immediately following installation. Temporary slope drains shall be provided to intercept runoff and adequately secured to prevent movement. Slope drains may be flexible or rigid but shall be capable of being readily shortened or extended. A portable flume shall be provided at the entrance to temporary slope drains.

(b) **Soil Stabilization:** Soil stabilization shall be applied within 7 days after attaining the appropriate grading increment for that stage of the construction operations, or upon suspension of grading operations for an anticipated duration of greater than 15 days, or upon completion of grading operation for a specific area. Areas excluded from this requirement include areas within 100 feet of the limits of ordinary high water or a delineated wetland which shall be continuously prosecuted until completed and stabilized immediately upon completion of the work in each impacted area. Soil stabilization includes: temporary and permanent seeding, riprap, aggregate, sod, mulching, and soil stabilization blankets and matting in conjunction with seeding. The applicable type of soil stabilization shall depend upon the location of areas requiring stabilization, time of year (season), weather conditions and stage of construction operations.

Cut and fill slopes shall be shaped and topsoiled where specified. Seed and mulch shall be applied in accordance with the requirements of Section 603 as the work progresses in the following sequence:

1. Slopes whose vertical height is 20 feet or greater shall be seeded in three equal increments of height. Slopes whose vertical height is more than 75 feet shall be seeded in 25-foot increments.

2. Slopes whose vertical height is less than 20 but more than 5 feet shall be seeded in two equal increments.

3. Slopes whose vertical height is 5 feet or less may be seeded in one operation.

Areas that cannot be seeded because of seasonal or adverse weather conditions should be mulched to provide some protection against erosion to the soil surface. Organic mulch shall be used, and the area then seeded as soon as weather or seasonal conditions permit in accordance with the requirements of Section 303.03(e). Mulch shall be applied in accordance with the requirements of Section 603.04. Organic mulch includes: straw or hay, fiber mulch, wood cellulose, or wood chips conforming to the requirements of Section 244.02(g).

(c) **Check Dams:** As an initial item of work, required check dams shall be constructed at 25- foot intervals, unless otherwise shown on the plans, below the outfall end of drainage structures.

Synthetic check dams recorded in the Department's Approved List may be substituted for Standard EC-4, Rock Check Dams, Type II, with the approval of the Engineer at no additional cost to the Department. Synthetic check dams shall be installed in accordance with the manufacturer's recommendation.

(d) **Baled Straw Silt Barriers:** Baled straw silt barriers may be substituted for temporary filter barriers with the approval of the Engineer in noncritical areas, such as pavement areas and rock locations where filter barriers cannot be installed in accordance with the plans and specifications and locations where the Engineer determines that streams and water beds will not be affected.

(e) **Temporary Silt Fences, Geotextile Fabric Silt Barriers, and Filter Barriers:**

1. **Temporary silt fences:** Fences shall be erected at locations shown on the plans or determined by the Engineer. Geotextile fabric used for silt fences shall be provided, and posts shall not be spaced more than 6 feet apart. Posts shall be uniformly installed with an inclination toward the potential silt load area of at least 2 degrees but not more than 20 degrees. Attaching fabric to existing trees will not be permitted.

   Fabric shall be firmly secured to the post or wire fence. The bottom of the fabric shall be entrenched in the ground in a minimum 6-inch by 6-inch trench. Temporary silt fence may also be entrenched using a slicing method with a minimum of 8 inches sliced into the ground. Fabric may be spliced only at support posts and with an overlap of at least 6 inches. The top shall be installed with a 1-inch tuck or reinforced top end section. The height of the finished fence shall be a nominal 29 inches.

2. **Geotextile fabric silt barriers:** Existing fences or brush barriers used along the down- hill side of the toe of fills shall have geotextile fabric attached at specified locations as shown on the plans. The bottom of the fabric shall be entrenched in the ground in a minimum 6-inch by 6-inch trench, and the top shall be installed with a 1-inch tuck or reinforced top end section. Temporary fabric silt barriers may also be entrenched using a slicing method with a minimum of 8 inches sliced into the ground.

   Brush barriers shall be installed prior to any major earth-disturbing activity and trimmed sufficiently to prevent tearing or puncturing fabric. Fabric shall be fastened securely to the brush barrier or existing fence. A 6-inch overlap of fabric for vertical and horizontal splicing shall be maintained and tightly sealed.

3. **Temporary filter barriers:** Barriers shall consist of geotextile fabric and shall be se- curely fastened to wood or metal supports that are spaced at not more than 3-foot inter- vals and driven at least 12 inches into the ground. At least three supports shall be used. The bottom of the fabric shall be entrenched in the existing ground in a minimum 4- inch by 4-inch trench.

   Temporary filter barriers may also be entrenched using a slicing method with a mini- mum of 6 inches sliced into the ground. The top of the fabric shall be installed with a 1-inch tuck or reinforced top end section. The height of the finished temporary filter barrier shall be a nominal 15 inches.

   Temporary filter barriers shall be installed at temporary locations where construction changes the earth contour and drainage runoff as directed or approved by the Engineer.

   After removal and disposal of the temporary silt fence, geotextile fabric silt barrier, and temporary filter barrier, the area shall be dressed and stabilized with a permanent vegetative cover or other approved permanent stabilization practice approved by the Engineer.

(f) **Sediment Traps and Sediment Basins:** Sediment traps are required if storm water runoff from less than 3 acres flows across a disturbed area of 10,000 square feet or more. Sediment basins are required if storm water runoff from 3 or more acres flows across a disturbed area of 10,000 square feet or more. Once a sediment trap or basin is constructed, the dam and all outfall areas shall be stabilized immediately.

(g) **Erosion Control Mulch:** This work shall consist of furnishing and applying mulch as a temporary erosion control treatment on slopes exposed to the elements but not at final grade during the period from December 1 to March 1 for periods of up to 30 days prior to final grading or to areas to receive stabilization or paved surfaces within 6 months in accordance with this provision and as directed by the Engineer.

Mulch shall be applied to exposed slopes requiring mulch or to areas to be stabilized or paved, within 48 hours after performance of grading operations. Straw or hay mulch shall be applied on bare slope areas at the rate of approximately 3 tons per acre (1.24 pounds per square yard). Straw or hay mulch shall be applied at a uniform thickness in such a manner that not more than 10 percent of the soil surface will be exposed. Straw or hay mulch shall be anchored to the slope surface by one of the following methods: spraying with cellulose fiber mulch at the rate of 750 pounds per acre (0.15 pound per square yard); disking or punching the mulch partially into the soil; using approved netting; or using other materials or methods approved by the Engineer. The Contractor may use more than one method on the same project.

303.04—Procedures

Loose rock 3 inches or larger shall be removed from the surface of cut slopes.

When slides occur, the Contractor shall remove and dispose of material as directed by the Engineer.

Where required, surface ditches shall be placed at the top of cut slopes or at the foot of fill slopes and at such other points not necessarily confined to the right of way or shown on the plans and shall be of such dimensions and grades as directed by the Engineer.

Allaying dust, when specified, shall be performed in accordance with the requirements of Section 511.

Prior to the beginning of grading operations in the area, necessary clearing and grubbing shall be performed in accordance with the requirements of Section 301.02.

(a) **Regular Excavation:** Existing foundations and slabs located within the construction limits shall be removed and disposed of in a location approved by the Engineer. In lieu of remov- al, foundations and slabs located 5 feet or more below the proposed subgrade may be bro- ken into particles not more than 18 inches in any dimension and reoriented to break the shear plane and allow for drainage. Cisterns, septic tanks, wells, and other such structures shall be cleared in accordance with the requirements of Section 516.

Balance points shown on the plans are theoretical and may vary because of actual field con- ditions.

When the material to be excavated necessitates the use of explosives, the requirements of Section 107.11 relating to the use of explosives shall apply. To prevent damage to newly constructed concrete, the Contractor shall schedule blasting operations in the proximity of proposed concrete

structures so that work will be completed prior to placement of concrete.
Regular excavation shall consist of removing and disposing of material located within the project limits, including widening cuts and shaping slopes necessary for preparing the roadbed; removing root mat; stripping topsoil; cutting ditches, channels, waterways, and en- trances; and performing other work incidental thereto. The Engineer may require materials in existing pavement structures to be salvaged for use in traffic maintenance.

Undrained areas shall not be left in the surface of the roadway. Grading operations shall be conducted so that material outside construction limits will not be disturbed.

Where rock or boulders are encountered, the Contractor shall excavate and backfill in accordance with the plans and contract documents.

When the presplitting method of excavation is specified for rock cuts, work shall be performed in a manner to produce a uniform plane of rupture in the rock and so that the resulting backslope face will be unaffected by subsequent blasting and excavation operations within the section. Rock shall be presplit along rock slopes at locations, lines, and inclina- tions shown on the plans or as determined by field conditions. A test section shall be pro- vided to establish the spacing of drill holes and the proper blasting charge to be used in the presplitting operation. Drill holes shall be spaced not more than 3 feet apart and shall extend to the plan grade or in lifts of not more than 25 feet, whichever is less. If drilled in benches, an offset may accommodate the head of the drill, but no offset shall be more than 12 inches. Presplitting shall extend at least 20 feet ahead of the limits of fragmentation blasting within the section.

Where the project has been designed and slopes have been staked on the assumption that solid rock will be encountered and the Contractor fails to encounter solid rock at the depth indicated, he shall cease excavation in the area and immediately notify the Engineer. If it is necessary to redesign and restake slopes, any additional excavation necessary will be paid for at the contract unit price per cubic yard.

Topsoil stockpiled for later use in the work shall be stored within the right of way unless the working area is such that the presence of the material would interfere with orderly prosecution of the work. Stockpile areas outside the right of way shall be located by the Contractor at his expense. Topsoil used in the work shall be removed first from stockpiles located on private property. Surplus topsoil remaining on private property after completion of topsoil- ing operations shall be moved onto the right of way and stockpiled, shaped, and seeded as directed by the Engineer.

Stripping topsoil shall be confined to the area over which grading is to be actively prosecuted within 15 calendar days following the stripping operation. Grading operations shall beconfined to the minimum area necessary to accommodate the Contractor's equipment and work force engaged in the earth moving work.

(b) **Borrow Excavation:** The Contractor shall make his own arrangements for obtaining borrow and pay all costs involved in accordance with the provisions of Section 106.03.

If the Contractor places an excess of borrow and thereby causes a waste of regular excavation, the amount of such waste, unless authorized, will be deducted from the volume of borrow as measured at the source or computed by vehicle count as specified in Section 109.01.

When borrow is obtained from sources within the right of way and the excavation is performed simultaneously with regular excavation, borrow excavation will be designated as regular excavation. Material secured by widening cuts beyond slope stakes, when taken from previously excavated slopes, will be designated as borrow excavation. When such a procedure is approved, slopes shall be uniform and no steeper than shown on the plans.

Borrow excavation areas shall be bladed and left in a shape to permit accurate measurements after excavation has been completed.

CBR values, stipulated for borrow excavation, shall apply to the uppermost three feet of fill below the top of earthwork, as defined in Section 101 of the Specifications. Borrow excavation, installed below the top three feet shall consist of suitable fill material, available from regular excavation or borrow excavation, as defined and of a quality consistent with project requirements.

(c) **Undercut Excavation:** Undercut excavation shall consist of removing and disposing of unsuitable material located within the construction limits in accordance with the requirements of Section 303.06(a)3.

Undercut excavation shall be disposed of in accordance with the requirements of Section 106.04.

(d) **Minor Structure Excavation:** Minor structure excavation shall consist of removing material necessary to accommodate the structure, such as box or arch culverts, including pipe arches, structural plate arches, structural plate pipe, pipe culverts, and storm drains with a span(s) or opening(s) of 48 inches or greater. Minor structure excavation shall also include dewatering, sheeting, bracing, removing existing structures, and backfilling. Removing existing structures shall also include foundations that might be necessary to clear the site.

(e) **Removing Unsuitable Material:** Where excavation to the finished graded section results in a subgrade or slopes of unsuitable material, such material shall be excavated below the grade shown on the plans or as directed by the Engineer. Areas so excavated shall be back-filled with approved material in accordance with (f) herein.

Excavation for structures shall be carried to foundation materials satisfactory to the Engineer regardless of the elevation shown on the plans. If foundation material is rock, the Contractor shall expose solid rock and prepare it in horizontal beds for receiving the structure. Loose or disintegrated rock and thin strata shall be removed. Excavated material, if suitable, shall be used for backfilling around the structure or constructing embankments.

Material shown on the plans as unsuitable and during construction found to be suitable for use shall first be used in embankments where needed in lieu of borrow. However, the use of this material in lieu of borrow shall not alter the provisions of Section 104.02 regarding underruns.

Material shown on the plans as suitable material but found at time of construction to be unsuitable shall be disposed of as unsuitable material.

Unsuitable material shall be disposed of in accordance with Section 106.04.

(f) **Backfill for Replacing Undercut Excavation:** Backfill shall be composed of regular exca- vation, borrow, select material, subbase material, or other material as directed by the Engineer. Backfilling operations shall be performed in accordance with (g) herein.

(g) **Backfilling Openings Made for Structures:** Backfill shall be suitable material removed for the structure, although the Engineer may require that backfill material be obtained from a source within the construction limits entirely apart from the structure or other approved material. The opening to be backfilled shall be dewatered prior to backfilling. Backfill shall not be placed against or over cast-in-place box culverts or other structures until the top con- crete slab section(s) has been in place 14 days, exclusive of days on which the average high- low ambient temperature is below 40 degrees F in the shade or until the concrete control cylinder(s) has attained a compressive strength equal to 93 percent of the 28-day design compressive strength.

Backfill shall be compacted in horizontal layers not more than 6 inches in thickness, loose measurement, and as specified in (h) herein. Backfill shall be placed in horizontal layers such that there will be a horizontal berm of compacted undisturbed material behind the structure for a distance at least equal to the remaining height of the structure or wall to be backfilled. Backfill shall be placed in a manner to deter impoundment of water and facilitate existing drainage. Backfill around piers in areas not included in the roadway prism shall be constructed in uniformly compacted layers. However, density requirements will be waived.

Box culverts shall not be opened to construction equipment traffic until concrete has at- tained 100 percent of the 28-day design compressive strength and has a backfill cover of at least 4.0 feet. The minimum height of backfill cover required to protect pipe culverts from construction equipment shall be in accordance with Standard Drawing PC-1 for the type and size specified.

Where only one side of abutments, wingwalls, piers, or culvert headwalls can be backfilled, care shall be taken that the area immediately adjacent to the structure is not compacted to the extent that it will cause overturning or excessive pressure against the structure. When both sides of a concrete wall or box structure is to be backfilled, operations shall be con- ducted so that the backfill is always at approximately the same elevation on both sides of the structure.

Openings subject to flooding shall be backfilled as soon as practicable or as directed by the Engineer.

(h) **Embankments:** Work shall consist of constructing roadway embankments; placing and compacting approved material within roadway areas where unsuitable material has been removed; and placing and compacting approved material in holes, pits, utility trenches, basements, and other depressions within the roadway area.

Embankment shall be constructed with approved material and placed so as to be uniformly compacted throughout. Embankment shall be placed adjacent to structures in the same manner as for backfill as described in (g) herein. Embankment shall not contain muck, frozen material, roots, sod, or other deleterious material. Embankment shall not be placed on frozen ground or areas covered with ice or snow.

Unsuitable material used in widening embankments and flattening embankment slopes shall be placed in uniform layers not more than 18 inches in thickness before compaction. Each layer of material placed shall be compacted to the extent necessary to produce stable and reasonably even slopes.

Wherever rock excavation is available on the project, an 8 to 15-inch layer of such materials shall be dump spread over the lower region of embankments in the immediate vicinity of stream crossings and used to cover ditches, channels, and other drainage ways leading away from cuts and fills. However, drainage ways shall be prepared to receive the rock excava- tion to the extent necessary to avoid reducing their cross section. If rock excavation is not available on the project, rip-rap, jute mesh or soil retention mats shall be used as the covering material and shall be installed in accordance with the requirements of Section 606.03(c). Limits of the area to be covered will be as noted on the plans or as directed by the Engineer.

Wherever sufficient right of way exists, surplus materials shall be used to widen embankments and flatten slopes as directed by the Engineer.

Rock excavation may be placed on slopes by uniform end dumping of the material from along the top of the embankment or as directed by the Engineer. Slopes that are covered with rock excavation shall not receive topsoil or seed.

When geotextile drainage fabric is required under rock fills, preparation shall be as specified in Section 245.

The Contractor shall schedule excavation and embankment work in a manner that will mini- mize the quantity of unsuitable material for which more than one handling is required prior to final placement. Therefore, the provisions for additional payment for each rehandling of material specified in Section 303.06(a) will not apply to placing unsuitable material for wid- ening embankments and flattening embankment slopes.

The surface area directly beneath the pavement and shoulders on which embankments of less than 5 feet in depth are to be constructed shall be denuded of vegetation. These areas shall be scarified and compacted to a depth of 6 inches to the same degree as the material to be placed thereon.

Areas that contain material unsuitable as foundations for embankments shall be undercut and backfilled in accordance with (e) and (f) herein.

Embankments to be placed over saturated areas that will not support the weight of hauling equipment may be constructed by end dumping successive loads in a uniformly distributed layer of a thickness capable of supporting the hauling equipment while subsequent layers are placed. The nose, or leading edge, of the embankment shall be maintained in a wedge shape to facilitate mud displacement in a manner that will prevent its entrapment in the em- bankment. The front slope of the embankment shall be maintained steeper than 2:1. The use of compacting equipment will not be required on the original course. However, the remainder of the embankment shall be constructed in layers and compacted in accordance with these specifications.

When geotextile for embankment stabilization is required, it shall be placed as shown on the plans. Geotextile shall be spliced by sewing double-stitched seams with stitching spaced 1/4 inch to 1/2 inch apart or as shown on the plans.

Once geotextile for embankment stabilization is placed, the initial lift of material to be placed atop shall be free draining and shall be end dumped onto the geotextile and spread to the thickness as shown on the plans. Free-draining material shall be any material of which 15 percent or less

passes the No. 200 sieve. If the geotextile becomes punctured or torn, the Contractor shall repair the area with geotextile lapped at least 3 feet all around the damaged area.

When embankment is to be placed and compacted on an existing road, the surface shall be scarified to such degree as will permit an ample bond between old and new material. Hydraulic cement concrete and asphalt concrete pavement structures within the proposed roadway prism shall be demolished in accordance with Section 508.02(a).

Existing slopes shall be continuously benched where embankments are constructed one-half width at a time; against slopes of existing embankments or hillsides; or across existing embankments, hillsides, and depressions at a skew angle of 30 degrees or more or the existing slopes are steeper than 4:1. For slopes steeper than 4:1 but not steeper than 1–1/2:1, the bench shall be at least 6 feet in width. For slopes steeper than 1–1/2:1 but less than 1/2:1, the bench shall be at least 4 feet in width. Benching shall consist of a series of horizontal cuts beginning at the intersection with the original ground and continuing at each vertical intersection of the previous cut. Material removed during benching operations shall be placed and compacted as embankment material.

When excavated material consists predominantly of soil, embankment shall be placed in successive uniform layers not more than 8 inches in thickness before compaction over the entire roadbed area. Each layer shall be compacted within a tolerance of □20 percent of op- timum moisture content to a density of at least 95 percent of the theoretical maximum den- sity as defined in Section 101.02.

Material having a moisture content above optimum by more than 30 percent shall not be placed on a previously placed layer for drying unless it is shown that the layer will not be- come saturated by downward migration of moisture in the material.

Field density determinations will be performed in accordance with the requirements of AASHTO T191, modified to include material sizes used in the laboratory determination of density, with a portable nuclear field density testing device or by other approved methods. When a nuclear device is used, density determinations for embankment material will be re- lated to the density of the same material tested in accordance with VTM-1 or VTM-12 and a control strip will not be required.

As the compaction of each layer progresses, continuous leveling and manipulating shall be performed to ensure uniform density. Prior to placement of subsequent layers, construction equipment shall be routed uniformly over the entire surface of each layer or the layer shall be scarified to its full depth in the area where the equipment is routed.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in layers of the thickness prescribed without crushing, pulverizing, or further breaking down the pieces resulting from excavation methods, such material may be placed in the embankment in layers that are not thicker than the approximate average size of the larger rocks. Rock not more than 4 feet in its greatest dimension may be placed in an embankment to within 10 feet of the subgrade. The remainder of the embankment to within 2 feet of the subgrade shall not contain rock more than 2 feet in its greatest dimension. Each layer shall be constructed so that rock voids are filled with rock spalls, rock fines, and earth. Rock shall be placed, manipulated, and compacted in uniform layers. However, density requirements may be waived. Rock, rock spalls, rock fines, and earth shall be distributed throughout each embankment layer and manipulated as specified herein so that the voids are filled. Rock shall not be end dumped over the

edges of the layer being constructed but shall be deposited on the layer and moved ahead so as to advance the layer with a mixture of rock, rock spalls, rock fines, and earth. The 2 feet of the embankment immediately below the subgrade shall be composed of material that can be placed in layers of not more than 8 inches before compaction and compacted as specified herein for embankments. Rock more than 3 inches in its greatest dimension shall not be placed within 12 inches of the subgrade in any embankment.

Rock, broken concrete, or other solid materials shall not be placed in embankment areas where piling is to be placed or driven.

The best material shall be reserved for finishing and dressing the surface of embankments. Work necessary to ensure the reservation of such material shall be the responsibility of the Contractor. Section 303.06(a) will not apply to subsequent handling of capping material.

CBR values, stipulated for Embankment, shall apply to the uppermost three feet of fill below the top of earthwork, as defined in Section 101 of the Specifications. Embankment, installed below the top three feet shall consist of suitable fill material, available from regular excavation, borrow excavation or embankment, as defined and of a quality consistent with project requirements.

Crushed glass shall be limited within the boundaries of the embankment as follows: Crushed glass shall be a minimum of two feet inside the side slope and contain a minimum of two feet of soil embankment cap. For those areas where crushed glass is to be incorporated into the embankment, glass may constitute up to approximately ninety percent by weight of that portion of the embankment, except where 100 percent crushed glass is used for drainage purposes (including blankets).

Crushed glass shall be blended with soil and/or soil like materials as follows:

1. The embankment shall be constructed by placing alternate four-inch layers of waste glass and soil and mixing and blending by scarification or other approved methods during compaction. The thickness of uncompacted layers of soil/glass shall be a maximum of 8 inches (loose); or

2. Pugmilled in predetermined ratios to a visually consistent blend and placed in lifts of a maximum of 8 inches (loose); or

3. As directed by the Engineer.

   Compaction of the soil/glass embankment shall be to the satisfaction of the Engineer and shall be accomplished with a vibratory compactor or other approved methods. Moisture and density requirements for the soil/glass embankments shall be the same as other conventional soil embankment in accordance with the requirements of Section 303 of the Specifications.

   Normal compaction procedures and requirements are to be used for compaction of the soil embankment “cap” above the crushed glass/soil blends.

(i) **Settlement Plates and Surcharge:** The Contractor shall expedite construction of embankment to provide the maximum time possible for settlement prior to completing grading operations.

1. **Settlement plates:** The base of settlement plates shall be firmly seated into original ground for the full depth of the steel fins. The base shall be leveled. The Engineer shall be provided time to obtain the elevation of the seated base and the top elevation of the pipe extensions prior to placement of embankment material. Pipe extensions shall not be more than 4 feet in length and shall be vertically installed as the embankment is constructed such that the top of the pipe is not covered. As each extension is added, the Engineer shall be provided time to obtain the top elevation of the existing pipe and the top elevation of the new pipe extension. Pipe extensions shall be properly flagged at all times. Care shall be taken while placing and compacting embankment material around pipe extensions. Settlement plates shall be maintained until no longer required, as de- termined by the Engineer. Upon completion of the normal embankment plus 2 feet of the specified surcharge, the Contractor shall immediately commence placing the re- maining surcharge to the limits shown on the plans or as directed by the Engineer. The remaining surcharge shall be placed in lifts of not more than 1 foot in depth and compacted uniformly with construction hauling and spreading equipment. Each lift shall be completed over the entire surcharge area before the next lift is begun.

   If a settlement plate is damaged, the Contractor shall notify the Engineer immediately and promptly repair it under the observation of the Engineer to the nearest undamaged pipe. Excavation, backfill, compaction, and repair of settlement plates shall be at the Contractor's expense. The Engineer shall be provided time to obtain the top elevation of the undamaged connection and the top elevation of each subsequent pipe extension.

   Settlement plates shall remain in place until settlement has been completed as indicated by elevation readings taken by the Engineer at approximately 2-week intervals. Evaluation of the readings by the Engineer will be the final and sole governing factor for releasing embankments for grading operations. Upon written release by the Engineer, extensions of settlement plate pipe shall be removed to at least 2 feet below the subgrade, the pipe capped, and the area backfilled and compacted.

(j) **Surcharge:** When authorized by the Engineer, surcharge shall be removed to the subgrade and embankment slopes graded to the typical section. Removed surcharge shall be placed in roadway embankments not previously brought to grade or shall be disposed of in accordance with Section 106.04 or as directed by the Engineer.

(k) **Hydraulic Embankment:** Hydraulic embankment shall consist of dredging and pumping materials approved by the Engineer from designated areas, placing the material in embankments, and dressing and completing the embankment. Material shall be nonplastic and of such grading that not more than 7 percent will pass the No. 200 sieve.

   Unless otherwise shown on the plans, material for the embankment shall not be obtained from sources closer than 300 feet from the toe of the slope of the embankment. The Engineer may reject materials considered to be unsatisfactory for use in the embankment, and such materials shall be stripped at the Contractor's expense before the embankment is built. Muck and unsuitable material shall be removed to the line, grade, and section shown on the plans. Unsatisfactory material brought to the top of the embankment shall be removed by the Contractor at his own expense, and satisfactory material shall be substituted.

   In placing material in the embankment, the Contractor shall begin at the centerline and deposit material in either or both directions toward the toe of slopes. Discharge shall always be in the direction of and parallel with the centerline. The maximum distance from the bottom of the

discharge pipe to the surface on which material is being deposited shall be 5 feet unless otherwise directed by the Engineer. Material shall be deposited in a manner that will maintain a higher elevation at the center of the roadway than on either side. The Contractor will not be permitted to construct retaining levees along the roadway of such dimensions as to cause damage to the foundation of the roadway. The Contractor shall conduct operations so as to ensure the completion of an embankment that will conform to the cross section shown on the plans except that he will be permitted to flatten side slopes. However, if mate- rial is deposited on private property, the Contractor shall obtain permission in writing from the affected property owner(s). No payment will be made for material beyond the limits of the net pay section.

The embankment shall be placed so as to ensure a minimum relative density of 80 percent of the theoretical maximum density when tested in accordance with (h) herein. If the method of placing the embankment fails to produce the required density, the Contractor shall use approved methods to obtain the specified density.

The Contractor shall take all necessary precautions to prevent placing material in streams. The Contractor shall be responsible for all damage to or caused by the hydraulic embankment. The Contractor shall provide sufficient material to maintain the embankment in accordance with the typical cross section as shown on the plans or as directed by the Engineer until final acceptance.
The Contractor's plan for support of suction or discharge pipes shall be submitted to and approved by the Engineer. Traffic shall be protected by the display of warning devices both day and night. If dredging operations damage an existing traveled highway, the Contractor shall cease operations and repair damage to the highway.

(l) **Surplus Material:** Surplus material shall not be wasted or sold by the Contractor unless authorized in writing by the Engineer. When authorization has been given for surplus material to be wasted, it shall be disposed of in accordance with the requirements of Section 106.04.

Material shown on the plans as surplus material will not be considered for overhaul payment.

1. **Disposal of surplus material within the right of way where the haul distance is 2,000 feet or less:** Surplus material shall be used or disposed of where directed within a haul distance of 2,000 feet of its origin. Usage in this manner will not be considered a change in the character of the work.

2. **Disposal of surplus material within the right of way where the haul distance is more than 2,000 feet:** The Engineer reserves the right to require the Contractor to use surplus material in lieu of furnishing borrow, or as otherwise directed, where the haul distance from the origin of the material is more than 2,000 feet. Disposal of surplus material at locations requiring a haul of more than 2,000 feet will be considered a change in the character of work unless otherwise noted on the plans.

   When material is declared surplus during construction and must be transported more than 2,000 feet from its origin, the Department will pay the Contractor $0.03 per station per cubic yard for overhaul. The quantity of surplus excavation will be determined by vehicle measurement in accordance with the provisions of Section 109.01 or from cross-section measurements by the average end area method. The haul distance will be measured along a line parallel with the centerline of the roadway from the center of the excavated area to the center of the placement area. Overhaul will be the product of the quantity of surplus material in cubic

yards and the haul distance in excess of 2,000 feet in 100-foot stations.

303.05—Tolerances

(a) **Finished grade of subgrade** shall conform to the requirements of Section 305.03(c).

(b) **Slopes** shall be graded in the following manner:

1. **Earth excavation slopes:**

   a. **Slopes steeper than 2:1** shall be grooved in accordance with the standard drawings and shall not deviate from the theoretical plane surface by more than 0.5 foot.
   b. **Slopes steeper than 3:1 up to and including 2:1** shall be rough graded in a manner to provide horizontal ridges and grooves having no more than 0.5 foot deviation from the theoretical line of the typical cross section as is accomplished by the normal operation of heavy grading equipment.

   c. **Slopes 3:1 or flatter** shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.5 foot.

2. **Earth embankment slopes:**

   a. **Slopes steeper than 3:1** shall not deviate from the theoretical plane slope by more than 0.5 foot and shall be rough graded in a manner to provide horizontal ridges and grooves not more than 0.5 foot from the theoretical line of the typical cross section as is accomplished by the normal operation of heavy grading equipment.

   b. **Slopes 3:1 and flatter** shall be uniformly finished and shall not deviate from the theoretical plane surface by more than 0.5 foot.

3. **Rock slopes** shall not deviate from a plane surface by more than 2.0 feet and shall not deviate from their theoretical location by more than 2.0 feet measured along any line perpendicular to the theoretical slope line.

   Finished excavation and embankment slopes shall not deviate from their theoretical location by more than 0.5 foot measured along any line perpendicular to the theoretical slope line.

303.06—Measurement and Payment

(a) **Excavation:** Excavation will be paid for at the contract unit price per cubic yard unless otherwise specified.

Excavation requiring more than one handling prior to final placement will be paid for at the contract unit price for regular excavation for each handling approved by the Engineer unless there is a pay item for the second handling, in which case work will be paid for at the contract price for such handling.

Quantities of regular or borrow excavation used to backfill pipe, pipe culverts, and box culverts will not be deducted from quantities due the Contractor for payment.

1. **Regular excavation:** When payment is specified on a cubic yard basis, regular excavation will be measured in its original position by cross-sectioning the excavation area. This measurement will include overbreakage or slides not attributable to the carelessness of the Contractor and authorized excavation of rock, muck, root mat, or other unsuitable material except material included in undercut excavation. Volumes will be computed from cross-section measurements by the average end area method.

   When it is impractical to measure material by the cross-section method, other acceptable methods involving three-dimensional measurements may be used.

   Excavation for benching slopes to accommodate roadway embankments as specified in Section 303.04(h) will not be measured for separate payment. The cost thereof shall be included in the price for the related excavation or embankment item.

   Excavation of existing roadways required to incorporate old roadway into new road-way or remove salvageable materials for use in traffic maintenance, other than those covered in Section 508, will be measured as regular excavation.

   When "presplitting rock cuts" is shown on the plans, the work shall be considered incidental to the cost of excavation and will not be measured for separate payment.

   In cut sections, excavation of topsoil and root mat and material down to a point 1 foot below the elevation of the top of earthwork or to the depth specified on the plans will be measured as regular excavation. When areas of unsuitable material are shown on the plans, excavation down to a point 1 foot below the elevation of such material shown on the plans will be measured as regular excavation.

   In fill sections, excavation of topsoil and root mat and material down to an elevation of 1 foot below the bottom of topsoil and root mat will be measured as regular excavation. When areas of unsuitable material are shown on the plans, excavation down to a point 1 foot below the elevation of such material shown on the plans will be measured as regular excavation.

   If slide material approved for measurement cannot be measured accurately, or if the removal of slide material will require different equipment than that being used in the regular excavation operations, payment therefor may be made on a force account basis when authorized by the Engineer.

   Excavation of surface ditches specified on the plans or otherwise required by the Engineer will be paid for as regular excavation except that when required after the slopes have been completed and the work cannot be performed with mechanical equipment, the excavation will be paid for as undercut excavation.

2. **Borrow excavation:** Borrow excavation will be measured in its original position by cross-sectioning the area excavated. The number of cubic yards will be computed from cross-section measurements by the average end area method. When it is impractical to measure the borrow excavation, vehicular measurement in accordance with Section 109.01 may be used.

   Borrow excavation with a stipulated CBR value shall be measured and paid for as borrow

excavation with the CBR value as specified.

Borrow excavation without a stipulated CBR value shall be measured and paid for as borrow excavation.

3. **Undercut excavation:** Measurement will be made by cross-sectioning the undercut area. The number of cubic yards will be computed by the average end area method. When it is impractical to measure material by the cross-section method because of erratic location of isolated deposits, acceptable methods involving three-dimensional measurements may be used.

   When unsuitable material must be removed from an area of the project where undercut is not shown on the plans, unsuitable material removed after reaching the depth specified in (a)1. herein, or 1 foot below original ground in fill sections where topsoil and root mat are not required to be removed, will be measured as undercut excavation.

   Excavation of rock or unsuitable material below the elevation of the bottom of the lower theoretical slab or culvert thickness or below the excavation limits shown on the plans or standard drawings for normal earth foundations, whichever is the greater depth, of minor structures having a span(s) or opening(s) of less than 48 inches will be measured for payment as undercut excavation. Such excavation for structures having a span(s) or opening(s) of 48 inches or greater will be measured as minor structure excavation in accordance with (a)4. herein.

   Undercut excavation will be paid for at the contract unit price per cubic yard. This price shall include removal and disposal. When not a pay item, undercut excavation will be paid for at twice the unit price per cubic yard for regular excavation.

4. **Minor structure excavation:** Excavation of material above the elevation of the bottom of the lower theoretical slab or culvert thickness, or above the excavation limits shown on the plans for earth foundations, whichever is the greater depth, for culverts having a maximum span or opening of less than 48 inches will not be measured for payment.

   Excavation of material for culverts having a span(s) or opening(s) of 48 inches or greater and excavation for minor structures not covered elsewhere in these specifications will be measured in cubic yards of minor structure excavation. The quantity allowed for payment will be the actual volume of material removed as bounded by the bottom of the lower theoretical slab or culvert thickness, or lower excavation limits shown on the plans for earth foundations, whichever is the greater depth; the original ground or regular excavation pay line, whichever is the lower elevation; and vertical planes 18 inches outside the neat lines of the structure (excluding wingwalls and other appurtenances) or bound by vertical planes coincident with the applicable bedding excavation limits shown on the plans. Payment for excavation for wingwalls and other appurtenances to structures will be based on the ratio of the plan area of the wingwalls or appurtenances to the plan area of the barrel. Once the ratio has been determined, the pay quantity for minor structure excavation will be increased accordingly.

   If embankment is placed prior to installation of a minor structure, excavation of the embankment area will not be measured for payment unless the Contract requires placement of the embankment prior to the installation of the minor structure.

The volume of the interiors of culverts, drop inlets, and other existing minor structures that must be removed will not be deducted from the overall quantity of minor structure excavation allowed for payment.

The price of minor structure excavation shall include the cost of backfill above the horizontal planes of the neatlines of the Class I or Class II backfill areas to original ground. Class I and Class II backfill shall be measured and paid for in accordance with Section 302.04.

5. **Earthwork:** When a pay item, earthwork will be paid for at the contract lump sum price, wherein no measurement will be made. This price shall include regular excavation, minor structure excavation, and grading.

(b) **Embankments:**

1. **If embankment is not a pay item,** the cost of embankment construction will be considered incidental to other items of excavation.

2. **If embankment is a pay item and regular excavation is to be paid for on a plan quantity basis,** the quantity of embankment for which payment will be made will not be measured separately but will be computed in accordance with the following:

   a. The regular excavation plan quantity will be adjusted in accordance with (C) Plan Quantities herein.

   b. The quantity of unsuitable material will be measured and subtracted from the adjusted regular excavation quantity determined in 2.a. herein. Quantities of unsuit able material removed from fill areas or below the subgrade in cut areas will be determined by using plan dimensions and may be adjusted for deviations based on actual measurement. Actual dimensions will be used to determine the quantity of any other unsuitable material.

   c. The total quantity shown on the plans will be adjusted for quantities not anticipated on the plans, such as changes in grade or undercut determined to be necessary during construction.

   d. The quantity of suitable material determined in 2.b. herein will be subtracted from the adjusted total fill quantity determined in 2.c. herein. The resultant quantity will be the embankment quantity for which payment will be made.
   The Contractor shall be responsible for determining the effect of the shrinkage or swell factor of the material, and no adjustment will be made in pay quantities for this factor.

   Hydraulic embankment will be paid for as embankment.

3. **If embankment is a pay item and regular excavation is to be paid for on the basis of measured quantities,** the quantity of embankment will be measured in cubic yards computed by the average end area method from the dimensions of the embankment cross section.

   Cross sections of the area to be covered by the embankment will be taken after the de- nuding or removal of unsuitable material and before any material is placed thereon. These cross sections shall extend laterally from the centerline to the toes of slopes as indicated on the

typical cross section. The elevations as determined by these sections will be considered the original ground line. The pay quantity to be measured will be the volume of material included in the section above the original ground and below the upper limits of the typical cross section.

When regular excavation is a pay item, the embankment area to be cross-sectioned will exclude that portion of the fill constructed from regular excavation. Material outside the limits of typical cross sections as shown on the plans will not be measured or paid for.

4. **Extra embankment required for subsurface consolidation** will be determined by the use of settlement plates. The total settlement recorded at each settlement plate will be allowed across 75 percent of the lateral width of each section. Volumes will be computed using the average end area method. Embankment quantities will be adjusted as specified herein to include extra embankment for subsurface consolidation.

   Settlement plates will be measured and paid for in units of each, complete-in-place. This price shall include furnishing, installing, maintaining, and removing when no longer required.

   Surcharge placement and removal will be measured in cubic yards as determined by the plan quantity and will be paid for at the contract unit price per cubic yard. This price shall include furnishing, placing, and removing surcharge material and disposing of surplus and unsuitable materials.

5. **If geotextile drainage fabric is a pay item,** measurement and payment will be in accordance with the requirements of Section 504.

6. **Geotextile for embankment stabilization** will be measured in square yards complete-in-place. Overlaps and seams will not be measured for separate payment. The accepted quantity of geotextile will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing, placing, lapping, or seaming material and for all materials, labor, tools, equipment, and incidentals necessary to complete the work.

   Embankment with a stipulated CBR value shall be measured and paid for as embank- ment with the CBR value as specified.

   Embankment without a stipulated CBR value shall be measured and paid for as embankment.

(c) **Plan Quantities:** The quantity of regular excavation for which payment will be made when plan quantities are specified will be that specified in the Contract. However, borrow excavation; excavation for entrances; unsuitable material below the top of earthwork; undercut excavation; slide excavation; rock excavation that changes the slopes or causes undercut; and side, inlet, and outlet ditches not covered by plan cross sections will be measured in their original position by cross sections and computed in cubic yards by the average end area method.

Where there are authorized deviations from the lines, grades, or cross sections, measurements will be made and the volume computed in cubic yards by the average end area method for these deviations. The plan quantity will then be adjusted to include these quantities for payment.
When unauthorized deviations occur, allowances will not be made for overruns. However, if the deviation decreases the quantities specified in the Contract, only the actual yardage excavated will be allowed.

(d) **Backfill:** Furnishing and placing backfill material, including backfill for undercut, will be included in the price for excavation and will not be measured for separate payment unless specific material is a pay item for backfill or unless suitable material is not available within the construction limits. When a specific material is a pay item, the unit of measure of the material will be in accordance with the unit specified in the Contract. When suitable backfill is not available within the construction limits, the material furnished and placed by the Contractor will be paid for in accordance with the requirements of Section 109.05.

(e) **Erosion Control Items:**

1. **Limiting the scope of construction operations, shaping the top of earthwork, and constructing temporary earth berms and brush silt barriers for temporary erosion and siltation control** will not be measured for payment but shall be included in the price for other appropriate pay items.

2. **Erosion control riprap** will be measured and paid for in accordance with the requirements of Section 414.04.

3. **Temporary protective covering** will be measured and paid for in accordance with the requirements of Section 606.04.

4. **Check dams** will be paid for at the contract unit price per each. This price shall in- clude furnishing, excavating, constructing, maintaining, and removing check dams when no longer required.

   Synthetic check dams may be substituted for Type II Rock Check Dams (Standard EC-4) at no additional cost to the Department.

5. **Temporary silt fences** will be measured in linear feet, complete-in-place, excluding laps, and will be paid for at the contract unit price per linear foot. Decomposed or ineffective geotextile fabric replaced after 6 months from the installation date will be mea- sured in linear feet of temporary silt fence and paid for at 1/2 the contract unit price for temporary silt fence. Decomposed geotextile fabric required to be replaced prior to 6 months after installation will not be measured for payment. This price shall include furnishing, installing, and maintaining the silt fence, including wire reinforcement and posts; removing and disposing of these materials, and dressing and stabilizing the area.

6. **Geotextile fabric** attached to brush barriers or existing fence or used for another function specified on the plans and not included in other pay items will be measured in square yards, complete-in-place, excluding laps, and will be paid for at the contract unit price per square yard. The brush barrier will not be measured for payment. The cost thereof shall be included in the price for clearing and grubbing. This price shall in- clude trimming the brush barrier; furnishing, installing, maintaining, and removing the fabric; anddressing and stabilizing the area.

7. **Temporary filter barriers** will be measured in linear feet, complete-in-place, excluding laps, and will be paid for at the contract unit price per linear foot. Decomposed or ineffective geotextile fabric replaced after 6 months from the installation date and decomposed or ineffective burlap fabric replaced after 3 months from the installation date will be measured in

linear feet of temporary filter barrier and paid for at 1/2 the con- tract unit price for temporary filter barrier. Decomposed geotextile fabric required to be replaced prior to 6 months and decomposed burlap fabric required to be replaced prior to 3 months after installation will not be measured for payment. When permitted, baled straw silt barrier used in lieu of temporary filter barrier will be paid for in linear feet of temporary filter barrier, complete-in-place. This price shall include furnishing, installing, and maintaining the filter barrier, including filter barrier material and posts; removing and disposing of these materials; anddressing and stabilizing the area. If the Contractor is permitted to use baled straw silt barrier in lieu of temporary filter barrier, payment will be made at the price for temporary filter barrier.

8. **Silt cleanout,** when approved or directed by the Engineer, will be measured as siltation control excavation in cubic yards of vehicular measurement in accordance with the requirements of Section 109.01 for the full volume of the vehicle.

   Silt removal and sediment cleanout will be paid in cubic yard of siltation control excavation. Payment shall be full compensation for removal of silt and sediment approved or directed by the Engineer and for transportation and disposal of the material.

   If approved or directed by the Engineer, the installation of additional temporary silt fence and temporary filter barrier in lieu of silt cleanout will be measured in linear feet as specified in (e)5. and (e)7. herein.

9. **Seeding materials** will be measured and paid for in accordance with the requirements of Section 603.

10. **Temporary erosion and siltation measures required to correct conditions created because of the Contractor's negligence, carelessness, or failure to install permanent controls in accordance with the plans and sequence for performance of such work** will not be measured for payment.

11. **Slope drains** will be measured in units of each, per location regardless of size or length and will be paid for at the contract unit price per each. Raising of the slope drain and addition of pipe lengths will not be measured as a new location. This price shall in- clude furnishing, installing, maintaining, and removing the drain and end section or portable flume.

12. **Sediment traps and basins** will be measured in cubic yards of sediment basin excavation and will be paid for at the contract unit price per cubic yard. This price shall in- clude excavation, maintenance, and backfill or removing to original ground when no longer needed.

13. **Storm water management basin excavation** will be measured in cubic yards and will be paid for at the contract unit price per cubic yard. The price shall include excavation, maintenance, and shaping of basin.

14. **Temporary sediment basin excavation** will be measured in cubic yards and will be paid for at the contract unit price per cubic yard. The price shall include excavation, maintenance and when no longer required the removal of dam, pipe, riser pipe, trash rack, backfill and site restoration.

15. **Drop inlet silt trap** will be measured in units of each and paid for only one time during the life of the project.

16. **Dewatering basin** will be measured and paid for at the contract unit price per each. This price shall include furnishing, installing, maintaining, and when no longer required, removing the dewatering basin; backfill; and site restoration.

17. **Erosion control mulch** shall be paid for per square yard or acre. This includes all materials and equipment necessary for the application.

Payment will be made under:

Pay Item	**Pay Unit**
Undercut excavation	Cubic yard
Minor structure excavation (Item)	Cubic yard
Earthwork	Lum Sum
Embankment	Cubic Yard
Embankment (CBR [value])	Cubic Yard
Settlement plate	Each
Surcharge placement and removal	Cubic Yard
Geotextile (Embankment stabilization)	Square Yard
Check dam (Type) (Log, rock, or straw)	Each
Temporary silt fence	Linear Foot
Geotextile fabric	Sqaure Yard
Temporary filter barrier	Linear Foot
Slope drain	Each
Storm water management basin excavation	Cubic Yard
Temporary sediment basin excavation	Cubic Yard
Drop inlet silt trap (Type)	Each
Dewatering basin	Each
Erosion control mulch	Square yard or acre

SECTION 305—SUBGRADE AND SHOULDERS

305.01—Description

This work shall consist of constructing the subgrade and shoulders to the cross section and grade shown on the plans and within the specified tolerances indicated on the plans and in these specifica- tions.

305.02—Materials

Materials may consist of material in place, treated material in place, or imported material. Imported material may be borrow material, select material, or other material as shown on the plans or specified in the Contract.

Materials other than regular excavation or borrow material that are shown on the plans or specified in the Contract shall conform to the applicable requirements of these specifications.

Geotextile materials used for subgrade stabilization shall conform to the requirements of Section 245.03(d).

305.03—Procedures

(a) **Shaping and Compacting Subgrade:**

1. **Subgrade consisting of material in place:** The subgrade area shall be scarified to a depth of 6 inches for a distance of 2 feet beyond the proposed edges of the pavement on each side. If sandy or other soil is encountered that will not compact readily, clay or other suitable material shall be added or water applied in such quantity and within the allowable moisture content specified herein as will permit compaction of the subgrade. Subgrade material shall be compacted at optimum moisture, within ±20 percent of optimum. The density of the subgrade when compared to the theoretical maximum density as determined in accordance with the requirements of VTM-1 shall conform to the following:

% Retained on No. 4 Sieve	Min. % Density
0–50	100
51–60	95
61–70	90

Percentages of material will be reported to the nearest whole number.

The subgrade shall then be shaped and checked to ensure a typical cross section and uniform grade prior to placement of any subsequent courses. If the subgrade becomes eroded or distorted prior to placement of material for subsequent courses, it shall be scarified, reshaped, and recompacted in accordance with the original requirements.

At the time of placing material for subsequent courses, the subgrade shall be compacted to the required density, free from mud and frost, and in a condition that will permit compaction of subsequent courses without distortion.
If the approved subgrade becomes unstable after placement of the subbase or base course and

becomes mixed with the aggregate therein, material from the unstable area and contaminated aggregate shall be removed. The area shall then be backfilled and compacted, and the subsequent course thereon reconstructed.

2. **Subgrade consisting of treated materials in place:** Subgrade shall be treated in accordance with the requirements of the applicable provisions of Section 306.03 and Section 307.05 except that the tolerance for depth will be waived when lime or cement is being used to bridge or correct extremely weak areas.

   If lime can be satisfactorily manipulated during initial mixing, and bridging of the weak area has been performed satisfactorily, additional mixing and compacting will not be required. Additional layers of fill may be placed without delay.

   Field density determinations will be performed in accordance with the requirements of AASHTO T191, modified to include material sizes used in the laboratory determination of density; with a nuclear density testing device; or by other approved methods. When a nuclear device is used, the nuclear density determination for treated in-place subgrade material will be related to the density of the same material tested in accor- dance with the requirements of VTM-1 or VTM-12 and a control strip will not be re- quired.

3. **Subgrade consisting of imported material:** The area to receive the material shall be graded to a true crown and cross section.

   Material shall be placed and compacted in accordance with the requirements of the applicable specifications governing the type of material. When select material is used, material shall be placed and compacted in accordance with the requirements of Section
   308.02 except that the provision for mixing will be waived. The top 6 inches of the finished subgrade shall be compacted in accordance with the requirements of the provi- sions of 1. herein.

   The provisions of 1. herein that are not specifically amended herein shall apply. Imported material shall be placed in approximately equal layers not more than 8 inches for commercial material and 6 inches for local material, compacted measure. Material will be tested after compaction for thickness and density. If material fails to conform to thickness requirements, it shall be corrected by scarifying, adding material if neces- sary, mixing, reshaping and recompacting, or removing and replacing. If the material fails to conform to density requirements, additional rolling will be required until the re- quired density is obtained provided the material is compacted at optimum moisture, within ±20 percent of optimum. If the moisture content is outside the allowable tolerance, the layer shall be scarified, brought to optimum moisture within the allowable tolerance, and recompacted to the specified density.

   An aggregate spreader will not be required in the placement of select material and other imported materials used as subgrade and shoulder courses.

   (b) **Treatment of Unsuitable Subgrade:** When solid rock occurs in cuts or the material is not suitable for subgrade or finishing purposes, the roadbed shall be excavated below the grade shown on the plans in accordance with the standard drawings.

   When solid rock or other unsuitable material has been removed, excavated areas shall be backfilled in accordance with the standard drawings.

(c) **Finishing Subgrade:** The Contractor shall provide effective drainage for the subgrade and maintain it in a satisfactory condition until the next course is placed.

When practicable, the subgrade shall be prepared at least 500 feet ahead of placement of any subbase, base, or surface course. Material for subsequent courses shall not be placed until the subgrade has been checked and approved. The finished subgrade elevation shall be within ±0.04 foot of the plan elevation unless otherwise specified. When imported material is used, acceptance of the course will be based on the requirements of Section 308.04.

(d) **Geotextile (Subgrade Stabilization):** When geotextile for subgrade stabilization is required, it shall be placed as shown on the plans. Geotextile shall be spliced by an overlap of at least 2 feet or by sewing double-stitched seams with stitching spaced 1/4 inch to 1/2 inch apart or as shown on the plans.

(e) **Shoulders:** Aggregate shoulder material shall be placed in accordance with the requirements of the applicable specifications governing the type of material or construction being used and shall be compacted at optimum moisture, within ±2 percentage points of optimum. Except when aggregate material No. 18 is used, the density of the aggregate shoulder material, when compared to the theoretical maximum density as determined in accordance with the requirements of VTM-1 or VTM-12, shall conform to the following:

% Retained on No. 4 Sieve	Min. % Density
0–50	95–100
51–60	90–100
61–70	85–100

Percentages of material will be reported to the nearest whole number.

When aggregate material No. 18 is used, the density, when compared to the theoretical maximum density, shall be not less than 90 percent or more than 95 percent.

Aggregate in the guardrail section of fills, 1 foot from the roadway side of the guardrail face to the outside of the shoulder, shall be compacted until a density of at least 90 percent of the theoretical maximum density has been obtained. The asphalt mixture in this area shall be sealed immediately after the hot mixture is spread. Rolling of the asphalt mixture shall con- tinue until roller marks are eliminated and a density of at least 85 percent of the theoretical maximum density has been obtained.

Stabilized and paved shoulders shall be constructed in accordance with the requirements of the applicable specifications for pavement stabilization. If the aggregate shoulder material becomes overconsolidated prior to final finishing, it shall be scarified for the approximate depth, reshaped, and recompacted to conform to the specified grade and cross section.

Shoulders shall be constructed simultaneously with nonrigid types of base or surface courses other than asphalt concrete or in advance of the base or surface course so as to pre- vent spreading of base or surface materials. The area of shoulders 12 inches adjacent to the pavement shall be rolled simultaneously with the course being deposited.

Where base or surface courses are being constructed under traffic and are more than 1 inch in depth, shoulder material adjacent thereto shall be placed within 72 hours after placement of the base or surface course.

305.04—Measurement and Payment

When material in place is used for the subgrade and shoulders, no measurement will be made. Treated material in place will be measured in accordance with the method of measurement for the specified stabilizing material. When imported material is specified, it will be measured as follows:

(a) **Select material, Type I,** will be measured in tons.

(b) **Select material, Types II and III,** will be measured in cubic yards in its original position.

(c) **Borrow** will be computed in its original position by cross-sectioning the area excavated. If cross-sectioning the area excavated is not practical, the quantity will be determined from compacted measurements in the road and then converted to pit volume.

When cubic yard measurement is specified and the plans do not show the thickness of material required, the material will be measured in the original position by the cross-section method. Where it is impractical to cross-section the area, measurement will be made in trucks in accordance with the requirements of Section 109.01.

When the ton unit is specified, the quantity shall be determined in accordance with the requirements of Section 109.01.

Moisture in excess of optimum, + 2 percentage points, will be deducted from the net weight of both truck and rail shipments.

Allowance will not be made for unauthorized depths beyond those shown on the plans and the allowable tolerances. When tonnage measurement is used, deduction for material exceeding the allowable tolerance will be based on 110 pounds per square yard per inch of depth.

When material in place is used for subgrade and shoulders, no separate payment will be made. The cost thereof shall be included in the price for other applicable pay items.

When imported materials are used, the subgrade and shoulders will be paid for at the contract unit price per cubic yard or per ton as specified. Treated material in place will be paid for in accordance with the requirements of the applicable specification.

Stabilized or paved shoulders shown as a pay item will be measured and paid for in accordance with the requirements of Section 306.04, Section 307.06, Section 312.05, or Section 315.08, as applicable.

Geotextile for subgrade stabilization will be measured in square yards complete-in-place. Overlaps and seams will not be measured for separate payment. The accepted quantity of geotextile will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing, placing, lapping, or seaming material and for all materials, la- bor, tools, equipment, and

incidentals necessary to complete the work.

These prices shall include furnishing, hauling, placing, manipulating, and compacting material; clearing and grubbing local pits; material royalties; and access roads.

Payment will be made under:

Pay Item	**Pay Unit**
Borrow excavation	Cubic yard
Select material (Type and min. CBR)	Cubic yard or ton
Aggregate material (No.)	Cubic yard or ton
Aggregate base material (Type and no.)	Cubic yard or ton
Geotextile (Subgrade stabilization)	Square yard

SECTION 308—SUBBASE COURSE

308.01—Description

This work shall consist of furnishing and placing one or more courses of mineral aggregate on a prepared subgrade in accordance with the required tolerances within these specifications and in conformity with the lines, grades, typical sections, and cross sections shown on the plans or as established by the Engineer.

308.02—Materials

Material shall conform to the requirements of Section 208.02(a) except where other types of aggregate material are specified in the Contract, in which case the applicable specifications governing the material shall apply. When material is obtained from local sources, the sources shall conform to the requirements of Section 106.03.

308.03—Procedures

Prior to placement of the subbase course, the subgrade shall be constructed in accordance with the requirements of the applicable provisions of Section 304 and Section 305.

Subbase material shall be mixed in an approved central mixing plant of the pugmill or other mechanical type in accordance with the requirements of Section 208.05. The mixed material shall be placed on the subgrade by means of an approved aggregate spreader, except that the use of such spreader will not be required where the material is being applied solely for the temporary maintenance of traffic or where the width of the course shown on the plans is transitional and impracticable to place with a spreader box.

Where the required thickness is more than 6 inches, the material shall be spread and compacted in two or more layers of approximately equal thickness. The compacted thickness of any one layer shall be not more than 6 inches. When vibrating or other approved types of special compacting equipment are used, the compacted depth of a single layer of subbase course may be increased to 10 inches upon the approval of the Engineer.

Each layer of subbase course shall be compacted at optimum moisture, within ±2 percentage points of optimum. The density of each layer of subbase aggregate material, when compared to the theoretical maximum density as determined in accordance with the requirements of VTM-1, shall conform to the following:

% Material Retained on No. 4 Sieve	Min. % Density
0–50	100
51–60	95
61–70	90

Percentages shall be reported to the nearest whole number.

Not more than one sample in every five shall have a density less than that specified, and the density of such a sample shall be not more than 2 percent below that specified.

If the surface of the subbase becomes uneven or distorted and sets up in that condition, it shall be scarified, reshaped, and recompacted. If the subbase when compacted and shaped shows a deficiency in

thickness or if depressions occur in the surface, the Contractor shall scarify such sections at his own expense before additional material is added.

Field density determinations will be performed with a nuclear field density device using the density control strip as specified in Section 304 and VTM-10 or in accordance with the requirements of AASHTO T191. The method of density determination will be as directed by the Engineer.

308.04—Tolerances

The thickness of the subbase course will be determined by the depth measurement of holes dug in the subbase in accordance with the requirements of VTM-38B.

Acceptance of the subbase course for the physical property of depth will be based on the mean result of tests performed on samples taken from each lot of material placed. A *lot* of material is defined as the quantity being tested for acceptance except that the maximum lot size will be 2 miles of paver application width.

A lot will be considered acceptable for depth if the mean result of the tests is within the following tolerance of the plan depth for the number of tests taken except that each individual test shall be within ±1.00 inch of the plan depth; mean of two tests, □0.75 inch; mean of three tests, ±0.60 inch; and mean of four tests, □0.50 inch.

If an individual depth test exceeds the ±1.00 inch tolerance, that portion of the lot represented by the test will be excluded from the lot. If the individual test result indicates that the depth of material represented by the test exceeds 1.00 inch, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the test. If the individual test result indicates that the depth of the material represented by the test is deficient by more than 1.00 inch, correction of the subbase course represented by the test shall be made as specified herein.

If the mean depth of a lot of material is in excess of the allowable tolerance, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the test.

If the mean depth of a lot of material is deficient by more than the allowable tolerance, correction will not normally be required and the Contractor will be paid for the quantity of material that has been placed in the lot.

For excessive depth subbase courses, when tonnage measurement is used, the rate of deduction from the tonnage allowed for payment as subbase material will be calculated at a weight of 110 pounds per square yard per inch of depth in excess of the tolerance. Areas that are deficient in depth by more than 1.00 inch and areas that do not provide a smooth uniform surface shall be scarified, material added or removed; reshaped; and recompacted to the specified density so as to conform with the depth tolerance and provide a smooth, uniform surface.

308.05—Measurement and Payment

Subbase course will be measured in cubic yards or tons as specified and will be paid for at the contract unit price per cubic yard or ton. When the cubic yard unit is specified, the quantity will be determined by compacted measurements on the road unless otherwise specified. When the ton unit is specified, the quantity shall be determined in accordance with the requirements of Section 109.01.

This price shall include furnishing, hauling, placing, manipulating, and compacting subbase course; clearing and grubbing local pits; material royalties; and access roads.

Moisture in excess of optimum + 2 percentage points will be deducted from the net weight of both truck and rail shipments.

Payment will be made under:

Pay Item	Pay Unit
Aggregate material (No.)	Cubic yard or ton
Aggregate base material (Type and no.)	Cubic yard or ton

SECTION 310—TACK COAT

310.01—Description

This work shall consist of preparing and treating an existing asphalt or concrete surface with asphalt in accordance with the requirements of these specifications and in conformity with the lines shown on the plans or as established by the Engineer.

310.02—Materials

Asphalt for tack coat shall be CRS-1, CRS-2, CRS-1h, or CSS-1h and shall conform to the requirements of Section 210. CMS-2, conforming to the requirements of Section 210, may be used during the winter months. With the exception of CMS-2, asphalt for tack coat may be diluted with 50 percent water provided that resulting material produces a uniform application of the tack.

310.03—Procedures

Equipment for heating and applying asphalt shall conform to the requirements of Section 314.04(b). The maximum application temperature of liquid asphalt shall conform to the requirements of Table III–1.

TABLE III–1
Liquid Asphalt Application Temperature

Grade	Max. Temperature (°F)
RC-70	180
RC-250	220
RC-800	225
RC-3000	290
MC-70	180
MC-250	220
MC-800	255
MC-3000	290
AC-5	300
AC-10	300
AC-20	300
AC-40	300
RS-2	175
SS-1h	180
AE-4	150
CRS-2	175
CSS-1h	180
CMS-2	200
CRS-1h	175
CRS-1	175

The existing surface shall be patched, cleaned, and rendered free from irregularities to the extent necessary to provide a reasonably smooth and uniform surface. Unstable corrugated areas shall be removed and replaced with suitable patching materials. The edges of existing pavements that are to be adjacent to new pavement shall be cleaned to permit adhesion of asphalt.

Tack material shall be uniformly applied with a pressure distributor conforming to the requirements of Section 314.04(b). Hand spray equipment shall not be used except in areas inaccessible by a pressure distributor. Undiluted asphalt shall be applied at the rate of 0.05 to 0.10 gallons per square yard. Diluted asphalt shall be applied at the rate of 0.10 to 0.15 gallons per square yard.

The tack coat shall be applied in a manner to offer the least inconvenience to traffic and permit one-way traffic without pick up or tracking of the asphalt.

The tack coat shall not be applied immediately prior to the course being placed. The tack coat shall be applied in accordance with the same weather limitations that apply to the course being placed. The quantity, rate of application, temperature, and areas to be treated shall be approved prior to application.

During the application of asphalt, care shall be taken to prevent spattering adjacent items. The distributor shall not be cleaned or discharged into ditches or borrow pits, onto shoulders, or along the right of way. When not in use, equipment shall be parked so that the spray bar or mechanism will not drip asphalt on the surface of the traveled way.

310.04—Measurement and Payment

Tack coat, when a pay item, will be measured in gallons and will be paid for at the contract unit price per gallon. When not a pay item, the cost thereof shall be included in the price for other appropriate pay items.

Patching will be paid for at the contract unit price for the various items used unless a reconditioning item is included in the Contract.

Payment will be made under:

Pay Item	Pay Unit
Tack coat	Gallon

SECTION 311—PRIME COAT

311.01—Description

This work shall consist of preparing and treating an existing surface with asphalt, and cover material if required, in accordance with the requirements of these specifications and in conformity with the lines shown on the plans or as established by the Engineer.

311.02—Materials

(a) **Asphalt** may be changed one viscosity grade by the Engineer during construction at no change in the contract unit price. Asphalt shall conform to the applicable requirements of Section 210.

(b) **Cover material** shall conform to the applicable requirements of Section 202 or Section 203. Lightweight aggregate shall conform to the requirements of Section 206. Cover material shall not be hauled directly from a washing plant for immediate use in the work.

311.03—Procedures

The rates of application of materials shall be determined in accordance with the method described in Education Series No. 12 of the Asphalt Institute entitled *Asphalt Surface Treatments Construction Techniques.*

The weather limitations of Section 314.03 shall apply to asphalt prime coat work. When asphalt is to be used as a cover for cement stabilization or as a primer for asphalt concrete, the weather limitations specified for these particular operations shall apply.

Equipment for heating and applying asphalt and cover material shall conform to the requirements of Section 314.04. The maximum application temperature of the liquid asphalt shall conform to the requirements of Table III–1 in Section 310.03.

The surface to be primed shall be shaped to the required grade and section; rendered free from ruts, corrugations, segregated material, or other irregularities; and uniformly compacted.

Delays in priming may necessitate reprocessing or reshaping to provide a smooth, compacted surface.

Asphalt shall be applied by means of a pressure distributor in a uniform continuous spread. When traffic is maintained, not more than 1/2 the width of the section shall be treated in one application. Care shall be taken that the application of asphalt at junctions of spreads is not in excess of the specified amount. Excess asphalt shall be removed from the surface by a squeegee. Skipped areas or deficiencies shall be corrected.

During the application of asphalt, care shall be taken to prevent spattering adjacent items. The distributor shall not be cleaned or discharged into ditches or borrow pits, onto shoulders, or along the right of way. When not in use, equipment shall be parked so that the spray bar or mechanism will not drip asphalt on the surface of the traveled way.

When traffic is maintained, one-way traffic shall be permitted on the untreated portion of the roadbed. When

the asphalt has been absorbed by the treated surface and will not pick up, traffic shall be transferred to the treated portion and the remaining width of the section primed.

The quantity, rate of application, temperature, and areas to be treated shall be approved before application of the prime coat.

If after application of the prime coat the asphalt fails to penetrate within the time specified and the roadway must be used by traffic, cover material shall be spread at the Contractor's expense in an amount that will prevent pick up of the asphalt.

311.04—Measurement and Payment

Prime coat will be measured and paid for at the contract unit price per gallon for asphalt and per ton for cover material.

Payment will be made under:

Pay Item	Pay Unit
Prime coat	Gallon
Cover material (Type)	Ton

SECTION 315—ASPHALT CONCRETE PAVEMENT

315.01—Description

This work shall consist of constructing one or more courses of asphalt concrete on a prepared foundation in accordance with the requirements of these specifications and within the specified tolerances for the lines, grades, thicknesses, and cross sections shown on the plans or as established by the Engineer.

315.02—Materials

(a) **Asphalt concrete** shall conform to the requirements of Section 211. If SUPERPAVE design densities begin to exceed 98 percent of the theoretical maximum density during con- struction, the Contractor shall alter the design.

(b) **Asphalt for tack coat and prime coat** shall conform to the requirements of Section 310. Asphalt may be changed one viscosity grade by the Engineer at no change in the contract unit price.

(c) **Curb backup material** shall be asphalt concrete conforming to any surface or intermediate mixture listed in Table II-13 and Table II-14.

(d) **Liquid asphalt coating (emulsion) for rumble strip** shall conform to the requirements of Section 210.

315.03—Equipment

(a) **Hauling Equipment:** Trucks used for hauling asphalt mixtures shall have tight, clean, smooth metal bodies equipped with a positive locking metal tailgate. Metal surfaces in contact with asphalt mixtures shall be given a thin coat of an aliphatic hydrocarbon invert emulsion release agent (nonpuddling), a lime solution, or other material on the Department's list of approved release agents. Except where a nonpuddling release agent is used, the beds of dump trucks shall be raised to remove excess agent prior to loading. Only a nonpuddling agent shall be used in truck beds that do not dump. Each truck shall be equipped with a tarpaulin or other cover that will protect the mixture from moisture and foreign matter and prevent the rapid loss of heat during transportation.

(b) **Asphalt Pavers:** The asphalt paver shall be designed and recommended by the manufacturer for the type of asphalt to be placed and shall be operated in accordance with the manufacturer's recommendations. Written recommendations pertaining to handling and placing the mix shall be made readily available on the project site to the Engineer. In the absence of the manufacturer's recommendations, the recommendations of the National Asphalt Pavement Association shall be followed. The paver, including when screed extensions are used, shall be capable of producing a smooth uniform texture, dense joints, and a smooth riding surface.

(c) **Rollers:** Rollers shall be steel wheel, static or vibratory, or pneumatic tire rollers and shall be capable of reversing without backlash. Rollers shall be operated at speeds slow enough to avoid displacement of the mixture. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable condition. The use of equipment that results in excessive crushing of aggregate or marring of the pavement sur- face will not be permitted.

If during construction the equipment being used mars the surface to the extent that imperfections

cannot satisfactorily be corrected or produces permanent blemishes, the use of the equipment shall be discontinued and the equipment shall be replaced with satisfactory units.

(d) **Rotary Saw:** A gasoline-powered rotary saw with a carbide blade shall be furnished for cutting test samples from the pavement. The Contractor shall furnish gasoline, oil, additional carbide blades, and maintenance for the rotary saw. The Contractor shall cool the pavement prior to sawing the sample. In lieu of a rotary saw, the Contractor may furnish the necessary equipment for coring and testing 4-inch core samples in accordance with the requirements of VTM-22.

315.04—Placement Limitations

Asphalt concrete mixtures shall not be placed when weather or surface conditions are such that the material cannot be properly handled, finished, or compacted. The surface upon which asphalt mixtures are to be placed shall be free of standing water, dirt, and mud and the base temperature shall conform to the following:

(a) **When the base temperature is above 80 degrees F,** mixture laydown will be permitted at any temperature conforming to the limits specified in Section 211.

(b) **When the base temperature is between 40 degrees F and 80 degrees F,** the Nomograph, Table III–2, shall be used to determine the minimum laydown temperature of the asphalt concrete mixes. At no time should the minimum base and laydown temperatures be less than the following:

Mix Designation	Minimum Base Temperature	Minimum Laydown
A	40°F	250°F
D	50°F	270°F
E	50°F	290°F
M	50°F	290°F
S	50°F	290°F

The maximum temperature of the mixture shall conform to the requirements of Section 211.08.

(c) **When the laydown temperature is between 301 degrees F and 325 degrees F,** the number of compaction rollers will be the same number as required for 300 degrees F.

Intermediate and base courses that are placed at rates of application that exceed the application rates shown in Table III–2 shall conform to the requirements for the maximum applica- tion rate shown for 8-minute and 15-minute compaction rolling as per number of rollers used.

Should the Contractor be unable to complete the compaction rolling within the applicable 8- minute or 15-minute period, the placing of asphalt mixture shall either cease until sufficient rollers are used or other corrective action is taken to complete the compaction rolling within the specified period.

Compaction rolling shall be completed prior to the mat cooling down to 175 degrees F. Finish rolling may be performed at a lower mat temperature.

The final asphalt pavement finish course shall not be placed until construction pavement markings are no longer required.

315.05—Procedures

(a) **Base Course:** The subgrade or subbase shall be prepared as specified in Section 305. The course upon which the pavement is to be placed, including the area that will support the paving equipment, shall be graded and compacted to the required profile.

(b) **Conditioning Existing Surface:** When the surface of the existing pavement or base is irregular, it shall be brought to a uniform grade and cross section as directed by the Engineer. The surface on which the asphalt concrete is to be applied shall be prepared in accordance with the requirements of the applicable specifications and shall be graded and compacted to the required profile and cross section.

When specified, prior to placement of asphalt concrete, longitudinal and transverse joints and cracks in hydraulic cement concrete shall be sealed by the application of an approved joint sealing compound.

Contact surfaces of curbing, gutters, manholes, and other structures projecting into or abutting the pavement and cold joints of asphalt shall be painted with a thick, uniform coating of asphalt prior to placement of asphalt mixture.

1. **Priming existing surface:** A tack or prime coat of asphalt shall be applied between the existing surface and each asphalt course placed thereafter. The tack or prime coat shall conform to the applicable requirements of Section 310 and Section 311.

   Asphalt classed as cutbacks or emulsions shall be applied ahead of the paving operations, and the time interval between applying and placing the paving mixture shall be sufficient to ensure a tacky residue providing maximum adhesion of the paving mixture to the base. The mixture shall not be placed on tack or prime coats that have been damaged by traffic or contaminated by foreign material. Traffic shall be excluded from such sections.

   On rich sections or those that have been repaired by the extensive use of asphalt patching mixtures, the tack coat shall be eliminated when directed by the Engineer.

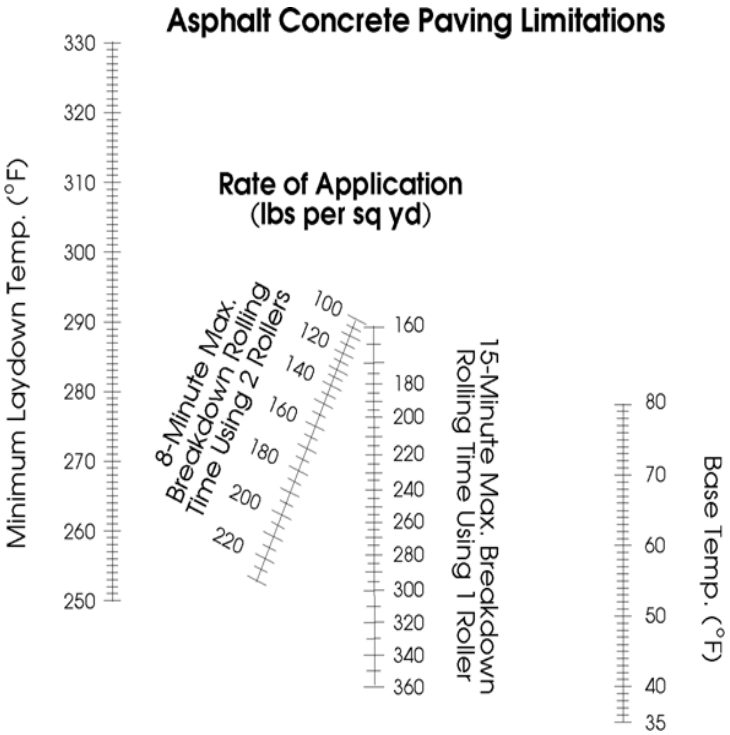
   Priming: When asphalt concrete to be placed has a total thickness of 4 inches or more, priming with asphalt material will not be required on aggregate subbase or base material.
   Tacking: Application of tack at joints, adjacent to curbs, gutters, or other appurtenances, shall be applied with a hand wand at the rate of 0.2 gallon per square yard. At joints, the tack applied by the hand wand shall be 2 feet in width with 4 to 6 inches protruding beyond the joint for the first pass. Tack for the adjacent pass shall com- pletely cover the vertical face of the mat edge, so that slight puddling of asphalt occurs at the joint, and extend a minimum of 1 foot into the lane to be paved. Milled faces that are to remain in place shall be tacked in the same way for the adjacent pass. Use of tack at the vertical faces of longitudinal joints will not be required when paving in ech- elon.

2. **Removing depressions and elevating curves:** Where irregularities in the existing surface would result in a course more than 3 inches in thickness after compaction, the sur- face shall be brought to a uniform profile by patching with asphalt concrete and thor- oughly tamping or rolling until it conforms with the surrounding surface. The mixture used shall be the same as that specified for the course to be placed.

When the Contractor elects to conduct operations to eliminate depressions, elevate curves, and place the surface course simultaneously, he shall furnish such additional spreading and compacting equipment as required to maintain the proper interval be- tween the operations.

(c) **Placing and Finishing:** Asphalt concrete shall not be placed until the surface upon which it is to be placed has been approved by the Engineer.

TABLE III–2
Cold Weather Paving Limitations



The edge of the pavement shall be marked by means of a continuous line placed and maintained a sufficient distance ahead of the paving operation to provide proper control of the pavement width and horizontal alignment.

An asphalt paver shall be used to distribute asphalt concrete over the widest pavement width practicable. Wherever practicable and when the capacity of sustained production and delivery is such that more than one paver can be operated, pavers shall be used in echelon to place the wearing course in adjacent lanes. Crossovers, as well as areas containing manholes or other obstacles that prohibit the practical use of mechanical spreading and finishing equipment, may be

constructed using hand tools. However, care shall be taken to obtain the required thickness, jointing, compaction, and surface smoothness.

The longitudinal joint in one layer shall offset that in the layer immediately below by approximately 6 inches. However, the joint in the wearing surface shall be at the centerline of the pavement if the roadway comprises two traffic lanes or at lane lines if the roadway is more than two lanes in width. Offsetting layers will not be required when adjoining lanes are paved in echelon and the rolling of both lanes occurs within 15 minutes after laydown. The Contractor shall have a certified Asphalt Field Technician present during paving opera- tions where more than 100 tons of material is placed in a single location. Immediately after placement and screeding, the surface and edges of each layer shall be inspected and straightedged by the technician and necessary corrections performed prior to compaction. The finished pavement shall be uniform and smooth.

The placement of asphalt concrete shall be as continuous as possible and shall be scheduled such that the interruption occurring at the completion of each day's work will not detrimentally affect the partially completed work. Material that cannot be spread and finished in daylight shall not be dispatched from the plant unless the use of artificial lighting has been ap- proved. When paving is performed at night, sufficient light shall be provided to properly perform and thoroughly inspect every phase of the operation. Such phases include cleaning planed surfaces, applying tack, paving, compacting, and testing. Lighting shall be provided and positioned such as to not create a blinding hazard to the traveling public.

During compaction of asphalt concrete, the roller shall not pass over the end of freshly placed material except when a construction joint is to be formed. Edges shall be finished true and uniform.

Asphalt concrete SUPERPAVE pavement courses shall be placed in layers not exceeding 4.0 times the nominal maximum size aggregate in the asphalt mixture. The maximum thickness may be reduced if the mixture cannot be adequately placed in a single lift and compacted to the required uniform density and smoothness. The minimum thickness for a pavement course shall be no less than 2.5 times the nominal maximum size aggregate in the asphalt mixture. Nominal maximum size aggregate for each mix shall be defined as one sieve size larger than the first sieve to retain more than 10 percent aggregate as shown in the design range specified in Section 211.03, Table II-13. Base courses to be placed in irregu- larly shaped areas of pavement, such as transitions, turn lanes, crossovers, and entrances, may be placed in a single lift.

Overlays in excess of 165 pounds per square yard or with a milled depth greater than 1 1/2 inches shall be squared up prior to opening to traffic.

The milled roadway areas that are to be opened to traffic, excluding curb and gutter sections, shall have drainage outlets cut through the shoulder at locations designated by the En- gineer. The Contractor shall plan and prosecute the milling operation to avoid the trapping of water on the roadway. Drainage outlets shall be restored to original grade, unless other- wise directed by the Engineer. The cost for cutting and restoring the drainage slots in the roadway shoulder shall be included in the price bid for other items of work.

The Contractor shall plan and prosecute a schedule of operations so that milled roadways will be overlaid with asphalt concrete as soon as possible. In no instance, shall the time lapse exceed 10 days after the milling operations, unless otherwise specified. The milled areas of the roadway shall be kept free of irregularities and obstructions that may create a haz- ard or annoyance to traffic in accordance with the requirements of Section 104.

A short ski or shoe shall be used to match the grade of the newly overlaid adjacent travel lane on primary, interstate, and designated secondary routes. Unless otherwise directed by the Engineer, a 24-foot minimum automatic grade control ski shall be used on asphalt mixtures on divided highways, with the exception of overlays that are less than full width and the first course of asphalt base mixtures over aggregate subbases. Care shall be exercised when working along curb and gutter sections to ensure a uniform grade and joint.

The Contractor shall construct the final riding surface to tie into the existing surface by an approved method, which shall include the cutting of a notch into the pavement. In addition to notching, the Contractor may use an asphalt design containing a fine-graded mix to achieve a smooth transition from the new asphalt concrete overlay to the existing pavement, with the approval of the Engineer. The material shall be of a type to ensure that raveling will not occur. The cost for constructing tie-ins in the asphalt concrete overlay shall be in- cluded in the price bid for asphalt concrete.

(d) **Compacting:** Immediately after the asphalt mixture is placed and struck off and surface irregularities are corrected, the mixture shall be thoroughly and uniformly compacted by rolling.

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

The number, weight, and type of rollers furnished shall be sufficient to obtain the required compaction while the mixture is in a workable condition. The sequence of rolling operations and the selection of roller types shall provide the specified pavement density.

Immediately after the hot mixture is placed, it shall be sealed with rollers. Thereafter, rolling shall be a continuous process, insofar as practicable, and all parts of the pavement shall receive uniform compaction.

Rolling shall begin at the sides and proceed longitudinally parallel with the center of the pavement, each trip overlapping at least 1/2 the roller width, gradually progressing to the crown of the pavement. When abutting a previously placed lane, the longitudinal joint shall be rolled first, followed by the regular rolling procedure. On superelevated curves, rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel with the centerline.

Displacements occurring as a result of reversing the direction of a roller or other causes shall be corrected at once by the use of rakes or lutes and addition of fresh mixture when required. Care shall be taken in rolling 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 a very small quantity of detergent or other approved material.

Excess liquid will not be permitted.

Along forms, curbs, headers, walls, and other places not accessible to rollers, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons, or 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 area.

Edges of asphalt pavement surfaces shall be true curves or tangents. Irregularities shall be corrected. The surface of the compacted course shall be protected until the material has cooled suffi- ciently to support normal traffic without marring.

(e) **Density:** Density shall be determined in accordance with the following:

1. The Contractor shall perform roller pattern and control strip density testing on surface, intermediate, and base courses in accordance with the requirements of VTM-76. The Contractor shall have a certified Asphalt Field Technician perform all density testing.

   Density shall be determined by the backscatter method of testing using a thin-lift nuclear gage with printer, conforming to the requirements of VTM-81. Density test locations for the control strip and test sections shall be marked and labeled in accordance with the requirements of VTM-76. The Contractor shall furnish and operate the nuclear gage, which shall have been calibrated within the previous 12 months by an approved calibration service. In addition, the Contractor shall maintain documentation of such calibration service for a 12-month period. The required density of the compacted course shall be not less than 98.0 percent and not more than 102.0 percent of the target control strip density.

   Nuclear density roller pattern and control strip density testing shall be performed on asphalt concrete overlays placed directly on surface treatment roadways and when overlays are placed at an application rate less than 125 pounds per square yard, based on 110 pounds per square yard per inch, on any surface. In these situations, sawed plugs or core samples will not be required and the minimum control strip densities as specified in Table III–3 will be waived. The required density of the compacted course shall be not less than 98.0 percent and not more than 102.0 percent of the target control strip.

TABLE III–3
Density Requirements

Mixture Type	Min. Control Strip Density (%)[1]
SM-9.5A, 12.5A	92.5
SM-9.5D, 12.5D	92.2
SM-9.5E, 12.5E	92.2
IM-19.0A	92.2
IM-19.0D	92.0
BM-25.0A, BM-25.0D	91.5

[1]The control strip density requirement is the percentage of theoretical maximum density of the job-mix formula by SUPERPAVE mix design or as established by the Engineer based on two or more production maximum theoretical density tests.

The project will be divided into “control strips” and “test sections” by the Engineer for the purpose of defining areas represented by each series of tests.

a. **Control Strip:** Control strips shall be constructed in accordance with the requirements of these specifications and VTM-76.

The term *control strip density* is defined as the average of 10 nuclear determinations selected at stratified random locations within the control strip.

One control strip shall be constructed at the beginning of work on each roadway and shoulder course and on each lift of each course. An additional control strip shall be constructed when a change is made in the type or source of materials or compaction equipment; whenever a significant change occurs in the composition of the material being placed from the same source; or when there is a failing control strip**.** During the evaluation of the initial control strip, paving operations may continue. However, paving and production shall be discontinued during construc- tion and evaluation of additional control strips. In the event that two consecutive control strips fail, subsequent paving operations shall cease until corrective ac- tion(s) has been taken with the approval of the Engineer. If it is determined with the Engineer’s approval that the density cannot be obtained because of the condi- tion of the existing pavement structure, the target control strip density shall be de- termined from the roller pattern that achieves the optimum density and shall be used on the remainder of the roadway that exhibits similar pavement conditions.

Either the Engineer or Contractor may initiate an additional control strip at any time.

The length of the control strip shall be approximately 300 feet, regardless of the width of the course being placed. On the first day of construction or beginning of a new course, the control strip shall be started between 500 and 1,000 feet from the beginning of the paving operation. The control strip shall be constructed using the same paving, rolling equipment, procedures, and thickness as shall be used on the remainder of the course being placed.

One nuclear reading shall be taken at each of 10 stratified random locations. No determination shall be made within 12 inches of the edge of any application width for surface and intermediate mixes or within 18 inches of the edge of any applica- tion width for base mixes. The average of these 10 determinations shall be the control strip density recorded to the nearest 0.1 pound per cubic foot. The minimum control strip density shall be determined in accordance with the requirements of VTM-76.
The control strip shall be considered a lot. If the control strip density conforms to the requirements specified in Table III–3, the control strip will be acceptable and the control strip density shall become the target control strip density. If the density does not conform to the requirements specified in Table III–3, the tonnage placed in the control strip and any subsequent paving prior to construction of another control strip will be paid for in accordance with Table III–4 on the basis of the percentage of the Table III–3 value achieved. The Contractor shall take corrective action(s) to comply with the density requirement specified in Table III–3.

TABLE III–4
Payment Schedule for Lot Densities

% of Target Control Strip Density	% of Payment
Greater than 102.0	95
98.0 to 102.0	100
97.0 to less than 98.0	95
96.0 to less than 97.0	90
Less than 96.0	75

b. **Test section (lot):** For the purposes of acceptance, each day's production shall be divided into lots (test sections). The standard size of a lot shall be 5,000 linear feet of any pass made by the paving train regardless of the width of the pass of the thickness of the course. Pavers traveling in echelon will be considered as two passes. Each lot shall be divided into five sublots of equal length. When a partial lot occurs at the end of a day's production or upon completion of the project, the lot size shall be redefined as follows: If the partial lot contains one or two sublots, the sublots will be added to the previous lot. If the partial lot contains three or four sublots, the partial lot will be redefined to be an entire lot. Each lot shall be tested for density by taking a nuclear density reading from two random locations selected by the Engineer within each sublot. Readings shall not be taken within 12 inches of the edge of any application width for surface and intermediate mixes or within 18 inches of the edge of any application width for base mixes. The average of the sublot nuclear density readings will be compared to the target nuclear control strip density to determine the acceptability of the lot. Once the average nucle- ar density of the lot has been determined, the Contractor will not be permitted to provide additional compaction to raise the average. If two consecutive sublots produce nuclear density results less than 98 percent or more than 102 percent of the target nuclear control strip density, the Contractor shall immediately notify the Engineer and institute corrective action. By the end of the day's operations, the Contractor shall furnish the test data developed during the day's paving to the Engineer.

The tonnage of each lot will be based on the lot's width and length and the mixture application rate as designated in the Contract or as revised by the Engineer. Payment will be made in accordance with the requirements of Table III–4.

The Engineer at any time on any project may perform lot density verification testing. Lot density verification can be performed by using either a nuclear gage or plugs. The Contractor shall be responsible for taking plugs for testing. Testing of the plugs will be done by or in the presence of the Engineer.

Surface, Intermediate, and Base mixes:

When a nuclear gage is used, the Engineer will take 10 stratified random readings per lot. If, based on the average of the 10 readings, the density does not meet the requirement for 100 percent pay or the same pay percentage determined by the Contractor's testing for that lot, the Engineer will take readings at the 10 Contractor sites and then average the readings of the 20 sites. If the density still does not conform to the requirements for 100 percent pay, payment for that lot will be in accordance with Table III–4 on the basis of the Engineer's average of the 20 test results. If the Contractor questions the payment for the lot, the Contractor can re- quest the

referee procedure.

The referee procedure shall consist of the Department taking five plugs from the five sites closest to the average of the Engineer's readings of the Contractor and Department sites. The density of the plugs will be determined. If the average density of the plugs does not conform to the requirements for 100 percent pay for the lot in question, payment for that lot will be in accordance with the specifications in Table III–4 on the basis of the percentage of the Table III–3 value achieved.

When plugs are used for lot density verification, five plugs shall be taken per lot. If the density of the plugs does not conform to the requirements for the lot in question, payment for that lot will be in accordance with the specifications in Table III–4 on the basis of the percentage of the Table III–3 value achieved.

2. **Surface, intermediate, and base courses** not having a sufficient quantity of material to run a nuclear density roller pattern and control strip shall be compacted to a minimum density of 91.5 percent of the theoretical maximum density as determined in ac- cordance with the requirements of VTM-22. The Contractor shall be responsible for cutting cores or sawing plugs for testing by the Department. If the density is less than 91.5 percent, payment will be made in accordance with the requirements of Table III–5.

TABLE III–5
Payment Schedule for Surface, Intermediate and Base Courses (Not sufficient quantity to per- form nuclear density roller pattern and control)

% TMD	% of Payment
Greater than 91.5	100
90.2–91.4	95
88.3–90.1	90
Less than 88.2	75

Any section in which a mixture (e.g., SM-9.0) is being placed at an application rate of less than 125 pounds per square yard, based on 110 pounds per square yard per inch, that does not have a sufficient quantity of material for a nuclear density roller pattern and control strip shall be compacted by rolling a minimum of three passes with a minimum 8-ton roller. No density testing will be required.

(f) **Joints:** Transverse joints shall be formed by cutting back on the previous run to expose the full depth of the course. A coat of asphalt shall be applied to contact surfaces of transverse joints just before additional mixture is placed against the previously rolled material.

Joints adjacent to curbs, gutters, or adjoining pavement shall be formed by hand placing sufficient mixture to fill any space left uncovered by the paver. The joint shall then be set up with rakes or lutes to a height sufficient to receive full compression under the rollers.

(g) **Rumble Strips:** This work shall consist of constructing rumble strips on mainline shoulders of highways by cutting 1/2-inch-deep concave depressions into existing asphalt concrete surfaces

as shown on the detail drawings and as directed by the Engineer.

Rumble strips shall be installed in accordance with detail drawings for rumble strips (asphalt shoulder). The depressions shall have a concave circular shape with a minimum 1/2- inch depth at center and maximum 5/8-inch allowable depth at center. Depressions shall have a smooth finish with a maximum 1/16-inch variance between peaks and valleys of the depression.

Prior to beginning production work on mainline shoulders, the Contractor shall demonstrate to the Engineer the ability to achieve the desired surface regarding alignment, consistency, and conformity with these specifications and the plans. The test site shall be approximately 25 feet longitudinally at a site mutually agreed upon by the Contractor and Engineer.

Following cutting and cleaning depressions of waste material, the entire rumble strip area shall be coated with liquid asphalt coating (emulsion) using a pressure distributor at an approximate rate of 0.1 gallon per square yard. Overspray shall not extend more than 2 inches beyond the width of the cut and/or shall not come in contact with pavement markings.

Rumble strips shall not be installed on shoulders of bridge decks, in acceleration/deceleration lanes, on surface drainage structures, or in other areas identified by the En- gineer.

Waste material resulting from the operation shall be removed from the paved surface and shall not be disposed of where waterways may be at risk of contamination.

(h) **Saw-Cut Asphalt Pavement:** This work shall consist of saw cutting the existing asphalt pavement to a depth shown on the plans and as directed by the Engineer.

315.06—Pavement Samples

The Contractor shall cut samples from the compacted pavement for testing for depth and density. Samples shall be taken for the full depth of the course at the locations selected by the Engineer. The removed pavement shall be replaced with new mixture and refinished. No additional compensation will be allowed for furnishing test samples and reconstructing areas from which they were taken.

315.07—Pavement Tolerances

(a) **Surface Tolerance:** The surface will be tested by using a 10-foot straightedge. The variation of the surface from the testing edge of the straightedge between any two contacts with the surface shall be not more than 1/4 inch. Humps and depressions exceeding the specified tolerance shall be corrected or the defective work shall be removed and replaced with new material.

(b) **Finished Grade Tolerance**: After placement of the final pavement layer, finished grade elevations shall be within +/–0.04 foot of the elevations indicated in the plans, unless otherwise specified, provided that the actual cross slope does not vary more than 0.20 percent from the design cross slope indicated in the plans and the pavement thickness conforms to the thickness tolerances specified herein.

If determined by the Engineer that either the finished grade elevations or cross slope exceed the tolerances specified, the Contractor shall submit to the Engineer for approval a plan of corrective

action.

(c) **Thickness Tolerance:** The thickness of the base course will be determined by the measurement of cores as described in VTM-32B.

Acceptance of asphalt concrete base course for depth will be based on the mean result of measurements of samples taken from each lot of material placed. A *lot* of material is defined as the quantity being tested for acceptance except that the maximum lot size will be 1 mile of 24-foot-width base course.

A lot will be considered acceptable for depth if the mean result of the tests is within the following tolerance of the plan depth for the number of tests taken except that each individual test shall be within ±0.60 inch of the plan depth: mean of two tests, ±0.45 inch; mean of three tests, ±0.35 inch; mean of four tests, ±0.30 inch.

If an individual depth test exceeds the ±0.60-inch tolerance, that portion of the lot represented by the test will be excluded from the lot. If an individual test result indicates that the depth of material represented by the test is more than 0.60 inch, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the test. If an individual test result indicates that the depth of the material represented by the test is deficient by more than 0.60 inch, correction of the base course represented by the test shall be made as specified hereinafter.

If the mean depth of a lot of material is excessive, the Contractor will not be paid for that material in excess of the tolerance throughout the length and width represented by the tests.

If the mean depth of a lot of material is deficient by more than the allowable tolerance, correction will not normally be required and the Contractor will be paid for the quantity of material that has been placed in the lot.

For excessive depth base courses, the rate of deduction from the tonnage allowed for payment as base course will be calculated at a weight of 115 pounds per square yard per inch of depth in excess of the tolerance. For sections of base course that are deficient in depth by more than 0.60 inch and less than 1.50 inch, the Contractor shall furnish and place material specified for the subsequent course to bring the base course depth within the tolerance. This material will be measured on the basis of tonnage actually placed, determined from weigh tickets, and paid for at the contract unit price for the base course material. Such material shall be placed in a separate course. If the deficiency is more than 1.50 inches, the Contractor shall furnish and place base course material to bring the base course thickness within the tolerance. Corrections for deficient base course depth shall be made in a manner to provide a finished pavement that is smooth and uniform.

When the Contract provides for the construction or reconstruction of the entire pavement structure, the surface and intermediate courses shall be placed at the rate of application shown on the plans within an allowable tolerance of ±5 percent of the specified application rate for application rates of 100 pounds per square yard or greater and within 5 pounds per square yard for application rates of less than 100 pounds per square yard. The amount of material exceeding the allowable tolerance will be deducted from the pay quantities.

When the Contract provides for the placement of surface or intermediate courses over existing pavement, over pavements constructed between combination curb and gutter, or in the construction or reconstruction of shoulders, such courses shall be placed at the approximate rate of application shown on the plans. However, the specified rate of application shall be altered where necessary to produce the required riding quality.

315.08—Measurement and Payment

Asphalt concrete base will be measured in tons and paid for at the contract unit price per ton. This price shall include preparing and shaping the subgrade or subbase, constructing and finishing should- ers and ditches, and removing and replacing unstable subgrade or subbase.

Asphalt concrete will be measured in tons and paid for at the contract unit price per ton. Net weight information shall be furnished with each load of material delivered in accordance with the require- ments of Section 211. Batch weights will not be permitted as a method of measurement unless the Contractor's plant is equipped in accordance with the requirements of Section 211, in which case the cumulative weight of the batches will be used for payment.

Asphalt used in the mixtures, when a pay item, will be measured in tons in accordance with the re- quirements of Section 109.01 except that transporting vehicles shall be tared prior to each load. The weight shall be adjusted in accordance with the percentage of asphalt indicated by laboratory extrac- tions.

Tack coat shall be included in the price for other appropriate pay items.
Asphalt curb backup material will be measured in tons and will be paid for at the contract unit price per ton. This price shall include placing, tamping, and compacting.

Liquid asphalt cement, when a pay item, will be measured in tons and will be paid for at the contract unit price per ton.

Rumble strips will be measured and paid for in linear feet of shoulder where the rumble strips are ac- tually placed and accepted, excluding the test site. This distance will be measured longitudinally along the edge of pavement with deductions for bridge decks, acceleration/deceleration lanes, surface drain- age structures, and other sections where the rumble strips are not installed. This price shall be full compensation for application; disposal of waste material; and all labor, tools, equipment, and inciden- tals necessary to complete the work. The test site will not be measured for payment but shall be in- cluded in the unit price for rumble strip.

Liquid asphalt coating (rumble strips) will be measured and paid for in square yards as described herein. This price shall be full compensation for cleaning rumble strips prior to application of the coating; furnishing and applying coating as specified herein; and all labor, tools, equipment, and inci- dentals necessary to complete the work.

Saw-cut asphalt concrete pavement will be measured in linear feet for the depth specified and will be paid for at the contract unit price per foot, which price shall be full compensation for saw-cutting the asphalt pavement to the depth specified.

These prices shall include heat stabilization additive, furnishing samples, and maintaining traffic. Payment will be made under:

Pay Item	Pay Unit
Asphalt concrete base course (Type)	Ton
Asphalt concrete (Type) (Class)	Ton
Asphalt concrete curb backup material	Ton
Liquid asphalt cement	Ton
Rumble strip (Asphalt)	Linear foot
Liquid asphalt coating (Rumble strips)	Square yard
Saw-cut asphalt concrete (depth)	Linear foot

Division V INCIDENTAL CONSTRUCTION

SECTION 502—INCIDENTAL CONCRETE ITEMS

502.01—Description

This work shall consist of constructing curbs, gutters, combination curbs and gutters, paved ditches, paved flumes, bridge drainage aprons and chutes, concrete median barriers, median strips, sign islands, and directional island curbs in accordance with these specifications and in conformity to the lines and grades shown on the plans or as established by the Engineer.

502.02—Materials

(a) **Hydraulic cement concrete** shall conform to the requirements of Section 217. With the approval of the Engineer, the design of the mixture may be modified to accommodate the placement equipment to be used.

(b) **Asphalt concrete** shall conform to the requirements of Section 211.

(c) **Preformed joint filler** shall conform to the requirements of Section 212. Material shall be approximately 1/2 inch in thickness and shall have a width and depth equal to those of the incidental structure.

(d) **Curing materials** shall conform to the requirements of Section 220.

(e) **Reinforcing steel** shall conform to the requirements of Section 223, Grade 40 or 60.

(f) **Rubble stone** shall conform to the requirements of Section 205.

(g) **Grout** shall conform to the requirements of Section 218.

(h) **Foundation course** shall be aggregate No. 68 conforming to the requirements of Section 203.

(i) **Dry filler** shall consist of aggregate conforming to the requirements of Section 202 or 203, as applicable.

(j) **Seed** shall conform to the requirements of Section 244.

(k) **Topsoil** shall conform to the requirements of Section 244.

Section 508—Demoltion of Pavement and Obscuring Roadway

508.01—Description

This work shall consist of demolition of pavement and obscuring roadway to restore areas that are no longer needed for highway use in accordance with these specifications and in conformity to the lines and contours shown on the plans or as established by the Engineer.

508.02—Procedures

(a) **Demolition of Pavement Structures:**

1. **Hydraulic cement concrete pavement** shall be demolished as follows:

   a. Pavement shall be broken into pieces and either used in fill areas as rock embankment in accordance with the requirements of Section 303 or disposed of at loca- tions selected by the Contractor and approved by the Engineer; *or*

   b. Material within the proposed roadway prism and more than 3 feet below the subgrade may be broken into pieces not more than 18 inches in any dimension, sufficiently displaced to allow for adequate drainage, and left in the roadway prism.

2. **Asphalt concrete pavement** that does not overlay or underlie hydraulic cement concrete pavement shall be removed as follows:

   a. Pavement shall be removed and used in the work as designated on the plans or as directed by the Engineer; *or*

   b. When approved by the Engineer, pavement shall be removed and disposed of at locations selected by the Contractor.

3. **Cement-stabilized courses underlying pavement designated for demolition** shall be disposed of in accordance with (a)1.a. or (a)1.b. herein.

4. **Aggregate underlying pavement designated for demolition** except hydraulic cement concrete pavement disposed of in accordance with (a)1.b. herein shall be salvaged and used for maintenance of traffic or, when approved by the Engineer, disposed of in accordance with (a)2.a. herein.

(b) **Obscuring Roadway:**

1. **Areas outside construction limits consisting of asphalt concrete or hydraulic cement concrete pavement demolished in accordance with (a) herein** shall be conditioned in accordance with the following:

   a. Tops of slopes that do not contain rock shall be rounded for a distance of not more than 10 but not less than 5 feet (where sufficient right of way exists) beyond the point of intersection of the existing slope and the natural ground surface. The depth of the rounding shall be not more than 2 feet below the original surface of slopes.

b. Disturbed areas that are to receive vegetation shall be scarified or plowed, harrowed, and shaped.

c. Clearing and grubbing shall be performed in accordance with the requirements of Section 301.

2. **Areas outside construction limits consisting of pavement structures, other than asphalt concrete or hydraulic cement concrete, that are designated for obscuring roadway** shall be conditioned in accordance with (b)1. herein. Prior to the obscuring, pavement structures shall be removed in accordance with the applicable requirements of (a) herein.

508.03—Measurement and Payment

Demolition of hydraulic cement concrete pavement and shoulder structure courses or a combination thereof will be measured as demolition of pavement (rigid) and will be paid for in square yards based on the width of the widest course. Such price shall include all demolition, removal and disposal costs of pavement, base, subbase and stabilized subgrade materials.

Demolition of asphalt concrete pavement and shoulder structure courses or a combination thereof will be measured as demolition of pavement (flexible) and paid for in square yards based on the width of the widest course. Such price shall include all demolition, removal and disposal costs of pavement, base, subbase and stabilized subgrade materials.

Demolition of a combination of hydraulic cement concrete pavement and asphalt concrete pavement and shoulder structure courses or a combination thereof will be measured as demolition of pavement (combination) and paid for in square yards based on the width of the widest course. Such price shall include all demolition, removal and disposal costs of pavement, base, subbase and stabi- lized subgrade materials.

Obscuring roadway will be measured in units of 1,000 square feet computed to the nearest 1/10 unit and will be paid for at the contract unit price per unit. The area measured will be entirely outside the construction limits of the new roadway, as evidenced by slope stakes. Areas disturbed by the opera- tions, including tops of slopes to be rounded, will be included in the measurement. Removing pave- ment structures other than hydraulic cement–stabilized, hydraulic cement concrete, and asphalt con- crete pavement structures in accordance with (b) 2. herein will be measured as regular excavation in accordance with the requirements of Section 303 or as lump sum grading on minimum plan and no plan projects. Clearing and grubbing will be paid for in accordance with the requirements of Section 301.

Payment will be made under:

Pay Item	Pay Unit
Demolition of pavement	Square yard
Obscuring roadway	Unit
Demolition of pavement (Type)	Square yard

Section 512—Maintaining Traffic

512.01—Description

This work shall consist of maintaining and protecting traffic through areas of construction, maintaining public and private entrances and mailbox turnouts, constructing and obliterating detours, and protecting the traveling public within the limits of the project and over detours that are not a part of the state highway system in accordance with the contract documents.

512.02—Materials

(a) **Materials** salvaged from the roadway shall be used in the maintenance of traffic insofar as possible. Material shall conform to the requirements of the applicable specifications.

(b) **Signalization, barricades, channelizing devices, safety devices, and pavement markings** shall conform to the requirements specified in Division VII, Traffic Control Devices, and the *Virginia Work Area Protection Manual* except where otherwise indicated. Retroreflective surfaces shall conform to the requirements of Sections 235, 247, and 702, as applicable.

(c) **Temporary pavement markers** shall conform to the requirements of Section 235.

(d) **Construction pavement markings** shall conform to the requirements of Section 246.

(e) **Construction signs** shall conform to the requirements of Section 247. Sign substrates for rigid construction signs mounted on posts shall conform to the requirements of Section 701 or be a 0.079-inch-thick aluminum/plastic laminate.

Sign substrates for signs mounted on drums, Type III barricades, and portable sign stands shall be of the materials as specified in the charts that follow and shall be the same material that was used when the device was tested and found to be in compliance with the requirements of *National Cooperative Highway Research Program (NCHRP) Report 350,* Test Level 3, or of other materials allowed in the FHWA acceptance letter.

Sign Substrates for Type III Barricades and Portable Sign Stands
Rollup sign 0.4-inch-thick corrugated polypropylene or polyethylene plastic 0.079-inch-thick aluminum/plastic laminate

Sign Substrates for Drums
0.4-inch-thick corrugated polypropylene or polyethylene plastic

512.03—Procedures

Traffic shall be maintained and protected in accordance with the requirements of Section 105.14. Work shall be scheduled and performed so as to provide minimum interference with and maximum protection for traffic. The Contractor's personnel, equipment, machinery, tools, and supplies shall be kept outside the clear zone and clear of active traffic lanes except as necessary for prosecuting active work. Stabilized construction entrances shall be used in construction areas where there is a potential for construction vehicles to track material from the construction site onto a paved surface. Material that is spilled or tracked onto the traveled pavement during prosecution of the work shall be promptly removed.

The Contractor shall maintain the traffic control devices, which shall include, but not be limited to, repositioning of displaced devices including traffic barrier service, replacement due to inadequate structural integrity including traffic barrier service, replacement due to loss of reflectivity, repair of defaced sheeting and legend, replacement of broken supports, repositioning of leaning signs so they are plumb and the sign face is perpendicular to the pavement edge, cleaning of dirty devices, and replacement of stolen or vandalized devices. Barricades, barriers, and other safety devices shall be inspected at least daily, and deficiencies shall be immediately corrected. Safety and protective devices furnished by the Contractor will remain the property of the Contractor and shall be removed from the project site upon completion of the work or as directed by the Engineer.

(a) **Signs:** The Contractor shall furnish and install temporary sign panels necessary for the project, which shall include, but not be limited to, maintenance of traffic, beginning and end of construction, and off-project detour signing.

Signs and their placement shall conform to the requirements of the *Virginia Work Area Protection Manual*, the *MUTCD*, and the plans and as directed by the Engineer. The Contractor shall submit to the Engineer a sketch of his proposed construction sign layout for approval prior to installation. The Contractor shall furnish supports, i.e., wood posts and barrier and wall attachments, and hardware for use with the temporary sign panels. In lieu of using wood posts, the Contractor may request permission from the Engineer to use alternate prod- ucts on the Special Products Evaluation List. The request shall contain all information related to the manufacturer's installation requirements, including but not limited to, post spacing and the square footage of sign panel the product can support based on AASHTO's requirements for a wind speed of 60 miles per hour. The Contractor shall be responsible for covering, uncovering, or removing and reinstalling existing signs that conflict with the signs needed for maintenance of traffic. Covering of existing signs shall be accomplished in accordance with the requirements of Section 701.03(d). The Contractor shall furnish and install flags for the temporary sign panels as directed by the Engineer except flags will not be required for use on portable sign supports. Signs shall be installed and attached to wooden supports in accordance with Standard WSP-1 of the Department's *Road and Bridge Standards*. The size and number of wooden supports shall be in accordance with the standard drawings. When alternate products for supports are approved for use by the Engineer, the supports, including size and number, and signs shall be installed in accordance with the manufacturer's recommendation.

Retroreflective flexible sign base materials conforming to the requirements of Section 247 for material that is not Type VI material may be used both day and night up to a maximum of three continuous days.

The Contractor may furnish portable sign stands for mounting temporary sign panels in accordance with the following:

1. Sign installations shall be used for no longer than 3 consecutive days.

2. Portable sign stands shall be used with signs having a substrate material of the type required in Section 512.02(e) and only those that were tested and found to be in compliance with the requirements of *NCHRP Report 350*, Test Level 3, or otherwise accepted in an FHWA acceptance letter for the specific sign stand.

Portable sign stands shall conform to the requirements of *NCHRP Report 350*, Test Level 3, and shall be selected from those shown on the Department's Approved List or the Contrac- tor shall submit a certification letter submitted prior to their use stating the brands and mod- els of portable sign stands to be used along with a copy of the FHWA acceptance letter indi- cating compliance with *NCHRP Report 350*, Test Level 3,.Portable sign stands shall be self- erecting and shall accommodate signs of the shape being used. Portable sign stands shall support a 16-square-foot sign panel in sustained winds of 50 miles per hour without tipping over, walking, or rotating more than ±5 degrees about its vertical axis. Additional weight consisting of no more than one 25-pound sandbag placed on each leg or no more than two cone weights positioned on the center of the sign stand and around the mast may be used to comply with this requirement. When used on uneven surfaces, the portable sign stand shall be capable of adjusting to those surfaces to allow the signs to be installed in their normal upright position ±15 degrees. Portable sign stands shall include decals, stenciling, or other durable marking system that indicates the manufacturer and model number of the stands. Such marking shall be of sufficient size so it is legible to a person in a standing position.

The Contractor shall erect, maintain, move, and be responsible for the security of sign panels and shall ensure an unrestricted view of sign messages for the safety of traffic.

When construction signs are covered to prevent the display of the message, the entire sign shall be covered with silt fence or other materials approved by the Engineer such that no portion of the message side of the sign shall be visible. Plywood shall be used on ground- mounted construction signs only. Attachment methods used to attach the covering material to .the signs shall be of a durable construction that will prevent the unintentional detach- ment of the material from the sign. At no times shall a construction sign and/or post be rotated to prevent the display of the message. In addition, the posts where the signs are being covered shall have two ED-3 Type II delineators mounting vertically on the post below the signs at a height of 4 feet to the top of the topmost delineator. The bottom delineator shall be mounted 6 inches below the top delineator.

(b) **Flagger Service and Pilot Vehicles:** The Contractor shall provide flagger service in accordance with the requirements of Section 105.14(c).

When one-way traffic is approved, the Contractor shall provide flagger service and, where necessary, pilot vehicles to maintain traffic. Each vehicle shall be equipped with at least one roof-mounted rotating amber flashing light and shall display required signs while in service.

Portable traffic control signals conforming to the requirements of Section 512.03(h)2 may be used in lieu of flagger service when specified or approved by the District Traffic Engineer. When

portable traffic control signals are used in lieu of flagger service, the portable traffic control signals will be measured and paid for separately.

(c) **Electronic Arrows:** Electronic arrows shall be electronic flashing or sequential amber arrows having dimmer controls and shall be mounted on suitable trucks or trailers. The Contractor shall maintain and move electronic arrows as needed for traffic control.

Trailers supporting arrow boards and the boards themselves shall be either Virginia highway orange (DuPont Color No. LF74279 AT or color equivalent) or federal yellow in color. The trailer's back frame shall have 2-inch-high retroreflective sheeting conforming to the requirements of Section 247.02(c) installed on the area facing traffic. The sheeting shall have alternating 11-inch-wide vertical red stripes and 7-inch-wide vertical white stripes.

(d) **Warning Lights:**

1. **Type A flashing lights** shall be used for advance warning signs and hazardous locations and shall be in operation during hours of darkness and low visibility. A Type A flashing light shall be installed on concrete traffic barrier service at the break point between the transition and tangent sections.

2. **Type B flashing lights** shall be used when specified on the plans for advanced warning signs and extremely hazardous locations and shall be in operation at all times.

3. **Type C steady burn lights** shall be used when specified on the plans for channeling traffic and may be placed on Group 2 channelizing devices. When used on Group 2 channelizing devices, the channelizing devices shall have been tested with the light and an FHWA acceptance letter issued indicating compliance with *NCHRP Report 350,* Test Level 3, as required in (e) herein. Lights shall be placed at intervals of 80 feet along tangent sections and 40 feet along bridges, transitions, and curves greater than 6 degrees. Lights shall be in operation from 30 minutes before sunset until 30 minutes after sunrise, on heavy overcast days, in fog, and during periods of darkness or low vis- ibility as directed by the Engineer.

(e) **Channelizing Devices:** Channelizing devices shall conform to the requirements of *NCHRP Report 350,* Test Level 3, Channelizing devices shall be selected from those shown on the Department's Approved List beginning with the applicable purchasing dates. The Contractor shall provide a certification letter stating the brands and models of channelizing devices contained on the listing that will be used. In lieu of using channelizing devices on that listing, the Contractor may use other brands and/or models conforming to the specification requirements provided he submits catalog cuts/brochures of each brand and model prior to their use and complies with the following requirements:

1. **Channelizing devices except drums/cones with an auxiliary device attached and portable vertical panel assemblies:** A copy of a letter from the manufacturer certifying that the specific channelizing device is crashworthy, i.e., that it will comply with the evaluation criteria specified in *NCHRP Report 350.* This certification may be a one-page affidavit signed by the manufacturer.

2. **Drums/cones with an auxiliary device attached, and portable vertical panel assemblies with or without an auxiliary device attached:** A copy of the FHWA acceptance letter indicating compliance with *NCHRP Report 350,* Test Level 3 shall be submitted.

The Contractor shall provide, when applicable, a certification letter indicating that the channelizing devices being used that are not on the Department's Approved List and for which no catalog cuts/brochures and self-certification are being supplied were purchased prior to October 2, 1998, or October 2, 2000, as applicable.

Spacing of channelizing devices shall be in accordance with the *Virginia Work Area Protection Manual.*

A. Group 1 devices shall consist of tubular delineators or cones approximately 36 inches in height for interstate and other limited access roadways and approximate- ly 28 inches in height for other roadways. They shall be used as temporary chan- nelizing devices. When used during hours of darkness, they shall be provided with reflectorized collars or sleeves.

B. Group 2 devices shall be drums or vertical panels. Drums shall be round, or par- tially round with no more than one flat side; made from plastic; have a minimum height of 36 inches, have a cross-sectional width no less than 18 inches in any di- rection; and conform to the requirements of the *Virginia Work Area Protection Manual*. Drums shall be designed to allow for separation of ballast and drum upon vehicular impact but not from wind and vacuum created by passing vehicles. Drums of two-piece design, i.e., drum and associated base, shall utilize sufficient amounts of enclosed sand at the base in accordance with the manufacturer's rec- ommendations to provide stable drum support. The base shall be not greater than 5 inches in height. Two-piece drums may also utilize a flared drum foundation and collar of not more than 5 inches in height and of suitable shape and weight to provide stable support. One-piece drums may be used provided they comply with these above requirements.

Vertical panels shall be mounted on posts conforming to the requirements of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

Vertical panels will be allowed only for use in locations indicated in the contract documents. Non-portable vertical panels shall be mounted on posts conforming to the requirements of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

Open-top drums will not be allowed. Markings on drums shall be horizontally cir- cumferential, alternating from the top of the drum, with orange and white 6-inch-wide retroreflective stripes. Each drum shall have a minimum of two orange and two white stripes, and the top stripe shall be orange. Any non-retroreflective areas on the drum except the base shall be orange, and spaces between retroreflective stripes shall not exceed 2 inches in width.

The Contractor shall furnish and install signs (Stop, chevron, Keep Right, etc.) for the drums as directed by the Engineer. Sign panels used on drums tested for con- formance with NCHRP 350, Test Level 3 requirements shall be of the same material as that used for the test except that

materials as allowed by the FHWA acceptance letter may be used when approved by the Engineer.

(f) **Traffic Barrier Service:** Barrier service shall be of sufficient length to protect traffic and personnel in construction areas.

The Contractor shall continuously prosecute the work until completion once a barrier is in place. If the Contractor does not, the Engineer may cause him to discontinue operations in other areas on the project and concentrate efforts behind the traffic barrier service. When construction work is completed to the extent that traffic barrier service is no longer required as determined by the Engineer, devices shall be removed.

Neither workers nor equipment shall traverse areas confined by traffic barrier service and travel lanes except as approved by the Engineer and then only with adequate flagger service to safeguard workers and traffic in advance of and at the point the traffic barrier service is opened. Barrier openings for construction access may be provided only along tangent sections or along the inside of curved sections and shall be limited to the minimum length required for equipment access. The normal pavement alignment at the barrier opening shall be maintained with removable pavement marking. At ingress openings, the exposed end of the barrier service shall be provided with a temporary impact attenuator as approved by the Engineer. At egress openings, the exposed end shall be transitioned as dependent on the posted speed for traffic. The transition flare rate shall comply with the requirements of the *Virginia Work Area Protection Manual*. For speeds below 30 miles per hour, the transition flare rate shall be the same as that indicated for 30 miles per hour. An impact attenuator will not be required at the exposed end of egress openings in barrier service provided the deflection an- gle between the pavement edge and ends of the barrier service openings is 20 degrees or more.

Delineators shall be installed on traffic barrier service in accordance with the requirements of Section 702. Barrier vertical panels shall be installed on top of the concrete barrier service. Reflectorized sheeting shall comply with the requirements of Section 247. Design and installation of barrier vertical panels shall comply with the requirements of the *Virginia Work Area Protection Manual*.

The Contractor shall maintain the structural integrity of the barrier and its alignment while it is in use and shall maintain warning lights, delineators, and other devices in a clean and visible condition at all times.

1. **Guardrail barrier service and terminal treatments** shall be installed in accordance with the requirements of Section 505 except that the offset distance shall be as specified by the Engineer. The Contractor may reuse guardrail used for traffic barrier service guardrail for permanent installation provided the guardrail material conforms to the requirements of Section 505 and the standard drawings and is acceptable to the Engineer. Marred galvanized surfaces shall be repaired in accordance with the requirements of Section 233.

2. **Concrete barrier service** shall be installed in accordance with the plans and standard drawings or as directed by the Engineer. When barrier terminates at a guardrail, fixed object attachments connecting the barrier to the guardrail shall be installed in accordance with the applicable standard for fixed object attachment. Installation shall include additional guardrail posts and attachments as required. Concrete barrier connections shall be snug to prevent

motion between sections.

Precast concrete parapet for precast concrete parapet traffic barrier service shall be anchored as shown on the plans. Anchor holes in bridge decks shall be drilled with a rotary impact drill or other approved equipment that will prevent damage to the deck. Anchor holes shall be located so as to avoid cutting reinforcing steel. Upon removal of the parapet, anchor holes shall be cleaned and filled with Type EP-4 or EP-5 epoxy mortar conforming to the requirements of Section 243.

Parapet used for concrete parapet traffic barrier service will not be permitted for permanent installations on bridge structures.

The Contractor shall visually inspect all traffic barrier service shipped to a project prior to placing it in use. Concrete barrier sections shall be structurally sound with no concrete missing along the top, bottom, sides, or end sections of the barrier; no through cracks; and no exposed rebar. Any traffic barrier service found by the Contractor or Engineer to be unaccept- able due to inadequate structural integrity or functionality shall be promptly removed from the project site and replaced at no cost to the Department. Traffic barrier service shall be selected from those shown on the Department's Approved List, except that the Contractor may use other traffic barrier service provided he submits a copy of the FHWA acceptance letter indicating compliance with *NCHRP Report 350* prior to it being used.

The Contractor shall maintain the structural integrity of the barrier and its alignment while it is in use and shall maintain warning lights, barrier vertical panels, delineators, and other devices in a clean and visible condition at all times. Concrete barrier service shall be cleaned or coated sufficiently to afford good visibility and uniformity of appearance.

(g) **Impact Attenuator Service:** Impact attenuator service shall be installed at locations shown on the plans or designated by the Engineer. A modified Type III object marker shall be installed on impact attenuators.

(h) **Temporary Signalization:** When specified on the plans, the Contractor shall install and maintain temporary or portable traffic control signal equipment. The Contractor shall submit to the Engineer a plan for locating, installing, and maintaining signals that shall depict the Contractor's intent for maintaining traffic flows during construction operations, including type of vehicle detection, phase sequencing, and timings. The Contractor shall receive acceptance of the plan from the Engineer prior to beginning work that would necessitate installing the proposed temporary or portable traffic control signals. The Contractor's design shall conform to the requirements of the applicable sections of *AASHTO's 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*; *MUTCD*; and the *Virginia Work Area Protection Manual*. Existing traffic control signal equipment materials on the project may be used. New, salvaged, or refurbished traffic con- trol signal equipment materials brought to the project shall conform to the contract specifications and standards.

1. **Temporary traffic control signals** shall conform to the following: the controller, accessory, auxiliary, and conflict monitoring equipment shall conform to the requirements of NEMA TS-1, NEMA TS-2, or as approved by the Engineer.

2. **Portable traffic control signals** shall conform to the following:

   a. phase sequencing, timings, and conflict monitoring complying with NEMA TS-1 (Functional Standards).

   b. 5 programmable day programs within a 24-hour period.

   c. 12-inch traffic signal head sections with backplates mounted in the vertical display arrangement.

   d. vehicular detection that will detect all licensed vehicles unless otherwise indicated in the contract documents.

   e. adequate safeguards to prevent unauthorized entry to the control equipment.

   f. trailer-mounted type with at least one of the two traffic signal heads positioned over the travelway with a minimum 16 feet of clearance from the pavement to the lowest point of the signal head assembly.

   g. operate from its own self-contained power supply with the capability of connecting to an external 110-VAC electrical power supply. When operating from a self- contained solar power supply, the battery backup shall be capable of operating for 18 continuous days at 77 degrees F without solar array assist.

   h. back frame of trailer with 2-inch-high reflective sheeting conforming to the requirements of Section 247.02(c) installed on the area facing traffic; sheeting shall have alternating 11-inch-wide vertical red stripes and 7-inch-wide vertical white stripes.

   i. designed to comply in the operating mode with loading conditions associated with wind gusts of 80 miles per hour as specified in *AASHTO's 1994 Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*.

Temporary and portable traffic control signals that are not specified on the plans but are installed by the Contractor for his convenience shall be installed at the Contractor's expense and shall be approved through the process specified herein.

Maintenance and operation of temporary and portable traffic control signals shall be the responsibility of the Contractor and shall be in accordance with the requirements of Section 703.03(a).

When required, the Contractor shall make arrangements with the local utility company for electrical service for new temporary and portable traffic control signals, which shall include the costs of connection, disconnection, and energy. If electrical service is not available, the Contractor shall provide a generator capable of continuously operating the temporary and portable traffic control signals for at least 24 hours unassisted. The Contractor shall demon- strate the signal's operational procedures and reliability to the Engineer for approval prior to beginning work necessitating use of the signal equipment.

(i) **Construction Pavement Markings:** Construction pavement markings shall be installed at locations shown on the plans and in the *Virginia Work Area Protection Manual* and at other locations as directed by the Engineer. Construction pavement markings shall be selected from the Department's Approved List of Construction Pavement Marking Materials. Con- struction pavement markings are classified as Type D, Classes I and II (removable tape); Type E (non-reflective black removable tape); and Type F, Classes I and II (temporary markings). Construction pavement markings shall be used as follows:

1. **Type D construction pavement markings** shall be used on final roadway surfaces or in areas where traffic patterns are subject to change before pavement is resurfaced unless the surface temperature of the pavement is below the pavement marking mini- mum application temperature recommended by the manufacturer. When the surface temperature of the pavement is below the manufacturer's minimum application tem- perature, a Type F construction pavement marking on the approved list under the same class as the specified Type D construction pavement marking may be used except on final surfaces. The Contractor shall select a Type F product known to perform the best under those temperature conditions. When a Type F construction pavement marking is used in lieu of a Type D construction pavement marking due to the surface temperature being below the manufacturer's minimum application temperature, the Contractor will be paid the price bid for Type D, which will include the Type F markings and any nec- essary eradication of existing pavement markings.

2. **Type E construction pavement markings** shall be used to cover existing markings in accordance with (j) herein.

3. **Type F construction pavement markings** shall be used where the roadway is to be resurfaced prior to changes in the traffic pattern or where pavement is to be demolished and traffic patterns will not change before demolition.

   Construction pavement markings shall be installed in accordance with the manufacturer's recommendations. Application thickness and bead application shall comply with the manufacturer's recommendations except as follows. In the event the manufacturer's recommendation for material thickness and quantity of beads is less than that used when the material was tested by the National Transportation Product Evaluation Pro- gram (NTPEP), the minimum values used during product installation shall conform to the NTPEP test values that are indicated on the approved list for the specific marking. The Contractor shall furnish a copy of the manufacturer's installation recommendations including the thickness, bead embedment, and dispersement to the Engineer.

   The Contractor shall maintain the construction pavement markings and shall correct any deficient markings by reapplying markings. Deficient construction pavement markings are considered to be any markings that do not provide adequate guidance to motorists due to inadequate retroreflectivity or color qualities or due to problems with adherence to the pavement. The Engineer will make a visual nighttime inspection of all construction pavement markings to identify areas of markings that have inadequate re- troreflectivity qualities.

Those markings that have inadequate retroreflectivity qualities as determined by the Engineer shall be replaced by the Contractor with the following exceptions:

a. Reapplication of skip line construction pavement markings is not required unless the inadequate retroreflectivity qualities are for at least two consecutive skip lines.

b. Reapplication of center; line, except skip lines; or edge line construction pavement markings is not required unless the inadequate retroreflectivity qualities are for at least a continuous section of 70 feet.

c. Reapplication of transverse markings is not required unless the inadequate retroreflectivity qualities are for at least a continuous section exceeding 3 feet.

In lieu of replacement of construction pavement markings based on visual observations by the Engineer, the Contractor may have retroreflectivity readings made. These measurements shall be taken within 48 hours after the Contractor has been notified of the deficient markings except additional time will be granted due to inclement weather that prevents the adequate measurement of the markings. The Contractor shall brush any form of debris from the line before performing the measurements. Measurements shall be taken in the presence of the Engineer using Contractor-furnished equipment con- forming to the requirements of ASTM E 1710. The Contractor shall operate the equipment in accordance with the manufacturer's instructions, and a copy of such instructions shall be provided to the Engineer. The photometric quantity to be measured is the coefficient of retroreflected luminance (RL), which shall be expressed as millicandelas per square foot per footcandle. Measurements shall be taken at three random locations within each area of markings that have inadequate retroreflectivity qualities. When the length of the visually inadequate area is greater than 1 mile, measurements shall be taken at three locations per mile segment or portion thereof. Measurements for all lines shall be taken in the middle of the line horizontally. Measurements for skip lines shall be taken in the middle of their length. Measurements for transverse lines shall be taken outside of the wheel path locations. The Engineer will designate the locations along the line segments where the measurements shall be taken. The Contractor shall make a log of the measurements and their locations and provide a copy to the Engineer. When the average of the three readings for an area is below 100 millicandelas per square foot per footcandle, the Contractor shall reapply the markings as indicated.

Construction pavement markings that no longer adhere to the pavement shall be reapplied by the Contractor with the following exceptions:

1. Reapplication of skip line construction pavement markings is not required unless the markings do not adhere for at least two consecutive skip lines.

2. Reapplication of center; lane, except skip lines; or edge line construction pavement markings is not required unless the markings do not adhere for at least a continuous section of 70 feet.

3. Reapplication of transverse markings is not required unless the markings do not adhere for at least a continuous section exceeding 3 feet.

However, all construction pavement markings that no longer adhere to the roadway that may cause guidance problems for motorists shall be removed by the Contractor.

Removable construction pavement markings shall be replaced on time frames as recommended by the manufacturer of the marking to prevent the need for eradication. The Con- tractor shall furnish a

copy of the manufacturer's recommendations to the Engineer.

Those construction pavement markings found in need of reapplication in accordance with these requirements shall be reapplied by the Contractor at no additional cost to the Department with the following exceptions:

a) Markings that have been under traffic for more than 90 days will be paid for at the contract unit price when needing reapplication unless the manufacturer's warranty coverage is still in effect.

b) Markings damaged by the Department's snow removal or other maintenance and construction operations will be paid for at the contract unit price.

Construction pavement markings shall be replaced in accordance with the time requirements of Section 704.

Eradication for reapplication of Type F construction pavement markings is not required if allowed by the marking manufacturer provided the existing marking is well adhered and the total thickness of the existing and reapplied marking combined will not exceed 40 mils. If not well adhered, 90 percent of the existing markings shall be removed prior to reinstalla- tion of the markings.

Temporary pavement markers shall be installed with construction pavement markings in accordance with (k) herein.

(j) **Eradicating Pavement Markings:** Markings that may conflict with desired traffic movement, as determined by the Engineer, shall be eradicated as soon as is practicable: either immediately prior to the shifting of traffic or immediately thereafter and prior to the conclu- sion of the workday during which the shift is made.

Eradication shall be performed by grinding, blasting, or a combination thereof. Grinding shall be limited to removal of material above the pavement surface except when removing thermoplastic and preformed tape markings, which may be removed by grinding alone. Blasting shall be used on both asphalt concrete and hydraulic cement concrete pavements to remove all other types of markings. Other methods may be submitted for approval by the Engineer. The Contractor shall ensure that the roadway surface is damaged as little as possi- ble when performing the eradication.

When eradicating pavement markings, the Contractor shall ensure workers are protected in conformance to the requirements of *Occupational Safety and Health Administration's (OSHA)* standards as detailed in 29 CFR 1910 or 1926, whichever is the most stringent at the time. The Contractor shall collect the eradication residue during or immediately after the eradication operation, except dust shall be collected during the entire operation. Eradication residue from the removal of any pavement markings is considered to be a non-hazardous waste material and shall be disposed of in a properly permitted waste disposal facility in ac- cordance with state and federal laws and regulations. Testing of the eradication residue for the eight Resource Conservation Recovery Act metals will not be required.

When markings are removed for lane shifts or transitions, 100 percent of the marking shall be removed.

Non-reflective removable black construction pavement marking may be used to cover exist- ing markings in lieu of eradication on asphalt concrete surfaces when its use will not be re- quired for more than 120

days and when specified as a pay item. The Contractor shall use this material to cover markings as indicated in the plans or as directed by the Engineer. Non-reflective removable black construction pavement marking shall be applied in accor- dance with the manufacturer's recommendations.

(k) **Temporary Pavement Markers:** Temporary pavement markers shall be installed with construction pavement markings, except non-reflective removable markings, in transition (lane drop) or lane shift areas of work zones that will encroach upon the traveled roadway for a period of more than 3 days and in other areas as required by the Engineer.

Temporary pavement markers shall be installed on 20-foot centers in lane shift and transition areas. When temporary pavement markers are required in other areas, they shall be in- stalled on 40-foot centers unless otherwise required by the Engineer. Temporary pavement markers shall be located between and in alignment with broken lines and beside solid line pavement markings. Where double-line pavement markings separating traffic are installed, two-way markers shall be installed beside each line. The Contractor may install two one- way markers in lieu of each two way marker at no additional cost to the Department.

Temporary pavement markers shall be installed with a hot-applied bitumen adhesive except epoxy may be used on hydraulic cement concrete roadways and non-final surfaces of asphalt concrete roadways. Damage to the pavement by removal of markers shall be repaired in kind by the Contractor at no additional cost to the Department.

Temporary pavement markers found in need of replacement shall be replaced by the Contractor at no additional cost to the Department except those markers damaged by the Department's snow removal operations or other maintenance and construction operations will be paid for at the contract unit price.

(l) **Detours:** Where temporary structures are necessary, they shall be designed and provided by the Contractor and of sufficient strength, width, and design to accommodate the volume and character of traffic using the highway. Temporary structures crossing waterways shall provide necessary hydraulic openings to accommodate the flow of the waterway. Temporary structure designs shall be submitted to the Engineer for review.

When a detour is no longer required, as determined by the Engineer, it shall be promptly removed, and the materials shall be disposed of as approved or directed by the Engineer. The Contractor shall design and provide temporary drainage facilities of adequate size to carry the normal flow of the existing drainage or waterway.

(m) **Aggregate Material:** Aggregate material shall be placed at crossovers, private entrances, and mailbox turnouts and where specified by the Engineer.

(n) **Construction Pavement Message Markings:** Markings shall be installed at locations designated on the plans and as determined by the Engineer and shall consist of messages that comply with the requirements of Section 704. Construction pavement message marking material including maintenance of the markings shall comply with the requirements for construction pavement markings. Retroreflective measurements shall be taken out of the wheel path locations, and each separate entity of a pavement message marking shall be replaced when the average of the three readings for the entity

is below 100 millicandelas per square foot per footcandle.

(o) **Type III Barricades:** Type III barricades shall conform to the requirements of *NCHRP Report* 350, Test Level 3, be at least 4 feet in width, and be selected from those shown on the Department's Approved List. The Contractor shall provide a certification letter stating the brands and models of Type III barricades on the listing that will be used. In lieu of using Type III barricades on that listing, the Contractor may use other brands and/or models pro- vided that prior to their use he submits a copy of the FHWA acceptance letter indicating their compliance with *NCHRP Report* 350, Test Level 3.

(p) **Truck-mounted Attenuators:** Truck-mounted attenuators shall conform to the requirements of *NCHRP Report 350, Test* Level 3.

Prior to their use, the Contractor shall submit catalog cuts/brochures of the truck-mounted attenuator and a copy of the FHWA's acceptance letter documenting acceptance of the specific truck-mounted attenuator

The truck-mounted attenuator shall be no less than 72 inches wide and no more than 96 inches wide. The color of the truck-mounted attenuators shall be yellow or orange.

The rear panel shall have alternate 6-inch-wide orange and black chevron (inverted V) stripes. Stripes shall be sloped at a 45-degree angle downward in both directions from the upper center of the rear panel. Stripes shall be fabricated from fluorescent orange prismatic lens reflective sheeting conforming to the requirements of Section 247.02(e).

The weight of the support truck shall be as recommended by the manufacturer of the truck-mounted attenuator. The Contractor shall provide a copy of the manufacturer's recommen- dation to the Engineer and a copy of a weigh ticket for the truck. The weigh ticket shall con- tain adequate information to associate the ticket with the applicable truck. Additional weight may be added to the support vehicle to achieve the range recommended by the man- ufacturer of the truck-mounted attenuator provided the total weight is within the Gross Ve- hicle Weight Recommendation of the support vehicle and is installed such that no move- ment will occur during impacts.

The support vehicle shall have at least one rotating amber light or high-intensity amber strobe light functioning while in operation in accordance with the *Virginia Work Area Pro- tection Manual (visible for 360 degrees)*. When allowed by the *Virginia Work Area Protection Manual*, an electronic arrow operated in the caution mode may be used in lieu of the ro- tating or high-intensity amber strobe light.

The transmission of the support vehicle with the truck-mounted attenuator in use shall be in second gear, except for those with an automatic transmission, which shall be in park. The parking brake shall be applied and the front wheels aligned straight ahead when operating in the stationary mode.

Limitations: Support vehicles shall not be used for other purposes while the truck-mounted attenuator is being used. There shall be no additional devices in the bed of the support vehi- cle except the additional weight as allowed in this Section and traffic control devices such as truck-mounted electronic arrows. There shall be no additional devices, including, but not limited to, signs, lights, and flag holders attached to the truck-mounted attenuator except those that were tested on the truck-mounted attenuator and provided

by the manufacturer of the truck-mounted attenuator.
In the event the truck-mounted attenuator is impacted, resulting in damage that would cause the unit to be ineffective, all work requiring the use of the truck-mounted attenuator shall cease until such time that the Contractor can provide an acceptable unit by means of repair or replacement.

Work performed in conjunction with (i), (j), (k), and (n) herein shall be performed in accordance with the requirements of Section 704 except as noted herein.

Replacement and correction of ineffective work zone traffic control devices: These shall be accomplished in accordance with the *American Traffic Safety Service Association's (ATSSA) Quality Standards for Work Zone Traffic Control Devices* with the following addi- tions and exceptions:

1. Requirements herein for replacement and correction of construction pavement markings shall be used in lieu of the requirements in the section entitled "Evaluation Guide Pavement Tape & Raised Pavement Markers."

2. The categories for "Arrow Panel (Flashing Arrow and Double Arrow Mode)" shall be replaced by the following:

   Acceptable: No lamps out in stem and arrow head(s), and dimming properly.

   Marginal: No more than 1 lamp out in the stem and no lamps out in the head(s), and dimming properly.

   Unacceptable: Any lamp out in the head(s) or more than 1 lamp out in the stem, or arrow panel not dimming properly.

3. "Arrow Panel (Caution Mode - Bar or Corners)" shall be replaced by the following: **EVALUATION**

   GUIDE - ARROW PANEL (CAUTION MODE - CORNERS) Acceptable: No lamps out and

   dimming properly.

   Unacceptable: Any lamp out or arrow panel not dimming properly.

   Any operating lamp that is out of alignment will be considered not functioning.

4. The "unacceptable" category for arrow panels shall necessitate immediate corrective action if the device is found in operation on the jobsite.

(q) **Portable Changeable Message Sign** (PCMS):

Units shall be self-contained, including message board, power supply, and trailer. The controller head shall have a back-up system to prevent loss of memory. The trailer and sign frame shall be painted federal yellow or Virginia Highway Orange (DuPont Color#LF74279 AT or color equivalent). The sign panel support shall provide for an acceptable roadway viewing height that shall be not less than 7 feet from bottom of sign to crown of road.

The message board shall provide for 3 lines of legend and shall be formed of characters no less

than 18 inches high. Each line shall be composed of at least eight characters and each character module shall at a minimum use a five-wide by seven high pixel matrix. The message shall be composed from keyboard entries. The message shall be legible in any lighting condition. Motorists should be able to read the entire PCMS message twice while traveling at the posted speed.

The sign shall be capable of sequentially displaying at least 3 messages of 3 lines each with appropriate controls for selection of messages and variable off-on time.

The Contractor shall determine from its plan of operations or working schedule the most efficient and effective use of the PCMS units based on its construction sequencing or traffic control operations. PCMS signs shall be periodically checked by the Contractor for compliance with manufacturer's requirements for operation and functions, and shall be ready for immediate use once employed on the project.

During emergency situations the Contractor shall make every effort to deploy units it has assigned to the project. However, if the number of units shown on the plans are already in operation and cannot be reassigned to handle the emergency situation, then the Contractor shall immediately contact the Engineer. The Engineer will then make a determination as to the most expeditious manner in which to deploy units for emergency use, whether by using Department supplied units, directing the Contractor to reassign those units he has commit- ted to the project, or having the Contractor supply additional units as may be necessary. In these circumstances, the cost for such additional units that are authorized by the Engineer shall be in accordance with the requirements of Section 109.05.

If the use of additional units beyond the number of those identified in the plans is required due to reasons attributable to the Contractor or his manner of operations as determined by the Engineer, and no units are available, the Contractor shall furnish such additional unit(s) to the project within two hours of the Engineer's request or the Department will move to provide such units as necessary and deduct the cost from any monies due the Contractor. This action shall in no way relieve the Contractor of the responsibility for controlling, main- taining, and completing the work.

The number of units estimated by the Department to be used for the project will be as shown on the plans. The number of units and hours of use estimated by the Department was based on the suggested Sequencing of Construction shown in the plans and may be different from the Contractor's own construction plan.

512.04—Measurement and Payment

Flagger service will be measured in hours as authorized or approved by the Engineer except when used for the Contractor's convenience, such as for ingress and egress for moving construction equipment or materials. In such cases, payment will not be made for flagger service. Flagger service will be paid for at the contract unit price per hour. This price shall include paddles, safety equipment, and portable traffic control signals.

Pilot vehicles will be measured in hours of actual use, as required by the Engineer, and will be paid for at the contract unit price per hour. This price shall include vehicles, necessary warning devices, drivers, fuel, and maintenance.

Electronic arrows will be measured in hours of actual use, as required by the Engineer, except when used as an option to the use of a rotating amber light or alternating high-intensity amber strobe light. In such cases, payment will not be made for electronic arrows. Electronic arrows will be paid for at the contract unit price per hour. This price shall include arrow panels, fuel, maintenance, and a truck or trailer having flashing amber warning lights.

Warning lights for use on sign panels will be measured in days of actual use for the type specified and will be paid for at the contract unit price per day. This price shall include maintaining, relocating, and removing warning lights. Warning lights installed on traffic barrier service will not be measured for separate payment, but the cost thereof shall be included in the linear foot price bid for traffic barrier service.

Group 1 channelizing devices will not be measured for separate payment. The cost thereof shall be included in the price for other appropriate pay items.

Group 2 channelizing devices, as required by the Engineer, will be measured in days and will be paid for at the contract unit price per day. This price shall include maintaining devices, removing devices when no longer required, and signs. When Group 2 channelizing devices are moved to a new location or are removed and re-installed at the same location, they will be measured for separate payment. However, when the Group 2 channelizing devices are moved from one lane to another by simply moving the devices across the lane edge line without removal from the roadway, no additional payment will be made.

Traffic barrier service will be measured and paid for at the contract unit price per foot per location. This price shall include warning lights, delineators, barrier vertical panels, fixed object attachments, patching restraint holes, maintaining, and removing when no longer required. When fixed object attachments are used on traffic barrier service in locations where existing guardrail is in place, this price shall include restoring existing guardrail to its original condition. When traffic barrier service is moved to a new location as directed or approved by the Engineer, the relocation will be measured for separate payment. Payment for traffic barrier service will not be made until the work behind the barrier is actively pursued.

Traffic barrier service guardrail terminal will be measured and paid for in units of each or linear feet, as applicable, which price shall include furnishing, installing, and removing when no longer needed. When traffic barrier service guardrail terminal is moved to a new location, as directed or approved by the Engineer, the relocation will be measured for separate payment.

Impact attenuator service will be measured in units of each and will be paid for at the contract price per each. Impact attenuators used with barrier openings for equipment access will not be measured for separate payment.

Temporary traffic control signal will be paid for on a lump sum basis. This price shall include, but not be limited to, poles; span wire; conduit; conductor cable; traffic signal heads; backplates; hanger assemblies; necessary control items; vehicle detection; and, when approved, portable traffic control signal equipment. The price shall also include maintaining, adjusting, and aligning equipment; providing electrical service; utility company costs; and removing equipment when no longer required.

Construction pavement markings will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include marking materials, preparing the surface, adhesive, maintaining, removing removable markings when no longer required, inspections, and testing.

Construction pavement message markings will be measured in units of each and will be paid for at the contract unit price per each. This price shall include marking materials, preparing the surface, adhesive, and maintaining and removing removable markings when no longer required.

Temporary pavement markers will be measured in units of each and will be paid for at the contract unit price per each. This price shall include furnishing and installing pavement markers, surface preparation, adhesive, maintaining and replacing lost or damaged markers, and removing the pavement markers and adhesive when no longer required.

Eradication of existing pavement markings will be measured in linear feet of a 6-inch width or por- tion thereof. Widths that exceed a 6-inch increment by more than 1/2 inch will be measured as the next 6-inch increment. Eradication of existing pavement markings will be paid for at the contract unit price per linear foot. This price shall include removing pavement line markings and messages and disposal of residue.

Temporary detours will be measured in linear feet along the centerline of the detour or by individual components with the quantities shown on the plans as maintenance of traffic items, in which the components will be measured in accordance with the applicable specifications. This price shall include removing and restoring. When a pay item, temporary detour will be paid for at the contract unit price per linear foot. This price shall include excavating, aggregate materials, drainage items, grading, asphalt, maintaining and removing detour, disposing of surplus and unsuitable material, and restoring property.

Aggregate material will be measured in tons and will be paid for at the contract unit price per ton for the type specified. This price shall include preparing the grade and furnishing, placing, maintaining, and removing material as required.

Type III barricades will be measured in units of each and will be paid for at the contract bid price per each for the width specified. Multiple 4-foot-wide Type III barricades may be used together to obtain the width being specified in the pay item. This price shall include the barricades; retroreflective sheeting; and maintaining, relocating to new locations, and removing the barricades when no longer required.

Construction signs will be measured in units of square feet and will be paid for at the contract price per square foot. This price shall include furnishing, installing, maintaining, covering and uncovering, relocating, and removing temporary sign panels, sign supports, hardware, delineators and flags. Payment based on square footage shall be compensation for the sign(s) for the duration of the project; multiple payments for the same sign used more than once will not be allowed.

Truck-mounted attenuator will be measured in hours of actual use and will be paid for at the contract unit price per hour. This price shall include the truck-mounted attenuator; support vehicle; lights; electronic arrows if allowed but not required; and maintenance. When electronic arrows are used at the option of the Contractor in lieu of the rotating or high-intensity amber strobe light, the cost of the electronic arrow shall be included in the price bid for truck-mounted attenuators. When electronic ar- rows are required and not only allowed on the truck-mounted attenuator support vehicles, they will be paid for separately.

Portable traffic control signal will be paid for on a lump sum basis. This price shall include portable traffic control signal equipment; installation; energy source; and maintaining, adjusting, aligning, removing, and relocating equipment.

Portable changeable message sign will be measured and paid for in hours of use, which price shall be full compensation for furnishing or mobilizing the unit(s) to the project, maintenance, operation, and repositioning the unit(s).

Payment will be made under:

Pay Item	Pay Unit
Flagger service	Hour
Pilot vehicle	Hour
Electronic arrow	Hour
Warning light (Type)	Day
Group 2 channelizing device	Day Traffic barrier service (Type and/or Standard) Linear foot
Traffic barrier service Guardrail terminal (Standard)	Each or Linear foot Impact attenuator service (Type) Each
Temporary signalization	Lump sum Construction pavement marking (Type and width) Linear foot Construction pavement message marking (Type and message) Each
Eradication of existing pavement marking	Linear foot
Temporary pavement marker ([ ]-way)	Each
Temporary detour (Standard and type)	Linear foot
Aggregate material (No.)	Ton
Type III barricade (Width)	Each
Construction signs	Square foot
Truck-mounted attenuator	Hour
Temporary traffic control signal	Lump sum
Portable traffic control signal	Lump sum
Portable Changeable Message Sign	Hour

SECTION 513—MOBILIZATION

513.01—Description

This work shall consist of performing preparatory operations, including moving personnel and equipment to the project site; paying bonds and insurance premiums; and establishing the Contractor's offices, buildings, and other facilities necessary to allow work to begin on a substantial phase of the Contract.

513.02—Measurement and Payment

Mobilization will be paid for at the contract lump sum price. This price shall include demobilization.

Payment for mobilization up to the limitations specified hereinafter will be made in two separate installments. The first installment of 50 percent of the contract lump sum price will be made on the first progress estimate following partial mobilization and initiation of construction work. The second installment will be made on the next progress estimate following completion of substantial mobilization, including erection of the Contractor's offices and buildings. Completion of erection of processing plants, if any, will not be required as a condition for the release of the second installment.

If the original contract lump sum price exceeds the limit stated hereinafter, the excess will be included on the semifinal estimate as follows:

More Than	To and Including	Limit
$0	$200,000	10% of total contract amount
200,000	1,000,000	$20,000 plus 7.5% (of total contract amount minus $200,000)
1,000,000	More	$80,000 plus 5% (of total contract amount minus $1,000,000)

No additional payment will be made for demobilization and remobilization because of shutdowns, suspensions of work, or other mobilization activities.

When not shown as a pay item, the cost of mobilization shall be included in the price bid for other appropriate items.

Payment will be made under:

Pay Item	Pay Unit
Mobilization	Lump sum

SECTION 515—PLANING PAVEMENT

515.01—Description

This work shall consist of planing rigid or flexible pavement to the designated depth in preparation for pavement repair or pavement overlay.

515.02—Procedures

Planing shall be performed with a pavement-planing machine of a type that has operated successfully on work comparable to that specified in the Contract.

Equipment and vehicles in use under traffic shall operate flashing or rotating amber lights. In addition, trail vehicles shall be equipped with electronic flashing or sequential amber arrows.

Irregularities and high spots shall be eliminated. The pavement surface shall be planed to the designated grade or gradient of approximately 1/4 inch per foot or as directed by the Engineer. Superelevated curves shall be planed as directed by the Engineer. Where the pavement is to be resurfaced, a 1-inch shoulder shall be cut along the gutter line to eliminate the necessity of feathering the edge of the new surface. Payment for providing the 1-inch shoulder shall be based on the total square yards of removed material regardless of the variable depth of the pass. Pavement cuttings shall be disposed of in accordance with the requirements of Section 106.04.

The planed surface shall be free from gouges, grooves, ridges, soot, oil film, and other imperfections and shall have a mosaic appearance suitable as a riding surface.

(a) **Hot Planing Methods:** Hot planing equipment shall be a self-propelled machine capable of heating, planing, and removing flexible pavement to the required depth, profile, and cross section. The machine shall be capable of cutting to a depth of at least 1/2 inch per pass and shall have an integral loader to pick up cuttings from the roadway and discharge them into a truck in a single operation. Planing machine burners shall use a heating fuel that will not cause aggregates or asphalt to be coated with soot or oil.

(b) **Milling and Cold Planing Methods:** Milling and cold planing equipment shall be capable of cutting to a depth of 2 inches in flexible pavement and 1/2 inch in rigid pavement while leaving a uniformly cut roadway surface capable of handling traffic prior to overlay placement. The ground speeds of the machine and the cutting equipment shall be independent. The machine shall have a self-contained water system for the control of dust and fine particles. The width of the machine shall allow controlled traffic.

515.03—Measurement and Payment

Where pavement is to be planed to a uniform depth, planning will be measured in square yards of removed pavement surface area per inch of depth and will be paid for at the contract unit price per square yard per inch. Where planning will be variable depth, planning will be measured in square yards of removed pavement surface area per pass per inch of depth measured at the maximum depth of removed pavement. This price shall include vehicles, safety equipment, warning devices, and removing and disposing of existing pavement.

Payment will be made under:

Pay Item	Pay Unit
Flexible pavement planing	Square yard
Rigid pavement planing	Square yard

Division VI ROADSIDE DEVELOPMENT

SECTION 602—TOPSOIL

602.01—Description

This work shall consist of applying topsoil in accordance with the requirements of these specifications and in conformity with the depths and limits shown on the plans or as established by the Engineer.

602.02—Materials

(a) **Class A topsoil** shall conform to the requirements of Section 244.02(b)1.

(b) **Class B topsoil** shall conform to the requirements of Section 244.02(b)2.

602.03—Procedures

(a) **Submittals:** When Class B topsoil is specified, the Contractor shall submit soil test reports to the Engineer for Class B topsoil in accordance with the requirements of Section 244.02(b).

(b) **Preparing Areas to Receive Topsoil:** Unless otherwise designated on the plans or directed by the Engineer, areas designated to receive topsoil shall be graded, shaped, and then scarified or tilled by disking, harrowing, or other approved methods to a depth of approximately 2 inches. Topsoil shall be applied only when the subsoil is in a loose, friable condition. Subsoil on slopes that have been horizontally grooved in accordance with the plans shall not be loosened.

(c) **Applying Topsoil:** The loose depth of topsoil shall be sufficient to allow the area to conform to the elevations shown on the plans after topsoil settles. After topsoil has been applied, large clods, hard lumps, and stones larger than 3 inches in diameter; brush; roots; stumps; litter; and foreign material shall be removed from the area. Where residential or commercial yards exist, the size of the large clods, hard lumps, and stones shall not exceed 3/4 inch in diameter. Such areas shall be hand raked to provide a smooth yard suitable for mowing by a yard mower. When the topsoiling operation is complete, the area shall be in a condition to receive seed, sod, or plants without further soil preparation. Areas shall be seeded within 7 calendar days after topsoiling is completed.

602.04—Measurement and Payment

Topsoil will be measured in acres of surface area computed to the nearest 0.1 acre and will be paid for at the contract unit price per acre. For smaller areas, and/or as identified on the plans, topsoil will be measured and paid for at the contract unit price per cubic yard. Such areas will be identified and labeled on the plans for cubic yards of soil to be applied. This price shall include soil testing and provision of test reports; preparing areas to receive topsoil; furnishing, loading, transporting, and applying topsoil; finishing areas; and restoring damaged areas.

Payment will be made under:

Pay Item	Pay Unit
Topsoil (Class and depth)	Acre
Topsoil (Class and depth)	Cubic yard

Section 603—Seeding

603.01—Description

This work shall consist of furnishing and applying fertilizer, lime, mulch, and seed in the quantities specified for areas designated on the plans or selected by the Engineer.

603.02—Materials

(a) **Seed** shall conform to the requirements of Section 244.02(c).

(b) **Fertilizer** shall conform to the requirements of Section 244.02(d).

(c) **Lime** shall conform to the requirements of Section 244.02(e).

(d) **Mulch** shall conform to the requirements of Section 244.02(g).

603.03—Procedures

Unless otherwise specified, seeding operations shall be performed at the times specified in Sections 303.03(b) and 602.03(b). Seeding operations shall not be performed when the ground is frozen or when soil or weather conditions would prevent proper soil preparation and subsequent operations. When hydroseeding is performed, nozzles or sprays shall not be directed toward the ground in a manner that will cause erosion or runoff. The Contractor shall notify the Engineer at least 48 hours prior to beginning seeding operations.

(a) **Applying Lime:** Lime shall be uniformly applied to areas to be seeded at the rate of 2 tons per acre. Any approved method may be used.

(b) **Preparing Soil:** After lime is applied, areas to be seeded shall be prepared in accordance with the following: Slopes 3:1 or flatter shall be loosened to a depth of approximately 3 inches by disking, harrowing, or other approved methods. Loosening of soil on excavated slopes steeper than 3:1 will not be required except to eliminate hard or crusted surfaces. Shoulders and embankment slopes steeper than 3:1 shall be loosened to a depth of approximately 1 inch. Clods, loose stones, and other foreign material larger than 3 inches in any dimension shall be removed and disposed of in accordance with the requirements of Section 106.04 or as approved by the Engineer. Gullies, washes, and disturbed areas that develop subsequent to final dressing shall be repaired before they are seeded.

    Topsoil, when specified, shall be applied in accordance with the requirements of Section 602.

(c) **Applying Fertilizer:** When dry fertilizer is used, it shall be applied uniformly to the seeding areas at the time of seeding at the rate of 300 pounds of fertilizer per acre (approximately 45 pounds of nitrogen per acre or 1.0 pound of nitrogen per 1,000 square feet) or as directed by the Engineer. Slow release and slowly soluble fertilizer may be applied through a hydraulic seeder except for sulfur-coated urea (SCU). The method of application for fertilizer products will be approved by the Engineer prior to application of the fertilizer. When applied in liquid form or mixed with water, fertilizer shall provide the same value of nutrients per acre as specified for dry fertilizer. Fertilizer applied in liquid form shall be constantly agitated during application.

(d) **Applying Seed:** Regular seeding shall consist of uniformly applying seed, fertilizer, and mulch on prepared areas.

Overseeding shall consist of applying seed and fertilizer on areas prepared as directed by the Engineer.

Where temporary seeding is employed as a means of soil stabilization it shall consist of applying seed, fertilizer, and mulch in accordance with the rates specified in the plans or in Section 603.03 to stabilize areas on which grading operations are anticipated to be suspended for durations greater than 15 days. Where temporary seeding is required or directed by the Engineer, the cost for removal of vegetation once grading operations resume shall be included in the price of seeding.

For hydroseeding, seed shall be put in the mixture slowly to result in a uniform mixture before application. Hydroseeding mixtures shall be constantly agitated from the time of mixing until application on the seed bed and used within 8 hours from the beginning of mixing.

If special seed is required in addition to the regular mixture, it will be furnished by the Department and shall be applied with the regular mixture at the Contractor's expense.

Leguminous seeds shall be inoculated or treated with approved cultures as specified by the manufacturer or directed by the Engineer before they are applied or mixed with other seeds to be applied. Seed shall be applied within 24 hours after treatment. When the hydroseeding method is used, leguminous seeds shall be treated with 5 times the amount of inoculant recommended by the manufacturer.

(e) **Applying Mulch:** Mulch shall be applied in a separate application within 48 hours after completion of the seeding operation. When straw or hay mulch is used, it shall be applied on seeded areas at the rate of approximately 2 tons per acre. When wood cellulose fiber mulch is used, it shall be uniformly applied at the rate of approximately 1,500 pounds net dry weight per acre. Mulch will not be required on overseeded areas.

Straw and hay mulch shall be applied to a uniform thickness in such a manner that not more than 10 percent of the soil surface will be exposed at the conclusion of the mulching operations. Wet straw or wet hay shall not be used. Straw or hay mulch shall be anchored to the seeded surface by spraying with wood cellulose fiber mulch at the rate of 750 pounds per acre; spraying with an emulsified asphalt at the rate of at least 100 gallons per ton of mulch in a manner that will protect adjacent property and pedestrian traffic areas; disking or punching the mulch partially into the soil; using approved netting; or using other materials or methods approved by the Engineer. The Contractor may use more than one method on the same project.

603.04—Measurement and Payment

Lime will be measured in tons and will be paid for at the contract unit price per ton.

Fertilizer will be measured in tons and will be paid for at the contract unit price per ton. When a grade different than that specified in the Contract is used, the tonnage quantity will be adjusted to the grade specified.

Seed will be measured in pounds of seed used and will be paid for at the contract unit price per pound. When bags of seed are transferred from project to project, certified scales shall be used for weighing the seed. Open bags will not be accepted for use.

Prices for seed, fertilizer, and lime shall include preparing seed beds; furnishing and applying seed; furnishing and applying mulch; and maintaining seeded areas until final acceptance.

Overseeding will be paid for at the contract unit price per pound of seed. This price shall include preparing seedbeds and furnishing and applying seed and additional fertilizer.

Mulch will not be measured for separate payment. The cost thereof shall be included in the price for seed.

Payment will be made under:

Pay Item	**Pay Unit**
(_____) seed	Pound
(_____) overseeding	Pound
Fertilizer (Ratio)	Ton
Lime	Ton

Section 606—Soil Retention Coverings

606.01—Description

This work shall consist of furnishing and placing protective coverings for soil retention, including seed, fertilizer, lime, topsoil, and water, in accordance with the requirements of these specifications and in conformity to the dimensions, lines, and grades shown on the plans or as established by the Engineer.

606.02—Materials

Materials for protective coverings and soil stabilization mats shall conform to the requirements of Section 244.02(k).

Soil Stabilization mats used for culvert outlet protection shall be Standard EC-3 Type B conforming to the requirements of Section 244.02(k).

606.03—Procedures

(a) **Preparing Areas:** Two inches of topsoil shall be applied to the area to be covered. Drainage channels shall be shaped in accordance with the cross section shown on the plans and shall be rolled or tamped to compact soil in place before final shaping.

During shaping operations, a seedbed approximately 3/4 inch in depth shall be provided.

Stones, roots, and other objects that will prevent protective covering from making close contact with the seedbed shall be removed before covering is installed.

(b) **Applying Seed:** Seed shall be applied in accordance with the requirements of Section 603 except that mulch will not be required. Seed, fertilizer, and lime shall be applied prior to installation of protective coverings.

Seeded areas adjacent to the channel or ditch that are disturbed during installation of covering shall be uniformly reshaped, reseeded, and mulched at the Contractor's expense.

(c) **Installing Soil Retention Coverings:** Coverings shall be installed in accordance with the standard drawings and manufacturer's recommendations.

(d) **Watering:** After coverings are installed, seeded areas shall be watered sufficiently to saturate the seedbed. Water shall be applied in a spray, and no additional watering will be required.

603.04—Measurement and Payment

Protective coverings and soil stabilization mats will be measured in square yards of area covered, complete-in-place, in accordance with the nominal plan dimensions and will be paid for at the contract unit price per square yard. Overlaps, overwidths, and cut slots will not be measured for separate payment. This price shall include furnishing, installing, and stapling soil retention coverings; smoothing and shaping ditch channels and waterways; preparing seed beds; and furnishing and applying topsoil, lime, seed, fertilizer, and water.

Payment will be made under:

Pay Item	Pay Unit
Protective covering (Standard)	Square yard
Soil stabilization mat (Standard and type)	Square yard

Division VII Traffic Control Devices

Section 700—General

700.01—Description

These specifications cover general construction items, methods, and procedures common to traffic control devices. Installation of materials shall be accomplished in accordance with the manufacturer's instructions except when otherwise indicated.

700.02—Materials

(a) **Concrete** shall be Class A3 conforming to the requirements of Section 217.

(b) **Reinforcing steel** shall conform to the requirements of Section 223.

(c) **Paint** shall conform to the requirements of Section 231 and shall be applied in accordance with the requirements of Section 411 except on nonferrous materials, where it shall be applied in accordance with the requirements of the manufacturer's recommendations.

(d) **Galvanizing** shall conform to the requirements of Section 233.

(e) **Electrical items** shall conform to the requirements of Section 238.

(f) **Wood for posts and poles** shall conform to the requirements of Section 236 and shall be treated in accordance with the requirements of Section 236. Wood items shall be cut prior to treatment.

(g) **Steel** for fabricated items shall conform to the requirements of Section 226 and shall be fabricated, welded, and inspected in accordance with the requirements of Section 407.

(h) **Aluminum** for fabricated items shall conform to the requirements of Section 229 and shall be fabricated, welded, and inspected in accordance with the requirements of Section 407.

(i) **Poles, posts, and overhead and bridge-mounted sign structures** shall conform to the following:

1. **Conventional and offset lighting poles** shall be steel or aluminum.

2. **Overhead and bridge-mounted sign structures, signal poles (mast arm and strain), and high-mast lighting poles** shall be steel.

3. **Pedestal poles** with a nominal diameter of more than 2 inches shall be steel or aluminum. Pedestal poles 2 inches and less in nominal diameter shall conform to the requirements of Section 238 for metal conduit.

4. **Sign posts** shall be wood or steel.

Lighting, signal, and pedestal poles; sign posts; and overhead and bridge-mounted sign structures not designed to support variable message signs shall conform to the requirements of the 1994 Edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

Overhead and bridge-mounted sign structures, including "butterfly" structures, designed to support variable message signs shall conform to the requirements of the 2001 Edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Lumi- naires, and Traffic Signals* and the following clarifications:

- Basic wind speed shall be used in the designs. The alternate method for wind pressures provided in Appendix C shall not be used.

- When the installation location of the structures lies between isotachs, the basic wind speed shall be determined by using the higher adjacent isotach.

- Any optional design parameters indicated in the AASHTO specification that are "allowed when acceptable to the owner" shall not be used for the designs.

Steel poles, posts, and overhead and bridge-mounted sign structures shall be hot-dip galvanized after fabrication. Except when shop painting is required, steel poles and posts shall be given one shop coat of primer and two field coats of paint and the galvanization finish of overhead and bridge-mounted sign structures shall be field treated for paint retention and two coats of paint applied.

Signal, lighting, and pedestal poles shall be of a one-piece or sectional single unit, tubular form, and shall be round or multisided. Multisided poles shall have at least eight sides. Pole shafts and arms shall have a removable cap fastened by at least three screws.

Mast arms shall not deflect below the horizontal plane or exceed a rise of 3 percent of the arm length after loads are applied. Mast arm poles shall include an arm attachment flange plate continuously welded to the gusset and side plates. The gusset and side plates shall be continuously welded to the pole and each other. The flange shall be fabricated with four studs permanently attached for receiving nuts (attaching arm). The flange plate and pole shall have a 2 1/2-inch wiring hole with a grommet centered in the pattern.

Strain poles shall not exceed a dead load deflection of 3 percent of the distance between the base of pole and point of dead load attachment. The minimum bottom diameter of strain poles shall be 11 inches.

Signal poles shall have a steel "J" hook located inside the poles for wire suspension within 5 inches of the top.

Lighting, signal poles, and overhead structures shall have a grounding lug welded to the in- side of the pole or structure easily accessible from the hand hole. The grounding lug shall be designed to secure the grounding electrode conductor and equipment-grounding conductor by inserting the conductor under a setscrew type of lug.

Signal poles, high-mast lighting poles, and overhead sign structures, including butterfly structures, shall have a minimum of six anchor bolts, each having a minimum diameter of 1 1/2 inch. The maximum space between the bottom of the base plate and the top of the foun- dation shall be no greater than the diameter of the anchor bolt plus 1 inch.

No grout will be permitted between the base plate and the top of the foundation of overhead structures, mast arm, lighting, and signal poles. No lock nuts or split washers will be allowed with the anchor bolts.

(j) Anchor bolts shall be steel, conforming to the requirements of Section 226.02(c)2. The portion of anchor bolts beginning 4 inches below the top of the foundation and extending above the foundation shall be galvanized except when stainless steel is used.

Anchor bolts used with signal poles, high-mast lighting poles, and overhead sign structures, including butterfly structures, shall conform to the requirements of Section 517 of the 2001 Edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

(k) **Breakaway support systems** shall conform to the requirements of the 1994 Edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.*

1. **Breakaway couplers and skirt covers** shall be aluminum. Threaded studs, nuts, and washers shall be stainless steel or galvanized steel.

2. **Frangible bases** shall be aluminum.

3. **Slip bases** shall be galvanized steel or other approved noncorrosive metal.

(l) **Miscellaneous hardware** shall be brass, bronze, stainless steel, or galvanized steel.

700.03—Working Drawings

The Contractor shall submit working drawings to the Engineer, including design calculations and catalog cuts, in accordance with the requirements of Section 105.10 except that each copy shall be submitted with the manufacturer's name and address clearly noted. Submitted data for the following aluminum lighting poles shall also specifically address how fatigue was considered in the design of the poles:

1. Conventional aluminum lighting poles with a height of 40 feet or greater.

2. Offset aluminum lighting poles with a height of 20 feet or greater.

3. Other aluminum lighting poles with a height greater than 20 feet and a pole-top-mounted luminaire.

4. All aluminum lighting poles mounted on bridges

Fatigue may be addressed through the use of vibration dampening devices or through other means as determined by the manufacturer.

In lieu of working drawings and catalog cuts, the Contractor may submit a letter indicating the brands, types, and models of equipment along with the approval numbers and contract item numbers. The Contractor shall include the words "Testing Required" with the approval numbers when materials testing is required for the equipment. The approval numbers shall be taken from the Department's

Pre-approved Traffic Control Device List. Any equipment on the list for which approval has been rescinded will not be allowed for use if the rescinded date is earlier than the receipt of bids for the project.

Inclusion of equipment on the list does not ensure acceptance if contract requirements prohibit use of the equipment. The Contractor shall ensure that the equipment as furnished conforms to the requirements of the Department.

700.04—Procedures

(a) **Grounding Electrodes:** Grounding electrodes (rods) shall be installed in accordance with the requirements of the NEC or by other methods approved by the Engineer. Grounding electrodes shall be installed using a hydraulic/pneumatic/electric hammer drill driving device with an electrode drive bit to minimize damage to the electrode tip. The electrode drive bit shall be designed for 3/4-inch electrodes. Grounding electrodes shall include a grounding electrode conductor and grounding electrode clamp.

1. **Electrical service grounding electrode installations**: The following procedures apply only to installing electrical service grounding electrodes:

- Grounding electrodes and grounding electrode conductors shall be installed in the presence of the Engineer at a date and time mutually agreed upon.

- Grounding electrode and grounding electrode conductors shall be connected using exothermic welds. Exothermic welds shall be designed for the size conductor and grounding electrodes and shall be installed in accordance with the manufacturer's instructions. Grounding electrode conductors and grounding electrodes shall be cleaned to remove oxidation and any other foreign material from the surface be- fore performing the exothermic welds.

- Primary grounding electrodes shall not have a resistance to ground of more than 25 ohms. A 10-foot section of grounding electrode shall have a minimum of an 8-foot contact with soil. Grounding electrodes shall be spaced a minimum of 10 feet between all electrodes.

- Primary grounding electrodes shall be installed vertically to a depth of 40 feet or until refusal. If the vertical grounding electrode cannot be installed to a minimum of an 8-foot contact with soil, the Contractor shall install a grounding electrode at an angle of no more than 45 degrees to a depth of 40 feet or until refusal. If refus- al occurs prior to installing the electrode to a minimum of an 8-foot contact with soil, the Contractor shall remove the electrode or cut it off 6 inches below grade and abandon it.

- Primary grounding electrodes complying with these requirements shall be augmented with an additional grounding electrode and connected in parallel to the primary grounding electrode to form a system. The augmented electrode shall be a single electrode driven to a depth of 4 inches below the finished grade. If refusal occurs prior to installing the electrode to a minimum of an 8-foot contact with soil, Contractor shall remove the electrode or cut it off 6 inches below grade and abandon it.

- Grounding electrodes shall be coupled at each section with couplers or exother-mic welded splices. The grounding electrode conductor shall be installed to a depth of 18 inches below grade when connecting the primary electrode and aug- mented grounding electrodes.

- The Contractor shall install a JB-2C junction box at the primary grounding electrode location for access to the electrode for connection and testing. Grounding electrode conductors shall be installed under the bottom flange of the JB-2C. The grounding electrode shall be centered in the bottom of the JB-2C with a minimum of 6 inches exposed. The JB-2C cover shall have the letters "VDOT ELEC" cast in the depression on the top.

The Contractor shall notify the Engineer of those location(s) where primary grounding electrodes do not conform to the following:

- Resistance does not measure 25 ohms or less.

- Grounding electrode does not have at least an 8-foot contact with soil. For such

locations, the Engineer will advise the Contractor how to proceed.

2. **Grounding electrode testing:** Primary grounding electrodes shall be tested after each 10-foot grounding electrode and/or section thereof is installed using the fall of potential (three-point measurement) method. After the primary grounding electrode is installed and tested, the Contractor shall connect to the augmented electrode(s) to con- duct a system test. The Contractor shall disconnect the grounding electrode conductor from the service equipment ground bus and bonding bushing before testing the grounding electrodes/system. The Contractor shall test the grounding electrode as required by the manufacturer's instructions for the type of earth testing equipment. The Contractor shall record the readings on a form provided by the District Traffic Engineering Office. The completed form shall be signed and submitted to the Engineer after installation of the electrical service grounding.

(b) **Excavation for Foundations:** Excavation shall be performed in accordance with the requirements of Section 401.

(c) **Concrete Foundations:** Concrete foundations shall be constructed and cured in accordance with the requirements of Section 404 and shall rest on material that will adequately support the design load. The Contractor may secure the anchor bolts to prevent their movement dur- ing concrete placement with a No. 3 or smaller rebar. Rebar shall be attached to the anchor bolts with rebar twist ties. Exposed areas of concrete foundations shall be given a Class 7 finish in accordance with the requirements of Section 404. Items shall not be erected on concrete foundations until concrete has cured for at least 28 days or has obtained a compressive design strength of at least 3,000 pounds per square inch.

Foundations for overhead sign structures shall be spread footings unless inadequate soil conditions require deep foundation systems, i.e., drilled piers, driven piles. Drilled foundations may be permitted except for single-pole structures, i.e., overhead single-pole-in-end forms, cantilever, or butterfly.

Foundation designs for signal poles, high-mast lighting poles, and overhead sign structures shall be

furnished by the Contractor. Designs shall indicate the cubic yard quantity of concrete required for the foundations. Foundations shall be designed to conform to the require- ments of the same edition of AASHTO's *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals* used for the structure it is supporting. The Contractor shall accomplish at least one test bore, as approved by the Engineer, at each foundation location to determine the subsurface conditions prior to designing the founda- tion. Test bores shall be performed in accordance with any of the following three methods:

1. ASTM D 420, ASTM D 1452, and ASTM D 1586
2. ASTM D 3441
3. ASTM D 4719.

For areas west of I-95, the depth of the test borings shall be at least 15 feet; for areas east of I-95, the depth of the test borings shall be at least 30 feet. When test borings are performed in the median of I-95, their depth shall be at least 15 feet for areas north of the intersection with Route 250 and at least 30 feet for areas south of the intersection with Route 250. Soil conditions shall be tested at the ground level and then at depth intervals of 3 feet in accor- dance with any of the three methods stated.

When auger refusal or a count of 50 blows per inch occurs before a 15-foot depth due to rock, the rock shall be continuously cored for at least 5 feet and be sampled in accordance with ASTM 2113. Boring logs shall be properly identified to the actual site with the center- line station and the distance perpendicular from the centerline indicated. On projects where the roadway is existing and no centerline is being surveyed, alternate methods for identi- fying the location shall be submitted by the Contractor for the Engineer's records. Bore log data shall be submitted electronically in an approved format, in accordance with Materials Division Policy and the resulting borehole log shall be included with the shop drawing sub- mittals for the foundation designs.

The quantity of cubic yards of concrete that is indicated in the contract is an approximation. Payment will be made for the actual cubic yards of concrete based upon the foundation design supplied by the Contractor.

Test bores shall be performed within 5 feet of the foundation's location, as shown on the plans, or as directed by the Engineer.

(d) **Electrical Service:** Electrical service shall be installed in accordance with the requirements of the NEC and the local power company. Meter bases and current transformer cabinets will be furnished by the local power company. The Contractor shall make arrangements with the local power company for pickup of this equipment. The Department will request and pay for electrical service and temporary electrical service for items temporarily relocated or ad- justed for the purpose of traffic control shown on the plans or directed by the Engineer. If the Contractor desires temporary service for his convenience, he shall arrange and pay for the service.

(e) **Poles, Posts, and Sign Structures:** The location of each pole, post, and sign structure shall be established by the Contractor with a stake bearing the number or identification designated on the plans. The Engineer, accompanied by the Contractor, will inspect the locationsand advise the Contractor of any necessary adjustments. Poles, posts, and sign structures shall be made plumb after installation of loads by the use of nuts and flat washers above and below the base plate on each

anchor bolt or by other approved methods.

If a pole, overhead sign structure, or span wire is to be located within 10 feet of an electric power line as measured in any direction, the Contractor shall immediately inform the Engineer. The Contractor shall not install the equipment until the Engineer has reviewed and advised the Contractor of any relocation or to proceed with the work.

A noncorrosive metal identification tag shall be permanently attached approximately 30 inches above the foundation to each signal, pedestal, and lighting pole; overhead sign structure; bridge-mounted sign structure; and steel sign post except U-channel sign posts and square tube steel. The tag shall be of sufficient size for 1/4-inch lettering, single-spaced between lines, and shall be attached by noncorrosive screws or rivets.

The tag shall be imprinted with "VDOT" except when the structures are located within an incorporated town or city on a primary or secondary roadway, where it shall be imprinted with the municipality's name unless otherwise noted on the plans or directed by the Engineer. The tag shall also be imprinted with the following:

1. Manufacturer's name on all tags.
2. Manufacturer's unique ID number on all tags.
3. Date of manufacture on all tags.
4. Signal poles: gage and length of pole and mast arm(s).
5. Pedestal poles: gage and length of pole.
6. Lighting poles: gage and length of pole and luminaire arm(s); electrical phase circuit designation.
7. Overhead sign structures: gage and length of pole and span.
8. Steel sign posts: I-beams: length, size, and weight per foot of post.

When transformer bases are used, bolt covers shall be installed on pole anchor bolts. Bolt covers shall be designed to allow ventilation of the nut and anchor bolt.

Poles shall be provided with hand holes that face away from traffic. Hand holes shall be at least 3 by 5 inches unless otherwise specified and shall be provided with a gasket and cover with an 18-inch-long galvanized chain with a minimum breaking strength of 300 pounds welded to the inside of the pole at the bottom of the hand hole opening and to the inside of the cover to prevent accidental loss. The cover shall be attached to the pole with noncorrosive captive screws, and attachment holes shall be drilled and tapped.

When required by the plans, the Contractor shall supply a terminal strip consisting of 24 double-pole terminals. The terminal strip shall be constructed of noncorrosive materials and shall be located on the outside of the pole just above the hand hole. A continuously welded frame and a removable,

weatherproof, gasketed cover designed to enclose both the hand hole and terminal strip shall be provided.

(f) **Breakaway Support Systems:** Breakaway support systems shall be installed on lighting poles when required by the plans and on pedestal poles except when used for power service. Breakaway support systems shall be installed in accordance with the requirements of the manufacturer's recommendations.

(g) **Conductor Cables:** Conductor cables in conduit runs more than 100 feet in length shall be installed with the use of an approved lubricant or pulling compound. Cleaning agents and lubricants that have a deleterious effect on cable coverings shall not be used.

Aerial cables that extend more than 20 feet shall be supported by a span wire or reinforced with a copper-clad, galvanized, or stainless steel wire for self-support. Cable rings shall be used to attach conductor cables to the supporting wire; however, lash wire may be used to attach interconnect cable when no other conductor cables are attached to the same span wire. Vinyl tape shall be used as shown on the plans to prevent sag. When aerial cables enter a service entrance head, an 8-inch drip loop shall be formed.

Bends in single or multiple conductor cables shall have a bend radius of at least 5 times the outside diameter of the cable.

Conductor cables shall be installed with the slack length coiled in junction boxes. The coiled length shall be sufficient to allow cables to extend at least 2 feet above junction boxes.

Solderless terminals shall not be used for connecting conductor cables having solid conductors to terminal posts.

Splices in lighting conductor cables will be permitted only at accessible locations. Splices in service entrance conductor cable will be permitted only for connection to the utility company's service conductor cables. Splices will not be permitted in signal and interconnect con- ductor cables.

Splices in lighting and service entrance conductor cables shall be made in accordance with the requirements of the NEC and the following additions and exceptions. Conductor insulation shall be removed only to the amount necessary to install the connector. Exposed conductors shall be wire brushed and cleaned before splicing. Splices shall be made with properly sized non-insulated butt-end connector compression sleeves for single conductors or split bolts for branch circuit connections. Conductor connections shall be made mechanically and electrically secure. Crimping tools used on compression sleeves shall be designed for the application and sized to the splicing connectors.

Splices shall be covered with an insulation rated equal to or higher than the voltage rating of the conductor cable. Single and branch circuit conductor splices shall be properly reinsulated and made water resistant by one of the following methods:

- Two layers of rubber electrical tape shall be applied half-lapped with the first layer extending the length of the disturbed insulation and the second layer extending at least 1 inch onto clean undisturbed insulation of each conductor. Rubber electrical tape shall be stretched and wrapped

tightly to eliminate air gaps. Rubber electrical tape shall be molded around irregular shapes and multiple conductors for smooth insulation buildup. Over the rubber electrical tape, at least two layers of vinyl electrical tape shall be applied half-lapped with each layer overlapping the end of the proceeding layer by at least 1 inch onto clean, undisturbed insulation. The splice and at least 1 inch of adja- cent clean insulation shall be covered using an acceptable water-resistant sealing com- pound for electrical splices;

- Heat-shrink tubing properly sized shall be installed extending at least 3 inches onto each end of clean, undisturbed insulation. End seams around two or more adjacent conductors shall be sealed and made water resistant; or
- The splice kit shall be properly sized to extend at least 3 inches onto each end of clean, undisturbed insulation.

Single conductor splices within a multi-conductor cable shall be re-insulated using heat-shrink tubing.

Re-jacketing of multi-conductor cables shall be accomplished using heat-shrink tubing properly sized.

Heat-shrink tubing shall be heated using a non-contact flameless device or a flamed heat source device equipped with a shield to prevent the flame from coming in contact with the tubing.

Breakaway connectors shall be installed on luminaire conductors and on signal conductors for signal head assemblies on pedestal poles. Breakaway connectors shall be fused for the hot conductors and nonfused for the grounded conductor. Breakaway connectors shall be located in the hand hole of the pole.

Signal and interconnect cable terminal strips shall be sealed with a moisture block com- pound to prevent moisture from entering the open cable end. The compound shall be soft, pliable, and easily removable and shall be used in accordance with the manufacturer's recommendations.

Termination of interconnect cable will be allowed only in a master controller cabinet, local controller cabinet, or terminal enclosure. The cable shield shall be grounded at each termination point. Whenever the cable is entered for connection to equipment, each wire of the cable shall be connected to a terminal post position.

The Contractor shall conduct a Megger test on the installed interconnect cable and shield, for which a reading of 100M ohms shall be required. Testing for 300-volt cable shall be per- formed at 200 volts, and testing for 600-volt cable shall be performed at 500 volts. Cables shall be disconnected from controller cabinet terminals during testing.

Service entrance and lighting conductor cables shall be marked in accordance with the requirements of Article 310–11 of the NEC. Markings shall be continuous and permanent. Signal and interconnect conductor cables shall be marked in accordance with the requirements of the applicable IMSA specification.

Prior to energizing an electrical system, the Contractor shall demonstrate to the Engineer that the system is clear and free from short circuits, open circuits, and unintentional grounds. Faulty circuits shall be repaired or replaced by the Contractor at his expense.

1. **Electrical service and lighting conductor identification:**

Grounded conductors: Insulated grounded conductors (Neutrals) shall be identified by a continuous white or gray outer finish except that those larger than No. 6 AWG may be identified by three continuous white stripes on other than green insulation along its entire length.

Equipment grounding conductors: Equipment grounding conductors shall be bare, covered, or insulated. Covered or insulated equipment grounding conductors shall have a continuous outer finish that is either green or green with one or more yellow stripes.

Ungrounded conductors: Ungrounded conductors, whether used as a single conductor or in multiconductor cables, shall be finished to be clearly distinguishable from grounded, grounding, and equipment grounding conductors. Ungrounded conductors shall be identified by a continuous color-coding outer finish by phase and system ex- cept that those larger than No. 6 AWG may be identified only at readily accessible locations by marking tape, tagging, or other approved means in accordance with NEC requirements.

Color-coding shall be as follows:

Circuit Designation	**Color Code**
2- wire circuits, 120 volts; 3-wire circuits, 120/240 volts; 3-phase, 4-wire wye cir- cuits, 208/120 volts; and 3-phase, 4-wire delta circuits, 240 volts	
Phase A or Line A	Black
Phase B or Line B	Red or orange*
Phase C	Blue
Grounded Conductor (Neutral)	White or gray** (see exception above)
Equipment Grounding Conductor	Bare, green, or green with one/more yellow stripes
3- phase, 4-wire wye circuits, 480/277 volts; 3-phase, 3-wire delta circuits, 480 volts	
Phase A	Phase A
Phase B	Phase B
Phase C	Phase C
Grounded Conductor (Neutral)	Grounded Conductor (Neutral)
Equipment Grounding Conductor	Equipment Grounding Conductor

*For 3-phase, 4-wire delta circuits, Phase B shall be the high leg and shall be orange.

**For outer covering of conductors of different systems that is contained within the same en- closure, refer to Article 200 of the NEC.

Electrical service and lighting conductors shall be permanently identified in accessible locations (hand holes, transformer bases, junction boxes, control centers, etc.) with non-ferrous metal tags or nylon tags attached to the conductor. Identifications shall be stamped or engraved on the metal tags and lettered with permanent ink on the nylon tags. Identifications shall be legible and shall indicate the electrical phase. Lighting conductors shall also indicate the electrical phase circuit designation. When the conductors are within a multi-conductor cable, the tag shall be attached to the cable jacket and shall

indicate the required information for all conductors on one tag. If the conductors of a multi-conductor cable have been exposed for splicing, connections, etc., the conductors shall be tagged in lieu of the cable jacket.

2. **Signal and interconnect cable** jackets shall be permanently identified by integral-impregnated color coding. Color coding for signal cable shall be as follows:

Cable Insulation Color	**14/12 Cable**	**14/7 Cable**	**14/4 Cable**	**14/3 Cable**
Red	Red	Red	Red	Don't Walk
Orange	Yellow	Yellow	—	—
Green	Green	Green	Green	—
Red with black tracer	Red	—	—	—
Orange with black tracer	Yellow	—	—	—
Green with black tracer	Green	—	—	—
Blue	Green	Green	—	—
White with black tracer	Yellow	Yellow	—	—
Black	Red	Red	Yellow	Walk
Black with white tracer	Spare	—	—	—
Blue with black tracer	Spare	—	—	—
White	AC Ground	AC Ground	AC Ground	AC Ground

Signal and interconnect cables shall be permanently identified in the controller cabinet, junction boxes, hand holes, and other accessible locations. Signal conductor cables shall also be identified in the hand hole of poles if the cables are attached to terminal strips in the hand hole. Identifications shall be indicated on nonferrous metal tags or nylon tags attached to the cable with nylon cable ties. The identification shall be stamped or engraved on the metal tags and lettered with permanent ink on the nylon tags. Identifications shall be legible and shall conform to the following:

a. **Signal cable**: phase and location of signal head; e.g., 1 NB left-turn head; 1 NB inside left-turn head; 2 SB through-lane heads; 1 left-turn head and 6 through-lane heads; 2 Ped head NW Quad.

b. **Interconnect cable:** description and direction from location (if cable is a spare). The word "spare" shall be included after "inter." The direction from location is re- quired only in the controller cabinet, e.g., Inter. NB; Inter. Spare NB; Inter. WB; Inter.

(h) **Conduit Systems:** Conduit systems shall be rigid except where contract documents specify otherwise. PVC, fiberglass, and metal conduit runs shall have the minimum number of couplings permitted by the use of standard conduit lengths. Ends of conduit sections that must be field cut shall be reamed smooth. PE conduit shall be installed in continuous unspliced runs between enclosures. Field-threaded portions of metal conduit shall be galvanized. Ex- cept for expansion couplings, conduit sections shall be

connected with couplings so that ends will abut squarely inside couplings.

Joint-sealing solvent shall be used as recommended by the conduit manufacturer. Where necessary, ends of each length of nonmetallic conduit shall be tapered by machining to provide joints that are tight after assembly.

Conduits shall be continuous and watertight between outlets. Deformed conduit shall not be used. Conduits shall be free from kinks or defects that would cause damage to conductor cables when pulled. Conduits shall be installed so that moisture will drain properly to electrical junction boxes or drainage tees with drip spouts.

After installation, each conduit shall be tested in the presence of the Engineer for obstructions. A suitable rigid or flexible mandrel having a diameter at least 80 percent of the inside diameter of the conduit shall be pulled through each conduit run. Obstructions shall be re- moved, and the conduit repaired at the Contractor's expense.

After testing, individual non-metallic conduit runs more than 150 feet in length that are to remain empty shall be equipped with a woven polyester or aramid pull tape having a tensile strength of at least 1,100 pounds and less than 15 percent elongation at yield. Pull rope shall not be used in non-metallic conduit. Twelve inches of pull tape shall be doubled back into the conduit at each end.

Metallic conduit runs more than 150 feet in length that are to remain empty shall be equipped with either a pull rope or tape having a tensile strength of at least 1,100 pounds. Twelve inches of pull tape or rope shall be doubled back into the conduit at each end.

Open ends of unused conduit shall be closed with watertight plugs or caps to seal against moisture. Open ends of conduits with conductors installed shall be sealed with an approved soft, pliable, and easily removable waterproof sealant. The sealant shall not have a deleteri- ous effect on cable coverings.

Metal conduit systems shall be bonded. When a nonmetallic conduit system is used, the Contractor shall furnish and install an equipment grounding conductor to maintain a bonded system in accordance with the requirements of the NEC.

Non-metallic conduit with non-metallic cable (fiber optic) within shall be equipped with a No. 8 locator wire.

Wherever conduit crosses a structural expansion joint, conduit shall be provided with an expansion fitting. The fitting shall permit longitudinal movement of the amount specified on the plans.

1. **Exposed conduit systems** shall be fabricated of heavy-wall PVC, fiberglass, or metal, with not more than four bends between any two outlets. The angular sum shall be not more than 360 degrees. When heavy-wall PVC or fiberglass conduit is accessible to public contact, it shall be covered with a protective shield conforming to the requirements of Section 238 for a distance of at least 8 feet above the adjacent finished grade. Splice boxes or pull boxes shall be of a size that will allow proper termination of conduit and connection of conductor cables as required by the NEC. Conduit shall be terminated by means of approved fittings or bushings.

2. **Buried conduit systems** shall be installed in straight lines between outlets. When obstructions are encountered during installation and conduit cannot be economically located elsewhere, the obstruction shall be bypassed by offsetting the conduit line in accordance with the requirements of the Standard Drawings. Required conduit bends shall be installed with a bend radius of at least 5 feet. Conduit bends in structures and foundations shall be installed in accordance with the requirements of the NEC. The use of a pipe tee or vice for bending conduit will not be permitted.

   When conduit is to be installed under an existing roadway, entrance, or fixed object and open cutting is not permitted, conduit shall be installed by an approved directional boring method. Conduit for the directional boring method shall be PVC designed specifically for the directional boring operation or high-density PE. With the approval of the Engineer, the Contractor may elect to use the jacked method to install a pipe sleeve for installation of the required conduit at no additional cost to the Department.

   Open cut areas shall be backfilled in accordance with the requirements of Section 302.

   (i) **Junction Box Covers:** If a special tool or wrench is needed to remove a cover, the Contractor shall furnish the Engineer five such tools.

   (j) **Hydraulic Cement Concrete Sidewalk:** When disturbed by the installation of equipment, sidewalk shall be replaced in accordance with the requirements of Section 504 along existing joint lines.

700.05—Measurement and Payment

Concrete foundations will be measured and paid for in units of each or cubic yards of concrete as applicable. When paid for in cubic yards of concrete, no payment will be made for concrete in excess of the cubic yards of concrete required by the foundation design unless otherwise approved by the Engineer. This price shall include foundation design, concrete, reinforcing steel, stub poles, anchor bolts, bolt circle templates, grounding equipment, conduits, excavating, backfilling, compacting, disposing of surplus and unsuitable material, and restoring existing areas.

Electrical service will be measured in units of each and will be paid for at the contract unit price per each. This price shall include service poles, safety switches or breaker boxes, service entrance conductor cables from the utility company's service box, conductors to the safety switch and circuit breaker box, conduits and fittings on poles and steel supports, conduit straps or clamps, meter base, service entrance heads, thimbleye bolts, steel supports, wireway, junction boxes for grounding electrode and utility service, excavation, concrete, and pickup and installation of meter base and current transformer cabinet.

Luminaire arms will be measured in units of each and will be paid for at the contract unit price per each. This price shall include pole mounting brackets, fittings, and mounting hardware.

Lighting poles will be measured in units of each and will be paid for at the contract unit price per each. This price shall include pole shafts, luminaire arms, grounding lugs, hand holes and covers, caps, identification tags, anchor bases, bolt covers, bracket arms, and breakaway support systems.

Signal poles will be measured in units of each and will be paid for at the contract unit price per each. This price shall include pole shafts, mast arms, grounding lugs, hand holes and covers, caps, fittings, anchor bases, bolt covers, and identification tags.

Overhead and bridge-mounted sign structures will be measured in units of each and will be paid for at the contract unit price per each. This price shall include structural units and supports, hand holes and covers, grounding lugs, walkways and handrails, electrical systems including conduit and fittings, and identification tags.

Sign posts will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include clamps, identification tags, and breakaway base assemblies.

Pedestal poles will be measured in units of each and will be paid for at the contract unit price per each. This price shall include caps, breakaway support systems, hand holes and covers, grounding lugs, identification tags, and anchor bases and bolt covers.

Wood poles will be measured in units of each and will be paid for at the contract unit price per each. This price shall include thimbleye bolts, guy wires with guards and anchors, excavating, backfilling, compacting, disposing of surplus and unsuitable material, and restoring existing areas.

Conductor cables will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include conductors, breakaway connections, markings and identifications, splice kits, electrical tape, testing, and connections.

Conduit will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include conduit bodies, fittings, bonding systems, pull ropes, pull tapes, plastic spac- ers, No. 8 locator wire when required, pull or splice boxes with an area of 512 cubic inches or less, supports, and protective metal shields.

Trench excavation will be measured in linear feet and will be paid for at the contract unit price per linear foot. This price shall include trenching, encasing, backfilling, locator tape, compacting, dispos- ing of surplus and unsuitable material, and restoring existing areas.

Junction boxes will be measured in units of each and will be paid for at the contract unit price per each. This price shall include concrete collars, frames and covers, tools to remove the cover, ground rods, ground conductors, grounding lugs, knockouts, cable racks, aggregate, excavating, backfilling, compacting, disposing of surplus and unsuitable material, and restoring existing areas.

These prices shall include providing the required finish.

Test bores will be measured in units of each and will be paid for at the contract unit price per each. This price shall include the test bore, rock sampling, and determination of the soil and rock condition.

Electrical service grounding electrode will be measured in units of each, per 10-foot electrode or portion thereof, and will be paid for at the contract unit price per each. This price shall include testing, exothermic welds, grounding electrode(s), electrode couplers, grounding conductor, and report documentation.

Bored conduit will be measured in units of linear feet and will be paid for at the contract unit price per linear foot for the size specified. The price shall include conduit; fittings; couplings; and, when required, No. 8 locator wire, bonding systems, and pull rope or tape.

Payment will be made under:

Pay Item	Pay Unit
Concrete foundation (Standard, type, and size)	Each or Cubic yard
Electrical service (Standard and type)	Each
Luminaire arm (Length)	Each
Lighting pole (Standard, luminaire mounting height, and length of luminaire arm	Each
Signal pole (Standard, length, number, and length of arms)	Each
Overhead sign structure (Location)	Each
Bridge-mounted sign structure (Location)	Each
Sign post (Type and size)	Linear foot
Pedestal pole (Standard and length)	Each
Wood pole (Class and length)	Each
Conductor cable (Size/number)	Linear foot
Conduit (Type and size)	Linear foot
Trench excavation (Standard)	Linear foot
Junction box (Standard)	Each
Test bore	Each
Electrical service grounding electrode (10 foot)	Each
Bored conduit (size)	Linear foot

Section 704 – Pavement Markings and Markers

704.01—Description

This work shall consist of establishing the location of pavement markings and installing pavement markings, pavement markers, and reflectorized material on specified pavements in accordance with these specifications, the *MUTCD,* and as directed by the Engineer.

704.02—Materials

The Contractor shall use an approved inventory tracking system for all materials received from the manufacturer. Shipment of materials from such inventory shall be accompanied by a signed form C- 85 containing the following certification statement:

Material shipped under the certification has been tested and approved by VDOT as indicated by laboratory test numbers listed hereon.

a) **Pavement Markings** shall conform to the requirements of section 246.

b) **Glass Beads** shall conform to the requirements of section 234.

c) **Pavement Markers** shall conform to the requirements of section 235.

704.03—Procedures

The Contractor shall have a certified Pavement Marking Technician present during pavement marking operations.

Pavement markings shall be installed on new roadways prior to opening the roadway to traffic. Pavement marking installation shall be completed within the time limits herein on roadways where the pavement markings have been removed or obscured and the roadway is open to traffic unless otherwise directed by the Engineer. Installation of Type B, Class VI, pavement markings on asphalt roadways are not applicable to these requirements if they are inlaid with the last pass of the asphalt roller or directly after the asphalt roller using a separate roller. Installation of edge lines on roadways where the existing pavement markings have been removed or obscured are also required within these time limits unless otherwise indicated by the Engineer. Exceptions to the below time limits will be granted only for weather restrictions, and installation of epoxy resin pavement markings on new pavement shall not commence until after 24 hours of final surface placement.

Pavement marking installation on roads having traffic volumes of 10,000 ADT or more shall be completed within 24 hours after the end of the workday where the pavement markings were removed or obscured.

Pavement marking installation on roads having traffic volumes between 3,000 and 10,000 ADT shall be completed within 48 hours after the end of the workday where the pavement markings were removed or obscured.

Pavement marking installation on roads having traffic volumes of less than 3,000 ADT shall be completed within 72 hours after the end of the workday where the pavement markings were removed or obscured.

If the Contractor will not have pavement markings installed within the time limits specified, the Contractor shall install Type D construction pavement markings within the same time limits and maintain such until the final pavement markings can be installed. The cost of installing, maintaining, and removing the Type D construction pavement markings shall be borne by the Contractor at no cost to the Department.

When establishing the location of pavement markings, the Contractor may mark the locations on the roadway by installing premarkings. Premarkings shall be accomplished using Type D (removable, any class) tape, chalk, or lumber crayons except special pavement markings such as stop lines, crosswalks, messages, hatching, etc., shall be made using chalk or lumber crayons. Premarkings shall be of the same general color as the pavement markings being premarked. When tape is used as premarking, premarking shall consist of 4-inch by 4-inch-maximum squares or 4-inch-maximum diameter circles spaced at 100-foot-minimum intervals in tangent sections and 50-foot-minimum intervals in curved sections. At locations where the pavement marking will switch colors, e.g., gore marking, the ends of the markings may be premarked regardless of the spacing. When chalk or lumber crayon is used as premarking, the entire length of the pavement marking may be premarked. Premarkings shall be installed whereby their installation shall not affect the adhesion of the pavement markings. When Type D tape is used as the premarking and the lateral location of such premarkings to the final pavement markings exceeds 6 inches, the premarkings shall be removed at no cost to the Department.

(a) **Pavement Markings:** Pavement markings shall be white or yellow markings as required by the *MUTCD* for the specific location or as specified by the Engineer and shall be installed in accordance with Table VII–1 unless otherwise recommended by the manufacturer and approved by the Engineer. The Contractor shall furnish a copy of the manufacturer's installation recommendations to the Engineer.

The Contractor shall perform quality control testing for application thickness and glass bead rate in accordance with VTM-94 at the beginning of each workday and every 3 hours thereafter. The Contractor shall be responsible for providing the apparatus indicated in VTM-94 that are needed to perform the quality control testing. Testing shall be performed in the presence of the Engineer.

The Contractor shall maintain a daily log (Form C-85) for both temporary and permanent pavement markings and markers. Entries in the log shall be made in ink, shall be legible, and the log shall be signed by the Contractor and delivered to the Engineer by the end of each workday.

Pavement line markings shall consist of stop lines, crosswalks, and solid or skip lines used for, but not limited to, dividing lanes, marking edges, channelizing, outlining and marking safety zones around objects, and forming islands and parking lot stalls.

1. **Crosswalks and stop lines** shall be installed using Type B, Class I or IV, markings.

TABLE VII–1
Pavement Markings

Type	Class	Name	Surface Temp. at Time of Application	Film Thickness (mils)	Pavement Surface	Application Limitations
A		Traffic paint	50°F+	15 ± 1 when wet	AC HCC	May be applied directly after paving operations
B	I	Thermoplastic Alkyd	50°F+	90 ± 5	AC	May be applied directly after paving operations
	I	Thermoplastic Hydrocarbon	50°F+	when set	AC	Do not apply less than 30 days after paving operations
	II	Polyester resin	50°F+	15 ± 1 when wet	HCC	Needs to be coned
	III	Epoxy resin	50°F+	20 ± 1 when wet	AC HCC	Pavement surface needs to be at least 1 day old
	IV	Plastic-backed preformed Tape	(Note 4)	60–90	AC HCC	Manufacturer's recommendations
	VI	Patterned preformed Tape	(Note 4)	20 min (Note 1) 65 min (Note 2)	AC HCC	Manufacturer's recommendations
D	I & II	Removable tape	(Note 4)	(Note 3)	AC HCC	Construction zone pavement marking
E		Removable black tape (Non-Reflective)	(Note 4)	(Note 3)	AC	Construction zone pavement marking for covering existing markings
F	I & II	Temporary markings	(Note 4)	40 max	AC HCC	Construction zone pavement marking

Note 1: Thinnest portion of the tape's cross section.
Note 2: Thickest portion of the tape's cross section.
Note 3: In the event the manufacturer's recommendation for film thickness is less than used when the material was tested by the National Transportation Product Evaluation Program or other Department-approved test facility, the minimum values used during installation shall conform to the test values indicated on the approved list for the specific marking.
Note 4: In accordance with manufacturer's recommendation.

2. **Solid lines or skip lines** shall be installed using Type A or Type B markings as specified.

Pavement message markings shall be installed using Type B, Class I, IV, or VI, markings and shall include, but not be limited to, school zone markings, railroad crossing markings, disabled parking symbols, elongated arrows, word messages, etc. The word SCHOOL shall be formed with characters that are 10 feet in height where permitted by the normal roadway width. School zone markings shall extend transversely across both lanes of two-lane roadways and across two or more approach lanes of roadways of three or more lanes. Disabled parking symbols shall be 41 inches in height, 36 inches in width, and shall use a 4-inch stroke width for the lines.

The Contractor shall protect the public from damage attributable to pavement marking operations. The Contractor shall be responsible for the complete preparation of the pavement surface, including, but not limited to, removing dust, dirt, loose particles, oily residues, cur- ing compounds, concrete laitance, residues from eradication, and other foreign matter immediately prior to installing pavement markings. The pavement surface shall be dry at the time of installation when tested in accordance with VTM-94. The Contractor shall be responsible for providing the apparatus indicated in VTM-94 that are needed to perform the moisture test. Marking material shall not be applied within 24 hours following rain or other inclement weather.

Liquid markings shall be applied so as to prevent splattering and overspray and shall be protected from traffic until track free by the use of guarding or warning devices as necessary. If a vehicle crosses a marking and tracks it or if splattering or overspray occurs, the affected marking and resultant tracking shall be removed and new markings applied at the Contractor's expense.

Equipment shall also be thoroughly cleaned between changes in colors of materials.

Pavement markings shall have clean and well-defined edges without running or deformation; shall be uniform, free of waviness; shall be straight on tangent alignment; and shall be on a true arc on curved alignment. The widths of pavement markings shall not deviate more than 1/4 inch on tangent nor more than 1/2 inch on curves from the required width. The length of the gap and the length of the individual stripes that form skip lines shall not devi- ate more than two inches. The length of the gap and individual skip line shall be of such uniformity throughout the entire length of each that a normal striping machine will be able to repeat the pattern and superimpose additional striping upon the existing marking. Glass beads shall be applied at the rate specified herein and shall be evenly distributed over the entire surface of the marking. Beads shall be applied to the surface of liquid markings by a bead dispenser attached to the applicator that shall dispense beads simultaneously on and in the just-applied marking. The bead dispenser shall be equipped with a cut-off control synchronized with the cut off of the applied marking material so that the beads are applied to- tally to the completed line. Beads shall be applied while the liquid marking is still fluid. Approximately 70 percent of beads shall be buried in the marking, and the remaining 30 percent shall be 50 to 60 percent embedded in the surface. Beads installed on crosswalks and stop lines on roadways with curbs only (no gutter) may be hand applied for two feet at the end of each line next to the curb with 100 percent of the beads embedded 50 to 60 percent in the surface.

Markings found to be unacceptable shall be removed, and new markings applied at the Contractor's expense.

1. **Type A markings:** Paint may be applied to asphalt concrete and hydraulic cement concrete

pavements. Paint shall not be applied over existing pavement markings of other materials unless the existing marking is 90 percent removed. Paint may be applied over existing paint markings.

Paint shall be applied with a line painting machine that is capable of hot spraying paint directly onto the pavement surface with a uniformity of feed through its nozzles for widths of 4 through 8 inches. The machine shall be capable of applying two pavement stripes, either solid or skip, at the same time when double line markings are required. Paint tanks on the equipment shall be equipped with a mechanical agitator and paint shall be thoroughly mixed and heated such that it will not track within 60 seconds after its application.

Non-truck mounted equipment shall be self-propelled and regulated to allow for calib- ration of the amount of material applied.

Glass beads shall be applied to the surface of the paint at the rate of 6 pounds per gallon of paint.

2. **Type B markings:** Equipment shall be capable of providing mixing, heating, and agitation of material. Material shall be uniformly heated throughout the system in accordance with the manufacturer's recommendations. Thermoplastic material shall be maintained in the heating kettle and applied to the road surface at a minimum temperature of 400 degrees F. Heating kettles shall be equipped with an automatic thermostatic control device. The Contractor shall furnish a properly calibrated infrared instrument for the purpose of measuring the actual temperature of molten thermoplastic material. Multi-component material shall be applied using internally injected guns for the mix- ing of catalyst and hardener.

   Non–truck mounted equipment for application of thermoplastic material shall be of the screed extrude type with a screw drive or shall be self propelled and regulated to allow for calibration of the amount of material applied. Non–truck mounted equipment for application of polyester and epoxy resin material shall be self-propelled and regulated to allow for calibration of the amount of material applied.

   a. **Thermoplastic (Class I)** material shall be applied only on asphalt concrete pave- ments and shall be applied by screed extrude, ribbon gun, or spray equipment. Alkyd thermoplastic may be applied directly after the paving operations; however, hydrocarbon thermoplastic shall not be applied less than 30 days after the paving operations.

      Alkyd and hydrocarbon materials shall not be mixed together. Equipment shall be thoroughly cleaned before types of material are changed.

      Thermoplastic shall not be applied over existing pavement markings of other materials unless the existing marking is 90 percent removed. Thermoplastic may be applied over existing thermoplastic markings. For concrete bridge decks that occur in asphalt roadways, Type B, Class VI, tape shall be used.

      Primer/adhesive shall be applied to asphalt concrete surfaces more than 2 years old and shall be from the same manufacturer as the thermoplastic.

      Glass beads shall be applied to the surface of the marking at the rate of 7 pounds per 100 square feet.

b. **Polyester resin (Class II)** material shall be applied only on hydraulic cement concrete pavements. Polyester resin shall not be applied over existing pavement markings of other materials unless the existing marking is 90 percent removed. Polyester resin may be applied over existing polyester resin markings.

Glass beads shall be applied to the surface at the rate of 8 pounds per gallon of material.

c. **Epoxy resin (Class III)** material shall be applied only to asphalt concrete pavement more than 1 day old and hydraulic cement concrete pavement. Epoxy resin shall not be applied over existing pavement markings unless the existing marking is 90 percent removed.

Glass beads shall be applied by the gravity method to the surface at the rate of 25 pounds per gallon of material.

d. **Plastic-backed preformed tape** shall be installed in accordance with the manu- facturer's recommendations and as denoted herein. Tape may be applied to asphalt concrete and hydraulic cement concrete pavements. Tape may be installed immediately following the final rolling of the new asphalt concrete surface. Tape shall not be applied over existing pavement markings of other materials unless the existing marking is 90 percent removed.

Primer/adhesive shall be used for all installations except when tape is applied immediately following the final rolling of the new asphalt concrete surface and shall be from the same manufacturer as the tape.

Tape for pavement line markings shall be applied by an application cart as recommended by the manufacturer. Tape shall be tamped into place with a tamper cart with the weight as recommended by the manufacturer. The use of a vehicle to ride over the markings for tamping will not be permitted.

(b) **Eradication:** Eradication of pavement markings for restriping when required shall be in accordance with the requirements of Section 512 except only 90 percent removal of the existing markings is required.

(c) **Pavement Markers:**

1. **Snow-plowable raised pavement markers** shall be installed by cutting two parallel grooves into the pavement at the depth and dimensions recommended by the manufacturer. Grooves shall be parallel to the adjacent pavement marking. Grooves shall be cut with saw blades having a diameter to match the curvature of the steel casting bottom and keels. Keel surfaces shall be free from scale, dirt, oil, grease, or any other contami- nant that might reduce bonding.

Casting keels shall be bonded in the saw-cut grooves in the manner recommended by the manufacturer of the marker. The bonding material shall be from the Department's approved list or as recommended by the manufacturer of the marker. Noses of the casting shall be installed flush with the pavement surface. The installed height of the raised pavement marker shall be approximately 1/2 inch above the pavement surface. The ambient temperature at the time of installation of the snow plowable raised pavement markers shall be at least 50 degrees F.

The top of reflectors shall be mounted flush with the top of the casting.

2. **Raised pavement markers** shall be bonded to the pavement surface in accordance with the manufacturer's recommendations. Bonding material shall be from the Depart- ment's approved list or as recommended by the manufacturer of the marker except that epoxy shall not be used on asphalt concrete pavements.

704.04—Measurement and Payment

Pavement line markings will be measured and paid for at the contract unit price per linear foot. This price shall include the pavement marking material, surface preparation, quality control tests, daily log, guarding devices, primer/adhesive, and glass beads.

Pavement message markings will be measured and paid for at the contract unit price per each per location. This price shall include the pavement marking material, surface preparation, quality control tests, daily log, guarding devices, primer/adhesive, and glass beads.

Pavement markers will be measured and paid for at the contract unit price per each. This price shall include prismatic retroreflectors, pavement cutting, adhesive, and castings.

Eradication of pavement markings will be measured and paid for in accordance with Section 512. Payment

will be made under:

Pay Item	Pay Unit
Pavement line marking (Type and/or class and width)	Linear foot Pavement message marking (Message) Each Pavement marker (Type, [ ]-way, and/or type pavement) Each