

JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)

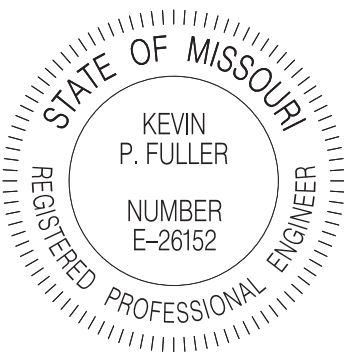
(Job Special Provisions shall prevail over General Special Provisions whenever in conflict therewith.)

A.	General - Federal JSP-09-02E	1
B.	Contract Liquidated Damages JSP-13-01B	1
C.	Liquidated Damages Specified JSP-93-28	2
D.	Work Zone Traffic Management (WZTMP)	3
E.	Emergency Provisions and Incident Management JSP-90-11	8
F.	Project Contact for Contractor/Bidder Questions JSP-96-05	8
G.	Supplemental Revisions JSP-18-01H	9
H.	Contractor Quality Control NJSP-15-42	11
I.	MoDOT's Construction Workforce Program NJSP-15-17A	13
J.	Additional Mobilization for Seeding NJSP-16-03A	18
K.	Utilities JSP-93-26F	19
L.	Winter Months Requirements JSP-15-07A	21
M.	Removal and Delivery of Existing Signs JSP-12-01B	21
N.	ADA Compliance and Final Acceptance of Constructed Facilities JSP-10-01B	22
O.	Optional Pavements JSP-06-06G	24
P.	Use of Crossovers and Truck Entrances JSP-04-10	24
Q.	Flagging Procedure for Two-Lane Roadways (3-2-1 Cone Procedure) NJSP-17-03A	25
R.	High Friction Surface Treatment NJSP-15-13B	26
S.	Intelligent Compaction NJSP-18-08	30
T.	Low-Tracking or Non-Tracking Tack Coat NJSP-15-15G	35
U.	Surface Sealing Treatment NJSP-15-28	38
V.	Shoulder Grading NJSP-15-27A	42
W.	Disposition of Existing Signal/Lighting and Network Equipment JSP-15-05A	42
X.	Paver-Mounted Thermal Profiles NJSP-18-09	43
Y.	Work Zone Intelligent Transportation System NJSP-15-32	45
Z.	Inlaid Pavement Marker Installation	49
AA.	MoDOT ITS Assets Relocation	51
BB.	Lighting Cable-Conduit Relocation	54
CC.	Microsurfacing Requirements	54
DD.	Modified Shaping Slopes, Class III	57
EE.	Temporary Traffic Control	57
FF.	NTCIP Compliant Changeable Message Sign, Contractor Furnished / Retained	59
GG.	Seeding, Fertilizing and Mulch	62
HH.	Remove and Relocate Existing Ground Mount Sign	63
II.	Tenon Poles	63
JJ.	Tenon Mounted Luminaires	64
KK.	Push Button Extension	64
LL.	Adjust to Grade Pull Box	64
MM.	Adjust Water Valve to Grade	65
NN.	Pavement Grinding	65
OO.	Temporary Crash Cushion, TL-3 (Narrow)	66
PP.	Property Owner Notification	67
QQ.	Access to Commercial and Private Entrances	67
RR.	Coordination with Other Projects	68
SS.	Furnishing and Placing Type 2 Rock Blanket	68
TT.	Modified Concrete Traffic Barrier, Type C	69

Job No.: J613295

Route: 44

County: Franklin

 <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY</p>	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65102 Phone 1-888-275-6636
	CRAWFORD, MURPHY & TILLY, INC. <i>One Memorial Drive, Suite 500 St. Louis, MO 63102</i>
	Certificate of Authority: 000631 Consultant Phone: 314-436-5500
	If a seal is present on this sheet, JSP's have been electronically sealed and dated.
	JOB NUMBER: J613295 FRANKLIN COUNTY, MO DATE PREPARED: October 9, 2019
ADDENDUM DATE:	
Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: All	

JOB
SPECIAL PROVISION

A. General - Federal JSP-09-02E

1.0 Description. The Federal Government is participating in the cost of construction of this project. All applicable Federal laws, and the regulations made pursuant to such laws, shall be observed by the contractor, and the work will be subject to the inspection of the appropriate Federal Agency in the same manner as provided in Sec 105.10 of the Missouri Standard Specifications for Highway Construction with all revisions applicable to this bid and contract.

1.1 This contract requires payment of the prevailing hourly rate of wages for each craft or type of work required to execute the contract as determined by the Missouri Department of Labor and Industrial Relations, and requires adherence to a schedule of minimum wages as determined by the United States Department of Labor. For work performed anywhere on this project, the contractor and the contractor's subcontractors shall pay the higher of these two applicable wage rates. State Wage Rates, Information on the Required Federal Aid Provisions, and the current Federal Wage Rates are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT", "Contractor Resources". Effective Wage Rates will be posted 10 days prior to the applicable bid opening. These supplemental bidding documents have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

1.2 The following documents are available on the Missouri Department of Transportation web page at www.modot.org under "Doing Business with MoDOT"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to July 2019 Missouri Standard Plans

For Highway Construction

These supplemental bidding documents contain all current revisions to the published versions and have important legal consequences. It shall be conclusively presumed that they are in the bidder's possession, and they have been reviewed and used by the bidder in the preparation of any bid submitted on this project.

B. Contract Liquidated Damages JSP-13-01B

1.0 Description. Liquidated Damages for failure or delay in completing the work on time for this contract shall be in accordance with Sec 108.8. The liquidated damages include separate amounts for road user costs and contract administrative costs incurred by the Commission.

2.0 Period of Performance. Prosecution of work is expected to begin on the date specified below in accordance with Sec 108.2. Regardless of when the work is begun on this contract, all

Job No.: J613295
Route: 44
County: Franklin

work shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec 108.7.1.

Notice to Proceed: February 3, 2020
Contract Completion Date: August 27, 2021

2.1 Calendar Days. The count of calendar days will begin on the date the contractor starts any construction operations on the project.

Job Number	Calendar Days	Daily Road User Cost
J613295	N/A	\$9,800

3.0 Liquidated Damages for Contract Administrative Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged contract administrative liquidated damages in accordance with Sec 108.8 in the amount of **\$2,000** per calendar day for each calendar day, or partial day thereof, that the work is not fully completed. For projects in combination, these damages will be charged in full for failure to complete one or more projects within the above specified completion date or calendar days.

4.0 Liquidated Damages for Road User Costs. Should the contractor fail to complete the work on or before the completion date specified in Section 2.0, or within the number of calendar days specified in Section 2.1, whichever occurs first, the contractor will be charged road user costs in accordance with Sec 108.8 in the amount specified in Section 2.1 for each calendar day, or partial day thereof, that the work is not fully completed. These damages are in addition to the contract administrative damages and any other damages as specified elsewhere in this contract.

C. Liquidated Damages Specified JSP-93-28

1.0 Description. If the Business Loop 44 pavement, shoulder, guardrail, signal, sidewalk, signing, pavement marking, slope protection, curb and gutter, entrance, and ADA improvements including any associated grading and seeding is not complete and open to traffic prior to October 1, 2020, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delay, with its resulting cost to the traveling public. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$2300 per day** for each full day that the Business Loop 44 pavement, shoulder, guardrail, signal, sidewalk, signing, pavement marking, slope protection, curb and gutter, entrance, and ADA improvements including any associated grading and seeding is not complete and open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of excess closure time.

1.1 The said liquidated damages specified will be assessed regardless of whether it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction, as amended elsewhere in this contract.

D. Work Zone Traffic Management (WZTMP)

1.0 Description. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

1.1 Work Zone Specialist (WZS). The Traffic Management Plan shall name an individual, either employed by the contractor or hired by the contractor, to act as the Work Zone Specialist (WZS) throughout the entirety of the project. The (WZS) will have no job duties other than traffic control. The WZS shall be in direct charge of the temporary traffic control pre-activity meeting and traffic control items such as; setup, communications, reviews, and reporting of all daily work zones on the project. Any change in personnel for the WZS shall be submitted in written form to the engineer. The WZS shall be trained and certified as a Traffic Control Supervisor from an organization such as ATSSA or equivalent and will be directly involved with daily traffic management and traffic management planning. It will be the responsibility of the WZS to coordinate daily traffic management with the contractor's traffic control crews, inspector or engineer and the ST. Louis Traffic Management Center (TMC). The WZS shall be required to be on the project daily and remain on the project until all work zones have been removed for the day. The WZS shall be on site before the first work zone sign is placed for the day and until the last traffic control device is taken down for the day. The WZS shall remain on site the entire time daily/nightly lane drops are in use. The WZS shall maintain daily contact with the engineer or inspector on the project.

1.2 Work Zone Set Up. The WZS shall direct the configuration and placement of each work zone daily and ensures work zones are set up and maintained in accordance with the EPG. The WZS shall conduct a daily meeting with the set-up crew to determine which traffic control devices are required, their locations and set up and take down times.

1.3 Work Zone Communication. The WZS shall notify the TMC before the first work zone sign is set up and after the last traffic control item is taken down at the end of each work day or night. The WZS shall also to notify the inspector of any work zone cancellation for the day. Notification of cancellations shall be made prior to 3:00 pm for nighttime work zones, as well as for daytime work zones the following day. The WZS shall also notify the inspector or engineer 2 weeks before any new lane closures or detours are put into place.

1.4 Work Zone Reviews. Once the traffic control has been placed for the day, the WZS shall review the work zone to ensure all devices are legible and clean, installed in the correct location with the correct spacing and convey the correct message. The WZS shall approve the work zone before any work can begin. The WZS shall also review the job site hourly to determine if any traffic control devices need to be added, reconfigured or cleaned. If the engineer or inspector notifies the WZS of any safety or traffic related concerns in the work zone, the engineer or inspector will communicate the type of deficiency as per Sec 616.4.2.5.2. This communication will be verbal and documented in writing via the DWR for that day. The DWR entry will include the time of verbal communication. The WZS will also document the deficiency in their daily report. For Category 1 deficiencies, the written documentation will include the time of notification and the time of correction. Any liquidated damages assessed shall be placed on the next Engineer's estimate as per 1.7 of this section.

1.5 Work Zone Reporting. After the WZS has conducted the daily initial review of the work zone, the WZS shall record the findings. Thereafter, the WZS shall conduct reviews on an hourly bases and subsequently record findings, required corrections and times the corrections were completed. Copies of the WZS review documentation shall be furnished to the Engineer within 24 hours.

1.6 Maintaining Work Zones and Work Zone Reviews. The WZS shall maintain work zones on a daily basis to ensure safety to the traveling public and the workers; this includes long term work zones that have devices and/or roadway conditions that need to be maintained. If the engineer or inspector notifies the WZS of any safety or traffic delay concerns in the work zone, the WZS shall promptly inspect and work to provide a solution to correct the situation in accordance with Sec. 616.4.2.5. Missing, damaged or over-turned traffic control devices shall typically be corrected without the need for direction by the engineer. The WZS is responsible to assure all traffic control devices are maintained in accordance with EPG standards. The WZS is responsible to ensure the work zone is operated within the hours specified by the engineer and will not deviate from the specified hours without prior approval of the engineer. The WZS is responsible to manage work zone delay in accordance with project special provisions. The WZS and engineer shall submit one joint weekly technical review of work zone operations identifying any concerns present and the corrective actions taken. Reviews may be subjected to unannounced inspections by the engineer to corroborate the validity of the ratings. The engineer and WZS will be notified of the results.

1.6.1 Work zone signs and bases shall be removed from both inside and outside shoulders of the roadway when not in use and the end of each work shift. This includes signs and bases used for daily or nightly lane closures.

1.7 Work Zone Conflict Resolution. Any conflict resolution shall be in accordance with Sec 616.4. Failure to make corrections on time may result in the engineer suspending work. The suspension will be non-excusable and non-compensable regardless of whether road user costs are being charged for closures.

2.0 Traffic Management Schedule.

2.1 Traffic management schedules shall be submitted to the engineer for review prior to the start of work and prior to any revisions to the traffic management schedule. The traffic management schedule shall include the proposed traffic control measures, the hours traffic control will be in place, and work hours.

2.2 The contractor shall request permission at least two working days prior to lane closures or shifting traffic onto detours, and 14 calendar days prior to the imposition of height, width or weight restrictions. This is to ensure closures do not conflict with other work within the zone of influence and the work zone information on the MoDOT's website can remain real-time. In accordance with Management of Traffic (MOT) procedures, the contractor shall submit lane closures for the following week to the engineer by 3:00pm on Monday.

2.3 The engineer shall be notified as soon as practical of any postponement due to weather, material or other circumstances.

2.4 In order to ensure minimal traffic interference, the contractor shall schedule lane closures for the absolute minimum amount of time required to complete the work. Lanes shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.5 Traffic Congestion. The contractor shall, upon approval of the engineer, take proactive measures to reduce traffic congestion in the work zone. The contractor shall immediately implement appropriate mitigation strategies whenever traffic congestion reaches an excess of **10 minutes** to prevent congestion from escalating beyond this delay threshold. If disruption of the traffic flow occurs and traffic is backed up in queues equal to or greater than the delay time threshold listed above then the contractor shall immediately review the construction operations which contributed directly to disruption of the traffic flow and make adjustments to the operations to prevent the queues from reoccurring. Traffic delays may be monitored by physical presence on site or by utilizing real-time travel data through the work zone that generate text and/or email notifications where available. The engineer monitoring the work zone may also notify the contractor of delays that require prompt mitigation. The contractor may work with the engineer to determine what other alternative solutions or time periods would be acceptable. The contractor may refer to the Work Zone Analysis Spreadsheet found in the electronic deliverables under the MoDOT Online Plans Room for detailed information on traffic delays.

2.5.1 Traffic Safety.

2.5.1.1 Where traffic queues routinely extend to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway, the contractor shall extend the advance warning area, as approved by the engineer.

2.5.1.2 When a traffic queue extends to within 1000 feet of the ROAD WORK AHEAD, or similar, sign on a divided highway or to within 500 feet of the ROAD WORK AHEAD, or similar, sign on an undivided highway due to non-recurring congestion, the contractor shall deploy a means of providing advance warning of the traffic congestion, as approved by the engineer. The warning location shall be no less than 1000 feet and no more than 0.5 mile in advance of the end of the traffic queue on divided highways and no less than 500 feet and no more than 0.5 mile in advance of the end of the traffic queue on undivided highways.

3.0 Work Hour Restrictions.

3.1 There are five major holiday periods shown below. All lanes shall be scheduled to be open to traffic during these holiday periods, from 12:00 noon on the last working day proceeding the holiday until 9:00 a.m. on the first working day subsequent to the holiday.

- Memorial Day
- Labor Day
- Thanksgiving
- Christmas
- New Year's Day

3.1.1 Independence Day. The lane restrictions specified in Section 3.1 shall also apply to Independence Day, except that the restricted periods shall be as follows:

12:00 noon July 2, 2020 – 10:00 p.m. July 5, 2020

12:00 noon July 2, 2021 – 6:00 a.m. July 6, 2021

12:00 noon July 1, 2022 – 6:00 a.m. July 5, 2022

3.2 The contractor shall not perform any construction operation on the roadway, including the hauling of material within the project limits, during restricted periods, holiday periods or other special events specified in the contract documents. Any work requiring a temporary reduction in the number of through lanes of traffic shall be completed during the following hours:

Route I-44 2-Lane Section

Eastbound:

10:00 p.m. – 5:00 a.m. Sunday

7:00 p.m. – 5 a.m. Monday – Thursday

8:00 p.m. – 8:00 a.m. Friday and Saturday

Westbound:

7:00 p.m. – 7:00 a.m. Monday – Thursday

8:30 p.m. – 8:00 a.m. Friday – Sunday

Route I-44 3-Lane Section (Single Lane Closure)

Eastbound:

9:00 a.m. – 5:00 a.m. Monday - Friday

9:00 p.m. – 5:00 a.m. Saturday and Sunday

Westbound:

7:00 p.m. – Noon Monday – Thursday

8:00 p.m. – 8:00 a.m. Friday – Sunday

Route I-44 3-Lane Section (Double Lane Closure)

Eastbound:

7:00 p.m. – 5:00 a.m. Monday - Friday

9:00 p.m. – 5:00 a.m. Saturday and Sunday

Westbound:

7:00 p.m. – 6:00 a.m. Monday – Thursday

8:00 p.m. – 6:00 a.m. Friday – Sunday

Business Loop 44 and Viaduct St.

9:00 a.m. – 2:30 p.m.

7:00 p.m. – 5:00 a.m.

I-44 Ramp Closures

10:00 p.m. – 4:00 a.m.

3.3 The contractor shall be aware that traffic volume data indicates construction operations on the roadbed outside of the hours in Section 3.2 will likely result in traffic queues greater than 15 minutes.

Based on this, the contractor's operations will be restricted accordingly unless it can be successfully demonstrated the operations can be performed without a 15 minute queue in traffic. It shall be the responsibility of the engineer to determine if the work hours in Section 3.2 may be modified. Working hours for evenings, weekends and holidays will be determined by the engineer.

3.4 The contractor shall not alter the start time, ending time, or a reduction in the number of through lanes of traffic or ramp closures without advance notification and approval by the engineer. The only work zone operation approved to begin 30 minutes prior to a reduction in through traffic lanes or ramp closures is the installation of traffic control signs. Should lane or ramp closures be placed or remain in place, prior to the approved starting time or after the approved ending time, the Commission, the traveling public, and state and local police and governmental authorities will be damaged in various ways, including but not limited to, increased construction administration cost, potential liability, traffic and traffic flow regulation cost, traffic congestion and motorist delays, with a resulting cost to the traveling public. These damages are not easily computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of **\$1000 per 15-minute increment** for each 15 minutes that the temporary lane or ramp closures are in place and not open to traffic in excess of the limitation as specified elsewhere in this special provision. It shall be the responsibility of the engineer to determine the quantity of unapproved closure time.

3.4.1 The said liquidated damages specified will be assessed regardless if it would otherwise be charged as liquidated damages under the Missouri Standard Specification for Highway Construction.

4.0 Detours and Lane Closures.

4.1 The contractor shall provide changeable message signs (CMS) notifying motorists of future traffic disruption and possible traffic delays one week before traffic is shifted to a detour or prior to lane closures. The CMS shall be installed at a location as approved or directed by the engineer. The CMS shall be capable of communication with the Transportation Management Center (TMC), if applicable, prior to installation on right of way. All messages planned for use in the work zone shall be approved and authorized by the engineer or its designee prior to deployment. Permanent dynamic message signs (DMS) owned and operated by MoDOT may also be used to provide warning and information for the work zone. Permanent DMS shall be operated by the TMC, and any messages planned for use on DMS shall be approved and authorized by the TMC at least 72 hours in advance of the work.

4.2 At least one lane of traffic in each direction shall be maintained at all times except for brief intervals of time required when the movement of the contractor's equipment will seriously hinder the safe movement of traffic. Periods during which the contractor will be allowed to interrupt traffic will be designated by the engineer.

5.0 Ramp Closure. Ramps may be closed, only as directed or approved by the engineer, if a ten-foot minimum lane width on a paved surface cannot be provided. No posted detour routes

are required for any ramp closures. Ramp closures will only be allowed from 10:00 pm – 4:00 am.

6.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract documents. All authorized changes in the traffic control plan shall be provided for as specified in Sec 616.

E. Emergency Provisions and Incident Management JSP-90-11

1.0 The contractor shall have communication equipment on the construction site or immediate access to other communication systems to request assistance from the police or other emergency agencies for incident management. In case of traffic accidents or the need for police to direct or restore traffic flow through the job site, the contractor shall notify police or other emergency agencies immediately as needed. The area engineer's office shall also be notified when the contractor requests emergency assistance.

2.0 In addition to the 911 emergency telephone number for ambulance, fire or police services, the following agencies may also be notified for accident or emergency situation within the project limits.

Missouri Highway Patrol: 636-300-2800			
Franklin County, MO	City of St. Clair, MO	City of Pacific, MO	City of Union, MO
Sherriff: 636-583-2560	Fire: 636-629-2727	Fire: 636-257-3633	Fire: 636-583-2515
	Police: 636-629-1313	Police: 636-257-2424	Police: 636-583-3700

2.1 This list is not all inclusive. Notification of the need for wrecker or tow truck services will remain the responsibility of the appropriate police agency.

2.2 The contractor shall notify enforcement and emergency agencies before the start of construction to request their cooperation and to provide coordination of services when emergencies arise during the construction at the project site. When the contractor completes this notification with enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

3.0 No direct pay will be made to the contractor to recover the cost of the communication equipment, labor, materials or time required to fulfill the above provisions.

F. Project Contact for Contractor/Bidder Questions JSP-96-05

All questions concerning this project during the bidding process shall be forwarded to the project contact listed below.

Chris Kelly, P.E.
Transportation Project Manager – St. Louis District
1590 Woodlake Dr.
Chesterfield, MO 63017

Telephone Number: (314) 453-5034
Email: Christopher.Kelly@modot.mo.gov

All questions concerning the bid document preparation can be directed to the Central Office – Design at (573) 751-2876.

G. Supplemental Revisions JSP-18-01H

Stormwater Compliance Requirements

1.0 Description. This provision requires the contractor to provide a Water Pollution Control Manager (WPCM) for any project that includes areas of land disturbance that will total one (1) acre or greater on the project site at any point in time. When a WPCM is required, all sections within this provision shall be applicable, including assessment of specified Liquidated Damages for failure to correct Stormwater Deficiencies, as specified herein.

1.1 Applicability. The project site consists of all areas designated on the plans, including temporary and permanent easements. This provision does not apply to Contractor staging, plant, or borrow areas that are not located on MoDOT right of way (Off-site). The Contractor is responsible for obtaining its own separate land disturbance permit for Off-site areas. This provision is in addition to any other stormwater, environmental, and land disturbance requirements specified elsewhere in the contract.

2.0 Water Pollution Control Manager (WPCM). The Contractor shall designate a competent person to serve as the Water Pollution Control Manager (WPCM) for projects meeting the description in Section 1.0. The Contractor shall ensure the WPCM completes all duties listed in Section 2.1.

2.1 Duties of the WPCM:

(a) Be familiar with the stormwater requirements including the current MoDOT State Operating Permit for construction stormwater discharges/land disturbance activities; MoDOT's statewide Stormwater Pollution Prevention Plan (SWPPP); the Corps of Engineers Section 404 Permit, when applicable; the project specific SWPPP, the Project's Erosion & Sediment Control Plan; all applicable special provisions, specifications, and standard drawings; and this provision;

(b) Successfully complete the MoDOT Stormwater Training Course within the last 4 years. The MoDOT Stormwater Training is a free online course available at MoDOT.org;

(c) Attend the Pre-Activity Meeting for Grading and Land Disturbance and all subsequent Weekly Meetings in which grading activities are discussed;

(d) Oversee and ensure all work is performed in accordance with the Project-specific SWPPP and all updates thereto, or as designated by the Engineer;

(e) Review the project site for compliance with the Project SWPPP, as needed, from the start of any grading operations until final stabilization is achieved, and take necessary actions to correct any known deficiencies to prevent pollution of the waters of the state or adjacent property owners prior to the engineer's weekly inspections;

(f) Review and acknowledge receipt of each MoDOT Inspection Report (Land Disturbance Inspection Record) for the Project within forty eight (48) hours of receiving the report and ensure that all Stormwater Deficiencies noted on the report are corrected within 7 days of the stormwater inspection or any extended period of time granted by the Engineer.

3.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point. A Pre-Activity Meeting for Grading/Land Disturbance shall be held prior to the start of any land disturbance operations. No land disturbance operations shall commence prior to the Pre-Activity Meeting except work necessary to install perimeter controls and entrances. Discussion items at the pre-activity meeting shall include a review of the Project SWPPP, the planned order of grading operations, proposed areas of initial disturbance, identification of all necessary BMPs that shall be installed prior to commencement of grading operations, and any issues relating to compliance with the Stormwater requirements that could arise in the course of construction activity at the project.

3.1 Hold Point. Following the pre-activity meeting for Grading/land disturbance and subsequent installation of the initial BMPs identified at the pre-activity meeting, a Hold Point shall occur prior to the start of any land disturbance operations to allow the engineer and WPCM the time needed to perform an on-site review of the installation of the BMPs to ensure compliance with the SWPPP is met. Land disturbance operations shall not begin until authorization is given by the engineer.

4.0 Inspection Reports. Weekly and post run-off inspections will be performed by the engineer and each Inspection Report (Land Disturbance Inspection Record) will be entered into a web-based Stormwater Compliance database. The WPCM will be granted access to this database and shall promptly review all reports, including any noted deficiencies, and shall acknowledge receipt of the report as required in Section 2.1 (f.).

5.0 Stormwater Deficiency Corrections. All stormwater deficiencies identified in the Inspection Report shall be corrected by the contractor within 7 days of the inspection date or any extended period granted by the engineer when weather or field conditions prohibit the corrective work. If the contractor does not initiate corrective measures within 5 calendar days of the inspection date or any extended period granted by the engineer, all work shall cease on the project except for work to correct these deficiencies, unless otherwise allowed by the engineer. All impact costs related to this halting of work, including, but not limited to stand-by time for equipment, shall be borne by the Contractor. Work shall not resume until the engineer approves the corrective work.

5.1 Liquidated Damages. If the Contractor fails to complete the correction of all Stormwater Deficiencies listed on the MoDOT Inspection Report within the specified time limit, the Commission will be damaged in various ways, including but not limited to, potential liability,

required mitigation, environmental clean-up, fines and penalties. These damages are not reasonably capable of being computed or quantified. Therefore, the contractor will be charged with liquidated damages specified in the amount of \$2,000 per day for failure to correct one or more of the Stormwater Deficiencies listed on the Inspection Report within the specified time limit. In addition to the stipulated damages, the stoppage of work shall remain in effect until all corrections are complete.

6.0 Basis of Payment. No direct payment will be made for compliance with this provision.

H. Contractor Quality Control NJSP-15-42

1.0 The contractor shall perform Quality Control (QC) testing in accordance with the specifications and as specified herein. The contractor shall submit a Quality Control Plan (QC Plan) to the engineer for approval that includes all items listed in Section 2.0, prior to beginning work.

2.0 Quality Control Plan.

- (a) The name and contact information of the person in responsible charge of the QC testing.
- (b) A list of the QC technicians who will perform testing on the project, including the fields in which they are certified to perform testing.
- (c) A proposed independent third-party testing firm for dispute resolution, including all contact information.
- (d) A list of Hold Points, when specified by the engineer.
- (e) The MoDOT Standard Inspection and Testing Plan (ITP). This shall be the version that is posted at the time of bid on the MoDOT website (www.modot.org/quality).

3.0 Quality Control Testing and Reporting. Testing shall be performed per the test method and frequency specified in the ITP. All personnel who perform sampling or testing shall be certified in the MoDOT Technician Certification Program for each test that they perform.

3.1 Reporting of Test Results. All QC test reports shall be submitted as soon as practical, but no later than the day following the test. Test data shall be immediately provided to the engineer upon request at any time, including prior to the submission of the test report. No payment will be made for the work performed until acceptable QC test results have been received by the engineer and confirmed by QA test results.

3.1.1 Test results shall be reported on electronic forms provided by MoDOT. Forms and Contractor Reporting Excel2Oracle Reports (CRE2O) can be found on the MoDOT website. All required forms, reports and material certifications shall be uploaded to a Microsoft SharePoint® site provided by MoDOT and organized in the file structure established by MoDOT.

3.2 Non-Conformance Reporting. A Non-Conformance Report (NCR) shall be submitted by the contractor when the contractor proposes to incorporate material into the work that does not meet the testing requirements or for any work that does not comply with the contract terms or specifications.

3.2.1 Non-Conformance Reporting shall be submitted electronically on the Non-Conformance Report form provided on the MoDOT Website. The NCR shall be uploaded to the MoDOT SharePoint® site and an email notification sent to the engineer.

3.2.2 The contractor shall propose a resolution to the non-conforming material or work. Acceptance of a resolution by the engineer is required before closure of the non-conformance report.

4.0 Work Planning and Scheduling.

4.1 Two-week Schedule. Each week, the contractor shall submit to the engineer a schedule that outlines the planned project activities for the following two-week period. The two-week schedule shall detail all work and traffic control events planned for that period and any Hold Points specified by the engineer.

4.2 Weekly Meeting. When work is active, the contractor shall hold a weekly project meeting with the engineer to review the planned activities for the following week and to resolve any outstanding issues. Attendees shall include the engineer, the contractor superintendent or project manager and any foreman leading major activities. This meeting may be waived when, in the opinion of the engineer, a meeting is not necessary. Attendees may join the meeting in person, by phone or video conference.

4.3 Pre-Activity Meeting. A pre-activity meeting is required in advance of the start of each new activity, except when waived by the engineer. The purpose of this meeting is to review construction details of the new activity. At a minimum, the discussion topics shall include: safety precautions, QC testing, traffic impacts, and any required Hold Points. Attendees shall include the engineer, the contractor superintendent and the foreman who will be leading the new activity. Pre-activity meetings may be held in conjunction with the weekly project meeting.

4.4 Hold Points. Hold Points are events that require approval by the engineer prior to continuation of work. Hold Points occur at definable stages of work when, in the opinion of the engineer, a review of the preceding work is necessary before continuation to the next stage.

4.4.1 A list of typical Hold Point events is available on the MoDOT website. Use of the Hold Point process will only be required for the project-specific list of Hold Points, if any, that the engineer submits to the contractor in advance of the work. The engineer may make changes to the Hold Point list at any time.

4.4.2 Prior to all Hold Point inspections, the contractor shall verify the work has been completed in accordance with the contract and specifications. If the engineer identifies any corrective actions needed during a Hold Point inspection, the corrections shall be completed prior to continuing work. The engineer may require a new Hold Point to be scheduled if the corrections require a follow-up inspection. Re-scheduling of Hold Points require a minimum 24-hour advance notification from the contractor unless otherwise allowed by the engineer.

5.0 Quality Assurance Testing and Inspection. MoDOT will perform quality assurance testing and inspection of the work, except as specified herein. The contractor shall utilize the inspection checklists provided in the ITP as a guide to minimize findings by MoDOT inspection staff. Submittal of completed checklists is not required, except as specified in 5.1.

5.1 Inspection and testing required in the production of concrete for the project shall be the responsibility of the contractor. Submittal of the 501 Concrete Plant Checklist is required.

6.0 Basis of Payment. No direct payment will be made for compliance with this provision.

I. MoDOT's Construction Workforce Program NJSP-15-17A

1.0 Description.

1.1 Projects utilizing federal funds include contract provisions for minority and female workforce utilization in the various trade crafts used to complete construction contracts. These federal contract workforce goals are described in the section labeled "Notice of Requirement for Affirmative Action to Ensure Equal Employment Opportunity". These goals are included in all MoDOT federal aid contracts and are under the authorization and enforcement of the U.S. Department of Labor (US DOL).

1.2 The Federal workforce requirement (Goals – TABLE 1) is authorized in 41 CFR Part 60-4 and Executive Order 11246 which set Equal Employment Opportunity goals with Affirmative Action requirements.

1.3 The required federal aid workforce provisions noted above, coupled with the following additional contract provisions, constitute MoDOT's Construction Workforce Program herein called Program.

1.4 This provision does not require pre-qualification nor is it a condition of award.

1.5 The Program does not eliminate or limit any actions the US DOL may take in relation to this contract's federal provisions.

1.6 The Program goals included in the contract are separate from any Disadvantaged Business Enterprise (DBE) or On-The-Job (OJT) training provision that may be included as contract provisions. DBE and OJT goals may or may not be included in a contract based on the individual size of contracts, type of contract work, anticipated length of contract, available and willing resources or other reasons.

1.7 Contractor, for the purpose of this provision, means the prime contractor and any and all subcontractors.

1.8 It is expected that the contractor recognizes the construction workforce goals for both minority and female workers in the project's county and make efforts to attain those goals, if possible, through the existing workforce makeup of the prime (including subcontractors) that will be on the project and/or through hiring opportunities that may arise for the project. However, it is not the intent of this provision to compel any contractor to displace existing workforce or move workers around to just meet the workforce goals.

1.9 If the contractor's existing Missouri construction workforce meets or exceeds the federal workforce goals established in Table 1, then the OJT goal (Training Provision) if included in the

contract, does not be apply.

1.10 Contractor's Workforce Plan. The Contractor shall submit its Workforce Plan a minimum of 1 week before construction starts. One plan shall be submitted for the project that shall include the cumulative planned workforce of the prime and subcontractor(s). The contractor shall prepare the plan, for total minority and female utilization, regardless of the craft. The Engineer will provide the Contractor with comments regarding their Workforce Plan prior to the start of construction. Once work starts, all monthly reporting shall include the craft of each worker reported. If the contractor's plan includes project manager, direct project support roles, project testers or other project professionals, these designations should also be included in addition to the workers designated by craft such as laborer, operator, carpenter, ironworker and others.

1.11 The plan accepted by the engineer before the start of construction will be the effort expected of the prime contractor to maintain during the life of the project.

1.12 If the contractors planned project workforce plan (including OJT hours if included in the contract) is short of the goals included in Table 1, there is opportunity for the contractor to receive a reimbursement of \$10.00 / hour for any new project minority and female hires needed through the remainder of the project. The reimbursement is applicable to work that qualifies for prevailing wage under the federal Davis-Bacon Act, [40 U.S.C. §§ 3141–3148](#), in accordance with an approved workforce plan. Any reimbursement must be pre-approved by the Engineer. The reimbursement is provided as a remedy to the contractor and as an aid in the long-term growth of experienced persons in the building of roads and bridges in Missouri. The contractor shall manage the plan through the life of the project as described in the plan or as modified, in coordination with the Engineer. The total amount available per project is not capped.

1.13 The Contractor's workforce plan may include existing construction support and professional services staff.

2.0 Forms and Documentation. The bidder must submit the following documents if awarded the contract:

Cumulative Workforce Utilization Reports. This report is contract specific. One report shall be submitted to the Engineer by the 15th of each month. The report will be used to report the total workforce compliance data for the prime contractor and all subcontractors retained by the contractor on the Commission's construction contract. The reporting shall include the workforce hours per each craft broken down by gender and ethnicity. Construction Support, testing and other professional services hours shall be included as these hours are part of the overall plan. The report will include the previous month's hours worked for the project. For projects less than 60 days in length, only one report with total hours worked by classification is required at substantial completion of construction.

3.0 Methods for Securing Workforce Participation and Good Faith Efforts.

3.1 *By submitting a bid, the Bidder agrees, as a material term of the contract, to carry out MoDOT's Construction Workforce Program by making good-faith efforts to utilize minority and female workers on the contractor's job sites to the fullest extent consistent with submitting the lowest bid to MoDOT. The Bidder shall agree that the Program is incorporated into this*

document and agree to follow the Program. If a bidder is unable to meet the workforce goals at the time of bid, it shall be required to objectively demonstrate to MoDOT that the goals have been met or demonstrate a good faith effort has been made with the level of effort submitted prior to the start of construction.

3.2 The Engineer, through consultation with MoDOT's External Civil Rights (ECR's) Division, may determine that the contractor has demonstrated that good-faith efforts to secure minority and female participation have been made.

3.3 In evaluating good-faith efforts, the ECR's Division will take into consideration the affirmative actions listed in the Federal Provisions (including provisions of Executive Order 11246).

3.4 MoDOT's Program allows the contractor flexibility to implement a project specific workforce and improve the diversity of their existing workforce that can be utilized across various areas of the state to meet future MoDOT Program goals and Federal Provisions.

3.5 If the contractor's approved plan changes during the project and/or the available workforce changes from what is approved at any time, it is the contractor's responsibility to remedy, in coordination with MoDOT's ECR Division, the conditions as outlined and made available through this provision.

4.0 Compliance Determination. (Required with project closeout) All documentation and on-site information will be reviewed by MoDOT's ECR Division in making a determination of whether the contractor made sufficient good faith efforts to meet the compliance with MoDOT's Construction Workforce Program.

5.0 Liquidated Damages. If the contractor elects to not submit a workforce plan prior to work starting or fails to fulfill their workforce plan committed to prior to the start of construction, the contractor will be required to establish a good-faith effort determination, as to why either of these events occurred. MoDOT may sustain damages, the exact extent of which would be difficult or impossible to ascertain, as this impacts the cost of future road and bridge construction. Therefore, in order to liquidate those damages, MoDOT shall be entitled, at its sole discretion, to deduct and withhold the following amounts: **The sum of one thousand five hundred (\$1,500)**

6.0 Administrative Reconsideration. The contractor shall be offered the opportunity for administrative reconsideration upon written request related to findings and/or actions determined by MoDOT's ECR's Division. The Administrative Reconsideration Committee shall be composed of individuals not involved in the original MoDOT determination(s).

7.0 Available Pre-Apprentice Training Programs. The Commission has established a labor force recruiting program intended to assist contractors in identifying, interviewing and hiring qualified job applicants. MoDOT strongly encourages the hiring of individuals from the MoDOT funded pre-apprentice training programs.

8.0 Independent Third-Party Compliance Monitor (Monitor). MoDOT may utilize a monitor that will be responsible for tracking the project's workforce utilization for the information the contractor submits. The contractor and its subcontractors shall allow the monitor access to their

reports, be available to answer the monitor's questions and allow the monitor to access to the site and to contractor and subcontractor employees. The monitor shall abide by the contractor's project site protocols.

9.0 Regional Diversity Council (Council). (Applicable to the Kansas City and St. Louis District regions only) The Council shall consist of local community leaders, leadership of local construction trades, MoDOT staff, Industry representation, and a representative(s) from the Federal Highway Administration. The Council will meet quarterly and evaluate the workforce activity per each project according to the following criteria:

- a. Review monthly workforce reports.
- b. Review progress toward the stated project workforce program.
- c. Review findings of Administrative Reconsideration hearings.
- d. Recommend *other* workforce actions to MoDOT.

10.0 Federal Workforce Goals.

Female Participation for Each Trade is 6.9% Statewide for Missouri.

Minority Participation for Each Trade is shown below in Table 1.

TABLE 1:

County	Goal (Percent)	County	Goal (Percent)
Adair	4	Linn	4
Andrew	3.2	Livingston	10
Atchison	10	McDonald	2.3
Audrain	4	Macon	4
Barry	2.3	Madison	11.4
Barton	2.3	Maries	11.4
Bates	10	Marion	3.1
Benton	10	Mercer	10
Bollinger	11.4	Miller	4
Boone	6.3	Mississippi	11.4
Buchanan	3.2	Moniteau	4
Butler	11.4	Monroe	4
Caldwell	10	Montgomery	11.4
Callaway	4	Morgan	4
Camden	4	New Madrid	26.5
Cape Girardeau	11.4	Newton	2.3
Carroll	10	Nodaway	10
Carter	11.4	Oregon	2.3
Cass	12.7	Osage	4

Cedar	2.3	Ozark	2.3
Chariton	4	Pemiscot	26.5
Christian	2	Perry	11.4
Clark	3.4	Pettis	10
Clay	12.7	Phelps	11.4
Clinton	10	Pike	3.1
Cole	4	Platte	12.7
Cooper	4	Polk	2.3
Crawford	11.4	Pulaski	2.3
Dade	2.3	Putnam	4
Dallas	2.3	Ralls	3.1
Daviess	10	Randolph	4
DeKalb	10	Ray	12.7
Dent	11.4	Reynolds	11.4
Douglas	2.3	Ripley	11.4
Dunklin	26.5	St. Charles	14.7
Franklin	14.7	St. Clair	2.3
Gasconade	11.4	St. Francois	11.4
Gentry	10	Ste. Genevieve	11.4
Greene	2	St. Louis City	14.7
Grundy	10	St. Louis County	14.7
Harrison	10	Saline	10
Henry	10	Schuyler	4
Hickory	2.3	Scotland	4
Holt	10	Scott	11.4
Howard	4	Shannon	2.3
Howell	2.3	Shelby	4
Iron	11.4	Stoddard	11.4
Jackson	12.7	Stone	2.3
Jasper	2.3	Sullivan	4
Jefferson	14.7	Taney	2.3
Johnson	10	Texas	2.3
Knox	4	Vernon	2.3
Laclede	2.3	Warren	11.4
Lafayette	10	Washington	11.4
Lawrence	2.3	Wayne	11.4
Lewis	3.1	Webster	2.3
Lincoln	11.4	Worth	10

		Wright	2.3
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**STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION
CONTRACT SPECIFICATIONS (EXECUTIVE ORDER 11246)**

This contractor and subcontractor shall abide by the requirements of 41 CFR 60-1.4(a), 60-300.5(a) and 60-741.5(a). These regulations prohibit discrimination against qualified individuals based on their status as protected veterans or individuals with disabilities and prohibit discrimination against all individuals based on their race, color, religion, sex, sexual orientation, gender identity or national origin. Moreover, these regulations require that covered prime contractors and subcontractors take affirmative action to employ and advance in employment individuals without regard to race, color, religion, sex, sexual orientation, gender identity, national origin, disability or veteran status.

As used in these specifications:

"Minority" includes;

- (i) Black (all person 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 American and maintaining identifiable tribal affiliations through membership and participation or community identification).

J. Additional Mobilization for Seeding NJSP-16-03A

1.0 Description. This provision provides compensation for additional mobilization for seeding, as specified herein.

2.0 Additional Mobilization for Seeding. Additional mobilization to perform temporary or permanent seeding, beyond the initial occurrence, may be necessary as specified in Sec 806.50.2 and as required per terms of the SWPPP. Mobilization of all equipment, workers and materials necessary to perform seeding and mulching shall be considered included in this work.

2.1 Measurement of the number of occurrences authorized by the engineer to mobilize equipment onto the project to perform temporary or permanent seeding will be made per each occurrence, except for the initial occurrence and as specified herein. No measurement will be made for mobilization necessary to perform repair work to previously seeded areas or for mobilization necessary due to removal of equipment prior to completion of seeding all areas available for seeding, as determined by the engineer.

3.0 Basis of Payment. The accepted occurrences of Additional Mobilization for Seeding will be paid for under 618-10.20, Additional Mobilization for Seeding, at a fixed unit price of \$600 per each occurrence. Payment for the initial occurrence to mobilize for seeding, and any additional mobilization costs in excess of the fixed price, shall be considered completely covered under other items.

K. Utilities JSP-93-26F

1.0 For informational purposes only, the following is a list of names, addresses, and telephone numbers of the known utility companies in the area of the construction work for this improvement:

<u>Utility Name</u>	<u>Known Required Adjustment</u>	<u>Type</u>
AT&T Distribution Contact: Todd Yenzler (314) 809-1335 Ty8856@att.com roger.payne.1@att.com	Yes See 2.0	Communications
Ameren Contact: Nick Eckelkamp (636) 639-8216 NEckelkamp@ameren.com	No	Power
Sho-Me Technologies Contact: Brad McGoon (417) 830-6717 DMcGoon@shomepower.com	No	Communications
City of Pacific Contact: Anna Hodge (636) 271-0500 ahodge@pacificmissouri.com	Yes See 3.0	Water, Electric, Sewer
Lightcore, A Centurylink Company Contact: Jason Johns (916) 296-8520 jason.johns@centurylink.com	No	Communications

Spire (Formerly Missouri Natural Gas) Contact: Brian Langenbacher (314) 768-7767 Brian.Langenbacher@spireenergy.com	No	Gas
Phillips 66 Contact: Richard Gragg (636) 391-8339 Richard.Gragg@P66.com	No	Gas Pipeline
Sprint Jason Cantrell (913) 488-8489 Jason.cantrell@sprint.com	No	Communications
Franklin County PWSD #3 Bob Hathcock (636) 742-5200 bobh@alliancewater.com	No	Water
Charter Communications Mark Marrow (636) 667-6298 Mark.Marrow@charter.com	No	Communications
David Didlot PREPASS (801) 989-8867 David.didlot@conduent.com	Yes See 4.0	Weight in motion Equipment

1.1 The existence and approximate location of utility facilities known to exist, as shown on the plans, are based upon the best information available to the Commission at this time. This information is provided by the Commission "as-is" and the Commission expressly disclaims any representation or warranty as to the completeness, accuracy, or suitability of the information for any use. Reliance upon this information is done at the risk and peril of the user, and the Commission shall not be liable for any damages that may arise from any error in the information. It is, therefore, the responsibility of the contractor to verify the above listing information indicating existence, location and status of any facility. Such verification includes direct contact with the listed utilities.

2.0 AT&T. AT&T has a pole and pedestal on West Osage at station 1228+40 left in conflict with the sidewalk improvement work. AT&T plans to relocate the pole and pedestal three weeks after the preconstruction meeting and take one week to complete the adjustments. See sheet 39 of 46 detailing the AT&T conflicts.

3.0 City of Pacific. The City of Pacific has one fire hydrant to relocate on West Osage, at station 1222+40 left in conflict with the sidewalk improvement work. The City plans to relocate

the fire hydrant soon after the preconstruction meeting. See sheet 38 of 46 detailing the conflict.

4.0 PREPASS. The contractor is hereby notified that a weigh-in-motion truck scale system called PREPASS has facilities embedded within the roadway pavement (outside WB lane) and shoulder of I-44, approximately from Sta. 144+57.65 to Sta. 147+82.65, as shown schematically on plan sheet 2 of 46. The above ground equipment is located between the outer road and I-44. PREPASS replaced the pavement and loop detectors in 2018 and some minor cracking occurred after installation. The contractor is advised not to disturb any of the buried or above ground equipment. PREPASS is a member of Missouri One Call. The PREPASS utility locator's name is James Harkins (217-213-8800). In the event that some of the roadway pavement and shoulder work within the limits of the PREPASS buried facilities needs to be replaced, the contractor shall notify David Didlot, 801-989-8867 and david.didlot@conduent.com four weeks from needing the work performed in conjunction with the contractor's traffic control and lane drop work. MoDOT will lay out the limits of any pavement repair work in the limits of the PREPASS concrete limits. David Didlot advised they will need four weeks prior notice to replace any pavement to perform any pavement repairs and take one week to complete the work. There is no direct pay for compliance of this coordination work and providing a lane drop for the PREPASS contractor.

5.0 Basis of Payment. There will be no direct pay for compliance with this provision.

L. Winter Months Requirements JSP-15-07A

1.0 Description. This project contains work which spans the winter months.

2.0 Work to be Completed. When the contractor ceases operations for the winter months, any paving operation performed by the contractor shall not result in a lane height differential between adjacent lanes.

3.0 Maintenance of Pavement Marking. Prior to ceasing operations for winter months, a permanent or temporary stripe shall be provided on any completed length to the point that the original stripe was obliterated or obscured by the contractor's operation. Temporary striped areas shall be re-striped with the remaining route upon performance of the final striping.

4.0 Winter Related Maintenance Activities. The contractor shall have the project in a condition as not to interfere with the plowing of snow. The contractor shall also provide a taper at the end of his paving that will not be damaged by the plowing of snow.

5.0 Basis of Payment. There will be no direct pay for compliance with this provision.

M. Removal and Delivery of Existing Signs JSP-12-01B

1.0 Description. All Commission-owned signs removed from the project shall remain the property of the Commission and shall be disassembled and delivered as specified herein.

2.0 Disassembly and Delivery. All Commission-owned signs, not to include abandoned billboard signs, designated for removal in the plans, and any other signs designated by the engineer, shall be removed by the contractor and delivered to the address below. The contractor shall call the phone number listed below 48 hours prior to delivery and make arrangements for delivery during normal business hours.

James "Dusty" Henson (Maintenance Supervisor – Signing & Striping)
Barrett Station Maintenance Lot
2309 Barrett Station Road
Ballwing, MO 63021
Phone: 314-205-7310

2.1 Signs shall be removed from sign supports and structures prior to delivery. Sign supports and structures shall become the property of the Contractor and removed from the project. Any oversized sign panels shall be disassembled or cut into widths of 8-feet or less with no restriction on length. Signs shall be stacked neatly in bins provided by MoDOT at the delivery site.

3.0 Basis of Payment. All costs associated with removing, disassembling, storing, and transporting of signs shall be considered as completely covered by the contract unit price for Item No. 202-20.10, "Removal of Improvements", per lump sum.

N. ADA Compliance and Final Acceptance of Constructed Facilities JSP-10-01B

1.0 Description. The contractor shall comply with all laws pertaining to the Americans with Disabilities Act (ADA) during construction of pedestrian facilities on public rights of way for this project. An ADA Checklist is provided herein to be utilized by the contractor for verifying compliance with the ADA law. The contractor is expected to familiarize himself with the plans involving pedestrian facilities and the ADA Post Construction Checklist prior to performing the work.

2.0 ADA Checklist. The contractor can locate the ADA Checklist form on the Missouri Department of Transportation website:

http://www.modot.mo.gov/business/contractor_resources/forms.htm

2.1 The ADA Checklist is intended to be a helpful tool for the contractor to use during the construction of the pedestrian facilities and a basis for the commission's acceptance of work. Prior to work being performed, the contractor shall bring to the engineer's attention any planned work that is in conflict with the design or with the requirement shown in the checklist. Situations may arise where the checklist may not fully address all requirements needed to construct a facility to the full requirements of current ADA law. In those situations, the contractor shall propose a solution to the engineer that is compliant with current ADA law using the following hierarchy of resources: 2010 ADA Standards for Accessible Design, Draft Public Rights of Way Accessibility Guidelines (PROWAG) dated November 23, 2005, MoDOT's Engineering Policy Guidelines (EPG), or a solution approved by the U.S. Access Board.

2.2 It is encouraged that the contractor monitor the completed sections of the newly constructed pedestrian facilities in attempts to minimize negative impacts that his equipment, subcontractors or general public may have on the work. Completed facilities must comply with the requirements of ADA and the ADA Checklist or have documented reasons for the non-compliant items to remain.

3.0 Coordination of Construction.

3.1 Prior to construction and/or closure on an existing pedestrian path of travel, the contractor shall submit a schedule of work to be constructed, which includes location of work performed, the duration of time the contractor expects to impact the facility and an accessible signed pedestrian detour compliant with MUTCD Section 6D that will be used during each stage of construction. This plan shall be submitted to the engineer for review and approval at or prior to the pre-construction conference. Accessible signed detours shall be in place prior to any work being performed that has the effect of closing an existing pedestrian travel way.

3.2 When consultant survey is included in the contract, the contractor shall use their survey crews to verify that the intended design can be constructed to the full requirements as established in the 2010 ADA Standards. When 2010 ADA Standards do not give sufficient information to construct the contract work, the contractor shall refer to the PROWAG.

3.3 When consultant survey is not included in the contract, the contractor shall coordinate with the engineer, prior to construction, to determine if additional survey will be required to confirm the designs constructability.

4.0 Final Acceptance of Work. The contractor shall provide the completed ADA Checklist to the engineer at the semi-final inspection. ADA improvements require final inspection and compliance with the ADA requirements and the ADA Checklist. Each item listed in the checklist must receive either a "YES" or an "N/A" score. Any item receiving a "NO" will be deemed non-compliant and shall be corrected at the contractor's expense unless deemed otherwise by the engineer. Documentation must be provided about the location of any non-compliant items that are allowed to remain at the end of the construction project. Specific details of the non-compliant items, the ADA requirement that the work was not able to comply with, and the specific reasons that justify the exception are to be included with the completed ADA Checklist provided to the engineer.

4.1 Slope and grade measurements shall be made using a properly calibrated, 2 foot long, electronic digital level approved by the engineer.

5.0 Basis of Payment. The contractor will receive full pay of the contract unit cost for all sidewalk, ramp, curb ramp, median, island, approach work, cross walk striping, APS buttons, pedestrian heads, detectible warning systems and temporary traffic control measures that are completed during the current estimate period as approved by the engineer. Based upon completion of the ADA Checklist, the contractor shall complete any necessary adjustments to items deemed non-compliant as directed by the engineer.

5.1 No direct payment will be made to the contractor to recover the cost of equipment, labor, materials, or time required to fulfill the above provisions, unless specified elsewhere in the contract documents.

O. Optional Pavements JSP-06-06G

1.0 Description. This work shall consist of a pavement composed of either Portland cement concrete or asphaltic concrete constructed on a prepared subgrade. This work shall be performed in accordance with the standard specifications and as shown on the plans or established by the engineer.

2.0 The quantities shown reflect the total square yards of pavement surface designated for each pavement type as computed and shown on the plans.

2.1 No additional payment will be made for asphaltic concrete mix quantities to construct the required 1:1 slope along the edge of the pavement, or for tack applied between lifts of asphalt.

2.2 No additional payment will be made for aggregate base quantities outside the limits of the final surface area as computed and shown on the plans. When A2 shoulders are specified, payment for aggregate base will be as shown on the plans.

2.3 The grading shown on the plans was designed for the thinner pavement option. For projects with grading in the contract, there will be no adjustment of the earthwork quantities due to adjusting the roadway subgrade for optional pavements.

2.4 The contractor shall comply with Sections 401 through 403 for the asphalt option and Sections 501 and 502 for the concrete option.

2.5 Pavement options composed of Portland cement concrete shall have contrast pavement marking for intermittent markings (skips), dotted lines, and solid intersection lane lines. The pavement markings shall be in accordance with Section 620. No additional payment will be made for the contrast pavement markings.

3.0 Method of Measurement. The quantities of concrete pavement will be measured in accordance with Section 502.14. The quantities of asphaltic concrete pavement will be measured in accordance with Section 403.22.

4.0 Basis of Payment. The accepted quantity of the chosen option will be paid for by the contract unit bid price for Item 401-99.05, pavement, per square yard.

P. Use of Crossovers and Truck Entrances JSP-04-10

1.0 Description. The contractor is advised that at no time shall the contractor be allowed to use the existing median crossovers or install temporary crossovers to turn around during hauling operations or for the moving of equipment. The contractor is also prohibited from constructing any temporary entrances to the mainline of the interstate.

2.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provision.

Q. Flagging Procedure for Two-Lane Roadways (3-2-1 Cone Procedure) NJSP-17-03A

1.0 Description. Flagging operations shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) Chapter 6, Section 107 and 616 in Missouri Standard Specifications for Highway Construction, Missouri Standard Plans for Highway Construction, temporary traffic control plans, and as described herein.

2.0 Procedures for Flagging Short, Intermediate, or Long-Term Stationary Operations. This procedure includes the use of three traffic cones or other channelizing devices.

2.1 Step 1. The flagger shall place three cones across the lane of traffic to be stopped, from centerline to shoulder. When no vehicles are present, the flagger should remain on the shoulder with the stop paddle visible.

2.2 Step 2. When traffic has stopped, the flagger shall move towards the centerline of the roadway, keeping the stop paddle visible, and keeping a visual contact with the stopped drivers. Once the flagger has confirmed that opposing traffic is clear, the flagger shall prepare to release the stopped traffic.

2.3 Step 3a. If the vehicles are to travel in the current lane, the flagger shall remove the center cone from the center of the lane.

2.4 Step 3b. If the vehicles are to travel in the opposite lane, the three cones shall remain across the closed lane.

2.5 Step 4. If opening the lane (Step 3a above) the flagger shall walk back to the shoulder with the cone, turn the stop paddle to slow, and then release traffic using a hand signal to direct vehicles between the two remaining cones. If releasing traffic to the other lane (Step 3b above) the flagger shall remain near the centerline of the roadway, turn the stop paddle to slow, and use a hand signal to direct the traffic around the cones into the open lane.

2.6 Once all traffic has cleared, the flagger shall return the slow paddle to stop. The flagger shall replace the cone to the center of the lane or leave the cones across the lane. The flagger then returns to the shoulder and repeats the steps.

2.7 If the roadway width is less than 12 feet, the number of cones may be reduced to two or one, or other channelizing devices may be used.

3.0 Basis of Payment. No direct payment will be made for any cost associated with this provision.

Pictorial Representation of Steps for Flagging Procedure for Two-Lane Roadways (3-2-1 Cone Procedure)



STEP 1



STEP 2



STEP 3



STEP 4

R. High Friction Surface Treatment NJSP-15-13B

1.0 Description. This work shall consist of furnishing and placing a High Friction Surface Treatment (HFST) on asphalt or concrete pavement.

1.1 The HFST shall be comprised of surface preparation and a minimum of a single layer using a Binder Resin System which holds a surface applied aggregate firmly in place. The Binder Resin System shall include Polymeric or Methl Methacrylate (MMA) Resins.

2.0 Material.

2.1.1 Resin Binder System. Resin Binder Systems shall be recommended by the manufacturer as suitable for use on the intended pavement surface and for the potential range of atmospheric exposure.

2.1.2 The contractor shall furnish and install a Resin Binder System that meets the criteria in (AASHTO PP 79-14 Table 1):

Table 1 - Resin Binder System			
Property	Test Method	Requirements	
		Polymeric Resin	MMA
Ultimate Tensile Strength	AASHTO M-235	2500-5000 psi	1500-5000 psi
Elongation at break point	AASHTO M-235	30-70%	30-70%
Compressive Strength	ASTM C 579	1000 psi min. at 3 hours 5000 psi min. at 7 days	1000 psi min. at 3 hours 2000 psi min. at 7 days
Water Absorption	AASHTO M-235	1% max.	1% max.
Durometer Hardness (Shore D)	ASTM D-2240	60-80	40-75
Viscosity	ASTM D-2556	Class C: 7-30 poises	Class C: 12-20 poises
Gel Time	AASHTO M-235	Class C: 10 minutes min.	Class C: 10 minutes min.
Cure Rate (Dry through time)	ASTM D-1640	3 hrs. max.	3 hrs. max.
Adhesive Strength at 24 hours	ASTM D 4541	250 psi min. or 100% substrate failure	250 psi min. or 100% substrate failure

2.1.3 Independent laboratory reports per formulation shall be provided, documenting that the resin binder meets the requirements of this specification. A sample of the resin binder or components lot/batch shall be supplied upon request.

2.1.4 At the request of the engineer, the manufacturer of the Resin Binder System shall certify that the Resin Binder System meets the requirements of this specification. Such certification shall consist of either a copy of the manufacturer’s test report or a statement by the manufacturer, accompanied by a copy of the current test results, that the Resin Binder System has been sampled and tested. Such certification shall indicate the date of testing and shall be signed by the manufacturer.

2.2.1 Aggregate. The contractor shall furnish and install a high friction aggregate that is clean, dry and free from deleterious material. The high friction aggregate shall be Calcined Bauxite for this project.

2.2.2 The calcined bauxite aggregate shall meet the criteria in Table 2:

Table 2 - Calcined Bauxite Aggregate		
Property	Test Method	Requirement
Resistance to Degradation	AASTHO T-96	20% max.
Aggregate Grading	AASHTO T-27	No. 4 Percent Passing 100% min. No. 6 Percent Passing 95% min. No. 16 Percent Passing 5% max.
Moisture Content	AASHTO T-255	0.2% max.
Aluminum Oxide	ASTM C-25	87% min.

2.2.3 All aggregates shall be furnished in appropriate packaging that is clearly labeled and protects the aggregate from any contaminants on the jobsite and from exposure to rain or other moisture.

2.2.4 At the request of the engineer, the manufacturer of the aggregate shall certify that the aggregate meets the requirements of this specification. Such certification shall consist of either a copy of the manufacturer’s report or a statement by the manufacturer, accompanied by a copy of the current test results, that the aggregate has been sampled and tested. Such certification shall indicate the date of testing and shall be signed by the manufacturer.

2.2.5 Test methods should be in accordance with AASHTO PP 79-14.

3.0 Construction Requirements. A manufacturer’s representative of the Resin Binder System shall be present at the jobsite during all construction operations relating to the preparation and placement of the HFST. All construction operations relating to the HFST shall meet the recommendations of the manufacturer’s representative. Final approval of all HFST placement operations will be given by the engineer.

3.1 Weather Limitations. Resin Binder system shall not be placed on any wet surface or when the ambient temperature or the temperature of the pavement is above or below the manufacturer’s recommendations or when the anticipated weather conditions would prevent the proper application of the surface treatment as directed by the manufacturer’s representative. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

3.2 Surface Preparations. The surface shall be thoroughly cleaned immediately prior to installation of the HFST. The surface shall be clean, dry and free of all dust, oil, debris and any other material that might interfere with the bond between the resin binder material and the existing surface as recommended by the manufacturer’s representative.

3.2.1 The contractor shall pre-treat joints and cracks greater than ¼ inch in width and depth with the mixed Resin Binder System. Once the resin binder in the pre-treated areas has gelled, the installation of the HFST may proceed.

3.2.2 Asphalt Pavement. Clean asphalt pavement surfaces using mechanical sweepers and high pressure air wash with sufficient oil traps. Mechanically sweep all surfaces to remove dirt, loose aggregate, debris, and deleterious material. Vacuum sweep or air wash using a minimum of 180 cfm of clean and dry compressed air, all surfaces to remove all dust, debris, and

deleterious material. HFST shall not be applied to newly placed asphalt pavement surfaces that are less than 30 days old.

3.2.3 Concrete Pavement. Clean concrete pavement surfaces by shot blasting and vacuum sweeping. Shot blast all surfaces to remove all curing compounds, loosely bonded mortar, surface carbonation, and deleterious material. The prepared surface shall comply with the International Concrete Repair Institute (ICRI) standard for surface roughness CSP 5. After shot blasting, vacuum sweep or air wash, with a minimum of 180 cfm of clean and dry compressed air, all surfaces to remove all dust, debris, and deleterious material.

3.2.4 All existing edge line pavement markings that are adjacent to the HFST location shall be covered and protected as approved by the engineer prior to performing surface preparation. HFST shall not be placed over existing pavement markings or rumble strips. Lane line pavement markings that conflict with the HFST installation shall be removed by methods approved by the manufacturer's representative. Any existing edge line pavement markings that are damaged during the HFST application process shall be replaced at the contractor's expense.

3.3 HFST shall be allowed to cure for the minimum duration as recommended by the binder component supplier's specifications and during that time the application area shall be closed to all vehicles and contractor's equipment traffic. After placement and cure of the HFST, the contractor shall test the finished surface in accordance with ASTM D7234 to detect unbonded areas.

3.4 Excess and loose aggregate shall be removed from the traveled way and shoulders in such a way that the HFST is not damaged or disturbed. Excess aggregate that can be reused shall be reclaimed by a vacuum sweeper. The recovered aggregate shall be clean, uncontaminated and dry, if it is to be re-used in the HFST application. All reclaimed aggregate must be in conformance with the requirements in Section 2.0. Material.

3.5 Utilities, drainage structures, curbs and any other structures within or adjacent to the treatment location shall be protected against the application of the HFST materials.

3.6 Surface Friction Test. The surface friction of the completed HFST shall meet a minimum requirement of 65 FN40R from the ASTM E274 test. MoDOT will perform this test, at the expense of the Commission, within 7 calendar days after completion of the HFST. In order to allow for adequate scheduling time for the surface friction test, the contractor shall provide an anticipated completion date of the HFST for each segment of roadway being treated in this contract. The contractor shall provide this date(s) to the engineer a minimum of two weeks prior to any anticipated completion date of the HFST.

3.6.1 Any surface that fails to conform to the above friction requirement must be removed and replaced at the contractor's expense within 24 hours after being notified by the engineer.

3.7 Surface Quality Verification. The engineer will check the HFST surface for areas of debonding or excessive loss of aggregate fourteen days after completion of the HFST. Any deficiencies found shall be corrected at the contractor's expense.

4.0 Application Methods. HFST shall be applied in accordance with the manufacturer's recommendations. The HFST can be applied by either mechanical or manual techniques.

4.1 The Resin Binder System shall be blended and mixed in the ratio per the manufacturer's specification (+/- 2% by volume) and shall be continuously applied once blended.

4.1.1 The Resin Binder System shall be applied at a uniform thickness of 50-65 mils (25-32 square feet per gallon). Coverage rate is based upon expected variances in the surface profile of the pavement.

4.1.2 The operation shall proceed in such a manner that will not allow the mixed material to separate, cure, dry, be exposed or otherwise harden in such a way as to impair retention and bonding of the high friction aggregate.

4.1.3 The high friction aggregate shall be immediately applied at a rate of 12-15 pounds per square yard (achieving saturation) in such a manner that there is no disruption to the leveled binder. It is the responsibility of the contractor to ensure full embedment of the high friction aggregate.

4.1.4 Wet spots shall be covered with the high friction aggregate prior to the gelling of the Resin Binder System.

4.1.5 Walking, standing on, or any form of contact or contamination with the wet uncured Resin Binder System without spiked shoes as approved by the engineer, prior to application of the aggregate, will result in that section of Resin Binder System being removed and replaced at the contractor's expense.

4.1.6 Applications on high speed highways such as interstate, interstate ramps, and bridge decks will require additional sweeping three days after the initial installation is completed to remove excess and loose aggregate from the traveled way and shoulders.

5.0 Method of Measurement. Final measurement of the completed HFST will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. When required, measurement of HFST, complete in place, will be made to the nearest square yard. The revisions or correction will be computed and added to or deducted from the contract quantity.

6.0 Basis of Payment. The accepted quantity of HFST, in place, will be paid for at the contract unit price bid for Item Number 413-99.05, "High Friction Surface Treatment-Bauxite", per square yard. The contract price per square yard of HFST shall include full compensation for all labor, materials, tools, equipment, testing and incidental items necessary to complete the described work.

S. Intelligent Compaction NJSP-18-08

1.0 Description. This work shall consist of collecting location, temperature, speed and intelligent compaction measurement values (ICMV) from properly instrumented rollers within the mainline paving limits and then submitting the Intelligent Compaction (IC) Data in the defined format. This provision shall apply for each lift of mainline pavement. This work shall be

completed in accordance with the general principles set forth in AASHTO PP81-17 Standard Practice for Intelligent Compaction Technology for Embankment and Asphalt Pavement Applications, and specifically as stated in the following sections.

2.0 IC Asphalt Rollers. All asphalt rollers with the exception of the finish roller shall be properly instrumented. These instrumented rollers will be referred to as IC Rollers. Steel wheel rollers shall be self-propelled double-drum vibratory rollers equipped with accelerometers mounted to acquire signals from the vibratory response in the drum measuring the interactions between the rollers and compacted materials in order to evaluate the applied compaction effort known as the ICMV. Rubber tire rollers will not be required to collect the ICMV. IC Rollers shall be equipped with non-contact temperature sensors for measuring pavement surface temperatures as well as a Global Positioning System (GPS) to map the roller position history.

3.0 Equipment Accuracy. IC Roller accuracy shall be in accordance with the following.

Operating Parameter	Accuracy
Global Positioning System	±50 mm (±2 in.) in the X and Y Direction
Rolling Speed	±0.5 kph (±0.3 mph)
Frequency	±2 Hz
Amplitude	±0.2 mm (±0.008 in.)
Temperature	±1.5°C (±2.7°F)

4.0 Onboard Unit. The IC Rollers shall include an integrated on-board documentation system that is capable of displaying real-time color-coded maps of IC measurement values including the stiffness response values, roller location, number of roller passes, pavement surface temperatures and line work (alignment file) if applicable. The unit shall display the current value for roller speeds, vibration frequencies and vibration amplitude of the roller drums. The operator shall have the ability to label or select each Layer ID. The display unit shall be capable of transferring the data by means of a USB port to a removable media device.

5.0 Software Requirements. The manufacturer's Intelligent Compaction software, or cloud computing, shall map and export gridded all-pass data and resemble PP81 section 4.3.5.2 as much as possible. At minimum, the exported data shall consist of the required fields in Table 5 of PP81 in order to allow adequate filtering in Veta.

6.0 Global Positioning System (GPS). Radio and receiver units shall be mounted on each IC roller to monitor the drum locations and track the number of passes of the rollers. The GPS system shall also meet the following requirements:

- (a) Set all GPS devices to the Universal Transverse Mercator (UTM) coordinate system No.15 except for portions of the SE District which are No. 16, regardless of whether GPS or Grid data are originally recorded. If UTM coordinates are not available, use the State Plane coordinate system and designate the appropriate State Plane zone. The recorded coordinates shall be in US survey feet. If an alternate coordinate system is established for the construction of the project, it may be used for the IC.
- (b) Provide a GPS system that can be a ground-based base station or Virtual Reference Station (VRS) to achieve Real Time Kinematic Global Positioning Systems (RTK-GPS) accuracy.

- (c) Provide GPS receivers on IC Rollers and a hand-held GPS rover that reference to the same ground-based base station channel or have the same VRS subscription.
- (d) Provide the recorded GPS data, whether from the IC Rollers or hand-held GPS rovers, in the following formats:
 - (i) The time stamp shall be in military format (HHMMSS.SS) in local time zone. Accuracy of 0.01 second is necessary to differentiate sequence of Intelligent Compaction data points during post processing.
 - (ii) Provide GPS latitudes and longitudes in DDMM.MMMMMMMM or decimal degrees (DD.DDDDDDDD).
 - (iii) Provide grid coordinates in feet to the nearest 0.1 foot.

7.0 Rover. The contractor shall provide one fully equipped survey grade hand-held GPS rover with RTK for the duration of the contract. The rover may remain in the possession of the contractor but shall be available to the engineer as needed.

7.1 Rover Specifications. The Rover shall read GPS signals L1 C/A, L1/L2 P-Code, and L2C and Glonass signals L1/L2 CA, L1/L2 P-Code. It shall achieve horizontal accuracies of 10mm + 1 ppm RMS and vertical accuracies of 15 mm + 1 ppm RMS in RTK surveys. It shall support Network RTK using NTRIP and have an internal modem with cellular service provided. Single Baseline RTK shall also be supported with an internal UHF Radio. Training shall be provided to ensure that MoDOT personnel shall have enough knowledge of software and hardware to operate the GPS rover.

8.0 Control Points. The contractor shall establish control points on the project at locations necessary to ensure compliance with the outlined provisions.

9.0 Data Management. All submitted files shall be adequately labeled prior to submission as defined in the MoDOT IC-PMTPS Project Protocol.

9.1 Trial Section Data. The results from the trial section shall be recorded on the appropriate spreadsheet and submitted to the engineer within 24 hours of completing the trial section.

9.2 Unfiltered Raw Data. Shall be downloaded twice per day and forwarded to the Engineer before the start of the next day's production.

9.3 Formatted Raw Data. Formatted Raw Data shall be submitted to the Engineer before the start of the next day's production. The formatted raw IC data shall be compatible with the latest version of Veta. The data shall include IC data files, core locations/data, and coordinates of daily production boundaries. The GPS and temperature verification data shall be submitted as well in a separate file. Each file shall be labeled with the corresponding production date, direction, starting and ending log mile, and lane if applicable (e.g. 160623, NB, 283.21-281.82, PL).

9.4 Veta Project File. The file shall include the day's production data and be submitted to the engineer within 36 hours after completion of the day's paving. The valid Veta project file shall contain the day's IC data, core locations and paving boundaries. IC Data shall include at a minimum roller locations, temperatures, amplitudes, frequencies and speeds.

9.5 Report. A report shall be furnished to the engineer by the contractor two days prior to the 1st and 15th of each month which includes the roller coverage results, classification for each segment, any qualifying GPS obstructions and the mean temperature at the optimum pass count.

10.0 Daily Verification. The temperature and GPS on each IC Roller shall be verified and recorded at the start of each day. IC Roller GPS verification shall include verifying a point established by the rover for both X and Y position to an accuracy of +/- 6 Inches. The rover shall be verified for both X and Y position with a control point at the start of each day. The IC roller temperature sensor verification shall be compared with a temperature gun which has been calibrated within the last year. The temperatures shall compare to within 5°F. A record of each verification shall be submitted to the engineer electronically as soon as possible but no later than the start of the next day's production.

11.0 IC Segments. Each IC Segment shall consist of one day's production.

12.0 Technical Support. Technical Support from the IC roller manufacturer shall include availability on an as-needed basis for the duration of the project at no cost to the Commission. The manufacturer's representative shall provide assistance with setup, verification, data management, operation, and analysis.

13.0 Training. One training will be provided by the Engineer annually. The IC Technician and other IC quality control staff shall have completed a qualifying IC/IR training within the past 2 years. Equipment operators shall be knowledgeable of the equipment that will be used and trained as needed by the contractor or equipment supplier.

14.0 IC Quality Control Plan. A pre-activity meeting shall be required prior to mainline paving. The IC Quality Control Plan shall be submitted to the Engineer at least 2 weeks prior to the mainline paving pre-activity meeting. The plan at minimum shall include the following:

- (a) A list of personnel previously trained
- (b) Detailed daily verification procedure for checking the RTK-GPS of both the IC roller(s) and rover(s)
- (c) Procedure for the construction of the trial section and establishment of the optimum compaction pass count and target IC-MV value
- (d) Procedure for downloading IC data from the roller(s)
- (e) A list of employees attending the provided training, along with the procedure for training operators or other individuals who may not be attending the training
- (f) Detailed daily verification procedure for checking the temperature sensor on IC Roller
- (g) The name of the designated IC Quality Control Technician
- (h) Procedure for submitting data
- (i) Contact information for technical support staff
- (j) A list of the control points with either UTM or State Plane Coordinates established by the contactor

15.0 Coring. Cores shall be taken as typically required by the Missouri Standard Specification for acceptance of the pavement. The GPS coordinates of each core shall be collected with an accuracy of +/- 2 inches and submitted to the Engineer by the start of the next day's production.

16.0 Daily Production Boundaries. The paving limits of the freshly placed mat shall be collected with an accuracy of +/- 2 inch. The edge of the new paved mainline surface shall be collected at least every 100 feet for curves and every 200 feet for tangent sections. These points shall be used to define the boundaries of each segment.

17.0 Software Access. The contractor shall supply the Engineer with the manufacturer's Intelligent Compaction Computer Software 14 days prior to beginning work and until ninety days after completion of all work. If Cloud Storage or Cloud Computing is used, the Engineer shall be supplied one user ID with full access for the same time period specified.

18.0 GPS Obstructions. Isolated areas influenced by a GPS obstruction may be excluded from % roller coverage computation provided that the following conditions are satisfied:

- 1) The position data is present
- 2) The GPS Reception Mode as recorded by the onsite equipment indicates that a obstruction is present
- 3) The location is properly flagged in the Veta project file and the location is identified in the bi-weekly report
- 4) The total of these areas is no more than 5% of any single day's production.

19.0 Trial Section. Mainline paving shall begin with the construction of a trial section for each mix type. One trial section may be constructed for each mix design. The Engineer shall be notified at least 48 hours prior to construction of the trial section. The trial section shall be constructed and compacted with the same equipment, progression and methods which will be used during production. The roller speed and frequency used on the trial section shall be maintained during the construction of the project. The trial section shall be constructed with sufficient passes to determine the optimum density. The trial section shall typically be 1000 feet in length, with the last 400 feet being utilized for testing, the width of one lane and shall be constructed as part of the project. Within the 400 feet long testing portion, one Evaluation Location shall be identified for each 100 feet. Flexibility will be allowed up a maximum combined length of 1500 feet in order to facilitate the construction of the trial section. Areas needed beyond the 1500 feet will be assessed as deficient. Each Evaluation Location shall be positioned away from the center of the lane due to potential overlap of roller passes during compaction. After each of the passes, the contractor shall collect a density measurement with a nuclear gauge at each Evaluation Location. When approved by the engineer, initial pairs or pass groups may be completed between density measurements. The passes shall be continued until either the pavement density begins to decrease or the density measurement on two consecutive passes are within 0.2%. Following completion of the trial section, a compaction curve shall be constructed from the pass vs. density information. From this curve the optimum number of passes and optimum IC-MV shall be determined from either the peak density versus pass value or from the 0.2% increase pass versus density values. If the 0.2% increase is the determining factor, the pass prior to the 0.2% increase will be used. Cores shall be collected at each Evaluation Location after completion of the recorded passes. The density of each core shall be determined by the contractor and used to correlate with the final density collected from

the nuclear gauge. If the density at the optimum pass count is determined to be outside the required acceptance range, then a new trial section shall be initiated. The trial section will not be considered for IC incentive or disincentive payment up to the 1500 feet max length.

20.0 Segment Classification. Passing Segments shall have a minimum of 90% coverage at or above the optimum number of passes. Segments with between 90% and 70% coverage will be called moderate segments. Any segment with less than 70% coverage at the optimum number of passes shall be a Deficient Segment, including areas where data is lost. If 70% of the target IC-MV is not obtained, the segment shall be flagged accordingly in the Veta project file. All segments with a mean temperature of less than 180 F at the optimum pass shall be considered deficient.

21.0 Basis of Payment. Payment for compliance with this provision will be made at the contract unit price for Item No. 401-99.01, Intelligent Compaction, lump sum. In addition, an incentive payment of \$75 per 1000 feet will be made on all Passing Segments and a disincentive deduct of \$75 per 1000 feet will be made on all Deficient Segments. No additional payment will be made for the equipment, software, training, survey, analysis, trial section, trial section cores or any other incidentals necessary to complete the work.

$$\text{Incentive or Disincentive Payment} = ((\text{Length of Days Run}) / 1000) \times \$75$$

T. Low-Tracking or Non-Tracking Tack Coat NJSP-15-15G

1.0 Description. This work shall consist of preparing and treating an existing bituminous or concrete surface with a low-tracking or non-tracking tack coat material prior to an asphalt overlay in accordance with Section 407, except as revised by this specification.

2.0 Low-Tracking or Non-Tracking Requirements. Products accepted for use as low-tracking or non-tracking tack shall not stick to the tires, tracks or other parts of paving equipment or vehicles such that the surface to be overlaid becomes visible or void of tack prior to the placement of the asphaltic concrete pavement mixture. The tack material shall exhibit a low-tracking or non-tracking characteristic within 30 minutes of being applied to the roadway. Products accepted for use shall exhibit a laboratory "no-pick-up" time of 60 minutes or less per TM-87. The product shall bond the two pavements. Products accepted for use shall exhibit a laboratory bond strength greater than or equivalent to a standard SS-1h tack material. The test method used may be any AASHTO TM method or other approved research test methods.

2.1 Optional Application. In lieu of applying a Low-Tracking or Non-Tracking Tack, a Polymer Modified Emulsion Tack may be placed immediately ahead of the asphalt pavement as defined below in section 4.0 Optional Polymer Modified Emulsion Tack.

3.0 Equipment and Construction Requirements. All equipment and construction requirements shall be in accordance with Section 407; except as revised as follows:

3.1 Storage and Handling. All guidelines and instructions about storage and handling of the non-tracking tack product shall be followed in accordance with the product manufacturer. A copy of this information shall be provided to the engineer. The information shall include the

application and maximum allowable temperatures for the product and the particle charge.

3.2 Distributor. The distributor shall have the full circulating and heating capabilities in the tank. If the particle charge of the low-tracking or non-tracking tack is different from the particle charge of the emulsion that was previously used then the tank shall be thoroughly cleaned prior to use, since some products are not compatible.

3.3 Curing. The low-tracking or non-tracking tack shall be allowed to cure prior to any construction traffic driving on the surface. A minimum of 15 minutes of cure time shall be allowed prior to driving on the tacked surface, unless less cure time is successfully demonstrated and approved by the engineer.

3.4 Supplier Information. The low-tracking or non-tracking tack materials are a different type of product compared to the conventional tack used in Missouri. There may be multiple products that can meet the low-tracking or non-tracking tack requirements. All products that achieve equivalent field performance will be allowed.

3.5 Material Requirements. All material shall be in accordance with Section 1015 of the Standard Specifications and specifically as follows:

Emulsion Properties for Low-Tracking or Non-Tracking Tack Coat			
Tests	Method	Min	Max
Viscosity, Saybolt Furol @ 25°C (77°F), s	AASHTO T 59	10	100
Storage Stability Test, 24 hr, percent	AASHTO T 59	--	1.0
Sieve Test, percent	AASHTO T 59	--	0.30
Residue by Distillation, percent	AASHTO T 59	50	
Oil Distillate by Distillation, percent	AASHTO T 59	--	1
Test on Residue from Distillation			
Penetration 25°C, 100 g, 5 s	AASHTO T 49	--	90
Solubility in Trichloroethylene, %	AASHTO T 44	97.5	--

OR

The following requirements are not intended to govern emulsified products.

PG Graded Products for Low-Tracking or Non-Tracking Tack Coat			
Tests	Method	Min	Max
Rotational Viscosity (Pa-sec) @ 302° F	AASHTO T 316 302°F	100	300
Penetration 25°C, 100 g, 5 s	AASHTO T 49	--	90
In addition to the table above, when using PG Graded Binders as tack, a certification shall be supplied to the engineer which includes test results demonstrating that the PG binder component meets the minimum requirements of a PG 58 or greater on the high end and a -22 or lower on the low end in accordance with AASHTO M320. The PG binder component shall account for at least 97% of the total product composition by volume. If using 100% PG			

binders, then the products shall be in accordance with Section 1015.10.

All products that meet a laboratory “no-pick-up” time of 60 min or less and a field “no-pick-up” time of 30 min or less shall be accepted per TM-87.

4.0 Optional Polymer Modified Emulsion Tack.

4.1 Description. In lieu of using a low-tracking or non-tracking tack coat material, a Polymer Modified Emulsion Tack may be placed prior to a bituminous overlay of hot asphaltic concrete pavement. The Polymer Modified Emulsion Tack shall be spray applied immediately prior to the application of the hot asphaltic concrete pavement so as to produce a homogeneous surface in accordance with Secs 401, 402, or 403. This option will not be required solely if low tracking tack products fail to perform in the field.

4.2 Materials. The Polymer Modified Emulsion Tack shall be in accordance with Sec 1015.20.5.1.1 or Sec 1015.20.6.2.

4.3 Construction Requirements. The asphaltic concrete pavement shall be placed in accordance with Secs 401, 402, or 403, except as modified herein.

4.4 Equipment. No wheel, track or other part of the paving machine or any hauling equipment shall come in contact with the Polymer Modified Emulsion Tack before the asphaltic concrete pavement mixture is applied.

4.5 Application of Polymer Modified Emulsion Tack.

4.5.1 The Polymer Modified Emulsion tack shall be sprayed at a temperature of 120 - 180° F. The sprayer shall accurately and continuously monitor the application rate and provide a uniform coverage across the entire width to be overlaid. The application rate of the asphalt emulsion tack shall be applied at the same rate as the low-tracking or non-tracking tack coat material in accordance with Sec 407. The Engineer may make adjustments to the application rate based upon the existing pavement surface conditions and the recommendations of the Polymer Modified Emulsion Tack supplier.

4.5.2 Water may be added to SS-1hp and CSS-1hp by the emulsion manufacturer and shipped to the jobsite. No dilution shall be allowed in the field. When water is added to SS-1HP or CSS-1HP, the resulting mixture shall contain no more than 20 percent of added water. The contractor shall notify the engineer of the use of a diluted emulsion. The exact quantity of added water shall be indicated on the manufacturer’s bill of lading, manifest or truck ticket. The application rate of the resulting mixture shall be adjusted such that the original emulsion will be spread at the specified rate. No water shall be added to the CPEM-1 or PEM-1.

5.0 Method of Measurement. Measurement of asphalt emulsion to the nearest gallon shall be made as specified in Sec 1015. The measurement of asphalt emulsion shall be based upon undiluted material.

6.0 Basis of Payment. The accepted quantity of low-tracking or non-tracking tack coat or polymer modified emulsion tack will be paid for at the contract unit price 407-99.12, Misc. Tack Coat – Low-tracking or Non-tracking.

U. Surface Sealing Treatment NJSP-15-28

1.0 Description. This work shall consist of furnishing and applying a surface sealing treatment to the existing roadway as shown on the plans. The surface treatment shall contain a mixture of cationic asphalt emulsion, latex polymer, fine aggregate, water, and other additives as needed.

2.0 Mix Design.

2.1 At least 30 days prior to placing the surface sealing treatment on the project, the contractor shall submit a mix design for approval to Construction and Materials. One gallon of the asphalt emulsion and 2500 grams of each aggregate material comprising the combined gradation shall be submitted with the mix design.

2.2 Required Information. At a minimum the Surface Sealing mix design shall contain the following information on the job mix formula:

- (a) Emulsified asphalt source and properties required.
- (b) Fine aggregate source, Acid Insoluble Residue (AIR) results, absorption, and deleterious requirements required.
- (c) Blended aggregate gradation required.
- (d) Mixture performance test results required.
- (e) Additives and their sources required.

2.3 Mix Design Gradation Requirement. The fine aggregate, mastic materials such as mineral filler, and/or other additives that comprise the combined gradation shall have 100 % of the material passing the No. 8 (2.36 mm) sieve. For spraying applications, the following mix gradation shall be required:

Sieve	Percent Passing
No. 8 (2.36 mm)	100
No. 16 (1.18 mm)	95-100
No. 30 (600 µm)	85-100
No. 50 (300 µm)	40-70
No. 100 (150 µm)	30-65
No. 200 (75 µm)	25-60

2.4 Mixture Performance Requirements. The mixture shall meet the following requirements.

Testing Requirement	Min.	Max.	Test Method
Maximum Wet-Track Abrasion Loss, grams per square meter.	--	80 g/m ²	TB 100 (ISSA) Modified ^a
Asphalt Content by Ignition Method, percent	30%	--	AASHTO T-308-08 ^b
Percent Solids, Asphalt Residue by Evaporation, percent	48%	--	AASHTO T59, Section 6

^aThis method is modified to a three-day soak and samples prepared per MoDOT TM 86.

^bTo account for high percentage of binder, sample size should be adjusted based on laboratory oven capability.

2.5 Required Additives. A minimum of 3% latex polymer by weight of wet mixture is required in the surface sealant treatment and shall be listed in the job mix formula.

2.6 Other Additives. Any other material added to the mixture or to any of the component materials shall be listed in the job mix formula.

3.0 Material Certification.

3.1 The materials used in the mix design shall be certified to meet the following specifications.

3.2 Bituminous Material. The bituminous material shall be an asphalt emulsion in accordance with the following table. The bituminous material shall show no separation after mixing. The emulsion shall be sampled in accordance with AASHTO T 40.

Asphalt Emulsion (CSS)			
	Min.	Max.	Test Method
Viscosity, Saybolt Furol at 25 C, s	15	100	AASHTO T 72
Particle charge test	Positive ^b		AASHTO T 59
Residue, %	60	--	AASHTO T 59
Test on Residue from Distillation	Min.	Max.	Test Method
Penetration, 25 C, 100 g, 5 s,	30	100	AASHTO T 49

^bIf the particle charge test is inconclusive, material having a maximum pH value of 6.7 will be acceptable.

3.3 Noncarbonated Fine Aggregate Requirement. The fine aggregate material (not including mastic material or additives) shall contain 100 percent non-carbonate aggregate. The fine aggregate material shall have an acid insoluble residue (AIR), MoDOT Test Method TM 76, of at least 75 percent insoluble residue.

3.4 Absorption and Deleterious Requirement. The absorption of the fine aggregate (not including mastic material or additives) shall have a maximum absorption limit of 2.0 percent tested in accordance with AASHTO T84. The percentage of deleterious substances shall not exceed the following values in accordance with AASHTO T113:

Item	Percent by Weight
Clay lumps	1.0
Total lightweight particles, including coal and lignite	0.5
Other deleterious substances	0.1

3.5 Lightweight fine aggregate sources not meeting the absorption limits or deleterious requirements of Section 3.4 above shall be in accordance with the following requirements tested on the parent material:

Property	Percent Maximum Limit
Micro-Deval, ASTM D7428, percent, max	20
Los Angeles Abrasion for Lightweight Aggregate, MoDOT Test Method TM 78, percent, max	50

3.6 Water. Water shall be potable and free of harmful soluble salts.

4.0 Construction Requirements.

4.1 The surface sealing mixture may be mixed and applied through mobile distribution equipment as described herein.

4.2 Mixing Equipment. All materials shall be thoroughly mixed as to produce a homogenous surface treatment. Individual volume or weight controls for proportioning each material in the mix shall be provided. Materials shall be added by a calibrated controlled device capable of monitoring the amount of material used at the time.

4.3 Distribution Equipment. The Distributor shall be equipped with a full sweep agitation system, a pumping system designed to handle fine aggregate mixes, and sufficient power to operate the full spray system and the agitation system at the same time. The Distribution equipment shall be equipped with a monitoring system that ensures the even distribution of material and measures the application rate of the mix.

4.4 Storage Tanks. If the mix is being delivered from a central mixing plant, then a job site storage tank shall have the minimum capacity of the entire transport load. The storage tank shall have an internal full sweep mixing system having a mixing capability of providing a homogenous mix representing the mix design at any given location within the tank.

4.5 Environmental Protection. The contractor shall comply with all federal, state, and local laws and regulations controlling pollution of the environment.

4.6 Weather Limitations. Bituminous material shall not be placed on any wet surface or when the ambient temperature or the temperature of the pavement on which it is to be placed is below 60° F. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

4.7 Surface Preparation. The surface shall be thoroughly cleaned immediately prior to placing the surface treatment.

4.8 Protection of Other Surfaces. All curbs, manhole covers, and ADA facilities shall be protected from the spray or laydown of the bituminous mixture during placement.

4.9 Dilution. The bituminous material shall not be diluted in the field with water or other additives except as approved by the manufacturer.

4.10 Placement. Placement of the mix shall be performed in two passes with a minimum coverage of 0.125 gal/yd² per pass and the minimum total coverage of 0.25 gal/yd². Contractor shall provide a mat ensuring total coverage free of voids and pit holes.

4.11 Opening to Traffic. After the sealant application, the roadway shall remain closed until the surface is tack-free and capable of being open to traffic without tracking.

4.12 Basis of Acceptance.

4.12.1 Quality Control. Two samples shall be collected during production on a project. One sample shall be retained for the engineer. The contractor shall test the other sample and verify the mix design in accordance with Section 2.4 of this specification and submit the test results to the engineer.

4.12.2 Field Performance. The finished surface sealant treatment shall be evaluated by the engineer based on the following criteria. Any of the following shall be considered unacceptable material.

- (a) The presence of loose aggregate or synthetic materials that may cause damage to traveling vehicles.
- (b) A final surface with insufficient coverage or delamination.

5.0 Method of Measurement. Final measurement of the surface treatment will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity. Where required, measurement of the surface treatment, complete in place, will be made to the nearest square yard. The revision or correction will be computed and added to or deducted from the contract quantity.

6.0 Basis of Payment. The accepted quantity of surface treatment, in place, will be paid for at the contract unit (square yard) price. No separate payment will be made for any additional construction methods or processes. Manufacturer shall report the unit weight (lbs/gallon) of the surface sealing material on the bill of lading.

V. Shoulder Grading NJSP-15-27A

1.0 Description. This work shall consist of excavating and grading the existing shoulder to facilitate placement of shoulder pavement, as well as backfilling the shoulder and shaping the fore slope following placement of the shoulder pavement.

2.0 Construction Requirements. The shoulder shall be excavated and graded as shown on the typical section with minimal disturbance of the existing sub-grade and fore slope. Density shall be obtained from reasonable compactive efforts consisting of no less than three passes with a roller until no further visible compaction can be achieved, or by other methods approved by the engineer.

2.1 Following placement of the shoulder pavement, the shaping of the fore slope shall be done to backfill the shoulder edge as shown on the typical section.

2.2 It may be necessary to go outside the limits of the right of way to obtain additional material or to dispose of excess material. All costs for providing additional material or disposing of excess material shall be included in SHOULDER GRADING.

2.3 Included in this work is any pavement edge treatment that might be necessary in order to stay in compliance with the Standard Plans. The need for edge treatment is determined by the contractor's method of operations.

3.0 Method of Measurement. Final measurement will not be made except where appreciable errors are found in the contract quantity.

3.1 Where required, measurement will be made to the nearest 10 feet, separately for the length of shoulder along each side of the roadway, measured along centerline of the traveled way and totaled to the nearest 100 feet for the sum of all segments.

4.0 Basis of Payment. Payment for SHOULDER GRADING as described in this provision will be made at the contract unit price for pay item 212-99.00 MISC. SHOULDER GRADING.

W. Disposition of Existing Signal/Lighting and Network Equipment JSP-15-05A

1.0 Description. All controllers, cabinets, cabinet equipment, network equipment, DMS equipment, antennas, radios, modems, and other equipment noted in the plans shall be removed by the contractor and delivered to the following location:

Ron Mize (Traffic Supervisor – Signals)
Barrett Station Maintenance Lot
2309 Barrett Station Road
Ballwin, MO 63021
314-205-7320

2.0 Signal Equipment. All equipment other than network communication devices noted in 3.0 are to be transported to the address listed above. The contractor shall notify the Commission's

representative 24 hours prior to each delivery by calling the phone number listed above and ask for the field traffic supervisor.

3.0 Network Communication Devices. Devices such as CCTV cameras and domes, video encoders, device servers, Ethernet switches, media converters, and radio assemblies are to be transported to the address listed below. The contractor shall notify the Commission's representative 24 hours prior to each delivery by calling phone number listed below and providing details for the delivery.

Ron Mize (Traffic Supervisor – Signals)
Barrett Station Maintenance Lot
2309 Barrett Station Road
Ballwin, MO 63021
314-205-7320

4.0 The contractor shall exercise reasonable care in the handling of the equipment during the removal and transportation. Should any of the equipment be damaged by the contractor's negligence, it shall be replaced at the contractor's expense. The contractor shall dispose of any other equipment. Delivery shall be within 2 working days of removal. All items returned shall be tagged with the date removed, project number and location/intersection.

5.0 Basis of Payment. Payment for removal, handling and transportation of all equipment specified shall be considered completely covered by the contract unit price for 202-20.10, Removal of Improvements, per lump sum.

X. Paver-Mounted Thermal Profiles NJSP-18-09

1.0 Description This work shall consist of collecting the paving location, surface temperature and paver stops with a Contractor supplied, Contractor retained Paver-Mounted Thermal Profile System (PMTPS) for each lift of mainline asphalt pavement. The PMTPS shall be used to continually monitor the surface temperature of the mat immediately behind the paver screed during paving operations in order to determine the thermal segregation levels for each sublot. Data from the PMTPS shall be automatically uploaded and processed through a wireless data connection or exported to an USB drive. This work shall be completed in accordance with the general principles set forth in AASHTO PP 80-17 "Standard Practice for Continuous Thermal Profile of Asphalt Mixture Construction", and specifically as stated in the following sections.

2.0 PMTPS Equipment The PMTPS shall consist of a temperature scanner/camera, wheel speed/distance sensor, GPS antenna, control panel and necessary cabling. The PMTPS shall measure the surface temperature over the complete paving width. The current position shall be recorded via the GPS antenna. The control panel shall feature the keys and screen displays necessary to control the system as well as the software for data recording and visualization during the paving process. The system shall provide a real-time map of the temperature readings, as well as the total number of sublots in each temperature segregation category. The system shall store the data locally on a memory stick and also upload the data directly to cloud-based software which shall be supplied by the contractor for use on this project. Logon information shall be provided to the engineer for direct access to the cloud storage. In addition, the equipment shall meet the following requirements;

<u>Parameter</u>	<u>Requirement</u>
Longitudinal and Lateral Surface	≤ 12.0 inch intervals at all paving speeds
Temperature Readings Footprints	Tolerance: ±1 inch
Surface Temperature Readings	Range: 32°F to 480°F Accuracy: ± 6° F
Location (x and y)	Accuracy: ± 4 feet
Ground Distance Sensor	Accuracy: ± 1/1000 feet

3.0 Verification. The system shall have a documented verification before beginning construction and a minimum of once per week for Travel Distance and Temperature.

4.0 PMTPS Training. The PMTPS Technician and individuals performing daily setup of the equipment shall be properly trained. If trained personnel are unavailable PMTPS scanning and mainline paving shall not be performed. The PMTPS Technician shall have completed a qualifying Veta training within the last 2 years.

5.0 Thermal Profile Sublots For each run, the thermal profiles shall be divided into sublots that are 150 ft. in length and of the width placed. Sublots shall not extend over multiple days, different lifts or directions.

6.0 Thermal Segregation Exclude the following surface temperature readings from each subplot: (1) Surface temperature readings less than 180°F; and (2) Surface temperature readings within 2 ft. prior to and 8 ft. after paver stops that are greater than 1 minute in length. The temperature differential is the difference between the surface temperature readings at the 98.5 and 1 percentile in each 150 ft. subplot. The thermal segregation categories are based on the temperature differential as shown in the table below.

Temperature Differential (TD)	Thermal Segregation Category
TD ≤25.0 F	Low
25.0 F < TD ≤ 50.0 F	Moderate
TD > 50.0 F	Severe

7.0 Data Management. All of the header inputs shall be correctly entered by the contractor at the start of each run. The Veta Thermal Segregation Report shall be generated and electronically submitted to the engineer for each day before the start of the next day's production, along with the Veta file. Each file shall be labeled with the corresponding production date, direction, starting and ending log mile, and lane according to the MoDOT IC-PMTPS Protocol. The contractor shall deliver to the engineer a summary of the daily Thermal Segregation Reports two days prior to the 1st and 15th of each month for verification.

8.0 Incentive/Disincentive. Incentive/disincentive adjustments shall be made for each subplot in accordance with the following:

Thermal Segregation Category	Adjustment per 150 ft. Sublot
Low	\$7 Incentive
Moderate	No Pay Adjustment
Severe	\$7 Disincentive

9.0 Quality Assurance (QA) Testing. The Engineer will record spot temperature readings with a calibrated infrared thermometer. 2 QA test sets each consisting of 3 spot readings at the lane quarter points will be taken for each full production day. The test sets will be taken at random locations. The contractor shall assist the engineer with determining the GPS location of each spot reading location. The recorded temperature shall be within 12°F of the temperature recorded by the thermal scanner for each location. If 4 readings from any 2 consecutive test sets fall outside of the 12°F range, then conflict resolution shall be initiated to determine corrective action.

10.0 Basis of Payment. Payment for compliance with this provision will be made at the Lump Sum Price for Item 401-99.01, Infrared Scanning. No additional compensation will be provided to the contractor for any direct or indirect cost, including scheduling delays, associated with the installation of the noted equipment, training or the affiliated data processing.

Y. Work Zone Intelligent Transportation System NJSP-15-32

1.0 General. The Work Zone Intelligent Transportation System (WZITS) shall be a portable, real-time, automated, solar powered system that calculates and displays travel time through work zones. The goal of this system is to provide advance traffic condition information to motorists at key decision points due to construction activity. The information reported to the public will include an accurate drive time through the work zone. This system shall be in operation 24 hours per day, seven days per week, during the construction period.

2.0 Description. This item shall consist of submittal and approval of a Work Zone Intelligent Transportation System plan, furnishing, installing, relocating, and operating a portable, automated, solar powered real-time work zone system (“Work Zone Intelligent Transportation System”) meeting the requirements noted herein, and providing a system manager to maintain the system during the duration of the project. The contractor shall assume responsibility for any damaged equipment due to crashes, vandalism, adverse weather, etc. that may occur during the system’s deployment.

2.1 The Contractor shall furnish and maintain this system for measuring and delivering real-time messages for the work zone.

2.2 The contractor is responsible for coordinating any work in adjacent roadway construction projects.

2.3 The contractor will be responsible to relocate the devices as directed by the engineer. When the equipment is no longer required for this project, the contractor shall remove it and retain ownership.

3.0 System Requirements

3.1 The Work Zone Intelligent Transportation System shall be installed on I-44 eastbound and west bound approaching the limits of the median concrete traffic barrier wall construction. It shall consist of the following as a minimum:

- 6 portable changeable message signs
- 8 portable non-intrusive traffic sensors
- 1 central computer

4.0 Smart Work Zone Plan

4.1 General. The contractor shall submit to the Engineer for approval a written and illustrated WZITS Plan three (3) weeks prior to mobilization of any component of the WZITS System. The WZITS Plan shall include the items required in this specification. The Contractor will not be allowed to start any construction activities that will affect traffic on the project until the WZITS Plan is approved by the Engineer.

4.2 Content of the WZITS Plan. The WZITS Plan shall include, as a minimum, the following items:

- (a) A detailed plan showing the proposed locations of all WZITS devices and equipment description including make and model.
- (b) A description of all proposed thresholds and proposed CMS messages to be implemented.
- (c) The name and contact information of the WZITS System Manager.
- (d) A detailed description of the proposed methods of communication between WZITS devices and WZITS Central Computer and between WZITS Central Computer and the MoDOT Transportation Management Center (TMC) located at 14301 South Outer 40 Road, Town and Country, MO 63017.
- (e) Proposed corrective method procedures including response times and notification process.

4.3 Approval of Plan. Approval of the WZITS Plan by the Engineer is required prior to the placement of any WZITS devices. Approval is conditional and will be predicated on satisfactory performance during construction. The Engineer reserves the right to require the Contractor to make changes in the WZITS Plan and operations, at no additional cost to the Commission, including removal of personnel, as necessary, to obtain the quality specified. The Contractor shall notify the Engineer in writing a minimum of seven (7) calendar days prior to any proposed changes in the WZITS Plan. Proposed changes are subject to approval by the Engineer.

5.0 Materials.

5.1 Changeable Message Signs. The Work Zone Intelligent Transportation System shall utilize MoDOT approved portable changeable message signs (CMS) in accordance with Missouri Standard Specifications for Highway Construction section 616 Temporary Traffic Control and 1063 Temporary Traffic Control Devices and Standard Plans for Highway Construction 616.10. Each CMS shall be capable of displaying eight characters on each of three rows. Each CMS power supply shall be properly sized to allow continuous operation for up to ten days during periods of darkness and inclement weather.

5.2 Each CMS shall be integrated with a radio/modem, and/or a traffic sensor or other equipment (e.g. controller) mounted on it and shall act as a single “device” for the purpose of communicating with similarly integrated “devices” and displaying real-time traffic condition information. Each device shall be capable of communicating through radios/modems with other device(s) at upstream or downstream locations. MoDOT District [TMC](#) staff must have the ability to override messages displayed on any CMS in the system. This feature must be password protected and on a website separate from MoDOT’s public website.

5.3 Portable Non-Intrusive Traffic Sensors. The Smart Work Zone System traffic sensors shall be side-fired microwave radar type whose accuracy is not degraded by inclement weather and visibility conditions including precipitation, fog, darkness, excessive dust and road debris. These sensors shall be capable of acquiring traffic data from up to [six \(6\)](#) lanes of traffic on a lane-by-lane basis.

5.4 Central Computer. The central computer shall provide the functionality described below:

General

- Provide a Graphical User Interface that is compliant with Windows standards.
- Communication between the central computer and any device shall be independent and *non-reliant* upon communications with any other CMS or sensor.
- Alerts to MoDOT [TMC](#) staff and the Engineer shall be provided via pagers and/or e-mail. Alerts shall be sent in the event of device failure or traffic delays over [15](#) minutes.

Data Processing Software

- The capability to collect and store sensor data.
- The capability to compare traffic data collected from sensors to user-defined thresholds and automatically update one or more CMS’s.
- The capability to estimate travel times and automatically update one or more portable CMS’s consistent with user-defined thresholds.
- The capability to display alternate route messages consistent with user-defined thresholds.

Data Management

- Storage of speed, volume, occupancy, CMS message history, and travel times as well as appropriate sensor status for each day.

Website

- The Contractor will be responsible for hosting the website and obtaining domain names. Possible domain names and overall website design must be submitted to the Engineer for approval prior to it being made available.
- The website shall contain an accurate map of the area affected by the work zone, including state highways or routes that may be used as alternates.
- Icons or hyperlinked text should accurately depict the current location of the system components and give real-time information provided by each component. In the event components are moved to a new location, the website must reflect these changes to the system layout.
- Historical data should be password protected and stored on the website for each day the system is in use, with date and time stamps included. The above data shall be available to MoDOT staff at all times for the duration of work zone activity. An electronic copy of

all data, including date and duration of system malfunction, shall be provided to MoDOT staff after all work zone activity is completed and the WZITS has been removed.

- The MoDOT [TMC](#) staff and the Engineer shall have the capability to override messages, via password protection, from the website.
- Device information shall be provided to MoDOT TMC staff through icons or hyperlinked text representing each device. Detectors should provide real-time speeds at the respective locations and CMS's should provide the current message of each sign.
- The website shall be designed and operated to allow [20](#) users to access the site at one time.

6.0 System Manager. The contractor shall employ a system manager for the WZITS. The system manager shall be locally available to maintain system components, maintain the website, move portable devices as necessary, and respond to emergency situations. The system manager shall be responsible for coordinating the placement of devices in the project areas. It is the responsibility of the system manager to move system components that interfere with construction operations and relocate the components to another area. The system manager shall supply a local phone number and/or a toll-free number to the engineer to contact the system manager or other system representative at any time. The system manager shall not perform any other duties on the jobsite.

7.0 Operational Test. Once the WZITS is installed, it shall undergo a five-day operational test. The operational test shall include a test of the system in operation during a lane closure to ensure that all WZITS equipment (including the [changeable message signs, traffic sensors, central computer, communication devices, and website](#)) is operating in a fully functional manner and in accordance with the Smart Work Zone Plan for a duration of at least [five \(5\)](#) calendar days. The contractor shall provide for complete operations support from the vendor during the operational test, and the contractor shall provide verification that the reported drive time through the work zone accurately reflects actual field conditions. If any equipment malfunctions occur for a combined period of [four \(4\)](#) hours or more during this operational test on any day, no credit will be given for that day for the operational test period, and the five-day operational test will reset.

7.1 The contractor shall maintain records of equipment stoppages and resumptions during the five-day operational test for submission to the engineer for his approval. In the event that ten percent or more of the time similar malfunctions occur that affect the proper operation of the WZITS, the engineer may declare a system component defective and require replacement of the equipment at no additional cost. When a system component defect is declared, the five-day operational test shall begin again after all defective equipment is replaced and the system is fully operational.

7.2 Report. The contractor shall submit a report to the engineer detailing the daily activity of the system during the operational test. The report shall indicate the date and time of any activity necessary to maintain operation of the WZITS during the operational test period. Each entry shall include the following information:

- Identity of the equipment on which work was performed
- Cause of equipment malfunction (if known)
- A description of the type of work performed
- Time required to repair equipment malfunction

Once the operational test report is received and approved by the engineer, the WZITS will be considered operational and the system will be accepted for use.

8.0 Method of Measurement. Work Zone Intelligent Transportation System (WZITS) shall be measured as described below in **Basis of Payment**.

8.1 Deduction for Failed System. A percentage of the lump sum will be deducted should the system malfunction for **three (3)** or more consecutive calendar days or any total of **five (5)** calendar days in any one calendar month after the approval of the operational test. This deduction will be based on a ratio of calendar days of unsuccessful operation to total calendar days of operation following the approval of the operational test. This deduction will not reduce the total system payment to less than **80** percent of the lump sum.

9.0 Basis of Payment. Payment for submittal and approval of a Work Zone Intelligent Transportation plan, furnishing, installing, relocating, operating, maintaining, testing, monitoring, providing a website, providing historical data, and removal of the Work Zone Intelligent Transportation System (WZITS), including all items required for proper operation of this installation, will be completely covered by the contract unit price for Item Number 616-99.01, "Temporary Traffic Control," per lump sum.

Z. Inlaid Pavement Marker Installation

1.0 Description. This work shall consist of furnishing and installing inlaid pavement markers as shown on the plans or as directed by the engineer. An inlaid pavement marker shall consist of a retro-reflective pavement marker installed below the pavement surface. The marker shall be installed with a cradle device which supports the reflector at the proper depth below the pavement and attached to the pavement with adhesive. In addition to cutting a location for the marker, a slot shall be grooved into the pavement both before and after the marker for visibility of the marker and drainage. Final product shall have two markers in place at each location.

2.0 Material. All material shall be in accordance with the following.

2.1 Marker. The marker shall have two retro-reflective lenses white facing traffic and red facing opposing / wrong way traffic to reflect incident light from opposite directions. The lens shall be hermetically sealed and permanently bonded to the marker base. The manufacturer's identification shall be molded in the face of the marker lens or on the marker body so as to be visible after installation. The reflector color shall be as shown on the plans.

2.1.1 The marker shall have nominal dimensions of 2.0 x 5.0 x 0.7 inches. The reflective surface of each lens shall be a nominal 1.93 square inches in area.

2.1.2 In addition to the requirements described, the marker/cradle system shall be National Transportation Product Evaluation Program (NTPEP) approved. The marker shall receive at a minimum an average rating of 3.0 for lens and visibility after one year of exposure on both concrete and asphalt test decks. A written request for qualification shall be sent by the manufacturer to Construction and Materials with the following information:

- (a) Brand name of the product.
- (b) A copy of the actual test results from NTPEP.
- (c) Certification that the material meets this specification and is intended for use as described.
- (d) Specific installation instructions.

2.2 Adhesive. The adhesive used to bond the marker to the pavement shall be an epoxy approved by the engineer or meet the manufacturers specifications.

3.0 Construction Requirements.

3.1 Reflector placement. A cradle shall be used to hold the marker at the correct nominal depth of 0.12 inch. The cradle shall be made of polycarbonate plastic and the net weight of the cradle and marker shall be less than 5 ounces. When installed, the marker shall be perpendicular to traffic.

3.2 Pavement groove. There shall be a groove cut both in advance and behind the marker using diamond tipped blades. The entire groove shall be cut in accordance with the manufacturer's recommendations. The groove should be straight to within 1/2 inch in 10 feet. The width of the groove shall be 5 inches or per manufacturer's specifications.

The overall length of the groove cut in the pavement surface shall be 9 feet, with markers placed 3.5 feet from either end and spaced 2.0 feet apart.

3.3 Installation. The groove and the bottom surface of the marker shall be free of scale, dirt, rust, oil, grease or any other contaminant that might reduce bonding to the adhesive.

3.3.1 The adhesive used to install the marker shall be machine applied unless otherwise approved by the engineer. The machine mixer and applicator shall be capable of accurately and uniformly proportioning the components. The mixing chamber shall produce an epoxy adhesive of uniform color with no visible evidence of streaks on the surface or within the mixed epoxy adhesive.

3.3.2 No markers shall be installed when the ambient temperature is below 50 F (10 C), the relative humidity is above 80 percent, or the pavement surface is wet.

3.3.3 Newly placed bituminous pavement surfaces shall be allowed to cure for a minimum of seven days prior to installing reflectors.

3.3.4 A longitudinal adjustment to the location of a marker shall be made in order to avoid damage to deteriorated pavement or transverse joints. In locations where concrete and bituminous surfaces abut, markers shall be installed in the concrete surface.

3.3.5 The pavement shall be accurately cut to the marker manufacturer's specifications. The depth of the groove where the marker is to be placed shall be in accordance with manufacturer's specifications.

3.3.6 If necessary, installation grooves on crowned pavements, superelevated pavements, or ramps shall be cut as needed to provide proper marker fit.

3.3.7 The groove shall be clean and dry prior to application of the adhesive.

3.4.9 There shall be no adhesive on the lens or top of the marker.

3.4.10 When hand mixing of epoxy adhesive is permitted, no more than one quart (L) of epoxy adhesive shall be mixed at one time. The marker shall be installed within five minutes after mixing operations are started.

3.4.11 The installed marker shall be protected from traffic until the adhesive has cured according to manufacturer's recommendations. If, after the manufacturer's recommended cure time, epoxy adhesive can be penetrated by a screwdriver or other pointed instrument, the marker shall be removed, cleaned, and reinstalled.

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. When required, measurement of inlaid pavement markers will be measured per each. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. The accepted quantity of inlaid pavement markers will be paid at the contract unit price for:

Item No.	Unit	Description
620-99.02	Each	Inlaid Pavement Marker Installation

5.1 Payment for the Inlaid Pavement Marker Installation per each includes all labor, equipment and materials necessary to fulfill the requirements of the above provision. The cost of grooving, adhesive, and installation of two pavement markers per groove will be included in the unit cost per marker each installation.

AA. MoDOT ITS Assets Relocation

1.0 Description. The work consists of relocating existing MoDOT Intelligent Transportation System (ITS) facilities (conduit, cable, and/or pull boxes) that may be in conflict with this project construction sections as noted in the plans.

2.0 Materials. The materials used for relocating MoDOT ITS facilities shall be per MoDOT Approved Product List (APL) and meet all MoDOT Specifications. If the material is not in the APL, the contractor shall submit material specification documents to the Engineer and the MoDOT ITS group (via an email in advance to SLITS@modot.mo.gov) for review and approval.

3.0 Construction Requirements. The Contractor shall be aware there are numerous utilities present along the route in this contract. Utility locates were not performed during the design phase of the project; therefore, the extent of conflicts with utilities are unknown.

3.1 The contractor shall exercise reasonable care relocating MoDOT ITS Assets. Damage to any MoDOT facilities within the area of work caused by the contractor will be deemed by the Engineer as either “non-emergency” or “emergency” upon notification of the damages. Repair to damages will be performed as follows:

- a) Non-Emergency: Contractor will have 4 hours to propose a repair plan to the Engineer for a complete repair within 3 business days.
- b) Emergency: Upon notification of the damage, Contractor must immediately submit a repair plan to the Engineer which will take no more than 4 hours to respond on-site and complete repairs within 48 hours of notification of damage.
- c) In either case, if the proposed plan is unacceptable for any reason to MoDOT, repairs will be made by MoDOT with all costs billed to the Contractor.

3.2 The ITS In-Ground Facilities located within the project limits are a crucial part of the traffic operation system for this area. It is imperative that the downtime be kept to a minimum when replacing, removing, or modifying any existing ITS In-Ground Facilities.

3.3 Prior to any in-ground work, the Contractor shall request for utility locates by contacting Missouri One Call (1-800 DIG-RITE or mo1call.com) for any in-ground installation locations as per plans. If there are any conflicts with MoDOT ITS Assets, the Contractor is responsible for relocation to the satisfaction of the Engineer prior to any in-ground work.

3.4 In the case of a conduit conflict, the Contractor shall trench an area beyond the in-ground work limits, install one or two conduits (must be the same quality as the existing conduit) using Split Duct Method, relocate the existing cables into the new conduit, and seal the conduit joints per manufacturer specifications.

3.5 The Contractor shall coordinate this work with the MoDOT ITS group and have the Engineer’s approval prior to performing this task.

3.6 The contractor shall perform a fiber testing (see below requirements) before and after relocating MoDOT fiber cables at the nearest Node Cabinet at each site as shown on the plans and submit that report to the SLITS Group for review and approval.

3.6.01 Test Procedure. For each fiber link, follow this procedure:

- (a) If the link includes fiber installed by others, use an optical loss test set to measure and record the optical loss over that portion of the link before it is spliced to new fiber.
- (b) Calculate the maximum allowable loss for the completed link, both at 1310 nm and at 1550 nm. Use the following formula:

$$\begin{aligned} \text{Maximum link loss} = & \text{Measured loss over portion installed by others} \\ & + (\text{Fiber length in km}) \times (0.35 \text{ for } 1310 \text{ nm and } 0.25 \text{ for } 1550 \text{ nm}) \\ & + (\text{Number of fusion splices}) \times (0.05) \end{aligned}$$

$$+ (\text{Number of mechanical splices [for temp. connection]}) \times (0.3)$$
$$+ (\text{Number of connections}) \times (0.5)$$

Provide this calculation to the engineer along with the test results.

- (c) Calibrate an optical loss test set and provide evidence satisfactory to the engineer that the set produces accurate results at both wavelengths. This can be a demonstration that the set correctly measures the loss of a test fiber whose loss is known.
- (d) Use the test set to measure the loss of the link under test. Record the result at both 1310 nm and 1550 nm. Arrange for the engineer or his representative to witness these tests.
- (e) If the measured loss exceeds the calculated maximum, use an optical time domain reflectometer and other test equipment to troubleshoot the link. Take whatever corrective action is required, including cable replacement, to achieve a loss less than the calculated maximum.

3.6.02 Test Result Documentation. Prepare a diagram showing all of the links tested in this project. For the portions installed in this project, show the equipment cabinets, splices, and pigtails. On each line representing a link, show the maximum allowable loss and the actual loss. The actual loss shall be the one measured after all corrective actions have been taken. Submit 5 copies of this diagram to the engineer, along with the calculations for the maximum allowable loss. Submit the diagrams and calculations in an electronic format acceptable to the engineer.

3.6.03 Documentation. Provide the engineer mark-ups of the plans, neat and legible, illustrating as-built versions of the splice and connection diagrams that are contained in the plans.

3.6.04 Certifications. The fiber optic cable shall be factory certified to meet the requirements in this specification. In addition, the manufacturer shall certify that the fiber optic cable has a life expectancy of 20 years.

3.7 The Contractor shall trench an area beyond the in-ground work limits, install one or two conduits (must be the same quality as the existing conduit) using Split Duct Method, relocate the existing cables into the new conduit, and seal the conduit joints per manufacturer specifications.

3.8 Upon completion of this work, the Contractor shall contact the MoDOT ITS group (via email at slits@modot.mo.gov or by calling 314-275-1526) to verify that all existing MoDOT ITS devices are online and request inspection of this work. Acceptance of this work shall be the sole judgment of the Engineer and the MoDOT ITS group's engineer.

3.9 The contractor shall restore those areas disturbed by this work or installation according to specifications herein.

Basis of Payment. Payment for "MoDOT ITS Assets Relocation" shall be paid as Linear Feet and shall include the trenching, conduit installation, conduit coupling, pull boxes, sealing

materials, cable relocation, needed fiber testing, restoration of all disturbed area, all labor and work incidental thereto, and shall be considered to be completely covered by the contract unit price for the following pay item:

Item No.	Unit	Description
910-99.03	Linear Feet	MoDOT ITS Assets Relocation

BB. Lighting Cable-Conduit Relocation

1.0 Description. This work shall consist of relocating lighting cable-conduit which may be in conflict due to the installation of new guardrail along I-44.

2.0 Construction Requirements. The Contractor shall be aware there are numerous utilities present along the route in this contract. Utility locates were not performed during the design phase of the project; therefore, the extent of conflicts with utilities, including MoDOT Signals and Lighting, are unknown.

3.1 The contractor shall exercise reasonable care relocating MoDOT Lighting Cable-Conduit Facilities. Damage to any MoDOT facilities within the area of work caused by the contractor will be performed as follows:

- a) Non-Emergency: Contractor will have 4 hours to propose a repair plan to the Engineer for a complete repair within 3 business days.

3.2 Prior to any in-ground work, the Contractor shall request for utility locates by contacting Missouri One Call (1-800 DIG-RITE or mo1call.com) for any in-ground installation locations as per plans. If there are any conflicts with MoDOT ITS In-Ground Facilities, the Contractor shall field-verify those locations with the MoDOT Construction Inspector and shall be responsible for relocation to the satisfaction of the Engineer prior to any in-ground work.

3.3 The contractor shall restore those areas disturbed by this work or installation according to specifications herein.

4.0 Basis of Payment. Measurement and payment for lighting cable-conduit will be made as follows:

Item No.	Unit	Description
901-30.03	L.F.	Conduit, 3 In. Rigid, In Trench
901-50.10	L.F.	Trenching Type I
901-74.04	L.F.	Cable-Conduit, 1 In., 2 Conductors & 1 BN, 6 AWG
901-74.07	L.F.	Cable-Conduit, 1 In., 2 Conductors & 1 BN, 8 AWG

CC. Microsurfacing Requirements

1.0 Description. Modified Type II Microsurfacing shall be in accordance with Sec 413.10, except as modified herein:

2.0 Construction Requirements. Modified Type II Microsurfacing shall be constructed using one of the two options listed below:

2.1 Option 1. Construct the Modified Type II Microsurfacing in two lifts. Each of the two lifts shall be a minimum of 3/8" in thickness, with the total thickness of the Modified Type II Microsurfacing being a minimum of 3/4" thick. Payment area for this option includes both lifts.

2.2 Option 2. Construct the Modified Type II Microsurfacing in one lift using alkali resistant glass reinforcing fibers. The lift and total thickness of the Modified Type II Microsurfacing shall be a minimum of 3/8" in thickness.

2.2.1 Alkali Resistant Glass Reinforcing Fibers. The alkali resistant (AR) glass reinforcing fiber shall be manufactured in compliance with ASTM C1666/C1666M-08 and meet the requirements listed in Table 1.

Table 1

Material Property	Requirement
Material	Alkali Resistant Glass
Zirconium (ZrO ₂) Content	16.0% min
Fiber Length / Form	0.25 in (6 mm) / Pre-chopped strands
Filament Diameter	0.000546 in (14 μm)
Tensile Strength	250 ksi (1,700 MPa)
Modulus of Elasticity	10,000 ksi (72 GPa)
Softening Point	1,580°F (860°C)
Density	0.097 lb/in ³ (2.68 g/cm ³)

(a) Delivery, Storage, and Handling:

- (1) Deliver AR glass reinforcing fiber in sealed, undamaged containers with labels intact and legible, indicating material name and lot number.
- (2) Store AR glass reinforcing fiber covered and off the ground.
- (3) Keep AR glass reinforcing fiber out of sand and dust and do not allow to become wet.

(b) Mixing, Production, and Quality Control:

- (1) Add AR glass reinforcing fiber at a dosage rate of 0.20-0.25% by dry weight or 4.0-5.0 lbs/ton per dry weight of aggregate.
- (2) The AR glass reinforcing fiber shall be added by a mounted hydraulic seeding system to either a truck mount or continuous paver. The continuous feed system shall automatically dispense fiber into the pugmill at an adjustable feeding rate.
- (3) The system shall be powered by the main hydraulic system of the mixer-spreader truck and turn on/off with the main start of the mixer-spreader truck.
- (4) The contractor shall have a system in place to record total AR glass reinforcing fiber added vs. tons of dry aggregate placed to verify accurate dosing in

compliance with the project specs.

- (5) Ensure sufficient AR glass reinforcing fiber material is present in the hopper of the mounted hydraulic feed system and refill material as necessary.
- (6) Visually ensure AR glass reinforcing fiber is dispersed and properly mixed in the weigh hopper.

(c) Placement:

- (1) Follow engineer's recommendations for placement of the AR glass fiber reinforced microsurfacing.

2.3 The contractor shall coldmill as necessary under any existing bridge as to not decrease the vertical clearance for vehicles. The contractor shall provide a 100:1 transition for coldmilling pavement under such bridges.

3.0 Edge Drop-Off. The contractor shall construct a maximum drop-off from the edge of pavement to the adjoining shoulder, concrete lane or curb and gutter of no more than 1/4" to 3/8". The transition from full depth microsurfacing at a lane line to the maximum microsurfacing edge drop-off at the edge of shoulder or adjacent concrete shall be applied over an entire lane width or as determined by the engineer.

4.0 Striping. The contractor shall not install permanent striping on a given section until a minimum of 14 days has passed since the placement of the microsurfacing. In the 14 days before installing permanent striping, the contractor shall stripe BL-44 with temporary 4" standard waterborne paint as specified in Sec 620.10.

5.0 Removal of Existing Pavement Markings. The contractor shall remove all existing pavement markings in areas where microsurfacing is to be placed in accordance with Sec 620.50.

6.0 Weather Limitations. Sec 413.10.5.4 is to be deleted and instead the following will apply. Micro-surfacing shall not be placed when either the air temperature or the temperature of the surface on which the mixture is to be placed is below 60 F, when it is raining, or when there is a change of temperatures 50 F within 24 hours after placement. Temperatures shall be obtained in accordance with MoDOT Test Method TM 20.

7.0 Method of Measurement. Final measurement of completed Modified Type II Microsurfacing will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, measurement of Modified Type II Microsurfacing, complete in place, will be made to the nearest square yard. The revision or correction will be added to or deducted from the contract quantity. Temporary 4" standard waterborne paint will not be measured for payment.

8.0 Basis of Payment. The accepted quantity of Modified Microsurfacing, Type II will be paid for at the contract unit price for the following, which shall include all costs for materials, equipment, labor and any other incidental work required to comply with this provision:

Item No.	Unit	Description
413-99.05	Square Yard	Modified Microsurfacing, Type II

There will be no direct pay for the temporary 4" standard waterborne paint.

DD. Modified Shaping Slopes, Class III

1.0 Description. Modified shaping Slopes, Class III shall consist of providing fill material and shaping slopes to construct additional shoulder width for the installation of guardrail and Type A crashworthy end terminals in accordance with the standard plans. Contractor shall use coldmilled material provided from improvements included in the project. If additional material is necessary contractor shall use 4-inch minus aggregate or other granular material approved by the engineer. Any excess material shall be disposed of outside the limits of the right of way.

2.0 Construction Requirements. Slope areas to be shaped by the addition of material shall be scarified to allow bonding with the added material. Density shall be obtained by reasonable compactive efforts consisting of no less than three passes with a roller or other methods approved by the engineer. The contractor will not be required to excavate any classified rock excavation under this item.

2.1 Benching of the existing slope may be necessary to provide stability to the additional shoulder width constructed by Shaping Slopes, Class III. All costs for benching shall be included in the cost of Shaping Slopes, Class III.

2.2 Shaping Slopes, Class III will apply only to those sections that have been specifically designated as such on the plans.

3.0 Method of Measurement. Final measurement will not be made except where appreciable errors are found in the contract quantity. Where required, measurement will be made in accordance with Sec 215.3. The plan quantity will be reduced in areas where Furnishing and Placing Type 2 Rock Blanket are used in lieu of Modified Shaping Slopes, Class III.

4.0 Basis of Payment. The accepted quantity of Modified Shaping Slopes, Class III will be paid for at the contract unit price for the pay item: 215-99.03, Modified Shaping Slopes Class III and shall be considered full compensation to recover the cost of equipment, labor, materials or time required to fulfill the above provision. No direct payment will be made for any additional material required for shaping slopes. No direct payment will be made for any required clearing and grubbing and the cost shall be included in the unit price for Modified Shaping Slopes, Class III.

EE. Temporary Traffic Control

1.0 Description. All work necessary to maintain safe and efficient traffic flow through the work area shall be provided by the contractor. This will include furnishing, relocating, and removing temporary traffic control devices, truck mounted attenuators and equipment, and the removal and relocation or covering and uncovering of existing signs and other traffic control devices in accordance with the contract documents or as directed by the engineer.

2.0 Work Requirements. Work shall be in accordance with Sec 612, 616, 619, 620 and the contract plans.

3.0 Method of Measurement. The quantities shown on the plans shall be considered an estimate and may be subject to change based on field conditions. This work will not be measured for payment but will be considered a lump sum unit. Any Value Engineering proposal to the temporary traffic control will not be paid for through value engineering but will be covered under Temporary Traffic Control, lump sum.

4.0 Basis of Payment.

4.1 Partial payments will be made as follows:

- (a) The first partial payment will be made when five percent of the original contract amount is earned. This payment will be the lesser of 50 percent of the contract price for the item of temporary traffic control or 5 percent of the original contract price.
- (b) The second partial payment will be made when 50 percent of the original contract amount is earned. This payment will be the lesser of 25 percent of the original contract price for the item of temporary traffic control or 2.5 percent of the original contract price.
- (c) The third partial payment will be made when 75 percent of the original contract amount is earned. This payment will be lesser of 20 percent of the original contract price for the item of temporary traffic control or 2 percent of the original contract price.
- (d) When the engineer has accepted the contract for maintenance in accordance with Sec 105, the remaining contract price for the item of temporary traffic control will be paid.
- (e) The above partial payment schedule may be adjusted by the engineer if proof of invoices submitted by the contractor demonstrate additional temporary traffic control costs were incurred earlier than the above proposed schedule. The total payment for temporary traffic control will not exceed the bid amount for Temporary Traffic Control, lump sum, unless covered by a cost change order as referenced in the following Section 4.3.

4.1.1 For the purpose of this provision, the term “original contract price” will be construed as the total dollar value of the construction items (excluding temporary traffic control) of the original contract.

4.2 Temporary traffic control will be paid for at the contract lump sum price for item:

Item No.	Type	Description
616-99.01	Lump Sum	Temporary Traffic Control

No direct payment will be made for the following:

- (a) Incidental items necessary to complete the work, unless specifically provided as a pay item in the contract.
- (b) Installing, operating, maintaining, cleaning, repairing, removing, or replacing traffic control devices.
- (c) Covering and uncovering existing signs and other traffic control devices.
- (d) Relocating temporary traffic control devices, including permanent traffic control devices temporarily relocated, unless specifically included as a pay item in the contract.
- (e) Providing channelizers, directional indicator barricades, moveable barricades, drums, signs, lights, flashers, lighting, etc.
- (f) Worker apparel.
- (g) Flaggers, pilot vehicles, and appurtenances at flagging stations.
- (h) Furnishing, installing, operating, maintaining, and removing construction related vehicle, work area, and equipment lighting.
- (i) Construction and removal of temporary equipment crossovers, including restoring pre-existing crossovers.
- (j) Removing existing pavement markings, installing temporary pavement markings, and removing and relocating temporary markings as necessary for staging operations. Removal of pavement markings shall not mar the surface of the pavement. Existing pavement marking being relocated along BL-44 or within the microsurfacing area on BL-44 will be paid for removal as indicated in the plans.

4.3 Any additional work deemed necessary by the engineer that requires temporary traffic control and is not covered by the contract plans will be included in the cost change order for the additional work. However, if the added work is required in a stage where temporary traffic control is already in place, no additional traffic control pay will be allowed in this case.

FF. NTCIP Compliant Changeable Message Sign, Contractor Furnished / Retained

1.0 Description. All solar powered changeable message signs, hereinafter referred to as a CMS, shall be in accordance with these specifications.

2.0 Material. Each CMS shall consist of an all LED (light emitting diode) matrix message board, solar/battery power supply and a user-operated interface, as specified, all mounted on a heavy duty, towable trailer.

2.1 Each CMS shall be either full matrix or character matrix, and have the following minimum characteristics:

- (a) Full Matrix – Each CMS shall be full matrix type with the capability of providing one, two, and three lines of individual changeable characters with minimum heights of 52 (1300), 28 (700), and 18 (450) inches (mm), respectively. Full matrix signs shall be capable of both static and dynamic graphics, and full display sized messages.
- (b) Character Matrix (Three Line) – Each CMS shall consist of a minimum of three lines containing eight individual changeable characters per line. Each character shall be a minimum of 12 inches (300 mm) wide and 18 inches (450 mm) high.
- (c) Sign firmware shall comply with the current FHWA (Federal Highway Administration) and DOT (Department of Transportation) NTCIP standards and support all NTCIP mandatory objects.
- (d) The sign controller shall be remotely accessible by the MoDOT St. Louis District Transportation Management Center (TMC) through the Commission's ATMS (Advanced Traffic Management System) software, currently TransSuite provided by TransCore. The contractor will be responsible for ensuring the CMS is added to the ATMS software.
- (e) The CMS shall have a cellular data modem compatible with the District's current cellular IP (packet data) service provider and be capable of allowing the MoDOT St. Louis District TMC ATMS software to have full control of the NTCIP compliant CMS controller remotely. Modem shall be capable of being programmed with a static IP.
- (f) The sign shall have a GPS unit that can assist in locating the sign's position when polled by the TMC. The GPS unit must be remotely accessible by the TMC and be part of or work with the provided communication modem.
- (g) Physical access to the onboard computer shall be protected by a padlock or other locking handle mechanism. Electronic access to the onboard computer shall be protected by a username and password.

2.2 Full matrix CMS and character matrix CMS shall meet the following:

- (a) The overall sign dimensions shall not be less than 72 inches (1800 mm) high by 126 inches (3150 mm) wide.
- (b) The CMS shall be legible up to a distance of 650 feet (200 m) for both day and night operations and shall be visible for ½-mile (800 m) with 18-inch (450 mm) characters.
- (c) When fully raised in the display position, the bottom of the CMS board shall be at least a height of 7 feet (2100 mm) from the ground and shall be able to rotate a complete 360 degrees atop the lift mechanism. A sight tube, used to aim the CMS board to oncoming traffic, shall be installed on the CMS board or mast. The CMS shall have an electrical hydraulic lifting mechanism that includes a manual lifting and lowering relief mechanism as a backup. It also must be able to be locked into various viewing angles as determined best for the motorists by the CMS operator.

- (d) All LED displays and control circuitry shall be operations from -20 f (-29 C) to 120 F (50 C). The LED's shall have a rated life of 100,000 hours. The LED's shall be ITE amber in color on a flat black background.
- (e) The CMS face shall be constructed that if an individual panel or pixel fails the rest of the face shall continue to display the message.
- (f) All costs and coordination needed for testing to verify modem communications, sign NTCIP compliance, remote GPS status polling, ability to control the sign via the St. Louis District's ATMS software provided by TransCore shall be the sole responsibility of the contractor. Full integration into TransCore's ATMS shall be completed at least 5 business days prior to use of the CMS on the project. TransCore contact information will be provided to the contractor by contacting MoDOT's Gateway Guide staff at 314-275-1526 or via email at ggtech@modot.mo.gov with details of the request. No other support shall be provided by MoDOT other than TransCore contact information. Information provided shall include, at a minimum, CMS make and model, IP address, and proposed locations and messages.
- (g) The contractor shall be responsible for all monthly cellular service fees for the duration of the project.
- (h) The unit shall be able to withstand a 65-mph (105-kmph) maximum road wind speed. The trailer shall be able to support the fully extended CMS board in an 80-mph (130-kmph) wind load.
- (i) Solar charging system shall allow for total autonomy of 24/7/365 continuous operation.
- (j) All exterior surfaces except the sign face shall be cleaned, primed, and finished with two coats of Highway Safety Orange and the sign interior itself shall be cleaned and finished with one coat of corrosion inhibiting primer and two coats of flat black. The sign face shall be covered with a rigid translucent material to prevent damage to the sign face caused by the environment.

3.0 Construction Requirements. Prior to placing a CMS on the project, the engineer shall verify proposed CMS location is void of conflict with another DMS or CMS locations presently established. If a conflict is present, the engineer shall contact the Traffic Management Center (TMC) at 314-275-1526 to mitigate. If no conflict is present, the engineer shall provide the Traffic Management Center (TMC) with Job Number, Route, County, specific CMS location, and a CMS identification number that is permanently affixed to the CMS. The engineer and contractor shall verify the message displayed on the board is compliant with CMS messaging policies. The contractor shall place the CMS 6 feet (2 m) off of the right edge of shoulder at the location shown on the plans or as directed by the engineer. The CMS shall be placed so that the right side of the unit is advanced approximately 3 degrees ahead with the direction of traffic. CMS shall not be located in medians. CMS shall be delineated with a minimum of five non-metallic channelizing devices. Installation, including location and placement, shall be approved by the engineer. If needed, the contractor shall relocate the CMS as directed by the engineer.

3.1 When not in use, the CMS shall be stored no closer than 30 feet (10 m) to the edge of pavement carrying traffic, unless it is in a properly protected area or an off-site storage area or as otherwise directed by the engineer.

4.0 Basis of Payment. All expenses incurred by the contractor in providing, integrating, maintaining, relocating, operating and protecting the changeable message signs as outlined above shall be paid for at the contract unit price for Item 616-99.02 NTCIP Compliant Changeable Message Sign, Contractor Furnished / Retained, per each.

4.1 Cost for channelizers shall be included in the contract unit price for CMS.

4.2 Cost of cellular phone hookup and monthly usage fee for the duration of the project shall be included in the contract unit price for CMS.

Item No.	Type	Description
616-99.02	Each	NTCIP Compliant Changeable Message Sign, Contractor Furnished / Retained

GG. Seeding, Fertilizing and Mulch

1.0 Description. All areas disturbed by the contractor's operations shall be fertilized, seeded and mulched. In addition, the disturbed areas shall be covered by an erosion control blanket.

2.0 Fertilizing. All work shall be in accordance with Sec 801. Fertilizer shall be applied at the following rate:

Nitrogen (N)	80 lb. per acre
Phosphoric Acid (P ₂ O ₅)	160 lb. per acre
Potash (K ₂ O)	80 lb. per acre
Effective Neutralizing Material	2700 lb. per acre

3.0 Seeding. All work shall be in accordance with Sec 805. The following seed mixture shall be applied at the rate specific in pounds of pure live seed per acre:

Tall Fescue	80 lb. per acre
Annual Ryegrass	8 lb. per acre
<u>White Clover</u>	<u>2 1/2 lb. per acre</u>
Total	90 1/2 lb. per acre

4.0 Mulching. All work shall be in accordance with Sec 802. All mulching shall be stabilized by overspray.

5.0 Method of Measurement and Basis of Payment. Measurement and payment shall be in accordance with Sec. 805. Payment will be considered full compensation for all labor, equipment and material to complete the described work. All expense incurred by the contractor

in compliance with the above requirements shall be considered as completely covered by unit prices for:

Item Number	Item Name	Units
805-10.00A	Seeding – Cool Season Mixtures	Acre

HH. Remove and Relocate Existing Ground Mount Sign

1.0 Description. This item provides for relocating and mounting existing signs, including any existing backing bars, of various sizes to new posts at locations shown on the plans. The Contractor shall be responsible for all existing signs, including any existing backing bars, to be relocated. During construction, if any sign, including any backing bars, to be relocated is lost, stolen, or damaged in any way, the Contractor shall be responsible for all costs.

2.0 Construction Requirements. The contractor shall install new sign support posts at the locations shown and then relocate and mount existing signs, including any existing backing bars, to the new posts. All work shall be in accordance with the construction requirements of Section 903.

3.0 Method of Measurement. Measurement will be made per each for relocating and mounting existing signs, including any existing backing bars, to new posts. Measurement for any concrete footings, structural steel posts, pipe posts, perforated square steel tubes and anchor sleeves, and breakaway assemblies will be made in accordance with Section 903.

4.0 Basis of Payment. All costs incurred for relocating and mounting existing signs, including existing backing bars, to new posts at the locations shown, complete in place, will be paid for at the contract unit price for bid item 903-99.02, Remove and Relocate Existing Ground Mount Sign, per each. Payment for all other labor, equipment, material, and incidental items will be considered completely covered by the bid items included in the contract.

II. Tenon Poles

1.0 Description. This work shall consist of furnishing and installing 30' tenon mount poles as indicated in the plans.

2.0 Construction Requirements. Ground mounted tenon poles shall conform to the standards for Type AT lighting poles and shall be fabricated with a circumferentially welded tenon and top plate to accept tenon mounted luminaries. The tenon shall extend 4" above the top of the pole and meet AASHTO loading requirements for the luminaries provided. The tenon shall be made of the same material as the pole shaft, be constructed as a one-piece pole and tenon unit by the manufacturer, and have an outside diameter that accepts the appropriate luminaries slip-fitter. Pole and tenon shall conform to all MoDOT specifications and material requirements.

3.0 Basis of Payment. Payment for furnishing and installing tenon poles shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be

considered to be completely covered by the contract unit price for Item Number 901-99.02, "30 FT. Tenon Mount Type AT Pole," per each as indicated in the plans.

JJ. Tenon Mounted Luminaires

1.0 Description. This work shall consist of furnishing and installing LED-A Tenon Mounted Luminaires as indicated in the plans.

2.0 Construction Requirements. Luminaires shall be vertical tenon type (pole top mount) with a slip-fitter that accommodates a standard 2" tenon. Available types are listed on the MoDOT approved products list and must meet all MoDOT Specifications. The contractor shall coordinate the pole top tenon size with the luminaire tenon to ensure compatibility.

3.0 Basis of Payment. Payment for furnishing and installing tenon mounted luminaries shall include all excavation, materials, equipment, tools, labor, and work incidental thereto, and shall be considered to be completely covered by the contract unit price for Item Number 901-99.02, "LED-A Tenon Mounted Luminaire," per each as indicated in the plans.

KK. Push Button Extension

1.0 Description. This work shall consist of furnishing and installing push button extensions as indicated in the plans. The existing pushbutton shall be removed and relocated onto a push button extension that is within a horizontal reach range of less than 10" and a vertical reach range less than 42". The Contractor shall submit shop drawings of the proposed push button extensions for approval, before installing.

2.0 Construction Requirements. Work shall be in accordance with Sec 902 and the manufacturer's recommendations.

3.0 Basis of Payment. Payment for furnishing and installing push button extensions shall include all excavation, materials, equipment, tools, labor, relocating existing push buttons, disconnecting/hooking up existing wiring, and work incidental thereto, and shall be considered to be completely covered by the contract unit price for Item Number 902-99.02, "Push Button Extension," per each as indicated in the plans

LL. Adjust to Grade Pull Box

1.0 Description. This work shall consist of adjusting pull boxes that are within areas where either new sidewalks/ramps/approaches/pavement are to be constructed as shown on the plans. The adjustment shall be made to the final grade.

2.0 Construction Requirements. Work shall be in accordance with the Missouri Standard Specifications for Highway Construction. Adjustments shall be completed so that the finished sidewalk, ramp, approach, or pavement meets current ADA standards.

3.0 Basis of Payment. All costs for materials, equipment, labor and installation shall be included in the cost for adjusting pull boxes.

Pay Item No. 902-99.02, Adjust to Grade Pull Box, per each

MM. Adjust Water Valve to Grade

1.0 Description. All existing water valves within the limits of the project, which require vertical adjustment necessary to match the proposed grade elevations, shall be adjusted as shown on the plans or as directed by the engineer.

2.0 Construction Requirements. Work shall be in accordance with the Missouri Standard Specifications for Highway Construction and the City of Pacific's water department specifications. Adjustments shall be completed so that the finished sidewalk, ramp, approach, or pavement meets current ADA standards. Any existing water valves which are damaged by the contractor while performing this work shall be repaired at his/her expense.

3.0 Basis of Payment. All costs for materials, equipment, labor and installation shall be included in the cost for adjusting water valves.

Pay Item No. 603-99.02, Adjust Water Valve to Grade, per each

NN. Pavement Grinding

1.0 Description. This work shall consist of removing the "bump" (6' x 7.5') in the bituminous pavement located in the southwest radius return of the BL-44 / W. Flier Dr. intersection (BL-44 Sta. 1147+95 Rt.) where the bituminous pavement meets the curb ramp. The "bump" shall be milled / ground as directed by the engineer to improve the profile of the existing pavement surface and crosswalk at the curb ramp. This work shall be constructed in accordance with Sec 622 except as modified herein.

2.0 Construction Requirements. The "bump" in the existing pavement where it meets the existing curb ramp shall be removed to a depth, width, grade and cross slope as directed by the engineer.

3.0 Equipment. The equipment for milling or grinding the pavement surface shall be capable of removing a thickness of bituminous material to the required depth and providing a smooth uniform profile and cross slope to the satisfaction of the engineer.

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Were required, measurement for Pavement Grinding will be computed to the nearest 0.1 square yard. The correction will be added or deducted from the contract quantity.

5.0 Basis of Payment. This work will be paid for at the contract unit price per square yard for Pavement Grinding. No direct payment will be made for loading, hauling, stockpiling or

disposing of the removed material, repairing spalled area or performing other items incidental to completion of this work.

Pay Item No. 622-99.05, Pavement Grinding, per square yard

OO. Temporary Crash Cushion, TL-3 (Narrow)

1.0 Description. This work shall consist of furnishing, installing, maintaining, and removing temporary crash cushions of the category and test level specified. This work shall be completed in accordance with Sec 606.30 except as modified herein.

2.0 Material. Material shall be as specified in Sec. 606.30.2.

3.0 Construction Requirements.

3.1 General. Temporary crash cushions shall meet the testing criteria contained in either the National Cooperative Highway Research Program (NCHRP) Report 350 or MASH and shall be on the MoDOT's qualified product list. The temporary crash cushions shall be NCHRP 350 Test Level 3, qualified to be used on temporary construction sites and qualified to be used in narrow spaces.

3.2 Installation. Temporary crash cushions shall be installed according to the manufacturer's specifications and include all necessary transitions between temporary crash cushion and the item to which it is attached. Regrading of slopes or approaches for the installation shall be as shown on the plans or as directed by the engineer.

Temporary crash cushion bases, when required by the manufacturer, shall be constructed on a prepared subgrade according to the manufacturer's specifications. The surface of the base shall be slightly sloped or crowned to facilitate drainage.

When water filled temporary crash cushions are used between November 1 and April 1, they shall contain anti-freeze according to the manufacturer's recommendations.

4.0 Markings. Markings shall be as specified in Sec 606.30.3.5.

5.0 Maintenance and/or Replacement. All maintenance and/or replacement of the temporary crash cushions shall be the responsibility of the contractor until removal is directed by the engineer.

6.0 Relocate. When relocation of temporary crash cushions is specified, they shall be removed, relocated and reinstalled at the new location. The reinstallation requirements shall be the same as those for a new installation.

7.0 Removal. Surplus material shall be disposed of according to Sec 202. Anti-freeze, when present, shall be disposed of/recycled according to local ordinances.

When temporary crash cushions have been anchored to the pavement, the anchor holes shall be repaired with rapid set mortar; only enough water to permit placement and consolidation by rodding shall be used and the material shall be struck-off flush.

8.0 Method of Measurement. This work will be measured for payment as each, where each is defined as one complete installation. Grading for temporary crash cushions will not be measured for payment.

9.0 Basis of Payment. This work will be paid for at the contract unit price for Item 606-99.02 Temporary Crash Cushion, TL-3 (Narrow), per each complete in place. Payment will be considered full compensation for complete installation including any backup assemblies or other items necessary for proper installation of the temporary crash cushion as required.

Relocation of the devices will be paid for at the contract unit price for Item 606-99.02(1) Relocating Temporary Crash Cushion, TL-3 (Narrow), per each complete in place. Payment will be considered full compensation for complete removal and reinstallation including any backup assemblies or other items necessary for proper installation of the temporary crash cushion as required.

Grading for temporary crash cushions will not be paid for separately but shall be include in the unit bid price for the temporary crash cushion and the relocation of the temporary crash cushion.

PP. Property Owner Notification

1.0 Description. It shall be the contractor's responsibility to inform and notify the adjacent property owner 48 hours prior to starting any construction activities that may impact driveway and parking lot access or occur along the frontage of the property owner's parcel. Notification shall be in written form and include the contractor's contact information, the Engineer's contact information, and an estimated schedule of work and the associated impacts.

2.0 Basis of Payment. No direct payment will be made to the contractor for the labor, equipment, material, or time required to comply with this provision.

QQ. Access to Commercial and Private Entrances

1.0 Description. While working on entrances or adjacent properties, the contractor shall make every reasonable effort to minimize any interference to the properties and to complete the work diligently. Under no circumstances shall the contractor block ingress/egress to and from businesses during the normal business hours of each business unless as approved by the property owner and engineer.

2.0 Construction Requirements. On all entrances the contractor shall keep one-half of the entrance open at all times. On narrow entrances it may be necessary for the contractor to provide temporary aggregate to provide access to the property. The contractor shall remove and dispose of the temporary aggregate following completion of the entrance. For properties

with more than one entrance the contractor may construct one entire entrance at a time with the approval of the property owner and the engineer.

3.0 Basis of Payment. No direct payment will be made to the contractor for any expenses incurred for compliance with this provision.

RR. Coordination with Other Projects

1.0 Description. The contractor shall coordinate traffic management between the following projects within the same project limits:

- MoDOT Job Number J613243 (I-44 Bridge Rehabilitation (Epoxy Polymer Overlays) at Various Locations in Franklin County)
- MoDOT Job Number J6P3246 (Route 50, Add Turn Lanes at Route EE and E. Denmark Rd., Resurface from East of Progress Pkwy. to West of I-44)
- MoDOT Job Number J6S3276 (BL44 Pavement Resurfacing from Neosho St. to East of Allenton)
- MoDOT Job Number J613383 (I-44 Replace Structural Signs from Crawford County Line to I-70 in St. Louis City)

1.1 This list of projects is not all inclusive. The contractor shall be aware that there may be other projects including, but not limited to, utility, Franklin County, City, private, MoDOT maintenance, permit, or other projects that may impact project construction or traffic control in the vicinity of this project. It shall be the responsibility of the contractor to determine what, if any projects other than the ones listed above may impact this project and work to coordinate construction and traffic management efforts between this project and any other project involved.

2.0 Basis of Payment. No direct payment will be made to the contractor to recover the cost of equipment, labor, materials or time required to fulfill the above provisions, unless specified elsewhere in the contract document.

SS. Furnishing and Placing Type 2 Rock Blanket

1.0 Description. This work shall consist of Furnishing and Placing Type 2 Rock Blanket in accordance with the plans and Sec 611.30 except as modified herein.

1.1 An estimated quantity of furnishing and placing rock blanket has been included in the contract to construct the required slope at proposed guardrail locations, as shown on the plans and where deemed necessary by the engineer. Modified Shaping Slopes, Class III is the primary pay item for completing the slope work at the proposed guardrail locations. If Type 2 Rock Blanket is utilized in areas not included in the plans the quantity of Modified Shaping Slopes, Class III shall be reduced accordingly. The Furnishing and Placing Type 2 Rock Blanket locations shall be as shown on the plans and as directed by the engineer.

5.0 2.0 Method of Measurement and Basis of Payment. Measurement and payment shall be in accordance with Sec. 611.30. Payment will be considered full compensation for all

labor, equipment and material to complete the described work. No direct payment will be made for any required clearing and grubbing, and the cost shall be included in the unit price for Placing Type 2 Rock Blanket. All expense incurred by the contractor in compliance with the above requirements shall be considered as completely covered by unit prices for:

Item Number	Item Name	Units
611-30.20	Furnishing Type 2 Rock Blanket	CU YD
611-30.40	Placing Type 2 Rock Blanket	CU YD

TT. Modified Concrete Traffic Barrier, Type C

1.0 Description. This work shall consist of constructing Modified Concrete Traffic Barrier, Type C on a reinforced concrete footing as detailed in the plans. This work shall be completed in accordance with Sec 617.10 except as modified herein.

2.0 Material. Material shall be as specified in Sec. 617.10.2.

3.0 Construction Requirements. The Modified Concrete Traffic Barrier, Type C and reinforced concrete footing shall be constructed as detailed in the plans and in accordance with Sec 617.10.3.

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. The revision or correction will be computed and added to or deducted from the contract quantity. Where required, measurement for Modified Concrete Traffic Barrier, Type C will be made to the nearest ½ linear foot for each continuous length and totaled to the nearest linear foot for the sum of the lengths. Reinforced concrete footing, reinforcing steel, dowels, joint filler material, and sawed joints will not be measured for payment.

5.0 Basis of Payment. Accepted Modified Concrete Traffic Barrier, Type C will be paid for at the contract unit price per linear foot. Reinforced concrete footing, reinforcing steel, dowels, joint filler material, and sawed joints will not be paid for separately but shall be considered included in the unit bid price for Modified Concrete Traffic Barrier, Type C.

Pay Item No. 617-99.03, Modified Concrete Traffic Barrier, Type C, linear foot