

STATE OF MISSOURI  
HIGHWAYS and TRANSPORTATION  
COMMISSION

JEFFERSON CITY, MISSOURI

CONSTRUCTING OR IMPROVING  
CONTRACT I.D. 161216-C04

THIS JOB SHALL BE CONSTRUCTED UNDER  
FEDERAL PROJECT NUMBER(S): FAS S301(10)

Job J4S3137 Route 1 CLAY County

BIDDER CHECKLIST  
FINAL CHECKLIST BEFORE SUBMITTING BID

1. Submit completed Contractor Questionnaire and/or Contractor Prequalification Questionnaire with attachments not later than seven (7) days prior to the date and hour of the bid opening. See Secs 101-103 of the Missouri Standard Specifications for Highway Construction, and Rule 7 CSR 10-15.010, "Prequalifications to Bid of Certain Contractors". Questionnaire and Contact information are provided on MoDOT's website.
2. All bids shall be submitted electronically using "Bid Express Secure Internet Bidding" at [www.bidx.com](http://www.bidx.com). Any paper bid submitted will be considered irregular per section 102.8 of the Missouri Standard Specifications for Highway Construction.
3. Please read all items in the bidding document carefully. The EBS files from MoDOT's website may be used for the itemized bid.
4. If submitted in the name of a firm or corporation, the legal name of the firm or corporation should appear in the space designated, and be signed for by one or more persons legally qualified to execute papers in the name of said firm or corporation.
5. The bidder shall submit a Bid Guaranty meeting the requirements of Sec 102 of the Missouri Standard Specifications for Highway Construction. If submitting a project specific or annual bid bond, bidders must use the MoDOT provided bid bond forms. The project specific bond form is included in the request for bid. The project specific and annual bid bond forms are also available on MoDOT's website. Annual bid bonds shall be executed by June 15th of each year.
6. Submit the Subcontractor Disclosure Form in accordance with the bidding documents. For bids of more than \$2,000,000, each bidder shall submit with each bid a disclosure of the subcontracts that have a subcontract value that is equal or greater than twenty percent of the total project bid or subcontracts that are greater than or equal to \$2,000,000. If that information is not available at the time of bid the bidder shall submit the "Subcontractor Disclosure Form" pages with MoDOT on or before 4:00 p.m. of the third business day after the bid opening date.
7. Submit the DBE Identification Submittal in accordance with the bidding documents for Federal Projects Only.
8. Alternate Pavements; to exercise this option, separate pay items, descriptions and quantities are included in the itemized proposal for each of the two alternates. The bidder shall bid only one of the two alternates and leave the contract unit price column blank for any pay item listed for the other alternate.

-----

- 9. When submitting a bid, your bid will still come through with "red" folders. You should make sure that it is not the Schedule of Items folder or the Signature and Identity of Bidder folder. Click on the yellow checkmark (Check Bid) at the top and it will list any errors in the bid. To view itemized folders, click the Tree View. This will show the status of the individual folders.

\*\*\*\*\*

Below is a list of common mistakes made by bidders leading to non-responsive bids. Please refer to the Standard Specifications for the appropriate procedures for completing and submitting a bid.

- a) Submitting a paper bid for a project
- b) Using a different bid bond form than the one provided
- c) Improper use of the Maximum Monetary Value Award Provision  
-only used if bidding more than one project and should be in only one bid proposal
- d) Not obtaining a digital ID in advance of the letting  
(obtaining a digital ID may take 5 business days)

\*\*\*\*\*

All questions concerning the bid document preparation shall be directed to the Central Office - Design Division at (573) 751-2876. Project specific questions shall be directed to the project contact listed in the Job Special Provisions.

-----

TABLE OF CONTENTS

Notice to Contractors

Proposed Work..... item (1)

Compliance With Contract Provisions..... item (2)

Period of Performance..... item (3)

Liquidated Damages..... item (4)

Acceptance of Provision for Price Adjustment for Fuel..... item (5a)

Acceptance of Provision for Asphalt Cement Price Index..... item (5b)

Max. Monetary Value of Awards Accepted this Bid Opening... item (6)

Combination Bids..... item (7)

Bid Guaranty..... item (8)

Certification for Federal Jobs..... item (9a)

Certification for State Jobs..... item (9b)

Antidiscrimination..... item (10)

Preference to Missouri Firms in Awarding of Contracts..... item (11)

Signature and Identity of Bidder..... item (12)

Trainees..... item (13)

Bidder's Certification for DBE Program and Contract Goal.. item (14)

Itemized Bid..... item (15)

Bid Bond\*

Subcontractor Disclosure Form\*

DBE Identification Submittal (Applies to Federal Projects Only) \*

\*These forms are also available on MoDOT's Website, [www.modot.org](http://www.modot.org) under General Information on the Bid Opening Info page of the Contractor Resources site.



NOTICE TO CONTRACTORS

Electronic bids submitted through the Bid Express website for the proposed work will be received by the Missouri Highways and Transportation Commission until 11:00 o'clock a.m. (prevailing local time) on 12-16-16.

Bid bonds will be received at the office of the Secretary to the Commission in the Missouri Department of Transportation Central Office Building, 105 West Capitol Avenue, Jefferson City, Missouri; delivered by US Mail should be mailed to: Missouri Highways and Transportation Commission, Attention: State Design Engineer/Bid Bond, P.O. Box 270, Jefferson City, MO 65102 or delivered by parcel delivery services, (such as UPS, Fed Ex, DHL, etc.) should be shipped to Missouri Highways and Transportation Commission, Attention: State Design Engineer/Bid Bond, 105 West Capitol Avenue, Jefferson City, MO 65102.

(1) PROPOSED WORK: The proposed work, hereinafter called the work, includes:

\*\*\*\*(1): Job J4S3137 Route 1 CLAY County. Resurface from Route 152 to 64th Street in Gladstone, the total length of improvement being 2.76 miles.

Combination bids will be Not Required on the Jobs listed above.

(2) COMPLIANCE WITH CONTRACT PROVISIONS: The bidder, having examined and being familiar with the local conditions affecting the work, and with the contract, contract documents, including the Missouri Highways and Transportation Commission's "Missouri Standard Specifications for Highway Construction, 2016," and "Missouri Standard Plans for Highway Construction, 2016", their revisions, and the request for bid, including appendices, the special provisions and plans, hereby proposes to furnish all labor, materials, equipment, services, etc., required for the performance and completion of the work. All references are to the Missouri Standard Specifications for Highway Construction, as revised, unless otherwise noted. All questions concerning the bid document preparation shall be directed to the Central Office - Design Division at (573) 751-2876.

-----

(3) PERIOD OF PERFORMANCE: If the bid is accepted, the bidder shall continuously and diligently prosecute the work in such order and manner as will ensure the completion of the work within the time specified in the Job Special Provisions in accordance with Sec 108.

(4) LIQUIDATED DAMAGES: The bidder agrees that, should the bidder fail to complete the work in the time specified or such additional time as may be allowed by the engineer under the contract, the amount of liquidated damages as specified in the Job Special Provisions to be recovered in accordance with Sec 108.

(5a) ACCEPTANCE OF PROVISION FOR PRICE ADJUSTMENT FOR FUEL: Bidders have the option to accept the provision for Price Adjustment for Fuel in accordance with Sec. 109.14. The bidder must select "Yes" for those items of work in which they choose to accept the provision. No price adjustments will be made, due to fuel price changes, for bidders who do not accept this provision. This provision does not apply to Seal Coat.

EXCAVATION PRODUCTION  
ASPHALT PAVING PRODUCTION AND HAULING  
CONCRETE PAVING PRODUCTION AND HAULING  
AGGREGATE BASE HAULING

(5b) ACCEPTANCE FOR PROVISION FOR ASPHALT CEMENT PRICE INDEX, SEAL COAT PRICE INDEX, UNDERSEAL PRICE INDEX, OR POLYMER MODIFIED EMULSION MEMBRANE PRICE INDEX:

Bidders have the option to accept the provision for Asphalt Cement Price Index, Seal Coat Price Index, Underseal Price Index, and/or Polymer Modified Emulsion Membrane Price Index in accordance with the General Provisions. The bidder must mark each box below if they choose to accept the provision. No price adjustments will be made, due to asphalt price changes, for bidders who do not accept this provision.

ASPHALT CEMENT  
SEAL COAT  
UNDERSEAL  
POLYMER MODIFIED EMULSION MEMBRANE

(6) MAXIMUM MONETARY VALUE OF AWARDS ACCEPTED THIS BID OPENING: Bidders have the option to specify the maximum monetary value of awards that they will accept for the total of all bids they have submitted in the bid opening, Sec 102.7.2. If the bidder is submitting only one bid, or if the bidder does not want to specify a maximum monetary value for submitted bids, this section should not be completed. If a submitted bid upon correction exceeds the indicated maximum monetary amount, the bid may be

-----

declared non-responsive. If a bidder's submitted bids show different values for the maximum monetary value, the lowest value will govern.

MAXIMUM MONETARY VALUE OF AWARDS ACCEPTED THIS BID OPENING

(Note: this amount should be entered in only one of the bids for this bid opening)

(7) COMBINATION BIDS: (Applies only if combination bids are specified. See cover and/or notice to contractor(s).) Combination bids will be in accordance with Sec 102.12. By selecting "ALL OR NONE", the bidder desires to combine all projects in accordance with Sec 102.12.2.1.

(8) BID GUARANTY: The bidder shall submit a Bid Guaranty meeting the requirements of Section 102 of the Missouri Standard Specifications for Highway Construction. MoDOT's bid bond and annual bid bond forms are available on MoDOT's website.

(9a) CERTIFICATIONS FOR FEDERAL JOBS: (Applies to Federal Projects only.) By signing and submitting this bid, the bidder makes the certifications appearing in Sec. 102.18.1 (regarding affirmative action and equal opportunity), Sec. 102.18.2 (regarding disbarment, eligibility, indictments, convictions, or civil judgments), Sec.102.18.3 (regarding anti-collusion), and Sec.102.18.4 (regarding lobbying activities). Any necessary documentation is to accompany the bid submission, as required by these sections. As provided in Sec.108.13, the Commission may terminate the contract for acts of misconduct, which includes but is not limited to fraud, dishonesty, and material misrepresentation or omission of fact within the bid submission.

(9b) CERTIFICATIONS FOR STATE JOBS: (Applies to State Projects only.) By signing and submitting this bid, the bidder makes the certifications appearing in Sec. 102.18.2 (regarding diseligibility, indictments, convictions, or civil judgments), Sec. 102.18.3 (regarding anti-collusion), and Sec. 102.18.5 (regarding Missouri Domestic Products Procurement Act). Any necessary documentation is to accompany the bid submission, as required by these sections. As provided in Sec. 108.13, the Commission may terminate the contract for acts of misconduct, which includes but is not limited to fraud, dishonesty, and material misrepresentation or omission of fact within the bid submission.

-----

Any necessary documentation is to accompany the bid submission, as required by these sections. As provided in Sec. 108.13, the Commission may terminate the contract for acts of misconduct, which includes but is not limited to fraud, dishonesty, and material misrepresentation or omission of fact within the bid submission.

By selecting "No" the bidder REFUSES to make one or more certifications for the above items 9a or 9b. The bidder shall provide a statement of explanation for the refusal in the space below or by fax to the Design Division @ Fax no. 573-522-2281.

(10) ANTIDISCRIMINATION: The Commission hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, businesses owned and controlled by socially and economically disadvantaged individuals will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of race, color, religion, creed, sex, age, ancestry, or national origin in consideration for an award.

(11) PREFERENCE TO MISSOURI FIRMS IN AWARDING OF CONTRACTS: (Applies to State Projects only.) The bidder's attention is directed to Section 34.355 RSMo Supp 2000, et seq, which requires that preference be given in awarding contracts to firms, corporations, or individuals doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal, or better, and the price quoted is the same, or less.

The law also requires that a contractor or bidder domiciled outside the state of Missouri shall be required, in order to be the successful bidder, to submit a bid which is the same percent less than the lowest bid submitted by a responsible contractor or bidder domiciled in Missouri as would be required for the Missouri domiciled contractor or bidder to succeed over the bidding contractor or bidder domiciled outside Missouri in a like contract or bid being let in his state. A contractor or bidder domiciled outside Missouri domiciliary shall also be required to submit an audited financial statement as would

-----

be required of a Missouri domiciled contractor or bidder on a like contract or bid being let in the domiciliary state of that contractor or bidder.

For firms, corporations or individuals domiciled outside the state of Missouri, it is requested they submit the following information:

List the state of domicile

List address of all Missouri offices or places of business

I acknowledge that I have read, understand and completed the above Contract Provisions.

-----

(12) Signature and Identity of Bidder

BY SUBMITTING THIS BID ELECTRONICALLY, I HEREBY ACKNOWLEDGE THAT ALL REQUIREMENTS INCLUDED IN THE HARD COPY REQUEST FOR BID, AND AMENDMENTS ARE A PART OF THIS BID AND CONTRACT.

\*\*\* AN ELECTRONIC PROPOSAL SUBMITTED AND SIGNED WITH A DIGITAL ID, UNDER THE PROVISION OF THE MISSOURI DEPARTMENT OF TRANSPORTATION, WILL BE CONSIDERED VALID AND BINDING. \*\*\*

THE BIDDER CERTIFIES THAT THE BIDDER AND ITS OFFICIALS, AGENTS, AND EMPLOYEES HAVE NEITHER DIRECTLY NOR INDIRECTLY ENTERED INTO ANY AGREEMENT, PARTICIPATED IN ANY COLLUSION, OR OTHERWISE TAKEN ANY ACTION IN RESTRAINT OF FREE COMPETITIVE BIDDING IN CONNECTION WITH THIS BID, AND THAT THE BIDDER INTENDS TO PERFORM THE WORK WITH ITS OWN BONAFIDE EMPLOYEES AND SUBCONTRACTORS, AND DID NOT BID FOR THE BENEFIT OF ANOTHER CONTRACTOR.

THE BIDDER CERTIFIES THAT THE BIDDER'S COMPANY KNOWINGLY EMPLOYS ONLY INDIVIDUALS WHO ARE AUTHORIZED TO WORK IN THE UNITED STATES IN ACCORDANCE WITH THE APPLICABLE FEDERAL AND STATE LAWS AND ALL PROVISIONS OF MISSOURI EXECUTIVE ORDER NO. 07-13 FOR CONTRACTS WITH THE MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION, ACTING THROUGH THE MISSOURI DEPARTMENT OF TRANSPORTATION.

THE BIDDER ACKNOWLEDGES THAT THIS IS AN UNSWORN DECLARATION, EXECUTED UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE UNITED STATES AND/OR FALSE DECLARATION UNDER THE LAWS OF MISSOURI, AND ANY OTHER APPLICABLE STATE OR FEDERAL LAWS. THE FAILURE TO PROVIDE THIS CERTIFICATION IN THIS BID MAY MAKE THIS BID NON-RESPONSIVE, AND CAUSE IT TO BE REJECTED.

Select "No" ONLY if the bidder REFUSES to make this certification. The bidder may provide an explanation for the refusal with this submittal in the space below or by fax to the Design Division @ fax no. 573-522-2281.

USE OF ANOTHER PERSON'S DIGITAL ID IN THIS BIDDING PROCESS VIOLATES THE LAWS OF MISSOURI.

I acknowledge that I have read, understand and completed the above Electronic Bid Submission Certification.

-----

DBE CERTIFICATION

(13) Trainees: (Applies to Federal Projects only) The number of trainee hours provided under this contract will be 0 slots at 1000 hours per slot or 0 hours.

(14) Bidder's Certification for DBE Program and Contract Goal (Applies to Federal Projects Only.)

(A) DBE Contract Goal: By submitting this bid, the bidder certifies that the bidder is familiar with the DBE Program Requirements in the General Provisions. The contract goal for the amount of work to be awarded is 11.00% of the total federal project price. The bidder shall also complete the DBE Identification Submittal form in accordance with the General Provisions. This form is available on MoDOT's Website, [www.modot.org](http://www.modot.org) under General Information on the Bid Opening Info page of the Contractor Resources site.

(B) DBE Participation: The bidder certifies that it will utilize DBE's as follows: % OF TOTAL FEDERAL CONTRACT

NOTE: Bidder must fill in the above box. If no percentage is specified, the bidder certifies that it agrees to and will comply with the contract goal. If a percentage below the contract goal is specified, then the bidder must submit complete documentation of good faith efforts to met the DBE contract goal, immediately below.

The DBE Identification Submittal form will be submitted via

(C) Certification of Good Faith Efforts to Obtain DBE Participation: By submitting its signed bid, the bidder certifies under penalty of perjury and other provisions of law, that the bidder took each of the following steps to try to obtain sufficient DBE participation to achieve the Commission's proposed DBE Contract Goal:

(15) ITEMIZED BID: The bidder should complete the following section in accordance with Sec 102.7. The bidder proposes to furnish all labor, materials, equipment, services, etc. required for the performance and completion of the work, as follows:

-----

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars Cts	Bid Amount Dollars Ct
Section 0001 Roadway Items - J4S3137				
Alt Group				
0010	2022010 REMOVAL OF IMPROVEMENTS	LUMP	LUMP	
0020	2071000 LINEAR GRADING CLASS 1	2.200 STA		
0030	2153000 SHAPING SLOPES, CLASS III	3.000 100F		
0040	3040506 TYPE 5 AGGREGATE FOR BASE (6 IN. THICK)	306.000 SQYD		
0050	4071005 TACK COAT	40.000 GAL		
0060	4133200 ULTRATHIN BONDED WEARING SURFACE, TYPE C	126,876.000 SQYD		
0070	5021108 CONCRETE PAVEMENT ( 8 IN. NON-REINF)	288.100 SQYD		

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Cts
0080	6083006 6 IN. CONCRETE MEDIAN STRIP	8.300 SQYD		
0090	6086004 CONCRETE SIDEWALK, 4 IN.	48.900 SQYD		
0100	6091051 CURB AND GUTTER TYPE A	80.000 LF		
0110	6123000A TRUCK OR TRAILER MOUNTED ATTENUATOR (TMA)	2.000 EA		
0120	6131010 FURNISHING AND PLACING CONCRETE MATERIAL FOR FULL DEPTH PAVEMENT REPAIR	965.400 SQYD		
0130	6131012 SUBGRADE COMPACTION (6 IN. DEPTH) (PAVEMENT REPAIR)	385.000 SQYD		
0140	6131013 TYPE 1 OR 5 AGGREGATE FOR BASE (4 IN. THICK) (PAVEMENT REPAIR)	97.000 SQYD		

State of MISSOURI  
Dept of Transportation  
Schedule of Items

Contract ID: 161216-C04  
Letting Date: 12-16-16  
Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Cts
0150	6131014 FULL DEPTH PAVEMENT REPAIR SAW CUT (FOR PERIMETER AND INTERNAL SAW CUTS)	3,738.000 LF		
0160	6131015 DOWEL BAR (DRILLING, FURNISHING AND INSTALLATION) FOR FULL DEPTH PAVEMENT REPAIR	2,381.000 EA		
0170	6133018 FURNISHING AND PLACING BITUMINOUS MATERIAL FOR CLASS B PARTIAL DEPTH PAVEMENT REPAIR	320.400 TONS		
0180	6133019 REMOVAL FOR CLASS B PARTIAL DEPTH PAVEMENT REPAIR	969.700 SQYD		
0190	6161005 CONSTRUCTION SIGNS	1,576.000 SQFT		
0200	6161008 ADVANCED WARNING RAIL SYSTEM	6.000 EA		
0210	6161009 FLAG ASSEMBLY	24.000 EA		

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Cts
0220	6161025 CHANNELIZER (TRIM LINE)	500.000 EA		
0230	6161040 FLASHING ARROW PANEL	2.000 EA		
0240	6161098A CHANGEABLE MESSAGE SIGN WITHOUT COMMUNICATION INTERFACE, CONTRACTOR FURNISHED, CONTRACTOR RETAINED	2.000 EA		
0250	6181000 MOBILIZATION	LUMP	LUMP	
0260	6205101A TYPE 2 PREFORMED MARKING TAPE (GROOVED), 4 IN., WHITE	6,604.000 LF		
0270	6205120 TYPE 2 PREFORMED MARKING TAPE (GROOVED), 24 IN., WHITE	432.000 LF		

State of MISSOURI  
Dept of Transportation  
Schedule of Items

Contract ID: 161216-C04  
Letting Date: 12-16-16  
Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Ct
0280	6205130 TYPE 2 PREFORMED MARKING TAPE (GROOVED), LEFT/RIGHT ARROW	43.000 EA		
0290	6205139 TYPE 2 PREFORMED MARKING TAPE (GROOVED), 12 IN. WHITE, YIELD LINE TRIANGLES	22.000 EA		
0300	6205906A 12 IN. WHITE HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT, TYPE L BEADS	467.000 LF		
0310	6206000C 4 IN. WHITE WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS	28,487.000 LF		
0320	6206001C 4 IN. YELLOW WATERBORNE PAVEMENT MARKING PAINT, TYPE P BEADS	26,240.000 LF		
0330	6221001 COLDMILLING BITUMINOUS PAVEMENT FOR REMOVAL OF SURFACING (3 IN. THICK OR LESS)	126,876.000 SQYD		

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Cts
0340	6224010 MODIFIED COLDMILLING (DEPTH TRANSITIONS)	115.000 SQYD		
Section 0001 Total				0.00

Section 0002            Guardrail / Guard Cable Items - J4S3137

Alt Group

0350	6061060 MGS GUARDRAIL	2,978.000 LF		
0360	6063014 TYPE A CRASHWORTHY END TERMINAL (MASH)	4.000 EA		
0370	6069902 MISC. MGS TRANSITION SECTION	4.000 EA		
0380	6069902 MISC. MGS BRIDGE ANCHOR	4.000 EA		
Section 0002 Total				0.00

Section 0003            Signal Items - J4S3137

Alt Group

--	--	--	--	--

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line No.	Item Description	Approx. Quantity and Units	Unit Price Dollars   Cts	Bid Amount Dollars   Cts
0390	9020114 SIGNAL HEAD, TYPE 4T	2.000 EA		
0400	9020514 SIGNAL HEAD, TYPE 4B	6.000 EA		
0410	9024283 CONTROLLER ASSEMBLY HOUSING, NEMA TS2 CONTROLLER	2.000 EA		
0420	9028500 CABLE, LOOP DETECTOR, IN DUCT	1,190.000 LF		
	Section 0003 Total			0.00

Section 0004 Signing Items - J4S3137

Alt Group

0430	9035004A SH-FLAT SHEET	40.000 SQFT		
0440	9039902 MISC. RELOCATION OF EXISTING SIGNS	2.000 EA		
	Section 0004 Total			0.00

State of MISSOURI  
 Dept of Transportation  
 Schedule of Items

Contract ID: 161216-C04  
 Letting Date: 12-16-16  
 Project(s):

Bidder: -

Line	Item	Approx.	Unit Price		Bid Amount	
No.	Description	Quantity	-----		-----	
		and Units	Dollars	Cts	Dollars	Ct
+-----+						
	Bid Total				0.00	
+-----+						

-----

Contract Id: 161216-C04  
Vendor Name:

Vendor Number:

SUBCONTRACTOR DISCLOSURE

The bidder shall submit with this bid any subcontracts that meet the requirements of Sec 102. List below the name of each subcontractor that will be furnishing labor or labor and materials, the category of work that the subcontractor will be performing (e.g. asphalt, concrete, earthwork, bridges...), and the dollar value of the subcontract. Select "NONE" if there are no subcontractors that need to be disclosed.

If the information is not available at the time of bid the bidder shall submit the "Subcontractor Disclosure Form", located on MoDOT's website, on or before 4:00 p.m. of the third business day after the bid opening date, directly to the Design Division, Missouri Department of Transportation, 105 W. Capitol Avenue, P.O. Box 270, Jefferson City, Missouri 65102-0270. Telefax transmittal to MoDOT will be permitted at fax no. 573-522-2281 or e-mailed to subcontractor.disclosure@modot.mo.gov. The complete signed original documents do not need to be mailed to MoDOT, but the bidder shall have it available if requested by the Design Division or the engineer.

SUBCONTRACTOR NAME	DOLLAR VALUE OF SUBCONTRACT	CATEGORY OF WORK
--------------------	--------------------------------	------------------

---

BID BOND

KNOW ALL PERSONS BY THESE PRESENTS, that we as principal and and as surety, are held and firmly bound unto the state of Missouri (acting by and through the Missouri Highways and Transportation Commission) in the penal sum of 0.00 Dollars to be paid to the commission to be credited to the state road fund, the principal and surety binding themselves, their heirs, executors, administrators, successors, and assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this.

THE CONDITION OF THIS OBLIGATION is such that WHEREAS the principal is submitting herewith a bid to the commission on

route(s)  
in County(ies)  
project(s)

for construction or improvement of state highway as set out in said bid;

NOW THEREFORE, if the commission shall accept the bid of the principal and if the principal shall properly execute and deliver to the commission the contract, contract bond, and evidence of insurance coverage in compliance with the requirements of the bid, the specifications, and the provisions of section 227.100 RSMo, to the satisfaction of the commission, then this obligation shall be void and of no effect, otherwise to remain in full force and effect.

In the event the said principal shall, in the judgment of the commission, fail to comply with any requirement as set forth in the preceding paragraph, then the state of Missouri, acting by and through the commission, shall immediately and forthwith be entitled to recover the full penal sum above set out, together with court costs, attorney's fees, and any other expense of recovery.

The principal and surety hereby certify that the document is the original or a verbatim copy of the bid bond form furnished by the Commission, in accordance with Sec 102.9 of the Missouri Standard Specifications for Highway Construction.

-----

This Bid contains 0 amendment files

-----

Job No. J4S3137  
 Route: 1  
 County: Clay

**JOB SPECIAL PROVISIONS TABLE OF CONTENTS (ROADWAY)**

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

- A. General
- B. Contract Liquidated Damages
- C. Work Zone Traffic Management Plan (WZTMP)
- D. Emergency Provisions and Incident Management
- E. Project Contact for Contract/Bidder Questions
- F. Supplemental Revisions
- G. Contractor Retained Guardrail
- H. Coldmilling Requirements
- I. Contractor Quality Control and Daily Reporting
- J. Disposition of Existing Signs
- K. Pavement Marking Log
- L. E-Construction
- M. Stormwater Compliance Requirements
- N. Relocation of Existing Sign Assemblies
- O. Traffic Signal Controller
- P. NEMA TS2 Traffic Controller Assemblies

**ADDITIONAL INFORMATION**

D-15 Equipment and Materials List

 <p>THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.</p>	<p><b>MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION</b>          105 W. CAPITOL AVE.          JEFFERSON CITY, MO 65102          Phone 1-888-275-6636</p>
	<p>If a seal is present on this sheet, JSP's have been electronically sealed and dated.</p>
	<p>JOB NUMBER: J4S3137          CLAY COUNTY, MO          DATE PREPARED: 09/21/16</p>
	<p>ADDENDUM DATE:</p>
<p>Only the following items of the Job Special Provisions (Roadway) are authenticated by this seal: A – P</p>	



A. GENERAL - FEDERAL JSP-09-02B

**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](http://www.modot.org) under "Bidding". 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](http://www.modot.org) under "Business"; "Standards and Specifications". The effective version shall be determined by the letting date of the project.

General Provisions & Supplemental Specifications

Supplemental Plans to October 2016 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

**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 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.

Job No. J4S3137  
Route: 1  
County: Clay

Notice to Proceed: March 10, 2017  
Completion Date: October 1, 2017

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

<b>Job Number</b>	<b>Calendar Days</b>	<b>Daily Road User Cost</b>
J4S3137	90	\$3,200

**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 **\$500** 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. WORK ZONE TRAFFIC MANAGEMENT PLAN (WZTMP) JSP-02-06D

**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. Any change in personnel for the WZS shall be submitted in written form to the engineer. This individual will be a trained Work Zone Specialist in accordance with Standard Specifications Section 616.3.3 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 engineer. The WZS shall maintain daily contact with the engineer either on-site or via telecommunication.

**1.2 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 a designated MoDOT employee (identified at the preconstruction meeting) 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. The WZS shall have personnel reviewing traffic control devices daily and any temporary lane drop traffic control devices for initial set up and during the operation. 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 these project 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.

**1.3 Work Zone Conflict Resolution.** Any conflict resolution shall be in accordance with Standard Specifications Section 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 if 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.

**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 **15 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.

### **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 six 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  
Independence Day  
Labor Day  
Thanksgiving  
Christmas  
New Year's Day

**3.2** The contractor shall not perform any construction operation on the active lanes, during restricted periods, holiday periods or other special events specified in the contract documents.

**3.3** The contractor shall be aware that traffic volume data indicates construction operations on the roadbed between the following hours will likely result in traffic queues greater than 15 minutes. Based on this, the contractors 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 above work hours may be modified. Working hours for evenings, weekends and holidays will be determined by the engineer.

Route 1 NB and SB from 73<sup>rd</sup> Terr to Route 152 - No Restrictions

Route 1 from 64<sup>th</sup> St to 73<sup>rd</sup> Terr  
Northbound from 12:00 noon to 6:00 p.m. Monday - Friday

Southbound from 7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m. Monday - Friday

**3.4** Any work requiring a reduction in the number of through lanes of traffic shall be completed during nighttime hours. Nighttime hours shall be considered to be 8:00 p.m. to 5:00 a.m. for this project. Ramps can be closed for nighttime operations as approved by the engineer.

**3.5** 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 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 **\$1,000.00 per 15 minute increment** for each 15 minutes that the temporary lane 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.

**3.5.1** 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, as amended elsewhere in this contract.

#### **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, including side streets, 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 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. All authorized changes in the traffic control plan shall be provided for as specified in Standard Specifications Section 616.

Job No. J4S3137  
Route: 1  
County: Clay

**D. EMERGENCY PROVISIONS AND INCIDENT MANAGEMENT**

**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 (816-622-0800)	
City of Kansas City	City of Gladstone
Fire: 816-784-9200	Fire: 816-454-8310
Police: 816-234-5111	Police: 816-436-3550

**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.

**E. PROJECT CONTACT FOR CONTRACTOR/BIDDER QUESTIONS**

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

Deborah Huffman, Project Contact  
KC District  
600 NE Colbern Rd  
Lee's Summit, MO 64086  
Telephone Number: 816-607-2244  
Email: [deborah.huffman@modot.mo.gov](mailto:deborah.huffman@modot.mo.gov)

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

F. **SUPPLEMENTAL REVISIONS JSP-09-01U**

***Insert Sec 109.15, Sec 109.16 and Sec 109.17, subsequent section renumbered accordingly:***

**109.15 Seal Coat Price Index.** Adjustments will be made to the payments due the contractor for Seal Coat placed in accordance with Sec 409 of the Standard Specifications. Adjustments will be calculated in accordance with Asphalt Cement Price Index of the General Provisions, except as defined herein.

**109.15.1 Basis of Payment.** To determine the adjustment for any material specified in this provision the following formula will be used.

$$A = B \times (0.68 \times 8.58/2000) \times (D - E)$$

Where: A = adjustment for Seal Coat placed during the index period  
B = gallons of seal coat placed during the index period  
D = average index price at the beginning of the period  
E = average index price at the time of bid  
0.68 = factor to reduce volume of emulsion to AC only  
(use average specific gravity of 1.03 for seal coat)

**109.15.2 Optional.** This provision is optional. If the bidder wishes to be bound by this provision, the bidder shall execute the acceptance form in the Bid for the Asphalt Cement Price Index. Acceptance of this provision will apply to both the Asphalt Cement Price Index and Seal Coat Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election to not participate in the Asphalt Cement Price Index or Seal Coat Price Index.

**109.16 Asphalt Underseal Price Index.** Adjustments will be made to the payments due the contractor for Asphalt underseal placed in accordance with Sec 625 of the Standard Specifications. Adjustments will be calculated in accordance with Asphalt Cement Price Index of the General Provisions, except as defined herein.

**109.16.1 Basis of Payment.** To determine the adjustment for any material specified in this provision the following formula will be used.

$$A = B \times (8.66/2000) \times (D - E)$$

Where: A = adjustment for asphalt underseal placed during the index period  
B = gallons of asphalt underseal placed during the index period  
D = average index price at the beginning of the period  
E = average index price at the time of bid  
(use average specific gravity of 1.04 for underseal)

**109.16.2 Optional.** This provision is optional. If the bidder wishes to be bound by this provision, the bidder shall execute the acceptance form in the Bid for the Seal Coat Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election to not participate in the Seal Coat Price Index.

**109.17 Polymer Modified Emulsion Membrane Price Index.** Adjustments will be made to the payments due the contractor for Polymer Modified Emulsion Membrane placed in accordance with Sec 413.30. Adjustment will be calculated in accordance with the Supplemental Asphalt Price Adjustment except as defined herein.

**109.17.1 Basis of Payment.** To determine the adjustment for any material specified in this provision the following formula will be used.

$$A=B \times (0.9/2000) \times (D - E)$$

Where: A = adjustment for membrane placed during the index period  
B = square yards of membrane placed during the index period  
D = average index price at the beginning of the period  
E = average index price at time of bid

**109.17.2 Optional.** This provision is optional. If the bidder wishes to be bound by the provision, the bidder shall execute the acceptance form in the Bid for Polymer Modified Emulsion Membrane Price Index. Failure by the bidder to execute the acceptance form will be interpreted to mean election not to participate in the Polymer Modified Emulsion Membrane Price Index.

**Delete Sec 403.2.5.2 and substitute the following:**

**403.2.5.2 Fibers.** A fiber additive shall be used as a stabilizer in SMA Mixtures. Fibers shall be uniformly distributed by the end of the plant mixing process. The dosage rate for fibers shall be no less than 0.3 percent by weight of the total mixture for cellulose and no less than 0.4 percent by weight for mineral fibers.

**Delete Sec 407 in its entirety and substitute the following:**

**407.1 Description.** This work shall consist of preparing and treating an existing bituminous or concrete surface with bituminous material, in accordance with these specifications.

**407.2 Material.** All material shall be in accordance with Division 1000, Material Details, and specifically as follows:

Item	Section
Emulsified Asphalt or PG Liquid Asphalt	1015

**407.3 Equipment.** The contractor shall provide a system for heating and applying the bituminous material. The system shall be designed, equipped, maintained and operated such that emulsified asphalt or liquid asphalt, at even heat, may be applied uniformly on variable widths of surface up to 15 feet with uniform pressure and an allowable variation from any specified rate of ±0.01 gallon per square yard. The system shall include a calibrated tank and a thermometer for measuring temperature of tank contents. The system shall be equipped with instrumentation that continuously verifies application

rates. The calibration of the system shall be approved by the engineer prior to use, and the contractor shall furnish all equipment, material and assistance if calibration is required.

**407.4 Construction Requirements.**

**407.4.1 Preparation of Surface.** The existing surface shall be free of all dust, loose material, grease or other foreign material at the time the tack is applied. Any excess bituminous surface mixture or bituminous joint material will be removed by MoDOT without cost to the contractor before the tack is applied.

**407.4.2 Application.** Asphalt emulsion or PG liquid asphalt shall be applied uniformly with a pressure distributor at the minimum rates indicated in the following table. No dilution of the emulsified asphalt material shall be allowed. The tack coat material shall be heated at the time of application to a temperature in accordance with Sec 1015. The tack coat shall be properly cured and the tacked surface shall be clean of all dirt before the next course is placed.

<b>Tack Coat Application Rates</b>	
<b>Surface Type</b>	<b>Minimum Application Rate (Gal. per sq. yd.)</b>
New Asphalt Pavement	0.05
Existing Asphalt or Concrete Pavement	0.08

**407.4.3 Tack.** The tack coat shall be applied in such a manner as to cause the least inconvenience to traffic and to permit one-way traffic without tracking of asphalt emulsion. All exposed tack coat shall be covered with bituminous mixture prior to opening to traffic.

**407.5 Method of Measurement.** Measurement of asphalt emulsion to the nearest 10 gallons will be made in accordance with Sec 1015.

**407.6 Basis of Payment.** The accepted quantity of tack coat will be paid for at the contract unit price.

***Amend Sec 620.10.3.1.1.1, and 620.10.3.1.1.2 to include the following:***

**620.10.3.1.1.1 Type 1 Preformed Marking Tape in Lieu of Type 2.** Type 1 Preformed Pavement Marking Tape will be allowed in lieu of Type 2 Preformed Marking Tape (Grooved) at no additional cost to the Commission. This work shall be in accordance with Sec 620 and accompanying provisions except as modified herein.

**620.10.3.1.1.2 Construction Requirements.** Grooving will not be required when Type 1 Preformed Marking Tape is used.

***Delete Sec 606.30.4 & 606.30.5 and substitute the following:***

**606.30.4 Method of Measurement.** Measurement for crashworthy end terminals will be made for each unit assembled, installed and complete in place. Grading for crashworthy end terminals will be measured in accordance with [Sec 203](#) when roadway and drainage excavation is included in the

contract, otherwise grading will be measured in accordance with Shaping Slopes, Class III or as directed on plans.

**606.30.5 Basis of Payment.** The accepted quantities of Type A, B C, D and E crashworthy end terminals, complete in place, will be paid for at the contract unit price. Payment will be considered full compensation for complete installation including any backup assemblies or other items necessary for proper installation of the end terminal or crash cushion as required. Grading for end terminals will be paid for at the contract unit price for roadway and drainage excavation if included in the contract; otherwise it will be paid for as Shaping Slopes, Class III. If the contractor elects to use a flared Type A crashworthy end terminal, additional embankment as shown on the plans shall be provided at the contractor's expense.

***Insert Sec 620.80 by to including the following:***

### **SECTION 620.80 CONTRAST PAVEMENT MARKINGS**

**620.80.1 Description.** This work shall consist of furnishing and installing black contrasting pavement marking for intermittent markings (skips), dotted lines and solid intersection lane lines on new, and newly ground concrete surfaces. This work shall be in accordance with Sec 620 and accompanying provisions except as modified herein

**620.80.2 Material.** The black contrast marking shall be compatible with the white pavement marking material specified in the plans.

#### **620.80.3 Construction Requirements.**

**620.80.3.1** The Contrast markings shall be accomplished by placing the black pavement marking according to manufacturer's recommendations.

**620.80.3.2** The white marking shall be centered within the black marking such that there will be a 1.5 inch border of black on both sides of the white marking. Tolerances for the width and length of the black and white markings shall be in accordance with Sec 620.2.4.2.

**620.80.4 Basis of Payment.** There will be no direct payment for compliance with the requirements of this provision.

***Delete Sec 1048.10.1.1 and substitute the following:***

**1048.10.1.1 Application.** Application shall be in accordance with the manufacturer's recommendations.

#### **G. CONTRACTOR RETAINED GUARDRAIL JSP-04-11**

**1.0 Description.** All guardrail removed from this project shall become the property of the Contractor and shall be disposed of in accordance with Sec 202.

**2.0 Basis of Payment.** All costs incurred for complying with this provision shall be considered completely covered by the contract unit price for Item No. 202-20.10, Removal of Improvements.

H. COLDMILLING REQUIREMENTS JSP-04-16

**1.0 Description.** The contractor will only be allowed to coldmill an area in which the first lift of bituminous material can be constructed in the same day's operation.

**1.1** Coldmilled areas that are exempt from the above requirement include typical transverse joint transitions for project beginning, end, ramp or bridge transitions and but joints for overlays at entrances and approaches.

**1.2** All exempt coldmilled areas shall have a temporary header installed and maintained until the first lift of bituminous material can be constructed.

**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.

I. CONTRACTOR QUALITY CONTROL AND DAILY REPORTING

**1.0** The contractor shall perform Quality Control (QC) testing and reporting 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](http://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.

**3.3 Contractor Daily Work Reporting.** The contractor shall submit to the engineer a Contractor Daily Work Report (CDWR) for each calendar day that work is performed. The CDWR shall include all information listed in 3.3.2.

**3.3.1** The CDWR information may be provided on the MoDOT-provided form or an approved contractor form. Each CDWR shall be digitally signed by the contractor and uploaded to the MoDOT SharePoint® site no later than two (2) business days following the end of each week.

**3.3.2** CDWR information:

- (a) Date and Contract Identification Number
- (b) Weather conditions, rainfall amounts, high/low ambient temperatures
- (c) List of subcontractors who performed work
- (d) Description of all work performed, including general location (ex. Sta, offset, log mile, etc.), and any testing performed.
- (e) Date range of days when no work was performed since the previous DWR
- (f) Pertinent traffic control information (changes, delays, accidents, etc.)
- (g) Statement: "All items installed meet or exceed contract requirements."

#### **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. Discussion topics should include: safety precautions, QC testing, traffic impacts, and any required Hold Points.

**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.

## J. DISPOSITION OF EXISTING SIGNS

**1.0 Signs to be removed and relocated.** The Contractor will be responsible for the removal and storage of any existing signs that are to be relocated whether they are ground mounted or overhead. If any signs are damaged during removal or damaged during storage due to the Contractor's negligence, he shall be responsible for replacing them at no additional cost to the Commission.

**2.0 Signs to be salvaged.** The Contractor will be required to remove State owned sign faces and/or posts identified on the plans. All State owned sign faces and/or posts that are removed as part of this

Job No. J4S3137  
Route: 1  
County: Clay

project that are considered salvageable by the Engineer shall be taken to MoDOT's Sign Shop located at 3050 NE Independence Avenue, Lee's Summit, Missouri 64064.

The Contractor shall notify the sign shop 24 hours before deliveries are made. The phone number the contractor needs to call to notify the Sign Shop is 816-622-0505.

**2.1** Sign faces shall be broken down into no larger than 8-foot by variable length sections. Signs shall be stacked neatly in bins provided by MoDOT's Sign Shop, under the supervision of MoDOT personnel, during normal working hours. All other signs shall be removed and disposed of by the Contractor.

**3.0 Payment.** All costs incurred for complying with this provision shall be considered completely covered by the contract unit price for Item No. 202-20.10, Removal of Improvements.

K. PAVEMENT MARKING LOG

**1.0 Description.** The contractor shall log the locations of existing pavement marking prior to any construction operations that may affect the existing pavement marking. The log shall contain all existing pavement marking and shall include center stripes, no passing stripes, lane lines, turn arrows, hash bars, cross walks, and stop bars. The contractor shall provide a copy of the existing pavement marking log to the engineer. The contractor shall place the new pavement marking at the same locations as the existing pavement marking, unless otherwise directed by the engineer or shown on the plans.

**1.0 Basis of Payment.** No direct payment will be made for logging of existing pavement marking.

L. E-CONSTRUCTION NJSP-15-36

**1.0 Description.** e-Construction is a paperless construction administration delivery process that includes electronic submission of construction documents, approval of documents with digital signatures, and communication between stakeholders by mobile devices. e-Construction saves both time and money for all stakeholders involved, simplifies document storage, and eliminates waste of paper and other resources. This provision does not apply to the contract or other contract execution documents.

**2.0 Document Submittals.**

**2.1** The contractor shall submit all required documents to MoDOT electronically, except as described in section 2.2 of this provision. Documents to be submitted electronically include, but are not limited to, Change Orders, Request to Subcontract Work (C-220), Project Payrolls, Progress Schedules, Value Engineering proposals, Safety Plans, Quality Plans, Pre-Construction conference submittals, etc. All documents shall be submitted in standard pdf format, except when otherwise directed by the engineer.

**2.2** The Affidavit for Compliance with the Prevailing Wage Law and the Contractor's Affidavit Regarding Settlement of Claims (Form C-242) require a notarization and therefore, by law, must be

submitted on paper.

**2.3** The engineer will submit project documents to the contractor via email or through other secure file sharing sites, except that the Contractor Performance Questionnaire will be submitted by certified mail.

**2.4** Documents that require multiple signatures, such as change orders, must include all required signatures on the original electronic document, without scanning.

**2.5** Project Payrolls from subcontractors shall be digitally signed by the subcontractor. Payrolls shall be submitted as separate files per contractor per pay period.

### **3.0 Digital Signature.**

**3.1** All electronic documents that require signature, such as those listed in section 2.1, must be signed electronically. Scanning an ink-signed document is not considered a valid digital signature.

**3.2** All users who are authorized to sign documents for the contractor shall submit their Digital Signature Certificate (Public Key .fdf file) to the Division of Construction prior to signing any documents. This file is used to validate the user's signature on documents. An authorization letter is also required for each person authorized to sign documents. A Digital Signature for Contractors Quick Reference Guide (QRG) is available on MoDOT's Engineering Policy Guide at <http://epg.modot.mo.gov/> (click on QRG in the left hand column).

**4.0 Communication.** The contractor shall be able to communicate and exchange information with MoDOT staff by email and mobile phone.

**5.0 Basis of Payment.** No payment will be made for compliance with this provision.

## **M. STORMWATER COMPLIANCE REQUIREMENTS NJSP-15-38**

**1.0** The land disturbance necessary to complete this project is not anticipated to exceed one (1) acre. Should the contractor disturb more than one (1) acre to complete the work, or for any other reason, all terms of this Job Special Provision will apply.

**1.1 Description.** The Contractor shall comply with the terms of the United States of America v. Missouri Highways and Transportation Commission Consent Decree (Consent Decree) that are identified as the responsibility of the Contractor or subcontractor, and with the terms of this provision. Viewing of the Consent Decree is available on the MoDOT Land Disturbance webpage under Contractor Resources, or by going to the web address [www.modot.org/LD](http://www.modot.org/LD).

**1.2 Applicability.** The Consent Decree and this provision apply to any project that includes land disturbance of areas totaling greater than one (1) acre on the project site. The project site consists of all areas designated on the plans, including temporary and permanent easements. The Consent Decree and this provision do 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 Stormwater Training for Contractor Employees.** The Contractor's on-site project manager, designated Water Pollution Control Manager (WPCM), as defined in Section 3.0, and WPCM delegate, shall complete MoDOT Stormwater Training prior to serving in those roles. If someone other than the Contractor's project manager is given the authority to manage the grading or erosion control operations, the project manager(s) for those operations shall also complete MoDOT Stormwater Training. MoDOT Stormwater Training is also required for any other person who the Contractor gives authority to take measures to prevent or minimize the consequences of non-compliance with the Stormwater requirements, as defined in Section 3.1(a) of this provision.

**2.1** The Commission will provide MoDOT Stormwater Training to the Contractor employees specified in Section 2.0 at a location and time determined by MoDOT. There will be no fee for attending the training; however, the Contractor shall be responsible for all other cost related to the training, such as travel expenses, if necessary, and wages for its employees. The time to complete the training is anticipated to be no more than 6 hours. As long as the Consent Decree is in effect, MoDOT will provide periodic trainings at various locations around the state, as needed, to ensure contractors and bidders have the opportunity to maintain the number of WPCMs they need to comply with this provision.

**2.2** Those who require MoDOT Stormwater Training per Section 2.0 shall complete the training prior to beginning any land disturbance work. Thereafter, training shall occur at least once every two (2) years. The training is not project-specific. Any Contractor employee who receives the training will be qualified to perform the WPCM duties on any MoDOT project for a period of two (2) years.

**2.3** MoDOT will document the names and dates that contractor employees attend MoDOT Stormwater Training and will retain those records for the period of time specified in the Consent Decree. Duplicate record keeping by the contractor is not required.

**3.0 Water Pollution Control Manager (WPCM).** Prior to the Pre-Activity meeting for Grading/ Land Disturbance, the Contractor shall designate a Water Pollution Control Manager (WPCM) to fulfill the duties and responsibilities listed in Section 3.1 until final stabilization occurs. The Contractor's on-site project manager may also serve as the WPCM or that role may be assigned to another manager employed by the contractor or a subcontractor. The Contractor shall also maintain a WPCM delegate to temporarily fulfill the WPCM duties in the absence of the primary WPCM (e.g. illness, vacation, other leave).

### **3.1 Duties of the WPCM:**

- (a) Be familiar with Stormwater Requirements including the National Pollutant Discharge Elimination System (NPDES), the current MoDOT State Operating Permit for construction stormwater discharges/ land disturbance activities, the Project-specific Stormwater Pollution Prevention Plan (Project SWPPP), the Corps of Engineers Section 404 Permit, when applicable, the Consent Decree, and this provision. The Project SWPPP includes: a title page with project-specific information, the general SWPPP posted on the MoDOT land disturbance

website, the Project Erosion & Sediment Control Plan, all applicable special provisions, and all applicable specifications and standard drawings;

- (b) Complete the stormwater training set forth in Section 2.0;
- (c) Attend the Pre-Activity for Grading/ Land Disturbance Meeting or, if hired after the meeting has occurred, be familiar with the conference decisions;
- (d) Review and sign the Project-specific SWPPP and all updates thereto within time periods set out in the Consent Decree;
- (e) Visit and review the project site for compliance with Stormwater Requirements at least once per week from the start of any grading operations until final stabilization is achieved and permit is closed;
- (f) Be authorized by the Contractor to supervise all work performed by the Contractor and subcontractors that involves compliance with Stormwater Requirements, including the authority to order work be stopped on a Project, implement MoDOT-directed changes in work related to Stormwater Requirements, and order the taking of, measures to cease, correct, prevent, or minimize the consequences of non-compliance with Stormwater Requirements;
- (g) Review and certify electronically each MoDOT inspection report for the Project within three (3) days of receiving each report to ensure it conforms with report requirements in the National Pollution Discharge Elimination System Stormwater (NPDES SW) Permit, Project SWPPP and the Consent Decree and ensure that all Stormwater Deficiencies noted on the report are corrected within the time required;
- (h) Recommend in writing within three (3) days of discovering any changes in site conditions and Best Management Practices (BMPs) that require an update to the Project-specific SWPPP; and
- (i) Be the point of contact relating to Stormwater Requirements and the Consent Decree between the Contractor, Subcontractors and MoDOT.

**4.0 Pre-Activity Meeting for Grading/Land Disturbance and Required Hold Point.** At each Project, a Pre-Activity Meeting for Grading/Land Disturbance shall be held prior to the start of any land disturbance and shall include a physical visit and review of the project site. 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.

**4.1** Contractor employees who shall attend the Pre-Activity Meeting for Grading/Land Disturbance include the WPCM for the Project and the person(s) designated the authority to manage the grading and erosion control operations.

**4.2** 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.

**5.0 Compliance with the NPDES SW Permit and Project SWPPP.** On all projects, the Contractor shall comply with all applicable Stormwater Requirements which are defined as, but are not limited to:

- (a) Consulting with the engineer on recommended design revisions to the Project SWPPP to accommodate the Contractor's staging plan, implementation, managing, and maintaining BMPs or other control measures to prevent or minimize sediment and other pollutants in stormwater runoff in accordance with contract specifications or any relevant manufacturer specifications and good engineering practices, including but not limited to the manuals (*Note: two manuals cited in the MoDOT permit are "Developing your stormwater pollution prevention plan: A guide for construction activities" and "Protecting Water Quality: A Field Guide to erosion, sediment and stormwater best management practices for development sites in Missouri"*) and any other applicable standards for sedimentation basins, stabilization, rock dams, brush checks, construction entrances, and other BMPs;
- (b) Installing all BMPs at the locations and relative times specified in the Project SWPPP; and
- (c) Complying with the Missouri Water Quality Standards and with effluent limitations in Section E.1 of the NPDES SW Permit. Measurement of effluent is not required except as specified in E.2.

**5.1 Stormwater Deficiency Corrections.** Per terms of the Consent Decree, Stormwater Deficiencies identified on the MoDOT Land Disturbance Inspection Report shall be corrected within 7 days of the inspection date to avoid stipulated penalties, except that more time might be 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.

**6.0 Inspection Protocol.** The Contractor and all subcontractors shall review and adhere to MoDOT's written Stormwater Inspection Protocol, found on the MoDOT Land Disturbance webpage ([www.modot.org/LD](http://www.modot.org/LD)). The Inspection Protocol is applicable to all Projects under the consent decree. The MoDOT Resident Engineer will serve the role of Stormwater Resident Engineer, or a delegate will be named in their absence.

**6.1 Inspection Reports.** MoDOT will provide one or more Environmental Construction Inspectors (ECI) to perform the weekly and post run-off inspections and other duties described in paragraph 17 of the Consent Decree. The ECI will enter the inspection reports into a web-based Stormwater Compliance database. The WPCM will have access to this database to view all report information, including any noted deficiencies, and to certify the report as required in Section 3.1 (g.). Automated

email reminders of pending reports that need to be certified and for deficiencies that need to be corrected will be sent to the WPCM. The Contractor may designate other employees or subcontractor employees to have viewing access to this database and to receive the email reminders. Completion of MoDOT Stormwater Training is necessary in order to receive the email reminders. The WPCM and other users shall be equipped with an electronic device (desktop computer, laptop, tablet, smartphone, etc.) with a browser and internet access to connect to the database. The contractor shall be responsible for providing the electronic devices.

**7.0 Stipulated Penalties.** If the Contractor fails to comply fully and timely with the requirements of the Consent Decree, stipulated penalties will be assessed to the Commission. For matters under the Contractor’s responsibility and control the following stipulated penalties will be assessed to the Contractor and MoDOT will withhold payment pursuant to the following:

Violation	Stipulated Penalty Amount
Failure to Designate or Maintain WPCM at each Project in Accordance with Section 3.0.	\$750 for the initial violation (each person not designated) and then \$750 for each fourteen (14) day period that person is not designated.
Failure to complete MoDOT Stormwater Training by an Individual Required to be Trained in Accordance with Section 2.0, such as the WPCM or Project Manager.	\$750 per person for each missed training. This \$750.00 per person violation shall continue to accrue for each fourteen (14) day period that the person fails to timely receive the applicable training
Failure of WPCM to Review and Certify an Inspection Report in Accordance with Inspection Protocol as set forth in Section 6.	\$250 per inspection report not reviewed or signed.
Failure to Comply with Any NPDES SW Permit or SWPPP Requirement.	\$1000 per violation for the first ten (10) days of the violation; \$2500 per violation for days 11-20; \$3500 per violation for days 21 and beyond.
Failure to Correct a Stormwater Deficiency Identified in a MoDOT Inspection Report, or Otherwise Discovered by the WPCM, within the Time Required by the NPDES SW Permit or SWPPP.	\$1000 per deficiency for the first ten (10) days after correction was required; \$2500 per deficiency for days 11-20 after correction was required; \$3500 per deficiency for days 21 and beyond after correction was required.

**8.0 Information Collection and Retention.** The EPA, its representatives and its agents shall have the right of entry into any facility covered by this Consent Decree, at all reasonable times, upon presentation of credential, to:

- (a) monitor the progress of activities required under the Consent Decree;
- (b) verify any data or information submitted to the United States in accordance with the terms of the Consent Decree;
- (c) obtain samples and, upon request, splits of any samples taken by MoDOT or its representatives, contractors, or consultants;

(d) obtain documentary evidence, including photographs and similar data; and

(e) assess MoDOT's compliance with the Consent Decree.

**8.1** Until three (3) years after the termination of the Consent Decree, Contractors and the agents of the Contractors shall preserve all non-identical copies of all documents, records, or other information (including documents, records, or other information in electronic form) in its or its Contractors' or agents' possession or control, or that come into the Contractor's or agent's possession or control, and that relate to MoDOT's performance of its obligations under the Consent Decree or to the Contractor's performance of its obligations under the Consent Decree. This information-retention requirement shall apply regardless of any contrary corporate or institutional policies or procedures.

**9.0 Basis of Payment.** Should the contractor disturb more than one (1) acre due to its method of operations, or for any other reason, no direct payment will be made for compliance with this provision, including the cost to provide a WPCM. Should the engineer direct the contractor to exceed one (1) acre of land disturbance, payment will be made only for the actual cost of the weekly duties of the WPCM. Separate payment will be made for erosion and sediment control devices, and for permanent and temporary seeding and mulching, when payment for those items are provided elsewhere in the contract.

#### N. RELOCATION OF EXISTING SIGN ASSEMBLIES

**1.0 Description.** This work consists of removing and relocating existing sign assemblies impacted by construction.

**1.1** This provision is in addition to the requirements of the temporary relocation of existing signs and markers under Section 104.10.2 Signs and Markers.

**2.0 Storage and Maintenance.** The existing sign assemblies, posts and hardware that are to be relocated shall be maintained in accordance with Section 104.10.2, as shown on the plans or as directed by the engineer and it shall be the responsibility of the contractor to properly store and maintain them in good condition until it is time to re-install the signs.

**2.2** The contractor shall exercise reasonable care in handling the sign assemblies and materials during removal and transportation. Should any of the signs be damaged by the contractor's negligence, they shall be replaced at the contractor's expense.

**2.3** The contractor shall reinstall existing sign assemblies after the work is completed in the area that relocation is required. Sign assemblies to be reinstalled shall match their existing location or be relocated as shown in the plans or as directed by the engineer. Relocated sign assemblies shall be reinstalled, on new posts, with a new post base and breakaway assembly, in accordance with section 903.

**3.0 Basis of Payment.** Payment will be made at the contract unit price for bid item number 903-99.02,

Relocation of Existing Sign Assemblies, per each. Payment shall constitute full compensation for all labor, materials and equipment necessary to complete this item of work. No direct payment shall be made for new posts, post bases, backing bars, breakaway assemblies, movable supports, frames, temporary sign supports, transportation or storage for relocation of existing sign assemblies.

O. TRAFFIC SIGNAL CONTROLLER

The Kansas City District is developing a plan to update all signal controllers in the district to utilize TranSuite.

All traffic signal controllers purchased and installed on this project shall be selected from the list below and match the cabinet type indicated on the D-37C sheet for each intersection(s). These are the only controllers that are fully functional with the version of TranSuite that the Kansas City district is currently operating.

<b>Firmware Type</b>	<b>Firmware Supported</b>	<b>Cabinet Type</b>
Eagle SEPAC	4.01 or 4.06	NEMA & 2070
Econolite ASC/2 1A	1.12	NEMA
Econolite ASC/2 2070	1, 1B, 1Ba, 1Ba rev G, 1Ba 1.03	2070
Econolite ASC/3	2.49, 2.50 or 2.55	NEMA
Econolite ASC/3 2070	22.49, 22.50 or 22.55	2070
Wapiti W4IKS	rev 38	170
Wapiti W4IKS	rev 60	170

P. NEMA TS2 TRAFFIC CONTROLLER ASSEMBLIES JSP-00-04A

**1.0 Description.** This work shall consist of furnishing and installing a NEMA TS2 traffic controller assembly at the location shown on the plans.

**2.0 Training.** MoDOT may require training on the maintenance and operation of NEMA TS2 controller assemblies. Maintenance and operation personnel shall be trained on programming, troubleshooting, maintenance and repair of controllers and all serviceable equipment. Training shall include field level troubleshooting and bench repair. This training shall be for a minimum of sixteen hours over two days. Training shall be conducted at a time and location mutually agreeable by the contractor and the engineer.

**3.0 Equipment.** Delete Secs 902.11, 1092.4.3 and 902.13 in their entirety and substitute the following:

**902.11 Traffic Controller Assemblies.** Traffic controller assemblies are defined as the complete assembly of all required equipment and components for control of traffic signal indications. Traffic controller assemblies shall conform to the requirements of the latest revision of NEMA Standards Publications No. TS 2, hereafter called NEMA. Each assembly shall consist

of a controller cabinet, controller unit, back panel, malfunction management unit, all required wiring, switches and connectors and all other equipment as defined in these specifications and as shown on the plans. Double controller assemblies to control two intersections shall consist of a controller cabinet, two controller units, two back panels, two malfunction management units all required wiring, switches and connectors and all other equipment as defined in these specifications and as shown on the plans.

### **902.11.1 General.**

**902.11.1.1 Voltage and Temperature Variations.** Variations in the voltage of the power supply from 89 to 135 volts or sustained temperatures inside the cabinet between -30 F(-34 C) and +165 F (+74 C) shall not change the timing of any functions or cause electrical or mechanical damage. Heater elements shall not be used to attain compliance with these requirements.

**902.11.1.2 Fuse Protection.** All controllers and other specified auxiliary equipment shall be properly protected with fuses on each applicable unit. Fuses shall be installed in 1/4 twist or screw-in type fuse holders or shall be automotive blade-type fuses. Pop-out fuse holders shall not be used. There shall be no exposed high voltage contacts on the outside of any unit.

**902.11.1.3 Manuals and Wiring Diagrams.** Three instruction manuals covering all operational and maintenance information shall be furnished with each controller unit, on-street system master, malfunction management unit, for each type of detector, and any other auxiliary unit(s) provided as specified. Four complete cabinet wiring diagrams shall be provided with each controller assembly. The cabinet wiring diagrams shall include labeling for all field terminal connections and shall provide an orientation of the terminal layout that conforms to the intersection information specified.

**902.11.1.4 Warranty.** All controller units, on-street system masters units, malfunction management units, terminals and facilities, detectors and any other auxiliary unit(s) provided as specified shall be warranted by the manufacturer to be free from defects in workmanship and material for at least one year from the date of project acceptance. Any components found to be defective during the warranty period shall be replaced free of charge. All warranties provided shall be transferred to the Commission upon project acceptance. No direct payment will be made for warranties.

**902.11.2 Controller Units (CU).** This section supplements NEMA in describing the general specifications for actuated solid state controller units. If requested by the engineer, the contractor shall provide a prototype controller for testing and evaluation.

#### **902.11.2.1 CU Configuration.**

(a) CUs shall be NEMA Actuated Type 2 with the following connectors:

- Port 1
- Port 2
- Port 3
- Connector A

Connector B  
Connector C

- (b) CUs shall be capable of operation of a minimum of 12 vehicle and pedestrian phases and 8 overlaps.
- (c) All phases and overlaps shall be activated or inactivated by program entry.

**902.11.2.2 Actuated Coordination.** Actuated coordination shall conform to NEMA and the following:

- (a) Signal phases controlling the movements on which signal progression is desired (coordinated phases) shall be serviced during a guaranteed period as specified by programming. While under coordination, the designated coordinated phase(s) shall be capable of releasing from a hold status and operating in the actuated mode. The CU shall operate in actuated mode from a designated hold release point to the corresponding force off point(s) of the coordinated phase(s). If the coordinated phase(s) gaps out or reaches the force off point and there is a conflicting phase with a call or recall, the CU shall terminate the coordinated phase(s) and service the next phase in the sequence with a call or recall.
- (b) For non-coordinated actuated phases, vehicle and pedestrian detectors shall remain active. The non-coordinated actuated phases may gap out prior to the force off point or shall be forced off at the force-off point and the next phase in the sequence with a call or recall shall be serviced. The coordinator shall provide selectable recall by signal plan for non-coordinated phases. The coordinator shall be capable of fixed time operation for any and all active phases by timing plan.
- (c) The coordinator shall be capable of generating individual force-off points for each available phase in each timing plan even though it may not be necessary to use all of phases. The position of the force-off points shall be settable at any percentage point or seconds in any selected timing plan. The coordinator shall be capable of placing force-off points at fixed points in the cycle or floating points as selected by programming. With floating force-offs split times govern the force-off point in each cycle regardless of the starting point of the phase.
- (d) The coordinator shall have all of the following methods of synchronizing to the master sync pulse:
  - (1) Dwell. The coordinator shall establish a new offset by stopping the cycle timer in the coordinated phase(s) green, until the new offset value is reached.
  - (2) Dwell with Interrupt. The coordinator shall establish a new offset by stopping the cycle timer in the coordinated phase(s) green. The maximum time the coordinator can dwell shall be adjustable from 1 to 99 seconds.

- (3) Short-way. The coordinator shall establish a new offset by the shortest route possible.
- (e) For hardwire systems, if the sync monitor detects a fault the controller shall revert to internal time based control unless no time based control is programmed. In that case, the CU shall revert to free mode.

**902.11.2.3 Time Base Control.** Time Base Control shall conform to NEMA and the following:

- (a) The CU shall be zero time based, settable to the second, programmable for 52 weeks, accommodate at least 3 weekly programs, 12 day programs and not less than 12 exception day programs. Total event changes shall not be less than 160. It shall be possible to interrogate the CU to determine the year, month, day, hour, minute, second, a.m. and p.m., as well as program information programmed in the unit. Indicators shall show the condition of all outputs.
- (b) The first program of the day shall be implemented at the beginning of the minute selected. When changing from one cycle length to another while in the coordination mode, the change to the new cycle length shall not occur until the present cycle length has terminated. If the controller is operated in the free mode between cycle lengths, the next cycle length programmed shall begin at the beginning of the minute selected.
- (c) The CU shall be capable of generating a daily reference point at which time all coordinated cycles are resynchronized. This daily reference point shall be either 12:00 midnight or a selectable time of which 12:00 midnight could be selected. The resynchronization reference time is an arbitrary point in time which marks the beginning of all cycles on a daily basis.
- (d) The CU shall be capable of generating an absolute reference point at which time all coordinated cycles are resynchronized. This absolute reference point shall be a selectable time by date and hour and minute which marks the beginning of all cycles.
- (e) Timing base shall be the 60 hertz power line frequency. Timing error shall not exceed plus or minus one second per month from any adjacent CU operating from the same power company substation. Timing error due to power failure or low voltage shall not exceed plus or minus 0.005 percent.

**902.11.2.4 Detector Functions.** The CU shall allow vehicle and pedestrian detector inputs to be programmed to any available phase. In addition to normal detector operation, the CU shall have the following programmable functions for vehicle detector inputs.

- (a) Call Detector. A mode of operation where the detection of a vehicle places a locking call into the assigned phase when the assigned phase is not green.
- (b) Detector Switching. Besides the normal assigned phase, the detector input can be programmed to switch to a secondary phase while the secondary phase is green and

the assigned phase is not green. In all other conditions the detector input acts as a normal detector input for the assigned phase.

- (c) Extend Function. While the assigned phase is green, each detector actuation input is extended a programmed amount of time with a range of at least 0 to 99 seconds.
- (d) Delay Function. While the assigned phase is not green each detector actuation input is delayed a programmed amount of time with a range of at least 0 to 99 seconds.

**902.11.2.5 Special Functions.** Any special functions, special sequences, or modes of operation specified in the plans or required to operate the specified signal phasing and timing shall be included in the programming capability of the CU.

**902.11.3 Malfunction Management Unit (MMU).** Each controller assembly shall contain a malfunction management unit external to the controller circuitry conforming to NEMA. When the MMU actuates flashing operation, the controller shall freeze or stop timing with the stop time switch in Normal position in the condition causing the actuation until manually reset.

**902.11.3.1** Phases or overlaps with only one signal head shall have load resistors installed across the outputs to prevent a single lamp failure from actuating the MMU.

**902.11.4 Terminals and Facilities.** All terminals and facilities in the controller assembly shall conform to NEMA TS2 Type 1 and the following requirements. For double controller assemblies, two complete sets of all terminals and facilities shall be provided with all items contained in the same compartment as the associated CU.

#### **902.11.4.1 Wiring and Terminations**

- (a) Field Wiring. Incoming field circuits shall be routed horizontally from the conduit to the back of the cabinet, then vertically to the terminal block. All field leads shall be identified by means of round aluminum identification tags with a minimum thickness of 0.1 mils (2.5 mm) attached to the cables with a copper wire to correspond with the plans. The outgoing signal circuits shall be of the same polarity as the line side of the power supply and the common return of the signal circuits shall be of the same polarity as the ground side of the power supply. The power supply shall be provided through three single conductor cables. All field conductors shall be terminated in the controller cabinet on a 600-volt heavy duty one piece mechanical screw connector offset tang assembly attached to a barrier terminal strip. Each mechanical screw connector shall accommodate up to four No. 12 AWG (2.5 mm<sup>2</sup>) conductors. Each field circuit shall be protected with a 150-volt metal oxide varistor (MOV) with an 80 Joule rating connected to cabinet ground. The MOVs shall be accessible on the front of the back panel and easily replaceable. For double controller cabinets, all wiring for each intersection shall be terminated in the same compartment of the cabinet as the signal controller for that intersection.
- (b) Back Panel Wiring. All wiring carrying 120 volts AC shall be discrete insulated wires and shall be soldered directly to lugs on the back of terminal blocks or sockets. All

discrete wiring on the back side of the back panel shall be neatly bundled and secured with plastic cable ties.

- (c) Any multi-conductor cable shall be contained in an expandable braided sleeve.
- (d) Input/output terminals shall be configured according to the following NEMA configurations:

<u>Specified Operation</u>	<u>NEMA Configuration (NEMA Table 5.3.1-1)</u>
2 through 8 Phases	Configuration 3 (12 Load Switch Positions)
9 through 12 Phases or more than 4 Overlaps or Pedestrian Phases	Configuration 4 (16 Load Switch Positions)

- (e) In addition to the minimum NEMA requirements, four pedestrian call input terminals shall be provided.
- (f) If hardwire interconnection is specified, the following input/output terminals shall be provided:

- Timing Plan A Output
- Timing Plan B Output
- Timing Plan C Output
- Timing Plan D Output
- Offset 1 Output
- Offset 2 Output
- Offset 3 Output
- Timing Plan A Input
- Timing Plan B Input
- Timing Plan C Input
- Timing Plan D Input
- Offset 1 Input
- Offset 2 Input
- Offset 3 Input
- Interconnect Common

- (g) Buss Interface Units (BIU) and BIU racks shall be provided for all required terminals and facilities.
- (h) All Port 1 cable connectors shall have positive strain relief latches such that tension on the cable will not disconnect the connector from the unit they are connected to.

**902.11.4.2 Switches and Controls.** Each controller cabinet shall be furnished with the following switches and controls. For double controller cabinets, two sets of switches and controls are provided, one set for each controller installed in each compartment.

- (a) Power Interrupt Switch - A switch located inside the main cabinet shall interrupt electrical power to the controller during maintenance on the controller. Operation of this switch shall not affect the flash operation. This switch shall not be accessible via the police panel.
- (b) Flash Switches - The following switches shall place the signal on flash. Operation of these switches shall not affect the electrical power supply to the controller. When the signals are returned to normal operation the external start shall be activated causing the controller to revert to the programmed initialization phase(s).
  - (1) Each controller cabinet shall be furnished with a clearly labeled flash switch mounted in the access or police panel.
  - (2) Each controller cabinet shall be furnished with a clearly labeled flash switch mounted on the cabinet door in the inside of the cabinet.
- (c) Stop Time Switch - A three position switch mounted inside the main cabinet shall provide the following functions:
  - (1) Stop Time - Causes the controller to stop time.
  - (2) Normal - Allows the controller to cycle all phases, but during MMU flash causes the controller to stop time.
  - (3) Run - Allows the controller to cycle all phases and during any flashing operation allows the controller to continue cycling all phases without displaying them on the signal heads.
- (d) Switches or relays which completely interrupt power to the signal heads other than the protective circuit breaker shall not be installed in the cabinet.
- (e) If specified, a manual operation push button shall be installed in the police panel. The push button shall be wired for manual operation of the signals. The push button shall be water resistant and designed to protect the user against electrical shock and shall be supplied with a coiled cord with a nominal 6 foot (2-m) stretched length. A clearly labeled switch shall also be installed in the police panel to switch between manual or automatic operation of the controller.

#### **902.11.4.3 Detector Facilities.**

- (a) At a minimum, one NEMA Configuration 2 detector rack shall be provided with the associated BIU. If more than 16 detector channels are specified, additional NEMA Configuration 1 or 2 detector racks and associated BIU(s) shall be provided for the required number of detectors. Each detector channel shall be assigned to a separate detector input into the CU.

- (b) Detector loop connections shall be provided for the total number of detector channels available in the detector racks supplied as specified above.
- (c) Two terminals shall be provided for each detector as follows.
  - (1) Screw terminal strips mounted vertically on the left side of the cabinet approximately 6 inches (150 mm) from the bottom of the cabinet.
  - (2) All inductive loop detector inputs shall be protected with two 30-volt metal oxide varistors (MOV) with a 30 Joule rating. An MOV shall be connected between each field terminal and cabinet ground.
- (d) The detector rack shall be attached to the controller cabinet shelf by an easily removable attachment. Sufficient wire lengths shall be provided for access to the back of the rack. The rack shall not block the back panel or other termination panels.
- (e) Unless shown differently on the plans, each detector field input into the card rack shall be associated with the appropriate card position as follows:

<i>Channel</i>	<i>Card Position</i>							
	1	2	3	4	5	6	7	8
1	Phase 1	1 or 6	6	6	3	3 or 8	8	8
2	Phase 5	5 or 2	2	2	7	7 or 4	4	4

- (f) Each detector channel shall be clearly labeled with detector number, phase and direction.

**902.11.4.4 Power Distribution.**

- (a) Each assembly shall contain a separate aluminum power panel located in the lower right portion of the cabinet containing the following equipment:
  - (1) Main breaker - one type B circuit breaker conforming to Sec 901.4.4 that shall interrupt power to the controller and signals. The frame size and trip rating is shown on the traffic signal plans or designated in the contract.
  - (2) Auxiliary breaker - one type B circuit breaker conforming to Sec 901.4.4 that interrupts power to cabinet lamp and receptacle. The frame size and trip rating shall be 15 amperes.
  - (3) One mercury contactor that controls power to the signal bus.
  - (4) One radio frequency interference suppresser.
  - (5) One AC service transient suppression device.

- (6) One terminal block for AC power input.
- (7) One earth ground bus terminal block.
- (8) One isolated AC neutral bus terminal block.

(b) Each controller assembly shall have a fluorescent lighting fixture.

**902.11.5 Auxiliary Interfaces for Controllers.** Interface panels shall be aluminum panels with de-burred edges and rounded corners installed in the controller cabinet containing the required terminals and equipment. Interface panels shall be neatly laid out, neatly wired and easily accessible. For double controller cabinets, the auxiliary interface shall be located in the same compartment as the associated CU.

**902.11.5.1 Pre-emption Interface.** The preemption operation and interface shall conform to NEMA. The pre-emption interface shall include any field wire termination panels, relays or isolators, wiring and connectors required for proper operation. Each preemption field input shall be protected with a metal oxide varistor (MOV). For 120 volt inputs, a 150-volt MOV with an 80 Joule rating shall be used and for 24 volt inputs, a 30-volt MOV with a 30 Joule rating shall be used.

**902.11.5.2 Hardwire Master and Local Coordination Interface.** The coordination interface shall consist of any field wire termination panels, wiring and connectors required for proper operation. The master coordination interface shall output commands to the local controllers in the system. Local coordination interfaces shall accept command inputs from the master coordination interface. Coordination interfaces shall be connected to one another or to a telephone interconnection unit, by a multi-conductor cable.

The coordination interface shall provide a control terminal strip for 7 or 12 wire interconnect as specified in the plans, vertically or horizontally mounted, that shall be located 6 (150 mm) to 8 (200 mm) inches above the bottom of the cabinet. Control voltages applied to the terminals are associated with the following input/output functions:

<u>7 - Wire</u>	<u>12 - Wire</u>
Neutral	Neutral
Timing Plan A (Dial 2)	Timing Plan A (Dial 2)
Timing Plan B (Dial 3)	Timing Plan B (Dial 3)
Timing Plan C (Split 2)	Timing Plan C (Split 2)
Offset 1	Timing Plan D (Split 3)
Offset 2	Offset 1
Automatic Flash	Offset 2
	Offset 3
	Automatic Flash

All command voltages applied to these terminals shall be 120 volts AC. Terminals for interconnect cable shall be fused and provided with a 150-volt metal oxide varistor (MOV) with

an 80 Joule rating. Interface circuitry between this terminal strip and the controller shall be by solid state or relay logic.

**902.11.5.3 Closed Loop System Interface.** If the controller assembly will be part of a closed loop system, all components required to interface with the system shall be in accordance with the plans.

**902.11.5.4 Dial-Up Modem Interface.** This panel shall provide for interfacing of a leased, unconditioned telephone drop to a Hayes compatible modem that connects to the on-street system master or local controller as specified in the plans. The panel shall be mounted on the inside of the cabinet on the right side. A telephone network interface, such as a Siecor CAL3000 or other approved interface acceptable to the local phone company shall be attached to the aluminum panel. The telephone interface shall also include the installation of the necessary cable, connectors, etc. to connect the interface to the telephone drop provided by the local telephone company. The contractor shall be responsible for the installation of the phone line and coordinate this through the local telephone company.

**902.11.5.5 Remote "ON - OFF" Switch (Pedestrian Interval Sequence).** The following type "On - Off" switches shall be furnished as specified:

- (a) Type I. This item shall consist of one manually operated heavy duty switch in a circuit not exceeding 18 volts. Necessary relays shall be located in the controller cabinet for including or excluding the pedestrian phase in the phasing sequence or switching signals between flashing and sequence operation. This shall be accomplished by energizing or de-energizing the pedestrian signal indications and push-button detectors. The switch shall be enclosed in a weatherproof, cast aluminum housing equipped for post mounting. The housing shall have a suitable lock, the key of which shall not unlock the controller cabinet. The housing shall be tapped for conduit.
- (b) Type II. This item is operationally identical to Type I except the switch may be 120 volts and shall be located in the access panel of the controller cabinet.

**902.11.5.6 Other Interfaces.** Where other interfaces are specified in the plans or required for specified operation, the required circuitry and any other required devices shall be installed on an interface panel or in a suitable metal enclosure.

**902.11.6 Auxiliary Devices.** Each auxiliary unit shall be enclosed in a suitably finished metal or molded plastic case. It shall be mounted in the controller cabinet unless otherwise specified. The function of each auxiliary unit shall be indicated by an identification plate on the case. Auxiliary equipment cases shall be ventilated. Temperature, voltage and frequency shall meet the requirements of Sec 902.4.5 unless otherwise specified.

**902.11.6.1 External Time Switches.** External time switches shall be solid state, key board entry and contain filtering and shielding circuitry to protect the unit's operation against electrical interference. Timing shall be based on the 60 Hz power supply frequency. Each unit shall contain a programmable automatic central daylight time compensation feature. Each unit shall contain a back-up power source to maintain time and memory functions during loss of AC power.

Each unit shall provide a weekly program with at least 20 event changes per week.

**902.11.6.2 Dial-Up Modem.** The unit shall be an auto-dial, auto-answer modem and shall be installed in the controller cabinet as specified on the plans. If specified an identical modem shall be installed at the central office computer facility in the MoDOT district office. The modem shall be Hayes compatible capable of responding to the standard "Hayes command set". The modem shall be self-contained. The unit shall be powered by a nominal 120 VAC from the duplex service outlet provided in the cabinet. The modem shall be capable of operating at all standard baud rates from 300 to 56K baud over a standard dial-up, unconditioned telephone line. Installation shall include the appropriate interface cable to connect to an RJ-11 telephone jack on the telephone interface panel, the RS-232 cable from the modem to the system master, all other cabling, connectors and incidental items necessary for operation.

**902.11.7 Controller Cabinets.** Controller cabinets shall be cast aluminum or 0.125 inch (3.2 mm) reinforced sheet aluminum alloy and be of clean-cut design and appearance. The cabinet shall provide ample space for housing all equipment and components. Controller cabinets housing solid state controllers shall be furnished with unused cabinet space measuring 18 inches (450 mm) wide by 12 inches (300 mm) high by 12 inches (300 mm) deep. Cabinet size shall be not less than 54 inches (1350 mm) high by 38 inches (950 mm) wide by 25 inches (625 mm) deep and support a 12 or 16 position back panel. The cabinet shall contain a rigid shelf of such construction that the CU and auxiliary equipment may be withdrawn from the cabinet without breaking any electrical connections or interrupting normal controller operation.

- (a) A hinged door or doors shall provide complete access to the interior of the cabinet. Door holds shall be furnished which shall hold the door in an open position at least 90 degrees from the closed position. The doors shall fit against a rain tight gasket. Each door shall be provided with a cabinet lock and shall have a stamped or raised outside designation, "Traffic Control" or other approved identification. An auxiliary door, positioned on each main cabinet door, equipped with a rain tight gasket, shall allow access to a switch panel and shall be equipped with a lock whose key will not unlock the main door. Two keys shall be furnished for each type lock used. The door hinges and pins shall be of corrosion resistant metal. Pins shall be rolled or solid rod, at least 1/8 inch (3.18 mm) in diameter, except if continuous hinges are furnished, the pins shall be continuous the full length of the hinges and shall be not less than 1/16 inch (1.59 mm) in diameter.
- (b) The back panel in all controller cabinets shall be hinged at the bottom to permit the top of the panel to be rotated forward and down to an angle of not less than 45 degrees with all components, including load switches, attached for maintenance purposes. The bottom of the back panel shall be not less than 6 inches (150 mm) above the bottom of the cabinet.
- (c) Cabinets shall have a thermostatically controlled ventilating fan with exhausting capability, in an enclosure, of at least 150 cubic feet per minute (4.25 m<sup>3</sup>/min) for cabinets up to 30.5 cubic feet (0.86 m<sup>3</sup>) and at least 250 cubic feet per minute (7.08 m<sup>3</sup>/min) for cabinets 30.5 cubic feet (0.86 m<sup>3</sup>) and more, installed in the top of the cabinet. These cabinets shall be supplied with a replaceable furnace type fiberglass

filter of at least one square foot (m2) area mounted behind louvers in the lower one fourth of the door.

- (d) Double controller cabinets for two controllers shall be not less than 57 inches (1425 mm) high by 74 inches (1850 mm) wide by 17 inches (425 mm) deep and shall support two 12 position back panels. All double cabinets shall have two doors that are hinged on the outside corners of the cabinet so that the doors open away from each other. Double cabinets shall have a divider between the two halves of the cabinet with an 8-inch (200-mm) opening between the compartments at the bottom of the divider for wiring between the compartments.

**1092.4.3 Induction Loop Detectors.** Induction loop detectors consist of loop detector cable in the pavement, lead-in cables, and associated conduits, pull boxes and loop detector units. The following section covers loop detector units. Other components of loop detectors are covered in other parts of Sec 902 and Division 1000. Loop detector units shall conform to NEMA. If specified, each channel shall have extension and delay timing features as specified in NEMA. Each detector shall have a regulator for the power input. The regulator shall have the appropriate power and voltage rating for operation of the detector.

**1092.4.3.1 Card Rack Detectors.** All detectors shall be card rack mounted detectors as specified in NEMA unless otherwise specified in the plans.

**1092.4.3.1.1 Card Rack Dual Output Detectors.** Card rack dual output detectors shall conform to NEMA and the following. Dual output detectors shall provide two relay outputs per induction loop detector. One output shall be capable of pulse detection for the purpose of traffic counting, speed and occupancy measurements. The other output shall be capable of presence detection. Each detector output shall be assigned to a separate detector input into the CU.

**1092.4.3.2 Shelf Mounted Detectors.** If shelf mounted detectors are specified, each shelf mounted inductive loop detector unit shall be self-contained. The detector shall conform to the applicable sections of NEMA and the following. The main chassis shall include the power supply for 120 VAC line power, line fuse and MS type connector.

- (a) The MS connector shall be a chassis jack, type MS3 102A-18-1P and cable plug, type MS3160A-18-1S, with a type MS3057-10 cable clamp and boot.
- (b) Wire size for the cable shall be 18 AWG (1 mm<sup>2</sup>) minimum and continuous between the connections and the detector panel. Minimum cable length shall be 6 feet (18 m).
- (c) The pin connection shall be as follows:

<i>Pin</i>	<i>Function</i>
A	120 VAC (Common)
B	Relay Output (Common)
C	120 VAC (Line)
D	Loop Input

E	Loop Input
F	Relay Output (Normally Open)
G	Relay Output (Normally Closed)
H	Chassis Ground
I	Spare
J	Time Control

**902.13 Other Detection Devices.**

**902.13.1 Probe-Type Detectors.** Probe-type detectors shall be as specified on the plans and shall conform to the following.

- (a) The sensing probes shall be cylindrical having maximum dimensions of 7/8 inch (21.9 mm) diameter by four inches (100 mm) long. The sensing probes shall be suitable for installation in a one inch (25 mm) diameter bored hole. The interconnecting four conductor cable and lead-in cable shall be suitable for installation in a 1/4 inch (6.25 mm) wide pavement sawed slot.
- (b) The jacket on the interconnecting cable and the casing on the sensing probe shall be an abrasion resistant polyurethane elastomer. The device shall be impervious to moisture and chemically resistant to all normal motor vehicle petroleum products. Lead-in cables shall be shielded, chemical resistant and completely waterproof.
- (c) The combined probe sets, manufacturer specified lead-in cable and detector probe shall detect all vehicles up to a lead-in cable length of 750 feet (228.6 m) with up to 6 probes per set.
- (d) The conductor cable from the probes to the detector panel in the controller assembly shall be as specified by the detector manufacturer, shall be continuous and un-spliced and shall be a minimum of 50 feet (15.2 m) in length. Probes shall be assembled in a set to form a vehicle detector as shown on the plans. No more than 6 probes shall be assembled as a set. The cables between probes shall be long enough to provide the spacing shown on the plans plus 5 feet (1.5 m). If no spacing is shown, 15 feet (5 m) of cable shall be provided between probes. Each set of probes shall have one lead-in cable.
- (e) Probes installed under bridge decks shall be protected by completely encapsulating them in a conduit system. The probes shall be oriented so that the detection zone is above the bridge deck and shall be installed in junction boxes with gaskets anchored to the bottom of the deck. The junction boxes shall have a minimum size of 6 (150 x 6 (150) x 4 inches (100 mm) and the probes shall be rigidly anchored in the box. The probes shall be no more than 18 inches (450 mm) below the top of the bridge deck. Conduit shall be sized so that the probe and cable can be pulled through the conduit. Any conduit bends shall be such that probe and cable can be pulled through the bend. External conduit on the structure shall conform to Sec 902.5.3.

**902.13.1.1 Induction Detector Probes.** The encapsulated induction detector probe shall detect the passage or presence of all vehicles with a standard induction loop detector amplifier.

- (a) The induction detector probe shall operate in a temperature range from -35 F (-37 C) to +165 F (74 C) with 0 to 100 percent humidity.
- (b) The operating field intensity range shall be 0.2 to 1.0 Oersted with a nominal inductance of 20 uH plus 20 uH per 100 feet (30 m) of cable. The nominal DC resistance shall be 0.5 ohms plus 3.2 ohms per 100 feet (30 m) of probe cable.

**902.13.2 Push-Button.** Pedestrian push-button detectors shall be direct push contact type. Each detector shall be a removable contact assembly mounted in a cast aluminum case. The housing shall be shaped to fit the curvature of the post to which it is attached and shall provide a rigid installation. Contacts shall be normally open, entirely insulated from the case and operating button and have connecting terminals. The case shall have one outlet tapped for 1/2-inch (12.5-mm) pipe. The operating button shall be recessed and made of brass or corrosion resistant metal alloy or non-metallic material. The operating voltage shall not exceed 24 volts. The entire assembly shall be weatherproof, secure against electrical shock to the user and of such construction as to withstand continuous hard usage.

**902.13.3 Microwave Vehicle Detectors.** The unit shall detect all licensed vehicles moving within the field of detection at speeds from 2 to 80 miles per hour (3.2 km/hr. to 128.4 k/hr.). The unit shall have a minimum detection range from 3 to 200 feet (1 m to 66.7 m) for all licensed vehicles. The pattern spread of the detection field shall be no more than 16 degrees. The unit shall be self-tuning and capable of continuous operation over a temperature range of -35 F (-37 C) to 165 F (74 C). The unit shall be microprocessor based using Doppler microwave at an operating frequency of 10.525 GHz. The unit shall have Federal Communications Commission (FCC) certification and be tested to the applicable FCC specifications. The unit shall be capable of side-fire mount or overhead mount. The enclosure shall be constructed of aluminum or stainless steel and shall be water resistant. The unit shall be capable of detecting directional traffic and the direction shall be user selectable. All user operated controls and adjustments shall be clearly marked and easily accessible. The unit shall have a relay detection output to the controller with a minimum 5 amp rating and be designed to place a constant call to the controller in the event of any failure. The unit shall have an easily accessible indicator showing activation of detection relay. Required wiring shall be as specified by the manufacturer. Mounting hardware for the type of mounting shown on the plans and power supply equipment shall be as specified by the manufacturer and shall be provided with the unit.

**902.13.4 Ultrasonic Presence Detectors.** The unit shall detect the continuous presence of any object within the field of detection. The unit shall have a minimum detection range from 3 (1 m) to 24 feet (8 m) from the front face of the unit and the detection range shall be adjustable. The detection pattern shall be conical with a nominal beam width of 20 degrees. The unit shall be capable of continuous operation over a temperature range of -35 F (-37 C) to 165 F (74 C). The unit shall be self-tuning and operate in the ultrasonic frequency range. The unit shall be capable of side-fire mount or overhead mount. The unit shall contain a variable detection time delay up to a minimum of 10 seconds. All user operated controls and adjustments shall be clearly marked and easily accessible. The enclosure shall be constructed of aluminum or

Job No. J4S3137  
Route: 1  
County: Clay

stainless steel and shall be water resistant. The detector shall have a relay detection output to the controller with a minimum 5 amp rating and be designed to place a constant call to the controller in the event of any failure. The unit shall have an easily accessible indicator showing activation of detection relay. Required wiring shall be as specified by the manufacturer. Mounting hardware for the type of mounting shown on the plans and power supply equipment shall be as specified by the manufacturer and shall be provided with the unit.

**4.0 Construction Requirements.** Construction requirements shall conform to Sec 902.

**5.0 Method of Measurement.** Method of measurement shall conform to Sec 902.

**5.1** Measurement of training including all specified training will be made per each.

**6.0 Basis of Payment.** Accepted NEMA TS2 traffic controller assemblies will be made at the contract unit price per each. Payment will be considered full compensation for all labor, equipment and material to complete the described work.

**6.1** If training is required by the engineer, payment for the training will be made at the contract unit price per each. Payment will be considered full compensation for all labor, equipment and material to complete the described training.

**6.1.1** If training is not required as determined by the engineer, no payment will be made for training.

**6.2** No direct payment will be made for programming the local intersection controllers and the on-street master after installing the system software.

CONTRACTOR: \_\_\_\_\_

ADDRESS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date           September 21, 2016

To:            Dan Niec  
                District Engineer  
                Missouri Department of Transportation

Subject:       Construction  
                Route 1, CLAY County  
                Job No. J4S3137-FINAL  
                Equipment and Materials List

We respectfully submit the attached list of proposed (Traffic Signal) items for your review and approval.

It is understood approval of this list does not constitute final acceptance nor in any way void sections of the specifications requiring sampling and testing of equipment and materials prior to final acceptance.

Furthermore, we understand none of these items are to be ordered nor any related construction work performed until this list has been approved in writing by your office.

Signature \_\_\_\_\_

Contractor

**REQUIRED INFORMATION  
LIST OF EQUIPMENT & MATERIALS  
PROPOSED FOR THIS PROJECT**

<b>ITEM NO.</b>	<b>DESCRIPTION</b>	<b>MANUFACTURER OR FABRICATOR<sup>(1)</sup></b>	<b>CATALOG NUMBER OR DRAWING NUMBER<sup>(1)</sup></b>
<b>TRAFFIC SIGNALS:</b>			
9020114	"SIGNAL HEAD, TYPE 4T"	_____	_____
9020514	"SIGNAL HEAD, TYPE 4B"	_____	_____
9024283	"CONTROLLER ASSEMBLY HOUSING, NEMA TS2 CONTROLLER"	_____	_____
	Cabinet and Backpanel Assembly	_____	_____
	NEMA Controller	_____	_____
	Conflict Monitor	_____	_____
	Loadswitch	_____	_____
	Flasher	_____	_____
	Flash Transfer Relay	_____	_____
	Surge Protector	_____	_____
	Controller Breaker <sup>(6)</sup>	_____	_____
	Auxiliary Breaker <sup>(6)</sup>	_____	_____
9028500	"CABLE, LOOP DETECTOR, IN DUCT <sup>(2)</sup> "	_____	_____
	Loop Sealant	_____	_____
	Detector Splice Kit	_____	_____

**NOTES:**

- <sup>(1)</sup> Contractor Complete
- <sup>(2)</sup> Indicate type of insulation on cable items. Certifications required for approval (see Standard Specifications).
- <sup>(3)</sup> All documentation required by Standard Specification Section 901.4.1 must be submitted to the engineer for review and approval.
- <sup>(4)</sup> All documentation required by Standard Specification Section 902.4.3.3 must be submitted to the engineer for review and approval.
- <sup>(5)</sup> Certifications required for approval (see Standard Specifications).
- <sup>(6)</sup> Specification sheets required for approval (shop drawings required for fabricated items).