



The following documentation is an electronically-submitted vendor response to an advertised solicitation from the *West Virginia Purchasing Bulletin* within the Vendor Self-Service portal at *wvOASIS.gov*. As part of the State of West Virginia's procurement process, and to maintain the transparency of the bid-opening process, this documentation submitted online is publicly posted by the West Virginia Purchasing Division at *WVPurchasing.gov* with any other vendor responses to this solicitation submitted to the Purchasing Division in hard copy format.

Header 3

General Information[Contact](#)[Default Values](#)[Discount](#)[Document Information](#)

Procurement Folder: 660917

Procurement Type: Central Master Agreement

Vendor ID:

Legal Name: IRON ARMOUR LLC

Alias/DBA:

Total Bid: \$0.00

Response Date: Response Time:

SO Doc Code: CRFQ

SO Dept: 0803

SO Doc ID: DOT200000111

Published Date: 1/24/20

Close Date: 2/6/20

Close Time: 13:30

Status: Closed

Solicitation Description:

Total of Header Attachments: 3

Total of All Attachments: 3



Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

**State of West Virginia
 Solicitation Response**

Proc Folder : 660917

Solicitation Description : ADDENDUM 1 TRAFFIC SIGNAL PARTS (8520C3003)

Proc Type : Central Master Agreement

Date issued	Solicitation Closes	Solicitation Response	Version
	2020-02-06 13:30:00	SR 0803 ESR02052000000004565	1

VENDOR
000000163399 IRON ARMOUR LLC

Solicitation Number: CRFQ 0803 DOT2000000111

Total Bid : \$0.00 **Response Date:** 2020-02-05 **Response Time:** 10:42:30

Comments:

FOR INFORMATION CONTACT THE BUYER
 Crystal G Hustead
 (304) 558-2402
 crystal.g.hustead@wv.gov

Signature on File	FEIN #	DATE
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All offers subject to all terms and conditions contained in this solicitation

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Ln Total Or Contract Amount
1	TRAFFIC SIGNAL PARTS FOR MAINTENANCE	0.00000	EA	\$17,025.000000	\$0.00

Comm Code	Manufacturer	Specification	Model #
46161504			

Extended Description : PRICING TO BE INCLUDED ON THE ATTACHED EXHIBIT A PRICING PAGE



Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

State of West Virginia
 Request for Quotation
 19 - Highways

Proc Folder: 660917

Doc Description: TRAFFIC SIGNAL PARTS (8520C3003)

Proc Type: Central Master Agreement

Date Issued	Solicitation Closes	Solicitation No	Version
2020-01-17	2020-02-06 13:30:00	CRFQ 0803 DOT2000000111	1

BID RECEIVING LOCATION

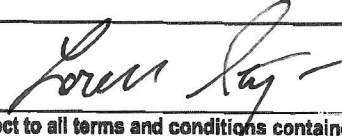
BID CLERK
 DEPARTMENT OF ADMINISTRATION
 PURCHASING DIVISION
 2019 WASHINGTON ST E
 CHARLESTON WV 25305
 US

VENDOR

Vendor Name, Address and Telephone Number:

FOR INFORMATION CONTACT THE BUYER

Crystal G Hustead
 (304) 558-2402
 crystal.g.hustead@wv.gov

Signature X  FEIN # 26-2023469 DATE 02/05/2020

All offers subject to all terms and conditions contained in this solicitation

ADDITIONAL INFORMATION:

THE STATE OF WEST VIRGINIA PURCHASING DIVISION FOR THE AGENCY, WEST VIRGINIA DIVISION OF HIGHWAYS, IS SOLICITING BIDS TO ESTABLISH AN OPEN-END CONTRACT FOR TRAFFIC SIGNAL PARTS PER THE ATTACHED DOCUMENTS.

QUESTIONS REGARDING THE SOLICITATION MUST BE SUBMITTED IN WRITING TO CRYSTAL.G.HUSTEAD@WV.GOV PRIOR TO THE QUESTION PERIOD DEADLINE CONTAINED IN THE INSTRUCTIONS TO VENDORS SUBMITTING BIDS

INVOICE TO	SHIP TO
DIVISION OF HIGHWAYS TRAFFIC ENGINEERING DIVISION 1900 KANAWHA BLVD E, BLDG 5 RM A550 CHARLESTON WV25305-0430 US	DIVISION OF HIGHWAYS TRAFFIC ENG. TSC - SIGNAL MAINTENANCE 180 DRY BRANCH DR CHARLESTON WV 25306 US

Line	Comm Ln Desc	Qty	Unit Issue	Unit Price	Total Price
1	TRAFFIC SIGNAL PARTS FOR MAINTENANCE	0.00000	EA		

Comm Code	Manufacturer	Specification	Model #
46161504			

Extended Description :
 PRICING TO BE INCLUDED ON THE ATTACHED EXHIBIT A PRICING PAGE

SCHEDULE OF EVENTS

Line	Event	Event Date
1	VENDOR QUESTION DEADLINE	2020-01-24

INSTRUCTIONS TO VENDORS SUBMITTING BIDS

1. REVIEW DOCUMENTS THOROUGHLY: The attached documents contain a solicitation for bids. Please read these instructions and all documents attached in their entirety. These instructions provide critical information about requirements that if overlooked could lead to disqualification of a Vendor's bid. All bids must be submitted in accordance with the provisions contained in these instructions and the Solicitation. Failure to do so may result in disqualification of Vendor's bid.

2. MANDATORY TERMS: The Solicitation may contain mandatory provisions identified by the use of the words "must," "will," and "shall." Failure to comply with a mandatory term in the Solicitation will result in bid disqualification.

3. PREBID MEETING: The item identified below shall apply to this Solicitation.

A pre-bid meeting will not be held prior to bid opening

A MANDATORY PRE-BID meeting will be held at the following place and time:

All Vendors submitting a bid must attend the mandatory pre-bid meeting. Failure to attend the mandatory pre-bid meeting shall result in disqualification of the Vendor's bid. No one individual is permitted to represent more than one vendor at the pre-bid meeting. Any individual that does attempt to represent two or more vendors will be required to select one vendor to which the individual's attendance will be attributed. The vendors not selected will be deemed to have not attended the pre-bid meeting unless another individual attended on their behalf.

An attendance sheet provided at the pre-bid meeting shall serve as the official document verifying attendance. Any person attending the pre-bid meeting on behalf of a Vendor must list on the attendance sheet his or her name and the name of the Vendor he or she is representing.

Additionally, the person attending the pre-bid meeting should include the Vendor's E-Mail address, phone number, and Fax number on the attendance sheet. It is the Vendor's responsibility to locate the attendance sheet and provide the required information. Failure to complete the attendance sheet as required may result in disqualification of Vendor's bid.

All Vendors should arrive prior to the starting time for the pre-bid. Vendors who arrive after the starting time but prior to the end of the pre-bid will be permitted to sign in but are charged with knowing all matters discussed at the pre-bid.

Questions submitted at least five business days prior to a scheduled pre-bid will be discussed at the pre-bid meeting if possible. Any discussions or answers to questions at the pre-bid meeting

Revised 01/09/2020

are preliminary in nature and are non-binding. Official and binding answers to questions will be published in a written addendum to the Solicitation prior to bid opening.

4. VENDOR QUESTION DEADLINE: Vendors may submit questions relating to this Solicitation to the Purchasing Division. Questions must be submitted in writing. All questions must be submitted on or before the date listed below and to the address listed below in order to be considered. A written response will be published in a Solicitation addendum if a response is possible and appropriate. Non-written discussions, conversations, or questions and answers regarding this Solicitation are preliminary in nature and are nonbinding.

Submitted e-mails should have solicitation number in the subject line.

Question Submission Deadline: **January 24, 2020 at 10:00 AM**

Submit Questions to: **Crystal Husted**

2019 Washington Street, East

Charleston, WV 25305

Fax: (304) 558-4115 (Vendors should not use this fax number for bid submission)

Email: Crystal.G.Husted@wv.gov

5. VERBAL COMMUNICATION: Any verbal communication between the Vendor and any State personnel is not binding, including verbal communication at the mandatory pre-bid conference. Only information issued in writing and added to the Solicitation by an official written addendum by the Purchasing Division is binding.

6. BID SUBMISSION: All bids must be submitted electronically through wvOASIS or signed and delivered by the Vendor to the Purchasing Division at the address listed below on or before the date and time of the bid opening. Any bid received by the Purchasing Division staff is considered to be in the possession of the Purchasing Division and will not be returned for any reason. The Purchasing Division will not accept bids, modification of bids, or addendum acknowledgment forms via e-mail. Acceptable delivery methods include electronic submission via wvOASIS, hand delivery, delivery by courier, or facsimile.

The bid delivery address is:

Department of Administration, Purchasing Division

2019 Washington Street East

Charleston, WV 25305-0130

A bid that is not submitted electronically through wvOASIS should contain the information listed below on the face of the envelope or the bid may be rejected by the Purchasing Division.:

SEALED BID:

BUYER: Crystal Husted

SOLICITATION NO.: CRFQ DOT2000000111

BID OPENING DATE: February 6, 2020

BID OPENING TIME: 1:30 PM

FAX NUMBER: 304-558-3970

Revised 01/09/2020

The Purchasing Division may prohibit the submission of bids electronically through wvOASIS at its sole discretion. Such a prohibition will be contained and communicated in the wvOASIS system resulting in the Vendor's inability to submit bids through wvOASIS. Submission of a response to an Expression or Interest or Request for Proposal is not permitted in wvOASIS.

For Request For Proposal ("RFP") Responses Only: In the event that Vendor is responding to a request for proposal, the Vendor shall submit one original technical and one original cost proposal plus n/a convenience copies of each to the Purchasing Division at the address shown above. Additionally, the Vendor should identify the bid type as either a technical or cost proposal on the face of each bid envelope submitted in response to a request for proposal as follows:

BID TYPE: (This only applies to CRFP)

Technical

Cost

7. BID OPENING: Bids submitted in response to this Solicitation will be opened at the location identified below on the date and time listed below. Delivery of a bid after the bid opening date and time will result in bid disqualification. For purposes of this Solicitation, a bid is considered delivered when confirmation of delivery is provided by wvOASIS (in the case of electronic submission) or when the bid is time stamped by the official Purchasing Division time clock (in the case of hand delivery).

Bid Opening Date and Time: **February 6, 2020 at 1:30 PM**

Bid Opening Location: Department of Administration, Purchasing Division
2019 Washington Street East
Charleston, WV 25305-0130

8. ADDENDUM ACKNOWLEDGEMENT: Changes or revisions to this Solicitation will be made by an official written addendum issued by the Purchasing Division. Vendor should acknowledge receipt of all addenda issued with this Solicitation by completing an Addendum Acknowledgment Form, a copy of which is included herewith. Failure to acknowledge addenda may result in bid disqualification. The addendum acknowledgement should be submitted with the bid to expedite document processing.

9. BID FORMATTING: Vendor should type or electronically enter the information onto its bid to prevent errors in the evaluation. Failure to type or electronically enter the information may result in bid disqualification.

10. ALTERNATE MODEL OR BRAND: Unless the box below is checked, any model, brand, or specification listed in this Solicitation establishes the acceptable level of quality only and is not intended to reflect a preference for, or in any way favor, a particular brand or vendor. Vendors may bid alternates to a listed model or brand provided that the alternate is at least equal to the model or brand and complies with the required specifications. The equality of any alternate being bid shall be determined by the State at its sole discretion. Any Vendor bidding an alternate model or brand should clearly identify the alternate items in its bid and should include manufacturer's specifications, industry literature, and/or any other relevant documentation demonstrating the

equality of the alternate items. Failure to provide information for alternate items may be grounds for rejection of a Vendor's bid.

This Solicitation is based upon a standardized commodity established under W. Va. Code § 5A-3-61. Vendors are expected to bid the standardized commodity identified. Failure to bid the standardized commodity will result in your firm's bid being rejected.

11. EXCEPTIONS AND CLARIFICATIONS: The Solicitation contains the specifications that shall form the basis of a contractual agreement. Vendor shall clearly mark any exceptions, clarifications, or other proposed modifications in its bid. Exceptions to, clarifications of, or modifications of a requirement or term and condition of the Solicitation may result in bid disqualification.

12. COMMUNICATION LIMITATIONS: In accordance with West Virginia Code of State Rules §148-1-6.6, communication with the State of West Virginia or any of its employees regarding this Solicitation during the solicitation, bid, evaluation or award periods, except through the Purchasing Division, is strictly prohibited without prior Purchasing Division approval. Purchasing Division approval for such communication is implied for all agency delegated and exempt purchases.

13. REGISTRATION: Prior to Contract award, the apparent successful Vendor must be properly registered with the West Virginia Purchasing Division and must have paid the \$125 fee, if applicable.

14. UNIT PRICE: Unit prices shall prevail in cases of a discrepancy in the Vendor's bid.

15. PREFERENCE: Vendor Preference may be requested in purchases of motor vehicles or construction and maintenance equipment and machinery used in highway and other infrastructure projects. Any request for preference must be submitted in writing with the bid, must specifically identify the preference requested with reference to the applicable subsection of West Virginia Code § 5A-3-37, and must include with the bid any information necessary to evaluate and confirm the applicability of the requested preference. A request form to help facilitate the request can be found at:

<http://www.state.wv.us/admin/purchase/vrc/Venpref.pdf>.

15A. RECIPROCAL PREFERENCE: The State of West Virginia applies a reciprocal preference to all solicitations for commodities and printing in accordance with W. Va. Code § 5A-3-37(b). In effect, non-resident vendors receiving a preference in their home states, will see that same preference granted to West Virginia resident vendors bidding against them in West Virginia. Any request for reciprocal preference must include with the bid any information necessary to evaluate and confirm the applicability of the preference. A request form to help facilitate the request can be found at: <http://www.state.wv.us/admin/purchase/vrc/Venpref.pdf>.

16. SMALL, WOMEN-OWNED, OR MINORITY-OWNED BUSINESSES: For any solicitations publicly advertised for bid, in accordance with West Virginia Code §5A-3-37(a)(7) and W. Va. CSR § 148-22-9, any non-resident vendor certified as a small, women-owned, or minority-owned business under W. Va. CSR § 148-22-9 shall be provided the same preference made available to any resident vendor. Any non-resident small, women-owned, or

minority-owned business must identify itself as such in writing, must submit that writing to the Purchasing Division with its bid, and must be properly certified under W. Va. CSR § 148-22-9 prior to contract award to receive the preferences made available to resident vendors. Preference for a non-resident small, women-owned, or minority owned business shall be applied in accordance with W. Va. CSR § 148-22-9.

17. WAIVER OF MINOR IRREGULARITIES: The Director reserves the right to waive minor irregularities in bids or specifications in accordance with West Virginia Code of State Rules § 148-1-4.6.

18. ELECTRONIC FILE ACCESS RESTRICTIONS: Vendor must ensure that its submission in wvOASIS can be accessed and viewed by the Purchasing Division staff immediately upon bid opening. The Purchasing Division will consider any file that cannot be immediately accessed and viewed at the time of the bid opening (such as, encrypted files, password protected files, or incompatible files) to be blank or incomplete as context requires, and are therefore unacceptable. A vendor will not be permitted to unencrypt files, remove password protections, or resubmit documents after bid opening to make a file viewable if those documents are required with the bid. A Vendor may be required to provide document passwords or remove access restrictions to allow the Purchasing Division to print or electronically save documents provided that those documents are viewable by the Purchasing Division prior to obtaining the password or removing the access restriction.

19. NON-RESPONSIBLE: The Purchasing Division Director reserves the right to reject the bid of any vendor as Non-Responsible in accordance with W. Va. Code of State Rules § 148-1-5.3, when the Director determines that the vendor submitting the bid does not have the capability to fully perform, or lacks the integrity and reliability to assure good-faith performance.”

20. ACCEPTANCE/REJECTION: The State may accept or reject any bid in whole, or in part in accordance with W. Va. Code of State Rules § 148-1-4.5. and § 148-1-6.4.b.”

21. YOUR SUBMISSION IS A PUBLIC DOCUMENT: Vendor’s entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled “confidential,” “proprietary,” “trade secret,” “private,” or labeled with any other claim against public disclosure of the documents, to include any “trade secrets” as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

22. INTERESTED PARTY DISCLOSURE: West Virginia Code § 6D-1-2 requires that the vendor submit to the Purchasing Division a disclosure of interested parties to the contract for all contracts with an actual or estimated value of at least \$1 Million. That disclosure must occur on the form prescribed and approved by the WV Ethics Commission prior to contract award. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

23. WITH THE BID REQUIREMENTS: In instances where these specifications require documentation or other information with the bid, and a vendor fails to provide it with the bid, the Director of the Purchasing Division reserves the right to request those items after bid opening and prior to contract award pursuant to the authority to waive minor irregularities in bids or specifications under W. Va. CSR § 148-1-4.6. This authority does not apply to instances where state law mandates receipt with the bid.

GENERAL TERMS AND CONDITIONS:

1. CONTRACTUAL AGREEMENT: Issuance of a Award Document signed by the Purchasing Division Director, or his designee, and approved as to form by the Attorney General's office constitutes acceptance of this Contract made by and between the State of West Virginia and the Vendor. Vendor's signature on its bid signifies Vendor's agreement to be bound by and accept the terms and conditions contained in this Contract.

2. DEFINITIONS: As used in this Solicitation/Contract, the following terms shall have the meanings attributed to them below. Additional definitions may be found in the specifications included with this Solicitation/Contract.

2.1. "Agency" or "Agencies" means the agency, board, commission, or other entity of the State of West Virginia that is identified on the first page of the Solicitation or any other public entity seeking to procure goods or services under this Contract.

2.2. "Bid" or "Proposal" means the vendors submitted response to this solicitation.

2.3. "Contract" means the binding agreement that is entered into between the State and the Vendor to provide the goods or services requested in the Solicitation.

2.4. "Director" means the Director of the West Virginia Department of Administration, Purchasing Division.

2.5. "Purchasing Division" means the West Virginia Department of Administration, Purchasing Division.

2.6. "Award Document" means the document signed by the Agency and the Purchasing Division, and approved as to form by the Attorney General, that identifies the Vendor as the contract holder.

2.7. "Solicitation" means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.

2.8. "State" means the State of West Virginia and/or any of its agencies, commissions, boards, etc. as context requires.

2.9. "Vendor" or "Vendors" means any entity submitting a bid in response to the Solicitation, the entity that has been selected as the lowest responsible bidder, or the entity that has been awarded the Contract as context requires.

3. CONTRACT TERM; RENEWAL; EXTENSION: The term of this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below:

Term Contract

Initial Contract Term: This Contract becomes effective on award and extends for a period of one (1) year(s).

Renewal Term: This Contract may be renewed upon the mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any request for renewal should be delivered to the Agency and then submitted to the Purchasing Division thirty (30) days prior to the expiration date of the initial contract term or appropriate renewal term. A Contract renewal shall be in accordance with the terms and conditions of the original contract. Unless otherwise specified below, renewal of this Contract is limited to three (3) successive one (1) year periods or multiple renewal periods of less than one year, provided that the multiple renewal periods do not exceed the total number of months available in all renewal years combined. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

Alternate Renewal Term – This contract may be renewed for _____ successive _____ year periods or shorter periods provided that they do not exceed the total number of months contained in all available renewals. Automatic renewal of this Contract is prohibited. Renewals must be approved by the Vendor, Agency, Purchasing Division and Attorney General's office (Attorney General approval is as to form only)

Delivery Order Limitations: In the event that this contract permits delivery orders, a delivery order may only be issued during the time this Contract is in effect. Any delivery order issued within one year of the expiration of this Contract shall be effective for one year from the date the delivery order is issued. No delivery order may be extended beyond one year after this Contract has expired.

Fixed Period Contract: This Contract becomes effective upon Vendor's receipt of the notice to proceed and must be completed within _____ days.

Fixed Period Contract with Renewals: This Contract becomes effective upon Vendor's receipt of the notice to proceed and part of the Contract more fully described in the attached specifications must be completed within _____ days. Upon completion of the work covered by the preceding sentence, the vendor agrees that maintenance, monitoring, or warranty services will be provided for _____ year(s) thereafter.

One Time Purchase: The term of this Contract shall run from the issuance of the Award Document until all of the goods contracted for have been delivered, but in no event will this Contract extend for more than one fiscal year.

Other: See attached.

4. NOTICE TO PROCEED: Vendor shall begin performance of this Contract immediately upon receiving notice to proceed unless otherwise instructed by the Agency. Unless otherwise specified, the fully executed Award Document will be considered notice to proceed.

5. QUANTITIES: The quantities required under this Contract shall be determined in accordance with the category that has been identified as applicable to this Contract below.

Open End Contract: Quantities listed in this Solicitation are approximations only, based on estimates supplied by the Agency. It is understood and agreed that the Contract shall cover the quantities actually ordered for delivery during the term of the Contract, whether more or less than the quantities shown.

Service: The scope of the service to be provided will be more clearly defined in the specifications included herewith.

Combined Service and Goods: The scope of the service and deliverable goods to be provided will be more clearly defined in the specifications included herewith.

One Time Purchase: This Contract is for the purchase of a set quantity of goods that are identified in the specifications included herewith. Once those items have been delivered, no additional goods may be procured under this Contract without an appropriate change order approved by the Vendor, Agency, Purchasing Division, and Attorney General's office.

6. EMERGENCY PURCHASES: The Purchasing Division Director may authorize the Agency to purchase goods or services in the open market that Vendor would otherwise provide under this Contract if those goods or services are for immediate or expedited delivery in an emergency. Emergencies shall include, but are not limited to, delays in transportation or an unanticipated increase in the volume of work. An emergency purchase in the open market, approved by the Purchasing Division Director, shall not constitute a breach of this Contract and shall not entitle the Vendor to any form of compensation or damages. This provision does not excuse the State from fulfilling its obligations under a One Time Purchase contract.

7. REQUIRED DOCUMENTS: All of the items checked below must be provided to the Purchasing Division by the Vendor as specified below.

BID BOND (Construction Only): Pursuant to the requirements contained in W. Va. Code § 5-22-1(c), All Vendors submitting a bid on a construction project shall furnish a valid bid bond in the amount of five percent (5%) of the total amount of the bid protecting the State of West Virginia. The bid bond must be submitted with the bid.

PERFORMANCE BOND: The apparent successful Vendor shall provide a performance bond in the amount of 100% of the contract. The performance bond must be received by the Purchasing Division prior to Contract award.

LABOR/MATERIAL PAYMENT BOND: The apparent successful Vendor shall provide a labor/material payment bond in the amount of 100% of the Contract value. The labor/material payment bond must be delivered to the Purchasing Division prior to Contract award.

In lieu of the Bid Bond, Performance Bond, and Labor/Material Payment Bond, the Vendor may provide certified checks, cashier's checks, or irrevocable letters of credit. Any certified check, cashier's check, or irrevocable letter of credit provided in lieu of a bond must be of the same amount and delivered on the same schedule as the bond it replaces. A letter of credit submitted in lieu of a performance and labor/material payment bond will only be allowed for projects under \$100,000. Personal or business checks are not acceptable. Notwithstanding the foregoing, West Virginia Code § 5-22-1 (d) mandates that a vendor provide a performance and labor/material payment bond for construction projects. Accordingly, substitutions for the performance and labor/material payment bonds for construction projects is not permitted.

MAINTENANCE BOND: The apparent successful Vendor shall provide a two (2) year maintenance bond covering the roofing system. The maintenance bond must be issued and delivered to the Purchasing Division prior to Contract award.

LICENSE(S) / CERTIFICATIONS / PERMITS: In addition to anything required under the Section of the General Terms and Conditions entitled Licensing, the apparent successful Vendor shall furnish proof of the following licenses, certifications, and/or permits upon request and in a form acceptable to the State. The request may be prior to or after contract award at the State's sole discretion.

The apparent successful Vendor shall also furnish proof of any additional licenses or certifications contained in the specifications regardless of whether or not that requirement is listed above.

8. INSURANCE: The apparent successful Vendor shall furnish proof of the insurance identified by a checkmark below and must include the State as an additional insured on each policy prior to Contract award. The insurance coverages identified below must be maintained throughout the life of this contract. Thirty (30) days prior to the expiration of the insurance policies, Vendor shall provide the Agency with proof that the insurance mandated herein has been continued. Vendor must also provide Agency with immediate notice of any changes in its insurance policies, including but not limited to, policy cancelation, policy reduction, or change in insurers. The apparent successful Vendor shall also furnish proof of any additional insurance requirements contained in the specifications prior to Contract award regardless of whether or not that insurance requirement is listed in this section.

Vendor must maintain:

Commercial General Liability Insurance in at least an amount of: \$1,000,000-See Below per occurrence.

Automobile Liability Insurance in at least an amount of: \$1,000,000-See Below per occurrence.

Professional/Malpractice/Errors and Omission Insurance in at least an amount of: _____ per occurrence. Notwithstanding the forgoing, Vendor's are not required to list the State as an additional insured for this type of policy.

Commercial Crime and Third Party Fidelity Insurance in an amount of: _____ per occurrence.

Cyber Liability Insurance in an amount of: _____ per occurrence.

Builders Risk Insurance in an amount equal to 100% of the amount of the Contract.

Pollution Insurance in an amount of: _____ per occurrence.

Aircraft Liability in an amount of: _____ per occurrence.

*****STATE OF WV MUST BE LISTED AS AN ADDITIONAL INSURED ON THE INSURANCE CERTIFICATE**

*****CERTIFICATE HOLDER SHOULD READ AS FOLLOWS:
STATE OF WV
1900 KANAWHA BLVD E, BLDG 5, CHARLESTON, WV 25305**

Notwithstanding anything contained in this section to the contrary, the Director of the Purchasing Division reserves the right to waive the requirement that the State be named as an additional insured on one or more of the Vendor's insurance policies if the Director finds that doing so is in the State's best interest.

9. WORKERS' COMPENSATION INSURANCE: The apparent successful Vendor shall comply with laws relating to workers compensation, shall maintain workers' compensation insurance when required, and shall furnish proof of workers' compensation insurance upon request.

10. [Reserved]

11. LIQUIDATED DAMAGES: This clause shall in no way be considered exclusive and shall not limit the State or Agency's right to pursue any other available remedy. Vendor shall pay liquidated damages in the amount specified below or as described in the specifications:

\$40 for \$0-25,000 orders, 470 for \$25,000 to \$100,000 orders and \$150 for \$100,000 to \$5 for each calendar day beyond 30 working days ARO, until the order is filled.

Liquidated Damages Contained in the Specifications

12. ACCEPTANCE: Vendor's signature on its bid, or on the certification and signature page, constitutes an offer to the State that cannot be unilaterally withdrawn, signifies that the product or service proposed by vendor meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise indicated, and signifies acceptance of the terms and conditions contained in the Solicitation unless otherwise indicated.

13. PRICING: The pricing set forth herein is firm for the life of the Contract, unless specified elsewhere within this Solicitation/Contract by the State. A Vendor's inclusion of price adjustment provisions in its bid, without an express authorization from the State in the Solicitation to do so, may result in bid disqualification. Notwithstanding the foregoing, Vendor must extend any publicly advertised sale price to the State and invoice at the lower of the contract price or the publicly advertised sale price.

14. PAYMENT IN ARREARS: Payment in advance is prohibited under this Contract. Payment may only be made after the delivery and acceptance of goods or services. The Vendor shall submit invoices, in arrears.

15. PAYMENT METHODS: Vendor must accept payment by electronic funds transfer and P-Card. (The State of West Virginia's Purchasing Card program, administered under contract by a banking institution, processes payment for goods and services through state designated credit cards.)

16. TAXES: The Vendor shall pay any applicable sales, use, personal property or any other taxes arising out of this Contract and the transactions contemplated thereby. The State of West Virginia is exempt from federal and state taxes and will not pay or reimburse such taxes.

17. ADDITIONAL FEES: Vendor is not permitted to charge additional fees or assess additional charges that were not either expressly provided for in the solicitation published by the State of West Virginia or included in the unit price or lump sum bid amount that Vendor is required by the solicitation to provide. Including such fees or charges as notes to the solicitation may result in rejection of vendor's bid. Requesting such fees or charges be paid after the contract has been awarded may result in cancellation of the contract.

18. FUNDING: This Contract shall continue for the term stated herein, contingent upon funds being appropriated by the Legislature or otherwise being made available. In the event funds are not appropriated or otherwise made available, this Contract becomes void and of no effect beginning on July 1 of the fiscal year for which funding has not been appropriated or otherwise made available.

19. CANCELLATION: The Purchasing Division Director reserves the right to cancel this Contract immediately upon written notice to the vendor if the materials or workmanship supplied do not conform to the specifications contained in the Contract. The Purchasing Division Director may also cancel any purchase or Contract upon 30 days written notice to the Vendor in accordance with West Virginia Code of State Rules § 148-1-5.2.b.

20. TIME: Time is of the essence with regard to all matters of time and performance in this Contract.

21. APPLICABLE LAW: This Contract is governed by and interpreted under West Virginia law without giving effect to its choice of law principles. Any information provided in specification manuals, or any other source, verbal or written, which contradicts or violates the West Virginia Constitution, West Virginia Code or West Virginia Code of State Rules is void and of no effect.

22. COMPLIANCE WITH LAWS: Vendor shall comply with all applicable federal, state, and local laws, regulations and ordinances. By submitting a bid, Vendor acknowledges that it has reviewed, understands, and will comply with all applicable laws, regulations, and ordinances.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to comply with all applicable laws, regulations, and ordinances. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

23. ARBITRATION: Any references made to arbitration contained in this Contract, Vendor's bid, or in any American Institute of Architects documents pertaining to this Contract are hereby deleted, void, and of no effect.

24. MODIFICATIONS: This writing is the parties' final expression of intent. Notwithstanding anything contained in this Contract to the contrary no modification of this Contract shall be binding without mutual written consent of the Agency, and the Vendor, with approval of the Purchasing Division and the Attorney General's office (Attorney General approval is as to form only). Any change to existing contracts that adds work or changes contract cost, and were not included in the original contract, must be approved by the Purchasing Division and the Attorney General's Office (as to form) prior to the implementation of the change or commencement of work affected by the change.

25. WAIVER: The failure of either party to insist upon a strict performance of any of the terms or provision of this Contract, or to exercise any option, right, or remedy herein contained, shall not be construed as a waiver or a relinquishment for the future of such term, provision, option, right, or remedy, but the same shall continue in full force and effect. Any waiver must be expressly stated in writing and signed by the waiving party.

26. SUBSEQUENT FORMS: The terms and conditions contained in this Contract shall supersede any and all subsequent terms and conditions which may appear on any form documents submitted by Vendor to the Agency or Purchasing Division such as price lists, order forms, invoices, sales agreements, or maintenance agreements, and includes internet websites or other electronic documents. Acceptance or use of Vendor's forms does not constitute acceptance of the terms and conditions contained thereon.

27. ASSIGNMENT: Neither this Contract nor any monies due, or to become due hereunder, may be assigned by the Vendor without the express written consent of the Agency, the Purchasing Division, the Attorney General's office (as to form only), and any other government agency or office that may be required to approve such assignments.

28. WARRANTY: The Vendor expressly warrants that the goods and/or services covered by this Contract will: (a) conform to the specifications, drawings, samples, or other description furnished or specified by the Agency; (b) be merchantable and fit for the purpose intended; and (c) be free from defect in material and workmanship.

29. STATE EMPLOYEES: State employees are not permitted to utilize this Contract for personal use and the Vendor is prohibited from permitting or facilitating the same.

30. PRIVACY, SECURITY, AND CONFIDENTIALITY: The Vendor agrees that it will not disclose to anyone, directly or indirectly, any such personally identifiable information or other confidential information gained from the Agency, unless the individual who is the subject of the information consents to the disclosure in writing or the disclosure is made pursuant to the Agency's policies, procedures, and rules. Vendor further agrees to comply with the Confidentiality Policies and Information Security Accountability Requirements, set forth in <http://www.state.wv.us/admin/purchase/privacy/default.html>.

31. YOUR SUBMISSION IS A PUBLIC DOCUMENT: Vendor's entire response to the Solicitation and the resulting Contract are public documents. As public documents, they will be disclosed to the public following the bid/proposal opening or award of the contract, as required by the competitive bidding laws of West Virginia Code §§ 5A-3-1 et seq., 5-22-1 et seq., and 5G-1-1 et seq. and the Freedom of Information Act West Virginia Code §§ 29B-1-1 et seq.

DO NOT SUBMIT MATERIAL YOU CONSIDER TO BE CONFIDENTIAL, A TRADE SECRET, OR OTHERWISE NOT SUBJECT TO PUBLIC DISCLOSURE.

Submission of any bid, proposal, or other document to the Purchasing Division constitutes your explicit consent to the subsequent public disclosure of the bid, proposal, or document. The Purchasing Division will disclose any document labeled "confidential," "proprietary," "trade secret," "private," or labeled with any other claim against public disclosure of the documents, to include any "trade secrets" as defined by West Virginia Code § 47-22-1 et seq. All submissions are subject to public disclosure without notice.

32. LICENSING: In accordance with West Virginia Code of State Rules § 148-1-6.1.e, Vendor must be licensed and in good standing in accordance with any and all state and local laws and requirements by any state or local agency of West Virginia, including, but not limited to, the West Virginia Secretary of State's Office, the West Virginia Tax Department, West Virginia Insurance Commission, or any other state agency or political subdivision. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Upon request, the Vendor must provide all necessary releases to obtain information to enable the Purchasing Division Director or the Agency to verify that the Vendor is licensed and in good standing with the above entities.

SUBCONTRACTOR COMPLIANCE: Vendor shall notify all subcontractors providing commodities or services related to this Contract that as subcontractors, they too are required to be licensed, in good standing, and up-to-date on all state and local obligations as described in this section. Obligations related to political subdivisions may include, but are not limited to, business licensing, business and occupation taxes, inspection compliance, permitting, etc. Notification under this provision must occur prior to the performance of any work under the contract by the subcontractor.

33. ANTITRUST: In submitting a bid to, signing a contract with, or accepting a Award Document from any agency of the State of West Virginia, the Vendor agrees to convey, sell, assign, or transfer to the State of West Virginia all rights, title, and interest in and to all causes of action it may now or hereafter acquire under the antitrust laws of the United States and the State of West Virginia for price fixing and/or unreasonable restraints of trade relating to the particular commodities or services purchased or acquired by the State of West Virginia. Such assignment shall be made and become effective at the time the purchasing agency tenders the initial payment to Vendor.

34. VENDOR CERTIFICATIONS: By signing its bid or entering into this Contract, Vendor certifies (1) that its bid or offer was made without prior understanding, agreement, or connection with any corporation, firm, limited liability company, partnership, person or entity submitting a bid or offer for the same material, supplies, equipment or services; (2) that its bid or offer is in all respects fair and without collusion or fraud; (3) that this Contract is accepted or entered into without any prior understanding, agreement, or connection to any other entity that could be considered a violation of law; and (4) that it has reviewed this Solicitation in its entirety; understands the requirements, terms and conditions, and other information contained herein.

Vendor's signature on its bid or offer also affirms that neither it nor its representatives have any interest, nor shall acquire any interest, direct or indirect, which would compromise the performance of its services hereunder. Any such interests shall be promptly presented in detail to the Agency. The individual signing this bid or offer on behalf of Vendor certifies that he or she is authorized by the Vendor to execute this bid or offer or any documents related thereto on Vendor's behalf; that he or she is authorized to bind the Vendor in a contractual relationship; and that, to the best of his or her knowledge, the Vendor has properly registered with any State agency that may require registration.

35. VENDOR RELATIONSHIP: The relationship of the Vendor to the State shall be that of an independent contractor and no principal-agent relationship or employer-employee relationship is contemplated or created by this Contract. The Vendor as an independent contractor is solely liable for the acts and omissions of its employees and agents. Vendor shall be responsible for selecting, supervising, and compensating any and all individuals employed pursuant to the terms of this Solicitation and resulting contract. Neither the Vendor, nor any employees or subcontractors of the Vendor, shall be deemed to be employees of the State for any purpose whatsoever. Vendor shall be exclusively responsible for payment of employees and contractors for all wages and salaries, taxes, withholding payments, penalties, fees, fringe benefits, professional liability insurance premiums, contributions to insurance and pension, or other deferred compensation plans, including but not limited to, Workers' Compensation and Social Security obligations, licensing fees, etc. and the filing of all necessary documents, forms, and returns pertinent to all of the foregoing.

Vendor shall hold harmless the State, and shall provide the State and Agency with a defense against any and all claims including, but not limited to, the foregoing payments, withholdings, contributions, taxes, Social Security taxes, and employer income tax returns.

36. INDEMNIFICATION: The Vendor agrees to indemnify, defend, and hold harmless the State and the Agency, their officers, and employees from and against: (1) Any claims or losses for services rendered by any subcontractor, person, or firm performing or supplying services, materials, or supplies in connection with the performance of the Contract; (2) Any claims or losses resulting to any person or entity injured or damaged by the Vendor, its officers, employees, or subcontractors by the publication, translation, reproduction, delivery, performance, use, or disposition of any data used under the Contract in a manner not authorized by the Contract, or by Federal or State statutes or regulations; and (3) Any failure of the Vendor, its officers, employees, or subcontractors to observe State and Federal laws including, but not limited to, labor and wage and hour laws.

37. PURCHASING AFFIDAVIT: In accordance with West Virginia Code §§ 5A-3-10a and 5-22-1(i), the State is prohibited from awarding a contract to any bidder that owes a debt to the State or a political subdivision of the State, Vendors are required to sign, notarize, and submit the Purchasing Affidavit to the Purchasing Division affirming under oath that it is not in default on any monetary obligation owed to the state or a political subdivision of the state.

38. ADDITIONAL AGENCY AND LOCAL GOVERNMENT USE: This Contract may be utilized by other agencies, spending units, and political subdivisions of the State of West Virginia; county, municipal, and other local government bodies; and school districts (“Other Government Entities”), provided that both the Other Government Entity and the Vendor agree. Any extension of this Contract to the aforementioned Other Government Entities must be on the same prices, terms, and conditions as those offered and agreed to in this Contract, provided that such extension is in compliance with the applicable laws, rules, and ordinances of the Other Government Entity. A refusal to extend this Contract to the Other Government Entities shall not impact or influence the award of this Contract in any manner.

39. CONFLICT OF INTEREST: Vendor, its officers or members or employees, shall not presently have or acquire an interest, direct or indirect, which would conflict with or compromise the performance of its obligations hereunder. Vendor shall periodically inquire of its officers, members and employees to ensure that a conflict of interest does not arise. Any conflict of interest discovered shall be promptly presented in detail to the Agency.

40. REPORTS: Vendor shall provide the Agency and/or the Purchasing Division with the following reports identified by a checked box below:

Such reports as the Agency and/or the Purchasing Division may request. Requested reports may include, but are not limited to, quantities purchased, agencies utilizing the contract, total contract expenditures by agency, etc.

Quarterly reports detailing the total quantity of purchases in units and dollars, along with a listing of purchases by agency. Quarterly reports should be delivered to the Purchasing Division via email at purchasing.requisitions@wv.gov.

41. BACKGROUND CHECK: In accordance with W. Va. Code § 15-2D-3, the Director of the Division of Protective Services shall require any service provider whose employees are regularly employed on the grounds or in the buildings of the Capitol complex or who have access to sensitive or critical information to submit to a fingerprint-based state and federal background inquiry through the state repository. The service provider is responsible for any costs associated with the fingerprint-based state and federal background inquiry.

After the contract for such services has been approved, but before any such employees are permitted to be on the grounds or in the buildings of the Capitol complex or have access to sensitive or critical information, the service provider shall submit a list of all persons who will be physically present and working at the Capitol complex to the Director of the Division of Protective Services for purposes of verifying compliance with this provision. The State reserves the right to prohibit a service provider’s employees from accessing sensitive or critical information or to be present at the Capitol complex based upon results addressed from a criminal background check.

Revised 01/09/2020

Service providers should contact the West Virginia Division of Protective Services by phone at (304) 558-9911 for more information.

42. PREFERENCE FOR USE OF DOMESTIC STEEL PRODUCTS: Except when authorized by the Director of the Purchasing Division pursuant to W. Va. Code § 5A-3-56, no contractor may use or supply steel products for a State Contract Project other than those steel products made in the United States. A contractor who uses steel products in violation of this section may be subject to civil penalties pursuant to W. Va. Code § 5A-3-56. As used in this section:

- a. "State Contract Project" means any erection or construction of, or any addition to, alteration of or other improvement to any building or structure, including, but not limited to, roads or highways, or the installation of any heating or cooling or ventilating plants or other equipment, or the supply of and materials for such projects, pursuant to a contract with the State of West Virginia for which bids were solicited on or after June 6, 2001.
- b. "Steel Products" means products rolled, formed, shaped, drawn, extruded, forged, cast, fabricated or otherwise similarly processed, or processed by a combination of two or more or such operations, from steel made by the open heath, basic oxygen, electric furnace, Bessemer or other steel making process. The Purchasing Division Director may, in writing, authorize the use of foreign steel products if:
- c. The cost for each contract item used does not exceed one tenth of one percent (.1%) of the total contract cost or two thousand five hundred dollars (\$2,500.00), whichever is greater. For the purposes of this section, the cost is the value of the steel product as delivered to the project; or
- d. The Director of the Purchasing Division determines that specified steel materials are not produced in the United States in sufficient quantity or otherwise are not reasonably available to meet contract requirements.

43. PREFERENCE FOR USE OF DOMESTIC ALUMINUM, GLASS, AND STEEL: In Accordance with W. Va. Code § 5-19-1 et seq., and W. Va. CSR § 148-10-1 et seq., for every contract or subcontract, subject to the limitations contained herein, for the construction, reconstruction, alteration, repair, improvement or maintenance of public works or for the purchase of any item of machinery or equipment to be used at sites of public works, only domestic aluminum, glass or steel products shall be supplied unless the spending officer determines, in writing, after the receipt of offers or bids, (1) that the cost of domestic aluminum, glass or steel products is unreasonable or inconsistent with the public interest of the State of West Virginia, (2) that domestic aluminum, glass or steel products are not produced in sufficient quantities to meet the contract requirements, or (3) the available domestic aluminum, glass, or steel do not meet the contract specifications. This provision only applies to public works contracts awarded in an amount more than fifty thousand dollars (\$50,000) or public works contracts that require more than ten thousand pounds of steel products.

The cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than twenty percent (20%) of the bid or offered price for foreign made aluminum, glass, or steel products. If the domestic aluminum, glass or steel products to be supplied or produced in a


“substantial labor surplus area”, as defined by the United States Department of Labor, the cost of domestic aluminum, glass, or steel products may be unreasonable if the cost is more than thirty percent (30%) of the bid or offered price for foreign made aluminum, glass, or steel products. This preference shall be applied to an item of machinery or equipment, as indicated above, when the item is a single unit of equipment or machinery manufactured primarily of aluminum, glass or steel, is part of a public works contract and has the sole purpose or of being a permanent part of a single public works project. This provision does not apply to equipment or machinery purchased by a spending unit for use by that spending unit and not as part of a single public works project.

All bids and offers including domestic aluminum, glass or steel products that exceed bid or offer prices including foreign aluminum, glass or steel products after application of the preferences provided in this provision may be reduced to a price equal to or lower than the lowest bid or offer price for foreign aluminum, glass or steel products plus the applicable preference. If the reduced bid or offer prices are made in writing and supersede the prior bid or offer prices, all bids or offers, including the reduced bid or offer prices, will be reevaluated in accordance with this rule.

44. INTERESTED PARTY SUPPLEMENTAL DISCLOSURE: W. Va. Code § 6D-1-2 requires that for contracts with an actual or estimated value of at least \$1 million, the vendor must submit to the Agency a supplemental disclosure of interested parties reflecting any new or differing interested parties to the contract, which were not included in the original pre-award interested party disclosure, within 30 days following the completion or termination of the contract. A copy of that form is included with this solicitation or can be obtained from the WV Ethics Commission. This requirement does not apply to publicly traded companies listed on a national or international stock exchange. A more detailed definition of interested parties can be obtained from the form referenced above.

45. PROHIBITION AGAINST USED OR REFURBISHED: Unless expressly permitted in the solicitation published by the State, Vendor must provide new, unused commodities, and is prohibited from supplying used or refurbished commodities, in fulfilling its responsibilities under this Contract.

DESIGNATED CONTACT: Vendor appoints the individual identified in this Section as the Contract Administrator and the initial point of contact for matters relating to this Contract.

 / Owner

(Name, Title) Loren Stayer / Owner

(Printed Name and Title)
1290 Fox Lane, Mogadore, OH 44260

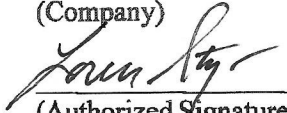
(Address)
330-608-5002

(Phone Number) / (Fax Number)
Loren@Ironarmour.com

(email address)

CERTIFICATION AND SIGNATURE: By signing below, or submitting documentation through wvOASIS, I certify that I have reviewed this Solicitation in its entirety; that I understand the requirements, terms and conditions, and other information contained herein; that this bid, offer or proposal constitutes an offer to the State that cannot be unilaterally withdrawn; that the product or service proposed meets the mandatory requirements contained in the Solicitation for that product or service, unless otherwise stated herein; that the Vendor accepts the terms and conditions contained in the Solicitation, unless otherwise stated herein; that I am submitting this bid, offer or proposal for review and consideration; that I am authorized by the vendor to execute and submit this bid, offer, or proposal, or any documents related thereto on vendor's behalf; that I am authorized to bind the vendor in a contractual relationship; and that to the best of my knowledge, the vendor has properly registered with any State agency that may require registration.

Iron Armour, LLC

(Company)
 / Owner

(Authorized Signature) (Representative Name, Title)
Loren Stayer / Owner

(Printed Name and Title of Authorized Representative)
02/05/2020

(Date)
330-608-5002

(Phone Number) (Fax Number)

ADDENDUM ACKNOWLEDGEMENT FORM
SOLICITATION NO.: DOT2000000111

Instructions: Please acknowledge receipt of all addenda issued with this solicitation by completing this addendum acknowledgment form. Check the box next to each addendum received and sign below. Failure to acknowledge addenda may result in bid disqualification.

Acknowledgment: I hereby acknowledge receipt of the following addenda and have made the necessary revisions to my proposal, plans and/or specification, etc.

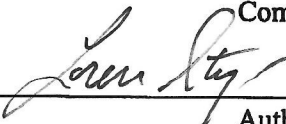
Addendum Numbers Received:

(Check the box next to each addendum received)

- | | |
|--|--|
| <input checked="" type="checkbox"/> Addendum No. 1 | <input type="checkbox"/> Addendum No. 6 |
| <input type="checkbox"/> Addendum No. 2 | <input type="checkbox"/> Addendum No. 7 |
| <input type="checkbox"/> Addendum No. 3 | <input type="checkbox"/> Addendum No. 8 |
| <input type="checkbox"/> Addendum No. 4 | <input type="checkbox"/> Addendum No. 9 |
| <input type="checkbox"/> Addendum No. 5 | <input type="checkbox"/> Addendum No. 10 |

I understand that failure to confirm the receipt of addenda may be cause for rejection of this bid. I further understand that any verbal representation made or assumed to be made during any oral discussion held between Vendor's representatives and any state personnel is not binding. Only the information issued in writing and added to the specifications by an official addendum is binding.

Iron Armour, LLC

Company
 / Owner
Authorized Signature

February 5, 2020

Date

NOTE: This addendum acknowledgement should be submitted with the bid to expedite document processing.
Revised 6/8/2012

**REQUEST FOR QUOTATION
CRFQ DOT2000000111
Traffic Signal Parts and Equipment (8520C3001)**

SPECIFICATIONS

- 1. PURPOSE AND SCOPE:** The West Virginia Purchasing Division is soliciting bids on behalf of the West Virginia Division of Highways (WVDOH) to establish an open-end contract for Traffic Signal Equipment for existing Traffic Signal infrastructure.

- 2. DEFINITIONS:** The terms listed below shall have the meanings assigned to them below. Additional definitions can be found in section 2 of the General Terms and Conditions.
 - 2.1 “Contract Item” or “Contract Items”** means the list of items identified in Section 3.1 below and on the Pricing Pages.
 - 2.2 “Pricing Pages”** means the schedule of prices, estimated order quantity, and totals contained in WVOASIS or attached hereto as **Exhibit A**, and used to evaluate the Solicitation responses.
 - 2.3 “Solicitation”** means the official notice of an opportunity to supply the State with goods or services that is published by the Purchasing Division.
 - 2.4 “LED”** means Light Emitting Diode.
 - 2.5 “MMU”** means Malfunctioning Monitoring Unit.
 - 2.6 “TS1”** means NEMA Standards Publication TS 1-2003 (R2008) Traffic Controller Assemblies for Traffic Signal Systems [updated in 2003, revised in 2008].
 - 2.7 “TS2”** means NEMA Standards Publication TS 2-2003 (R2008) Traffic Controller Assemblies for Traffic Signal Systems [updated in 2003, revised in 2008].
 - 2.8 “RFQ”** means Request for Quotation.
 - 2.9 “ASTM”** means American Society for Testing and Materials.
 - 2.10 “AASHTO”** means American Association of State Highway Transportation Officials.
 - 2.11 “NEMA”** means National Electrical Manufacturers Association.
 - 2.12 “Equivalent”** means equal in value, function or quality.

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- 2.13 The symbol “ % ” means percent which means one part in every hundred.
- 2.14 “SEPAC®” is a registered trade name (trademark) for a traffic signal control software program owned by Siemens/Eagle.
- 2.15 “TACTICS®” is a registered trade name (trademark) for a traffic signal control software program owned by Siemens/Eagle.
- 2.16 “SEMARC®” is a registered trade name (trademark) for a traffic signal control software program owned by Siemens/Eagle.
- 2.17 “BIU” means Bus Interface Unit.
- 2.18 “RC” means Resistive/Capacitive.
- 2.19 “DC” means Direct Current.
- 2.20 “AC” means Alternating Current.
- 2.21 “AWG” means American Wire Gauge.
- 2.22 “PVC” means PolyVinyl Chloride.
- 2.23 “SDLC” means Synchronous Data Link Control.
- 2.24 “HACR” means Heating, Air-Conditioning and Refrigeration.
- 2.25 “UL” means Underwriters Laboratories.
- 2.26 “VDC” means Volts Direct Current.
- 2.27 “VAC” means Volts Alternating Current.
- 2.28 “GFI” means Ground-Fault Interrupting.
- 2.29 “ETL” means Environmental Testing Laboratories.
- 2.30 “EMTRAC” is a registered trade name (trademark) for a traffic signal control software program and system owned by STC, Inc.

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- 2.31 “FPM”** means Flashes Per Minute.
- 2.32 “I/O”** means Input/Output.
- 2.33 “ARIES®”** is a registered trade name (trademark) for a traffic signal control software program owned by Econolite.
- 2.34 “CENTRACS®”** is a registered trade name (trademark) for a traffic signal control software program owned by Econolite.
- 2.35 “RTV”** is a designation for high-temperature resistive silicone gasket material.
- 2.36 “GE”** means General Electric.
- 2.37 “MUTCD”** means Manual on Uniform Traffic Control Devices (2009 Edition with Revisions 1 and 2, May 2012).
- 2.38 “EMI”** means ElectroMagnetic Interference.
- 2.39 “RFI”** means Radio Frequency Interference.
- 2.40 “FCC”** mean Federal Communications Commission.
- 2.41 “GHZ”** means GigaHertz, a measurement of frequency.
- 2.42 “MHZ”** means MegaHertz, a measurement of frequency.
- 2.43 “CPU”** means Central Processing Unit.
- 2.44 “MPH”** means Miles Per Hour.
- 2.45 “dB”** means decibel, a unit of measuring sound power.
- 2.46 “VSWR”** means Voltage Standing Wave Ratio.
- 2.47 “BUS”** is a designation for a metal strip or bar.

**REQUEST FOR QUOTATION
CRFQ DOT2000000111
Traffic Signal Parts and Equipment (8520C3001)**

3. GENERAL REQUIREMENTS:

3.1 Contract Items and Mandatory Requirements: Vendor shall provide Agency with the Contract Items listed below on an open-end and continuing basis. Contract Items must meet or exceed the mandatory requirements as shown below. The specifications of this RFQ and or any WVDOH Standards referenced in and/or attached to this RFQ may include references to specific recognized “industry standard” specifications which are issued by third parties, such as the American Society for Testing and Materials (ASTM) and the American Association of State and Highway Transportation Officials (AASHTO). Such specifications are protected by strict copyright restrictions and cannot be published as part of this RFQ. The ability to access such specifications shall be considered a mandatory requirement for participation in this RFQ process as a Vendor or as a supplier to the Vendor, as applicable.

3.1.1 Contract Item #1 – Siemens Eagle Traffic Controller or Equal

3.1.1.1 Contract Item #1 shall be a Siemens EPACM60 series or Equal, 16-phase, NEMA TS2 Type 2 traffic controller with Siemens SEPAC® software or equivalent that is backwards compatible with NEMA TS1 and TS2, Type 1 controller cabinets. An equal controller is defined as a controller that can be interchanged with the existing controllers using the SEPAC® or TACTICS® software at 100% capacity and without changes to the existing software and controllers.

3.1.2 Contract Item #2 – Siemens Eagle Master Traffic Controller or Equal

3.1.2.1 Contract Item #2 shall be a Siemens EPACM60 series or Equal, 16-phase, NEMA TS2 Type 2, closed-loop, master traffic controller with Siemens SEMARC® software or equivalent that is backwards compatible with NEMA TS1 and TS2, Type 1 controller cabinets. Controller must have either radio connection or hard-wired connection or equivalent, per purchase order. An equal controller is defined as a controller that can be interchanged with the existing controllers using the SEMARC® software at 100% capacity and without changes to the existing software and controllers.

3.1.3 Contract Item #3 - Repairs of Siemens Eagle Traffic Signal Controllers or Equal

REQUEST FOR QUOTATION
CRFQ DOT200000111
Traffic Signal Parts and Equipment (8520C3001)

3.1.3.1 Contract Item #3 shall be for the repair of Siemens Eagle EPAC series or Equal traffic controllers and master traffic controllers compatible with NEMA TS1, TS2, Type 1 and TS2, Type 2 cabinets. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by a Siemens Eagle or Equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.4 Contract Item # 4 - Eagle Traffic Control Systems TS2 Traffic Signal Cabinet or Equal - Pole Mounted

3.1.4.1 Contract Item # 4 shall be an Eagle Traffic Control Systems (a division or Mobotrex) Size M36 (Model #EL704S2 or equivalent) with two (2) pole-mount brackets (UL26).

Cabinets: The following are minimum design requirements for a TS2 Type 1 or Type 2 traffic control cabinet assembly. As a minimum, the cabinet assembly shall meet all applicable sections of the NEMA Standard publication No.TS2-2003 (Revised 2008) or most recent version. Where differences occur, this specification shall govern.

Cabinet Design and Construction: The cabinet shall be constructed from type 5052-H32 aluminum with a minimum thickness of 0.090 to 0.125 inches. The cabinet shall have the following features:

1. The cabinet shall be designed and manufactured with materials that will allow rigid mounting, whether intended for pole, base or pedestal mounting.
2. The cabinet must not flex on its mount.
3. A rain channel shall be incorporated into the design of the main door opening to prevent liquids from entering the enclosure.
4. The cabinet door opening must be a minimum of 80 percent of the front surface of the cabinet.
5. A stiffener plate shall be welded across the inside of the main door to prevent flexing.
6. Top of the cabinet shall incorporate a slope toward the rear to prevent rain accumulation.
7. The cabinet shall be supplied with a natural aluminum finish.

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Traffic Signal Parts and Equipment (8520C3001)

8. Sufficient care shall be taken in handling to ensure that scratches are minimized.
9. All surfaces shall be free from weld flash. Welds shall be smooth, neatly formed, free from cracks, blowholes and other irregularities.
10. All sharp edges shall be ground smooth.
11. All seams that are not welded shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
12. All cabinets shall be supplied with a minimum of two (2) removable shelves manufactured from 5052-H32 aluminum. Shelf shall be a minimum of 10 inches deep. Shelves to be designed to accommodate a minimum 50-pound loading. The shelf shall have horizontal slots at the rear and vertical slots at the front of the turned down side flange. The shelf shall be installed securely at the rear edge of the shelf on the cabinet rear sidewall mounting studs, then lowering the shelf on the front sidewall mounting studs. The front edge of the shelf shall have holes punched every 6 inches to accommodate tie-wrapping of cables/harnesses.
13. A minimum of two (2) sets of vertical "C" channels shall be mounted on each interior wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring mounted nuts or studs. All mounting rails shall extend to within 7 inches of the top and bottom of the cabinet. Sidewall rail spacing shall be no more than 9.0 inches center-to-center. Rear wall rail spacing shall be 19.0 inches center-to-center.
14. The main door and police door-in-door shall close against a weatherproof and dust-proof, closed-cell neoprene gasket seal. The gasket material for the main door shall be a minimum of 0.250 inches thick by 1.00 inch wide. The gasket material for the police door shall be a minimum of 0.250 inches thick by 0.500 inches wide. The gaskets shall be permanently bonded to the cabinet.
15. The cabinet shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient air flow per the rated fan capacity. Louvers must satisfy the NEMA rod entry test for 3R ventilated enclosures. A non-corrosive, vermin- and insect-proof, removable air filter shall be secured to the air entrance. The filter shall fit snugly against the cabinet door wall. The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125 inches in diameter.

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16. The main door of the cabinet shall be equipped with a three-point latching mechanism. The handle on the main door of the cabinet shall be manufactured from cast aluminum or stainless steel. The handle shall include a hasp for the attachment of an optional padlock. The cabinet door handle shall rotate counterclockwise to open. The handle shall not extend beyond the perimeter of the main door at any time.
17. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door.
18. The main door hinge shall be a one-piece, continuous piano hinge with a stainless-steel pin running the entire length of the door. The hinge shall be attached in such a manner that no rivets or bolts are exposed.
19. The main door shall include a mechanism capable of holding the door open at approximately 90, and/or (165 or 180) degrees under windy conditions. The main door shall be equipped with a standard Corbin No. 2 lock or exact equivalent.
20. Minimum of two keys shall be supplied.

The police door-in-door shall be provided with a treasury type lock Corbin No. R357SGS or exact equivalent and have a minimum of one key. Each cabinet shall be of sufficient size to accommodate all equipment. At a minimum, the cabinet sizes are as follows:

POLE MOUNTED EAGLE CABINETS

51.00 INCHES HEIGHT
36.00 INCHES WIDTH
17.00 INCHES DEPTH

Main door shall incorporate a shroud to cover the filtered louvered openings. The assembly is secured on the interior of the door over the filtered Louvers. The shroud is louvered downward and matches the door louvers. All enclosures must be constructed, approved and marked in accordance with the requirements for Type 1 Industrial Control Panel Enclosures contained in UL 508A, the Standard for Industrial Control Panels. Enclosure must meet NEMA 3R rating requirements and be marked with UL approval sticker.

Terminals and Facilities/Main panel Design and Construction: The main panel shall be constructed from 5052-H32 brushed aluminum of 0.125 inch minimum thickness and

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installed so as to minimize flexing when plug-in components are installed. All main panels are provided with a mounting mechanism which allows access to all wiring on the rear of the panel without the removal of any cabinet shelves. Lowering of the main panel can be accomplished. Complete removal can be accomplished by use of hand tools.

The cabinet shall have the following features:

1. The terminals and facilities shall be available as a minimum in the following configuration: Sixteen load switch sockets, six flash transfer relay sockets, one flasher socket, 2-BIU sockets (expandable to 4), one 16-channel detector rack (expandable to 4) with one BIU, and one Type-16 MMU.
2. All load switch and flash transfer relay socket reference designators shall be silk-screen labeled on the front and rear of the main panel to match drawing designations. Socket pins shall be marked for reference on the rear of the panel. A maximum of eight load switch sockets may be positioned horizontally or stacked in two rows on the main panel.
3. Main panels requiring more than eight load switch sockets shall be mounted in one horizontal or two vertical rows. All load switches shall be supported by a bracket, extending at least half the length of the load switch.
4. The 16 load switch position main panels shall have all field wires contained on two rows of horizontally mounted terminal blocks. The upper row shall be wired for the pedestrian and overlap field terminations. The lower row shall be reserved for phase one through phase eight vehicle field terminations.
5. All field output circuits shall be terminated on a non-fused barrier type terminal block with a minimum rating of 10 amps.
6. All field input/output (I/O) terminals shall be identified by permanent alphanumeric labels. All labels shall use standard nomenclature per the NEMA TS2 specification.
7. It shall be possible to flash either the yellow or red indication on any vehicle movement and to change from one color indication to the other by use of a screwdriver. Field terminal blocks shall be wired to use four positions per vehicle or overlap phase (green, yellow, and red, flash).

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8. It shall not be necessary to de-buss field terminal blocks for flash programming. The main panel shall contain at least one flasher socket (silk screen labeled) capable of operating a 15-amp, 2-pole, NEMA solid-state flasher. The flasher shall be supported by a bracket, extending at least half its length.
9. One RC network shall be wired in parallel with each group of three flash-transfer relays and any other relay coils.
10. All logic-level, NEMA-controller and Malfunction Management Unit input and output terminations on the main panel shall be permanently labeled.
11. Cabinet prints shall identify the function of each terminal position.
12. At a minimum, three 20-position terminal blocks shall be provided at the top of the main panel to provide access to the controller unit's programmable and non-programmable I/O.
13. Terminal blocks for DC signal interfacing shall have a number 6-32 x 7/32-inch screw as minimum.

All main panel wiring shall conform to the following wire size exactly and color:

1. Green/Walk load switch output - brown wire - 14 gauge
2. Yellow load switch output - yellow wire - 14 gauge
3. Red/Don't Walk load switch - red wire output - 14 gauge
4. MMU (other than AC power) - violet wire - 22 gauge
5. Controller I/O - blue wire - 22 gauge
6. AC Line (power panel to - black wire main panel) - 8 gauge
7. AC Line (main panel) - black wire - 10 gauge
8. AC Neutral (power panel to - white wire main panel) - 8 gauge
9. AC Neutral (main panel) - white wire - 10 gauge
10. Earth ground (power panel) - green wire - 8 gauge
11. Logic ground - gray wire - 22 gauge
12. Flash programming - Orange wire
13. Flasher terminal - Black wire red or yellow field terminal - 14 gauge

All wiring, 14 AWG and smaller, shall conform to MIL-W-16878/1, type B/N, 600V, 19-strand tinned copper. The wire shall have a minimum of 0.010 inches thick PVC insulation with clear

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nylon jacket and rated to 105 degrees Celsius. All wiring shall have the following features:

1. All 12 AWG and larger wire shall have UL listed THHN/THWN-2 90 degrees Celsius, 600V, 0.020 inches thick PVC insulation and clear nylon jacketing.
2. Connecting cables shall be sleeved in a braided nylon mesh or poly-jacketed.
3. The use of exposed tie wraps or interwoven cables is unacceptable.
4. All Terminals and Facilities configurations shall be provided with BIU wiring assignments consistent with NEMA TS2-2003 specifications.
5. All Terminals and Facilities configurations shall be provided with sufficient RS-485 Port 1 communication cables to allow for the intended operation of that cabinet.
6. Each SDLC communication cable connector shall be a 15-pin metal shell D subminiature type. The cable shall be a shielded cable suitable for RS-485 communications.
7. All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.
8. All wiring shall be neat in appearance.
9. All cabinet wiring shall be continuous from its point of origin to its termination point.
10. Butt type connections or splices are not acceptable.
11. All connecting cables and wire runs shall be secured by mechanical clamps. Stick-on type clamps are not acceptable.
12. The grounding system in the cabinet shall be divided into three separate circuits (AC Neutral, Earth Ground, and Logic Ground). These ground circuits shall be connected together at a single point as outlined in the NEMA TS2 Standard. The main panel shall incorporate a relay, to be designed as K1, to remove +24 VDC from the common side of the load switches when the intersection is placed into mechanical flash. The relay shall have a momentary pushbutton located on the relay to apply power to the load switch inputs for ease of troubleshooting.
13. All pedestrian push button inputs from the field to the controller shall be opto-isolated through the BIU and operate at 12 VAC. All wire (size 16 AWG or smaller) at solder joints shall be hooked or looped around the eyelet or terminal block post prior to

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soldering to ensure circuit integrity. Lap joint soldering is not acceptable.

Power Panel Design and Construction: The power panel shall be integrated into the main panel and be located on the lower right portion of the cabinet. The power panel shall be wired to provide the necessary filtered power to the load switches, flasher(s), and power bus assembly. The power components shall be equipped with a removable plastic front cover for protection. The design will allow a technician to access the main and auxiliary breakers without removing the protective front cover. The power panel portion of the main panel shall include the following components:

- A minimum of one (1) 40-amp main breaker for 16 position cabinets. This breaker shall supply power to the controller, MMU, signals, cabinet power supply and auxiliary panels. Breakers shall be at minimum, a thermal magnetic type, UL listed for HACR service, with a minimum of 10,000 amp interrupting capacity.
- A minimum of one (1) 15-amp auxiliary breaker. This breaker shall supply power to the fan, light and GFI utility outlet.
- An EDCO model SHP-300-10 or exact approved equivalent surge arrester.
- A 50 amp, 125 VAC radio interference line filter.
- A normally-open, 50-amp, Solid State Relay (SSR). Shall be Crydom Model Number HA4875H or approved equal.
- A minimum of one (1) 8-position neutral bus bar capable of connecting three #12 wires per position.
- A minimum of one (1) 6-position ground bus bar capable of connecting three #12 wires per position.
- A minimum of one (1) NEMA type 5-15R GFI utility outlet.
- The cabinet shall have a roll-out/swing-out concealable shelf/platform that can be used as platform for a laptop computer or other tools when the cabinet door is opened.

Power and SDLC Bus Panel: The Power and SDLC BUS Panel shall be manufactured from 0.090 to 0.125 inch thick, 5052-H32 aluminum. It shall provide a central location to supply filtered power for the controller, malfunction management unit, cabinet power supply, and all auxiliary equipment. It shall have the following features:

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1. It shall include the SDLC Bus connecting cables wired to a barrier type terminal block. As an alternate, SDLC Bus connections may be made via an SDLC Hub Assembly.
2. All cabinet equipment requiring filtered power to operate shall be hardwired directly to the supplied barrier type terminal blocks on the Power and SDLC BUS Panel.
3. All AC+ power sources shall be protected with a removable plastic cover plate.
4. The SDLC Hub Assembly shall accommodate all D-Subminiature Female 15 (DB15) connectors as required, and a minimum of five (5) SLDC connections shall be provided.

Auxiliary Cabinet Equipment: The cabinet shall be provided with a thermostatically controlled (adjustable between 55-160 degrees Fahrenheit) ventilation fan in the top of the cabinet plenum. The fan plate shall be removable with the use of hand tools for serviceability. A minimum of one, maximum of two, exhaust fans shall be provided. The fan shall be a ball bearing type fan and shall be capable of drawing a minimum of 100 cubic feet of air per minute (CFM). The Fan/Thermostat assembly shall be connected to the Power panel by means of a 4 position plug-in cable or hardwired to an appropriate circuit breaker.

A LED cabinet lighting system may be used to illuminate the internal structure of the cabinet assembly. The LED cabinet lighting shall be a Luxembright LED module Model #770-W0013 and approved power supply or approved equivalent. This lighting system shall be wired directly to a door active switch mounted near the top of the door. Alternately, a fluorescent lighting fixture shall be mounted on the inside top of the cabinet near the front edge. The fixture shall be rated to accommodate at minimum a F15T8 lamp operated from a normal power factor UL or ETL listed ballast. The lamp shall be wired on the power panel or to a door activated switch mounted near the top of the door.

A re-sealable print pouch shall be mounted to the door of the cabinet. The pouch shall be of sufficient size to accommodate one complete set of folded cabinet prints. A minimum of two sets of complete and accurate cabinet drawings shall be supplied with each cabinet.

Vehicle Detection: A minimum of one Detector rack shall be provided in each cabinet. The detector rack shall have the following features:

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1. Shall support up to 16 channels of loop detection (either eight 2 channel detectors or four 4 channel detectors), two 2-channel preemption devices and one BIU.
2. All connections to the back of the detector racks to the detector cards shall be soldered to a 44 terminal, double row, 3.962 mm (0.156 in.) contact spacing, Cinch Jones card edge connector 50-44A-30M, or equivalent centered vertically for each detector module.
3. All designations shall correspond to the requirements of the TS2-2003 specification. Card guides shall be provided on the top and bottom of the card rack for each connector position.
4. Each cabinet shall contain a detector interface panel per each detector rack for the purpose of connecting field loops and vehicle detector amplifiers. The panels shall be manufactured from 0.090 or 0.125 inch thick 5052- H32 Aluminum and use barrier type terminal blocks.
5. One 16-position interface panel shall be provided for a 16-channel rack cabinet. The interface panel shall be secured to the left wall of the cabinet.
6. Each interface panel shall allow for the connection of a minimum of eight independent field detectors.
7. In the case of loop detection, a ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in cable ground wire. Each interface panel shall provide a barrier style terminal block to terminate the field wires for up to two 2-channel preemption devices.
8. Lightning protection device mounting holes shall be provided to accommodate the potential usage of an EDCO LCA-6, lightning protection device.
9. A cable consisting of 20 AWG twisted pair wires shall be wired directly from the interface panel to the detector rack. The twisted pair wires shall be color coded red and white wire. No connectors shall be used to connect the interface panel to the detector rack.
10. All termination points shall be identified by a unique number and silk screened on the panel. Each detector rack shall accommodate rack mountable preemption devices such as EMTRAC or Opticom.

Cabinet Test Switches and Police Panel: A test switch panel shall be mounted on the inside of the main door. The test switch panel shall provide as a minimum the following:

1. **SIGNALS ON/OFF SWITCH** - In the OFF position, power shall be removed from signal heads in the intersection. The

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controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.

2. AUTO/FLASH SWITCH - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall not be stop timed when in flash. Wired according to NEMA-TS2-2003, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. STOP TIME SWITCH - When applied, the controller shall be stop timed in the current interval.
4. CONTROL EQUIPMENT POWER ON/OFF - This switch shall control the controller, MMU, and cabinet power supply AC power. The TS2 controller to be provided with the cabinet assembly shall provide vehicular and pedestrian call inputs from its keyboard while in the standard status display.

The police door switch panel shall contain the following:

1. SIGNALS ON/OFF SWITCH - In the OFF position, power shall be removed from signal heads within the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. AUTO/FLASH SWITCH - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall be stop timed when in flash. Wired according to NEMA-TS2-1998, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. AUTO/MANUAL SWITCH - Cabinet wiring shall include provisions for an AUTO/MANUAL switch and a momentary push button or hand cord. The AUTO/MANUAL switch and push button or hand cord shall not be provided unless it is called for in the CUSTOMER SPECIFICATION.

All toggle type switches shall be heavy duty and rated 15 amps minimum. Single- or double-pole switches may be provided, as required. Any exposed terminals or switch solder points shall be covered with a non-flexible shield to prevent accidental contact. All switch functions must be permanently and clearly labeled. All wire routed to the police door-in-door and test switch push button panel shall be adequately protected against damage from repetitive opening and closing of the main door.

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Auxiliary Devices:

Load Switches: Load switches shall be solid state and shall conform to the requirements of Section 6.2 of the NEMA TS2 Standard. Signal load switches shall have a minimum rating of 10 amperes at 120 VAC for an incandescent lamp load. The front of the load switch shall be provided with three indicators to show the input signal from the controller to the load switch. Load switches shall be dedicated per phase. The use of load switches for other partial phases is not acceptable. The full complement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Flashers: The flasher shall be solid state and shall conform to the requirements of section 6.3 of the NEMA TS2 Standard. Flashing of field circuits for the purpose of intersection flash shall be accomplished by a separate flasher. The flasher shall be rated at 15 amperes, double pole with a nominal flash rate of 60 FPM. A full complement of flasher shall be provided.

Flash Transfer Relays: All flash transfer relays shall meet the requirements of Section 6.4 of the NEMA TS2 Standard. The coil of the flash transfer relay must be de-energized for flash operation. The full complement of relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Malfunction Management Units (MMU): Each cabinet assembly shall be supplied with one MMU as defined by the requirements of Section 4 of the NEMA TS2 Standard. Malfunction Management Units shall be a Type 16. The MMU shall be Model MMU-16 (EDI Model MMU-16LE) or approved equal.

Bus Interface Units (BIU): All BIUs shall meet the requirements of Section 8 of the NEMA TS2 Standard. A full complement of BIUs meeting Section 5.3.1.4 of the NEMA Publication No. TS2-2003 shall be supplied per cabinet. Bus Interface Units shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed. A minimum of 3 BIUs shall be provided for each cabinet. Each BIU shall include power on, transmit and valid data indicators - all indicators shall be LEDs. A Type 1 Interface shall be as defined by Section 5.3, the controller interface shall conform to the Standard Publication No. TS2-2003.

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Cabinet Power Supply: The cabinet power supply shall meet the requirements of Section 5.3.5 of the NEMA TS2 Standard. The cabinet power supply shall provide LED indicators for the line frequency, 12 VDC, 12 VAC, and 24 VDC outputs. The cabinet power supply shall provide (on the front panel) jack plugs for access to the +24 VDC for test purposes. Cabinet power supply shall be provided with each cabinet assembly per manufacturer's specifications and be wired directly to the Power Bus Assembly via a 12-pin Molex Robotic type connector Model# 54332-1270 or exact equivalent.

Testing: Each controller and cabinet assembly shall be tested as a complete entity under signal load for a minimum of 48 hours. Each assembly shall be delivered with a signed document detailing the cabinet final tests performed. The cabinet shall be assembled and tested by the controller manufacturer or authorized local distributor to ensure proper component integration and operation.

Warranty: The controller and Malfunction Management Unit shall be warranted by the manufacturer against mechanical and electrical defects for a period of two years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable. The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment. Any defects shall be corrected by the manufacturer at no cost to the owner.

**3.1.5 Contract Items #5 - Eagle Traffic Control Systems TS 2
Traffic Signal Cabinet or Equal - Ground Mounted**

3.1.5.1 Contract Item # 5 shall be an Eagle Traffic Control Systems (a division or Mobotrex) Size P (Model #EL712 or equivalent) with one (1) set [of four (4)] anchor bolts (UA242).

Cabinets: The following are minimum design requirements for a TS2 Type 1 or Type 2 traffic control cabinet assembly. As a minimum, the cabinet assembly shall meet all applicable sections of the NEMA Standard publication No.TS2-2003 (Revised 2008) or most recent version. Where differences occur, this specification shall govern.

Cabinet Design and Construction: The cabinet shall be constructed from type 5052-H32 aluminum with a minimum

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thickness of 0.090 to 0.125 inches. The cabinets shall have the following features:

1. The cabinet shall be designed and manufactured with materials that will allow rigid mounting, whether intended for pole, base or pedestal mounting.
2. The cabinet must not flex on its mount.
3. A rain channel shall be incorporated into the design of the main door opening to prevent liquids from entering the enclosure.
4. The cabinet door opening must be a minimum of 80 percent of the front surface of the cabinet.
5. A stiffener plate shall be welded across the inside of the main door to prevent flexing.
6. Top of the cabinet shall incorporate a slope toward the rear to prevent rain accumulation.
7. The cabinet shall be supplied with a natural aluminum finish.
8. Sufficient care shall be taken in handling to ensure that scratches are minimized.
9. All surfaces shall be free from weld flash. Welds shall be smooth, neatly formed, free from cracks, blowholes and other irregularities.
10. All sharp edges shall be ground smooth.
11. All seams that are not welded shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
12. All cabinets shall be supplied with a minimum of two (2) removable shelves manufactured from 5052-H32 aluminum. Shelf shall be a minimum of 10 inches deep. Shelves to be designed to accommodate a minimum 50-pound loading. The shelf shall have horizontal slots at the rear and vertical slots at the front of the turned down side flange. The shelf shall be installed securely at the rear edge of the shelf on the cabinet rear sidewall mounting studs, then lowering the shelf on the front sidewall mounting studs. The front edge of the shelf shall have holes punched every 6 inches to accommodate tie-wrapping of cables/harnesses.
13. A minimum of two (2) sets of vertical "C" channels shall be mounted on each interior wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring mounted nuts or studs. All mounting rails shall extend to within 7 inches of the top and bottom of the cabinet. Sidewall rail spacing shall be no more than 9.0 inches center-to-center. Rear wall rail spacing shall be 19.0 inches center-to-center.
14. The main door and police door-in-door shall close against a weatherproof and dust-proof, closed-cell neoprene gasket seal. The gasket material for the main door shall be a

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minimum of 0.250 inches thick by 1.00 inch wide. The gasket material for the police door shall be a minimum of 0.250 inches thick by 0.500 inches wide. The gaskets shall be permanently bonded to the cabinet.

15. The cabinet shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient air flow per the rated fan capacity. Louvers must satisfy the NEMA rod entry test for 3R ventilated enclosures. A non-corrosive, vermin- and insect-proof, removable air filter shall be secured to the air entrance. The filter shall fit snugly against the cabinet door wall. The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125 inches in diameter.
16. The main door of the cabinet shall be equipped with a three-point latching mechanism. The handle on the main door of the cabinet shall be manufactured from cast aluminum or stainless steel. The handle shall include a hasp for the attachment of an optional padlock. The cabinet door handle shall rotate counterclockwise to open. The handle shall not extend beyond the perimeter of the main door at any time.
17. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door.
18. The main door hinge shall be a one-piece, continuous piano hinge with a stainless-steel pin running the entire length of the door. The hinge shall be attached in such a manner that no rivets or bolts are exposed.
19. The main door shall include a mechanism capable of holding the door open at approximately 90, and/or (165 or 180) degrees under windy conditions. The main door shall be equipped with a standard Corbin No. 2 lock or exact equivalent.
20. Minimum of two keys shall be supplied.

The police door-in-door shall be provided with a treasury type lock Corbin No. R357SGS or exact equivalent and have a minimum of one key. All base mounted cabinets require anchor bolts to properly secure the cabinet to its base. The cabinet flange for securing the anchor bolts shall not protrude outward from the bottom of the cabinet. Four (4) anchor bolts shall be required for proper installation. Each cabinet shall be of sufficient size to accommodate all equipment. At a minimum, the cabinet sizes are as follows:

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56.00 INCHES HEIGHT
44.00 INCHES WIDTH
25.00 INCHES DEPTH

Main door shall incorporate a shroud to cover the filtered louvered openings. The assembly is secured on the interior of the door over the filtered Louvers. The shroud is louvered downward and matches the door louvers. All enclosures must be constructed, approved and marked in accordance with the requirements for Type 1 Industrial Control Panel Enclosures contained in UL 508A, the Standard for Industrial Control Panels. Enclosure must meet NEMA 3R rating requirements and be marked with UL approval sticker.

Terminals and Facilities/Main panel Design and Construction: The main panel shall be constructed from 5052-H32 brushed aluminum of 0.125 inches minimum thickness and installed so as to minimize flexing when plug-in components are installed. All main panels are provided with a mounting mechanism which allows access to all wiring on the rear of the panel without the removal of any cabinet shelves. Lowering of the main panel can be accomplished. Complete removal can be accomplished by the use of hand tools.

The cabinet shall have the following features:

1. The terminals and facilities shall be available as a minimum in the following configuration: Sixteen load switch sockets, six flash transfer relay sockets, one flasher socket, 2- BIU sockets (expandable to 4), one 16-channel detector rack (expandable to 4) with one BIU, and one Type-16 MMU.
2. All load switch and flash transfer relay socket reference designators shall be silk-screen labeled on the front and rear of the main panel to match drawing designations. Socket pins shall be marked for reference on the rear of the panel. A maximum of eight load switch sockets may be positioned horizontally or stacked in two rows on the main panel.
3. Main panels requiring more than eight load switch sockets shall be mounted in one horizontal or two vertical rows. All load switches shall be supported by a bracket, extending at least half the length of the load switch.
4. The 16 load switch position main panels shall have all field wires contained on two rows of horizontally mounted terminal blocks. The upper row shall be wired for the pedestrian and overlap field terminations. The lower row shall be reserved for phase one through phase eight vehicle field terminations.

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5. All field output circuits shall be terminated on a non-fused barrier type terminal block with a minimum rating of 10 amps.
6. All field input/output (I/O) terminals shall be identified by permanent alphanumeric labels. All labels shall use standard nomenclature per the NEMA TS2 specification.
7. It shall be possible to flash either the yellow or red indication on any vehicle movement and to change from one color indication to the other by use of a screwdriver. Field terminal blocks shall be wired to use four positions per vehicle or overlap phase (green, yellow, and red, flash).
8. It shall not be necessary to de-buss field terminal blocks for flash programming. The main panel shall contain at least one flasher socket (silk screen labeled) capable of operating a 15-amp, 2-pole, NEMA solid-state flasher. The flasher shall be supported by a bracket, extending at least half its length.
9. One RC network shall be wired in parallel with each group of three flash-transfer relays and any other relay coils.
10. All logic-level, NEMA-controller and Malfunction Management Unit input and output terminations on the main panel shall be permanently labeled.
11. Cabinet prints shall identify the function of each terminal position.
12. At a minimum, three 20-position terminal blocks shall be provided at the top of the main panel to provide access to the controller unit's programmable and non-programmable I/O.
13. Terminal blocks for DC signal interfacing shall have a number 6-32 x 7/32 inch screw as minimum.

All main panel wiring shall conform to the following wire size and color:

1. Green/Walk load switch output - brown wire - 14 gauge
2. Yellow load switch output - yellow wire - 14 gauge
3. Red/Don't Walk load switch - red wire output - 14 gauge
4. MMU (other than AC power) - violet wire - 22 gauge
5. Controller I/O - blue wire - 22 gauge
6. AC Line (power panel to - black wire main panel) - 8 gauge
7. AC Line (main panel) - black wire - 10 gauge
8. AC Neutral (power panel to - white wire main panel) - 8 gauge
9. AC Neutral (main panel) - white wire - 10 gauge
10. Earth ground (power panel) - green wire - 8 gauge
11. Logic ground - gray wire - 22 gauge
12. Flash programming - Orange wire
13. Flasher terminal - Black wire red or yellow field terminal - 14 gauge

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All wiring, 14 AWG and smaller, shall conform to MIL-W-16878/1, type B/N, 600V, 19-strand tinned copper. The wire shall have a minimum of 0.010 inches thick PVC insulation with clear nylon jacket and rated to 105 degrees Celsius. All wiring shall have the following features:

1. All 12 AWG and larger wire shall have UL listed THHN/THWN-2 90 degrees Celsius, 600V, 0.020 inches thick PVC insulation and clear nylon jacketed.
2. Connecting cables shall be sleeved in a braided nylon mesh or poly-jacketed.
3. The use of exposed tie wraps or interwoven cables is unacceptable.
4. All Terminals and Facilities configurations shall be provided with BIU wiring assignments consistent with NEMA TS2-2003 specifications.
5. All Terminals and Facilities configurations shall be provided with sufficient RS-485 Port 1 communication cables to allow for the intended operation of that cabinet.
6. Each SDLC communication cable connector shall be a 15-pin metal shell D subminiature type. The cable shall be a shielded cable suitable for RS-485 communications.
7. All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.
8. All wiring shall be neat in appearance.
9. All cabinet wiring shall be continuous from its point of origin to its termination point.
10. Butt type connections or splices are not acceptable.
11. All connecting cables and wire runs shall be secured by mechanical clamps. Stick-on type clamps are not acceptable.
12. The grounding system in the cabinet shall be divided into three separate circuits (AC Neutral, Earth Ground, and Logic Ground). These ground circuits shall be connected together at a single point as outlined in the NEMA TS2 Standard. The main panel shall incorporate a relay, to be designed as K1, to remove +24 VDC from the common side of the load switches when the intersection is placed into mechanical flash. The relay shall have a momentary pushbutton located on the relay to apply power to the load switch inputs for ease of troubleshooting.
13. All pedestrian push button inputs from the field to the controller shall be opto-isolated through the BIU and operate at 12 VAC. All wire (size 16 AWG or smaller) at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. Lap joint soldering is not acceptable.

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Power Panel Design and Construction: The power panel shall be integrated into the main panel and be located on the lower right portion of the cabinet. The power panel shall be wired to provide the necessary filtered power to the load switches, flasher(s), and power bus assembly. The power components shall be equipped with a removable plastic front cover for protection. The design will allow a technician to access the main and auxiliary breakers without removing the protective front cover.

The power panel portion of the main panel shall include the following components:

1. A minimum of one (1) 40-amp main breaker for 16 position cabinets. This breaker shall supply power to the controller, MMU, signals, cabinet power supply and auxiliary panels. Breakers shall be at minimum, a thermal magnetic type, UL listed for HACR service, with a minimum of 10,000 amp interrupting capacity.
2. A minimum of one (1) 15-amp auxiliary breaker. This breaker shall supply power to the fan, light and GFI utility outlet.
3. An EDCO model SHP-300-10 or exact approved equivalent surge arrester.
4. A 50-amp, 125 VAC radio interference line filter.
5. A normally open, 50-amp, Solid State Relay (SSR). Shall be Crydom Model Number HA4875H or approved equal.
6. A minimum of one (1) 8-position neutral bus bar capable of connecting three #12 wires per position.
7. A minimum of one (1) 6-position ground bus bar capable of connecting three #12 wires per position.
8. A minimum of one (1) NEMA type 5-15R GFI utility outlet.
9. The cabinet shall have a roll-out/swing-out concealable shelf/platform that can be used as platform for a laptop computer or other tools when the cabinet door is opened.

Power and SDLC Bus Panel: The Power and SDLC BUS Panel shall be manufactured from 0.090 to 0.125 inch thick, 5052-H32 aluminum. It shall provide a central location to supply filtered power for the controller, malfunction management unit, cabinet power supply, and all auxiliary equipment. It shall have the following features:

1. It shall include the SDLC Bus connecting cables wired to a barrier type terminal block. As an alternate, SDLC Bus connections may be made via an SDLC Hub Assembly.

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2. All cabinet equipment requiring filtered power to operate shall be hardwired directly to the supplied barrier type terminal blocks on the Power and SDLC BUS Panel.
3. All AC+ power sources shall be protected with a removable plastic cover plate.
4. The SDLC Hub Assembly shall accommodate all D-Subminiature Female 15 (DB15) connectors as required, and a minimum of five (5) SLDC connections shall be provided.

Auxiliary Cabinet Equipment: The cabinet shall be provided with a thermostatically controlled (adjustable between 55-160 degrees Fahrenheit) ventilation fan in the top of the cabinet plenum. The fan plate shall be removable with the use of simple hand tools for serviceability. A minimum of one, maximum of two, exhaust fans shall be provided. The fan shall be a ball bearing type fan and shall be capable of drawing a minimum of 100 cubic feet of air per minute (CFM). The Fan/Thermostat assembly shall be connected to the Power panel by means of a 4 position plug-in cable or hardwired to an appropriate circuit breaker.

A LED cabinet lighting system may be used to illuminate the internal structure of the cabinet assembly. The LED cabinet lighting shall be a Luxembright LED module Model #770-W0013 and approved power supply or approved equivalent. This lighting system shall be wired directly to a door active switch mounted near the top of the door. Alternately, a fluorescent lighting fixture shall be mounted on the inside top of the cabinet near the front edge. The fixture shall be rated to accommodate at minimum a F15T8 lamp operated from a normal power factor UL or ETL listed ballast. The lamp shall be wired on the power panel or to a door activated switch mounted near the top of the door.

A re-sealable print pouch shall be mounted to the door of the cabinet. The pouch shall be of sufficient size to accommodate one complete set of folded cabinet prints. A minimum of two sets of complete and accurate cabinet drawings shall be supplied with each cabinet.

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Vehicle Detection: A minimum of one Detector rack shall be provided in each cabinet.

1. Shall support up to 16 channels of loop detection (either eight 2 channel detectors or four 4 channel detectors), two 2-channel preemption devices and one BIU.
2. All connections to the back of the detector racks to the detector cards shall be soldered to a 44 terminal, double row, 3.962 mm (0.156 in.) contact spacing, Cinch Jones card edge connector 50-44A-30M, or equivalent centered vertically for each detector module.
3. All designations shall correspond to the requirements of the TS2-2003 specification. Card guides shall be provided on the top and bottom of the card rack for each connector position.
4. Each cabinet shall contain a detector interface panel per each detector rack for the purpose of connecting field loops and vehicle detector amplifiers. The panels shall be manufactured from 0.090 or 0.125 inch thick 5052- H32 Aluminum and use barrier type terminal blocks.
5. One 16-position interface panel shall be provided for a 16-channel rack cabinet. The interface panel shall be secured to the left wall of the cabinet.
6. Each interface panel shall allow for the connection of a minimum of eight independent field detectors.
7. In the case of loop detection, a ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in cable ground wire. Each interface panel shall provide a barrier style terminal block to terminate the field wires for up to two 2-channel preemption devices.
8. Lightning protection device mounting holes shall be provided to accommodate the potential usage of an EDCO LCA-6, lightning protection device.
9. A cable consisting of 20 AWG twisted pair wires shall be wired directly from the interface panel to the detector rack. The twisted pair wires shall be color coded red and white wire. No connectors shall be used to connect the interface panel to the detector rack.
10. All termination points shall be identified by a unique number and silk screened on the panel. Each detector rack shall accommodate rack mountable preemption devices such as EMTRAC or Opticom.

Cabinet Test Switches and Police Panel: A test switch panel shall be mounted on the inside of the main door. The test switch panel shall provide as a minimum the following:

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1. SIGNALS ON/OFF SWITCH - In the OFF position, power shall be removed from signal heads in the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. AUTO/FLASH SWITCH - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall not be stop timed when in flash. Wired according to NEMA-TS2-2003, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. STOP TIME SWITCH - When applied, the controller shall be stop timed in the current interval.
4. CONTROL EQUIPMENT POWER ON/OFF - This switch shall control the controller, MMU and cabinet power supply AC power. The TS2 controller to be provided with the cabinet assembly shall provide vehicular and pedestrian call inputs from its keyboard while in the standard status display.

The police door switch panel shall contain the following:

1. SIGNALS ON/OFF SWITCH - In the OFF position, power shall be removed from signal heads within the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. AUTO/FLASH SWITCH - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall be stop timed when in flash. Wired according to NEMA-TS2-1998, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. AUTO/MANUAL SWITCH - Cabinet wiring shall include provisions for an AUTO/MANUAL switch and a momentary push button or hand cord. The AUTO/MANUAL switch and push button or hand cord shall not be provided unless it is called for in the CUSTOMER SPECIFICATION.

All toggle type switches shall be heavy duty and rated 15 amps minimum. Single- or double-pole switches may be provided, as required. Any exposed terminals or switch solder points shall be covered with a non-flexible shield to prevent accidental contact. All switch functions must be permanently and clearly labeled. All wire routed to the police door-in-door and test switch push button panel shall be adequately protected against damage from repetitive opening and closing of the main door.

Auxiliary Devices:

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Load Switches: Load switches shall be solid state and shall conform to the requirements of Section 6.2 of the NEMA TS2 Standard. Signal load switches shall have a minimum rating of 10 amperes at 120 VAC for an incandescent lamp load. The front of the load switch shall be provided with three indicators to show the input signal from the controller to the load switch. Load switches shall be dedicated per phase. The use of load switches for other partial phases is not acceptable. The full complement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Flashers: The flasher shall be solid state and shall conform to the requirements of section 6.3 of the NEMA TS2 Standard. Flashing of field circuits for the purpose of intersection flash shall be accomplished by a separate flasher. The flasher shall be rated at 15 amperes, double pole with a nominal flash rate of 60 FPM. A full complement of flasher shall be provided.

Flash Transfer Relays: All flash transfer relays shall meet the requirements of Section 6.4 of the NEMA TS2 Standard. The coil of the flash transfer relay must be de-energized for flash operation. The full complement of relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Malfunction Management Units (MMU): Each cabinet assembly shall be supplied with one MMU as defined by the requirements of Section 4 of the NEMA TS2 Standard. Malfunction Management Units shall be a Type 16. The MMU shall be Model MMU-16 (EDI Model MMU-16LE) or approved equal.

Bus Interface Units (BIU): All BIUs shall meet the requirements of Section 8 of the NEMA TS2 Standard. A full complement of BIUs meeting Section 5.3.1.4 of the NEMA Publication No. TS2-2003 shall be supplied per cabinet. Bus Interface Units shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed. A minimum of 3 BIUs shall be provided for each cabinet. Each BIU shall include power on, transmit and valid data indicators - all indicators shall be LEDs. A Type 1 Interface shall be defined as defined by Section 5.3: the controller interface shall conform to the Standard Publication No. TS2-2003.

Cabinet Power Supply: The cabinet power supply shall meet the requirements of Section 5.3.5 of the NEMA TS2 Standard. The cabinet power supply shall provide LED indicators for the line

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frequency, 12 VDC, 12 VAC, and 24 VDC outputs. The cabinet power supply shall provide (on the front panel) jack plugs for access to the +24 VDC for test purposes. Cabinet power supply shall be provided with each cabinet assembly per manufacturer's specifications and be wired directly to the Power Bus Assembly via a 12-pin Molex Robotic type connector Model# 54332-1270 or exact equivalent.

Testing: Each controller and cabinet assembly shall be tested as a complete entity under signal load for a minimum of 48 hours. Each assembly shall be delivered with a signed document detailing the cabinet final tests performed. The cabinet shall be assembled and tested by the controller manufacturer or authorized local distributor to ensure proper component integration and operation.

Warranty: The controller and Malfunction Management Unit shall be warranted by the manufacturer against mechanical and electrical defects for a period of two years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable. The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment. Any defects shall be corrected by the manufacturer at no cost to the owner.

3.1.6 Contract Item # 6 - Econolite Cobalt ATC Traffic Signal Controller or Equal

3.1.6.1 Contract Item #6 shall be an Econolite Cobalt ATC series (ASC/3-2100) or Equal, 16-phase, NEMA TS2 Type 2 traffic controller with Econolite Cobalt ASC/3-LX software or equivalent which is capable of being placed in an existing traffic signal cabinet utilizing Econolite controllers and capable of NEMA TS1 and TS2 Type 1 and Type 2 environments with ARIES® software or equal. An equal controller is defined as a controller that can be interchanged with the existing controllers using the ARIES® or CENTRACS® software at 100% capacity and without changes to the existing software and controllers.

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3.1.7 Contract Item # 7 - Repair of Econolite Traffic Signal Controllers or Equal

3.1.7.1 Contract Item # 7 shall be for the repair of Econolite TS1/TS2 ASC or ATC Traffic Controllers, Econolite Mater Controllers or Equal. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by an Econolite or Equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.8 Contract Item # 8 - Econolite TS2 Traffic Signal Cabinet or Equal - Pole Mounted

3.1.9.1 Contract Item # 8 shall be an Econolite Control Products Model #P38 or equivalent with two (2) pole-mount brackets.

Cabinets: The following are minimum design requirements for a TS2 Type 1 or Type 2 traffic control cabinet assembly. As a minimum, the cabinet assembly shall meet all applicable sections of the NEMA Standard publication No.TS2-2003 (Revised 2008) or most recent version. Where differences occur, this specification shall govern.

Cabinet Design and Construction: The cabinet shall be constructed from type 5052-H32 aluminum with a minimum thickness of 0.090 to 0.125 inches. The cabinet shall have the following features:

1. The cabinet shall be designed and manufactured with materials that will allow rigid mounting, whether intended for pole, base or pedestal mounting.
2. The cabinet must not flex on its mount.
3. A rain channel shall be incorporated into the design of the main door opening to prevent liquids from entering the enclosure.
4. The cabinet door opening must be a minimum of 80 percent of the front surface of the cabinet.
5. A stiffener plate shall be welded across the inside of the main door to prevent flexing.
6. Top of the cabinet shall incorporate a slope toward the rear to prevent rain accumulation.

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7. The cabinet shall be supplied with a natural aluminum finish.
8. Sufficient care shall be taken in handling to ensure that scratches are minimized.
9. All surfaces shall be free from weld flash. Welds shall be smooth, neatly formed, free from cracks, blowholes and other irregularities.
10. All sharp edges shall be ground smooth.
11. All seams that are not welded shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.
12. All cabinets shall be supplied with a minimum of two (2) removable shelves manufactured from 5052-H32aluminum. Shelf shall be a minimum of 10 inches deep. Shelves to be designed to accommodate a minimum 50-pound loading. The shelf shall have horizontal slots at the rear and vertical slots at the front of the turned down side flange. The shelf shall be installed securely at the rear edge of the shelf on the cabinet rear sidewall mounting studs, then lowering the shelf on the front sidewall mounting studs. The front edge of the shelf shall have holes punched every 6 inches to accommodate tie-wrapping of cables/harnesses.
13. A minimum of two (2) sets of vertical "C" channels shall be mounted on each interior wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring mounted nuts or studs. All mounting rails shall extend to within 7 inches of the top and bottom of the cabinet. Sidewall rail spacing shall be no more than 9.0 inches center-to-center. Rear wall rail spacing shall be 19.0 inches center-to-center.
14. The main door and police door-in-door shall close against a weatherproof and dust-proof, closed-cell neoprene gasket seal. The gasket material for the main door shall be a minimum of 0.250 inches thick by 1.00 inch wide. The gasket material for the police door shall be a minimum of 0.250 inches thick by 0.500 inches wide. The gaskets shall be permanently bonded to the cabinet.
15. The cabinet shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient air flow per the rated fan capacity. Louvers must satisfy the NEMA rod entry test for 3R ventilated enclosures. A non-corrosive, vermin- and insect-proof, removable air filter shall be secured to the air entrance. The filter shall fit snugly against the cabinet door wall. The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125 inches in diameter.

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16. The main door of the cabinet shall be equipped with a three-point latching mechanism. The handle on the main door of the cabinet shall be manufactured from cast aluminum or stainless steel. The handle shall include a hasp for the attachment of an optional padlock. The cabinet door handle shall rotate counterclockwise to open. The handle shall not extend beyond the perimeter of the main door at any time.
17. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door.
18. The main door hinge shall be a one-piece, continuous piano hinge with a stainless-steel pin running the entire length of the door. The hinge shall be attached in such a manner that no rivets or bolts are exposed.
19. The main door shall include a mechanism capable of holding the door open at approximately 90, and/or (165 or 180) degrees under windy conditions. The main door shall be equipped with a standard Corbin No. 2 lock or exact equivalent.
20. Minimum of two keys shall be supplied.

The police door-in-door shall be provided with a treasury type lock Corbin No. R357SGS or exact equivalent and have a minimum of one key. Each cabinet shall be of sufficient size to accommodate all equipment. At a minimum, the cabinet sizes are as follows:

POLE MOUNTED ECONOLITE CABINETS

55.00 INCHES HEIGHT
38.25 INCHES WIDTH
26.00 INCHES DEPTH

Main door shall incorporate a shroud to cover the filtered louvered openings. The assembly is secured on the interior of the door over the filtered Louvers. The Shroud is louvered downward and matches the door louvers. All enclosures must be constructed, approved and marked in accordance with the requirements for Type 1 Industrial Control Panel Enclosures contained in UL 508A, the Standard for Industrial Control Panels. Enclosure must meet NEMA 3R rating requirements and be marked with UL approval sticker.

Terminals and Facilities/Main panel Design and Construction: The main panel shall be constructed from 5052-

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H32 brushed aluminum of 0.125 inch minimum thickness and installed so as to minimize flexing when plug-in components are installed. All main panels are provided with a mounting mechanism which allows access to all wiring on the rear of the panel without the removal of any cabinet shelves. Lowering of the main panel can be accomplished. Complete removal can be accomplished by the use of hand tools.

The cabinet shall have the following features:

1. The terminals and facilities shall be available as a minimum in the following configuration: Sixteen load switch sockets, six flash transfer relay sockets, one flasher socket, 2- BIU sockets (expandable to 4), one 16-channel detector rack (expandable to 4) with one BIU, and one Type-16 MMU.
2. All load switch and flash transfer relay socket reference designators shall be silk-screen labeled on the front and rear of the main panel to match drawing designations. Socket pins shall be marked for reference on the rear of the panel. A maximum of eight load switch sockets may be positioned horizontally or stacked in two rows on the main panel.
3. Main panels requiring more than eight load switch sockets shall be mounted in one horizontal or two vertical rows. All load switches shall be supported by a bracket, extending at least half the length of the load switch.
4. The 16 load switch position main panels shall have all field wires contained on two rows of horizontally mounted terminal blocks. The upper row shall be wired for the pedestrian and overlap field terminations. The lower row shall be reserved for phase one through phase eight vehicle field terminations.
5. All field output circuits shall be terminated on a non-fused barrier type terminal block with a minimum rating of 10 amps.
6. All field input/output (I/O) terminals shall be identified by permanent alphanumeric labels. All labels shall use standard nomenclature per the NEMA TS2 specification.
7. It shall be possible to flash either the yellow or red indication on any vehicle movement and to change from one color indication to the other by use of a screwdriver. Field terminal blocks shall be wired to use four positions per vehicle or overlap phase (green, yellow, and red, flash).
8. It shall not be necessary to de-buss field terminal blocks for flash programming. The main panel shall contain at least one flasher socket (silk screen labeled) capable of operating a 15-amp, 2-pole, NEMA solid-state flasher. The flasher shall be supported by a bracket, extending at least half its length.
9. One RC network shall be wired in parallel with each group of three flash-transfer relays and any other relay coils.

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10. All logic-level, NEMA-controller and Malfunction Management Unit input and output terminations on the main panel shall be permanently labeled.
11. Cabinet prints shall identify the function of each terminal position.
12. At a minimum, three 20-position terminal blocks shall be provided at the top of the main panel to provide access to the controller unit's programmable and non-programmable I/O.
13. Terminal blocks for DC signal interfacing shall have a number 6-32 x 7/32 inch screw as minimum.

All main panel wiring shall conform to the following wire size exactly and color:

1. Green/Walk load switch output - brown wire - 14 gauge
2. Yellow load switch output - yellow wire - 14 gauge
3. Red/Don't Walk load switch - red wire output - 14 gauge
4. MMU (other than AC power) - violet wire - 22 gauge
5. Controller I/O - blue wire - 22 gauge
6. AC Line (power panel to - black wire main panel) - 8 gauge
7. AC Line (main panel) - black wire - 10 gauge
8. AC Neutral (power panel to - white wire main panel) - 8 gauge
9. AC Neutral (main panel) - white wire - 10 gauge
10. Earth ground (power panel) - green wire - 8 gauge
11. Logic ground - gray wire - 22 gauge
12. Flash programming - Orange wire
13. Flasher terminal - Black wire red or yellow field terminal - 14 gauge

All wiring, 14 AWG and smaller, shall conform to MIL-W-16878/1, type B/N, 600V, 19-strand tinned copper. The wire shall have a minimum of 0.010 inches thick PVC insulation with clear nylon jacket and rated to 105 degrees Celsius. All wiring shall have the following features:

1. All 12 AWG and larger wire shall have UL listed THHN/THWN-2 90 degrees Celsius, 600V, 0.020 inches thick PVC insulation and clear nylon jacketed.
2. Connecting cables shall be sleeved in a braided nylon mesh or poly-jacketed.
3. The use of exposed tie wraps or interwoven cables is unacceptable.
4. All Terminals and Facilities configurations shall be provided with BIU wiring assignments consistent with NEMA TS2-2003 specifications.

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5. All Terminals and Facilities configurations shall be provided with sufficient RS-485 Port 1 communication cables to allow for the intended operation of that cabinet.
6. Each SDLC communication cable connector shall be a 15-pin metal shell D subminiature type. The cable shall be a shielded cable suitable for RS-485 communications.
7. All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.
8. All wiring shall be neat in appearance.
9. All cabinet wiring shall be continuous from its point of origin to its termination point.
10. Butt type connections or splices are not acceptable.
11. All connecting cables and wire runs shall be secured by mechanical clamps. Stick-on type clamps are not acceptable.
12. The grounding system in the cabinet shall be divided into three separate circuits (AC Neutral, Earth Ground, and Logic Ground). These ground circuits shall be connected together at a single point as outlined in the NEMA TS2 Standard. The main panel shall incorporate a relay, to be designed as K1, to remove +24 VDC from the common side of the load switches when the intersection is placed into mechanical flash. The relay shall have a momentary pushbutton located on the relay to apply power to the load switch inputs for ease of troubleshooting.
13. All pedestrian push button inputs from the field to the controller shall be opto-isolated through the BIU and operate at 12 VAC. All wire (size 16 AWG or smaller) at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. Lap joint soldering is not acceptable.

Power Panel Design and Construction: The power panel shall be integrated into the main panel and be located on the lower right portion of the cabinet. The power panel shall be wired to provide the necessary filtered power to the load switches, flasher(s), and power bus assembly. The power components shall be equipped with a removable plastic front cover for protection. The design will allow a technician to access the main and auxiliary breakers without removing the protective front cover. The power panel portion of the main panel shall include the following components:

1. A minimum of one (1) 40-amp main breaker for 16 position cabinets. This breaker shall supply power to the controller, MMU, signals, cabinet power supply and auxiliary panels. Breakers shall be at minimum, a thermal magnetic type, UL listed for HACR service, with a minimum of 10,000 amp interrupting capacity.

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2. A minimum of one (1) 15-amp auxiliary breaker. This breaker shall supply power to the fan, light and GFI utility outlet.
3. An EDCO model SHP-300-10 or exact approved equivalent surge arrester.
4. A 50-amp, 125 VAC radio interference line filter.
5. A normally open, 50-amp, Solid State Relay (SSR). Shall be Crydom Model Number HA4875H or approved equal.
6. A minimum of one (1) 8-position neutral bus bar capable of connecting three #12 wires per position.
7. A minimum of one (1) 6-position ground bus bar capable of connecting three #12 wires per position.
8. A minimum of one (1) NEMA type 5-15R GFI utility outlet.
9. The cabinet shall have a roll-out/swing-out concealable shelf/platform that can be used as platform for a laptop computer or other tools when the cabinet door is opened.

Power and SDLC Bus Panel: The Power and SDLC BUS Panel shall be manufactured from 0.090 to 0.125 inch thick, 5052-H32 aluminum. It shall provide a central location to supply filtered power for the controller, malfunction management unit, cabinet power supply, and all auxiliary equipment. It shall have the following features:

1. It shall include the SDLC Bus connecting cables wired to a barrier type terminal block. As an alternate, SDLC Bus connections may be made via an SDLC Hub Assembly.
2. All cabinet equipment requiring filtered power to operate shall be hardwired directly to the supplied barrier type terminal blocks on the Power and SDLC BUS Panel.
3. All AC+ power sources shall be protected with a removable plastic cover plate.
4. The SDLC Hub Assembly shall accommodate all D-Subminiature Female 15 (DB15) connectors as required, and a minimum of five (5) SDLC connections shall be provided.

Auxiliary Cabinet Equipment: The cabinet shall be provided with a thermostatically controlled (adjustable between 55-160 degrees Fahrenheit) ventilation fan in the top of the cabinet plenum. The fan plate shall be removable with the use of simple hand tools for serviceability. A minimum of one, maximum of two, exhaust fans shall be provided. The fan shall be a ball bearing type fan and shall be capable of drawing a minimum of 100 cubic feet of air per minute (CFM). The Fan/Thermostat assembly shall

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be connected to the Power panel by means of a 4 position plug-in cable or hardwired to an appropriate circuit breaker.

A LED cabinet lighting system may be used to illuminate the internal structure of the cabinet assembly. The LED cabinet lighting shall be a Luxembright LED module Model #770-W0013 and approved power supply or approved equivalent. This lighting system shall be wired directly to a door active switch mounted near the top of the door. Alternately, a fluorescent lighting fixture shall be mounted on the inside top of the cabinet near the front edge. The fixture shall be rated to accommodate at minimum a F15T8 lamp operated from a normal power factor UL or ETL listed ballast. The lamp shall be wired on the power panel or to a door activated switch mounted near the top of the door.

A re-sealable print pouch shall be mounted to the door of the cabinet. The pouch shall be of sufficient size to accommodate one complete set of folded cabinet prints. A minimum of two sets of complete and accurate cabinet drawings shall be supplied with each cabinet.

Vehicle Detection: A minimum of one Detector rack shall be provided in each cabinet.

1. Shall support up to 16 channels of loop detection (either eight 2 channel detectors or four 4 channel detectors), two 2-channel preemption devices and one BIU.
2. All connections to the back of the detector racks to the detector cards shall be soldered to a 44 terminal, double row, 3.962 mm (0.156 in.) contact spacing, Cinch Jones card edge connector 50-44A-30M, or equivalent centered vertically for each detector module.
3. All designations shall correspond to the requirements of the TS2-2003 specification. Card guides shall be provided on the top and bottom of the card rack for each connector position.
4. Each cabinet shall contain a detector interface panel per each detector rack for the purpose of connecting field loops and vehicle detector amplifiers. The panels shall be manufactured from 0.090 or 0.125 inch thick 5052- H32 Aluminum and use barrier type terminal blocks.
5. One 16-position interface panel shall be provided for a 16-channel rack cabinet. The interface panel shall be secured to the left wall of the cabinet.
6. Each interface panel shall allow for the connection of a minimum of eight independent field detectors.

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7. In the case of loop detection, a ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in cable ground wire. Each interface panel shall provide a barrier style terminal block to terminate the field wires for up to two 2-channel preemption devices.
8. Lightning protection device mounting holes shall be provided to accommodate the potential usage of an EDCO LCA-6, lightning protection device.
9. A cable consisting of 20 AWG twisted pair wires shall be wired directly from the interface panel to the detector rack. The twisted pair wires shall be color coded red and white wire. No connectors shall be used to connect the interface panel to the detector rack.
10. All termination points shall be identified by a unique number and silk screened on the panel. Each detector rack shall accommodate rack mountable preemption devices such as EMTRAC or Opticom.

Cabinet Test Switches and Police Panel: A test switch panel shall be mounted on the inside of the main door. The test switch panel shall provide as a minimum the following:

1. **SIGNALS ON/OFF SWITCH** - In the OFF position, power shall be removed from signal heads in the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. **AUTO/FLASH SWITCH** - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall not be stop timed when in flash. Wired according to NEMA-TS2-2003, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. **STOP TIME SWITCH** - When applied, the controller shall be stop timed in the current interval.
4. **CONTROL EQUIPMENT POWER ON/OFF** - This switch shall control the controller, MMU, and cabinet power supply AC power. The TS2 controller to be provided with the cabinet assembly shall provide vehicular and pedestrian call inputs from its keyboard while in the standard status display.

The police door switch panel shall contain the following:

1. **SIGNALS ON/OFF SWITCH** - In the OFF position, power shall be removed from signal heads within the

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intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.

2. AUTO/FLASH SWITCH – When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall be stop timed when in flash. Wired according to NEMA-TS2-1998, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. AUTO/MANUAL SWITCH - Cabinet wiring shall include provisions for an AUTO/MANUAL switch and a momentary push button or hand cord. The AUTO/MANUAL switch and push button or hand cord shall not be provided unless it is called for in the CUSTOMER SPECIFICATION.

All toggle type switches shall be heavy duty and rated 15 amps minimum. Single- or double-pole switches may be provided, as required. Any exposed terminals or switch solder points shall be covered with a non-flexible shield to prevent accidental contact. All switch functions must be permanently and clearly labeled. All wire routed to the police door-in-door and test switch push button panel shall be adequately protected against damage from repetitive opening and closing of the main door.

Auxiliary Devices:

Load Switches: Load switches shall be solid state and shall conform to the requirements of Section 6.2 of the NEMA TS2 Standard. Signal load switches shall have a minimum rating of 10 amperes at 120 VAC for an incandescent lamp load. The front of the load switch shall be provided with three indicators to show the input signal from the controller to the load switch. Load switches shall be dedicated per phase. The use of load switches for other partial phases is not acceptable. The full complement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Flashers: The flasher shall be solid state and shall conform to the requirements of section 6.3 of the NEMA TS2 Standard. Flashing of field circuits for the purpose of intersection flash shall be accomplished by a separate flasher. The flasher shall be rated at 15 amperes, double pole with a nominal flash rate of 60 FPM. A full complement of flasher shall be provided.

Flash Transfer Relays: All flash transfer relays shall meet the requirements of Section 6.4 of the NEMA TS2 Standard. The coil

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of the flash transfer relay must be de-energized for flash operation. The full complement of relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Malfunction Management Units (MMU): Each cabinet assembly shall be supplied with one MMU as defined by the requirements of Section 4 of the NEMA TS2 Standard. Malfunction Management Units shall be a Type 16. The MMU shall be Model MMU-16 (EDI Model MMU-16LE) or approved equal.

Bus Interface Units (BIU): All BIUs shall meet the requirements of Section 8 of the NEMA TS2 Standard. A full complement of BIUs meeting Section 5.3.1.4 if the NEMA Publication No. TS2-2003 shall be supplied per cabinet. Bus Interface Units shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed. A minimum of 3 BIUs shall be provided for each cabinet. Each Bus Interface Unit shall include power on, transmit and valid data indicators - all indicators shall be LEDs. A Type 1 Interface shall be defined as defined by Section 5.3: the controller interface shall conform to the Standard Publication No. TS2-2003.

Cabinet Power Supply: The cabinet power supply shall meet the requirements of Section 5.3.5 of the NEMA TS2 Standard. The cabinet power supply shall provide LED indicators for the line frequency, 12 VDC, 12 VAC, and 24 VDC outputs. The cabinet power supply shall provide (on the front panel) jack plugs for access to the +24 VDC for test purposes. Cabinet power supply shall be provided with each cabinet assembly per manufacturer's specifications and be wired directly to the Power Bus Assembly via a 12-pin Molex Robotic type connector Model# 54332-1270 or exact equivalent.

Testing: Each controller and cabinet assembly shall be tested as a complete entity under signal load for a minimum of 48 hours. Each assembly shall be delivered with a signed document detailing the cabinet final tests performed. The cabinet shall be assembled and tested by the controller manufacturer or authorized local distributor to ensure proper component integration and operation.

Warranty: The controller and MMU shall be warranted by the manufacturer against mechanical and electrical defects for a period of two years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable.

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The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment. Any defects shall be corrected by the manufacturer at no cost to the owner.

3.1.9 Contract Item # 9 - Econolite TS2 Traffic Signal Cabinet or Equal - Ground Mounted

3.1.10.1 Contract Item #9 shall be an Econolite Control Products Model #P44 or equivalent.

Cabinets: The following are minimum design requirements for a TS2 Type 1 or Type 2 traffic control cabinet assembly. As a minimum, the cabinet assembly shall meet all applicable sections of the NEMA Standard publication No.TS2-2003 (Revised 2008) or most recent version. Where differences occur, this specification shall govern.

Cabinet Design and Construction: The cabinet shall be constructed from type 5052-H32 aluminum with a minimum thickness of 0.090 to 0.125 inches. The cabinet shall have the following features:

1. The cabinet shall be designed and manufactured with materials that will allow rigid mounting, whether intended for pole, base or pedestal mounting.
2. The cabinet must not flex on its mount.
3. A rain channel shall be incorporated into the design of the main door opening to prevent liquids from entering the enclosure.
4. The cabinet door opening must be a minimum of 80 percent of the front surface of the cabinet.
5. A stiffener plate shall be welded across the inside of the main door to prevent flexing.
6. Top of the cabinet shall incorporate a slope toward the rear to prevent rain accumulation.
7. The cabinet shall be supplied with a natural aluminum finish.
8. Sufficient care shall be taken in handling to ensure that scratches are minimized.
9. All surfaces shall be free from weld flash. Welds shall be smooth, neatly formed, free from cracks, blowholes and other irregularities.
10. All sharp edges shall be ground smooth.
11. All seams that are not welded shall be sealed with RTV sealant or equivalent material on the interior of the cabinet.

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12. All cabinets shall be supplied with a minimum of two (2) removable shelves manufactured from 5052-H32aluminum. Shelf shall be a minimum of 10 inches deep. Shelves to be designed to accommodate a minimum 50-pound loading. The shelf shall have horizontal slots at the rear and vertical slots at the front of the turned down side flange. The shelf shall be installed securely at the rear edge of the shelf on the cabinet rear sidewall mounting studs, then lowering the shelf on the front sidewall mounting studs. The front edge of the shelf shall have holes punched every 6 inches to accommodate tie-wrapping of cables/harnesses.
13. A minimum of two (2) sets of vertical "C" channels shall be mounted on each interior wall of the cabinet for the purpose of mounting the cabinet components. The channels shall accommodate spring mounted nuts or studs. All mounting rails shall extend to within 7 inches of the top and bottom of the cabinet. Sidewall rail spacing shall be no more than 9.0 inches center-to-center. Rear wall rail spacing shall be 19.0 inches center-to-center.
14. The main door and police door-in-door shall close against a weatherproof and dust-proof, closed-cell neoprene gasket seal. The gasket material for the main door shall be a minimum of 0.250 inches thick by 1.00 inch wide. The gasket material for the police door shall be a minimum of 0.250 inches thick by 0.500 inches wide. The gaskets shall be permanently bonded to the cabinet.
15. The cabinet shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient air flow per the rated fan capacity. Louvers must satisfy the NEMA rod entry test for 3R ventilated enclosures. A non-corrosive, vermin- and insect-proof, removable air filter shall be secured to the air entrance. The filter shall fit snugly against the cabinet door wall. The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125 inches in diameter.
16. The main door of the cabinet shall be equipped with a three-point latching mechanism. The handle on the main door of the cabinet shall be manufactured from cast aluminum or stainless steel. The handle shall include a hasp for the attachment of an optional padlock. The cabinet door handle shall rotate counterclockwise to open. The handle shall not extend beyond the perimeter of the main door at any time.

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17. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door.
18. The main door hinge shall be a one-piece, continuous piano hinge with a stainless-steel pin running the entire length of the door. The hinge shall be attached in such a manner that no rivets or bolts are exposed.
19. The main door shall include a mechanism capable of holding the door open at approximately 90, and/or (165 or 180) degrees under windy conditions. The main door shall be equipped with a standard Corbin No. 2 lock or exact equivalent.
20. Minimum of two keys shall be supplied.

The police door-in-door shall be provided with a treasury type lock Corbin No. R357SGS or exact equivalent and have a minimum of one key. All base mounted cabinets require anchor bolts to properly secure the cabinet to its base. The cabinet flange for securing the anchor bolts shall not protrude outward from the bottom of the cabinet. Four (4) anchor bolts shall be required for proper installation. Each cabinet shall be of sufficient size to accommodate all equipment. At a minimum, the cabinet sizes are as follows:

GROUND MOUNTED ECONOLITE CABINETS

55.00 INCHES HEIGHT
44.25 INCHES WIDTH
26.00 INCHES DEPTH

Main door shall incorporate a shroud to cover the filtered louvered openings. The assembly is secured on the interior of the door over the filtered Louvers. The Shroud is louvered downward and matches the door louvers. All enclosures must be constructed, approved and marked in accordance with the requirements for Type 1 Industrial Control Panel Enclosures contained in UL 508A, the Standard for Industrial Control Panels. Enclosure must meet NEMA 3R rating requirements and be marked with UL approval sticker.

Terminals and Facilities/Main panel Design and Construction: The main panel shall be constructed from 5052-H32 brushed aluminum of 0.125 inches minimum thickness and installed so as to minimize flexing when plug-in components are installed. All main panels are provided with a mounting mechanism which allows access to all wiring on the rear of the

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panel without the removal of any cabinet shelves. Lowering of the main panel can be accomplished. Complete removal can be accomplished by the use of hand tools.

The cabinet shall have the following features:

1. The terminals and facilities shall be available as a minimum in the following configuration: Sixteen load switch sockets, six flash transfer relay sockets, one flasher socket, 2- BIU sockets (expandable to 4), one 16-channel detector rack (expandable to 4) with one BIU, and one Type-16 MMU.
2. All load switch and flash transfer relay socket reference designators shall be silk-screen labeled on the front and rear of the main panel to match drawing designations. Socket pins shall be marked for reference on the rear of the panel. A maximum of eight load switch sockets may be positioned horizontally or stacked in two rows on the main panel.
3. Main panels requiring more than eight load switch sockets shall be mounted in one horizontal or two vertical rows. All load switches shall be supported by a bracket, extending at least half the length of the load switch.
4. The 16 load switch position main panels shall have all field wires contained on two rows of horizontally mounted terminal blocks. The upper row shall be wired for the pedestrian and overlap field terminations. The lower row shall be reserved for phase one through phase eight vehicle field terminations.
5. All field output circuits shall be terminated on a non-fused barrier type terminal block with a minimum rating of 10 amps.
6. All field input/output (I/O) terminals shall be identified by permanent alphanumeric labels. All labels shall use standard nomenclature per the NEMA TS2 specification.
7. It shall be possible to flash either the yellow or red indication on any vehicle movement and to change from one color indication to the other by use of a screwdriver. Field terminal blocks shall be wired to use four positions per vehicle or overlap phase (green, yellow, and red, flash).
8. It shall not be necessary to de-buss field terminal blocks for flash programming. The main panel shall contain at least one flasher socket (silk screen labeled) capable of operating a 15-amp, 2-pole, NEMA solid-state flasher. The flasher shall be supported by a bracket, extending at least half its length.

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9. One RC network shall be wired in parallel with each group of three flash-transfer relays and any other relay coils.
10. All logic-level, NEMA-controller and MMUs input and output terminations on the main panel shall be permanently labeled.
11. Cabinet prints shall identify the function of each terminal position.
12. At a minimum, three 20-position terminal blocks shall be provided at the top of the main panel to provide access to the controller unit's programmable and non-programmable I/O.
13. Terminal blocks for DC signal interfacing shall have a number 6/32 x 7/32 inch screw as minimum.

All main panel wiring shall conform to the following wire size exactly and color:

1. Green/Walk load switch output - brown wire - 14 gauge
2. Yellow load switch output - yellow wire - 14 gauge
3. Red/Don't Walk load switch - red wire output - 14 gauge
4. MMU (other than AC power) - violet wire - 22 gauge
5. Controller I/O - blue wire - 22 gauge
6. AC Line (power panel to - black wire main panel) - 8 gauge
7. AC Line (main panel) - black wire - 10 gauge
8. AC Neutral (power panel to - white wire main panel) - 8 gauge
9. AC Neutral (main panel) - white wire - 10 gauge
10. Earth ground (power panel) - green wire - 8 gauge
11. Logic ground - gray wire - 22 gauge
12. Flash programming - Orange wire
13. Flasher terminal - Black wire red or yellow field terminal - 14 gauge

All wiring, 14 AWG and smaller, shall conform to MIL-W-16878/1, type B/N, 600V, 19-strand tinned copper. The wire shall have a minimum of 0.010 inches thick PVC insulation with clear nylon jacket and rated to 105 degrees Celsius. All wiring shall have the following features:

1. All 12 AWG and larger wire shall have UL listed THHN/THWN-2 90 degrees Celsius, 600V, 0.020 inches thick PVC insulation and clear nylon jacketed.
2. Connecting cables shall be sleeved in a braided nylon mesh or poly-jacketed.

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3. The use of exposed tie wraps or interwoven cables is unacceptable.
4. All Terminals and Facilities configurations shall be provided with BIU wiring assignments consistent with NEMA TS2-2003 specifications.
5. All Terminals and Facilities configurations shall be provided with sufficient RS-485 Port 1 communication cables to allow for the intended operation of that cabinet.
6. Each SDLC communication cable connector shall be a 15-pin metal shell D subminiature type. The cable shall be a shielded cable suitable for RS-485 communications.
7. All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.
8. All wiring shall be neat in appearance.
9. All cabinet wiring shall be continuous from its point of origin to its termination point.
10. Butt type connections or splices are not acceptable.
11. All connecting cables and wire runs shall be secured by mechanical clamps. Stick-on type clamps are not acceptable.
12. The grounding system in the cabinet shall be divided into three separate circuits (AC Neutral, Earth Ground, and Logic Ground). These ground circuits shall be connected together at a single point as outlined in the NEMA TS2 Standard. The main panel shall incorporate a relay, to be designed as K1, to remove +24 VDC from the common side of the load switches when the intersection is placed into mechanical flash. The relay shall have a momentary pushbutton located on the relay to apply power to the load switch inputs for ease of troubleshooting.
13. All pedestrian push button inputs from the field to the controller shall be opto-isolated through the BIU and operate at 12 VAC. All wire (size 16 AWG or smaller) at solder joints shall be hooked or looped around the eyelet or terminal block post prior to soldering to ensure circuit integrity. Lap joint soldering is not acceptable.

Power Panel Design and Construction: The power panel shall be integrated into the main panel and be located on the lower right portion of the cabinet. The power panel shall be wired to provide the necessary filtered power to the load switches, flasher(s), and power bus assembly. The power components shall be equipped with a removable plastic front cover for protection. The design will allow a technician to access the main and auxiliary breakers without removing the protective front cover.

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The power panel portion of the main panel shall include the following components:

1. A minimum of one (1) 40-amp main breaker for 16 position cabinets. This breaker shall supply power to the controller, MMU, signals, cabinet power supply and auxiliary panels. Breakers shall be at minimum, a thermal magnetic type, UL listed for HACR service, with a minimum of 10,000 amp interrupting capacity.
2. A minimum of one (1) 15-amp auxiliary breaker. This breaker shall supply power to the fan, light and GFI utility outlet.
3. An EDCO model SHP-300-10 or exact approved equivalent surge arrester.
4. A 50-amp 125 VAC radio interference line filter.
5. A normally open 50-amp, Solid State Relay (SSR). Shall be Crydom Model Number HA4875H or approved equal.
6. A minimum of one (1) 8-position neutral bus bar capable of connecting three #12 wires per position.
7. A minimum of one (1) 6-position ground bus bar capable of connecting three #12 wires per position.
8. A minimum of one (1) NEMA type 5-15R GFI utility outlet.
9. The cabinet shall have a roll-out/swing-out concealable shelf/platform that can be used as platform for a laptop computer or other tools when the cabinet door is opened.

Power and SDLC Bus Panel: The Power and SDLC BUS Panel shall be manufactured from 0.090 to 0.125 inch thick 5052-H32 aluminum. It shall provide a central location to supply filtered power for the controller, malfunction management unit, cabinet power supply, and all auxiliary equipment. It shall have the following features:

1. It shall include the SDLC Bus connecting cables wired to a barrier type terminal block. As an alternate, SDLC Bus connections may be made via an SDLC Hub Assembly.
2. All cabinet equipment requiring filtered power to operate shall be hardwired directly to the supplied barrier type terminal blocks on the Power and SDLC BUS Panel.
3. All AC+ power sources shall be protected with a removable plastic cover plate.
4. The SDLC Hub Assembly shall accommodate all D-Subminiature Female 15 (DB15) connectors as required, and a minimum of five (5) SLDC connections shall be provided.

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Auxiliary Cabinet Equipment: The cabinet shall be provided with a thermostatically controlled (adjustable between 55-160 degrees Fahrenheit) ventilation fan in the top of the cabinet plenum. The fan plate shall be removable with the use of simple hand tools for serviceability. A minimum of one, maximum of two, exhaust fans shall be provided. The fan shall be a ball bearing type fan and shall be capable of drawing a minimum of 100 cubic feet of air per minute (CFM). The Fan/Thermostat assembly shall be connected to the Power panel by means of a 4 position plug-in cable or hardwired to an appropriate circuit breaker.

A LED cabinet lighting system may be used to illuminate the internal structure of the cabinet assembly. The LED cabinet lighting shall be a Luxembright LED module Model #770-W0013 and approved power supply or approved equivalent. This lighting system shall be wired directly to a door active switch mounted near the top of the door. Alternately, a fluorescent lighting fixture shall be mounted on the inside top of the cabinet near the front edge. The fixture shall be rated to accommodate at minimum a F15T8 lamp operated from a normal power factor UL or ETL listed ballast. The lamp shall be wired on the power panel or to a door activated switch mounted near the top of the door.

A re-sealable print pouch shall be mounted to the door of the cabinet. The pouch shall be of sufficient size to accommodate one complete set of folded cabinet prints. A minimum of two sets of complete and accurate cabinet drawings shall be supplied with each cabinet.

Vehicle Detection: A minimum of one Detector rack shall be provided in each cabinet.

1. Shall support up to 16 channels of loop detection (either eight 2 channel detectors or four 4 channel detectors), two 2-channel preemption devices and one BIU.
2. All connections to the back of the detector racks to the detector cards shall be soldered to a 44 terminal, double row, 3.962 mm (0.156 in.) contact spacing, Cinch Jones card edge connector 50-44A-30M, or equivalent centered vertically for each detector module.
3. All designations shall correspond to the requirements of the TS2-2003 specification. Card guides shall be provided on the top and bottom of the card rack for each connector position.
4. Each cabinet shall contain a detector interface panel per each detector rack for the purpose of connecting field loops and vehicle detector amplifiers. The panels shall be

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manufactured from 0.090 or 0.125 inch thick 5052- H32 Aluminum and use barrier type terminal blocks.

5. One 16-position interface panel shall be provided for a 16-channel rack cabinet. The interface panel shall be secured to the left wall of the cabinet.
6. Each interface panel shall allow for the connection of a minimum of eight independent field detectors.
7. In the case of loop detection, a ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in cable ground wire. Each interface panel shall provide a barrier style terminal block to terminate the field wires for up to two 2-channel preemption devices.
8. Lightning protection device mounting holes shall be provided to accommodate the potential usage of an EDCO LCA-6, lightning protection device.
9. A cable consisting of 20 AWG twisted pair wires shall be wired directly from the interface panel to the detector rack. The twisted pair wires shall be color coded red and white wire. No connectors shall be used to connect the interface panel to the detector rack.
10. All termination points shall be identified by a unique number and silk screened on the panel. Each detector rack shall accommodate rack mountable preemption devices such as EMTRAC or Opticom.

Cabinet Test Switches and Police Panel: A test switch panel shall be mounted on the inside of the main door. The test switch panel shall provide as a minimum the following:

1. SIGNALS ON/OFF SWITCH - In the OFF position, power shall be removed from signal heads in the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. AUTO/FLASH SWITCH - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall not be stop timed when in flash. Wired according to NEMA-TS2-2003, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. STOP TIME SWITCH - When applied, the controller shall be stop timed in the current interval.
4. CONTROL EQUIPMENT POWER ON/OFF - This switch shall control the controller, MMU, and cabinet power supply AC power. The TS2 controller to be provided with the cabinet assembly shall provide

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vehicular and pedestrian call inputs from its keyboard while in the standard status display.

The police door switch panel shall contain the following:

1. **SIGNALS ON/OFF SWITCH** - In the OFF position, power shall be removed from signal heads within the intersection. The controller shall continue to operate. When in the OFF position, the MMU shall not conflict or require reset.
2. **AUTO/FLASH SWITCH** - When in the flash position, power shall be maintained to the controller and the intersection shall be placed in flash. The controller shall be stop timed when in flash. Wired according to NEMA-TS2-1998, the MMU forces the controller to initiate the start-up sequence when exiting flash.
3. **AUTO/MANUAL SWITCH** - Cabinet wiring shall include provisions for an AUTO/MANUAL switch and a momentary push button or hand cord. The AUTO/MANUAL switch and push button or hand cord shall not be provided unless it is called for in the CUSTOMER SPECIFICATION.

All toggle type switches shall be heavy duty and rated 15 amps minimum. Single- or double-pole switches may be provided, as required. Any exposed terminals or switch solder points shall be covered with a non-flexible shield to prevent accidental contact. All switch functions must be permanently and clearly labeled. All wire routed to the police door-in-door and test switch push button panel shall be adequately protected against damage from repetitive opening and closing of the main door.

Auxiliary Devices:

Load Switches: Load switches shall be solid state and shall conform to the requirements of Section 6.2 of the NEMA TS2 Standard. Signal load switches shall have a minimum rating of 10 amperes at 120 VAC for an incandescent lamp load. The front of the load switch shall be provided with three indicators to show the input signal from the controller to the load switch. Load switches shall be dedicated per phase. The use of load switches for other partial phases is not acceptable. The full complement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Flashers: The flasher shall be solid state and shall conform to the requirements of section 6.3 of the NEMA TS2 Standard. Flashing

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of field circuits for the purpose of intersection flash shall be accomplished by a separate flasher. The flasher shall be rated at 15 amperes, double pole with a nominal flash rate of 60 FPM. A full complement of flasher shall be provided.

Flash Transfer Relays: All flash transfer relays shall meet the requirements of Section 6.4 of the NEMA TS2 Standard. The coil of the flash transfer relay must be de-energized for flash operation. The full complement of relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

Malfunction Management Units (MMU): Each cabinet assembly shall be supplied with one MMU as defined by the requirements of Section 4 of the NEMA TS2 Standard. Malfunction Management Units shall be a Type 16. The MMU shall be Model MMU-16 (EDI Model MMU-16LE) or approved equal.

Bus Interface Units (BIU): All BIUs shall meet the requirements of Section 8 of the NEMA TS2 Standard. A full complement of BIUs meeting Section 5.3.1.4 of the NEMA Publication No. TS2-2003 shall be supplied per cabinet. Bus Interface Units shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed. A minimum of 3 BIUs shall be provided for each cabinet. Each BIU shall include power on, transmit and valid data indicators - all indicators shall be LEDs. A Type 1 Interface shall be defined as defined by Section 5.3, the controller interface shall conform to the Standard Publication No. TS2-2003.

Cabinet Power Supply: The cabinet power supply shall meet the requirements of Section 5.3.5 of the NEMA TS2 Standard. The cabinet power supply shall provide LED indicators for the line frequency, 12 VDC, 12 VAC, and 24 VDC outputs. The cabinet power supply shall provide (on the front panel) jack plugs for access to the +24 VDC for test purposes. Cabinet power supply shall be provided with each cabinet assembly per manufacturer's specifications and be wired directly to the Power Bus Assembly via a 12-pin Molex Robotic type connector Model# 54332-1270 or exact equivalent.

Testing: Each controller and cabinet assembly shall be tested as a complete entity under signal load for a minimum of 48 hours. Each assembly shall be delivered with a signed document detailing the cabinet final tests performed. The cabinet shall be assembled and tested by the controller manufacturer or authorized

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local distributor to ensure proper component integration and operation.

Warranty: The controller and MMU shall be warranted by the manufacturer against mechanical and electrical defects for a period of two years from date of shipment. The manufacturer's warranty shall be supplied in writing with each cabinet and controller. Second party extended warranties are not acceptable. The cabinet assembly and all other components shall be warranted for a period of one year from date of shipment. Any defects shall be corrected by the manufacturer at no cost to the owner.

3.1.10 Contract Item # 10 - Iteris RZ4 Vehicle Detection Video Camera or Equal

3.1.11.1 Contract Item #11 shall be an Iteris Vantage RZ4 series or Equal vehicle detection video camera with associated connectors, cable, installation hardware and accessories including surge protection (EDCO #CX06-M or equivalent).

3.1.11 Contract Item # 11 – Non-Warranty Repair of Iteris RZ4 Vehicle Detection Video Camera or Equal

3.1.11.1 Contract Item #11 shall be for the repair of Iteris RZ4 or Equal vehicle detection video Camera. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by an Iteris or Equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.12 Contract Item #12 - Iteris or Equal Vehicle Detection Video Cards

3.1.13.1 Contract Item #13 shall be an Iteris Edge 2 Dual series (Model # 493094001) vehicle detection video card or equivalent.

3.1.13 Contract Item #13 - Non-Warranty Repair of Iteris or Equal Vehicle Detection Video Card

3.1.13.1 Contract Item #13 shall be for the repair of Iteris or Equal vehicle detection video cards. The repaired items shall be

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repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by an Iteris or equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.14 Contract Item # 14 - Autoscope Vehicle Detection Video Camera or Equal

3.1.15.1 Contract Item #14 shall be an Autoscope AIS-IV series (Model # 703170) or Equal vehicle detection video camera with associated connectors, cable, installation hardware and accessories including surge protection or equivalent.

3.1.15 Contract Item # 15 – Non-Warranty Repair of Autoscope Vehicle Detection Video Camera or Equal

3.1.15.1 Contract Item #15 shall be for the repair of Autoscope vehicle detection video cards. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by an Autoscope or Equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

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3.1.16 Contract Item #16 - Autoscope Vehicle Detection Video Cards

3.1.17.1 Contract Item #16 shall be an Autoscope Rackvision Pro 2 series (Model # PRO2-A700-1030) or Equal vehicle detection video card or equivalent.

3.1.17 Contract Item # 17- Non-Warranty Repair of Autoscope Vehicle Detection Video Cards or Equal

3.1.17.1 Contract Item #17 shall be for the repair of Autoscope vehicle detection video cards. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by an Autoscope or Equalcertified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.18 Contract Item #18 - Wavetronix Smartsensor "Matrix" Vehicle Detection Radar or Equal

3.1.19.1 Contract Item #18 shall be a Wavetronix Smartsensor Matrix series (Model #SS225) or equivalent Radar Presence Detection (RPD) and shall provide accurate presence-detection of moving vehicles up to 140 feet from the stop bar. The RPD shall be provided with all required cabinet hardware, mounting brackets, cables, and connections.

3.1.19 Contract Item #19 - Wavetronix Smartsensor "Advance" Vehicle Detection Radar or Equal

3.1.20.1 Contract Item #19 shall be a Wavetronix Smartsensor Advance (Model #SS200E) or equivalent Radar Advance Digital Detection (RADD) and shall provide accurate advanced presence-detection of moving vehicles or clusters of vehicles up to 900 feet from the stop bar. The RADD shall be provided with all required cabinet hardware, mounting brackets, cables, and connections.

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**3.1.20 Contract Item #20 - Wavetronix 2-Channel Vehicle
Detection Radar Card or Equal**

3.1.21.1 Contract Item #20 shall be a Wavetronix (Model # Click! 112 series) or Equal 2-channel vehicle detection radar card or equivalent.

**3.1.21 Contract Item #21 - Wavetronix 4-Channel Vehicle
Detection Radar Card or Equal**

3.1.22.1 Contract Item #21 shall be a Wavetronix (Model # Click! 114 series) or Equal 4-channel vehicle detection radar card or equivalent.

**3.1.22 Contract Item #22 – Econolite Accuscan “Stop Bar +
Advance” Vehicle Detection Radar**

3.1.23.1 Contract Item #22 shall be an Econolite Accuscan “Stop Bar + Advance” (Model #500 or Equal) or equivalent Radar Advance Digital Detection (RADD) and shall provide accurate advanced presence-detection of moving vehicles or clusters of vehicles up to 425 feet (130 meters) from the stop bar. The RADD shall be provided with all required cabinet hardware, mounting brackets, cables, and connections.

**3.1.23 Contract Item #23 – Econolite Accuscan “Stop Bar +
Advance” Vehicle Detection Radar**

3.1.24.1 Contract Item #23 shall be an Econolite Accuscan “Stop Bar + Advance” (Model #600C or Equal) or equivalent Radar Advance Digital Detection (RADD) and shall provide accurate advanced presence-detection of moving vehicles or clusters of vehicles up to 515 feet (157 meters) from the stop bar. The RADD shall be provided with all required cabinet hardware, mounting brackets, cables, and connections.

**3.1.24 Contract Item #24 – Econolite Accuscan Vehicle Detection
Radar Controller Interface Card or Equal**

3.1.25.1 Contract Item #24 shall be an Econolite Accuscan (Model # TMIB2 or Equal) 4-channel vehicle detection radar controller interface card or equivalent.

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3.1.25 Contract Item #25 - TOMAR Preemption Control Systems Detectors or Equal

3.1.26.1 Contract Item #25 shall be a TOMAR Strobecom II series (Model # 2091-SD) or equivalent.

3.1.26 Contract Item # 26 - TOMAR Preemption Control Systems Detection Cards or Equal

3.1.27.1 Contract Item # 26 shall be a TOMAR Strobecom II series (Model # 3080 optical signal processor) or equivalent.

3.1.27 Contract Item # 27 - Non-Warranty Repair of TOMAR Preemption Control Systems Detection Cards or Equal

3.1.27.1 Contract Item #27 shall be for the repair of TOMAR Preemption Control Systems or Equal detection cards. The repaired items shall be repaired to new working condition and with a description of the repair and certificate of repair confirming it was repaired and verifying the date of repair. Repairs must be made by a TOMAR or Equal certified factory workshop and by a technician with a manufacturer's certification that they are certified to work on these items.

3.1.28 Contract Item # 28 - Traffic Signal Conflict Monitor

3.1.29.1 Contract Item #28 shall be an EDI SSM-LE series (Model # SSM-12LE) or Equal, 12-channel conflict monitor or equivalent with EIA-232 port.

3.1.29 Contract Item #29 - Traffic Signal Malfunction Management Unit

3.1.29.1 Contract Item #29 shall be an EDI MMU-LE Series (Model # MMU-16LE) or Equal, 16-channel MMU or equivalent with EIA-232 port.

3.1.30 Contract Item #30 - Traffic Signal Bus Interface Unit

3.1.31.1 Contract Item #30 shall be an EDI standard-width (Model # BIU-700) or half-width (Model #BIU-700H) bus interface unit or equivalent with EIA-232 port.

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3.1.31 Contract Item #31 - Green LED Signal Lamp

3.1.31.1 Contract Item # 31 shall be a 12-inch green LED signal lamp, GE Lighting Solutions GTX series (Model #DR6-GTFB-77A or # DR6-GTFB-VLA) or Leotek IL6-P3 series (Model # TSL-12G-LX-IL6-A1-P3) or equivalent and shall carry a five (5) year warranty from the time of purchase.

3.1.32 Contract Item #32 - Yellow LED Signal Lamp

3.1.32.1 Contract Item #32 shall be a 12-inch yellow LED signal lamp, GE Lighting Solutions GTX series (Model #DR6-YTFB-77A or # DR6-YTFB-VLA) or Leotek IL6-P3 series (Model # TSL-12Y-LX-IL6-A1-P3) or equivalent and shall carry a five (5) year warranty from the time of purchase.

3.1.33 Contract Item #33 - Red LED Signal Lamp

3.1.33.1 Contract Item #33 shall be a 12-inch red LED signal lamp, GE Lighting Solutions GTX series (Model #DR6-RTFB-77A or # DR6-RTFB-VLA) or Leotek IL6-P3 series (Model # TSL-12R-LX-IL6-A1-P3) or equivalent and shall carry a five (5) year warranty from the time of purchase.

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3.1.34 LED Pedestrian Signal Head with Housing and Mounting Hardware

3.1.38.1 Contract Item #34 shall be a 16-inch by 18-inch LED countdown pedestrian signal, GE Lighting Solutions GT1 series (Model # PS7-CFF1-27A-J) or equivalent in full compliance with the MUTCD.

3.1.35 Contract Item #35 - Audible Pedestrian Push Button

3.1.39.1 Contract Item #35 shall be a Polara Model # iN3 or Campbell Model # AGPS 915 or equivalent.

3.1.36 Contract Item #42 - TS1 Cabinet Power Supply

3.1.40.1 Contract Item #36 shall be a NEMA TS-1 cabinet power supply, Siemens Model #CPS105 or equivalent.

3.1.37 Contract Item #37 - TS2 Cabinet Power Supply

3.1.41.1 Contract Item #37 shall be a NEMA TS-2 cabinet power supply, EDI Model #PS-250 or equivalent.

3.1.38 Contract Item #38 - Time Clocks

3.1.42.1 Contract Item #38 shall be an ELTEC Model # TC-18 or Equal programmable time clock or equivalent.

3.1.39 Contract Item #39 - 56K Wired Modems

3.1.43.1 Contract Item #45 shall be a US Robotics 56K Serial Controller Faxmodem (Model # 5686G) or equivalent.

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3.1.40 Contract Item #40- Flash Transfer Relays

3.1.44.1 Contract Item #40 shall be Struthers-Dunn Model #W21ACPX-2/W21ACPXD-5 or equivalent.

3.1.41 Contract Item #41 - Solar Flasher Controller

3.1.45.1 Contract Item #41 shall be a Morningstar Corporation ProStar-15 series (Model # PS-15) or equivalent.

3.1.42 Contract Item #42 - Solar Flasher Motor Unit

3.1.46.1 Contract Item #42 shall be a Traffic Sensor Corporation (TSC) Model # C/N FU4204 or equivalent.

3.1.43 Contract Item #43 - 4G/LTE Wireless Modems

3.1.43.1 Contract Item # 43 shall be a 4G/LTE Wireless Cradlepoint COR IBR1100 series or Sierra Wireless Airlink GX450 series or equivalent.

3.1.44 Contract Item #44 - Encom Radio Transceivers or Equal

3.1.44.1 Contract Item #44 shall be an Encom Model # Pulse S series spread spectrum radio transceiver or equivalent. This work shall consist of furnishing and installing spread-spectrum radio equipment in accordance with this special provision, the Signal Spread-Spectrum Provisions, and as directed by the Engineer. Spread-spectrum radio equipment shall be used for bi-direction data communications between the designated master and local intersection controllers. The prescribed Closed Loop System must be able to integrate both spread-spectrum interconnect as well as twisted pair communication cable interconnect to conform to the Signal Spread-Spectrum Provisions relating to system software functions.

Note: For supplementary information on the specifications below, reference the West Virginia Division of Highways Standard Specifications, Roads and Bridges, 2017 Edition at:

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http://www.transportation.wv.gov/highways/contractadmin/specifications/2017StandSpec/Documents/2017_Standard.pdf.

Materials shall be:

- A. Electrical Items shall conform to the requirements of Section 660 of the specifications.
- B. Galvanizing shall conform to the requirements of Section 660 and Subsection 715.42.
- C. Steel for fabrication items shall conform to the requirements of Section 660 and subsection 715.42.

Equipment shall be:

- A. Transceivers: Transceivers shall interface with the designated master and local intersection controllers providing under this contract and shall conform to the following:
 - a. FCC part 15.247
 - b. Frequency range 902-928 MHz
 - c. Frequency hopping type modulation
 - d. 250 milli-Watt to 1000 milli-Watt output power, adjustable
 - e. 7 channels minimum (50 frequencies minimum)
 - f. LED status indicators for transmission
 - g. Standard RS232C data interface with a DB25 connector on the transceiver
 - h. Data rate a minimum of 4800 bps
 - i. Antenna connector on transceiver shall be type "N"
 - j. Transceivers shall operate from 120 VAC or shall include a power supply for conversion of 120 VAC to the transceiver's voltage requirement
 - k. Maximum bit error rate of 1×10^{-6} at -105 dBm.
 - l. Transceivers shall be designed to prevent EMI and RFI interference
 - m. Transceivers shall be manufacturer's proven model designed for spread-spectrum communications

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- n. Transmitter frequency stability shall be 0.00015% from -30C degrees to +60C degrees
- o. Transceivers shall operate within a temperature range of -30C degrees to +60C degrees and 95% relative humidity at 40 degrees centigrade

B. Master/Repeater Antennas: Master/repeater antenna shall conform to Parts 15.247 and 15.249 of the FCC Telecommunications Manual for field strength of emissions, and be the manufacturer's proven model and conform to the following:

- a. Fiberglass, omni-directional type
- b. 9dbd gain, omni-directional pattern
- c. Frequency Range 902-928 MHz
- d. Mountable for vertical polarization
- e. "N" type female connector
- f. Minimum wind rating of 150 MPH
- g. Direct DC grounding system
- h. Stainless steel mounting hardware

Transmitting antennas with directional gain greater than 6 dBi shall have the power reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

C. Remote Antennas: Remote antennas shall be the manufacturer's proven model and conform to the following requirements:

- a. Yagi type with a minimum of 7 elements, including driven element
- b. 9 dBd gain
- c. Frequency range 902-928 MHz
- d. Mountable for horizontal and vertical polarization
- e. "N" type female connector
- f. Stainless steel mounting hardware

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D. Antenna Cables: Antenna cables having a length of 60 feet or less shall be 0.6" foam "hard line". Feed line loss of the antenna cables shall be no more than 3 dB.

E. Lightning Protection: Lightning protection for connection within the coax cable run shall conform to the following:

- a. Frequency Range, D.C. GHZ
- b. VSWR 1.5:1 Maximum
- c. Power Capacity of 200 watts @ 900 MHz
- d. Insertion loss of less than 0.3 dB @ 900 MHz
- e. D.C. Breakdown Voltages 350 VDC +/- 15%
- f. Maximum Impulse Current at 8 x 10 microseconds, 5000 amps
- g. Impulse Life at 10 x 1000 microseconds 500 amps, 500 occurrences minimum
- h. Insulation resistance at 100 VDC, 100 mega ohms
- i. Connectors "N" type female

F. Software: Software (two copies) shall be furnished on 3.5" diskettes for use with a standard IBM compatible 80386 CPU laptop computer. One copy shall be provided to the City and one copy to be provided to the Traffic Engineering Division. Software shall be menu driven and furnished with operating instructions. The Contractor shall furnish a standard RS232C cable with DB25 connector for connection to the computer and transceivers. Operation of the software on existing T.E.D. laptop computers shall be demonstrated by the contractor and any software and cable problems shall be corrected by the Contractor at no expense to the T.E.D. Software shall control the following programming and diagnostic parameters:

- a. Radio system address
- b. Radio loop-back mode
- c. Mode – master remote
- d. Channel
- e. Hop pattern

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- f. Data interface rate
- g. Radio model number, serial number and date of manufacture
- h. Owners name
- i. Link check
- j. Polling check
- k. Sync check

3.1.45 Contract Item #45 - Intuicom Communicator II Radio Transceivers or Equal

3.1.45.1 Contract Item #45 shall be an Intuicom EB-X series spread spectrum radio transceiver or equivalent. This work shall consist of furnishing and installing spread-spectrum radio equipment in accordance with this special provision, the Signal Spread-Spectrum Provisions, and as directed by the Engineer. Spread-spectrum radio equipment shall be used for bi-direction data communications between the designated master and local intersection controllers. The prescribed Closed Loop System must be able to integrate both spread-spectrum interconnect as well as twisted pair communication cable interconnect to conform to the Signal Spread-Spectrum Provisions relating to system software functions.

Note: For supplementary information on the specifications below, reference the West Virginia Division of Highways Standard Specifications, Roads and Bridges, 2017 Edition at:

http://www.transportation.wv.gov/highways/contractadmin/specifications/2017StandSpec/Documents/2017_Standard.pdf.

Materials shall be:

- A. Electrical Items shall conform to the requirements of Section 660 of the specifications.
- B. Galvanizing shall conform to the requirements of Section 660 and Subsection 715.42.

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- C. Steel for fabrication items shall conform to the requirements of Section 660 and subsection 715.42.

Equipment shall be:

- A. Transceivers: Transceivers shall interface with the designated master and local intersection controllers providing under this contract and shall conform to the following:
1. FCC part 15.247
 2. Frequency range 902-928 MHz
 3. Frequency hopping type modulation
 4. 250 milli-Watt to 1000 milli-Watt output power, adjustable
 5. 7 channels minimum (50 frequencies minimum)
 6. LED status indicators for transmission
 7. Standard RS232C data interface with a DB25 connector on the transceiver
 8. Data rate a minimum of 4800 bps
 9. Antenna connector on transceiver shall be type "N"
 10. Transceivers shall operate from 120 VAC or shall include a power supply for conversion of 120 VAC to the transceiver's voltage requirement
 11. Maximum bit error rate of 1×10^{-6} at -105 dBm.
 12. Transceivers shall be designed to prevent EMI and RFI interference
 13. Transceivers shall be manufacturer's proven model designed for spread-spectrum communications
 14. Transmitter frequency stability shall be 0.00015% from -30C degrees to +60C degrees
 15. Transceivers shall operate within a temperature range of -30C degrees to +60C degrees and 95% relative humidity at 40 degrees centigrade

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B. Master/Repeater Antennas: Master/repeater antenna shall conform to Parts 15.247 and 15.249 of the FCC Telecommunications Manual for field strength of emissions, and be the manufacturer's proven model and conform to the following:

1. Fiberglass, omni-directional type
2. 9dbd gain, omni-directional pattern
3. Frequency Range 902-928 MHz
4. Mountable for vertical polarization
5. "N" type female connector
6. Minimum wind rating of 150 MPH
7. Direct DC grounding system
8. Stainless steel mounting hardware

Transmitting antennas with directional gain greater than 6 dBi shall have the power reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

C. Remote Antennas: Remote antennas shall be the manufacturer's proven model and conform to the following requirements:

1. Yagi type with a minimum of 7 elements, including driven element
2. 9 dBd gain
3. Frequency range 902-928 MHz
4. Mountable for horizontal and vertical polarization
5. "N" type female connector
6. Stainless steel mounting hardware

D. Antenna Cables: Antenna cables having a length of 60 feet or less shall be 0.6" foam "hard line". Feed line loss of the antenna cables shall be no more than 3 dB.

E. Lightning Protection: Lightning protection for connection within the coax cable run shall conform to the following:

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1. Frequency Range, D.C. GHZ
2. VSWR 1.5:1 Maximum
3. Power Capacity of 200 watts @ 900 MHz
4. Insertion loss of less than 0.3 dB @ 900 MHz
5. D.C. Breakdown Voltages 350 VDC +/- 15%
6. Maximum Impulse Current at 8 x 10 microseconds, 5000 amps
7. Impulse Life at 10 x 1000 microseconds 500 amps, 500 occurrences minimum
8. Insulation resistance at 100 VDC, 100 mega ohms
9. Connectors "N" type female

F. Software: Software (two copies) shall be furnished on 3.5" diskettes for use with a standard IBM compatible 80386 CPU laptop computer. One copy shall be provided to the City and one copy to be provided to the Traffic Engineering Division. Software shall be menu driven and furnished with operating instructions. The Contractor shall furnish a standard RS232C cable with DB25 connector for connection to the computer and transceivers. Operation of the software on existing T.E.D. laptop computers shall be demonstrated by the contractor and any software and cable problems shall be corrected by the Contractor at no expense to the T.E.D. Software shall control the following programming and diagnostic parameters:

1. Radio system address
2. Radio loop-back mode
3. Mode – master remote
4. Channel
5. Hop pattern
6. Data interface rate
7. Radio model number, serial number and date of manufacture
8. Owners name
9. Link check
10. Polling check
11. Sync check

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4 CONTRACT AWARD:

- 4.1 Contract Award:** The Contract is intended to provide Agencies with a purchase price on all Contract Items. The Contract shall be awarded to the Vendor that provides the Contract Items meeting the required specifications for the lowest overall total cost by section as shown on the Pricing Pages. Each section shall be evaluated independently, and award shall be made to multiple vendors if needed.
- 4.2 Pricing Pages:** Vendor should complete the Pricing Pages by completing **Exhibit A** by entering the Unit Price for each commodity line item requested. The **Exhibit A Pricing Pages** are supplied in Excel and formatted to calculate the Extended Cost and the Grand Total Cost. It is the vendor's responsibility to ensure the calculations for their bid is correct before submitting. Vendor should complete the Pricing Pages in their entirety as failure to do so may result in Vendor's bids being disqualified.

The Pricing Pages contain a list of the Contract Items and estimated purchase volume. The estimated purchase volume for each item represents the approximate volume of anticipated purchases only. No future use of the Contract or any individual item is guaranteed or implied.

Vendor should electronically enter the information into the Pricing Pages through wvOASIS if available, or as an electronic document. In most cases, the Vendor can request an electronic copy of the Pricing Pages for bid purposes by sending an email request to the following address: Crystal.G.Hustead@wv.gov

5 ORDERING AND PAYMENT:

- 5.1 Ordering:** Vendor shall accept orders through WVOASIS, regular mail, facsimile, e-mail, or any other written form of communication. Vendor may, but is not required to, accept on-line orders through a secure internet ordering portal/website. If Vendor has the ability to accept on-line orders, it should include in its response a brief description of how Agencies may utilize the on-line ordering system. Vendor shall ensure that its on-line ordering system is properly secured prior to processing Agency orders on-line.
- 5.1 Payment:** Vendor shall accept payment in accordance with the payment procedures of the State of West Virginia.

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6 DELIVERY AND RETURN:

6.1 Delivery Time: Vendor shall deliver standard orders within thirty-two (32) working days after orders are received. Vendor shall deliver emergency orders within three (3) working day(s) after orders are received. Vendor shall ship all orders in accordance with the above schedule and shall not hold orders until a minimum delivery quantity is met.

6.2 Late Delivery: The Agency placing the order under this Contract must be notified in writing if orders will be delayed for any reason. Any delay in delivery that could cause harm to an Agency will be grounds for cancellation of the delayed order, and/or obtaining the items ordered from a third party. Any order not received in full after thirty-two (32) working days of ARO will be penalized \$40.00 per calendar day until order is completed in full.

Any Agency seeking to obtain items from a third party under this provision must first obtain approval of the Purchasing Division.

6.3 Delivery Payment/Risk of Loss: Standard order delivery shall be F.O.B. destination to the Agency's location. Vendor shall include the cost of standard order delivery charges in its bid pricing/discount and is not permitted to charge the Agency separately for such delivery. The Agency will pay delivery charges on all emergency orders provided that Vendor invoices those delivery costs as a separate charge with the original freight bill attached to the invoice.

6.4 Return of Unacceptable Items: If the Agency deems the Contract Items to be unacceptable, the Contract Items shall be returned to Vendor at Vendor's expense and with no restocking charge. Vendor shall either make arrangements for the return within five (5) days of being notified that items are unacceptable or permit the Agency to arrange for the return and reimburse Agency for delivery expenses. If the original packaging cannot be utilized for the return, Vendor will supply the Agency with appropriate return packaging upon request. All returns of unacceptable items shall be F.O.B. the Agency's location. The returned product shall either be replaced, or the Agency shall receive a full credit or refund for the purchase price, at the Agency's discretion.

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- 6.5 Return Due to Agency Error:** Items ordered in error by the Agency will be returned for credit within 30 days of receipt, F.O.B. Vendor's location. Vendor shall not charge a restocking fee if returned products are in a resalable condition. Items shall be deemed to be in a resalable condition if they are unused and in the original packaging. Any restocking fee for items not in a resalable condition shall be the lower of the Vendor's customary restocking fee or 5% of the total invoiced value of the returned items.

7 VENDOR DEFAULT:

- 7.1** The following shall be considered a vendor default under this Contract.
- 7.1.1 Failure to provide Contract Items in accordance with the requirements contained herein.
 - 7.1.2 Failure to comply with other specifications and requirements contained herein.
 - 7.1.3 Failure to comply with any laws, rules, and ordinances applicable to the Contract Services provided under this Contract.
 - 7.1.4 Failure to remedy deficient performance upon request.
- 7.2** The following remedies shall be available to Agency upon default.
- 7.2.1 Immediate cancellation of the Contract.
 - 7.2.2 Immediate cancellation of one or more release orders issued under this Contract.
 - 7.2.3 Any other remedies available in law or equity.

8 MISCELLANEOUS:

- 8.1 No Substitutions:** Vendor shall supply only Contract Items submitted in response to the Solicitation unless a contract modification is approved in accordance with the provisions contained in this Contract.
- 8.2 Vendor Supply:** Vendor must carry sufficient inventory of the Contract Items being offered to fulfill its obligations under this Contract. By signing its bid, Vendor certifies that it can supply the Contract Items contained in its bid response.

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- 8.3 Reports:** Vendor shall provide quarterly reports and annual summaries to the Agency showing the Agency's items purchased, quantities of items purchased, and total dollar value of the items purchased. Vendor shall also provide reports, upon request, showing the items purchased during the term of this Contract, the quantity purchased for each of those items, and the total value of purchases for each of those items. Failure to supply such reports may be grounds for cancellation of this Contract.
- 8.4 Contract Manager:** During its performance of this Contract, Vendor must designate and maintain a primary contract manager responsible for overseeing Vendor's responsibilities under this Contract. The Contract manager must be available during normal business hours to address any customer service or other issues related to this Contract. Vendor should list its Contract manager and his or her contact information below.

Contract Manager: _____
Telephone Number: _____
Fax Number: _____
Email Address: _____

Exhibit A Pricing Page

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Item Number	Estimated Quantities	Unit of Measure	Description	UNSPC CODE	Unit Price	Total Cost
SECTION 1						
1	20	ea	Siemens Eagle Traffic Controller M60 Series or equivalent	46161504		
2	10	ea	Siemens Eagle Master Traffic Controller M60 Series or equivalent	46161504		
3	30	ea	Repairs of Siemens Eagle Traffic Controllers	46161504		
4	1	ea	Eagle Traffic Signal TS2 Pole Mounted Signal Cabinet or equivalent	46161504		
5	1	ea	Eagle TS2 Ground Mounted Traffic Signal Cabinets or equivalent	46161504		
SECTION 2						
6	20	ea	Econolite Cobalt ATC Traffic Signal Controller or euqivalent	46161504		
7	20	ea	Repair of Econolite Traffic Controller	46161504		
8	1	ea	Econolite TS2 Pole Mounted Signal Cabinet or equivalent	46161504		
9	1	ea	Econolite TS Ground Mounted Signal Cabinet or equivalent	46161504		
SECTION 3						
10	10	ea	Iteris RZ4 Vehicle Detection Camera or equivalent	46161504		
11	5	ea	Repair of Iteris RZ4 Video Detection Camera or equivalent	46161504		
12	10	ea	Iteris Vehicle Detection Card or equivalent	46161504		
13	10	ea	Repair of Iteris Video Detection Card	46161504		
SECTION 4						
14	10	ea	Autoscope Vehicle Detection Video Camera or equivalent	46161504		
15	10	ea	Repair of Autoscope Vehicle Detection Camera or equivalent	46161504		
16	10	ea	Autoscope Vehicle Detection Cards or equivalent	46161504		
17	10	ea	Repair of Autoscope Vehicle Detection Cards	46161504		
SECTION 5						
18	1	ea	Wavetronix Smart Sensor Matrix Vehicle Detection Radar or euqivalent	46161504	\$5,450.00	\$5,450.00
19	1	ea	Wavetronix Smart Sensor"Advance" Matrix Vehicle Detection Radar or equivalent	46161504	\$5,850.00	\$5,850.00
20	10	ea	Wavetronix Smart 2-Channel Detection Card or equivalent	46161504	\$360.00	\$3,600.00
21	5	ea	Wavetronix 4-Channel Vehicle DetectionCard or equivalent	46161504	\$425.00	\$2,125.00
SECTION 6						
22	1	ea	Econolite Accuscan "Stop Bar"+Advance Model 500 or Equal Vehicle Detection Radar	46161504		
23	1	ea	Econolite Accuscan "Stop Bar"+ Advnace Model 600c or equal Vehicle Detection Radar	46161504		
24	10	ea	Econolite Accuscan model TMIB2 or equal Detection Radar Controller Interface Card	46161504		
SECTION 7						
25	30	ea	TOMAR Preemption Control Systems Detectors or euqivalent	46161504		
26	20	ea	TOMAR Preemption Control Systems Detection Cards or equivalent	46161504		
27	15	ea	Repair of TOMAR Preemption Control Systems Detection Cards or euqivalent	46161504		
SECTION 8						
28	30	ea	Traffic Signal Conflict Monitor	46161504		
29	15	ea	Traffic Signal Malfunction Management Unit	46161504		
30	30	ea	Traffic Signal Bus Interface Unit	46161504		
31	150	ea	Green LED Signal Lamp	46161504		
32	150	ea	Yellow LED Signal Lamp	46161504		
33	150	ea	Red LED Signal Lamp	46161504		
34	30	ea	LED Pedestrian Signal Head with Housing and Mounting Hardware	46161504		
35	30	ea	Audible Pedestrian Push Button	46161504		
36	50	ea	TS1 Cabinet Power Supply	46161504		
37	15	ea	TS2 Cabinet Power Supply	46161504		
38	5	ea	Time Clocks	46161504		
39	50	ea	56K Wired Modems	46161504		
40	20	ea	Flash Transfer Relays	46161504		

41	5	ea	Solar Flasher Controller	46161504		
42	5	ea	Solar Flasher Motor Unit	46161504		
			SECTION 10			
43	20	ea	ENCOM Radio Transceivers or equivalent	46161504		
			SECTION 11			
44	10	ea	Intuicom Radio Transceivers or equivalent	46161504		

West Virginia Ethics Commission



Disclosure of Interested Parties to Contracts

Pursuant to *W. Va. Code* § 6D-1-2, a state agency may not enter into a contract, or a series of related contracts, that has/have an actual or estimated value of \$1 million or more until the business entity submits to the contracting state agency a Disclosure of Interested Parties to the applicable contract. In addition, the business entity awarded a contract is obligated to submit a supplemental Disclosure of Interested Parties reflecting any new or differing interested parties to the contract within 30 days following the completion or termination of the applicable contract.

For purposes of complying with these requirements, the following definitions apply:

"Business entity" means any entity recognized by law through which business is conducted, including a sole proprietorship, partnership or corporation, but does not include publicly traded companies listed on a national or international stock exchange.

"Interested party" or "Interested parties" means:

- (1) A business entity performing work or service pursuant to, or in furtherance of, the applicable contract, including specifically sub-contractors;
- (2) the person(s) who have an ownership interest equal to or greater than 25% in the business entity performing work or service pursuant to, or in furtherance of, the applicable contract. (This subdivision does not apply to a publicly traded company); and
- (3) the person or business entity, if any, that served as a compensated broker or intermediary to actively facilitate the applicable contract or negotiated the terms of the applicable contract with the state agency. (This subdivision does not apply to persons or business entities performing legal services related to the negotiation or drafting of the applicable contract.)

"State agency" means a board, commission, office, department or other agency in the executive, judicial or legislative branch of state government, including publicly funded institutions of higher education: Provided, that for purposes of *W. Va. Code* § 6D-1-2, the West Virginia Investment Management Board shall not be deemed a state agency nor subject to the requirements of that provision.

The contracting business entity must complete this form and submit it to the contracting state agency prior to contract award and to complete another form within 30 days of contract completion or termination.

This form was created by the State of West Virginia Ethics Commission, 210 Brooks Street, Suite 300, Charleston, WV 25301-1804. Telephone: (304)558-0664; fax: (304)558-2169; e-mail: ethics@wv.gov; website: www.ethics.wv.gov.

West Virginia Ethics Commission
Disclosure of Interested Parties to Contracts
(Required by W. Va. Code § 6D-1-2)

Name of Contracting Business Entity: Iron Armour, LLC Address: 1290 Fox Lane
Mogadore, OH 44260

Name of Authorized Agent: Loren Stayer Address: Same as above

Contract Number: DOT2000000111 Contract Description: Traffic Signal Parts

Governmental agency awarding contract: WV Division of Highways

Check here if this is a Supplemental Disclosure

List the Names of Interested Parties to the contract which are known or reasonably anticipated by the contracting business entity for each category below (attach additional pages if necessary):

1. Subcontractors or other entities performing work or service under the Contract
 Check here if none, otherwise list entity/individual names below.

2. Any person or entity who owns 25% or more of contracting entity (not applicable to publicly traded entities)
 Check here if none, otherwise list entity/individual names below.

3. Any person or entity that facilitated, or negotiated the terms of, the applicable contract (excluding legal services related to the negotiation or drafting of the applicable contract)
 Check here if none, otherwise list entity/individual names below.

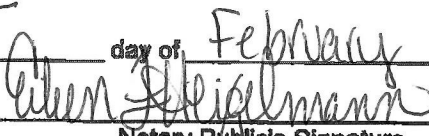
Signature:  Date Signed: 02/05/2020

Notary Verification


State of Ohio, County of Summit:

I, Iron Armour LLC / Loren Stayer, the authorized agent of the contracting business entity listed above, being duly sworn, acknowledge that the Disclosure herein is being made under oath and under the penalty of perjury.

Taken, sworn to and subscribed before me this 5 day of February, 2020


Notary Public's Signature

To be completed by State Agency:
Date Received by State Agency: _____
Date submitted to Ethics Commission: _____
Governmental agency submitting Disclosure: _____

 **EILEEN F. HEIGELMANN**
Notary Public State of Ohio
My Comm. Expires MAY 02, 2021

STATE OF WEST VIRGINIA
Purchasing Division
PURCHASING AFFIDAVIT

CONSTRUCTION CONTRACTS: Under W. Va. Code § 5-22-1(i), the contracting public entity shall not award a construction contract to any bidder that is known to be in default on any monetary obligation owed to the state or a political subdivision of the state, including, but not limited to, obligations related to payroll taxes, property taxes, sales and use taxes, fire service fees, or other fines or fees.

ALL CONTRACTS: Under W. Va. Code §5A-3-10a, no contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and: (1) the debt owed is an amount greater than one thousand dollars in the aggregate; or (2) the debtor is in employer default.

EXCEPTION: The prohibition listed above does not apply where a vendor has contested any tax administered pursuant to chapter eleven of the W. Va. Code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Employer default" means having an outstanding balance or liability to the old fund or to the uninsured employers' fund or being in policy default, as defined in W. Va. Code § 23-2c-2, failure to maintain mandatory workers' compensation coverage, or failure to fully meet its obligations as a workers' compensation self-insured employer. An employer is not in employer default if it has entered into a repayment agreement with the Insurance Commissioner and remains in compliance with the obligations under the repayment agreement.

"Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

AFFIRMATION: By signing this form, the vendor's authorized signer affirms and acknowledges under penalty of law for false swearing (W. Va. Code §61-5-3) that: (1) for construction contracts, the vendor is not in default on any monetary obligation owed to the state or a political subdivision of the state, and (2) for all other contracts, that neither vendor nor any related party owe a debt as defined above and that neither vendor nor any related party are in employer default as defined above, unless the debt or employer default is permitted under the exception above.

WITNESS THE FOLLOWING SIGNATURE:

Vendor's Name: Iron Armour, LLC

Authorized Signature: *Laura Key* Date: 02/05/2020

State of Ohio

County of Summit, to-wit:

Taken, subscribed, and sworn to before me this 5 day of February, 2020

My Commission expires May 02, 2021, 20 .

AFFIX SEAL HERE

NOTARY PUBLIC

Eileen F. Heigelmann
Purchasing Affidavit (Revised 01/19/2018)



EILEEN F. HEIGELMANN
Notary Public State of Ohio
My Comm. Expires MAY 02, 2021

CRFQ DOT200000111

Item Number	Estimated Quantities	Unit of Measure	Description	UNSPC CODE	Unit Price	Total Cost
SECTION 1						
1	20	ea	Siemens Eagle Traffic Controller M60 Series or equivalent	46161504		
2	10	ea	Siemens Eagle Master Traffic Controller M60 Series or equivalent	46161504		
3	30	ea	Repairs of Siemens Eagle Traffic Controllers	46161504		
4	1	ea	Eagle Traffic Signal TS2 Pole Mounted Signal Cabinet or equivalent	46161504		
5	1	ea	Eagle TS2 Ground Mounted Traffic Signal Cabinets or equivalent	46161504		
SECTION 2						
6	20	ea	Econolite Cobalt ATC Traffic Signal Controller or euqivalent	46161504		
7	20	ea	Repair of Econolite Traffic Controller	46161504		
8	1	ea	Econolite TS2 Pole Mounted Signal Cabinet or equivalent	46161504		
9	1	ea	Econolite TS Ground Mounted Signal Cabinet or equivalent	46161504		
SECTION 3						
10	10	ea	Iteris RZ4 Vehicle Detection Camera or equivalent	46161504		
11	5	ea	Repair of Iteris RZ4 Video Detection Camera or equivalent	46161504		
12	10	ea	Iteris Vehicle Detection Card or equivalent	46161504		
13	10	ea	Repair of Iteris Video Detection Card	46161504		
SECTION 4						
14	10	ea	Autoscope Vehicle Detection Video Camera or equivalent	46161504		
15	10	ea	Repair of Autoscope Vehicle Detection Camera or equivalent	46161504		
16	10	ea	Autoscope Vehicle Detection Cards or equivalent	46161504		
17	10	ea	Repair of Autoscope Vehicle Detection Cards	46161504		
SECTION 5						
18	1	ea	Wavetronix Smart Sensor Matrix Vehicle Detection Radar or euqivalent	46161504	\$5,450.00	\$5,450.00
19	1	ea	Wavetronix Smart Sensor"Advance" Matrix Vehicle Detection Radar or equivalent	46161504	\$5,850.00	\$5,850.00
20	10	ea	Wavetronix Smart 2-Channel Detection Card or equivalent	46161504	\$360.00	\$3,600.00
21	5	ea	Wavetronix 4-Channel Vehicle DetectionCard or equivalent	46161504	\$425.00	\$2,125.00
SECTION 6						
22	1	ea	Econolite Accuscan "Stop Bar"+Advance Model 500 or Equal Vehicle Detection Radar	46161504		
23	1	ea	Econolite Accuscan "Stop Bar"+ Advnace Model 600c or equal Vehicle Detection Radar	46161504		
24	10	ea	Econolite Accuscan model TMIB2 or equal Detection Radar Controller Interface Card	46161504		
SECTION 7						
25	30	ea	TOMAR Preemption Control Systems Detectors or euqivalent	46161504		
26	20	ea	TOMAR Preemption Control Systems Detection Cards or equivalent	46161504		
27	15	ea	Repair of TOMAR Preemption Control Systems Detection Cards or euqivalent	46161504		
SECTION 8						
28	30	ea	Traffic Signal Conflict Monitor	46161504		
29	15	ea	Traffic Signal Malfunction Management Unit	46161504		
30	30	ea	Traffic Signal Bus Interface Unit	46161504		
31	150	ea	Green LED Signal Lamp	46161504		
32	150	ea	Yellow LED Signal Lamp	46161504		
33	150	ea	Red LED Signal Lamp	46161504		
34	30	ea	LED Pedestrain Signal Head with Housing and Mounting Hardware	46161504		
35	30	ea	Audible Pedestrian Push Button	46161504		
36	50	ea	TS1 Cabinet Power Supply	46161504		
37	15	ea	TS2 Cabinet Power Supply	46161504		
38	5	ea	Time Clocks	46161504		
39	50	ea	56K Wired Modems	46161504		
40	20	ea	Flash Transfer Relays	46161504		

41	5	ea	Solar Flasher Controller	46161504		
42	5	ea	Solar Flasher Motor Unit	46161504		
			SECTION 10			
43	20	ea	ENCOM Radio Transceivers or equivalent	46161504		
			SECTION 11			
44	10	ea	Intuicom Radio Transceivers or equivalent	46161504		



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

02/05/2020

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER COX & DERVIN INSURANCE 1225 S MAIN ST STE E NORTH CANTON OH 44720		CONTACT NAME: Christopher Cox PHONE (A/C No. Ext): (330) 494-5923 E-MAIL ADDRESS: ccox@coxdervin.com FAX (A/C, No): (330) 494-4330	
INSURED Iron Armour Llc 1290 Fox Ln Mogadore OH 44260-9522		INSURER(S) AFFORDING COVERAGE INSURER A: ATO - AUTO OWNERS INSURANCE INSURER B: INSURER C: INSURER D: INSURER E: INSURER F:	
		NAIC # 18988	

COVERAGES**CERTIFICATE NUMBER:****REVISION NUMBER:**


THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	Y		05358371	11/15/2019	11/15/2020	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 10,000 PERSONAL & ADV INJURY \$ GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ \$
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY	Y		4338059106	11/15/2019	11/15/2020	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$ \$
	<input type="checkbox"/> UMBRELLA LIAB <input type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED RETENTION \$						EACH OCCURRENCE \$ AGGREGATE \$ \$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A				<input type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ E.L. DISEASE - EA EMPLOYEE \$ E.L. DISEASE - POLICY LIMIT \$

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

STATE OF WV IS LISTED AS CERTIFICATE HOLDER AND ADDITIONAL INSURED

CERTIFICATE HOLDER**CANCELLATION**

STATE OF WV 1900 KANAWHA BLVD E BLDG 5 CHARLESTON, WV 25305	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE 
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