

MOBILE COUNTY COMMISSION

205 Government Street 8TH FL South
Mobile, Alabama 36644

BID INVITATION

NO. 109-24

APRIL 12, 2024

In accordance with General Act No. 217, Special Session 1967, notice is hereby given that the Mobile County Commission, Mobile, Alabama, will receive bids on the following items: **ANNUAL TRAFFIC SIGNAL CABINET AND CONTROLLER EQUIPMENT BID FOR MOBILE COUNTY PUBLIC WORKS AS PER ATTACHED SPECIFICATIONS:**

NOTE: PRICES MUST REMAIN FIRM FROM THE DATE THE OF AWARD THROUGH SEPTEMBER 30, 2025.

Any questions or comments concerning the bid requirements must be brought to the attention of Susan Holland, Purchasing Agent, 205 Government Street, 8th FL South, Mobile, Alabama 36644, susan.holland@mobilecountyal.gov prior to the bid opening or will be forever waived.

All bidders shall furnish a five percent (5%) bid bond on any contract exceeding \$30,000.00: provided that bonding is available for services, equipment or materials. Bid bond will be accepted in the form of a certified check, cashier's check, or postal money order, etc.

Out of State Corporations shall furnish a Certificate of Authority to transact business in the State of Alabama. Out of State limited liability companies shall furnish proof of registration to transact business in this state. Alabama law requires that a successful bidder, if it has employees in the State of Alabama, provide proof of enrollment in E-Verify prior to the award of a contract. (See enclosed notice which must be completed, signed and returned with your bid.)

If applicable to a contract resulting from this invitation, the successful bidder must comply with the Contractor Felony Investigation Policy, available in the Purchasing Department or at www.mobilecountyal.gov.

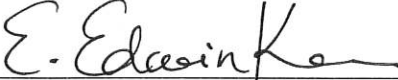
THE MOBILE COUNTY COMMISSION DOES NOT DISCRIMINATE ON THE BASIS OF RACE, AGE, SEX, NATIONAL ORIGIN, RELIGION, OR DISABILITIES.

F.O.B. Mobile DATE OF DELIVERY _____ TERMS _____ You are invited to bid on the above specifications. The restrictions contained herein are for the purpose of fixing a quality level, and any deviation therefrom must, in detail establish that it meets the quality requirements.

BIDS WILL BE RECEIVED UNTIL 10:00 A.M. MAY 1, 2024.

ALL BIDS MUST BE SEALED, "BID NUMBER, COMPANY'S NAME, AND NAME OF THE BID ITEM MARKED ON THE OUTSIDE OF THE ENVELOPE." THE BIDDER WILL RETURN THE ENTIRE BID PACKAGE. BIDS MUST BE DELIVERED TO THE RECEPTIONIST IN THE OFFICE OF THE COUNTY COMMISSION ADMINISTRATOR, 205 GOVERNMENT STREET ON THE EIGHTH FLOOR SOUTH TOWER OF THE MOBILE COUNTY GOVERNMENT PLAZA. FAILURE TO OBSERVE THE ABOVE INSTRUCTIONS WILL CONSTITUTE GROUNDS FOR REJECTION OF YOUR BID. THE COMMISSION RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS.

MOBILE COUNTY COMMISSION



E. EDWIN KERR, INTERIM COUNTY ADMINISTRATOR

We propose to meet the above specifications for the sum of

\$see attached list.

Delivery can be made in _____ days from receipt of order.

RESPECTFULLY

BY _____

SAMPLE



Company ID Number: 477783

To be accepted as a participant in E-Verify, you should only sign the Employer's Section of the signature page. If you have any questions, contact E-Verify at 888-464-4218.

Employer Mobile County Commission

Connie Hudson

Name (Please Type or Print)

Title

Electronically Signed

12/21/2011

Signature

Date

Department of Homeland Security – Verification Division

USCIS Verification Division

Name (Please Type or Print)

Title

Electronically Signed

12/21/2011

Signature

Date

Information Required for the E-Verify Program

Information relating to your Company:

Company Name:	Mobile County Commission
Company Facility Address:	205 Government Street
	8th Floor South Tower
	Mobile, AL 36644
Company Alternate Address:	
County or Parish:	MOBILE
Employer Identification Number:	336001644



IMPORTANT

**THIS DOCUMENT MUST BE COMPLETED,
SIGNED AND RETURNED WITH YOUR BID**

As a condition for the award of a competitively bid contract to a company having one or more employees in the State of Alabama, the Beason-Hammon Alabama Taxpayer Citizenship and Protection Act, codified at Section 31-13-1, et seq., Code of Alabama (1975), as amended, requires that the company provide, in advance, proof of enrollment in E-Verify. E-Verify is an internet based system operated by the U.S. Department of Homeland Security, which may be used to determine the eligibility of new hires to work in the United States. Further information about enrollment in E-Verify may be found at www.uscis.gov/everify and www.Verify.Alabama.gov.

As proof of enrollment in E-Verify, Mobile County requires a copy of the electronically signed signature page of the contractor's Memorandum of Understanding with the U.S. Department of Homeland Security or Alabama Department of Homeland Security (contractors having fewer than 25 employees may enroll in E-Verify through the state Department of Homeland Security).

Please complete the following and return with your bid:

_____ (company name) has no employees in the
State of Alabama

Or

_____ (company name) is enrolled in E-Verify and a
copy of the electronically signed signature page of the company's Memorandum of Understanding is
attached.

_____ Date

_____ Signature

_____ Title

Date: _____

BID # 109-24

ANNUAL TRAFFIC SIGNAL CABINET AND CONTROLLER EQUIPMENT BID FOR MOBILE COUNTY PUBLIC WORKS:

Name of Company: _____

Company Representative _____
(Print)

Company Representative _____
(Signature)

Address _____

Phone Number () _____ Fax Number() _____

Federal ID Number _____

Email Address _____

Company Web Address _____

Please attach a current W-9.

Traffic Signal Cabinet and Controller Equipment For Mobile County

I. NEMA TRAFFIC SIGNAL ASSEMBLY and Related Equipment

A. GENERAL REQUIREMENTS

- i. This specification defines the minimum characteristics and components for a traffic signal assembly for use by the County of Mobile. As a general requirement, the facility shall meet the current NEMA Standards for a TS2 Type 2 facility unless otherwise specified herein. The cabinet shall conform to the latest version of specifications for use by the County of Mobile. The cabinet facility shall be wired per the wiring diagram as approved by the Alabama Department of Transportation.

B. EXCEPTIONS TO OR CLARIFICATION OF NEMA REQUIREMENTS

- i. The general cabinet specifications shall be as per NEMA unless otherwise noted herein.
- ii. NEMA Section 5.2.4 — Printed circuit boards are not allowed for wiring of the Main Panel wiring assembly.
- iii. Main Panel Assembly shall be wired for a Type 2 Controller Unit (CU) and
- iv. Malfunction Management Unit (MMU2). The terminal facilities shall include unique indelible markings for terminal strips and devices. The facility shall be MODE 2 capable and the cabinet drawings shall include complete wiring designations for Mode 0 or Mode 2.
- v. NEMA Section 5.3.1.1 — It shall be possible to also program load switch outputs for No Flash. Wiring between the load switches, flash transfer relays and the field terminal points shall be color coded to reflect the source component of the circuit.
- vi. NEMA Table 5-2
 1. Configurations 1 and 3 are not acceptable under this Specification

C. CABINET, BASE MOUNT

I. CONSTRUCTION

1. No riveted construction shall be acceptable. All attachments shall be welded or utilize stainless steel hardware.
2. The main cabinet door shall have a #2 lock. Two keys shall be supplied for each cabinet.
3. All cabinets shall be furnished with a self-latching three-position door stop which shall hold the main door open at approximately 90,135 and 180 degrees. The door stop shall be designed to lock into position and withstand the force of a 30 MPH wind.
4. A removable dust filter shall be mounted on the inside of the main door completely covering the intake vent. The cabinet air filter shall be of the throwaway type and its minimum area shall be 250 square inches. The filter shall be installed, positioned and firmly held in place so that all intake air is filtered with no by-passing permitted through cracks, clearance spaces or gaps. Positive retention shall be provided on all sides to prevent warping of the filter and prevent the entry of foreign matter around the edges.
5. All cabinets shall have two independent thermostatically controlled exhaust fans. The exhaust fans shall have a minimum rating of 100 CFM per minute. The fans shall be rated for continuous duty and a lifetime of at least three years. A standard fuse of sufficient rating shall be used to protect against surges and short circuits. The fans shall be standard commercially available units.
6. The thermostat controlling the exhaust fans shall be manually adjustable to turn on between 90°F and 150°F with a differential of not more than 10°F between

automatic turn-on and turn-off.

7. 120 VAC power for the fans shall be provided by the Main Power cabinet circuit breaker.
8. There shall be a minimum of 6 inches clearance between the bottom of the cabinet and any panel located on any cabinet wall.
9. Each cabinet shall include a minimum of three shelves to support supplied shelf mount devices with at least 20% of the total shelf width unused and available for future devices. Shelves shall have the following features:
 - a. Shall be attached to u-channel slots that are secured to the cabinet walls.
 - b. Shall be attached to the u-channels using standard screws and a securing device such as a spring nut.
 - c. Shall not impede the owners' ability to lower the main panel to approximately 90 degrees without the need to remove cabinet components.
 - d. The top shelf shall be no closer than 14" from the lowest point of the top of the cabinet.

II. DETECTION

1. The cabinet shall be wired with a detector rack system. The rack shall support 2 Channel Loop amplifiers, Radar Detection units and Video Detection Units. Communications between the rack and the controller unit shall be via the SDLC port on the Rack BIU2 and the controller BIU2.
2. All cabinets shall include a loop detection field input panel for termination of a minimum of 12 field loops or as required by the bid documents. When required by the plans or other bid documents, video and radar detection field interface panels or modules shall be supplied. Any AC power required by the video or radar system shall be supplied by the filtered (sure protected) output of the EDCO ASP-340 on the power input panel. The rack shall include a BIU2 for communications with the controller. A TS-2 Cabinet Power Supply (CPS) shall be included. The CPS shall provide all power for the detector rack as well as the 24VDC that goes to Load Switch Pin 9. Detection shall be accomplished using dual channel rack mounted loop detector amplifiers with stretch-delay features in a NEMA TS2 configured detector rack. Up to 16 channels of vehicle detection shall be included in each rack. Vehicle calls, placed by the detector amplifiers, shall be transmitted to the controller through a serial interface using an NEMA TS2 BIU (Bus Interface Unit). The detection rack shall support 2-channel TS2 loop amplifiers, video detection and radar detection units. Standard detection shall be inductive loops or video or radar when specified in the bid documents.

III. MAIN PANEL

1. The Main Panel shall provide the termination facilities for all of the Controller and Malfunction Management Units inputs and outputs. The MP shall have the following features on one Main Panel Facility
 - a. Shall have 16 load switch bases located on the Main Panel
 - i. Bases 1-8 shall be vehicle phases
 - ii. Bases 9-12 shall be overlaps A-D
 - iii. Bases 13-16 shall be pedestrian
 - b. Shall have 6 flash transfer relay bases
2. shall have 1 flasher base
 - a. On base Mount cabinets, the main panel shall fold down to approximately 90 degrees without the need to remove any other panels or cabinet equipment.
3. The Main Panel Assemble shall be wired for a Type 2 Controller Unit (CU) and Malfunction Management Unit (MMU2). The terminal facilities shall include unique indelible markings for terminal strips and devices. The facility shall be MODE 2 capable

- and the cabinet drawings shall include complete wiring designations for Mode 0 or Mode 2.
- a. The Main Panel (MP) shall contain all of the control wiring for the proper operation of the controller and MMU2. All wiring from the controller or MMU2 shall be terminated at a barrier terminal strip or a device that is physically attached to the MP.
4. The MP wiring shall include the following:
- a. Single or double tie barrier terminal strips.
 - b. #6 screws for CU and MMU2 I/O
 - c. #10 screws for 120 VAC Load Switch Outputs
 - d. Silk screened or indelibly labeled termination points or devices
 - e. Support bracket for load switches and flasher
5. Wiring shall be neatly routed and supported. Screw mounted anchor ties shall be used to support connecting cables and inter-panel wiring. Adhesive anchor ties are not acceptable.
- a. Wiring points for Load Switch and Flasher AC+ shall utilize a #10 screw.
 - b. Flasher Outputs A and B shall be user assignable using only a screwdriver and shall not require access to the rear of the panel.
 - c. There shall be circuitry to preclude all but flash operation if a MMU2 is not present.
 - d. There shall be circuitry to remove the 24VDC input to all load switches (Pin 9) when the solid state relay for Load Switch AC+ coil power is removed. There shall be a technician momentary override of this circuit.

IV. POWER PANEL

1. There shall be a panel for AC power distribution. This panel shall contain the following:
 - a. A radio interference suppressor shall be provided in a series with AC power before it is distributed to any equipment inside the cabinet. The filter shall provide a minimum attenuation of 40 decibels, and a frequency range of 200 kilohertz to 60 megahertz. It shall be hermetically sealed in a metal case. The filter shall have the same minimum circuit rating as the main circuit breaker and shall meet the standards of the Underwriter's Laboratories, Incorporated and Electronic Industries Association.
 - b. The 120 Volt AC for Load Switch Pin 1 shall be provided by a solid state relay rated at a minimum of 40 amperes that is de-energized for flash operation. There shall be a redundant interlock failsafe that removes the 24 VDC input to the load switches whenever 120 VAC is removed from the coil of the mercury contactor.
 - c. A copper ground bus bar shall be mounted on panel for the connection of A.C. neutral wires and chassis ground wires. It shall be securely fastened to the cabinet. The AC Neutral buss shall have a minimum of 10 open positions to accept 14 AWG wire.
 - d. Multiple Buss Bars
 - i. All ground buss bars for terminating a specific circuit shall be interconnected with a minimum of a No. 12 AWG stranded copper cable.
 - ii. Each bus bar shall have at least two (2) positions where a No. 6 AWG stranded copper wire can be attached.
2. All cabinets shall be furnished with a minimum of three (3) circuit breakers. 30 amp circuit breaker shall control all electrical power for normal signal operation. The circuit breaker shall not control flash operation. The cabinet fan shall be connected to this breaker. A 15 ampere circuit breaker that provides all AC power associated with the FLASH Operation. A single 15 ampere breaker shall provide power for the GFCI outlet and the service lamps. The location of the Power Input Panel shall not impede the owner's ability to lower the main panel to the 90 degree position. Logic Ground, 120 VAC Neutral and Chassis ground shall be isolated from each other within the cabinet. There shall be a single tie point that will allow the connection of these circuits together

3. TS 2 Standard Section 5.4.2.2 Disconnect Means shall be appended as follows:
 - a. Main Breaker shall be: 1 Pole 30 Amps
 - b. Flash Breaker shall be: 1 Pole 15 Amps
 - c. Auxiliary Breaker shall be: 1 Pole 15 Amps
 - d. A TS2 24vdc cabinet power supply shall also be integrated into the cabinet to power the vehicle detector racks and other ancillary equipment requiring 24vdc.

V. FUSING AND SURGE PROTECTION

1. Over-current protection and surge protection shall be provided as described below.
 - a. AC Service Input - Each controller cabinet shall be furnished with an EDCO ACP-340 surge protector or an approved equal on the AC Service Input.
 - b. Each vehicle loop detector input shall be protected with an EDCO SRA916 surge protector or an approved equal.
 - c. Each load switch output terminal as it enters the cabinet shall be protected with a 20 Joule MOV arrestor or an approved equal. One MOV shall be provided for each of the 3 load switch outputs. The ground side of the MOV shall be soldered to a bare copper buss that is connected to chassis ground.
 - d. Relays shall have a coil noise suppression device installed.
 - e. A radio interference suppressor shall be provided in a series with AC power before it is distributed to any equipment inside the cabinet. The filter shall provide a minimum attenuation of 40 decibels, and a frequency range of 200 kilohertz to 60 megahertz. It shall be hermetically sealed in a metal case. The filter shall have the same minimum circuit rating as the main circuit breaker and shall meet the standards of the Underwriter's Laboratories, Incorporated and Electronic Industries Association.
 - f. Each pedestrian detector input shall be protected with a surge protector that is a unique device to protect a single circuit. Pedestrian detector pushbuttons shall be wired to an electrical circuit that carries a maximum 12 VAC. Pedestrian pushbutton detector circuits external to the cabinet shall not be referenced to logic ground or 120 VAC common.

VI. WIRING — GENERAL

1. NEMA Section 5.2.4 is appended to preclude the use of printed circuit boards for wiring of the Main Panel wiring assembly.
2. All cabinet wiring shall be hardwired unless specifically allowed by this specification. Wire type and sizes shall be as per NEMA. Color-coded wires shall be provided as follows:
 - a. 120 volt AC wiring shall be coded as black, white and green.
 - b. Load switch NEMA input and output wires shall be red, yellow and brown.
 - c. 24 VDC shall be uniquely colored.
3. All cabinet wiring shall be neatly routed and secured. Stick-on anchor ties are not acceptable.
4. There shall be a minimum of two (2) copper ground busses electrically isolated from earth ground.
5. AC common, Logic Ground and Earth ground shall be isolated within the cabinet wiring. There shall be only one tie point where all three grounds are tied together and it shall be possible to isolate each from the other(s).

VII. SWITCH PANELS AND OTHER FEATURES

1. NEMA Section 5.5 CONTROL CIRCUITS shall be appended as follows.
 - a. Main Door
 - i. The Main Door shall have locked keyed as #2.
 - ii. The police door shall be equipped with a lock whose key will not unlock the main door. Two keys shall be furnished for each cabinet. The police door shall be located in the top half of the main door for pad mounted cabinets and in the bottom half or midpoint of the main door

- for all pole mounted cabinets. Police Panel shall contain the following switch set:
- iii. Signal Head Power Switch: When in the OFF position, all power to the signal heads shall be removed.
 - iv. Flash Switch: When in the ON position, the intersection shall flash as stipulated in previously for Flashing of Signals. A.G. power shall be removed from the load switches. Stop timing shall be applied to the controller.
 - v. Manual Switch: When in the ON position, the controller unit shall operate as specified previously for Manual Control. A complete on-off cycle of the manual push button shall cause immediate termination of the interval in process of timing, except for vehicle clearance intervals. All vehicle clearance intervals shall be timed by the controller unit. Activation of the manual push button shall not terminate vehicle clearance intervals until the controller unit has completely timed the preset clearance interval time.
 - vi. Push Button Cord: Cabinets shall be wired for but shall not include a manual push button cord.
 - vii. Technician Panel There shall be a Technician Service Panel (TSP) located on the inside of the main door at approximately the mid vertical point of the door. The TSP shall have the following switch set.
 - b. Signal Head Power Switch: When in the OFF position, all power to the signal heads during normal operation shall be removed.
 - c. Flash Switch: When in the ON position, the intersection shall flash as follows:
 - i. Power ON-OFF Switch: When in the OFF position, A.C. power shall be removed the controller, MMU2, detectors and any other electronic device within the cabinet.
 - d. Detector Call/Test Switches: Each controller cabinet shall be equipped with an adequate number of vehicle detector switches and pedestrian call switches. These switches shall be capable of placing no call, continuous call, or pulse call. The output of these switches shall be terminated directly to the rear panel terminal designated for the controller detector call inputs.
 - e. Stop Timing Switch:
 - i. When in the ON position, the controller stop timing shall be applied constantly.
 - ii. When in the OFF position, no Stop Time will be active.
 - iii. When in the AUTO Position, the MMU2 shall provide the Stop Time ground Input.
 - iv. Interval Advance Switch: There shall be a pushbutton switch to activate the controller Interval Advance Circuit. This switch shall be functional ONLY when the Stop Timing Switch is in the ON position.

VIII. MISCELLANEOUS NEMA SECTIONS 5.4.2.7 AND 5.4.2.7.1 LIGHTING FIXTURE ARE APPENDED AS FOLLOWS.

1. The cabinet shall have the following miscellaneous cabinet electrical facilities
 - a. A three (3) wire 115 VAC GFI duplex receptacle shall be mounted and wired in the cabinet. The receptacle shall be fed through a circuit breaker serving only the receptacle and the cabinet light and shall remain in service even when the power switch is turned off. This receptacle shall not be used as the AC power source for any device housed within the cabinet.
 - b. The cabinet shall be provided with LED lighting to illuminate the front of the main panel and other cabinet panels. Two such fixtures are required to provide the lighting needs, one to illuminate the main panel and one mounted on the plenum. A refrigerator door type switch shall be provided to turn the light on and off when the cabinet door is opened and closed.

- c. When railroad preemption is required, a momentary contact switch shall be installed in the preemptor actuation circuit to provide a means to test the preemptor operation.
 - d. The Cabinet shall be provided with two non-GFCI electrical outlets that derive 120VAC source from the main power input surge protected output. This outlet shall be used as the electrical source for any cabinet device that must be connected to an electrical outlet. Any external modem, radio or other field operational device must be connected to this outlet(s). The GFCI shall be reserved exclusively for technicians use and shall have no cabinet devices connected to it.
 - e. There shall be a set of terminals that function under Mode 2 that provide the following inputs into the controller to emulate the proprietary "0" connector functions. The following functions shall be included:
 - i. Alarms 1 and 2
 - ii. Preemption inputs 1-6.
 - iii. Vehicle Detector 9-16 inputs.
2. There shall be a detection input panel that is supplied to support the type of detection specified in the bid documents or plans.
- a. All detector field input panels shall be positioned on the left wall of the cabinet and shall include a multi-position copper ground buss.
 - b. If the detection system requires a cabinet supplied 120VAC source, that source shall be from the surge protected output of the power input panel and shall have a circuit breaker or switch to remove field power when necessary positioned at the left wall connection point.
 - c. Pedestrian detector field wiring shall be provided with a multi-position termination point for the pushbutton 12 VAC source to the button and a return to the cabinet. All terminations shall be at a terminal or buss point.

IX. MALFUNCTION MANAGEMENT UNIT

- 1. The cabinet shall be wired for a 16 channel malfunction management unit. The MMU2 wiring shall support a NEMA TS 1 12 Channel Conflict Monitor Unit (CMU).
- 2. On circuits where all field outputs are not used (such as left-turn phases) unused circuits shall be terminated at a load resistor and the monitor plus features shall function.
- 3. As a minimum, 4 resistors shall be included in all cabinets. The resistors shall be located in a manner to be easily replaced and to allow for adequate heat dissipation.
- 4. The MMU2 sampling inputs shall be terminated at the same tie point as the field termination for the signal displays. No intermediary terminations or tie points for MMU2 Field Inputs (Phase G, W, Y or Red) will be accepted.
- 5. No functional field display shall be permitted unless monitored by the MMU2.
- 6. The cabinet shall be able to utilize a TS 1 Conflict Monitor Unit and there shall be a Main Panel terminal that when Logic Ground is applied, the MMU2 will function as a 12 Channel CMU.

X. CONTROLLER UNIT

1. THE CONTROLLER UNIT (CU) SHALL BE A NEMA TS2 TYPE 2 UNIT. THE CU SHALL MEET THE NEMA STANDARDS AND BE PROVIDED WITH THE FOLLOWING ADDITIONAL SPECIFIED FEATURES.
- a. Front Panel Mounted Connectors
 - b. Port 1 (SDLC)
 - c. Port 2 (terminal)
 - d. Port 3A (Telemetry) RS-232
 - e. Port 3B (FSK Telemetry) if the controller is installed at a location using twisted pair communications.
 - f. Ethernet
 - g. Display
 - i. LCD, 16 line x 40 characters per line

- ii. Shall be backlit, and have front panel button(s) for Contrast adjustment
- 2. The controller shall be able to accept, via a SDLC port, inputs from a video detection system that is Ethernet capable and uses video over power.
- 3. Current Status Displays
 - a. The CU shall have multiple display screens to display information about specific controller operations.
 - b. Controller
 - i. The default screen shall show the current timing status of the 4 controller rings including:
 - 1. Per Phase: Phase R-Y-G, On and Next Status
 - 2. Per Phase: Vehicle and Pedestrian Call Status
 - 3. Per Phase: Recall Status
 - 4. Per Phase: Interval(s) timing with counter
 - 5. Per Phase: Cause of phase termination
 - 6. Timing plan in effect
 - 7. Communications Status
 - 8. Current date and time
 - ii. Coordinator Status Display shall show the following:
 - 1. Per Phase: Phase R-Y-G, On and Next Status
 - 2. Per Phase: Vehicle and Pedestrian Call Status
 - 3. Per Phase: Recall Status
 - 4. Local Cycle Timer
 - 5. System Cycle Timer
 - 6. Free or Coordinated Status
 - iii. Preemptor STATUS DISPLAY SHALL SHOW THE FOLLOWING:
 - 1. Per Phase: Phase R-Y-G, On and Next Status
 - 2. Per Phase: Vehicle and Pedestrian Call Status
 - 3. Per Phase: Recall Status
 - 4. Per Phase: Interval(s) timing
 - 5. Per Phase: Cause of phase termination
 - 6. Preempt # Active
 - 7. Preempt Per Ring Active
 - iv. Time of Day status shall indicate the following:
 - 1. Source of Coordination;
 - 2. Time of Day
 - 3. Manual Override
 - 4. Telemetry command from Master Communications
 - 5. There shall be a display that shows the communications status for each of the front panel communications ports.
 - v. Detectors SHALL display The following for each of the 16 detectors
 - 1. Delay Timer
 - 2. Extend Timer
 - 3. Detector Failed
 - vi. Inputs and Outputs
 - 1. There will be a status screen for each of the inputs and outputs of the A-B-C connectors, with the connector (A-C) and pin (alphabetic) displayed.
 - vii. CONTROLLER EXPANDED FUNCTIONALITY - Timing Plans - there shall be 4 timing plans with the full NEMA timing intervals and functions. Functions and Timing Intervals beyond the NEMA Standards shall be provided in each of the 4 timing plans and shall include the following.
 - 1. Delayed Green timer shall extend the phase Red Clearance to allow the next phase Walk to proceed the parent phase green.
 - 2. Bicycle Minimum Green with a dedicated detector input.
 - 3. Walk 2 and Pedestrian 2 enabled by TOD Plan or external input.
 - 4. Delayed overlap if the overlap conflicts with a possible pedestrian movement.

5. Startup - The user shall be able to define the Start condition where user specifies the phases, overlaps and the color display to be implemented under startup conditions.
 6. Minimum Time - The User shall be able to set Minimum Interval values for the following intervals:
 - a. Minimum Green
 - b. Walk
 - c. Pedestrian Clearance
 - d. Yellow Clear
 - e. Red Clear
 - f. Overlap Green
- viii. Programming Methods - It shall be possible to program the CU via all of the following methods.
1. Via the front panel keyboard
 2. Via telemetry from a central computer directly or via an on-street master
 3. Downloading from a computer connected directly to the controller
 4. Transfer of data from a flash memory device
 5. Software for data transfer from the central computer or a laptop connected directly to the CU shall be the same and be able to share the same database.
 6. Default Data Load
- c. Coordination - the coordinator shall allow the user to implement a minimum of 120 coordination patterns (See section V.C.a.1). Each pattern shall allow selection of the following:
- i. An independent cycle length per pattern
 - ii. User settable over the range of 30-999 seconds in 1 sec increments
 - iii. An Offset value (In seconds or percent)
 - iv. A split pattern that allows selection of the following:
 1. Coordinated Phases
 2. Split percent or time by phase
 3. Phase(s) to be omitted
 4. Minimum Recall, Maximum Recall or no recall per phase
 5. Pedestrian Recall per phase
 - v. User selected Manual Override
 1. The user shall be able to override the programmed plan in effect by choosing a Manual operating plan that will implement a different plan, free operation or flash operation until deselected by an operator.
 - vi. Preemption - the controller shall have a minimum of 6 independent preemption plans.
 1. Each plan shall have the following user programmable functions:
 - a. User selectable as to Railroad or Emergency Vehicle Preempt
 - b. Selectable as Dwell or Cycling Preempt
 - c. User selection of Track Clearance Vehicle and Overlap Display
 - d. Dwell display for Vehicle, Overlaps and Pedestrian Phases
 - e. Phases to Exit preempt to
 - i. Exit Preemption to Coordination
 - ii. Phases to be called upon Exit Preempt
 - iii. Hardwire output for Preempt Active
 - vii. Preempt Plan Enable
 - viii. Lock Preempt Input
 - ix. Delay Preempt Call
 - x. Turn off Pedestrian Display

- xi. Functions with user programmable timing values:
 - 1. Enter preemption minimum times for:
 - a. Walk
 - b. Pedestrian Clearance
 - c. Minimum Green
 - d. Yellow and Red clearances
 - e. Track Clearance
 - f. Minimum Green
 - g. Yellow and Red Clearances
 - h. Exit Conditions
 - i. Minimum Dwell Time
- xii. Time of Day — operation shall provide the user the ability to implement a coordination plan, free plan or flash plan, and other functions as required herein.
 - 1. Implement a pattern (C-O-S)
 - 2. Implement a specific detector plan
 - 3. Implement 1 of the 4 CU Timing Plans
 - 4. Initiate FLASH or FREE
 - 5. Implement Per Phase Dimming
 - 6. Implement Special Functions

XI. NEMA TS2 (SDLC) Serial Bus

- 1. The cabinet shall be provided with a set of NEMA TS2 SDLC serial bus interface harnesses (cables) and connectors to provide TS2 communications between the MMU2 and cabinet detector BIU2's
- 2. An SDLC distribution panel with minimum of 8 connecting points for up to 8 SDLC cables shall be provided.
- 3. The panel, harnesses and connectors shall conform to NEMA TS2 standards
- 4. SDLC Cables to connect the controller to the detector rack BIU2 and the MMU2 shall be provided.
- 5. The main panel shall not be required to use BIU2's.
- 6. A BIU2 shall be provided in the cabinet for the detector rack.
- 7. MMU2 shall connect directly to the serial bus without the requirement of an external BIU2..

XII. MALFUNCTION MANAGEMENT UNIT (MMU2) SPECIFICATION

- a. The following specification describes the minimum acceptable requirements for a sixteen (16) channel MALFUNCTION MANAGEMENT UNIT (MMU2) as part of the Assembly.
 - i. The MMU2 shall meet or exceed TS-2 2003 v02.06 specifications. In addition to meeting or exceeding NEMA TS-2 specifications, the MMU2 shall also meet the specific features defined in this detailed specification.
 - ii. The manufacturer of the MMU2 shall provide full warrantee coverage for a period of at least two (2) years. The warrantee period shall be based on the actual usage time of the MMU2 unit. The MMU2 shall include an Up Time Accumulator to track usage.
 - iii. The MMU2 shall be a Model MMU2-16000E manufactured by Reno, A & E or an equal that has been tested and approved prior to bid.

NEMA TS2 FULLY-ACTUATED ADVANCED TRAFFIC CONTROLLER

a. INTRODUCTION

- i. This specification sets forth the minimum requirements for a shelf-mounted, two through sixteen phase, fully-actuated, digital, solid-state traffic controller to be supplied as part of the Assembly. The controller shall meet, as a minimum, all applicable sections of the NEMA Standards Publications for TS2, NTCIP and the ATC 6.1 Standards. Where differences occur, these

specifications shall govern. Controller versions shall be available to comply with NEMA TS2 Types 1 and 2. Type 2 versions of the controller shall be capable of operating as a Type 1 controller.

The controller and video detection system shall be a matched component system (IE from the same manufacturer and designed to work together) The CU shall be an Econolite Cobalt C in order to maintain compatibility with other controllers and systems in use in Mobile County.

- D. If the cabinet/controller are to be supplied as a component of an existing system, the cabinet and controller shall be provided with communication components that will interface with existing system components to maintain complete system operation.

E. SYSTEM COMMUNICATIONS

i. On-Street Master Communications

1. The controller shall be capable of communicating with an on-street system master. This capability shall be provided by a separate telemetry module, which shall be included in the controller when required by the plans and specifications.
2. The telemetry module shall receive system master commands and data transmissions. In addition, it shall transmit the controller status, data base and system detector information to the system master.
3. If required by the plans and specifications, an external fiber optic modem or external radio or other means of communications shall be provided instead of the telemetry module.

ii. System Commands

1. The telemetry module shall allow the controller to receive, as a minimum, the following commands:
 - a. Cycle, offset, and split (coordination pattern)
 - b. System sync
 - c. Special function commands (minimum of four)
 - d. Free and flash mode commands
 - e. Time and date
 - f. Request for local status
 - g. Recall to Max
2. All commands must occur more than once in any three
a. -second period in order to be recognized.
3. All mode and special function commands shall be
a. cleared after 20 minutes of loss of communication between controller and system master.
4. The status of each of the following functions shall be transmitted to the system master in response to a local status request:
 - a. Green and yellow status for all phases and overlaps
 - b. Walk and pedestrian clearance status for all phases
 - c. Vehicle and pedestrian detector status
 - d. Phase termination status
 - e. Local time
 - f. Coordination status
 - g. Command source
 - h. Sync or transitioning status of coordinator
 - i. Conflict flash status
 - j. Local flash status
 - k. Preempt activity and calls
 - l. Volume and occupancy data from a minimum of 16 system detectors
 - m. Speed data from a minimum of two speed detectors
 - n. Maintenance required (cabinet door open) status
 - o. Status of two user-defined alarms
5. The status of each of the following parameters shall be calculated on a per-cycle basis and transmitted to the system master for Split Monitor Reporting:

- a. Actual time spent in each phase
 - b. Time of day at end of cycle
 - c. Phases forced off during cycle
 - d. Type of coordination operation
 - e. Whether transitioning to new offset
 - f. Cycle, offset, and split in effect during last cycle
 - g. Flash status if operation is Free
6. Upload/Download Capability — The telemetry module shall provide the capability to upload/download the entire intersection database. Phase assignments for overlaps and preemptors shall not be downloaded to preclude unsafe controller operation. It shall be possible to inhibit downloading of phases in use and left-turn head control. Data transfer shall not require the intersection to be in flash.

iii. Telemetry

1. Telemetry shall utilize TDM/FSK data transmission from 1200 baud to 9600 baud over two pairs of wires. These may be leased lines (Type 3002, voice grade, unconditioned) or dedicated cable. Optional external fiber optic or wireless communications capability shall also be available.
2. The nominal transmitter output level shall be 0 dbm into a 600-ohm load. The receiver sensitivity shall be -34 dbm and shall be adjustable from -40 to +6 dbm.
3. Parity and error checking shall be employed to assure transmission and reception of valid data. Indicators shall be provided on the telemetry module to show telemetry activity as follows: transmit, receive carrier, and valid data.
4. In the event of a telemetry failure, the controller shall revert to the non-interconnected coordination mode after it has self-synchronized for a number of cycles, which shall be selectable from 1-254. If the number of cycles is set to 255, the controller will self-synchronize until a synchronizations pulse is detected.

iv. Communications Protocols

1. The controller shall have the capability of supporting communications with traffic management systems using industry standard protocols with the installation of appropriate optional software.
2. At a minimum the controller shall have optional software to support the following protocols:
 - a. CalTrans AB3418
 - b. ECIPIP
 - c. NTCIP Level 2 as defined by Section 3.3.6 of NEMA TS2- 2003. NTCIP v02.06 capabilities shall include all NTCIP mandatory and optional objects. The controller vendor shall provide access to all controller data via vendor specific objects. These and all other objects supported by the controller shall be defined in a standard MIB file.

v. Ethernet Communications

1. The controller shall have the capability of supporting Ethernet communications, using TCP/IP communications protocols.
2. This communications protocol shall utilize the controller's built-in Network Interface Card and shall not require Ethernet-to-Serial converters.

vi. External Clock

1. The controller shall have the capability of communicating with an external clock like a GPS or WWV clock for setting its internal time of day clock.
2. The controller shall include a time reset input. This feature shall reset the TOD clock to 03:30 whenever the time reset input from the GPS or WWV clock is TRUE.

vii. Communications Ports

1. The controller shall as a minimum have the following internal communications ports:
 - a. Port 1 SDLC for communications to other devices in the cabinet
 - b. Port 2 Terminal port for communications with a computer for the purposes of uploading, downloading or upgrading the controller software
 - c. Port 3 Systems communications port. This port shall be provided to either communicate to an on-street master or a central computer system or upgrading the controller software or database.
 - d. An optional telemetry module shall utilize TDM/FSK data transmission from 1200 baud to 9600 baud over two pairs of wires.
2. Serial communications shall operate at 1200 to 115.2 K baud

F. DIAGNOSTICS

- i. General Diagnostics Features
 1. The controller shall include both automatic and operator-initiated diagnostics. This capability shall be a standard feature and shall not require additional modules or software.
 2. Automatic diagnostics shall verify memory and microprocessor operation each time power is reapplied to the controller. After power has been applied, diagnostics shall continually verify the operation of essential elements of the controller including at a minimum: memory, communications, and the microprocessor.
- ii. Detector Diagnostics
 1. Time-of-day controlled detectors diagnostics shall be provided that allow testing vehicle and pedestrian detectors for no activity, maximum presence, and erratic output.
 2. A minimum of four detector diagnostic plans shall be provided. These plans shall be selectable on a time-of-day basis. This shall allow varying the detector diagnostic intervals to correspond with changes in detector activity.
 3. If a detector is diagnosed as failed, the associated phase shall be placed in one of the following keyboard selectable modes:
 - a. Detector fail recall from 1 to 255 seconds
 - b. Disable the detector from clling or extending.
- iii. Diagnostics for NEMA TS2 detectors connected to the controller using a Bus Interface Unit (BIU2) shall also include detection of watchdog, open and shorted loop, and excessive inductance change failures.

G. LOGGING

- i. The controller shall be capable of logging and reporting detector activity, detector failures, and the occurrence of selected events or alarms. Logs shall be capable of being printed or displayed on the front of the controller.
- ii. Detector Logging
 1. The controller shall include a detector log buffer capable of logging volume, occupancy and average speed for selected vehicle and speed detectors.
 2. The detector-logging interval shall be keyboard selectable as 5, 15, 30, or 60 minutes.
 3. Detector logging shall be capable of being enabled or disabled by time-of-day.
- iii. Detector Failure Logging
 1. The controller shall include a detector failure log buffer capable of storing a minimum of 100 time and date-stamped detector failure events. Once logged, detector failure events shall remain in the log until cleared or the log buffer capacity is exceeded at which time the oldest detector failure events shall be overwritten.
 2. All detector diagnostic failures shall be recorded in the detector failure log including: no activity, maximum presence, erratic output, watchdog failure, open loop, shorted loop, and excessive inductance change. If a detector recovers after a diagnostic failure, a detector on-line event shall be stored in the detector failure log.
 3. Detector failure logging shall be capable of being disabled.
- iv. Event Logging
 1. The controller shall include an event log buffer capable of storing a minimum of 200 time and date-stamped events or alarms. Once logged, events shall remain in the buffer until cleared or the log buffer capacity is exceeded at which time the oldest events shall be overwritten.
 2. At a minimum the following events shall be logged: communication failures, coordination faults, MMU and local flash status, preempt, power ON/OFF, low battery, and status of a minimum of two alarm inputs. An on-line event shall be logged when an event or alarm returns to normal status.
 3. If security is enabled, an event shall be logged when a user enters a data change. This event shall include the user's ID. It is necessary to log the first change only and not

every change. Also an entry shall be recorded when a user logs in and out of the controller. Event logging shall be capable of being enabled or disabled for each category of event or alarm.

H. OPTIONAL SOFTWARE MODULES

- i. The optional software modules shall not be considered as base features of the controller. These features shall be enabled through a special function data key, which when inserted in the controller shall unlock the software features and allow the controller to activate the functionality.
- ii. Intersection Monitor (IM)
 1. The controller shall include an intersection monitoring option that requirement of a Master Controller.
 2. Intersection monitoring shall provide remote database management of the controller programming. It shall be possible to remotely upload, download or compare the controller programming.
 3. The intersection monitor shall report any prioritized problem to central traffic control software by an external dial up telephone modem.
- iii. Transit Signal Priority (TSP)
 1. Six Transit Signal Priority plans shall be available to allow priority control of identified transit vehicles
 2. The transit vehicles shall be identified through special inputs into the controller. The inputs shall be of the following types:
 - a. Check-In and Check-Out — These shall be two momentary inputs providing a service request for the transit vehicle. Transit Signal Priority shall be given to the vehicle from the time the Check-In signal is received to the moment the Check-Out signal is received, or the max TSP timer expires, whichever comes first.
 - b. Constant Call — This shall be one continuous input providing a service request for the transit vehicle. Transit Signal Priority shall be given to the vehicle from the time the signal is received to the moment the call is terminated, or the max TSP timer expires, whichever comes first.
 3. The TSP algorithm shall provide priority service to the transit vehicle without terminating coordination plans or skipping phases.
- iv. ACS Lite Interface
 1. The controller shall provide an interface to the FHWA funded Adaptive Control Software. The controller shall provide both NTCIP and ACS Lite objects to provide detector and phase data. The controller shall accept new splits and offsets from the ACS Lite software.

XIII. Training

- a. Contractor shall provide two (2) days of training which shall minimally consist of
 1. Cabinet layout and trouble shooting
 2. Controller programming and setup
 3. Video detection setup

XIV. Contract Life

The length of this contract shall be from the Date of the Award through September 30, 2025. The bidder shall supply all items at the unit price listed for the life of the contract.

Bid List

Traffic Signal Assembly (cabinet, MMU2, CU) Type A \$ _____

- 12 load switches
- 2 flashers
- 8 channels of loop detection (for video or radar detection)
- 1 detector rack w/ no BIU2

Traffic Signal Assembly (cabinet, MMU2, CU) Type B \$ _____

- 12 load switches
- 2 flashers
- 0 channels of loop detection
- 1 detector rack w/ 1 BIU2

Traffic Signal Assembly (cabinet, MMU2, CU) Type C \$ _____

- 16 load switches
- 2 flashers
- 16 channels of loop detection
- 1 detector rack w/ 1 BIU2

Controller & MMU2 Only \$ _____

Controller Only \$ _____

MMU2 Only \$ _____

Cabinet Only

Type A \$ _____

Type B \$ _____

Type C \$ _____

Autoscope Vision Sensor (A700-1172L) processor \$ _____
on board.

Video Detection Camera (bid price is per camera)

Note: The CU Econolite Cobalt C shall be installed
With EOS software.

Joint Purchasing Agreement

This contract authorizes the City of Mobile to make purchases, if they so desire, in accordance with Section 41.16-50(b), and authorized by a joint purchasing agreement between the City of Mobile and Mobile County. All ordering, billing, and other transactions by the City of Mobile shall be the sole responsibility of the City of Mobile officials. All ordering, billing, and other transactions by Mobile County shall be the sole responsibility of the County of Mobile. Mobile County is not responsible for any items within this contract that are purchased by the City of Mobile. The City of Mobile is solely responsible for the item(s) purchased and implemented by the City of Mobile.