

PURPOSE

All work associated with the installation of a traffic signal shall conform to current Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, Florida Department of Transportation (FDOT) Design Standards, Florida Department of Transportation (FDOT) Minimum Specifications for Traffic Control Signal Devices, National Electrical Code (NEC), and this supplement. It is the intent of this supplement to detail installation requirements dictated by the County, which exceed standard FDOT and NEC requirements. It is the Engineer of Record and Signalization Contractor's responsibility to note these extended specifications, and to adhere to the methods and requirements mandated in this document.

SUPPLEMENTAL TERMS AND CONDITIONS

Refer to the "Supplemental Terms and Conditions" document for additional contractor responsibilities and damage assessment for traffic signal construction.

102 MAINTENANCE OF TRAFFIC

Section 102 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

TRAFFIC CONTROL:

Traffic shall be maintained in accordance with the "Manual on Uniform Traffic Control Devices" and "Roadway and Traffic Design Standards" and as designated in the plans. Except as approved by the County, there will be no lane closures or signal shutdowns during the following periods:

- Monday through Friday, from 6:00 AM until 9:00 AM and from 3:00 PM until 6:00 PM, or as specified on the local agency permit documents.
- The Contractor will be permitted to work in the roadway during all other periods, unless informed otherwise by the County. In no case shall the Contractor close more than one lane without approval of the County.

TEMPORARY SIGNALIZATION AND MAINTENANCE:

The maintenance of temporary signalization, until removed, shall be the responsibility of the Contractor. Replacement components for traffic signal cabinet assemblies will be provided by the Contractor.

TEMPORARY TRAFFIC DETECTION AND MAINTENANCE:

The Contractor shall provide vehicle detection and maintenance at existing, temporary, and new signalized intersections for the duration of the project.

555 DIRECTIONAL BORE

Section 555 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

All under pavement crossings shall be accomplished by means of a directional bore. The contractor shall provide Collier County with directional bore log(s) taken at 10' intervals for all directional bores.

The Contractor will be responsible for cleaning up the spoil and returning the site back to the original condition after the bore operation is complete. All drainage facilities shall be properly protected (i.e. hay-bails, silt-fence, etc.) from directional bore spoil. If drainage facilities become filled with spoil as a result of the directional bore, it shall be the Contractor's responsibility to have the material removed and the facility returned to its original condition.

603 GENERAL REQUIREMENTS FOR TRAFFIC CONTROL SIGNALS AND DEVICES

Section 603 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

GENERAL INSTALLATION, MAINTENANCE, AND WORKMANSHIP REQUIREMENTS:

All work is to be performed in a workmanlike manner. It is the Contractor's responsibility to provide the skilled labor in the appropriate areas necessary to provide an acceptable and professional finished product. The Contractor and his personnel shall always have all the necessary paperwork needed to complete the job. It is expected that plumb surfaces shall be plumb. Spacing of multiple components, such as conduit stubs or straps, shall be in equal increments. All materials shall be new or in like-new condition.

All mast arm pole assemblies, pedestrian poles, and supplemental signal poles shall be leveled to the satisfaction of the Collier County Signal Inspector.

During all working hours, the Contractor shall have a responsible, English-speaking superintendent on the project with the capabilities and authority required by the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 5-8.

Employees shall be trained in and familiar with the safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments per OSHA Standard 1910 - Electrical and Federal Register 29 CFR Part 1926 Cranes and Derricks in Construction; Final Rule. Employees shall also be trained in and familiar with any other safety practices, including applicable emergency procedures that are not specifically addressed, but that are related to their work and are necessary for their safety.

The Collier County Signal Inspector assigned to the project shall have the authority to make final determinations on whether workmanship, materials, and/or final product(s) meet the specifications contained herein.

RESPONSIBILITIES OF SIGNAL CONTRACTOR PERSONNEL:

Collier County Traffic Operations Inspection Staff shall be notified in writing either via form letter (To: Collier County Traffic Operations, 2885 Horseshoe Drive South, Naples, FL 34104) or e-mail (TrafficOps@colliergov.net) a minimum of seventy-two (72) hours prior to the commencement of jobs that include overhead and/or underground work that will be conducted as part of construction or maintenance projects within Collier County or State Road rights-of-way within Collier County. Also "Daily Work - Advance Notification" requisites shall be met as to the scheduling of any and all overhead and/or underground work throughout the length of any and all jobs as they continue to be performed within Collier County or State Road rights-of-way within Collier County, such notifications shall be received by at least NOON of the day before based upon a normal work week/workday Monday through Friday (e.g., an "Daily Work - Advance Notification" for a workday request submitted for work to be performed on a Monday shall be received no later than NOON the Friday before). All requests to work Weekends or Holidays shall be submitted and approved in writing no less than a week in advance. Any rescheduling or cancellation of work shall be provided in writing as soon as possible.

All underground facilities shall be located prior to the commencement of all jobs and/or the implementation of all work to be performed within Collier County or State Road rights-of-way within Collier County. Collier County Traffic Operation Department Inspection Staff has the full authority to shut down all overhead or underground work that has failed to comply with the aforementioned requisites.

The Contractor shall be responsible for coordinating with all utilities having overhead or underground facilities in close proximity or possible conflict with the Contractor's excavations and underground cable installation. The Contractor shall notify all utility companies and maintaining agencies seventy-two (72) hours in advance of commencing work. Hand-digging will be required in all areas where the utilities stake or locate a possible conflict, or where hand-digging is specified on the plans. The exact location of utilities shall be determined by the Contractor when necessary, during construction.

The Contractor shall schedule work in such a manner that signal coordination is maintained throughout the course of the project at locations where the County requires existing coordination to be maintained. Coordination may temporarily be accomplished using time-based coordination (TBC), where applicable, but in no case shall uncoordinated operation be allowed without the contractor obtaining authorization from Collier County Traffic Operations. Existing signalization shall remain in place to the extent possible and shall be used for Maintenance of Traffic as required.

The interruption of communication with County equipment shall be kept to an absolute minimum. This includes communication such as controller telemetry, video transmission, camera control signals, Highway Advisory Radio, wireless interconnect, telephone (POTS/ISDN/DSL), high speed Internet, or any other County communication signals. This provision applies to cable types including copper, multi-mode fiber optic, single mode fiber optic, telephone cables, Internet cables, or any other cable used by the County to monitor and maintain its various signal and ITS equipment. The contractor shall plan ahead, and shall stage his construction work accordingly, so that he can interrupt communication, and then restore communication, with as little down time as possible. For example, when a section of existing interconnect is being relocated, the new hand holes and conduits should be installed prior to disconnecting the interconnect cable. The interconnect cable can then be disconnected, pulled out of the existing conduit, pulled through the new conduit, and reconnected. In addition, when an existing fiber optic cable is to be reused, the contractor shall be prepared to immediately replace any fiber splices and/or terminations that become damaged. Prior to disconnecting any Collier County communication link, the contractor shall contact the Collier County Project Manager for approval of the planned construction method.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET
NO.
TSP-2

CONCEALED WORK:

All work which will not be readily visible upon completion shall not be concealed until a County Signal Inspector gives approval. In the event the below items are concealed, it will be the Contractor's responsibility to expose the questioned item(s) for the Inspectors' approval, at no additional cost to the County. This includes, but is not limited to:

1. Buried or imbedded conduit
2. Ground wire, rods, and array
3. Loops and home runs
4. Leveling nuts before grouting
5. Loop splices before encapsulating

EQUIPMENT AND MATERIALS:

The application of the following materials to various traffic signal components shall be performed during assembly:

- **Threaded Hardware:**
All non-electrical threaded hardware (i.e., mounting bracket hardware, pole hardware, or any threaded surface) shall be coated with an Anti-Seize Lubricant, or County -approved equivalent. No spray on anti -seize compound will be accepted. The amount of anti-seize being applied shall be sufficient enough to be visibly seen.
- **Galvanized Surfaces:**
All scratches and field -drilled holes shall be treated with a cold galvanizing compound.
- **Weatherproofing:**
Irregular mating surfaces shall be rendered weatherproof by applying an appropriate bead of clear silicone caulk, such as Silicone II, or County -approved equivalent. These areas include serrated signal couplings, controller cabinet foundation, pedestrian push buttons, and any other areas typically prone to moisture infiltration.
- **Cable Entry/Exit**
Wherever a cable enters or exits a field -drilled hole, the hole shall be protected by a permanently installed rubber grommet.

LOCATING UNDERGROUND FACILITIES:

Once the Contractor has begun any work on any portion of the project the contractor is responsible for providing locate services for all traffic control devices, interconnect, and street lighting within the limits of the construction project. Contractor requests for equipment locates will be granted only once prior to the start of the contract. Additional requests shall be at the expense of the Contractor. The locating of underground traffic facilities does not relieve the Contractor of their responsibility to repair any item(s) damaged during the construction, at his/her own expense. Locate requests from company's and/or individuals not associated with the construction project will be forwarded to the contractor.

SUBMITTAL REQUIREMENTS;

Prior to the installation of signal equipment and within 30 days after the pre- construction conference, submit a completed listing of all traffic devices or hardware with certification number(s) to the Engineer and Collier County Traffic Operations for approval on a form approved by the Florida Department of Transportation.

TRANSFER OF MAINTENANCE:

Once the Contractor has begun any work on any portion of the project, all traffic control devices, including interconnect, within the limits of this contract shall become the full responsibility of the Contractor.

Whenever a new traffic control device is to be installed at a location where there is an existing device, the Contractor shall notify the Collier County Project Manager of their intent to begin any physical construction work on the project or any portion thereof. This notification must be a minimum of seven (7) working days prior to the start of construction to allow sufficient time for the Contractor to conduct an inspection of the existing traffic control device installation(s). In the event any deficiencies are noted by the Contractor, at the county's option, they are to be repaired by Collier County Traffic Operations or documented on the "Transfer of Maintenance" form. If work is started prior to the inspection, maintenance of the traffic control device(s) will immediately be transferred to the Contractor without an inspection. The Contractor shall then become responsible for repairing or replacing all equipment that is not operating properly or is damaged at no cost to the owner of the traffic control device.

The Contractor shall be responsible for continuous maintenance of the existing device until such time as the new device is activated, inspected by the County, and accepted. For new traffic control devices, partial or final acceptance and inspection will be scheduled with the Collier County Project Manager before the traffic control device is placed in normal operational mode. Notification is also required before placing the signal in the flashing mode.

REMOVAL OF EXISTING EQUIPMENT:

Existing signal equipment removed from any project shall become the property of Collier County, except any concrete or wooden signal poles which shall be disposed of by the contractor.

611 ACCEPTANCE PROCEDURES FOR TRAFFIC CONTROL SIGNALS AND DEVICES

Section 611 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows: Upon notification that all Contract Work, or all Contract Work on the portion of the Contract scheduled for acceptance, has been completed, Collier County Traffic Operations will inspect for acceptance. The inspection will be made within seven working days of the notification. The contractor shall arrange for a representative of the Controller Assembly manufacturer, Video Detection manufacturer and/or Radar Detection manufacturer, if applicable, to be present during the inspection for acceptance to ensure the controller assembly, video detection and/or Radar Detection is functioning properly. If Collier County Traffic Operations finds that all work has been satisfactorily completed, Collier County Traffic Operations will consider such inspection as the final inspection. If any or all of the Work is found to be unsatisfactory, Collier County Traffic Operations will detail the remedial work required to achieve acceptance. The contractor shall immediately perform such remedial work. Subsequent inspections will be made on the remedial work until Collier County Traffic Operations accepts all Work. Upon satisfactory completion of the Work, Collier County Traffic Operations will provide written notice of acceptance, either partial or final, to the Contractor. Until final acceptance in accordance with the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 5-11, contractor shall replace or repair any damage to the accepted Work. Payment of such work will be as provided in the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 7-14.

PARTIAL ACCEPTANCE:

Collier County Traffic Operations may make inspection for partial acceptance under the Contract in accordance with the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 5-10 of a complete installation of a signalization control system upon its completion in accordance with the Contract Documents and at such time that other parts of the total Contract are at a stage of completion that either require or allow the installation to operate in a manner which is in accordance with the Contract Documents. Before inspection for partial acceptance, the Engineer will require the satisfactory completion of all field tests of completed installations in accordance with the requirements of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 611-4 and the Collier County Traffic Operations Contractor / CEI Request for Signal Inspection form. The Engineer will make inspection for partial acceptance in accordance with the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 5-10 in company with a Contractor's representative and a representative of Collier County Traffic Operations.

FINAL ACCEPTANCE:

Collier County Traffic Operations will make inspection for final acceptance of signal installations as part of all work under the Contract in accordance with the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 5-11, only after satisfactory completion of all field tests of completed installations in accordance with the requirements of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 611-4, the Collier County Traffic Operations Contractor / CEI Request for Signal Inspection form, and on the basis of a comprehensive final field inspection of all traffic signal installations. Collier County Traffic Operations will make the final inspection of all signal installations with a contractor's representative and a representative of Collier County Traffic Operations to accept maintenance responsibility. Transfer to Collier County Traffic Operations any guarantees on equipment or materials furnished by the manufacturer and ensure that the manufacturer includes with such guarantees the provision that they are subject to such transfer, and proper validation of such fact. In addition, as a condition precedent to final acceptance in accordance with 5-11, provide a Warranty/Maintenance Bond in accordance with the requirements of 611-5.

REVISIONS

<i>DATE</i>	<i>BY</i>	<i>DESCRIPTION</i>	<i>DATE</i>	<i>BY</i>	<i>DESCRIPTION</i>
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET NO.
TSP-3

620 GROUNDING AND LIGHTNING PROTECTION

Section 620 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Minimum size of all ground/bond wire shall be green insulated stranded #6 AWG Bare wire will not be accepted inside a conduit.

Ground wire shall be attached to the ground rod by means of an Exothermic Grounding Bond. Use materials from the same source, meeting the requirements of the Institute of Electrical and Electronics Engineers (IEEE) Standards 80 and 837.

All ground rods shall be 5/8" x 10', copper clad bonded to a steel core.

All exposed, above-ground metal conduit shall be properly grounded with a grounding bushing or clamp.

All separately grounded elements at an intersection shall be bonded together to form an intersection grounding network array.

630 CONDUIT

Section 630 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Ensure all surfaces to be coated are clean, dry, and free from oil, grease, dirt, dust, soluble salts, corrosion, and any other surface contaminants. Sequence the surface preparations and coating operations so that freshly applied coatings will not be contaminated by dust or foreign matter and per the manufacturer's instructions.

Collier County reserves the right to redirect the termination point(s) of any or all conduit(s) from what is shown on the plans. If the quantity of materials is increased, the Contractor shall be compensated according to the per unit price of this change.

The Contractor shall field galvanize, prime and paint the areas of mast arm and upright poles damaged or affected by field cutting or drilling operations per the above finish specification.

Mast arm bases are to be left un-grouted until the leveling nut installation is inspected by the county.

All conduit and fittings shall be utilized for the purpose they were designed. There shall be no fabrications of non-standard sweeps by "cutting up" a standard sweep. Heat-bending PVC conduit is not acceptable. No conduit shall be filled beyond the capacity stated in the National Electrical Code. PVC conduit stubs into the controller cabinet shall be plumb and evenly distributed. All PVC conduits shall be joined together with special long line couplings and terminated with deep bell ends.

- Controller assembly PVC stubs are to be the following function and sizes:
 One 3/4" conduit for grounding.
 One 1 1/4" conduit for power service.
 One 3" conduit for vehicle traffic signal cable.
 One 3" conduit for pedestrian traffic signal cable.
 One 3" conduit for street lighting and/or illuminated signage.
 One 3" conduit for pedestrian detection cable.
 One 3" conduit for detection cable and/or inductive loop detection cable, emergency vehicle detection cable, and ITS CCTV camera cable.
 One 2" conduit for communications cable.
- Each one-way mast arm traffic signal assembly shall contain the following conduits:
 One dedicated 2" conduit for vehicle and/or pedestrian traffic signal cable.
 One 2" conduit for pedestrian detection cable.
 One 2" conduit for vehicle detection and Emergency Vehicle Detection cable.

- Each two-way mast arm traffic signal assembly shall contain the following conduits:
 Two dedicated 2" conduits for vehicle and/or pedestrian traffic signal cable.
 One 2" conduit for pedestrian detection cable.
 One 2" conduit for vehicle detection and Emergency Vehicle Detection cable.
- Each pedestal mounted one or two-way vehicle traffic signal assembly and with a one or two-way pedestrian traffic signal assembly shall contain the following conduits:
 One dedicated 2" conduit for vehicle and pedestrian traffic signal cable.
 One 2" conduit for pedestrian detection cable.
- Each pedestal mounted one or two-way vehicle traffic signal assembly shall contain the following conduits:
 One dedicated 2" conduit for vehicle traffic signal cable.
- Each pedestal mounted one or two-way pedestrian traffic signal assembly shall contain the following conduits:
 One dedicated 2" conduit for pedestrian traffic signal cable.
 One 2" conduit for pedestrian detection cable.
- Each pedestal mounted one or two-way pedestrian push button assemblies shall contain the following conduits:
 One 2" conduit for pedestrian detection cable.

A #12 AWG blue insulated solid, or approved equivalent, locate wire shall be installed in all conduits that are empty, spare, or shown on the plans that are to receive cable at a future date. At least five feet of locate/pull wire shall be accessible at each conduit termination and secured within the pull box or place of termination.

All exposed, above ground conduit shall be heavy wall, galvanized rigid conduit a minimum 6" underground. All threaded rigid conduit connections shall be coated with anti-seize lubricant.

All under-ground signalization conduit shall be schedule 40 PVC, gray in color, sectional or continuous.

Conduit for the purpose of fiber optic communications that will be installed under pavement and shall be 2" continuous HDPE, SDR 11, orange in color.

Conduit for the purpose of signalization that will be installed under pavement shall be 3" continuous HDPE, SDR 11, gray in color.

Duct seal shall be used for sealing conduit ends.

All under pavement crossings shall be placed at a minimum depth of 36" below pavement to a maximum depth of 120" below pavement. All conduit crossing a designed roadside ditch or swale invert shall be placed at a minimum depth of 30" below the designed roadside ditch or swale invert to 120" below the designed roadside ditch or swale invert. Primary cable (voltage exceeding 500 volts) shall have minimum 36" of cover to a maximum 120" of cover. Secondary cable (voltages less than 500 volts) shall have a minimum 30" of cover to a maximum 120" of cover. Exception may be made by authority of the Collier County Signal Inspector for good cause shown. If conduits cannot be placed at a 30" minimum to 120" maximum depth due to underground conflicts (i.e., rocks, roots, culvert pipes, etc.), the Contractor shall contact the Collier County Signal Inspector to receive authorization to place conduits at less than 30" or greater than 120.

Conduit entrances into base-mounted controller cabinets through the sides, back or top of the cabinet are not permitted.

632 SIGNAL CABLE

Section 632 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

All signalization cable to mast arm poles and inductive loop shielded cable and communications cable to the cabinet shall run in conduit either under pavement or underground as required. At no time shall logic level (low voltage), or fiber optic cable be placed in the same conduit as 120-volt signal cable.

All pedestrian and vehicular indication signal cable shall be IMSA Spec. 19-1 or 20-1, stranded, #14 AWG.

Mast arm, arm mounted vehicular signal indication:

- A minimum 18 conductor signal cable shall be installed continuous from the controller assembly to each one-way mast arm pole terminal compartment for vehicular signal indications.
- A minimum two 18 conductor signal cables shall be installed continuous from the controller assembly to each two-way mast arm pole terminal compartment for vehicular signal indications.
- A minimum 7 conductor signal cable shall be installed continuous from the mast arm pole terminal compartment to each 3 and/or 4-section signal indication terminal block.
- A minimum 9 conductor signal cable shall be installed continuous from the mast arm pole terminal compartment to each 5-section signal indication terminal block.

Mast arm, pole mounted vehicular signal indications that service a different approach than the mast arm signal indications:

- A minimum 9 conductor signal cable shall be installed continuous from the controller assembly to each mast arm pole terminal compartment for vehicular signal indications.
- A minimum 7 conductor signal cable shall be installed continuous from the mast arm pole terminal compartment to each 3 and/or 4-section signal indication terminal block.
- A minimum 9 conductor signal cable shall be installed continuous from the mast arm pole terminal compartment to each 5-section signal indication terminal block.

Mast arm, pole mounted pedestrian signal indication:

- A minimum 5 conductor signal cable shall be installed continuous from the controller assembly to each mast arm pole mounted pedestrian signal indication terminal block.

Pedestal mounted vehicular signal indication:

- A minimum 7 conductor signal cable shall be installed continuous from the controller assembly to each 3 and/or 4-section pedestal mounted vehicular signal indication terminal block.
- A minimum 9 conductor signal cable shall be installed continuous from the controller assembly to each 5-section pedestal mounted vehicular signal indication terminal block.

Pedestal mounted pedestrian signal indication:

- A minimum 5 conductor signal cable shall be installed continuous from the controller assembly to each pedestal mounted pedestrian signal indication terminal block.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
 2885 South Horseshoe Drive
 Naples, Florida 34104
 Phone: (239) 252-8260
 Fax: (239) 252-5868

**COLLIER COUNTY
 GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
 SPECIAL PROVISIONS**

SHEET NO.
 TSP-4

Pedestrian detection cable shall be IMSA Spec. 50-2, shielded, stranded, #14 AWG.

- A pedestrian detection cable shall be installed continuous from the controller assembly to each pedestrian push button. Each pedestrian detection cable shield wire shall be terminated in the controller assembly inductive loop panel earth ground terminal.

All L.E.D. illuminated sign panel cable shall be IMSA Spec. 19-1 or 20-1, stranded, #14 AWG.

- A minimum 5 conductor signal cable shall be installed continuous from the controller assembly to each mast arm pole terminal compartment for L.E.D. illuminated sign panels.
- A minimum 5 conductor signal cable shall be installed continuous from the mast arm pole terminal compartment to each L.E.D. illuminated sign panel.

Signal wiring shall be labeled by phase and direction. Signal heads shall be wired in accordance with the following color code:

WIRE COLOR	FUNCTION
RED	3 SECTION THRU MOVEMENT RED BALL
ORANGE	3 SECTION THRU MOVEMENT YELLOW BALL
GREEN	3 SECTION THRU MOVEMENT GREEN BALL
WHITE	3 SECTION THRU MOVEMENT NEUTRAL
RED/BLACK	3 OR 4 SECTION LEFT TURN MOVEMENT RED ARROW
ORANGE/BLACK	3, 4, OR 5 SECTION LEFT TURN MOVEMENT YELLOW ARROW
BLUE/BLACK	4 SECTION LEFT TURN MOVEMENT FLASHING YELLOW ARROW
GREEN/BLACK	3, 4, OR 5 SECTION LEFT TURN MOVEMENT GREEN ARROW
WHITE/BLACK	3, 4, OR 5 SECTION LEFT TURN MOVEMENT NEUTRAL
RED/WHITE	3 OR 4 SECTION RIGHT TURN MOVEMENT RED ARROW
BLUE	3, 4, OR 5 SECTION RIGHT TURN MOVEMENT YELLOW ARROW
BLUE/WHITE	4 SECTION RIGHT TURN MOVEMENT FLASHING YELLOW ARROW
GREEN/WHITE	3, 4, OR 5 SECTION RIGHT TURN MOVEMENT GREEN ARROW
BLACK/WHITE	3, 4, OR 5 SECTION RIGHT TURN MOVEMENT NEUTRAL
BLACK/RED	SPARE
WHITE/RED	SPARE
ORANGE/RED	SPARE
BLACK	SPARE

PHASE WIRING:

Each vehicle movement shall be wired separately and combined in the controller cabinet to obtain the specific sequence of operation as shown on the plans or as directed by the county.

Wherever applicable, or as otherwise specified by the county, the controller assembly will be wired with signal head numbering and vehicle phasing per Index No.17870 of the Roadway and Traffic Design Standards, and directionally oriented as follows:

A. When MAJOR ARTERIAL is a North/South direction:

- Southbound Vehicle Movements = Controller Phase Two
- Northbound Vehicle Movements = Controller Phase Six
- Eastbound Vehicle Movements = Controller Phase Eight
- Westbound Vehicle Movements = Controller Phase Four

B. When MAJOR ARTERIAL is an East/West direction:

- Southbound Vehicle Movements = Controller Phase Eight
- Northbound Vehicle Movements = Controller Phase Four
- Eastbound Vehicle Movements = Controller Phase Six
- Westbound Vehicle Movements = Controller Phase Two

All neutral conductors shall be terminated in the controller cabinet at the neutral/ground bus and labeled as to the appropriate phase.

All Spare conductors shall be placed into a split bolt and terminated to the cabinet at the neutral/ground bus with a #6 AWG stranded green insulated wire pigtail and labeled "spares".

The signal cable shall have a vertical support at the top of each mast. The use of Strain Relief Grips, sized for each cable, shall be used.

All pull boxes shall contain sufficient slack signal cable, which will extend a minimum of 3' above the top of the pull box.

635 PULL, SPLICE, AND JUNCTION BOXES:

Section 635 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

All pull boxes shall be heavy duty traffic -rated reinforced polymer concrete, "Quazite Composites", or approved equivalent.

- Inductive loop functions shall use part #PG1324BA12(box), and #PG1324HA TRAFFIC CONTROL (lid).
- Signal functions shall use part #PG1730BA12(box), and #PG1730HA TRAFFIC SIGNAL (lid).
- Communications function shall use part #PG2436BA36(box), and #PG2436HA CCTO COMMUNICATIONS (lid)

All pull boxes shall be used for a single, dedicated function, and shall not carry cables of varying functions. All pull boxes shall have cover logos identifying their specific purpose. These shall be as follows:

- TRAFFIC CONTROL - all inductive loop functions
- TRAFFIC SIGNAL - all signal functions
- CCTO COMMUNICATIONS - interconnect

All pull boxes shall have a concrete apron poured around them. The concrete apron shall extend 12" beyond the edges of the pull box in all directions. The concrete apron may be reduced to 6" between adjacent pull boxes. The concrete apron shall have a minimum thickness of 6". The top of the pull box and concrete apron shall be equal to the final elevation. Concrete apron is to be included in the cost of each pull box.

639 ELECTRICAL POWER SERVICE ASSEMBLIES

Section 639 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

The Contractor shall install electrical power service equipment as shown in the plans. **The contractor shall be responsible for all additional components and fees required by service provider that are associated with installation of power service installation.** All electrical service work shall be supervised by a Licensed Electrician. Installation shall be in accordance with Index No. 17736 of the current Roadway and Traffic Design Standards, as illustrated with "METER USED". Electrical service shall be installed in accordance with the current NEC and FDOT Standard Specifications for Road and Bridge Construction, with the following enhancements:

When replacing any electrical power service, all work shall be completed in one day and the signal shall be made fully operational by the end of the Contractor's workday.

A 40-ampere breaker shall be installed for the electrical power service main disconnect unless current requirements for normal operation of the signalized intersection exceeds 25 amperes. As a minimum, the breaker supplied for the electrical power service shall exceed the current requirements for normal operation of the signalized intersection by twenty five percent.

No nails or small screws shall be used to mount the electrical disconnect or straps in place. All fastening devices shall be screws, sleeve anchors, or lag bolts, 5/16" x 2" or larger. The electrical service shall be installed onto a **10"** concrete service pedestal. The electrical service disconnect and breaker shall be manufactured by Square D Company. The service disconnect part number shall be QO612L100RB or approved equivalent. All service wire is to be #6 AWG minimum. The service neutral wire shall have continuous white insulation. Earth ground conduit size from the disconnect shall be 3/4" rigid. After the wire leaves the weather head, the wire shall have a minimum of ten turns to form a coil, with a minimum of 3' of wire past that point. The 1 1/4" service feed may be changed to schedule 40 PVC 18" below grade.

No nails or small screws shall be used to mount the electrical disconnect or straps in place. All fastening devices shall be screws, sleeve anchors, or lag bolts, 5/16" x 2" or larger. The electrical service shall be installed onto a **10"** concrete service pedestal. The electrical service disconnect and breaker shall be manufactured by Square D Company. The service disconnect part number shall be QO612L100RB or approved equivalent. All service wire is to be #6 AWG minimum. The service neutral wire shall have continuous white insulation. Earth ground conduit size from the disconnect shall be 3/4" rigid. After the wire leaves the weather head, the wire shall have a minimum of ten turns to form a coil, with a minimum of 3' of wire past that point. The 1 1/4" service feed may be changed to schedule 40 PVC 18" below grade.

649 GALVANIZED STEEL POLES, MAST ARMS, AND MONOTUBE ASSEMBLIES

Section 649 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

All mast arm and mono type structures shall be manufactured to comply with FDOT Standard Drawings, Indexes 17741 through 17746. The mast arm poles shall include the "optional terminal compartment". The center of the mast arm and pole connection plates shall have a minimum 4" diameter wiring hole. The Standard Drawing Indexes shall be included within all signalization plans. The Engineer of Record shall calculate and sign/seal all dimensions which deviate from standard mast arm structure sizes. Mast arm assembly shop drawings must be submitted prior to any new mast arm pole installation. All shop drawings must be FDOT approved and shown on the Qualified Product List (QPL) index.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET NO.
TSP-5

DESCRIPTION:

The work consists of furnishing and installing galvanized steel strain poles, galvanized steel mast arm(s) and galvanized steel monotube assemblies in accordance with the details shown in the Contract Documents, subject to a five-year warranty period as defined herein. The warranty period will apply only when strain poles, mast arms or steel monotube assemblies are painted as called for in the Contract Documents.

MATERIALS:

Use strain poles and mast arm assemblies listed on the FDOT's Qualified Products List (QPL) for all standard configurations shown in the Design Standards and Collier County Signalization Technical Special Provisions (CCSTSP). Obtain strain poles, mast arm, and monotube assemblies from a fabrication facility that is listed on the FDOT's list of metal producers with accepted quality control program, meeting the requirements of 105-3.

Provide shop drawings and signed and sealed calculations, as needed, in accordance with Section 5 for configurations shown in the plans and denoted as special.

Use coating products meeting the requirements of Section 975.

Use grouts meeting the requirements of Section 934 listed on the FDOT QPL.

Use water meeting the requirements of Section 923.

Use membrane curing compounds meeting the requirements of Section 925.

FABRICATION:

Fabricate strain poles, mast arm and monotube assemblies and miscellaneous hardware in accordance with the Contract Documents. Cut all materials to the final dimensions and complete all welding prior to galvanizing. Obtain all components for individual strain poles, mast arm and monotube assemblies from the same fabricator. Obtain the luminaire and bracket from other sources, when necessary.

Affix an aluminum identification tag which will be visible from the handhold or located inside the terminal box containing the information described in the Design Standards.

Before shipping, assemble mast arm and monotube assemblies including luminaire and bracket, to assure proper fit. The mast arm and monotube assemblies may be separated for shipment.

Ensure all components are protected from damage during shipping and handling by wrapping or other effective methods. Replace any component, which the Engineer determines is damaged beyond repair, at no additional cost to the Department. If components are wrapped for shipment, remove wrappings no later than five days after receipt of components or immediately if the wrappings become saturated. Post these instructions in brightly colored wording on the wrapper. Failure to comply with these instructions may lead to damage of the coating system and will be cause for the rejection of the component.

COATINGS:

GALVANIZING:

Galvanize all components in accordance with ASTM A 123, except galvanize all fastener assemblies in accordance with ASTM A 153. Use galvanizing methods which provide surfaces suitable for painting.

SURFACE PREPARATION:

Prepare all galvanized surfaces to be painted in accordance with ASTM D 6386 and the manufacturer of the coating system's specifications. Provide a clean and suitable galvanized surface that maximizes coating system adhesion.

Measure the thickness of the zinc coating after completion of surface preparation using a magnetic thickness gage in accordance with ASTM A 123. Ensure sufficient galvanizing remains on the substrate to meet the requirements of ASTM A 123 and the Contract Documents. Correct any deficient areas to the satisfaction of the Engineer at no additional cost to the Department.

PAINTING:

The Mast Arm Assemblies shall be painted per the following:

The default finish color coat shall be "English Ivy" equal to Ameron Coatings PSX 700T3 Color Number 510007-217.

The default finish color coat shall be Federal Code Color RAL 6005.

GENERAL:

When required by the Contract Documents, provide painted strain poles, mast arms and monotube assemblies. Provide products from a fabricator on the FDOT list of Pre-qualified Fabricators of Painted Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies. Provide products that will meet specification requirements throughout the warranty period. Meet the color requirement as specified in the Contract Documents. Provide the Engineer with two metal sample coupons, a minimum of 2" x 4", painted concurrently and with the same paint as was used on the first lot of any strain poles, mast arms and monotube assemblies delivered to the job site. Provide sample coupons and manufacturer product data sheets to the Engineer along with the delivery of the first shipment of any painted strain poles, mast arms or monotube assemblies delivered to the job site. At the time of their delivery, the sample coupons described in this paragraph shall match the color of the strain poles, mast arms and monotube assemblies to within 1° measured as specified in Section 975-7 of the FDOT Standard Specifications. If the delivered sample coupons exhibit a difference in color from the strain poles, mast arms and monotube assemblies greater than 1° then the sample coupons will be considered unacceptable, and no payment shall be made for the materials which the sample coupons represent. Those materials shall not be accepted by the Department until acceptable representative sample coupons in accordance with the requirements of this Section have been delivered to the Engineer.

RESPONSIBLE PARTY WARRANTY:

When the Contract Documents call for painted galvanized steel strain poles, mast arms or monotube assemblies, the Contractor shall designate a Responsible Party to accept responsibility. The Responsible party designated by the Contractor must execute and deliver to the Department a form, provided by the Department, prior to the first delivery to the job site of any painted strain poles, mast arms or monotube assemblies, stipulating that the Responsible Party accepts responsibility for ensuring the coating system adhesion and color retention requirements as specified in Section 975-7 are met for a period of five years after final acceptance in accordance with Section 5-11 Acceptance. The Responsible Party shall also bear the continued responsibility for performing all remedial work associated with repairs of adhesion or color retention failure as defined in Section 975, as to which notice was provided to the Responsible Party within the five-year warranty period. Failure to timely designate the Responsible Party will result in the Contractor being the Responsible Party unless otherwise agreed to in writing by the Department. The responsible Party shall be either the Contractor or the Fabricator. When the Responsible

Party is the Fabricator, the Responsible Party shall be one of the Fabricators listed on the "Pre-qualified Fabricators of Painted Galvanized Steel Strain Poles, Mast Arms and Monotube Assemblies". This list may be viewed on the FDOT web site at the following URL: www.dot.state.fl.us/construction/.

Upon final acceptance of the Contract in accordance with Section 5-11 Acceptance, the Contractor's responsibility to ensure that the coating system adhesion and color retention requirements specified in Section 975-7 will terminate. The obligations of the Responsible Party set forth in this Section shall start at final acceptance of the Contract in accordance with Section 5-11 Acceptance and continue thereafter until expiration of the five-year warranty period.

INSTALLATION:

The Contractor shall notify the County a minimum of 24 hours prior to pouring concrete.

The mast arm shall not be attached to the mast arm pole until the concrete achieves the strength specified by the pole manufacturer's engineer of record. It is the Contractor's responsibility to verify that the mast arm foundation(s) is installed at the correct location and to the correct elevation(s), as denoted on the plans.

All conduits shall be terminated at the nearest pull box and have a locate/pull wire installed. It is the Contractor's responsibility to verify the bolt projection from the concrete. Cutting off excess anchor bolt material is unacceptable. Hitting mast arm anchor bolts to straighten them for any purpose will not be accepted. It is the Contractor's responsibility to contain all removed spoil from the foundation drilling process. All drainage facilities shall be properly protected from the foundation hole spoil (i.e., hay- bails, silt fence, etc.). If drainage facilities become filled with spoil as a result of the foundations excavation, it shall be the Contractor's responsibility to have the material removed and restored to the original condition. It shall be the Contractor's responsibility to return the mast arm foundation location back to the original condition, including sod.

All mast arm installations are to be installed such that the mast arms are perpendicular (+ or - 1 degree) to the travel lane that is controlled by signals mounted on the mast arm.

650 VEHICULAR SIGNAL ASSEMBLIES

Section 650 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Signal housings, light emitting diode (LED) modules, backplates, and signal auxiliaries shall be listed on the Florida Department of Transportation Approved Product List (APL). Ensure that all equipment is marked in accordance with Section 603.

All signal heads shall be on the Florida Department of Transportation Approved Products List with tunnel visors. Plastic signal heads are not accepted. All signal indications shall be L.E.D., with a manufacturer's 15-year full performance warranty.

Collier County's standard is to install signal heads horizontally on mast arm (rigid mount) installations, and vertically on span wire (free swinging mount) installations.

Protected only and through movement signal heads shall be placed in the center of the lane, as required by geometrics. Protected-permissive 4-section flashing yellow signal heads shall be placed in the center of the lane, as required by geometrics. Five-section signal heads shall be placed on the lane line, as required by geometrics.

Five-section vertical mounted signal heads shall have a serrated locking spacer ring installed on the arrow side of the signal head. The doors of a five- section signal head shall open away from each other (i.e., the wing nuts are between the two sections). A terminal strip shall be added to the red circular indication of the five-section cluster. The wire connection for the red indication shall be made on this terminal block.

All traffic signal heads shall have back plates installed. Back plate material shall be aluminum louvered with a powder coated flat black finish. A yellow retro reflective strip with a minimum width of 1" and maximum width of 3" shall be placed along the perimeter of each signal back plate.

REVISIONS

<i>DATE</i>	<i>BY</i>	<i>DESCRIPTION</i>	<i>DATE</i>	<i>BY</i>	<i>DESCRIPTION</i>
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

*SHEET NO.
TSP-6*

Mast arm vehicular traffic signal mounting brackets shall be manufactured by Pelco Products, Inc., part number SP-1128-FL, or approved equivalent, and installed according to the manufacturer's installation instructions.

Pedestal mounted vehicular traffic signal equipment shall be manufactured by Pelco Products, Inc., or approved equivalent, and installed according to the manufacturer's installation instructions. Pedestal mounted vehicular traffic signal poles shall be mounted using Pelco Products Inc., part number SP-1116-FL-NL-GL-PNC base assemblies or approved equivalent. The base assemblies shall be equipped with Pelco Products Inc., part number PB 5325-PNC base collar assembly or approved equivalent. All aluminum poles shall have a spun finish. The vehicular signal assembly shall be grounded by means of a grounding lug in the base assembly. Poles which require threads (i.e., to mount signs, etc.) shall be drilled and tapped.

653 PEDESTRIAN SIGNAL ASSEMBLIES

Section 653 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

All pedestrian signals shall meet current F.D.O.T. Specifications, display full hand and full man International Symbols, light emitting diodes (L.E.D.) shall be the display source, display countdown digits during clearance interval, be black in color, and constructed of lightweight aluminum.

Pedestrian signal mounting equipment shall be manufactured by Pelco Products, Inc. or approved equivalent, and installed according to the manufacturer's installation instructions. Pedestrian signal poles shall be mounted using Pelco Products Inc., part number SP 1116-FL-NL-GL-PNC base assemblies or approved equivalent. The base assemblies shall be equipped with Pelco Products Inc., part number PB-5325-PNC base collar assembly or approved equivalent. All aluminum poles shall have a spun finish. The pedestrian signal assembly shall be grounded by means of a grounding lug in the base assembly. Poles which require threads (i.e., to mount pedestrian pushbuttons, pedestrian signs, etc.) shall be drilled and tapped.

660 VEHICLE DETECTION SYSTEM

Section 660 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

INDUCTIVE LOOP:

Inductive loops are the standard for vehicle detection in Collier County.

All inductive loop installations shall be sealed with an FDOT approved epoxy type loop sealant. No hot tar or other heated sealant's will be accepted. Inductive loop wire type shall be #12 AWG stranded copper wire with type XHHW cross-linked polyethylene insulation and an additional outer sleeve composed of polyvinyl chloride or polyethylene insulation that meets the requirements of International Municipal Signal Association (IMSA) 51-7.

Inductive loop Shielded Lead-in Cable shall be #14 AWG two conductor, stranded copper wire with shield and polyethylene insulation, meeting the requirements for IMSA 50-2.

A router saw will not be permitted to cut slots for the inductive loop(s) in the finished surface of the asphalt.

The inductive loop window shall not be placed on a radius. All inductive loops shall have a soldered connection between the loop wires and the home run shielded cable. The soldered connections shall be covered with a wire nut and placed into a County-approved, watertight enclosure.

All inductive loop lead-ins shall run from the proposed loops to the nearest pull box, then to the controller assembly. All inductive loop wires and loop lead-in assemblies shall be installed continuously as one length of wire or cable. No splices or connections shall be permitted in inductive loop wires or lead-in cables except where indicated in the plans. All splices between twisted inductive loop wire and inductive loop lead-in cable shall be made in pull boxes. Splices in saw cuts, conduit or on poles are not permitted. In pull boxes where twisted inductive loop wires are to be spliced to lead-in cables, allow a minimum of 3 feet of slack in the twisted inductive loop wires and the lead-in cable for each inductive loop assembly.

All inductive loop lead-in cable shall be grounded to the controller cabinet ground.

Each inductive loop shall be installed on a separate loop detector channel. All inductive loop wires shall be labeled as to phase and direction.

All saw cuts must have inductive loop and lead-in wires placed and sealed immediately after initial sawing with an inductive loop sealant that is approved by the State Materials Office and is on the Certified Products List; except Type III Steep Asphalt and Type II Coal Tar Base cement, which are not acceptable for use in Collier County. Inductive loop wire placement in saw cuts shall be a minimum of one inch from pavement surface.

All saw cuts for inductive loops or inductive loop lead- ins at signalized intersections shall not exceed 4.25” nor lie less than 3.75”, with 4.00” being the standard.

Exception to this requirement may be taken, when in the judgment of the county, the required depth exceeds the thickness of the existing pavement.

INDUCTIVE LOOP DETECTOR UNITS:

Inductive loop detectors shall meet all applicable NEMA TS2-2016 requirements.

Inductive loop detectors shall be 2 channel, rack mount.

OPTICAL VEHICLE DETECTION:

Inductive loops are the standard for vehicle detection in Collier County. In the event optical video detection is called for in the plans, the following specifications shall Apply:

All vehicle detection modules shall be Iteris Vantage Edge 2 dual input video processors, including one Iteris EdgeConnect quad-view communications module and one Vantage TS2-IM Interface Module. The video detection system shall communicate with TS-2 controllers using standard protocols. All cameras shall be Iteris RZ-4 Advanced WDR assemblies. The camera(s) shall be wired with a combination video/power cable as manufactured by Isotec or approved equivalent. The camera(s) shall include Edco Model CXO6M video detection suppression with a BNC pig tail. All of the video suppressors shall be mounted upon one panel along with the system main surge arrestor and terminal block.

Optical vehicle detection mounting equipment shall be manufactured by Pelco Products, Inc. EC part # 3075 CM or approved equivalent, and installed according to the manufacturer's installation instructions. The system installer shall leave a minimum of 30" of spare cable at each camera bracket to neatly form a cable-tied loop to the camera. All manufacturer installation instructions and tools shall be used.

The controller assembly shall come equipped with a minimum 7” LCD monitor approved by the manufacturer of the video detection system.

MICROWAVE:

Inductive loops are the standard for vehicle detection in Collier County. In the event microwave detection is called for in the plans, the following specifications shall Apply: Microwave detection shall be Wavetronix LLC or approved equivalent. The cabinet interface unit shall be a Wavetronix model Click 650 with SDLC communications.

DILEMMA ZONE DETECTION:

Microwave Dilemma zone detection shall be Wavetronix SmartSensor Advance Extended Range or approved equivalent. Each SmartSensor cable shall be installed continuous from the controller assembly to each SmartSensor detection unit. The SmartSensor detection unit shall be mounted in the center of the through lanes for each approach.

PRESENCE DETECTION:

Microwave presence detection shall be Wavetronix SmartSensor Matrix or approved equivalent. Each SmartSensor cable shall be installed continuous from the controller assembly to each SmartSensor detection unit. The SmartSensor detection unit shall be mounted in accordance with the plans.

663 SIGNAL PRIORITY AND PREEMPTION SYSTEMS

Section 663 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Each approach to a signalized intersection shall be provided with an emergency vehicle preemption. The installation shall be compatible with the existing Collier County Global Traffic Technologies (GTT) Opticom Infrared Emergency Vehicle Preemption System. The pay item number for an emergency vehicle Preemption shall include all components and wiring for the installation of a fully operational emergency vehicle detection system. Emergency vehicle detection components shall be compatible with a TS2 Type 1 controller assembly.

The cost to furnish and install the "Emergency Vehicle Preemption with Confirmation Light" and "Preemption Confirmation Light Relay Interface Panel" shall be included with the pay item number for the emergency vehicle Preemption.

PREEMPTION EQUIPMENT REQUIREMENTS:

Each TS2 Type 1 controller assembly shall include a GTT Opticom Model 764 multimode phase selector installed in the dedicated Opticom slot in detector rack number 1.

Each approach to a signalized intersection shall include a GTT Opticom Model 700 Series infrared detector. A typical installation shall use an infrared detector model number 711 and/or 712 for emergency vehicle detection for a single approach and a model number 722 for emergency vehicle detection for two-way approaches.

The cable between the controller assembly and GTT Opticom Model 700 Series Infrared detectors shall be GTT Opticom Model 138 detector cables or equivalent cables approved by the manufacturer. Holes drilled into signal poles, mast arms, or posts shall require rubber grommets to prevent chafing of wires.

A new traffic signal cabinet installed or supplied in Collier County shall include an emergency vehicle confirmation light panel installed according to the Collier County Signalization Technical Special Provisions, Emergency Vehicle Detection Details, "Preemption Confirmation Light Relay Interface Panel Detail" sheet.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET
NO.

TSP-7

PREEMPTION DETECTOR WIRING:

Emergency vehicle preemption detector cables shall be continuous from the controller assembly to each GTT Opticom Model 700 Series Infrared detector.

Each vehicle approach shall be wired separately and combined in the controller assembly to obtain the specific sequence of operation as shown on the plans or as directed by the county. Each Preemption detector shall be wired in the controller assembly to place a call for service in the following "Controller Emergency Preemption number":

A. When MAJOR ARTERIAL is a North/South direction:

- Northbound Vehicle Movement.....Controller Emergency Vehicle Preemption #1
- Eastbound Vehicle Movements.....Controller Emergency Vehicle Preemption #2
- Southbound Vehicle Movement.....Controller Emergency Vehicle Preemption #3
- Westbound Vehicle Movement.....Controller Emergency Vehicle Preemption #4

B. When MAJOR ARTERIAL is an East/West direction:

- Eastbound Vehicle Movement.....Controller Emergency Vehicle Preemption #1

- Southbound Vehicle Movement.....Controller Emergency Vehicle Preemption #2
- Westbound Vehicle Movement.....Controller Emergency Vehicle Preemption #3
- Northbound Vehicle Movement.....Controller Emergency Vehicle Preemption #4

PREEMPTION CONFIRMATION LIGHT:

Each approach to a signalized intersection shall be equipped with a Preemption Confirmation Light. The preempted movement shall be indicated by a steady indication on the confirmation light and the stopped preempted movements shall be indicated by a flashing confirmation light indication. The emergency vehicle confirmation light shall be installed according to the Collier County Signalization Technical Special provisions "Emergency Vehicle Detection Details" sheets.

Confirmation light cable shall be either polyethylene insulated, polyvinyl chloride jacketed signal cable conforming to the requirements of the International Municipal Signal Association, Inc. (IMSA) Specification No. 19-1 or polyethylene insulated, polyethylene jacketed signal cable conforming to the requirements of IMSA Specification No. 20-1. Each 1-way preemption confirmation light IMSA signal cable shall be 5 conductors. Each 2-way preemption confirmation light IMSA cables shall be 7 conductors. Emergency vehicle preemption confirmation light IMSA cables shall be continuous from the controller assembly to each confirmation light disconnect box.

The confirmation light shall consist of a PAR 38 white, non-dimming, LED flood lamp for each approach. The lamp shall have an adjustable mount with a weatherproof enclosure for cable splicing. All hardware shall be cast aluminum, malleable Iron, powder coated steel, and/or stainless steel.

665 PEDESTRIAN DETECTOR ASSEMBLY

Section 665 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Pedestrian push button signs shall be according to the Collier County "PEDESTRIAN PUSH BUTTON SIGN DETAIL" sheet. The pedestrian push button shall be manufactured by Polara, Momentary L.E.D. Bulldog model, part number BDL3-B or approved equivalent. The location of each button shall face perpendicular to the crosswalk for which it is intended. Cable from the pedestrian and/or vehicle signals shall not be run in the same conduit as the cable for the pedestrian detectors. All pedestrian field wiring entering the controller shall be wired through an appropriate lightning suppression device.

670 TRAFFIC CONTROLLER ASSEMBLY

Section 670 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

The entire controller assembly concrete foundation shall be compacted with a plate tamper, to the County's approval, before the concrete is poured. The elevation at the top of the controller assembly concrete foundation shall be equal to the crown of the roadway. No preformed controller assembly concrete foundations are acceptable. The controller assembly concrete foundation shall have five 3" PVC conduits for signalization and detection functions, one 2" PVC conduit for interconnect, one 1 1/4" PVC conduit for the electrical power service, and one 3/4" PVC conduit for cabinet ground (8 total). The controller assembly concrete foundation shall include one 1 1/4" PVC conduit for the U.P.S. electrical power service and one 2" PVC conduit for communications installed in the foundation connecting the U.P.S. and controller assemblies. The traffic signal cabinet shall be located on the right side of the controller assembly concrete foundation and the U.P.S. cabinet shall be located on the left side of the controller assembly concrete foundation. All spare conduits shall be terminated in a pull box.

671 TRAFFIC CONTROLLERS

Section 671 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

Each traffic controller shall be solid state digital, based upon microprocessor design. The traffic controller shall meet, as a minimum, all applicable sections of the NEMA TS-2 Traffic Controller Assemblies with NTCIP-ASC Requirements, 5.3b. Where differences occur, this specification shall govern. The traffic controller shall be aa **NEMA TS-2, Type 2 Q-Free, Inc. Model X3, or most recent model.** Traffic controller shall be fully compatible with Collier County's existing Advanced Traffic Management System.

676 TRAFFIC CABINETS

Section 676 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

The controller assembly shall include approved rack mounted detector assemblies with external power supply. The rack with associated field hook-up panel(s) shall be fully wired and capable of 32 or 48 channels of detection consecutively labeled according to NEMA phase associations. When the rack assembly with power supply is furnished as part of the cabinet assembly, the cost of such shall be covered by the cost of the controller assembly Pay Item. The Contractor shall provide additional racks, power supplies and mounting hardware when detection requirements exceed 32 channels, or as shown on the plans. The cost of the additional racks, power supplies and mounting hardware shall be included in the cost of the detector units.

An ethernet switch meeting the requirements outlined within this specification shall be supplied with each controller assembly.

Each controller assembly shall be supplied with a fiber optic communications interface that is fully compatible with the counties existing Advanced Traffic Management System.

CABINET DESIGN AND CONSTRUCTION

GENERAL:

The cabinet and door(s) shall be constructed from type 5052-H32 aluminum with a minimum thickness of 0.125". All welds shall be neatly formed and free of cracks, blowholes and other irregularities.

All inside and outside edges of the cabinet shall be free of burrs. All sharp edges shall be made smooth.

The cabinet shall be designed and manufactured with materials that will allow for base mounting.

A rain channel shall be incorporated on all four (4) sides of the main door opening to prevent liquids from entering the enclosure. Cabinet door openings shall be double flanged outward on all four (4) sides to produce the rain channel.

The top of the cabinet shall incorporate a 1" (inch) slope toward the rear to prevent rain accumulation.

The cabinet shall be supplied with a natural aluminum finish. Sufficient care shall be taken in handling to ensure that scratches are minimized. All surfaces shall be cleaned of all oil residue and shall be free from weld flash.

All interior seams shall be sealed with silicone sealant or equivalent material.

All cabinets shall be supplied with three removable shelves manufactured from 5052-H32 aluminum having a minimum thickness of 0.125".

One set 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 4" of the top and bottom of the cabinets. Rivets or pop-rivets of any kind shall not be used in the cabinet or on the main panel. No bolts or screws shall protrude through the outside walls, top, bottom, or sides of the cabinet.

All cabinets shall be supplied with four (4) anchor bolts to properly secure the cabinet to its base.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET NO.
TSP-8

DOOR AND HARDWARE:

Controller cabinet shall have front (main) and rear (auxiliary) door assemblies.

The lower section of the main cabinet door shall be equipped with a louvered air entrance. The air inlet shall be large enough to allow sufficient airflow per the rated fan capacity. A removable fiberglass, air filter shall be supplied with each cabinet. The filter shall be secured to the air entrance in such fashion as to always maintain close contact to the louvered air entrance. The filter retainer shall be a slide fit design with no bolts or springs utilized to secure the filter to the door opening.

The roof of the cabinet shall incorporate an exhaust plenum with a vent screen. Perforations in the vent screen shall not exceed 0.125” in diameter.

The main and auxiliary door shall be equipped with a three-point draw roller type latching mechanism. The push rods shall be turned edgewise at the outward supports and shall be 0.250” by 0.750” aluminum, minimum.

The handle on the main and auxiliary door shall include a hasp for the attachment of an optional padlock. The handle shall not extend beyond the perimeter of the main door at any time. The lock assembly shall be positioned so that the handle shall not cause any interference with the key when opening the cabinet door. When the door is closed and latched, the door shall automatically lock. It shall not be necessary to use a key in order to lock the door.

The main and auxiliary door shall be equipped with a mechanism to automatically hold the door open at approximately 90, 125, and 150 degrees, in windy conditions. The main door shall be equipped with a #2 tumbler lock number. The lock shall be of brass construction and shall have a swing away cover. Two No. 2 keys shall be supplied and attached to each cabinet door upon shipment.

POLICE SWITCH COMPARTMENT:

A switch compartment shall be provided on the main door.

The opening for the switch compartment door shall be double flanged on all four sides and shall incorporate a rain channel on all four sides.

The police door lock shall be of brass construction and shall have a swing away cover. All cabinets shall have a police panel door that utilizes a slam shut type latching mechanism. Two police keys shall be supplied and attached to each cabinet door upon shipment.

TYPE 1 TERMINALS AND FACILITIES MAIN PANEL DESIGN:

The main panel shall be constructed from 5052-H32 brushed aluminum of 0.090” minimum thickness and formed to minimize any flexing when plug -in components are installed.

All main panels shall be hinged at the bottom to allow easy access to all wiring on the rear of the panel. The cabinet back panel conductors shall be arranged to allow the top of the panel to be tilted out through the main cabinet door.

MAIN PANEL CONFIGURATION:

The main panel shall be fully wired in the following configuration:

Sixteen load switch sockets, (eight vehicle sockets, four pedestrian sockets and four overlap sockets) eight flash transfer relay sockets, one flasher socket and two main panel BIU rack positions.

Reference designators for all load switch and flash transfer relay sockets shall be silk screen labeled on the front and rear of the main panel.

Up to eight load switch sockets may be positioned horizontally and stacked in two rows on the main panel. All load switch sockets, flasher sockets, and flash transfer sockets shall be mounted on the main panel only.

A bracket extending at least half the length of the load switch shall support all load switches. This support must be rigidly mounted to the main panel and be removable for maintenance by using hand tools only.

All field output circuits shall be terminated on a non-fused terminal block with a minimum rating of 20 amps.

All main panels shall provide means of programming the controller phase outputs to load switch inputs with only the use of a screwdriver.

Permanent alphanumeric labels shall identify all field input/output (I/O) terminals. All labels shall use standard nomenclature per the NEMA TS-2 Specification.

All flash color selection shall be accomplished at the field terminals with the use of a screwdriver only. It shall also be possible to select, through terminal connections, which of the two flasher circuits is connected to each phase. All cabinets shall be wired so that flasher circuit output #1 be wired for signal output channels 1, 2, 5, 6, 9, 11, 13, and 15. Flasher output circuit #2 shall be wired for signal output channels 3, 4, 7, 8, 10, 12, 14, and 16. Cabinets shall be pre-wired to flash signal output channels 2 and 6 yellow, flash signal output channels 1, 3, 4, 5, 7, 8, 13, 14, 15, and 16 red, and flash signal output channels 9, 10, 11, and 12 with no flash.

Signal output terminals shall be screw type, Compression type termination shall not be acceptable.

As a minimum, an RC network shall be wired in parallel with each group of three flash-transfer relay coils.

An RC network shall be installed on all other relay coils.

All Controller Unit and Malfunction Management Unit cables shall be of sufficient length to allow the units to be placed on either two of the lower shelves. Connecting cables shall be jacketed or sleeved in a braided nylon mesh. The use of exposed tie-wraps or interwoven cables are unacceptable.

Cabinet configuration shall be provided with a minimum of eight RS-485 Port 1 communication cables to allow full capabilities of that cabinet. Each 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.

All main panels shall be pre-wired for a Type-16 Malfunction Management Unit.

All wiring shall be neat in appearance. All cabinet wiring shall be continuous from its point of origin to its termination point. Butt type connections/splices are not acceptable. All cabinet back panel conductors shall be soldered, at its destination point as specified. Printed circuit boards, except for BIU, shall not be used on main panels.

All connecting cables and wire runs shall be secured by mechanical clamps. Stick- on type clamps are not acceptable.

All exposed or protruding 120 VAC terminals or screws shall be covered or shielded to prevent shock hazard to personnel.

POWER PANEL DESIGN AND CONSTRUCTION:

The power panel shall consist of a separate, fully enclosed module, securely fastened to the lower right-side wall of the cabinet. The power panel shall be wired to provide the necessary power to the cabinet, controller, Malfunction Management Unit, cabinet power supply and auxiliary equipment. Means shall be provided to allow access to the main and auxiliary breakers without removing the front cover. All components of the power panel shall be accessible for ease of replacement without removing any other components or equipment. Adequate space between components shall be provided for the tightening of all terminals. The main circuit breaker shall turn off all power to the cabinet and shall not be used for the power switch which is located in the service panel.

The power panel shall house the following components:

All circuit breakers shall be single pole Square-D or approved equivalent. The main power panel circuit breaker (Main) shall be rated at 30 amperes. The main power panel circuit breaker shall supply power to a secondary 15 ampere circuit breaker (Sec. 1) for the controller, MMU2, cabinet power supply, and signal buss. The main power panel circuit breaker shall supply power to an Auxiliary 15 ampere breaker (Aux. 1) that shall supply power to the fan, cabinet interior light, one duplex GFCI outlet installed in a 1-gang outlet box on the upper right-side wall of the cabinet, and two duplex outlets installed in a 2-gang outlet box on the upper left side wall of the cabinet. The power feed for this breaker shall be fed from the load side of the main circuit breaker. All breakers shall be installed in a vertical orientation.

- A 50-amp, 125 VAC radio interference line filter shall be supplied.
- A normally open, 60-amp, mercury contractor shall be supplied.
- One (1) Insulated AC Neutral bus bar with a minimum of twelve (12) positions capable of accepting three #12 wires per position.
- One (1) Earth ground bus bar (chassis ground) with a minimum of seven (7) positions large enough to accept three #12 wires per position.

AUXILIARY CABINET EQUIPMENT

The cabinet shall be provided with two thermostatically controlled (adjustable between 80-150 degrees Fahrenheit) ventilation fans in the top of the cabinet plenum.

Two L.E.D. lighting fixtures shall be mounted in the cabinet. One on the inside top of the cabinet near the front edge and one under the slide-out document tray. Each L.E.D. lighting fixtures shall be wired to a door-activated switch mounted near the top of the door. If the main door is closed the L.E.D. lighting fixtures will be off.


A rigid slide-out document tray shall be mounted below the bottom shelf. The tray shall be of sufficient size and strength to hold a complete set of cabinet wiring drawings, intersection diagrams, equipment and programming manuals for all equipment and modules applicable to each cabinet. The tray shall operate by sliding out, then opening a hinged cover to remove documents. After removing the documents and closing the cover, the tray shall serve as a suitable resting place for documents or a laptop computer.

Three (3) sets of complete and accurate cabinet wiring drawings shall be supplied with each cabinet.

One (1) set of manuals for the Controller Unit, Malfunction Management Unit, Power Supply, Vehicle Detection, and Emergency Vehicle Detection shall be supplied with each cabinet.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

*SHEET NO.
TSP-9*

VEHICLE DETECTION:

Two vehicle detector racks shall be provided in each cabinet. The cabinet shall have the capability to add an optional additional third vehicle detector rack if called for in the plans.

One vehicle detector rack shall support 8 position - 16 channels of vehicle detection, 2 position - 4 channels of preempt detection (with Opticom compatibility), and 1 BIU. Second vehicle detector rack shall support 8 position - 16 channels of vehicle detection and 1 BIU. In the event a third optional additional vehicle detector rack is called for in the plans, it shall support 8 position - 16 channels of vehicle detection and 1 BIU.

Each cabinet shall contain a vehicle detector interface panel for the purpose of connecting field loops. One 32-position vehicle detector interface panel shall be provided for the two 16-channel vehicle detector racks. In the event an optional additional third vehicle detector rack is called for in the plans, an additional 16-position vehicle detection interface panel shall be provided for the optional additional 16-channel vehicle detector rack. The interface panel(s) shall be attached to the lower left side wall of the cabinet.

The interface panel shall allow for the connection of a minimum total of thirty-two independent field loops. In the event the plans call for an optional additional third vehicle detector rack, the interface panel(s) shall allow for the connection of a minimum total of forty-eight independent field loops.

A ground bus terminal shall be provided between each loop pair terminal to provide a termination for the loop lead-in ground wire. Detector Terminals shall be screw type, Compression type termination shall not be acceptable.

Printed circuit boards shall not be used on the interface panel.

All interface panels shall be provided with lightning protective devices for all channels. All interface panels shall be provided with EDCO SRA-6LCA or approved equivalent lightning protective devices for all available inputs.

All termination points shall be identified by a unique number and silk -screened on the panel.

Each detector rack shall be powered by the cabinet power supply.

CABINET AUXILIARY SWITCH PANEL AND POLICE PANEL:

An auxiliary switch panel shall be mounted on the inside of the main door. The panel shall include a hinged flip up plastic cover for the switches. The auxiliary switch panel shall provide as a minimum the following:

- AUTO/FLASH SWITCH. When in the FLASH position, power shall be maintained to the controller and the "flash entry" programming sequence initiated with the intersection being placed into uniform code flash (remote flash). The controller shall not be in stop timed when in remote flash. When the switch is moved from the FLASH position to the AUTO position, the controller shall initiate the flash exit startup sequence and intersection placed into stop-and-go operation.
- SIGNALS ON/OFF SWITCH. When in the SIGNALS OFF position, power shall be removed from all signal heads in the intersection. The MMU2 shall not conflict or require reset.
- STOP TIME ON/OFF/AUTO SWITCH. STOP TIME ON position, when applied, the controller shall be stop timed in the current interval. STOP TIME MOMENTARY OFF position, when applied, the controller shall not stop time in the current interval. STOP TIME AUTO position, when applied, the controller normal operation.
- EQUIPMENT POWER ON/OFF SWITCH. This switch shall control the Controller Unit, Malfunction Management Unit and Power Supply AC power. When in the ON position the AC power shall be applied.

- POWER ON/OFF SWITCH. This switch shall turn all power off except for the cabinet lighting, outlet(s), and fan.

The police door switch panel shall contain the following:

* AUTO/FLASH SWITCH. When in the FLASH position, power shall be maintained to the controller and stop time shall be applied. The intersection shall be placed in flash. When the switch is moved from FLASH position to the AUTO position, an external start signal shall be applied to the controller that will force the controller to initiate the start-up sequence when exiting flash.

* AUTO/MANUAL SWITCH. Cabinet wiring shall include provisions for an AUTO/MANUAL toggle switch and a six (6') foot hand cord. Hand Cord and police panel connection shall be made with an RCA type connection.

All toggle type switches shall be heavy duty and rated 15 amps, at a minimum. Single or double-pole switches may be provided, as required.

All switch functions shall be permanently and clearly labeled.

All wire routed to the police panel and auxiliary panel shall be adequately protected against damage from repetitive opening and closing of the main door. No modular connectors will be allowed in the cabinet except for the detector panel interface. All other cabinet wiring shall be "hard wired" point to point.

678 TRAFFIC CONTROLLER ACCESSORIES

Section 678 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

MALFUNCTION MANAGEMENT UNIT:

This specification sets forth the minimum requirements for a shelf -mountable, sixteen channel, solid-state Malfunction Management Unit Two (MMU2). The MMU2 shall meet, as a minimum, all applicable sections of the NEMA Standard TS2-2016, including NEMA Amendment #4-2012 for Flashing Yellow Arrow (MMU2). Where differences occur, this specification shall govern. The Malfunction Management Unit Two shall be an Eberle Design Inc. (EDI) MMU2-16LEip with 10/100 Mbps Ethernet Port or approved equivalent.

TS-2 CABINET POWER SUPPLY:

The TS-2 cabinet power supply shall provide regulated DC power, unregulated AC power and a line frequency reference for the TS-2 detector rack, Bus Interface Units, load switches, and other auxiliary equipment. As a minimum, the power supply shall meet all applicable requirements of the NEMA TS2-2016 Standard. In addition, the 12-volt DC output shall be rated at 5 amps. The TS-2 cabinet power supply shall be a Mobotrex, Model: CPS 105 or approved equivalent.

LOAD SWITCHES:

Signal load switches shall have a minimum load current rating of 10 amperes per circuit at 120 VAC. The front of the load switch shall embody a minimum of three LED indicators. The three indicators shall show the inputs to the load switch. The full supplement of load switches shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

FLASHER:

Signal flasher shall have a minimum load current rating of 15 amperes per circuit at 120 VAC. The flasher shall be dual circuit rated at 15 amperes per circuit, with a nominal flash rate of 60 FPM.

FLASH TRANSFER RELAYS:

All flash transfer relays contacts shall be capable of making, breaking, with a contact current rating of twenty (20) amperes. The coil of the flash transfer relay must be de- energized for flash operation. The full complement of flash transfer relays shall be supplied with each cabinet to allow for maximum phase utilization for which the cabinet is designed.

BUS INTERFACE UNITS:

All Bus Interface Units (BIU's) shall meet the requirements of the NEMA TS2-2016 Standard. The full complement of Bus Interface Units shall be supplied with each cabinet to allow for maximum phase and function utilization for which the cabinet is designed. Each Bus Interface Unit shall include power on, transmit and valid data indicators. All indicators shall be LED's.

PHOTOCELL CONTROL:

A photocell for illuminated signage and street lighting shall be located inside the controller assembly. The photocell shall be mounted on a separate panel and wired so that an on/off/auto switch can be utilized by maintenance personnel. A 2" hole, covered with Plexiglas, shall be installed in the controller cabinet. The panel shall include a Square D contactor, model number 8910DPA42V02 or approved equivalent. Contactor circuit L1 shall be wired to control the illuminated signage and circuit L2 shall be wired to control the street lighting. All controller assemblies shall have one breaker specifically for the illuminated street signs and street lighting located on the power panel, which shall be labeled accordingly. A 10-amp square D or approved equivalent, circuit breaker shall be wired to the illuminated signage circuit. A 20-amp square D or approved equivalent, circuit breaker shall be wired to the street lighting circuit.

682 VIDEO EQUIPMENT

Section 682 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows: **If a closed-circuit television (CCTV) camera is to be installed, it shall be manufactured by Axis AXISQ60-E PTZ Network Camera with Axis Core license, or an approved equivalent.**

The camera shall be installed such that it can view all incoming and outgoing approaches as well as the controller assembly. In the event a single camera cannot view all approaches and cabinet assembly, a second camera shall be installed.

In the event the cables from the controller assembly to the CCTV camera exceed 260 LF, an ethernet extender cabinet will be required. The typical location of an ethernet extender cabinet will be on a mast arm pole, strain pole, or pedestal. Refer to the plans for the proposed location and mounting method of the ethernet extender cabinet. The cost to furnish and install an ethernet extender cabinet and associated hardware will be included in the pay item number for the closed-circuit television (CCTV) camera. The Ethernet Extender Cabinet shall be according to the Collier County Signalization Technical Special Provisions, "Ethernet Extender Cabinet Detail" sheet.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET NO.
TSP-10

684 NETWORK DEVICES

Section 684 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

HARDENED MANAGED FIELD ETHERNET SWITCH:

A hardened managed ethernet switch with gigabit uplink ports shall be furnish and installed in each controller assembly. Ethernet ports shall consist of 2 fiber optical ethernet ports (10k-1000 Base X) and 8-12 fast ethernet ports (10/100/1000 Base-TX). All fiber connections to the ethernet ports shall use an "FC" type connector. The 2 fiber optical gigabit ports and fast ethernet ports 1 through 4 shall be reserved for arterial monitoring camera use. The fast ethernet ports 5 through 8 shall be reserved for the Collier County Traffic Management System use. The unit shall carry a 5-year warranty applicable to design and manufacturing related product defects. The ethernet switch shall be a "CISCO" model:

"IE3300-8T2S-E" with IEM 3300 8 port expansion, PWR-IE50W-AC power supply and two (2) GLC-LX-SM-RGD Cisco SFP.

The signal contractor shall furnish and install "Transient Voltage Surge Suppression" for the ethernet switch. The 120 VAC power to the ethernet switch shall be wired to an advanced 3 stage hybrid, solid-state power line protector (load side). The power line protector (line side) shall be connected to the controller assembly, power panel, 15-amp auxiliary breaker. Wire connections to the power line protector shall be made with compression-type screw terminations. The power line protector shall be an "EDCO" model: "HSP121BT-1RU" or approved equivalent.

The managed ethernet switch shall use Cat 6 color coded ethernet patch cables for each connected device. The Cat 6 color coded ethernet patch cables shall be of sufficient length to connect from the managed ethernet switch port to each connected device. The color code for each ethernet patch cable, if applicable, shall be as follows:

DEVICE	COLOR CODE	CISCO/PORT
PTZ CAMERA	GREY	1
ITERIS DETECTION	GREEN	2
UPS	ORANGE	3
WAVETRONIX CLICK 650	WHITE	5
GTT 764 PHASE SELECTOR	YELLOW	6
EDI MMU2-16LE(ip)	RED	7
INTELIGHT X3	BLUE	8
RHYTHUM INSYNC	WHITE	N/A
BLUETOAD	BLACK	5

685 TRAFFIC CONTROL SYSTEM AUXILIARIES

Section 685 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

UNINTERRUPTED POWER SUPPLY (UPS):

A Traffic/ITS Uninterruptible Power Supply (UPS) shall be furnished and installed at each signalized intersection. The UPS shall be A Clary SP2000LX with internal SNMP option providing TCP/IP capability to Internet or approved equivalent meeting the following specifications:

The Traffic/ITS UPS system with batteries shall meet or exceed the NEMA Environmental Standards without the aid of heaters and/or air conditioners. The included non-gassing battery set shall meet or exceed the requirements of Mil-Spec #MIL-B-8565J. Documentation from an independent testing facility shall be made available upon request.

The true Digital On-Line full double conversion Traffic/ITS UPS unit shall use programmable digital technology to create a Power Factor Corrected and fully regulated and conditioned, pure sine wave output power. All power to the cabinet and signals shall be supplied by the UPS which converts utility AC to DC and then digitally regenerates clean regulated AC to all cabinet and signal loads. The resulting continuous AC output shall be a pure clean regenerated sine wave at 60 hertz, nominal 120 volts. The UPS unit shall automatically correct the utility input power to all connected cabinet and signal equipment (power factor corrected). A fully programmable digital flash timer must be included. The UPS shall always supply continuous uninterrupted no-break power to all loads, regardless of utility spikes, sags, surges, brownouts or blackouts and status of battery charging system.

The Traffic/ITS UPS system shall be fully software / firmware programmable. UPS shall be capable of Local and/or remote programming. A Windows software program shall be included as part of the UPS system to allow the user to easily make operational and communications changes. The UPS unit shall utilize a hot swappable design of the UPS, and/or batteries that facilities ease of maintenance. The complete UPS system including Power Interface Module and/or Manual Bypass Module with batteries shall have a full three-year factory warranty.

OPERATION:

- A. Unit shall be capable of on-site programming without the uses of attached computers.
- B. On-line technology shall be supported and 100% of the load shall flow through the inverter 100% of the time to isolate and protect the attached equipment.
- C. Power connection shall be made to the front or back of the UPS chassis to support optional cabinet mounting.
- D. The traffic system shall support two modes of operation; Off-line (Standby operating mode which supports power outages in the flash mode) and Online (Continuous operating mode which supports power outages in the full online mode).
- E. The traffic UPS shall be capable of providing continuous, fully conditioned and regulated sinusoidal (AC) power to selected devices such as signal controllers, modems, communication hubs, NTCP adapters and video equipment.
- F. Up to the maximum rating, the Traffic UPS shall be capable of supporting all cabinet systems, regardless of power factor rating, without overdriving the poorer power factor LED heads which may cause early degradation, low luminosity or early signal failure.
- G. Upon loss of utility power, the Traffic UPS shall insert battery power into the system via a supplied Power Interface Module (PIM). In case of UPS failure and/or battery depletion, the PIM will ensure that the UPS will drop out and, upon return of utility power the traffic control system will default to normal operating mode.
- H. The By-pass switch shall enable removal and replacement of the Traffic UPS without shutting down the traffic control system (i.e. "hot swap" capability). Connectors shall be equipped with a "safety interlock" feature.
- I. The UPS shall support generator input without going to batteries.
- J. The UPS traffic control system shall be capable of "cold starting", starting when no utility AC is available, i.e. starting while on batteries.
- K. Existing cabinet Flasher Modules and Flash Transfer Relays shall be utilized.
- L. To facilitate emergency crews and police activities, the Traffic UPS shall be compatible with the police panel functions.
- M. The Traffic UPS shall not duplicate or assume flash operation or flash transfer relay functions.
- N. The UPS shall deliver 120 V ac out +/- 3% with an AC input between 85 and 135 V ac without discharging the batteries while operating in the true Online Mode.

- O. The SP2000LX shall support a continuous load of 1400 watts through the full NEMA temperature range of - 40 degrees to + 74 degrees Celsius while on continuous battery operation.
- P. The Traffic UPS system shall be UL listed and conform to NEMA standards for traffic control systems.

UNINTERRUPTED POWER SUPPLY (UPS) BATTERIES:

The UPS batteries shall be designed for deep cycle, extreme temperature applications. UPS battery configuration shall be Clary Outpost Model OP96D (8 batteries) with a minimum 51 Amp hour capacity or approved equivalent. Battery voltage shall be 12 VDC each for a total system voltage of 96 VDC.

UNINTERRUPTED POWER SUPPLY (UPS) CABINET:

UPS Cabinet shall meet NEMA 3R specifications. UPS assemblies shall be designed to be base mounted. The cabinet door shall open to the left (hinged on left side of cabinet). The cabinet must include a generator access panel located on the left side of the cabinet. One L.E.D. lighting fixture shall be mounted in the cabinet. The L.E.D. lighting fixture shall be located on the inside top of the cabinet near the front edge. The L.E.D. lighting fixture shall be wired to a door-activated switch mounted near the top of the door. If the main door is closed the L.E.D. lighting fixtures will be off.

WIRING OF UNINTERRUPTED POWER SUPPLY (UPS):

The Traffic/ITS Uninterrupted Power Supply (UPS) shall be wired according to the Collier County Signalization Technical Special Provisions, "Uninterrupted Power Supply Connection Details" sheet.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
2885 South Horseshoe Drive
Naples, Florida 34104
Phone: (239) 252-8260
Fax: (239) 252-5868

**COLLIER COUNTY
GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
SPECIAL PROVISIONS**

SHEET NO.
TSP-11

700 HIGHWAY SIGNING

Section 700 of the Florida Department of Transportation, Standard Specifications for Road and Bridge Construction is expanded as follows:

INTERNALLY ILLUMINATED SIGNS:

Internally illuminated signs installed on a mast arm shall have a rigid mount as shown on the Collier County Signalization Technical Special Provisions, Aerial Street Name Sign Details. The mounting hardware shall consist of two Pelco Products, Inc., or approved equivalent sign hanger brackets.

Internally illuminated signs installed on a concrete strain pole shall have a cantilever swing mount as shown on the Collier County Signalization Technical Special Provisions, Illuminated Street Name Sign Details. The mounting hardware shall consist of two Pelco Products, Inc., or approved equivalent sign hanger brackets.

Illuminated signs shall utilize L.E.D.'s as the light source.

Street name sign faces shall have a green background with white lettering and a 1" white border around the entire sign. The legend and border shall be diamond Grade reflective film. The background shall be Engineered Grade reflective film.

MECHANICAL SPECIFICATIONS:

1. The sign assembly standard widths are in 12" increments from 48" to 120". The standard viewable heights shall be 24" and 30". The overall thickness of the sign body shall be no more than 3".
2. The sign body shall be fabricated in accordance with NEMA 3R standards. Sign body shall be constructed of sheet aluminum 5052H32 with a thickness of 0.090". The sign body enclosure shall be continuously welded. The sign body shall be reinforced to allow for mounting hardware on the back and top of the sign. The sign body shall have 2 weep holes in the bottom to allow for filtration of any moisture. Photocell shall be external to sign.
3. The color of the exterior of the sign assembly shall be semigloss black. All exterior surfaces of the sign assembly shall be powder-coat painted in accordance with Military Standard MIL-C-24712. Finish will meet the requirements of ASTM D 3359, ASTM D 3363, and ASTM D 552. A quality assurance program shall be in place, meeting MIL-1-45208A.
4. Sign shall be UL listed and approved.
5. Sign shall be able to be hung via standard PELCO mounting hardware.
6. The sign face shall be constructed of 1/8" white polycarbonate or clear polycarbonate with Diamond Grade reflective film.
7. The sign shall have UL approved foam gaskets, to provide a watertight seal between the sign panel and the housing.
8. The sign assembly, including sign panel and mounting assemblies shall be designed, tested, and constructed so that no permanent deformation, warping or failure will occur when subjected to 140 mph wind loads.
9. The sign shall include solid-state high flux/high output ultra-high brightness white LED light engine T8 bulbs (described in detail below), utilizing state-of-the-art high-power LED's and high efficiency heat dissipating panel. This LED light engine bulb shall be of adequate dimension to uniformly light the sign face.
10. Edge-lit sign shall be lit internally by installing (1) T8 LED bulb along the top edge and along the bottom edge. T8 LED bulbs will be (1) piece dimensioned to the length of the sign.
11. T8 LED bulbs shall be configured for 120 VAC and be able to be lit and operated without the need for a ballast.

12. T8 LED bulbs shall have internal access via a swing down door sign face, (1) side for single sided signs and (2) sides for double sided signs. The swing down doors shall have (2) lockable hasps fastened at the top of the sign.

REVISIONS

DATE	BY	DESCRIPTION	DATE	BY	DESCRIPTION
7/28/23	CAO	Modified 639 on TSP-5 Modified 671 on TSP-8 Modified 682 on TSP-10			Modified 684 on TSP-11



Collier County Traffic Operations
 2885 South Horseshoe Drive
 Naples, Florida 34104
 Phone: (239) 252-8260
 Fax: (239) 252-5868

**COLLIER COUNTY
 GROWTH MANAGEMENT DIVISION**

**SIGNALIZATION TECHNICAL
 SPECIAL PROVISIONS**

SHEET NO.

TSP-12