LOI-000921 Committee Meeting January 7, 2013 Minutes

Technical Review Committee for Design Consultant Services; LOI-000921, held a duly noticed meeting on Wednesday, January 7, 2013, commencing at 09:09a.m. in the Sandpiper Conference Room at the OCEA Administrative Bldg, Orlando, Florida.

Evaluation Committee Members Present:
Corey Quinn, Director of Expressway Operations
Rick Morrow, FDOT
Julie Naditz, Orange County
Iranetta Dennis, Director of Business Development

Technical Review Committee Members Present:
Joe Berenis, Deputy Executive Director Engineering and Operations
Corey Quinn, Director of Expressway Operations
Glenn Pressimone, Project Manager

Other Attendees:
Robert Johnson, Manager of Procurement
Krista Small, Atkins

Discussion and Motions:
Robert explained that the LOI process has been revamped in that the Authority now has two (2) committee’s; one to review/evaluate/shortlist the LOI submittals and the other; to evaluate the technical and provide recommendations to the Board. This meeting is also new and the first of its kind whereby the Project Manager provides an overview of the project to the Committee(s) and answer any questions that the Committee members may have.

Corey provided a PowerPoint overview of the project and provided a scope of services to each of the Committee members. Upon completion of the presentation, Corey answered various questions on the project; design project duration, consultant qualifications, consultant experience, wireless considerations, the SIRIT reader, right-of-way considerations, Orange County signal boxes, construction length, use of existing structures, structure analysis, and antenna attachment method from the Committee members about the project.

There being no further business to come before the Committee, the meeting was adjourned at 9:40a.m. These minutes are considered to be the official minutes of the Evaluation / Technical Review Committee(s) meeting held Monday, January 7, 2013, and no other notes, tapes, etc., taken by anyone takes precedence.

Submitted by:

[Signature]
Robert Johnson, Manager of Procurement

On behalf of the Evaluation / Technical Review Committee these minutes have been review and approved by:

[Signature]
Corey Quinn, Director of Expressway Operations
SIRIT READER REPLACEMENT

- The current legacy Sirit IdentityFlex readers are only capable of reading the 7204 protocol which exists on the Allegro box-style portable transponders.
- In late 2009, the Sego (mini sticker tags) were introduced into the transponder population.
- The percentage of transactions is increasing in a linear fashion and at the current rate, the transaction by sticker tags will surpass 20% by the end of 2012.
- The project will replace the current IdentityFlex readers with the new Sirit 8204 multiprotocol reader.
- The 8204 reader is capable of simultaneously reading the Title 21, ISO 6B, ISO 6C and IAG tags.
- This project will be replacing approximately 120 Sites.
Cabinet Replacement

The IIS system currently has approximately 50 Type III single door cabinets.

With the expansion of the IIS system, the cabinets have reached their full capacity and can no longer support additional equipment.
**Fiber Modem Upgrade**

- There are approximately 28 point to point fiber modems remaining on the system that require upgrading.
- The Authority has been upgrading the system with RuggedCom managed switches over the past few years.
- Converting the remaining few locations will allow the last remaining devices to be fully managed within the existing ITS network.

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**UPS Upgrade**

- The Authority utilizes UPS at all ITS cabinets to provide a backup power source in the event of brief power outages.
- The current units deployed in the field have reached their end of life and are no longer supported or repairable. (Approximately 190 units)
- In addition, maintenance costs for repairs have steadily increased over the past couple years.
- Approximately 190 UPS will require replacement.
- The Existing Models are: Minuteman with Battery pack and Myers with 4 external batteries.
- The Recommended Replacement Model is: Alpha environmentally hardened UPS with 2 external batteries.
Fiber Optic Cable / Bores

Project will install approximately 10 miles of fiber optic feeder cable between University and Dean Rd Mainline Plaza.

ITS devices transmit information on the feeder cable and the remaining 10 mile portion will complete the 408 and 417 with this design standard.

Translateral bores will be installed and key interchanges to allow reduction of the ITS network rings.

Smaller network rings allow fewer device outages with a roadway.

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Budgetary Estimate

- The Authority estimated design and CEI cost of 924,000
- The Construction cost is 2.763 Million
Professional Engineering Design Services

Contract 599-520: Systemwide Data Collection Sensor Upgrade

For

Expressway Management System

Scope of Services

Prepared by

EXPRESSWAY AUTHORITY

Orlando - Orange County Expressway Authority

January 2013
1.0 GENERAL

1.1 PROJECT BACKGROUND

The Authority's Data Collection Sensor (DCS) system is a critical component of the OOCEA travel time system. DCS are supplemental automated vehicle identification (AVI) readers that are installed at strategic points on the Authority's expressways to anonymously read the population of toll transponders. This information is encrypted and then provided to the Authority's Data Server where it is used to calculate minute-by-minute travel times. DCS are installed at each exit ramp, at OOCEA jurisdictional boundaries, and at most dynamic message signs where travel time information is displayed.

The first data collection sensor sites were installed under OOCEA Project 719A. The sensors installed under this project (and most subsequent installations) were Sirit IdentityFlex readers. These units are programmed to read the Title-21 page which exists on the Authority's (and Florida's Turnpike's) Allegro box-style transponders. The unit consists of an RF Reader module which is installed in a small gray cabinet near the top of the sign structure upright. Cables from the reader module are connected to pairs of antennas that are installed over the travel lanes. The reader is also connected by power and data cables to communications equipment in a larger ITS cabinet that is mounted lower on the sign structure upright, or nearby on the ground.

The IdentityFlex unit is a very simple, reliable, and cost-effective unit that has served the Authority well for many years. However, the primary disadvantage of the IdentityFlex unit is that it can only read the Title-21 protocol. In late 2009, the Authority and Florida's Turnpike Enterprise began to introduce Sego sticker tags into the transponder population, including new hard-case transponders that operate on the Sego protocol.

Since December 2009, the Authority has tracked the percentage of transactions made by the sicker tags versus those made by the legacy Allegro tags. The percentage of transactions made by the sticker (or mini) transponders has increased in a linear fashion. Likewise, the Allegro transponder transactions have correspondingly decreased. At the current rate, the percentage of transactions made by Sego (sticker tags) transponders on the Authority system will surpass 20% before the end of 2012.

Multiprotocol DCS Readers

In response to the shifting population of AVI transponders, the Authority made the decision in 2011 to start using a multiprotocol DCS reader for ITS deployments. This reader, the Sirit Identity 5204, can read several protocols concurrently. It is also firmware updatable, which means that the protocols can be changed simply by uploading new software to the reader. The Sirit Identity 5204 can read Title-21, ISO 6B, and ISO 6C, among others. It also is Ethernet compatible, which makes it easier to connect to the Authority's ITS network and allows the unit to incorporate more advanced remote diagnostics. The Authority has deployed over 30 Sirit Identity 5204 readers on SR 414 as part of Project 414-510 and on portions of SR 408 under Project 599-503 which will not be upgraded at this time.

All remaining legacy IdentityFlex DCS will need to be upgraded to the new Sirit Identity 6204 readers, which can read IAG tags as well as Title-21, ISO 6B, and ISO 6C, among others. The Authority has made the decision to utilize the Sirit Identity 6204 reader for this DCS upgrade project. Current design projects such as 429-518 (Apopka Expressway ITS), 528-405 (SR 528
Airport Mainline Plaza Conversion), 253F (SR 408 / SR 417 Ultimate Interchange Enhancement) will utilize the Sirit Identity 6204 readers and should not require upgrades under this project unless otherwise directed by the Authority.

This Scope of Services describes the design work necessary to meet the following project objectives:

- Design approximately one hundred and twenty (120) upgraded Data Collection Sensors (DCS) sites on S.R. 408, S.R. 417, S.R. 429, and S.R. 528. All upgraded DCS sites will require the 6204 Sirit Reader to be utilized.
- Design retrofit of approximately fifty (50) Type III single door equipment cabinets with Type 170 336s equipment cabinets systemwide.
- Upgrade approximately twenty-eight (28) fiber optic modems to gigabit Ethernet field switches for improved reliability and to ensure these sites meet the Authority's current ITS networking standards.
- Systemwide upgrade of one hundred ninety (190) UPS in existing ITS cabinets at locations specified by the Authority.
- Design less than 10 miles of fiber optic feeder cable along S.R. 408 east of S.R. 417 and along S.R. 417 north of S.R. 408 as needed to complete the fiber optic feeder cable system in those areas.
- Design translateral bores at key locations and major interchanges as specified by the Authority.

The Authority shall herein be defined as the Orlando-Orange County Expressway Authority (OOCEA) and/or their representative/designate.

1.2 PROJECT DESCRIPTION

The Authority requires professional design services to support the upgrade of all Sirit IdentityFlex Title-21 readers with Sirit 6204 multiprotocol readers. These requirements are described in detail below.

The Designer shall develop plans for upgrading all existing Sirit IdentityFlex Title-21 readers to the Sirit 6204 multiprotocol reader. Approximately one hundred twenty (120) sites systemwide shall be upgraded and additional DCS shall be added if additional coverage is required. Each upgraded DCS location shall include any additional antennas needed to achieve performance denoted in Specification 663 to read all ramp and travel lanes at a site. Additional antennas may be required to optimize lane coverage due to previous roadway expansion projects or other geometric changes since the sensors were originally installed. In addition, the Designer shall understand that the read range for the Sego tags is significantly shorter than that for the Title-21 tags, so high-gain yagi antennas may be required at side-fire locations. The Designer shall coordinate their design with Sirit (the reader manufacturer) to obtain concurrence for the method of antenna usage proposed by the Designer.

Each DCS site shall read one direction of travel. DCS sites are typically installed on existing sign structures located at the exit gore of an interchange ramp, at each travel time DMS, and at system boundaries. The DCS design shall include, but not be limited to, device layout, network architecture, power interconnect including grounding, utility coordination, “last-mile” connectivity with the fiber optic network backbone, backbone fiber and conduit utilization, civil support infrastructure, DCS structure design, inside plant design, antenna optimization, and value engineering. Wherever possible, the Designer shall maximize the use of existing power service. Unless otherwise directed,
all DCS shall be connected to the OOCEA fiber optic network using redundant data paths. The Designer's fee estimate shall include provisions to design up to one hundred and twenty (120) complete DCS site upgrades.

The Designer shall develop plans for upgrading all Type III single door equipment cabinets with Type 170 336s equipment cabinets systemwide. Approximately fifty (50) cabinets systemwide shall be upgraded and the design shall include a standardized, upgraded cabinet layout. Cabinets shall allow for future ITS design and additional equipment expansion. All equipment shall be located within the cabinet and installed in the same manner as recently upgraded cabinets with all conduits entering through the bottom of the cabinets. The cabinet details shall include equipment elevation placement details including a laptop shelf, cable management, and wiring details. The cabinets shall be designed with the proper TVSS equipment (relocated where applicable). The Designer's fee estimate shall include provisions to design up to fifty (50) complete cabinet upgrades.

The Designer shall develop plans for upgrading approximately twenty-eight (28) existing fiber optic modems to gigabit Ethernet field switches for improved reliability. The design shall ensure these are sites meet the Authority's current ITS networking standards utilizing Authority approved equipment. The design shall include the removal of the fiber optic modems, fiber re-spooling for the new Authority approved gigabit Ethernet switch, and the installation of the gigabit Ethernet switch. At CCTV cabinets, the designer shall include relocating the CCTV encoder from the mainline toll plaza to the cabinet in the design. If the cabinet is housing DCS equipment, an Authority approved terminal server will be required in the cabinet. The Designer shall design the cabinets accordingly. The Designer's fee estimate shall include provisions to design up to twenty-eight (28) fiber optic modem upgrades.

The Designer shall develop plans for upgrading approximately one hundred and ninety (190) Uninterruptible Power Supplies (UPS) at ITS cabinet locations specified by the Authority. The design shall ensure these sites are up to the Authority's current ITS standards utilizing Authority approved equipment. Each site shall include the removal and replacement of the UPS and connection to the environmental cabinet monitoring unit. The design shall include the updated wiring diagram including each device the UPS is connected to for every location. The Designer shall coordinate with the manufacturers of the proposed UPS and the environmental monitoring units to verify that the Designer's design allows proper monitoring of UPS battery voltage by the environmental units while remaining in compliance with UPS warranty requirements. The Designer's fee estimate shall include provisions to design up to one hundred ninety (190) UPS upgrades.

The Designer shall develop plans for approximately 10 miles of fiber optic feeder cable along S.R. 408 east of S.R. 417 and along S.R. 417 north of S.R. 408 as needed to complete the fiber optic feeder cable system in those areas. The Designer shall also analyze the Authority's fiber optic network and identify key locations and interchanges that transaloter bores should be installed to allow the Authority's network rings to be optimized. The analysis shall be provided to the Authority for review and approval prior to incorporating transaloters into the plans. The Designer's fee estimate shall include provisions to design the aforementioned fiber optic network upgrades.

Unless otherwise directed, all devices shall be connected to the OOCEA fiber optic network using redundant data paths. The Designer shall develop plans for the installation of redundant fiber optic feeder cable to provide a complete fiber optic cable feeder system within the project limits.
2.0 SERVICES PROVIDED

This Scope of Services will require the Designer to perform the following tasks. Each item is detailed in the following sections followed by a summary of required submittals.

- Design Methodology Report
- Site Construction Plans
- Inside-Plant Construction Plans
- Technical Specifications
- Construction Cost Estimate

2.1 DESIGN METHODOLOGY REPORT

The Designer shall submit a Design Methodology Report for Authority review and approval. The Design Methodology Reports shall be submitted with the 75% plans and include the following:

- Provide conceptual site layouts of all DCS distinguishing between DCS that have already been upgraded and DCS requiring upgrades.
- Document potential impact to survivability of DCS locations due to other projects in the latest OOCEA Five-Year Work Plan by identifying each device and its proposed location, mounting configuration, assessment of survivability, project in conflict, and installation life. The Designer shall demonstrate that potential conflicts with future projects have been minimized.
- Evaluate each DCS site and determine if a power failure for that site would introduce additional devices or ring failure. At the discretion of the Authority design a remedy (i.e. additional power service location or splicing fiber to opposite side of the road).
- Document power requirements for each device including power service locations (existing power meters or new power supply locations finalized with utility owners), utility owner, relevant correspondence with utility owner, power run distances, voltage drop calculations, existing power meter numbers, cost justification for providing new power meters, and total estimated cost (utility company and project cost) for power service to each device. The Designer must demonstrate that the use of existing power meters is maximized provided that installation cost is minimized. Right of way maps shall also be provided to show the location of each new power service in proximity to OOCEA property (if applicable).
- If applicable, the Designer shall prepare a chart of all new power sources that the utility companies will provide. This chart shall list the total estimated cost for establishing power connectivity at each location. For each site, the chart shall list the cost that OOCEA would be billed (labor + materials), whether this is a new pole or new transformer, and costs for any project labor or materials that are to be installed by the Contractor.
- When creating the power design, the Designer shall also be mindful of system redundancy. While device co-location is desirable, the Designer shall make sure such co-location does not occur to the detriment of the overall ITS system. Power and fiber connections shall be made from the same side of the road whenever possible. Under no circumstances shall a single power service support devices that are spliced to the fiber on separate sides of the road.
- Document the power requirements of a typical DCS site and a co-located TMS/DCS/CCTV/DMS site. The documentation shall contain a typical cabinet layout and
power requirements per component, typical breaker panel assignments, and load center sizing requirements.

- Evaluate and document the existing grounding conditions and design improvements as needed.

- Document where devices can be co-located with existing device cabinets for communications and power interconnect. The Designer must demonstrate that co-location of new devices with existing device locations is maximized provided that installation cost is minimized.

- Identify existing or proposed structures for mounting Data Collection Sensors. The Designer must demonstrate that co-location of Data Collection Sensors on existing sign structures and bridge overpasses is maximized provided that installation cost is minimized and system requirements are satisfied.

- Document a plan such that the proposed installation of Data Collection Sensors and Traffic Monitoring Stations do not cause interference with the existing OOCEA or any other agency’s toll collection system or data collection sensors.

- Verify the proposed Data Collection Sensors are mounted to optimally pick up all lanes of travel. Conduct a field review and determine which sites require additional antennas and which sites need to have their antennas relocated for optimum system performance. Ensure mounting height meets FDOT standards.

- The Designer shall provide a site survey at each upgraded DCS location and perform a radio frequency interference engineering analysis and provide a written report and include in the Design Methodology Report.

- Provide an analysis of major interchanges and key locations on the Authority’s network that adding translaterals would allow the Authority’s network rings to be optimized.

- A manhole inventory shall be performed for all manholes where splicing is proposed for this project. Submit an inventory sheet for each manhole as part of the Design Methodology Report including interior photographs of each manhole, documentation of the presence of splice enclosures, and the presence of stub outs to allow conduit access to the manhole.

- The Design Methodology Report should not contain duplicate copies of plan sheets or other content verbatim from the plans or specifications.

Prior to the submission of the Design Methodology Report, the Designer shall identify all problem areas and special requirements that are determined to affect the development of the 75% plans. All problem areas and special requirements are to be documented in the Design Methodology Report.

An approved Design Methodology Report shall be required prior to the submission of 100% plans.

2.2 SITE CONSTRUCTION PLANS

Site construction plans are required for Project 599-520. The Designer shall prepare site construction plans utilizing aerial rasters and/or topographic electronic files provided by the Authority as the basemap. The Designer shall superimpose the location of the existing fiber optic network conduit, derived from the OOCEA Graphical Information System (GIS) and As-Builts from previous projects, on the aerial basemap. Locations of other utilities, contained in the Project 276 Fiber Optic Network Outside Plant Electronic Plans shall also be displayed on the plans. In areas of

Site construction plans shall show the exact location and construction method for all proposed devices and details for mounting the devices on structures. The site construction plans shall be developed on aerial rasters at a scale of 1" equals 100 feet, unless the roadway geometry contained on the aerials is obsolete. In that case, plans shall be based upon the latest facility improvement plans plotted at a scale of 1" equals 100 feet. Site construction plans shall also include superimposed insets at a scale of approximately 1" equals 10 feet to detail proposed construction, but shall label these details "Not to Scale." Where plan sheets cannot fit all necessary details due to device co-location, the Designer shall provide a separate sheet to detail the device layout. The Designer shall identify existing physical features and utilities that will impact the construction and installation of the equipment. The Designer shall be responsible for identifying and resolving all utility conflicts during the design by avoiding the conflict or by direct coordination with the utility owner. The Designer shall display in the plans, all locations where fiber optic cable is being installed in existing or proposed conduit. The Designer shall detail with plan sheets all power service runs where the detail needs to be expanded beyond the device plan sheet to the utility company demarcation.

The design must demonstrate that any proposed device structure does not conflict with known existing utilities and are compatible with sign spacing requirements used by the Authority. The design shall demonstrate that existing highway signage is not obstructed by new or relocated camera poles. Topographic survey shall be performed where necessary to identify potential conflicts but should be minimized. The Designer must propose the means and method to accurately transfer the device site designs to the field for construction, such as offsets from two fixed points that will survive concurrent construction activity.

Site construction plans shall include the following:

- Roadway geometry
- Rights-of-Way
- Existing utilities within the right-of-way including the Authority's FON
- Physical features affecting construction/installation (sign structures and corresponding sign panels, light poles, fences, drainage structures, etc.)
- Manhole/Pull box locations and stub-out details
- Device layout
- Device installation details
- Conduit installation details
- Fiber optic cable route marker details
- Power route marker details
- Fiber count per conduit
- Communications interconnect
- Connectivity with the FON backbone conduits
- Fiber cable design to include link loss budget calculations, per Corning standard recommended procedure
- Fiber cable routing summaries, fiber cable allocation charts, splice details and splice tables
- Data collection sensor mounting details
- Dynamic Message Sign details (if applicable)
- Power interconnect and service point details
- 5-Ohm Grounding for DCS, TMS, DMS and CCTV devices
- Maintenance of traffic
- System Overview showing new and existing ITS device locations on a map
- System Overview showing the power services and locations on a map
- Table of quantities
- Special notes
- System block diagrams for DCS
- System block diagrams for CCTV, DMS, TMS, and DCS (if Co-Located)
- Transient Voltage Surge Suppression (TVSS) installation details
- Data collection sensor mounting details, including details showing integration of DCS equipment into the DMS housing
- Camera pole, lowering system, foundation and mounting details (if co-located)
- TMS pole, foundation and mounting details (if applicable)
- Data collection sensor mounting details, including details showing integration of DCS equipment into the DMS housing.
- Cabinet Details including new pole mount and base mount cabinets, existing pole mount and base mount cabinets, and NEMA enclosures for each DCS site.
- Updates to OOCEA standard details to ensure conformance with project requirements
- Any power and fiber optic cable, conduit, splicing, or other infrastructure necessary to provide fully operational DCS to match existing OOCEA DCS subsystem

The Designer shall take the following information into consideration when developing the site construction plans:
- Minimizing utility conflicts and adjustments.
- Maximizing transponder read effectiveness of Data Collection sensors.
- Maximizing data collection effectiveness of Data Collection sensors.
- Traffic impact.
- Accessibility and ease of equipment maintenance.
- Safety of equipment maintenance personnel and the traveling public.
- Environmental conditions.
- OOCEA guide signing plans (present and future)
- Concurrent/future Authority projects.
- Colocation of devices where advantageous. However, any construction dependencies between other Authority projects shall be kept to an absolute minimum.
- Legibility of the plan set: do not use fonts smaller than 8 point equivalents unless approved by the Authority.

Designer shall submit 75%, 100%, and Bid Set plans for the review and approval of the Authority. The 75% plans shall contain at a minimum the location of all proposed devices, power service for each device (finalized with utility owners), fiber optic interconnect (including conduit, pullboxes, fiber optic cable, splice details, splice tables, fiber allocation charts), definition of pay items, details, and general notes. The Designer’s 100% plans shall address all 75% comments as well as provide all final quantities and design elements. The Authority reserves the right to influence the design based upon planned ITS, facility, and roadway improvement projects or other requirements as identified by the Authority.

After 75% plans are submitted to the Authority, the Designer and Authority representatives shall jointly survey the proposed device locations and utility power service demarcations (e.g. load centers, poles, meters, etc.) to avoid unforeseen problem areas, as well as jointly reviewing the problem areas and special requirements solutions. At each milestone review, representatives from each organization having ownership, control or jurisdiction of highways, bridges, land, utilities, waterways, rights-of-way and other facilities shall provide input during a site survey and any major project issues shall be investigated and resolved by the Designer.

The Designer shall be responsible for coordinating all utility conflict resolutions with the appropriate agencies. Site construction plans shall be prepared in accordance with the latest standards listed herein and all applicable national, state, county and local codes, laws and regulations. The Designer shall sign and seal Bid Set site construction plans by a licensed professional Civil or Electrical Engineer registered in the state of Florida, as appropriate. All site construction plans shall be subject to Authority review and approval.

The Designer shall be responsible for providing structural calculations and plan details for all structures and foundations required as well as for mounting devices to existing or proposed structures. These calculations and plan details must be signed and sealed by a licensed professional Structural Civil Engineer registered in the State of Florida. The Designer shall be responsible for providing calculations for inside and outside plant power design (including voltage drop calculations), heat loads, and all fiber cable link loss budgets signed and sealed by a licensed professional Electrical Engineer registered in the State of Florida. All design calculations are subject to Authority review and approval. Authority approved design calculations are required for the approval of all site construction plans. All calculations shall be submitted with the 75%, 100%, and bid plans.

Construction plans shall show the locations of all existing and proposed ITS devices and their associated power and fiber infrastructure where the project limits of this project overlap with an existing, future, or concurrent project.
2.3 INSIDE-PLANT CONSTRUCTION PLANS (IF APPLICABLE)

If applicable, Inside-plant construction plans shall be prepared as 75%, 100%, and Bid submittals. The Designer shall prepare inside-plant construction plans detailing the installation of all related equipment utilizing the Projects 719, 719A, 599-500, 599-501, 599-503, 599-511, 414-507, 414-510, 408-113, 429-518, 429-200, 429-200A, 429-200B, 429-200D, 429-201, 253E and 253F inside-plant plans as necessary. The inside-plant construction plans shall indicate the location of items to be installed in or removed from the Authority facilities, location of other equipment with connections to project equipment, equipment demarcations, power supply, backboards, conduit, etc. Site-specific installation plans shall be prepared for the Authority's Headquarters and each OOCEA mainline toll plaza where proposed equipment is to be installed. Inside-plant construction plans shall be required for all equipment and operations rooms where equipment shall be installed and operated (or removed). Designer shall be responsible for any data collection necessary to complete their design.

The Designer and Authority representatives shall jointly pre-survey the equipment rooms to identify potential installation problems. Problems shall be identified and special requirements determined during the survey of this project. Any problems identified during the survey shall be resolved in the 75% inside-plant construction plan submittal. As part of the 75% review of the inside-plant construction plans, a field check of the equipment rooms shall be conducted with Authority representatives to identify conflicts, issues and make-ready work required. The Designer shall be responsible for the design of all make-ready work.

The inside-plant construction plans shall include top view drawings of the equipment room and shall indicate the exact location where equipment is to be installed. The Designer shall coordinate with the Authority to receive input regarding the preferred location of the equipment at each facility. The inside-plant construction plans will also include front and rear drawings of all related equipment clearly detailing all installation requirements and complete interconnection detail with all other associated equipment. The Designer will be responsible for supplying power to all network equipment and providing sufficient redundant power supplies to maintain the fiber optic network availability requirements. The Designer shall provide power distribution diagrams for all equipment locations. All equipment shown on the inside-plant construction plans shall be clearly delineated as existing or for construction. The Designer shall be responsible for identifying and detailing on the inside-plant construction plans with notes and drawings any make-ready work required. The Designer shall also provide a table of quantities for all materials and equipment specified in the inside-plant construction plans. The inside-plant construction plans shall be engineered to accommodate all requirements of the specified equipment including heat ventilation and front/rear access for operations and maintenance activities. The Designer shall sign and seal bid set inside-plant construction plans by a licensed professional Electrical Engineer registered in the state of Florida. The inside-plant construction plans shall be subject to the review and approval of the Authority.

The Designer shall provide calculations for all equipment attached to interior walls signed and sealed by a licensed professional Civil Engineer registered in the State of Florida. All calculations shall be subject to the review and approval of the Authority.

The site construction plans and inside plant plans shall be submitted as a cohesive plan set submittal using a common table of quantities and title sheet at each submittal level.
2.4 TECHNICAL SPECIFICATIONS

The Designer shall review the Authority’s existing ITS specifications at the 75%, 100%, and bid set submission phases. These specifications shall include the technical specifications specific to related equipment in the field, mainline toll plazas, and central control locations (i.e., OOCEA Headquarters, FDOT RTMC), as well as reviewing OOCEA standard specifications required for construction. The Designer shall research each part number listed in the OOCEA standard ITS specifications to verify that the validity of each part number. In the event a part has been superseded or is no longer available, the Designer shall recommend the appropriate part number to the Authority for its approval. The Technical Specifications shall provide the Authority the ability to procure equipment on a competitive basis. Unless substantial benefit for the Authority can be demonstrated by the Designer and approval is granted by the Authority, the Technical Specifications shall be based on national, industry-standard open architecture/protocol/design standards and shall not contain proprietary requirements. The Technical Specifications shall include but not be limited to the following requirements for all equipment:

- A descriptive listing of overall functions that will be required of the equipment.
- Equipment interface requirements with associated/attached devices (existing or proposed).
- Technical requirements stating the required specific technical performance standards based on national open standards.
- Installation requirements for each device.
- Maintenance requirements for proper system operation.
- Warranty requirements detailing the transfer of all equipment manufacturers’ warranties to the Authority.
- Testing requirements for demonstrating proper installation and system integration that shall be the basis for the development of a System Acceptance Test Plan.
- Equipment reliability requirements as necessary to maintain an overall system network reliability as established by the Authority.
- Training requirements required by the Authority for system operation.

The Designer shall sign and seal bid set Technical Specifications by a licensed professional Civil or Electrical Engineer registered in the state of Florida, as appropriate. If the Designer recommends revisions to part numbers listed in the standard specifications, The Designer shall submit product description sheets, specifications and operation/maintenance manuals from equipment Vendors for each specified device that specifically addresses equipment adherence to the Technical Specifications with the bid submittal. The Designer shall obtain a statement of conformance from each Vendor signed by a duly authorized officer of the company. The Technical Specifications shall be subject to the review and approval of the Authority.

2.5 CONSTRUCTION COST ESTIMATE

The Designer shall develop construction cost estimates at the 75%, 100% and Bid Set Plan Submission Phases, subject to the review and approval of the Authority. These estimates shall be based on the table of quantities developed during the preparation of the site construction plans and the inside-plant construction plans, as well as all make-ready or other work associated with the project. All pay items shall use consistent descriptions in the plan sets, specifications, and cost estimate.
2.6 QUALITY CONTROL

The Designer shall be responsible for providing continuous quality control and quality assurance (QA/QC) during the project. The Designer shall produce construction documents, studies and reports that have been thoroughly checked. The documents produced shall be prepared with the degree of care that will meet or exceed the tests of "standard practice" or "due care" as established by recognized industry wide professional organizations such as the National Society of Professional Engineers (NSPE). The Designer's QA/QC responsibilities shall not be limited to responding to Authority comments but also provide for a complete review of project deliverables prior to their submittal. The Authority reserves the right to reject a submittal in its entirety if QA/QC is not evident relative to addressing Authority comments.

The Designer shall prepare and submit to the Authority a Project Quality Control (QC) Plan. The QC Plan shall describe how the required production, project staff and review time will be planned and scheduled to accomplish the required quality control. The plan will include a plans production manual detailing guidelines for the production of ITS plans. This QA/QC time and effort is an essential part of the design effort if quality workmanship is to be achieved. The Designer's management shall be responsible for providing the proper organization and staff to perform all QA/QC tasks associated with the production of a project according to the QC Plan in a complete and thorough manner. The QC plan shall, at a minimum, describe a process of applying quality control at each deliverable at every stage of production of the deliverable, including a final QC review by a resource that was not used to produce the deliverable. The QC Plan will be reviewed to determine if it meets the Authority's needs and requirements. The QC Plan shall be completed and submitted to the Authority within five (5) calendar days after receipt of Notice to Proceed. An approved QC Plan is required as a prerequisite for the approval of all submittals. The designer shall certify with each submittal that a thorough QC review has been performed. The Authority shall retain the option to request documentation of QC activities at any time.

2.7 PROJECT MANAGEMENT AND COORDINATION

2.7.1 Schedule (General Items)

The schedules shall provide 20 working days for Authority review of all submittals and 15 working days for Authority review of re-submittals. The Designer may continue design efforts while design submittals are being reviewed. Doing so, however, in no way relieves the Designer of the responsibility to answer and incorporate review comments into the design, nor does it entitle the Designer to any additional compensation as a result of making changes due to review comments.

When there is an actual or potential delay in the schedule or if the Designer proposes to change the sequence or duration of any activities, an updated schedule and accompanying narrative must be submitted to the Authority for approval.

2.7.2 Project Schedule

The following list represents the schedule of major project milestones for a project duration of 180 calendar days:

- Notice to Proceed (Assume a start date of May 1, 2013)
- Project Kickoff Meeting - Within 5 working days after receipt of the Notice to Proceed.
- Detailed Schedule – Submitted at the Project Kickoff Meeting. The schedule shall contain activities in sufficient detail to demonstrate the Designer has a reasonable work plan to
complete the project. Long-term activities shall be broken down into manageable segments where each activity does not exceed twenty (20) working days.

- Quality Control Plan – within 5 calendar days after receipt of Notice to Proceed, submitted at the Project Kickoff Meeting.
- Complete Design Phase – 180 calendar days after receipt of Notice to Proceed.

2.7.3 MEETINGS AND PROGRESS REPORTING

The Designer shall attend a Kick-off Meeting where the Designer will submit a schedule and project plan identifying key staff and their responsibilities. The Designer shall meet with the Authority on an as-needed basis to obtain design information and at least once a month to provide written progress reports including an updated schedule that describes the work performed on each task. The Authority will make judgment on whether work of sufficient quality and quantity has been accomplished by comparing the reported percent complete against actual work accomplished. The Designer shall submit draft minutes of these meetings to the Authority within 5 working days after the meeting. The designer shall provide final minutes, conformed to Authority comments, within 2 days of receipt of Authority comments.

The Designer shall establish and maintain an Action Item Data Base. This database will be used to support the closure of action items in a timely manner. An updated list of action items with status and required resolution dates shall be included as part of the monthly progress report. The Action Item Data Base format shall be submitted at the Kick-off Meeting for review and approval by the Authority.

2.7.4 PROJECT COORDINATION AND KEY PERSONNEL

The Authority and the Designer will each designate a Project Manager who shall be the representative of their respective organizations for the project. The final direction on all matters of this project shall remain with the Authority’s Project Manager. The Designer's Project Manager shall be the point of contact for all project coordination and shall be familiar with all aspects of the project, including production of deliverables, contract administration, coordination with subconsultants, and invoices. The Designer may assign a technical representative for major subconsultants for attendance at project meetings and for technical coordination, subject to Authority approval.

The Designer shall identify key project staff to the Authority. The Designer shall make no changes in key personnel without written notification and approval from the Authority.

The Designer shall be responsible for coordinating all site construction plans with OOCEA expansion projects in the 5-Year Work Plan currently under design or construction. The Designer shall coordinate with the OOCEA expansion project designers to resolve all conflicts and design issues.

2.8 SUBMITTALS

The Designer shall be responsible for making submittals to the Authority for review. The Authority’s review time shall start when all required deliverables for each submittal have been received and end with the return shipping of the review comments. All construction and installation plans shall be accurate, legible, complete in design and drawn to the appropriate scale. All construction plans
submitted for review shall be 11" x 17" plan sheets. The number of copies of materials to be furnished for each submittal is as follows:

<table>
<thead>
<tr>
<th>SUBMITTAL/ITEM</th>
<th>NO. OF COPIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Schedule</td>
<td>3</td>
</tr>
<tr>
<td>Quality Control Plan</td>
<td>5</td>
</tr>
<tr>
<td>Design Methodology Report</td>
<td>5</td>
</tr>
<tr>
<td>Site Construction Plans</td>
<td>10</td>
</tr>
<tr>
<td>Site Design Calculations</td>
<td>5</td>
</tr>
<tr>
<td>Inside-Plant Installation Plans</td>
<td>10</td>
</tr>
<tr>
<td>Inside-Plant Design Calculations</td>
<td>5</td>
</tr>
<tr>
<td>Technical Specifications</td>
<td>10</td>
</tr>
<tr>
<td>Construction Cost Estimate</td>
<td>10</td>
</tr>
</tbody>
</table>

The exact quantity of plans to be submitted may vary and shall be discussed with the Authority prior to printing.

2.9 COMPUTER AUTOMATION

The Designer shall be required to develop the plans utilizing computer automation systems. The Designer shall be required to submit final completed CADD design files in Microstation™ format and PDF on a CD-ROM. The Working Units for the design file shall be 100 Master units (MU) and 10 Sub-units (SU) for a total working area of 4,294,967 (MU sq.). The global origin for a 2D design file shall be the lower left hand corner of the design plane. The Designer shall be responsible for any translation of a non-Microstation design file to Microstation™ format. Upon Authority approval, the Designer may use Microsoft Visio™ for plans provided all electronic files are provided to the Authority. The Designer shall develop CADD standards for this project to be approved by the Authority. These standards shall contain design file information including, but not limited to, levels, line weight, line style, color and a file naming convention. All translated files shall conform to the CADD standards developed for the project.

The Designer shall be required to submit electronic files of all final deliverable reports and cost estimates in Microsoft Word™/Microsoft Excel™, and Adobe Acrobat™ (.pdf) format on CD-ROM. The Designer shall submit all project schedules in Microsoft Project™ format on CD-ROM or via email. The Designer shall submit electronic files of all presentations in Microsoft PowerPoint™ format on CD-ROM. When requested by the Authority, the Designer shall provide electronic files of interim submittals.

2.10 APPLICABLE CODES AND STANDARDS

All installation work, equipment, cable, conduit/duct and associated electrical work for this contract shall be designed in conformity with the current requirements and practices of the latest version of each of the following:

- FDOT Utility Accommodations Manual
- FDOT Roadway and Traffic Design Standards
- Florida DOT Standard Specifications for Road and Bridge Construction
• National Electric Code (NEC)
• Applicable Electronic Industries Association (EIA), Telecommunications Industry Association (TIA) and Bellcore Standards
• Manual of Uniform Traffic Control Devices (MUTCD)
• ANSI/IEEE Standards Publication
• Occupational Safety and Health Act (OSHA)
• All applicable Federal, State and Local Laws, Ordinances, Rules and Regulations
• OOCEA Systemwide ITS Deployment Phase 1 Functional Requirements (Latest Version)

All design plans shall be signed and sealed by a licensed professional Engineer registered in the State of Florida of the appropriate discipline (i.e., Electrical, Civil, Structural) as dictated by the nature of the design.

2.11 RESOURCES AVAILABLE

The Authority has existing documentation available to assist the selected Designer in the services required. The Authority does not warrant or guarantee the accuracy of the documentation, and the use of such documentation is at the sole risk of the Designer.

The following resources are available to the Designer in electronic format:

• Project 276 Fiber Optic Network Outside-Plant Electronic Plans on aerial rasters
• OOCEA Systemwide Aerial Rasters
• Fiber Optic Network Electronic Splice Details and Cable Terminations
• Fiber Optic Network Inside-Plant Electronic Plans
• Fiber Optic Conduit System and Manhole Standard Specifications
• Dynamic Message Sign Standard Specifications
• OOCEA Standard Construction Specifications
• OOCEA GIS roadway centerline, FON conduit routing, and manhole numbering in MicroStation format
• Construction Plans for OOCEA Expansion projects currently approved for construction.

The following resources are available to the Designer in hardcopy or PDF format:

• Interim (30%, 60%, 90%, 100%) design plans for OOCEA expansion projects. Submission levels will vary with the design progress of each project.
• OOCEA ITS Master Plan

2.12 SURVEY

For any new overhead structures for mounting Dynamic Message Signs or Data Collection Sensors, a survey cross-section from right-of-way to right-of-way shall be performed by a Professional Land Surveyor registered in the State of Florida. These services will be performed on an as needed basis, with prior written approval from the Authority, to a maximum fee as identified in the Designer's fee estimate. Reference points used in the surveys shall be available during the construction of the project.
2.13 GEOTECHNICAL SERVICES

Worst-case soils conditions will be assumed for the CCTV foundation and pole design. Geotechnical borings would be required in the event new overhead structures are needed, which is not currently anticipated.

2.14 ADDITIONAL SERVICES

Additional services may be assigned to the Consultant in accordance with the Contract and this Scope of Services. No work will be accomplished under additional services without prior written authorization to the Consultant to perform the work.