



State of Rhode Island  
Department of Administration / Division of Purchases  
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**ADDENDUM #1**

RFQ# 7598600


**TITLE: ON-CALL INTELLIGENT TRANSPORTATION SYSTEM (ITS)  
OPERATION & CONSTRUCTION SERVICES**

**SUBMISSION DEADLINE: 03/05/2019 at 1:00 PM**

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The following items are included in this addendum:

1. Responses to submitted questions
2. Pre-bid sign in sheet

*Alyssa Ward* 

Alyssa Ward  
Buyer I



STATE OF RHODE ISLAND AND PROVIDENCE PLANTATIONS  
**RIDOT Addendum Notification**

**On Call Intelligent Transportation Systems(ITS) Operation & Construction Services**

RFP# 7598600  
RIC# 2019-OM-002  
ADDENDUM #1  
SUBMISSION DEADLINE: March 5, 2019 at 1:00 pm

Per the issuance of the Rhode Island Department of Transportation **ADDENDUM # 2019-OM-002A1** the following changes and clarifications are noted:

After review of Job Specifications based on questions asked during the Pre-Bid Meeting on February 19, 2019, regarding the Job Specification for 12 Strand Single Mode Fiber optical cable. RIDOT TMC has removed the Mandatory Optical Time Domain Reflectometer (OTDR) Test from the 12 Stand Single Mode Type Fiber Optic Cable Specification and created a separate item for the OTDR Test that should be bid on accordingly.

- 1) Updated Job Specification for T04.9906 12 Stand Single Mode Type Fiber Optic Cable
- 2) Updated Bid Table to Include Optical Time Domain Reflectometer (OTDR) Test Item 87.0
- 3) New Job Specification for Optical Time Domain Reflectometer (OTDR) Test
- 4) Pre-Bid Meeting Sign-In Sheet

APPROVED: \_\_\_\_\_

  
Michael Wreh  
Manager, Transportation Management Center

2/25/19  
DATE

## JOB SPECIFIC

T04.9906

### 12-strand Single Mode Type Fiber Cable

#### DESCRIPTION:

This item of work shall conform to the applicable sections of the Standard Specifications for Road and Bridge Construction and with IMSA General Specification 70 for Single and Multi-Mode Fiber Optic Cable. This item shall consist of furnishing and installing Fiber Optic Cable and appurtenances.

The fiber optic cable shall consist of the number of strands of single mode optical fibers identified above and called out in the Contract Drawings.

Provide all equipment, materials, and work in accordance with all of the cable manufacturers' recommendations.

#### MATERIALS:

The materials for this work shall conform to the following requirements.

##### **1. General Requirements:**

- 1.1 All of the Fiber Optic Cable for this project shall be from the same manufacturer and shall be 12-strand Single Mode type Fiber Cable.
  - 1.2 Ensure that the optical fiber used in both outside and inside plant cable conforms to the requirements of the United States Department of Agriculture Rural Utilities Service (RUS) standard 7 CFR 1755.900 and this Specification.
  - 1.3 Ensure that single mode optical fiber used in cables meets EIA/TIA 492-BA000 Class 4A, Current Edition.
  - 1.4 Ensure that all optical fibers are free of surface imperfections and occlusions to meet the optical, mechanical, and environmental requirements of this specification.
  - 1.5 Each optical fiber shall consist of a doped silica core surrounded by a concentric silica cladding. The fiber shall be of a matched clad design.
  - 1.6 Use fiber coating that is a dual layered, UV cured acrylate applied by the fiber manufacturer. It shall be removable with commercially available stripping tools in a single pass without damaging the fiber.
- 2 The Fiber Optic Cable shall also meet the following requirements:
- 2.1 The Fiber Optic Cable shall operate over a temperature range of -40 to 74 degrees C at a relative humidity of 10% to 90% condensing.
  - 2.2 All fiber optic strand materials shall be non-conductive to electricity.
  - 2.3 The Fiber Optic Cable shall meet or exceed the following performance characteristics when tested in accordance with the following fiber optic test procedures (FOTP) and EIA/TIA-455-B Series standards:
    - 2.3.1 When tested in accordance with FOTP-3, "Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components," the change in attenuation at extreme operational temperatures (-400C and +700C) shall not exceed 0.2 dB/km at 1550 nm.
    - 2.3.2 When tested in accordance with FOTP-25, "Repeated Impact Testing of Fiber Optic Cables and Cable Assemblies", the cable shall withstand 25 impact cycles. The change in attenuation shall not exceed 0.2 dB at 1550 nm.

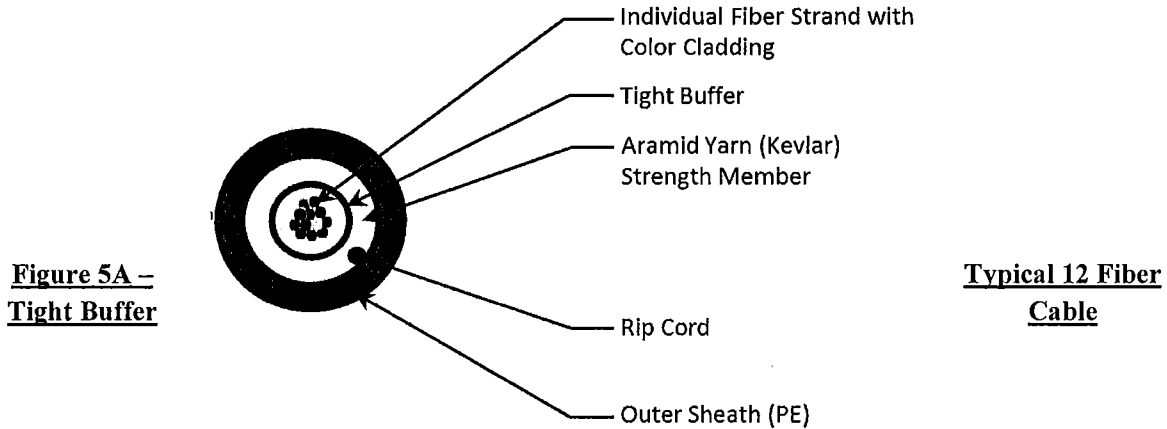
- 2.3.3 When tested in accordance with FOTP-33, "Fiber Optic Cable Tensile Loading and Bending Test," using a maximum mandrel and sheave diameter of 560 mm, the cable shall withstand a tensile load of 2700 N (608 lbs.). The change in attenuation shall not exceed 0.2 dB during loading and 0.1 dB after loading at 1550 nm.
- 2.3.4 When tested in accordance with FOTP-37, "Low or High Temperature Bend Test for Fiber Optic Cable", the cable shall withstand four full turns around a mandrel of <10 times the cable diameter for non-armored cables and <20 times the cable diameter for armored cables after conditioning for four hours at test temperatures of -300C and +600C. Neither the inner or outer surfaces of the jacket shall exhibit visible cracks, splits, tears or other openings. Optical continuity shall be maintained throughout the test.
- 2.3.5 When tested in accordance with FOTP-41, "Compressive Loading Resistance of Fiber Optic Cables," the cable shall withstand a minimum compressive load of 440 N/cm (250lbf/in) for armored cables and 220 N/cm (125 lb./in) for non-armored cables applied uniformly over the length of the sample. The load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for ten minutes. The change in attenuation shall not exceed 0.4 dB during loading and 0.2 dB after loading at 1550 nm.
- 2.3.6 When tested in accordance with FOTP-81, "Compound Flow (Drip) Test for Filled Fiber Optic Cable", the cable shall exhibit no flow (drip or leak) of filling and/or flooding material at 80°C.
- 2.3.7 When tested in accordance with FOTP-85, "Fiber Optic Cable Twist Test", a length of cable no greater than 4 meters shall withstand 10 cycles of mechanical twisting. The change in attenuation shall not exceed 0.40 dB at 1550 nm.
- 2.3.8 When tested in accordance with FOTP-104, "Fiber Optic Cable Cyclic Flexing Test", the cable shall withstand 25 mechanical flexing cycles around a sheave diameter not greater than 20 times the cable diameter. The change in attenuation shall not exceed 0.1 dB at 1550 nm.

**3** The cable shall be composed of the following elements:

- 3.1 Anti-buckling central member which shall prevent the cable from buckling and stretching.
- 3.2 The central member shall consist of a dielectric glass reinforced plastic rod. The central member expansion and contraction characteristics shall be similar to the optical fibers and the fiber tubes.
- 3.3 Loose Buffered Tubes in which multiple fibers strands are placed inside each Buffer Tube shall meet the following requirements:
  - 3.3.1 Allowed buffered tube diameters shall be 3.0 mm or 1.9mm.
  - 3.3.2 The number of fibers inside a Buffer Tube shall not exceed 12 strands.
  - 3.3.3 Buffer Tube material shall prevent the fiber from adhering to the inside of the tube.
  - 3.3.4 Buffer Tubes shall be colored in accordance with TIA/EIA-598-A, "Color Coding of Optical Fiber Cables".

- 3.3.5** Fiber Optic Strands shall be placed loosely inside the Buffer Tube to allow for fiber expansion and contraction due to temperature changes.
- 3.4** Buffer Tube shall be filled with a water blocking material meeting the following requirements:
- 3.4.1** Filling compound in the buffer tubes shall be a homogeneous hydrocarbon based gel with anti-oxidant additives.
- 3.4.2** The filling shall prevent water intrusion, be nontoxic, and nonirritant to skin contact.
- 3.4.3** The filling shall be non-nutritive to fungus.
- 3.4.4** The filling shall be electrically non-conductive and readily removable with conventional non-toxic solvents.
- 3.4.5** Fiber Optic Strands, which shall consist of a doped-glass cylindrical core, surrounded by a concentric cladding, the fiber shall be of a matched clad design. An acrylate coating shall cover the fiber to add protection and color.
- 3.5** Each fiber optic strand shall meet the following requirements:
- 3.5.1** Core diameter shall be  $8.3 \mu\text{m} \pm 0.5\mu\text{m}$ .
- 3.5.2** Cladding diameter shall be  $125 \mu\text{m} \pm 1.0 \mu\text{m}$ .
- 3.5.3** Core to Cladding offset shall be less than  $0.8 \mu\text{m}$ .
- 3.5.4** Cladding Non-Circularity shall be less than 1.0%.
- 3.5.5** Total coating diameter shall be  $245 \pm 10\mu\text{m}$  and shall be mechanically strippable.
- 3.5.6** Coating color shall be in accordance with TIA/EIA -598-A, "Optical Cable Color Coding".
- 3.5.7** No point discontinuity along the fiber shall have attenuation greater than 0.10 dB at either 1310 or 1550 nm.
- 3.5.8** Attenuation at the Water Peak shall not exceed 2.1 dB/km at  $1383 \pm 3 \text{ nm}$ .
- 3.5.9** Mode-Field Diameter shall be  $6.0 \pm 0.50 \mu\text{m}$  at 1310 nm, and  $10.5 \pm 1.0 \mu\text{m}$  at 1550 nm.
- 3.5.10** Zero Dispersion Wavelength shall be between 1301.5 nm and 1321.5 nm.
- 3.5.11** Zero Dispersion Slope shall be less than  $0.092 \text{ psi}/(\text{nm}^2 * \text{km})$ .
- 3.5.12** Cable loss shall not exceed 0.55 dB/Km when measured at a light wavelength of 1,310 nm.
- 3.5.13** Cable loss shall not exceed 0.30 dB/Km when measured at a light wavelength of 1,550 nm.
- 3.6** The cable casing shall be composed of a minimum of two protective layers. Each layer requirements are as follows:
- 3.6.1** The first casing layer shall be composed of high tensile strength dielectric yarns helically stranded evenly around the cable core.
- 3.6.2** The second and outer most layers shall be a polyethylene jacket. The jacket shall meet the following requirements:
- 3.6.2.1** The jacket shall be black medium or high density polyethylene in accordance with ASTM D1248, Type II or Type III, Class C, Category 3, 4, or 5 and contain a suitable antioxidant.
- 3.6.2.2** The jacket shall contain carbon black to provide ultraviolet light protection.

- 3.6.2.3 The jacket shall have a minimum thickness of 1.4 mm.
- 3.6.2.4 The jacket shall have permanent affixed markings every two feet or every one meter along the cable. These markings shall contain at a minimum the cable length, (in feet if markings appear every two feet or in meters if markings appear every one meter), manufacturer's name, date of manufacturer, and the fiber count.
- 3.6.2.5 A ripcord shall be provided between the first and second layer.
- 3.6.2.6 All casing layers shall be non-nutritive to fungus.



**Figure 5A –  
Tight Buffer**

**Typical 12 Fiber  
Cable**

**CONSTRUCTION METHODS:**

The Contractor shall fully comply with the following construction and installation procedures when installing the Fiber Optic Cable:

**4. SHIPPING REELS:**

- 4.1 The Fiber Optic Cable shall be shipped in reels that meet the following requirements:
  - 4.1.1 The reels shall be designed to prevent damage to the cable during shipment and installation.
  - 4.1.2 Each reel shall contain an identification tag with the following minimum information:
    - 4.1.2.1 Date of Manufacture.
    - 4.1.2.2 Manufacturer's Cable Code.
    - 4.1.2.3 Fiber Count.
    - 4.1.2.4 Length of Cable.
    - 4.1.2.5 Beginning and End length markings.
    - 4.1.2.6 Both ends of the cable shall be accessible to provide access for testing.
    - 4.1.2.7 The cable ends shall be securely fastened and shall not protrude beyond any portion of the reel in an unprotected manner to prevent the cable from becoming loose in transport.
    - 4.1.2.8 Cables ends shall be sealed to prevent the escape of the water blocking material and entry of moisture during shipping, handling, storage, and installation.

## Testing and Certification:

- 4.2 The personnel involved and responsible for the installation, splicing, and termination of the cable shall meet the following minimum requirements:
  - 4.1.1 Documented proof of three (3) years experience with the installation of single mode Fiber Optic Cable, including splicing, termination, and testing.
  - 4.1.2 The installation experience should be applicable to the work required for this project and shall include projects of similar or larger scope, providing mid-span access points and fusion splicing in field conditions.
  - 4.1.3 The Contractor shall provide the names and phone numbers of references to the Engineer.
  - 4.1.4 At least thirty (30) days prior to the installation of the Fiber Optic Cable, the Contractor shall submit to the Engineer, documentation outlining the information above.
  - 4.1.5 Permission for the Engineer to contact the references provided must be authorized prior to submitting the information.
  - 4.1.6 The Contractor shall provide the Engineer with four (4) copies of the cable manufacturer's recommendations and requirements, listed below, for each Fiber Optic Cable type and size:
    - 4.1.6.1 A list of the cable manufacturer's approved pulling lubricants for use on the cable. No other lubricants will be permitted.
    - 4.1.6.2 The maximum pulling tensions of the cable, which shall specify both pulling from the cable's strength member(s) and for pulling from the outer jacket.
    - 4.1.6.3 The minimum bending radius of the cable, which shall specify a radius for both the installation and for long-term installation.
- 4.2 Prior to shipping, the manufacturer of the cable shall conduct fiber loss tests on the entire length of cable to be delivered for this project. These tests shall be conducted at both 1310 nm and 1550 nm light wavelengths. Four (4) manufacturer's certified copies of the fiber loss tests shall be delivered with the cable for review by the Engineer.
- 4.3 Upon delivery of the cable to the project site, the Contractor shall conduct fiber loss tests on the entire length of cable in the presence of the Engineer. These tests shall be conducted at both 1310 nm and 1550 nm light wavelengths. The Contractor shall provide the Engineer with for (4) certified copies of the loss test results for comparison with the test made on the cable prior to delivery.
- 4.4 At the Request of RIDOT after installation of the cable is complete, the Contractor shall conduct fiber loss tests of the entire length of cable demonstrating that all requirements of this specification are met. This test shall be conducted at both 1310 nm and 1550 nm light wavelengths.
  - 4.4.1 Testing will be paid for under the contract unit price for an Optical Time Domain Reflectometer (OTDR) test.
  - 4.4.2 Testing will conform to the specifications for Optical Time Domain Reflectometer Test.

## **INSTALLATION:**

- 5** The Contractor shall adhere to the following installation procedures during the placement of the Fiber Optic Cable:
- 5.1** All Fiber Optic Cables to be installed in a conduit or duct facility shall be pulled as a unit.
  - 5.2** The Contractor shall ensure the cable is not damaged during storage, delivery and installation.
  - 5.3** The cable shall not be pulled along the ground or over or around obstructions.
  - 5.4** The cable shall not be stepped on by workmen, or run over by vehicles or equipment.
  - 5.5** All cable shall be inspected and approved by the Engineer prior to installation.
  - 5.6** All cable shall be pulled in conduit with a cable grip designed to provide a firm hold on the exterior covering of the cable, with heat shrinkable end caps placed on the cable ends.
  - 5.7** The maximum pulling tensions and minimum bending radius shall not be violated at any time during installation, and shall be monitored at all times during installation.
  - 5.8** Prior to any installation of cable, the Contractor shall clean existing conduit and aerial messengers (if applicable), per industry standards.
  - 5.9** The Contractor shall establish adequate voice communications between the cable feeding location and the cable pulling equipment prior to commencing any pulling operation.
  - 5.10** The cable reels shall be placed on the same side of the pull box with the conduit where the cable is being installed. The reel shall be made level and brought into proper alignment with the conduit section, such that the cable will pass from the top of the reel. The cable shall be fed by manually rotating the reel.
  - 5.11** The Fiber Optic Cable shall not be pulled through an intermediate junction box, pull box, or any other opening in the conduit, unless approved by the Engineer.
  - 5.12** The necessary length of cable to be installed shall be pulled from pull box, or cabinet to the immediate next downstream pull box or cabinet. The remaining length of cable to be installed in the next conduit or along aerial messenger shall be carefully stacked or stored in a manner that allows that length of cable to be safely pulled into the next conduit.
  - 5.13** An approved cable feeder guide shall be used between the cable reel or the storage stack and the face of the conduit to protect the cable, and to guide the cable installation. The dimensions and set-up of the feeder guide shall be such that the cable does not bend at any location to a radius less than the cable's minimum allowable bending radius.
  - 5.14** The cable shall not be pulled over edges or corners, over or around obstructions, or through unnecessary curves or bends.
  - 5.15** The cable shall be looped in and out to cabinets and pull boxes to provide adequate slack and the least amount of stress on the fibers.
  - 5.16** The Contractor shall ensure that the cable is not damaged during storage or installation.
  - 5.17** Fiber Optic Cable ends shall be kept sealed at all times during installation, using an approved cable end cap. Tape shall not be permitted to seal the cable end. The cable end shall remain sealed until the Contractor terminates the fiber cables.
  - 5.18** Cables that are not immediately terminated shall have a minimum of six feet of slack.
  - 5.19** The allowable pulling tension shall be the lesser of either of the two values below:
    - 5.19.1** The cable manufacturer's recommended pulling tension from the outer jacket for the cable.



- 5.19.2 Eighty percent of the cable manufacturer's maximum pulling tension from the outer jacket.
- 5.20 The Contractor shall monitor the tension on the Fiber Optic Cable with the use of an approved tension gauge.
- 5.21 The gauge shall be placed sufficient distance from the take up reel, such that the tension can be read throughout the entire pulling operation.
- 5.22 When using lubricants, the Contractor shall adhere to the cable manufacturer's requirements for the proper amount, application tools and method, and removal of the lubricant from the exposed cable.
- 5.23 All cable shall run continuously from termination point to termination point as indicated on the plans or as instructed by the Engineer.
- 5.24 The Contractor shall carefully determine the length of cable to reach from termination point to termination point.
- 5.25 Splicing of Fiber Optic Cables at any location other than those shown on the plans shall not be permitted.
- 5.26 The Contractor shall document the locations of all splices and connections for each strand of Fiber Optic Cable. This documentation shall show the distance in feet of Fiber Optic Cable from the end of the cable for every splice and connection, and shall also show the cable length marking as marked on the cable for every splice and connection.
- 5.27 Four copies of the documentation shall be furnished to the Engineer prior to testing.

#### **CABLE TERMINATION:**

- 6 The Contractor shall terminate Fiber Optic Cables in the following manner:
- 6.1 Bare fibers shall be completely re-coated with a protective room temperature vulcanizing (RTV) coating gel, or similar approved substance, prior to the application of the sleeve so as to protect the fiber from scoring, dirt, or micro bending.
- 6.2 A minimum of one hundred twenty five (125) feet of trunk cable shall be stored in all fiber optic splice manholes and twenty five (25) feet shall be stored in the cabinet.
- 6.3 Cable storage shall be performed in an industry standard manner that does not violate the minimum bending radius specification of the cable.
- 6.4 Use tie wraps to attach cable loops to rails where rails are present.

#### **SUBMITTALS:**

Submit submittal data for all equipment, materials, test procedures, and routine maintenance procedures required for these items within 60 calendar days after the "Notice To Proceed" and prior to any installation, unless noted otherwise in the Contract Documents.

Submit to the Engineer for approval, six (6) copies of the manufacturer's descriptive literature (catalog cuts), technical data, operational documentation, service and maintenance documentation and all other materials required within this specification.

Provide submittal data that is neat, legible, and orderly. Neatly organize each package of submittal data and separate by fiber or hardware item.

**METHOD OF MEASUREMENT:**

Item, "12-STRAND SINGLE MODE FIBER OPTIC CABLE" shall be measured for payment by the unit 'LINEAR FOOT', for the amount of linear feet actually installed, complete-in-place and accepted for the fiber count called out in the Contract Drawings.

**BASIS OF PAYMENT:**

Item, "12-STRAND SINGLE MODE FIBER OPTIC CABLE" shall be paid for at the contract unit price bid per "LINEAR FOOT", which price shall include furnishing, installing, connecting, splicing the Fiber Optic Cable of the type specified. The price shall also include furnishing all labor, tools, materials, equipment, storage, attachment, transportation, and other incidentals necessary to complete the work for the Fiber count called out in the Contract Drawings.

Vendor Name: \_\_\_\_\_

Rhode Island Division of Purchases  
ITS On Call Contract  
BID: 7598600

Item	Class-Item	QTY	Unit	Unit Price	Total
1.0	202.0200 Rock Excavation Common	1	CUBIC YARD		
2.0	205.0240 Trench Rock Excavation (0-7')	1	CUBIC YARD		
3.0	901.0101 Guardrail Steel Beam Single Face Earth and Asphalt	100	LINEAR FOOT		
4.0	901.0192 Guardrail Steel Beam Anchorage Trailing End Section Stds 34.3.1 and 34.3.4	1	EACH		
5.0	901.9901 Guardrail Approach Terminal Section	1	EACH		
6.0	919.0101 Test Pits	1	EACH		
7.0	937.9901 Maintenance And Protection Of Traffic - Type 1	23	EACH		
8.0	937.9902 Maintenance And Protection Of Traffic - Type 2	13	EACH		
9.0	937.9903 Maintenance And Protection Of Traffic - Type 3	23	EACH		
10.0	937.9904 Maintenance And Protection Of Traffic - Type 4	13	EACH		
11.0	937.9905 Maintenance And Protection Of Traffic - Type 5	32	EACH		
12.0	937.9906 Maintenance And Protection Of Traffic - Type 6	13	EACH		
13.0	937.9907 Maintenance And Protection Of Traffic - Type 7	13	EACH		
14.0	937.9908 Maintenance And Protection Of Traffic - Type 8	13	EACH		
15.0	937.9909 Maintenance And Protection Of Traffic - Type 9	5	EACH		
16.0	937.9910 Maintenance And Protection Of Traffic - Type 10	5	EACH		
17.0	937.9911 Maintenance And Protection Of Traffic - Type 11	3	EACH		
18.0	937.9912 Maintenance And Protection Of Traffic - Type 12	3	EACH		
19.0	937.9913 Maint And Protection Of Traffic For Contractor Support - Type 1	8	HRS		
20.0	937.9914 Maint And Protection Of Traffic For Contractor Support - Type 2	8	HRS		
21.0	937.9915 Maint And Protection Of Traffic For Contractor Support - Type 3	8	HRS		
22.0	937.9916 Maint And Protection Of Traffic For Contractor Support - Type 4	8	HRS		
23.0	937.9917 Maint And Protection Of Traffic For Contractor Support - Type 5	8	HRS		
24.0	937.9918 Maint And Protection Of Traffic For Contractor Support - Type 6	8	HRS		
25.0	937.9919 Maint And Protection Of Traffic For Contractor Support - Type 7	8	HRS		
26.0	937.9920 Maint And Protection Of Traffic For Contractor Support - Type 8	8	HRS		
27.0	937.9921 Maint And Protection Of Traffic For Contractor Support - Type 9	8	HRS		
28.0	937.9922 Maint And Protection Of Traffic For Contractor Support - Type 10	8	HRS		
29.0	937.9923 Maint And Protection Of Traffic For Contractor Support - Type 11	8	HRS		
30.0	937.9924 Maint And Protection Of Traffic For Contractor Support - Type 12	8	HRS		
31.0	T03.9901 Ground Rod Array	3	EACH		
32.0	T03.9902 Lightning Dissipater	3	EACH		
33.0	T04.6902 '2' Stranded Copper Conductor 600V Insulation	100	LINEAR FOOT		
34.0	T04.6906 '6' Stranded Copper Conductor 600V Insulation	500	LINEAR FOOT		
35.0	T04.9901 Outdoor 23 Awg Category 6A Stp - Network Video Cable	1000	LINEAR FOOT		
36.0	T04.9902 23 Awg Category 6 Stp - Network Video Cable	1000	LINEAR FOOT		
37.0	T04.9903 12 Fiber Optic Splice Closure	5	EACH		
38.0	T04.9904 24 Fiber Optic Splice Closure	5	EACH		
39.0	T04.9905 Furnish And Install Hardened Ethernet Switch With Sfp Fiber Optic Transceivers	25	EACH		
40.0	T04.9906 12-strand Single Mode Type Fiber Cable	2000	LINEAR FOOT		
41.0	T04.9907 Fiber Optic Patch Panel - 12 Position	10	EACH		
42.0	T05.0100 Precast Type A Handhole Standard 18.2.0	1	EACH		
43.0	T05.9901 Furnish And Install Hand-Hole (Composite Type) 24" X 36" X 36" Pullbox For Comm/Power	10	EACH		
44.0	T05.9902 Break Into Existing Handhole	1	EACH		
45.0	T05.9903 Break Into Existing Manhole	1	EACH		
46.0	T05.9904 Dewatering	1	EACH		
47.0	T06.1020 2 In. Rigid Steel Conduit - Underground	500	LINEAR FOOT		
48.0	T06.2020 2 In. Rigid Steel Conduit - Overhead	100	LINEAR FOOT		
49.0	T06.3020 2 In. Rigid Steel Conduit - Under Existing Pavement	100	LINEAR FOOT		
50.0	T06.5020 2 Inch Polyvinyl Chloride Plastic Conduit - Underground	100	LINEAR FOOT		
51.0	T06.6020 2 Inch Polyvinyl Chloride Plastic Conduit - Overhead	100	LINEAR FOOT		
52.0	T06.9901 Weather Head Installation On Existing Pole	3	EACH		
53.0	T06.9902 Dual 1-1/4 Inch High Density Polyethylene Duct - Under Existing Pavement	100	LINEAR FOOT		
54.0	T06.9903 Dual 1-1/4 Inch High Density Polyethylene Duct - Underground	100	LINEAR FOOT		
55.0	T06.9904 Dual 2 Inch High Density Polyethylene Duct - Underground	100	LINEAR FOOT		
56.0	T06.9905 Dual 3 Inch High Density Polyethylene Duct - Underground	100	LINEAR FOOT		
57.0	T11.6006 Span and Messenger Wires 6/16	100	LINEAR FOOT		
58.0	T11.9901 Service Pole Standard, Wood 40 Foot	3	EACH		
59.0	T11.9902 Service Pole Standard, Wood 45 Foot	3	EACH		
60.0	T11.9903 Install Existing 80 Foot Camera Pole On New Foundation	1	EACH		
61.0	T11.9904 40 Foot Galvanized Steel Camera Pole With Lowering Device And Foundation	1	EACH		
62.0	T11.9905 60 Foot Galvanized Steel Camera Pole With Lowering Device And Foundation	1	EACH		
63.0	T11.9906 80 Foot Galvanized Steel Camera Pole With Lowering Device And Foundation	1	EACH		
64.0	T11.9907 Portable Lowering Tool	1	EACH		
65.0	T12.9150 Meter Socket w/ Manual By-Pass	1	EACH		
66.0	T12.9902 Ccve Inspection And Cleaning - With Lowering Device	250	EACH		
67.0	T12.9903 Ccve Inspection And Cleaning - Without Lowering Device	150	EACH		
68.0	T12.9904 Remove Existing CLD And Furnish And Install New IP CLD On Existing Pole	20	EACH		
69.0	T12.9905 Replace Existing Flashing Beacons With Yellow Led Module	6	EACH		
70.0	T12.9906 Relamp Existing Led Module On Har Signs	2	EACH		
71.0	T12.9907 Flatbed Truck With Lift And Operator	24	HRS		
72.0	T12.9908 Preventative Maintenance WWD System	60	EACH		
73.0	T12.9909 Quarterly Maintenance WWD System	216	EACH		

Vendor Name: \_\_\_\_\_

Rhode Island Division of Purchases  
 ITS On Call Contract  
 BID: 7598600

74.0	T12.9911 Meter Pedestal	1	EACH		
75.0	T12.9912 Disconnect Switch	1	EACH		
76.0	T12.9913 Transformer	1	EACH		
77.0	T12.9914 Ground Mounted Camera Control Cabinet And Foundation	1	EACH		
78.0	T12.9915 Pole Mounted Camera Control Cabinet	1	EACH		
79.0	T12.9916 Break Into Existing Cabinet	1	EACH		
80.0	T12.9917 Ground Mounted P Size Replacement Cabinet	1	EACH		
81.0	T12.9918 Ground Mounted M Size Replacement Cabinet	1	EACH		
82.0	T12.9919 Pole Mounted M Size Replacement Cabinet	3	EACH		
83.0	Hourly Rate for Diagnostic and Troubleshooting (without Repair)	80	EACH		
84.0	Hourly Rate for Routine Troubleshooting and Repair	400	HRS		
85.0	Hourly Rate for Urgent (Overtime) Troubleshooting and Repair	50	HRS		
86.0	Miscellaneous Materials and Services	180000	EACH		
87.0	T04.9908 Optical Time Domain Reflectometer(OTDR) Test	6	EACH		
					Contract Total

## **JOB SPECIFIC**

**T04.9908**

### **Optical Time Domain Reflectometer(OTDR) Test**

#### **DESCRIPTION:**

This item of work consists of the testing of fiber optic cable segments using an Optical Time Domain Reflectometer. This item consists of fully testing the fiber optic cable segments installed as per the contract drawings run and investigating and resolving any connection that may be causing problems with the fiber optic cables. Tests may be performed on newly installed fiber or preexisting fiber.

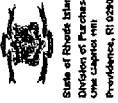
- 1 This test shall be conducted bidirectionally at both 1310 nm and 1550 nm light wavelengths. All testing shall be performed with a contractor supplied Optical Time Domain Reflectometer (OTDR), as follows:
  - 1.1 Testing shall be conducted on all components of the Fiber Optic Cable plant, including fiber cables, splices, and patch panels.
  - 1.2 The OTDR used shall include a disk drive for storage of all Fiber Optic Cable signatures.
  - 1.3 Signatures of all cables tested shall be stored on a disk and supplied by the Contractor.
  - 1.4 The Contractor shall supply OTDR emulation software manufactured by the OTDR manufacturer which is capable of reading the stored signatures from the disk(s) and performing all measurement and analysis on the stored signatures as if the OTDR were connected live to the Fiber Optic Cable.
  - 1.5 The analysis shall include, but not be limited to, readout of fiber loss per unit length, splice loss measurement (amount of loss and distance from OTDR), connector loss measurement (amount of loss and distance from OTDR), total Fiber Optic Cable length, generation of event tables, as well as identification and measurement of any other reflective events or faults.
  - 1.6 The OTDR shall be located at one end of the Fiber Optic Cable plant during the testing.
  - 1.7 The pulse width setting of the OTDR shall be set to the lowest possible setting while allowing the full length of Fiber Optic Cable to be measured for faults or reflective events.
  - 1.8 The Contractor shall document the OTDR readings by supplying hard copies of the OTDR signatures for all Fiber Optic Cables.
  - 1.9 The Contractor shall also supply hard copy of the reflective event table for all optical fibers which shall be directly printed out from the OTDR.
  - 1.10 The Contractor shall supply Fiber Optic Cable plant loss calculations for all installed components of the cable plant demonstrating that the total plant losses for each fiber are less than the minimum optical fiber power budget required for all fiber optic transmission equipment to be provided and installed as part of this project, including a safety margin of at least 4dB.

#### **METHOD OF MEASUREMENT:**

“Optical Time Domain Reflectometer(OTDR) Test” shall be measured for payment by the unit “EACH” for all OTDR testing and documentation provided and accepted.

**BASIS OF PAYMENT:**

“Optical Time Domain Reflectometer(OTDR) Test” shall be paid for at the contract unit price bid per "EACH", which price shall include full compensation for all materials, equipment, tools, labor, testing, testing results and documentation, and other incidentals necessary to complete the work of OTDR testing.



State of Rhode Island  
Division of Purchases  
One Capitol Hill  
Providence, RI 02908

**"NON-MANDATORY" PRE-BID CONFERENCE SIGN IN SHEET**

BID NUMBER: 7598600  
 BID TITLE: ON CALL INTELLIGENT TRANSPORTATION SYSTEM (ITS) OPERATIONAL CONSTRUCTION SERVICES  
 PRE-BID DATE AND TIME: February 19th, 2019 at 10:00am

Alyssa Ward

1	RIDOT	Erin H Samerchano	[Signature]	2 Capitol Hill, Rm 110		X4427
2	RIDOT	Phelim V. D'Ercole	[Signature]	2 CAPITAL Hill		CR-4119
3	RIDOT	GARY GARZONE	[Signature]	" "		X-4408
4	Allied	Sally Brunard	[Signature]	" "		
5	RIDOT	MIKE WRETH	[Signature]	" "		X4200
6	Jacobs	Michael Holystonson	[Signature]	" "		641-6674 Michael.Holystonson@jacobs.com
7	Jacobs	Nicholas Riccitelli	[Signature]	" "		Nicholas.Riccitelli@jacobs.com
8	Liddell	Anthony Cardinale	[Signature]	600 Industrial Dr. Holford MA		anthony@liddellbrothers.com 639-3495
9	RIDOT	Russell Holt	[Signature]	2 Capitol Hill, Rm. 150		russell.holt@dot.state.ri.gov x4046
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