

SEPTEMBER 2, 2016
NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW HAVEN LINE
PHASE 2
FEDERAL AID PROJECT NO. N/A
STATE PROJECT NO. 300-178
TOWNS OF FAIRFIELD , STRATFORD AND WESTPORT; CITY OF BRIDGEPORT

ADDENDUM NO. 1

This Addendum addresses the following questions and answers contained on the “CT DOT QUESTIONS AND ANSWERS WEBSITE FOR ADVERTISED CONSTRUCTION PROJECTS”:

Questions and Answers Nos. 1, 6, 7, 9, and 12

SPECIAL PROVISIONS
REVISED SPECIAL PROVISIONS

The following Special Provisions are hereby deleted in their entirety and replaced with the attached like-named Special Provisions:

- **NOTICE TO CONTRACTOR – ACCEPTANCE TESTING**
- **SECTION 1.06 – CONTROL OF MATERIALS**
- **ITEM NO. 0063538A – WORKSTATION**
ITEM NO. 1108872A – VIDEO MANAGEMENT SYSTEM
ITEM NO. 1108868A – CCTV WORKSTATION SOFTWARE LICENSES
ITEM NO. 1108881A – VIDEO MANAGEMENT SYSTEM SOFTWARE LICENSES
- **ITEM NO. 1112228A – CCTV CABINET-BASE MOUNTED**
ITEM NO. 1112229A – CCTV CABINET-BASE MOUNTED FOUNDATION
ITEM NO. 1112245A – CCTV CABINET-PECK BRIDGE
ITEM NO. 1112246A – CCTV CABINET-CONCRETE PAD
- **ITEM NO. 1112237A – REMOTE CCTV CABINET**
ITEM NO. 1112247A – REMOTE SWITCH CABINET BASE

PLANS

NEW PLAN

The following Plan Sheet is hereby added to the Contract:

06.013-1.A1 DRAWING NO. FCI-618-1 CABLE TRANSITION DETAIL AT
BRIDGEPORT STATION

REVISED PLANS

The following Plan Sheets are hereby deleted and replaced with the like-numbered Plan Sheets:

02.01.A1

03.016.A1

03.024.A1

03.042.A1

03.052.A1

06.012.A1

06.024.A1

The attached Certificates of Permissions below are hereby added to the contract:

Metro North Railroad Bridge 08038R, Fairfield

Metro North Railroad Bridge 08043R, Fairfield

Metro North Railroad Bridge 08045R, Fairfield

Metro North Railroad Bridge 08047R, Bridgeport and Fairfield

Metro North Railroad Bridge 08064R, Bridgeport

The Bid Proposal Form is not affected by this Addendum.

There will be no change in the number of calendar days due to this Addendum.

The foregoing is hereby made a part of the contract.

NOTICE TO CONTRACTOR – ACCEPTANCE TESTING

General Requirements:

The Contractor shall verify that the complete System, installed and configured, meets all requirements set forth in the specifications and plans to the satisfaction of the Engineer. The contractor shall provide test, inspection, and documented test results sufficient to verify design, ensure proper performance, safety and reliability, and demonstrate compliance with the specifications. All systems, components, installation, and any associated workmanship or materials are required to be reviewed, tested, and accepted prior to turnover to MNR. The Contractor shall test all functional requirements set forth in the specification have been met by the System.

The Contractor shall submit test procedures for the approval of the Engineer, showing in complete detail the manner in which they propose to perform each test. The Contractor shall provide full documentation and certifications of all tests performed. Six (6) copies of a test report that includes test instrumentation, description, calibration, certification data, test methods, test results, and other pertinent information shall be submitted to the Engineer for review and approval.

An Acceptance Testing Plan and all Test Procedures shall be prepared by the Contractor. The Contractor shall give 20 days' advance notice when the Contractor is ready to perform acceptance testing. Actual date and time of testing will be determined by the Engineer.

The Engineer or his representative will witness all tests. The Contractor shall be responsible for retesting of any items as necessary at no additional cost. As defined herein, the Contractor, in the presence of the Engineer, shall inspect the installation for conformity with the approved design and drawings and as recommended by the manufacturers. The Contractor shall provide all facilities, labor and equipment and shall be responsible for the satisfactory completion of the inspections and reports thereof. This shall apply to both Contractor and Railroad furnished equipment.

Additional requirements for specific Items may be listed in other Specifications. The absence of specific test requirements in another section does not relieve the Contractor from performing testing for those items. Likewise, listing specific requirements elsewhere does not relieve the Contractor from complying with requirements listed herein.

Applicable Standards:

Pertinent provisions of the following latest standards shall apply to the work of this Section, except as they may be modified herein, and are hereby made a part of this Specification to the extent required.

<u>Organization</u>	<u>Number</u>	<u>Title</u>
ANSI	C2	National Electrical Safety Code
ANSI/IEEE	829	Standard for Software and System Test Documentation
NFPA	70	National Electrical Code

Materials:

All measuring instruments shall be of the precision type and shall have a valid calibration certificate at the time of test. The Contractor shall be responsible for furnishing all test personnel, test instruments, inspection vehicle, and other equipment/materials necessary for performing and recording field inspections and tests.

Submittals:Test Plan:

The Contractor shall submit for approval by the Engineer a Test Plan outlining all testing to be performed. At a minimum, the Contractor's Acceptance Test Plans shall conform to the requirements of ANSI/IEEE Standard 829. The Test Plan shall contain but not be limited to the following:

1. A list and schedule of all testing and inspection activities (duration, order, prerequisites) including flow diagram of inspections and tests.
2. A description of the overall test environment including: test equipment details; test equipment configuration sketches and diagrams including cabling requirements; and hardware and software required for the test including the number and type of devices to be used during the test and/or the method of simulation.
3. A summary statement of each test phase.
4. A narrative presenting the Contractor's plan for achieving all testing requirements.
5. Safety program defining general precautions to be taken, notices, signs and barriers to be posted concerning the safety of the public, work personnel and equipment. The program will define precautionary measures to be taken prior to, during and following the inspection and test until such time as normal work is resumed.
3. Samples of test forms to be used during testing.
4. Preliminary test procedures for all tests. Test Procedures shall be fully developed after approval of the Test Plan.
5. The Contractor shall apply these requirements to all Tests described herein.

Test Procedures:

The Contractor shall develop Test Procedures for all tests and inspections. The Contractor shall sufficiently document test procedures to ensure that each test is comprehensive, representative of the functions to be exercised, and repeatable in whole or in part if so desired. The Contractor shall submit to the Engineer for approval the final versions of all Test Procedures at least four (4) weeks before the start of testing. The Engineer will approve test procedures only if they are inclusive and thoroughly test each device and, where applicable, each subassembly both individually and when connected to external devices.

The Contractor shall minimally include the following information in the test procedures:

1. Test Schedule.
2. Responsibilities of Contractor and Railroad personnel.
3. Record keeping assignments, procedures and forms.
4. Copies of any certified test data to be supplied by the Contractor.
5. List of all documentation to be used during the test.
6. A description of test equipment or data to be supplied by the Contractor.
7. Block diagram of each hardware test configuration(s) including equipment to be supplied by the Railroad.
8. Techniques and equipment used to simulate, or substitute for, devices not available during factory testing.
9. Problem resolution and procedure for handling variances
10. Provisions for retest.

The Contractor shall include in the test procedures the following specific information for each test:

1. The purpose of each test and the functions to be tested.
2. The detailed procedures to be followed. Test procedures shall be written step-by-step such that someone not familiar with the system would be able to perform the test.
3. The test set-up and test conditions.
4. All inputs and outputs.
5. Test firmware/software descriptions and listings.
6. Expected results.
7. Acceptance criteria.

All tests may be witnessed and accepted or rejected by the Engineer or Metro-North Railroad.

Test Records:

The Contractor shall maintain a complete record of all test results. The Contractor shall make the test records available to the Engineer at all times and shall submit the test records to the Engineer upon completion of all testing. The Contractor shall key the test records to the test procedures.

The Contractor shall include the following in test records, as a minimum:

1. Summary of test, including equipment tested and description of test.
2. The signatures of the Contractor and the Railroad personnel witnessing each of the tests and re-tests.
3. List of test equipment used and calibration date.
4. Any special test conditions or actions taken.
5. Test results, including plots/graphs.
6. Test date and time.
7. Software versions of associated software.
8. All serial numbers of associated hardware.
9. Space for comments by the witnesses.

The Contractor shall prepare and include a variance report in the test record each time a deviation from Contract Document requirements is detected. The variance report shall include a complete description of the variance, and indicate whether the variance is to be corrected immediately, at the end of the current test session, or at some identified point in the future.

Once corrected, the Contractor shall document corrective actions taken to eliminate each variance by providing sufficient information to enable the Engineer to determine the need for re-testing the equipment, for testing interactions with any previously tested equipment, and for updating documentation as a result of the corrective action. The variance is eliminated when the Contractor and the Engineer have acknowledged, by signature, correction of the variance.

Before any testing begins, the Contractor shall submit a copy of their Acceptance Testing Plan and Acceptance Test Procedures, tables, and all forms to be used for recording all results of the inspections and tests, to the Engineer.

Each set of Test Records shall include a brief written summary of the final Test notes, exceptions and findings and shall be compiled, bound and submitted for review no later than 30 days after the completion of the test.

Construction Methods:

The Contractor shall not proceed to the next phase of testing without approval of the Engineer. Conditional approvals to proceed to the next phase shall be addressed and verified as soon as possible in the next testing phase.

Prior to gaining approval to conduct witnessed Acceptance Testing, the Contractor shall provide the Engineer with a preliminary test report enumerating each component of each system tested and showing satisfactory results.

The Contractor shall be fully responsible for site safety and the satisfactory completion of inspection and tests as per the Acceptance Testing Plan. The Contractor shall prepare a detailed site safety plan following the guidelines included in the Acceptance Test Plan. The Contractor shall provide personnel to enforce the site safety plan. If tests and/or inspections are repeated

due to discrepancies, defects in the installations and/or the equipment, the Contractor shall bear all costs pertaining to the retest.

The Contractor shall promptly correct any defects in the materials or installations. Any visible defect on the Railroad furnished equipment shall be considered the Contractor's responsibility unless previously documented and submitted to the Engineer. Defects noted at time of delivery shall be resolved prior to acceptance testing. Functional failure of Railroad furnished equipment shall be resolved by the Railroad. Any retesting caused by Railroad furnished equipment failures will be the responsibility of the Railroad unless specifically noted otherwise.

Acceptance of test results by the Engineer shall not relieve the Contractor of the responsibility for the installed system to meet the specifications as set forth herein and other sections of the Specifications.

Pre-Installation (Factory) Testing:

Pre-installation/factory testing shall be performed by the Contractor and include inspection of all System equipment prior to delivery to any work site. The contractor shall inspect and test all system equipment for the following:

1. Damage to equipment
2. Missing components and parts
3. Correct power and communication connections
4. Correct positioning and mounting
5. Conformance to the configuration plan
6. Completeness
7. All installed equipment shall be energized, exercised, and tested for function and operation.
8. All installed equipment communication ports shall be subject to testing that shall confirm proper data exchange.
9. Compatibility with associated equipment (including camera compatibility with the existing Verint Nextiva System). The Contractor shall test all software and hardware components individually and as an integrated system to ensure that they perform according to the Specifications as set forth herein.

Items manufactured by the Contractor, such as CCTV cabinets and remote switch cabinets shall be manufactured in a controlled facility and be fully tested prior to delivery to the site. Such items may be inspected by the Engineer or Railroad personnel at any time.

Field Installation Testing

Field Installation Testing shall be performed by the Contractor and be performed following the equipment installation and configuration. The Test Procedures shall require sufficient testing to determine that no shipment or installation problems have occurred and that all devices are installed and operate as intended.

Field Installation Testing should take place locally at each location in order to effectively troubleshoot the devices and ensure each location is properly configured prior to an integrated system-wide test. Testing submittals shall be in the same general format as the Pre-Installation (Factory) Test documentation. Because the Field Installation Testing will be on the installed equipment, properly connected, configured, and interfaced to the actual field devices, the test procedures shall be in correspondingly greater detail than the Pre-Installation Test and shall demonstrate the full and complete local system functionality and compliance with all Contract Requirements. At a minimum, Field Installation Testing shall include:

- a. General inspections – Verify no damage has occurred
- b. Verification of wiring – Ensure no sharp bend exist, verify cable sizes and quantities, verify cable management in place and cabling is dressed and secured, verify labeling, verify ground is in place, verify correct circuit breakers
- c. Verification of grounding – Verify all items are properly grounded and bonded
- d. Verification of installation – Verify installation locations and details against approved shop drawings. Verify all items to be installed are present. Test procedures shall list all equipment and devices along with quantities and specific configurations for verification
- e. Verification of labeling – For all wiring, devices, panels, breakers, etc.
- f. Power on test – verify cabinet voltage, device power and voltage (both inputs and outputs), ensure no breakers trip, verify all equipment is operational as intended, verify voltage drop
- g. Functional testing - verify command, control, and monitoring of all devices locally.
- h. Field of views – Verify field of views against approved views. Camera views shall be tested during both daytime and nighttime hours for verification of low light operations. Any repairs, construction, or modifications as required to comply with this Item shall be performed at the Contractor's expense. Camera view and IR illumination adjustments shall be adjusted under the direction of the Engineer to obtain the optimal fields of view and illumination levels.
- i. Other requirements specified elsewhere in the Contract Documents.

Preliminary marked-up shop drawings shall be available during the tests and their accuracy shall be verified as part of the Field Installation Testing.

Integrated System Testing

After Field Installation Testing and agreement by the Engineer to initiate Integrated System Testing, the System shall be tested as a complete integrated System. Integrated System Testing shall be conducted with all devices and components installed, integrated as a system.

Integrated System Testing shall be in the same general format as previous testing. Integrated System Testing shall include:

1. Verify Video Management System parameters such as IP addresses, recording rates, user access, device locations, maps, failover, dual recording, etc.

2. Command, control, and monitoring of all field interface equipment both locally and over the network where required by the Contract Documents. Verify Video Management System functions as described in other sections.
3. Verification of all existing functionality and configurations of the System prior to modifications under this Contract remain unless specifically removed by this Contract.
4. Verify Network Monitoring System – ensure all devices are configured for monitoring and verify configuration. Tests such as loss of video input, loss of IP camera network link, network link failure, power supply failure, shall be tested.
5. Verify network failover – In cooperation with Metro-North personnel, verify in the event of network link failure, network traffic is re-routed.
6. Other requirements specified elsewhere in the Contract Documents.

During the Integrated System Testing, the Contractor shall perform any recalibration, reconfiguration, or reprogramming of the System hardware and software required as part of the normal operational configuration and to correct any system bug or errors encountered to ensure that the system performs in accordance with the Specifications and required sequences of operation. Such changes shall include field device adjustments such as cameras and IR illuminators. Field of views (including IR illumination) shall be further verified to ensure installation is secure and has not rotated out of position.

After completion of installation and prior to witnessed testing, a factory trained technician shall test and certify the system's operation. Test shall also certify that equipment is installed in accordance with approved factory means and methods.

The existing CCTV system shall remain operational throughout testing unless specifically authorized otherwise by Metro-North.

31 Day Operational Acceptance Testing

Prior to the commencement of Operational Acceptance Testing the Contractor shall furnish one complete set of the approved equipment shop drawings, wiring diagrams, and maintenance and operations manuals for use by the Engineer during the test process.

Operational Acceptance Testing shall commence following notification by the Engineer that the results of the Integrated System Test are satisfactory. The Operational Acceptance Test shall be performed by the Contractor. The Contractor shall provide test procedures to periodically verify all functionality is operating as intended, with full functionality verified at least once per week and spot checks at least once per day.

During the Operational Test period, the Engineer (or designated official) may operate the system as specified using the fully configured software and hardware and all applicable manuals, printed guides, and procedures submitted by the Contractor. The Contractor shall correct any major failure or malfunction of material significance during the period as it occurs. Said malfunctions include, but are not limited to, equipment failure or failure of the System to comply with any

requirement. Major failure is defined for this purpose as any failure of any item of the equipment or software, or both, that prevents the Engineer from performing meaningful work based upon the Railroad's business needs.

During the Operational Acceptance Testing, the Contractor shall perform any re-calibration, reconfiguration, or re-programming of the System hardware and software required as part of the normal operational configuration and to correct any system bug or errors encountered to ensure that the system performs in accordance with the Specifications and required sequences of operation. Such changes shall include field device adjustments such as cameras and IR illuminators. All changes performed during Operational Acceptance Testing shall be fully documented by the Contractor and shall not be implemented without prior approval by the Engineer.

All malfunctions encountered during Operational Acceptance Testing shall be corrected by the Contractor at their expense. After correction, the Operational Acceptance Test shall restart at day one, and shall continue until the results meet the conditions and terms of the performance period and the System has operated continuously for 31 consecutive days without error or malfunction.

Upon completion of the testing, prior to final acceptance, thoroughly clean (internally and externally) all equipment furnished and/or installed in accordance with manufacturer recommended cleaning methods.

Testing shall not be considered complete until all Test Records have been submitted with passing results and accepted by the Engineer. Contractor shall allow a minimum of 21 days for review of Test Records by the Engineer.

Failure to Complete Acceptance Testing Successfully

In the event the system is deemed not to have successfully completed Operational Acceptance Testing within ninety (90) days of the scheduled completion, the Engineer may, at its sole discretion, elect one of the following options, the election of which shall be effective upon written notification to the Contractor by the Engineer:

1. Engineer may require the Contractor to install, within such time period as may be mutually agreed in writing by the Engineer and the Contractor, a direct substitute of equipment or components. Contractor shall use due care in the removal and substitution of such equipment or components. Such substitutions shall be subject to all testing as provided in this section and, in the event such substitute component fails to successfully complete all the testing by the agreed-upon date, the provisions of this paragraph shall again be applicable.
2. The Engineer may permit the Contractor to continue to attempt to successfully complete the Acceptance Testing required by this Section; however, the Engineer may revoke its election of this alternative at any time upon not less than five (5) days prior written notice to the Contractor, in which event the Engineer may, in its sole discretion, elect any one of the other options specified in this paragraph, the further election of which shall be effective upon written notification of the

- Contractor by the Engineer.
3. The Engineer may pursue any other remedy hereunder or available at law or in equity or seek to enforce any damages, in addition to those provided under the Contract.

Exchange and Expansion Equipment during Factory, Field and Acceptance Testing

Contractor shall certify in writing to the Engineer when exchange or expansion equipment, devices, or components are installed and ready for use. For the purpose of this section, “expansion” is used to denote equipment which is not specified in the approved final design Bill of Materials. If this occurs during the 31 Day Operational Test, the operational test must re-start.

Payment

Testing shall be included in the price of each item. No additional payments will be made. The Contractor shall bid the Project accordingly. If, in the opinion of the Engineer, the Contractor does not fulfill the requirements of this section, payments for items not fully tested may be withheld.

SECTION 1.06 – CONTROL OF MATERIALS

Article 1.06.07 - Certified Test Reports and Materials Certificates:

Add the following:

1) For the materials in all the contract items with the exception of the following items, a Certified Test Report will be required confirming their conformance to the requirements set forth in these plans or specifications or both. Should the consignee noted on a Certified Test Report be other than the Prime Contractor, then Materials Certificates shall be required to identify the shipment.

2) For the materials in all the contract items with the exception of the following items, a Materials Certificate will be required confirming their conformance to the requirements set forth in these plans or specifications or both.

The following contract items do not require Certified Test Report or Materials Certificates:

0100426A	Water Transportation for Rescue Operations
0969000A	Project Coordinator (Minimum Bid)
0970006A	Traffic Person
0201001	Clearing and Grubbing
1008908A	Clean Existing Conduit/Duct
1108672A	Cisco Professional Services
1108868A	CCTV Workstation Software Licenses
1108881A	Video Management System Software Licenses
1112244A	Removal, Storage and Transfer of CCTV Equipment
1206036A	Remove and Relocate Sign
1108882A	Video Management System Support Services

ITEM #0063538A – WORKSTATION

ITEM #1108872A – VIDEO MANAGEMENT SYSTEM

ITEM #1108868A – CCTV WORKSTATION SOFTWARE LICENSES

ITEM #1108881A – VIDEO MANAGEMENT SYSTEM SOFTWARE LICENSES

Description:

There is an existing, redundant Verint Video Management System (VMS) installed at the CCO Shop and T&E building (both located in the New Haven Yard). The Contractor shall furnish, install, and test an expansion of this system to accommodate Phase 2 cameras.

The System provides monitoring, control, and video recording and archiving as specified herein, and as indicated on the Contract Drawings. The System shall comprise of, but not be limited to:

1. Monitoring and control
2. Networked capability for remote monitoring and control
3. Network Video Recording with redundant back-up and archival of video.

The System shall include the following: additional head-end servers, hardware and software licenses, management software, prerequisite software, 19” equipment racks, rack mounted KVM console, video decoders/video encoders, digital video recording/storage servers (e.g., RAID array), client workstations and related software, and all brackets, conduits, fittings, cables, connectors, wires, and ancillary equipment required for a fully functioning system described herein. Contractor shall include any other required equipment for a complete and operating system not included in this list. The system shall provide scalability and future expansion capability.

The VMS head-end servers are configured as a redundant, hot-standby with the CCO shop as primary, and T&E building as backup in the event the primary VMS system becomes damaged or inaccessible. Cameras are recorded at both locations continuously. The Contractor shall coordinate all work with the active system.

This specification covers the Video Management System (including the Network Video Recording System) and the Workstation computers that will all be integrated with each other to provide a complete system. The locations where the Contractor shall install the equipment for the Video Management System, Network Video Recording System, and Workstations shall be as shown in the Plans.

The Contractor shall retain the services of a System Integrator to perform the integration necessary for the inclusion of cameras and components into the existing Verint Nextiva software.

1. The Contractor shall utilize qualified, certified, and licensed personnel with experience in design of integrated security systems from Verint. Prior to

- commencement of Work, the Contractor shall submit evidence of personnel having recent certifications for the system.
2. Systems Integrator and Installer shall demonstrate a minimum of 7 years of continuous experience and technical expertise in performing contracts comparable in size and complexity, and whose installation and integration work was performed skillfully in a satisfactory manner and on time.
 3. The Systems Integrator shall be of established reputation and experience in the field of Video Surveillance Systems and shall be certified by the manufacturers of the proposed equipment to install, service, and maintain each manufacturer's equipment.

Requirements set forth in this Section shall apply to all CCTV System components (cameras, illuminators, power supplies, head-end servers, workstations, media converters, etc.) working as a complete system.

CCTV Software Licenses

The Contractor shall supply the following items of CCTV software licenses to meet the requirements as shown in the plans for expansion of the existing CCTV system. Only these items will be paid under Item #1108881A - VIDEO MANAGEMENT SYSTEM SOFTWARE LICENSES. All system configuration, other hardware, and other software required for the VMS shall be paid under Item #1108871A – VIDEO MANAGEMENT SYSTEM.

Verint Part Number	Description
VMS-1CAM-ENT	Verint VMS, One (1) VMS Software Camera License for Enterprise Master Server Systems
VMS-1DUAL-ENT	Verint VMS, One (1) Dual Recording Redundancy Software Camera License for Enterprise Master Server Systems
	Gold Level Maintenance for each camera license and dual recording license furnished under this contract through 12/31/2019.

Furnish licenses for every camera installed or integrated into the existing system as part of the Contract.

CCTV Workstation Licenses

The Contractor shall supply the following items of CCTV workstation licenses to meet the requirements as shown in the plans for expansion of the existing CCTV system. These items only shall be paid under Item #1108868A – CCTV WORKSTATION SOFTWARE LICENSES. All system configuration, other hardware, and other software required for the CCTV workstations shall be paid under Item #0063538A – WORKSTATION.

Verint Part Number	Description
VMS-1RV-S	One (1) Review/Smart Client License
	Gold Level Maintenance for each review/smart client license furnished under this contract through 12/31/2019.

Video Management System

Codes, Standards and Specifications

- A. All items furnished and installed under this Specification shall comply with the latest edition of applicable codes, provisions and all applicable standards issued by the organizations referenced below. The following publications are incorporated herein by reference to the extent applicable:
1. National Fire Protection Association (NFPA): NFPA 70 National Electrical Code.
 2. Underwriters Laboratories, Inc. (UL) Standards.
 3. National Electrical Manufacturers Association (NEMA) Standards.
 4. American National Standards Institute (ANSI) Standards.
 5. Telcordia Technologies Standards: FR-2063 NEBS Family of Requirements (or equivalent standards, as applicable).

General Requirements

- A. The Contractor shall ensure the system provided meet all functional requirements specified. In general, the System shall consist of readily available, reliable, and proven hardware, software, and firmware elements, which fully comply with or exceed the requirements of this Section and the Contract Drawings. If the system does not meet a specific requirement, submit to the Engineer explanation and proposed alternative at least 60 days prior to the commencement of Factory Acceptance Testing or on the first production unit.
- B. Provide all equipment required to provide a complete system, whether the equipment is specifically listed in the specification or not. The Contractor shall be responsible for the installation of a completely functional turnkey system.
- C. Unless otherwise specified on the Contract Drawings or in this Section, the System shall be manufactured and installed in compliance with NFPA 70, all local codes, and other publications referenced in the Section.
- D. All system components, hardware, software, firmware, and equipment furnished under this contract shall conform to the following:
1. All hardware and software used shall be industry standard and conform to

established open architecture standards, allowing for a distributed server architecture. This shall include the use of established programming languages, industry standard and general use database management system and operating systems. All hardware and software utilized shall be the latest commercially available version. The System shall not require any proprietary hardware for video recording and monitoring.

2. All application software and firmware shall be a standard, commercially available, "off-the-shelf" product.
3. Hardware and software shall be scalable, allowing for additional servers, storage units, workstations, cameras, and associated software licenses to be connected without replacement of the System. The System shall allow for use of non-proprietary PC storage hardware that shall not limit the storage capacity and shall allow for gradual upgrades of the recording capacity.

Functional Requirements

- A. The primary storage system and VMS head-end servers is located within the CCO Shop in the New Haven Rail Yard. All video system requests shall be retrieved from the primary storage system unless it becomes inaccessible or damaged.
- B. A backup storage system is located in the T&E Building second floor communications room in the New Haven Rail Yard. The backup storage system shall record all camera feeds in parallel with the primary storage system for use only when the primary storage system is unavailable. The backup storage system shall replicate any database entries needed to recover video in the event of a catastrophic failure. All requirements applicable to the primary storage system shall apply to the backup storage system.
- C. All existing functionality shall remain operational throughout the Contract. Contractor shall document and verify existing operations and functions prior to making any System modifications. Verify all functionality remains after modifications are made. Submit all test procedures in accordance with the "NOTICE TO CONTRACTOR - Acceptance Testing".
- D. The Contractor shall configure the cameras added under this Contract to report to the existing CCTV head-end. The System shall include the following capabilities at a minimum:
 1. Capture, record, control, and allow monitoring (live or pre-recorded viewing) of all of the cameras provided under the Contract, or existing cameras to be integrated.
 2. Viewing real-time and recorded video streams simultaneously from any camera or storage device in the system. The system shall route images from any camera to any viewing station. Viewing permissions shall be based on

user login.

3. Storage, retrieval, and search capabilities for a minimum 30 days with simultaneous camera inputs at all ports.
4. Video loss detection. The system shall trigger an alarm to a remote location upon loss of video.
5. The equipment shall be connected to the MNR network and have bidirectional communication capability. Client workstations shall have the capability to communicate with the head-end servers via HTTP and HTTPS.
6. The system shall allow an operator to dynamically specify frame rate adjustment at a particular camera location for monitoring that location. The System shall be capable of configuring recording rate and resolution individually for each camera or encoder locally or remotely. The frame rate shall also be adjustable based on pre-set conditions, such as time-of-day or time-of-week. Changing the parameters shall not interfere with other system operations such as recording or playback.
7. The system shall tag each video frame with a time/date, camera identification and/or station location. The system shall allow additional tagging of images by an operator. The location of the system tag on the image shall be able to be set by the user.

E. Recording Rate and Storage

1. The resolution and clarity of captured images shall be maintained under a range of lighting conditions from darkness through bright sunlight and provide a full color image to the maximum extent of the camera hardware provided by the Contract. The System shall store high quality images with no visible compression artifacts, noise, or dropouts caused by the recording system.
2. Recorded video shall be stored on a hard disk. The use of a tape storage medium is not acceptable.
3. Storage drives shall be configured for RAID 5 or better.
4. Contractor shall furnish, install, and configure the System with additional recording space for IP cameras and encoders for all devices added under this Contract. Use of existing storage space is not permitted unless otherwise shown on the Plans. Storage and recording capabilities shall be based on the following:
 5.
 - i. All cameras and encoders provided under this Contract, plus 50% spare for 24 hours per day, 7 days per week, continuously for 30 days.
 - ii. IP cameras configured for H.264 compression with a recorded pixel

resolution of 720p (1280x720), 30 frames per second.

- iii. External encoders configured for H.264 compression with a recorded pixel resolution of 704x480 (4CIF/NTSC), 30 frames per second.
 - iv. Minimum 4000kbps output per IP camera, 768kbps per analog camera via external encoder.
 - v. RAID 5 storage configurations.
6. Once storage capacity or a pre-defined time (in this case, 30 days) has been reached, the system shall automatically record over previously recorded images on a first-in, first-out basis unless an operator intervenes with the appropriate programming commands to retain video within the storage system.
7. Submit supporting storage calculations based on the values for frame rate, resolution, bandwidth, and recording period. The compressed file sizes used for the storage calculations must give high quality images as described within.
- F. Client workstations shall be furnished and installed as indicated on Plans. Furnish, install, and configure client software on each workstation.
- G. The System shall interface to external encoders provided under this Contract in order to view and record video from existing analog CCTV cameras. All requirements applicable to camera viewing, recording, and playback shall apply to external encoders unless otherwise noted.
- H. Cameras shall not require “genlocking” (synchronizing) to each other or to the system to achieve the required capture rate. Disconnection and disabling of one or more cameras shall not compromise recording from other cameras.
- I. System Management and Administration
- 1. The system shall provide automated, system-wide health monitoring and diagnostics. The diagnostics detailed metrics and real-time displays of performance data help accelerate troubleshooting by graphically highlighting trends and exceptions. The system shall be capable of monitoring SNMP traps of CCTV system equipment such as cameras. This function shall be automatic and alert other systems, such as the central management software, of specified alarms. System management package shall be native to the VMS. The management solution shall allow the system administrator to control, configure, and monitor the VMS and recording system.
 - 2. The administrator shall have the ability to independently set up each camera for frame rate, compression rate, brightness, contrast, and other performance settings.

3. All functions and system settings available by the software shall be made available to the system administrator. The system administrator shall have the ability to add, modify, and remove all configurable items including, but not limited to, users, user groups, user rights, user group rights, system maps, etc.

J. Security Requirements

1. Access to the existing active System will be provided by MNR as needed. Contractor shall request access through the engineer at least two (2) weeks in advance.
2. For test and/or non-production systems:
 - a. The System shall provide a password initiated security hierarchy, which will provide access privileges to users. There will be a minimum three privileged levels. User accounts are not to be created locally on Windows servers if at all possible.
 - b. All application users are required to successfully log in to the software before any application functions are accessible. Access to monitors, cameras, recorders, and all software features shall depend on the assigned user rights, which shall be designated through the system administrator.
3. The system shall provide password protection and other suitable protective measures to achieve:
 - a. Protect video stored within the unit.
 - b. Protect video following export from the unit.
 - c. Prevent unauthorized copying of video to removable media.
4. The system shall feature a continuously running activity log with remote access/connectivity page and performance/operation page.

K. Head-end system power shall be 208 VAC, single phase unless otherwise noted. All workstations shall operate on 120 VAC.

L. The System shall maintain full functionality and be capable of operating within the environmental conditions encountered in the locations installed.

Submittals

A. The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details of departures and reasons therefore shall be submitted as soon as practicable for written approval of the Engineer. Contractor shall ensure all substitutions are coordinated with the design and the installation conforms to all Contract requirements and local codes.

- B. Make field inspections necessary in order to prepare accurate shop drawings in accordance with existing conditions. Submit shop drawings coordinated with existing conditions and all other work for approval prior to performing any installation.
- C. Submit the following for review and approval as required.
 - 1. Product data for each product specified; samples as required.
 - 2. Plans furnished by the manufacturer.
 - 3. Drawings indicating all work including mounting, riser diagrams, wiring diagrams, and other details.
 - 4. Tagging/labeling nomenclature and related product data.
 - 5. Test procedures for all testing and product data for test equipment; forms to be used for test report; test schedule; certified copies of test results; notification of testing four weeks in advance.
 - 6. Manufacturer's Certification: Signed by the manufacturer certifying that they comply with the specifications requirements. Upon request submit evidence of experience.
 - 7. Product Certification: Signed by manufacturer certifying that products comply with the specified requirements.
 - 8. Installers Certificates: Signed by the Contractor, certifying that the installers comply with the specifications requirements.
 - 9. Field testing organization certificates, signed by the Contractor, certifying that the organization complies with the specifications requirements.
 - 10. User Manuals and System Documentation.
 - 11. Training plans and documentation.
- D. Survey the communications rooms and submit, concurrently with product data for the proposed communications room equipment cabinet, a drawing indicating the following:
 - 1. Architectural plan of the room with dimensions, including elevations.
 - 2. Locations of all existing (where applicable) and new cabinets, racks, power plants, cables, cable ladders and conduits with sizes and types indicated. Provide actual (installed) locations as determined by field measurements.
 - 3. A.C. and/or D.C. feeds to equipment cabinets with references to the source

- locations (A.C. panels, transfer panels).
 - 4. Location of equipment proposed for future installation, as directed.
 - 5. Submit photographs of the Communications Room for each survey.
- E. The Contractor shall coordinate all network topology requirements with Metro-North. Submit a request for IP addresses for all devices to the Engineer in Excel format, or other approved format. Allow a minimum of thirty (30) days for a response.

Materials:

Head-End Servers

- A. Servers shall be in current manufacturing production and meet or exceed the latest VMS system manufacturer's recommended specifications at the time of procurement and the following:
- 1. Intel® Xeon® E5-2430, 6-core, 15MB Cache, 2.20 GHz
 - 2. 6GB RAM
 - 3. 24X multi-burner drive
 - 4. (5) 500 GB, 7,200 RPM, SATA hard drives, RAID 1 configuration
 - 5. Dual 10/100/1000 Ethernet communication ports
 - 6. (1) serial port, (4) USB ports
 - 7. Integrated Video Card
 - 8. Integrated RAID Controller
 - 9. Dual redundant, hot-swappable power supplies
 - 10. Operating System: Windows Server 2012 or later, to be coordinated with existing system OS
 - 11. Support external storage devices, to be coordinated with storage array
 - 12. Manufactured by Dell, HP, Lenovo, or approved equal.
 - 13. All hardware shall be compatible with the existing Verint Nextiva VMS Platform.
- B. Number of servers shown on the Plans are typical, and based on manufacturer

recommendations. Contractor shall be responsible to furnish servers to meet Contract requirements, including spare capacity, based on actual performance characteristics of the servers. In no case shall the number of servers be less than shown on the Plans.

Storage Array

- A. Storage arrays shall be in current manufacturing production and meet or exceed the VMS/NVR system manufacturer's recommended specifications and the following:
1. Dual 8Gb fibre channel controllers
 2. Support RAID 0, 1, 1+0, 4, 5, 6. Storage shall be configured for RAID 5 or better.
 3. Dual redundant, hot-swappable power supplies
 4. Shall be Nexsan E60 series, or approved equal
 5. All hardware shall be compatible with the existing Verint Nextiva VMS Platform
- B. Contractor shall be responsible to size storage array in accordance with Contract requirements, including spare capacity. Additional arrays shall be provided to meet Contract requirements.

Workstations

- A. Workstations shall be in current manufacturing production and meet or exceed the VMS manufacturer's recommended specifications at the time of procurement and the following:
1. Intel® Xeon® E5-1650 v3, 6-core, 3.5GHz, 15MB Cache
 2. 24" widescreen (16:9 or 16:10) flat panel anti-glare LCD or LED-backlit display with 1920x1080 min. resolution, high dynamic contrast ratio, 8ms response time, DVI or DisplayPort connection.
 3. 8GB 2133MHz DDR4 ECC RAM
 4. Dual optical drives: 16X (DVD+/-RW) and 48X CD Burner/DVD Combo
 5. AMD FirePro™ W2100 2GB video card
 6. 500GB SATA 7200rpm hard drive
 7. 10/100/1000 Ethernet communication port

8. (4) USB ports, (1) serial port
 9. Operating system: Windows 7 or later, to be coordinated with existing VMS workstations
 10. USB keyboard and mouse
 11. Manufactured by Dell, HP, or approved equal.
 12. All hardware shall be compatible with the existing Verint Nextiva VMS Platform.
- B. Only that software which is required for review station functionality shall be provided on the CCTV workstation. Contractor shall prevent other devices, such as thumb drives, hard disks, external networks, etc. from connecting the CCTV workstation in accordance with direction from MNR. The Contractor shall furnish, install, and configure any software required for use of the System. This includes, but is not limited to, operating systems, runtime files, additional media players, etc. All software shall be submitted and approved for use by MNR.

Equipment Cabinet

- A. Equipment cabinet for T&E building shall be furnished and installed by the Contractor, and meet or exceed the VMS equipment manufacturer's recommended specification. Cabinet shall be designed to house the equipment to be installed and provide adequate airflow and cooling. It shall meet or exceed the following:
1. EIA compliant 19" gangable equipment rack.
 2. Fully welded construction provides the following weight capacities: UL Listed load capacity: 2,500 lbs., Static load capacity: 10,000 lbs., seismic certified capacity: 1,050 lbs.
 3. Rack shall be constructed of the following materials: top and bottom shall be 14-gauge steel, horizontal braces shall be 16-gauge steel.
 4. Dimensions shall be approximately 83-1/8" H x 22" W x 42" D. Contractor to coordinate exact size with equipment requirements.
 5. Rack shall come equipped with two pairs of 11-gauge steel rackrail with tapped 10-32 mounting holes in universal EIA spacing, black e-coat finish and numbered rackspaces.
 6. Rack shall be fully enclosed with removable perforated front and rear doors, removable solid side panels with recessed lift handles, and removable solid top. Top shall accommodate field drilling for conduit entry.
 7. Durable black textured powder coat finish.

8. Cabinet shall satisfy the 2007 & 2010 CBC; 2006, 2009 & 2012 IBC; ASCE 7-05 (2005 Edition) & ASCE 7-10 (2010 Edition) and the 2006 & 2009 editions of NFPA 5000 for use in areas of high seismicity, Seismic Use Group III, Zone 4 or Seismic Design Category (SDC) "D" with lateral force requirements for protecting 1,050 lbs. of essential equipment in locations with the highest level of seismicity and top floor or rooftop installations with an Importance factor (Ip) of 1.5.
 9. Supply the cabinet with the required seismic floor anchor bracket
 10. UL Listed in the US and Canada
 11. Grounding and bonding stud shall be 1/4-20 threaded, installed in base of enclosure
 12. Supply 3-1/4" wide, 44 space vertical lacer strip
 13. Minimum six horizontal lacer bars
 14. Twelve 8" Velcro cable management straps
 15. Leveling feet
 16. Ground bar
 17. Equipment shelves and mounting supports.
 18. Drawing pocket/cabinet
 19. All required wiring and cabling
 20. Cabinet shall be Middle Atlantic Products MRK series, or approved equal.
- B. Design and layout of the cabinet shall be submitted and approved prior to ordering. Contractor shall supply any additional accessories required per Engineer's approved submittal.

Power Distribution Units (PDU)

1. 208VAC, single phase
2. L6-30P plug, or as needed to coordinate with feeds provided by MNR
3. (6) IEC C19 and (24) IEC C13 receptacles
4. Metered

Power distribution units shall be coordinated with the power feeds provided by MNR and equipment installed within rack.

Furnish two (2) PDUs for each head-end rack.

KVM Console

- A. Furnish and install KVM console switch for all head-end servers. Provide all cabling from KVM console to each server.
- B. KVM console shall meet or exceed the following specifications:
 - 1. Integrated 1U rackmount KVM switch with 19" LCD screen, keyboard, touchpad, and ports for at least 8 servers. Console shall support connections to additional consoles or KVM switches.
 - 2. (2) USB ports for connection of external mouse or keyboard.
 - 3. Support resolutions of at least 1280x1024.
 - 4. Compatible with all major operating systems.
 - 5. Support two-level security (administrator vs. user).
 - 6. Auto-scan for discovery of connected systems.
 - 7. Switch ports via console pushbuttons, hotkey keyboard commands, or the on-screen display.
 - 8. Tripp Lite B020-U08-19-K or approved equal.

Execution:

Installation Requirements:

- A. General Installation Requirements
 - 1. Install all CCTV equipment to be furnished under this Contract unless otherwise noted. Contractor shall install all equipment and software at the CCO Shop Head End and other remote locations as per this Section. All equipment shall be installed in accordance with the manufacturers' recommendations and MNR Policy. This information shall be submitted at the time catalog cuts and shop drawings are submitted for approval.
 - 2. Prior to delivery of the equipment to the work site, prepare and submit for approval an equipment placement and staging plan. Plan shall be coordinated with the Engineer and all affected trades. The plan shall indicate:

- a. General Schedule, schedule by stage or phase, and schedule for each device. Indicate start dates, end dates, and durations. Include major milestones such as fabrication, production testing, shipment, delivery, inspection, site preparation work, installation, energizing, and testing.
- b. Placement drawings, both overall and for each installation stage or phase.
- c. The order in which the equipment and devices will be installed. Identify the various installation stages or phases. For each stage or phase, identify which devices will be installed, where they will be installed, and in what order.
- d. Step-by-step detailed procedures for installation of the equipment including:
 - i. Pre-delivery of the equipment to the Contractor's storage facility or location.
 - ii. Inspection at the storage facility or location.
 - iii. Pre-delivery assembly and testing.
 - iv. All site work and preparation required for installation of the equipment.
 - v. Delivery to the work site.
 - vi. Work site equipment assembly.
 - vii. Equipment installation.
 - viii. Procedures for installation, testing, and termination of all power, control, and communications wiring and cabling.
 - ix. Qualifications of personnel required.
 - x. Estimated dates and times that preparatory work and equipment placement will be performed.
 - xi. Identification of interfaces with others (if any).
 - xii. List of activities required from the Engineer or others, if any, to perform the work.
 - xiii. Contingency plans for placement, testing, or commissioning delays.

3. Installation of all System equipment and materials shall be in accordance with the manufacturer's recommendations, the approved shop drawings, and the requirements of this section and the Contract Drawings.
 - a. Locate all equipment which must be serviced, operated, or maintained in fully accessible positions, especially when located in concealed locations.
 - b. Minor equipment location deviations from the Contract Drawings may be made to allow for better accessibility, but all such deviations shall be approved by the Engineer prior to any work being performed.
 - c. All equipment, except wiring and conduit, shall be completely accessible without the requirement to remove any portion of the building structure or other system component, except an appropriately sized access door or ceiling tile.
 - d. Enclosure access doors shall be hinged and arranged to allow full swing open and complete access to all enclosure components and wiring.
 - e. Furnish all fittings, conduit associated with panel-to-panel and panel-to-trough/cable tray connections, trough, wireways, boxes, hangers, wiring devices, enclosures, signage, fasteners, connections, control panels, relays, cable trays, and miscellaneous accessories necessary for the complete installation of the System.
 - f. Contract Drawings are schematic for systems equipment as exact roughing requirements vary slightly with different manufacturers and job conditions. The Contract Drawings represent a schematic depiction of the CCTV System conduit, cable tray, and wire network layout for the system equipment specified. Final conduit, cable tray, and wire quantity, size and arrangement, as well as final routing and placement shall be based on system equipment, manufacturer's engineering requirements, field coordination with other trade work, and existing site conditions.
 - g. Carefully coordinate the work of this section with all affected trades.
 - h. Coordinate all cable, conduit and device identifiers with the Engineer. Ensure uniformity and interrelation of identifiers. Avoid identifier duplication.
4. Perform all setting, adjustment, and programming required for a complete and operational CCTV system to include Head End, as approved and as directed by the Engineer. Submit setting, adjustment, and programming information for approval.
5. Furnish and install all required hardware and brackets to install the equipment as specified and as indicated on the Contract Drawings. Furnish and install all

required rack mounting kits to install the equipment as specified and as indicated on the Contract Drawings.

6. For systems with camera switching, camera switching shall be smooth and without “roll”.
 7. Fasteners used for any of the following purposes shall be tamper resistant:
 - a. camera housing screws
 - b. junction box screws for CCTV or security system applications.
 - c. screws in electronic equipment housings
 8. Install cable, conduit and raceways in such a manner as to minimize visual impact.
 9. Rack-mount the video recording system and related equipment in the Communications Room equipment cabinet. Design mounting methods for any equipment that is not normally rack-mounted.
 10. Make electrical connections as required from the equipment to circuit breaker panels.
 11. At each camera-mounted threaded pipe joint, install a stainless steel taper pin to prevent rotation due to vibration and vandalism.
- B. A binder with a set of as-built drawings and pictures in a legible 11” x17” laminated print outs shall be placed at the head-end rack locations for quick reference to identify all cameras and camera locations connected to the System.

VMS Manufacturer’s Service Technician

- A. Testing, checking, system startup, and configuration shall be performed under the technical direction of the manufacturer’s service engineer. The Contractor, in conjunction with the manufacturer, shall provide, at no additional cost to the Department, start-up service package including travel.

Programming and System Configuration

- A. Perform all programming services required to provide a complete and fully functional system. This shall include all high-level database programming which may be required due to any project specific operational or special 3rd party system interfaces to allow for a fully functional system. Ensure that the entire Video Management System (VMS) and all other interfaces are properly configured and programmed to provide complete operation and monitoring as specified herein and/or as indicated in the Contract Drawings. Functions of the System shall include, at a minimum:

1. Simultaneously record and display live video and display recorded video
 2. Multiple, simultaneous views of different cameras
 3. Event-based recording
 4. Mark events and make available for playback and/or archiving at any time
 5. Link video events to intrusion alarms and access control exception events in the System database
 6. Unlimited users accessing any video feed from any camera
 7. Multiple users access to recorded video on the network.
 8. User defined profiles for tailored granular access to configuration and operation
 9. The ability to enhance a frame of video with embedded features or off-the-shelf software while providing security for the original video image to preserve integrity
 10. Configure video bit-rate per camera
 11. Pre and post roll in seconds
 12. Active event-based archiving
 13. Motion detection alarms
 14. Set continuous recording mode
 15. Video camera groups and tours
 16. Still image capture
 17. Still image save
 18. Export video clip to file
 19. Blind camera alarm
 20. Resizable video window
 21. Video loss detection
 22. Save and export recorded video to a file
 23. Modifications to or additions of user access rights
- B. Contractor shall coordinate all software versions, patches, etc. with the existing system.
1. Furnish and install any major version updates, service packs, update rollups, etc. available from the manufacturer.
 2. Notify the Engineer of any patches, firmware updates, and/or software updates required for proper operation and security of the System including operating system or any third party software.
 3. All updates shall be approved by the Engineer prior to installation on any of the hardware connected to the System. Submit all requests to the Engineer for approval by Metro-North.
 4. Upon approval by Metro-North and the Engineer, approved updates shall be installed by the Contractor on both the existing system and new equipment furnished under this Contract. The Contractor shall be responsible to ensure software versions, patches, etc. for all items furnished and installed under this

Contract are fully coordinated with the existing system.

- C. All existing functionality shall remain operational throughout the Contract. Contractor shall document and verify existing operations and functions prior to making any System modifications. Verify all functionality remains after modifications are made. New equipment shall be integrated to the existing System and operate as a single system.
- D. Submit a System Configuration Plan for approval prior to modifying the existing System. System Configuration Plan shall include, at a minimum:
 - 1. All programming modifications to be made to the existing VMS.
 - 2. Configuration settings for each device and System interfaces.
 - 3. System backup and disaster recovery procedures.
 - 4. Programming and verification procedures.
- E. Request programming information relating to alarm events, response instructions, user rights, and any/all special programming information in writing to the Engineer. Allow a minimum of four weeks for a response. As part of the request, provide descriptive information of what is to be reported by the System for each device, and identify all required questions which require a response in order to complete the System's programming. Contractor shall submit final programming information for approval.
- F. System Backup
 - 1. Prior to starting System modifications, create a backup of the existing System configurations. This backup shall be maintained for the duration of the Contract.
 - 2. After initial backup, furnish updated backups of any changes to the programming, configuration, or database of the System performed.
 - 3. All backups made to the live System shall be done only with permission of the Engineer and under technical direction of the manufacturer's service technician.
 - 4. The initial and latest back-up media shall be available at the head-end locations for immediate recovery and restoration of the System in the event of a System failure.
 - 5. Develop and implement a programming and backup media tracking and management system to ensure that both the Contractor and Railroad have the latest system back up media and to ensure that in the event of a System failure, the latest backups are used for recovery. This management and tracking system shall include having an off-site copy of the latest backup media and secure storage of all copies of physical backup media to ensure that only authorized Railroad and Contractor personnel have access to the

- 6. backup media.
 - 6. Prepare Disaster Recovery Procedures which provide compete and step-by-step instructions for restoring the System to its normal operational state with minimal loss of System operational capability or availability, in the event of System failure or in the event that any subsequent modifications to the System by the Contractor after completion Operational Acceptance Test due to the Work of successive installation and testing phases, result in System errors or faults.
 - 7. All backup media shall be furnished by the Contractor.
- G. Recording and viewing rates shall be separately configured. The System shall enable multicast video at a maximum of 720p (1280x720), 30 FPS for real time viewing, or any of a series of selectable combinations, and separate unicast video streams simultaneously for recording at similarly variable recording rates, the maximum of which shall be 720p (1280x720).
- H. Recording of video shall not be affected by loss of communication with a server. Failover recovery shall be activated for loss of any server. For system equipment with dual data network or communications connections, the network shall automatically allow for re-routing of data network traffic and communications to redundant connection.
- I. The System shall be configured to store H.264 compression video at 720p (1280x720) for a 30 day period. The Contractor shall submit calculations for storage capacity to the Engineer. Storage calculations shall be submitted for both H.264 and MPEG-4 compression.
- J. All application software and firmware shall be a standard off-the-shelf product. Any custom application software required to meet the requirements of the Specifications and Contract Drawings shall be written in a programming language which is in general use and fully sported from multiple sources. The application software shall be modular, commented, documented, and structured to facilitate software maintenance by MNR.
- K. Request the Engineer to schedule a meeting with the user department. At the meeting, inform the user department of available system programming options and obtain their input. Program the system to meet their needs.
- 1. Develop monitor viewing sequences appropriate for the operations of the facility. Considerations shall include variations for day/night tours, weekends/holidays, alarm activation for each device, monitoring of intruders, and peak hours of operations in the facility.
- L. Configure the VMS with graphical maps of the facilities on all System workstations and servers that identify the location of all cameras connected to the System. Graphical maps shall become property of MNR. If a separate program is used to create the graphical representation, source file shall become property of

MNR. Submit original file and a licensed copy of the software used to create the file to MNR. Maps shall be configured with GPS coordinates of each device. The Contractor shall be responsible to obtain GPS coordinates by field survey.

- M. Program the CCTV workstations to provide calendar-based announcements that regularly scheduled maintenance is required. The maintenance schedule for each device, for which maintenance is recommended by the manufacturer, shall be programmed. The announcements shall include telephone numbers and names of MNR and other service personnel.

Training Program:

Refer to “NOTICE TO CONTRACTOR – Training” for system training program requirements. All general system training requirements shall be included in the “Video Management System” Bid Item, except as specifically noted otherwise.

Testing:

Refer to “NOTICE TO CONTRACTOR – Acceptance Testing” for overall testing requirements and additional information.

Method of Measurement:

The Video Management System shall be measured for payment by the number of “Each” complete system installed, tested, made fully operational, with all training completed meeting all requirements described in this specification.

The Video Management System Software Licenses shall be measured for payment by the number of “Each” complete camera license furnished. Complete camera license includes the primary license, fail-over license, and associated maintenance.

The Workstations shall be measured for payment by the number of “Each” complete system installed, tested and made fully operational meeting all requirements described in this specification.

The CCTV Workstation Software Licenses shall be measured for payment by the number of “Each” complete workstation license and associated maintenance furnished.

Basis of Payment:

The work under these items shall be paid for at the contract price per each system installed, tested and made fully operational meeting all requirements described in this specification.

Pay Item

Pay Unit

Video Management System Software Licenses
CCTV Workstation Software Licenses
Video Management System
Workstation

Each
Each
Each
Each

ITEM #1112228A – CCTV CABINET – BASE MOUNTED

ITEM #1112229A – CCTV CABINET – BASE MOUNTED FOUNDATION

ITEM #1112245A – CCTV CABINET – PECK BRIDGE

ITEM #1112246A – CCTV CABINET – CONCRETE PAD

Description:

Under this item, the Contractor shall furnish and install CCTV Cabinets – Base Mounted and CCTV Cabinets – PECK Bridge at the locations shown in the plans and as directed by the Engineer.

The CCTV Cabinet items shall include a 12” base adapter to be included with the cabinet, and each CCTV Cabinet shall require either a concrete foundation under the CCTV Cabinet Foundation item or CCTV Cabinet Platform Pad item depending on location.

The Cabinets shall house the CCTV field equipment supplied under this and other Contract items, including but not limited to fiber optic patch panels, power supplies, communications equipment, and surge suppression equipment.

Materials:

The Cabinets shall be provided complete with all internal components and all mounting hardware necessary to provide for the installation of equipment as described in the plans and Contract Documents. Cabinets shall be sized as shown in the plans. Changes in Cabinet size to accommodate equipment proposed by the Contractor shall require approval by the Engineer.

The Contractor shall submit a detailed layout diagram, interconnection diagram, etc. for each type of Cabinet layout specified for review by the Engineer. Only Cabinets with approved layouts will be accepted under this Contract item.

Product Data: Submit Manufacturer’s literature and catalog cuts for all products/materials to the Engineer for review and approval.

Base Mounted Cabinet Requirements

The Cabinet shall be constructed of 12 gauge Type 316L stainless steel, with fully welded seams, and measure approximately 6’ high, 2’ wide, and 2’ deep. The Cabinet shall accommodate EIA 19” rack mount equipment by providing mounting rails on each side of the Cabinet and in the front and back of the Cabinet. The Cabinet shall be rated as a NEMA Type 4X or 3RX enclosure as indicated on the plans.

All devices shall be hardwired. Plug-in devices are not acceptable.

All components incorporated into the cabinet shall have a minimum operational temperature range of -13°F to 158°F (-25°C to 70°C) unless otherwise noted.

Cabinets and their final configurations shall conform to requirements of the National Electrical Code (NFPA 70), National Electrical Safety Code, and all other local codes.

The Cabinet shall have front and rear full size doors, equipped with continuous hinge and heavy-duty pad-lockable handles with three-point locking mechanisms sized to fit a standard MNR communications padlock. The Cabinet shall have a seamless foam-in-place gasket for water-tight and dust-proof seal. The Cabinet shall include stops on each door, at the top and bottom, with stop positions at 90° and 180°.

Provisions shall be made in the Cabinet for the installation of all equipment that is provided and installed inside the Cabinet under other Contract items.

General Cabinet Requirements

In addition, the following equipment shall be provided in all Cabinet configurations as part of these Contract items:

- a) One main circuit breaker
- b) Duplex ground fault current interrupter convenience outlet, outdoor rated and weather resistant
- c) Surge protection for power lines and signal wires
- d) One anodized aluminum drawer that shall slide into and out of the Cabinet to house cabinet and equipment documentation or data pocket on door. Documentation shall be provided in a weather-protective sleeve/envelope or shall be laminated.
- e) Cabinet Finish - The cabinet exterior shall be smooth #4 brush finish.
- f) Heating and ventilation – For cabinets with equipment that is not rated for temperatures below -10°F or above 157°F, heating and ventilation shall be provided for the cabinet.
 1. An appropriately sized cabinet heater shall be provided inside the Cabinet, coordinated with the operating temperatures of the equipment installed. An adjustable thermostat shall be provided to turn the heater on and off. Thermostat setting shall be coordinated with equipment requirements. Provide final calculation based on actual Contractor-submitted and approved equipment. Calculation shall be based on a maximum -10°F outdoor temperature without direct sunlight.
 2. Fan/filter unit(s) shall be provided to cool and vent the cabinet. Fan/filter shall maintain the cabinet temperature below the maximum normal operating temperature of the equipment inside the cabinet. Fan/filter shall be Type 12/IP54 type. Fan/filter shall be provided with an adjustable thermostat to control on/off operation. Fan/filter shall provide a minimum 162 CFM of free airflow. Install fan/filter behind NEMA 3R rated opening/louver. NEMA 3R exhaust louvers/grilles shall also be provided.

Complete fan/filter and exhaust louver/grille combination shall provide a minimum airflow of 149 CFM. Provide final calculation based on actual Contractor-submitted and approved equipment. Calculation shall be based on a minimum 106°F outdoor temperature under direct sunlight.

- g) Light - Two LED light fixtures with standard size lamps shall be provided at the front and back of each cabinet. The lights shall be configured to turn on upon door opening.
- h) Each CCTV Cabinet shall include a 12" cabinet base adapter to raise the cabinet 12" off the mounting surface. The adapter shall be constructed of the same material, finish and methods as the cabinet and shall be from the same manufacturer when available. The cabinet base adapted shall be submitted for approval by the Engineer and included in the shop drawing submittal with the CCTV Cabinet.
- i) Tamper switch – Tamper switches shall be installed such that each door is monitored for door status. Tamper switches shall be wired to the alarm inputs of the Cisco switch installed in the cabinet and configured to report through the Network Monitoring System. Switches shall be wired in a normally closed configuration where the circuit opens when the door opens.
- j) Protective Vent – For cabinets without a fan and heater, furnish a protective vent to equalize pressure within the sealed cabinet and reduce condensation within the enclosure to protect the electronic equipment. Vent shall meet the following requirements:
 - 1. IP66, IP67, IP68, and IP69k rated
 - 2. Operating temperature of -40°C to 125°C per IEC 60068-2-1, 60068-2-2, and 60068-2-14.
 - 3. Humidity testing at 85°C at 85% RH for 1000 hours per IEC 600-2-78.
 - 4. Salt resistance per IEC 60068-2-11 and 60068-2-52.
 - 5. Corrosive gas testing per GR-3108-CORE
 - 6. Fungus resistance per ASTM G-21
 - 7. UL 94-V0 f1 flammability and UV resistance
 - 8. Hail impact resistance per IEC 62108 10.9
 - 9. Humidity freeze withstand per IEC 62108 10.8
 - 10. Shall be Gore Polyvent XL / M32x1.5 with backing nut or approved equal

Electrical Requirements

Wiring

All cabinet wiring, where connected to terminal strips, relays, switches, radio interference suppressor, etc., shall be identified by the use of insulated pre-printed sleeving slipped over the wire before attachment of the lug or the completion of the connection. The wire markers shall

carry the legend in plain words with sufficient details so that a translating sheet will not be required.

All wires shall be cut to the proper length before assembly. No wires shall be doubled back to take up slack. Wires shall be neatly laced into cables with nylon lacing and/or Velcro ties. Cables shall be secured with nylon cable clamps. Furnish and install a complete cable management system to control cable bend radius, provide strain relief, and provide a neat and workmanlike appearance.

All electrical connections in the cabinet, including relays, terminal strips, etc., shall have sufficient clearance between each terminal and the cabinet to provide an adequate distance to prevent a leakage path or physical contact under stress. Where these distances cannot be maintained, barriers must be provided. All equipment grounds shall run directly and independently to the ground bus. The interconnect cabling shall be routed such that when the doors are closed, they do not press against the cables or force the cables against the various components inside the cabinets.

All wiring containing AC line voltage shall be routed and bundled separately and/or shielded from all low voltage circuits. Clearances required by NFPA 70 (National Electrical Code) shall be maintained at all times.

All conductors and live terminals or parts which could be hazardous to maintenance personnel shall be covered with suitable insulating materials.

All wiring containing AC line voltage shall be a minimum size of #12 AWG and conform to XHHW-2 in accordance with other contract provisions. All other electrical conductors used in the cabinet wiring shall be #22 AWG or larger with a minimum of 19 strands. Conductors shall conform to Mil Spec #MIL-W-16878D, type B or D. All conductor specifications shall be coordinated with the equipment requirements. Cat 5e cabling shall conform to the requirements of other sections. Cabling that does not extend outside the cabinet, and all cabinet grounding cabling, shall be considered part of this Item and will not be paid separately.

The AC return and equipment ground wiring shall be electrically isolated from each other and the energized AC wiring by an insulation resistance of at least 10 Megaohms when measured at 250 VAC. Return and equipment grounding wiring shall be color coded white and green respectively.

GFI Duplex Outlet

In addition to any outlets required for equipment service, all cabinets shall be furnished with a 125VAC convenience outlet with integral ground fault current interrupt (GFCI), protected by a circuit breaker. The receptacle shall be a NEMA Type 5-15R outdoor, weather-resistant duplex receptacle located so that no electrical hazard shall exist when used by service personnel.

Circuit Breaker(s)

300-178

The cabinet circuit breakers shall be approved and listed by Underwriter's Laboratories (UL 489). Supplemental breakers (UL 1077) are not acceptable. The operating mechanisms shall be enclosed, trip free from operating handle on overload, and trip indicating. Breakers shall have a minimum interrupt capacity of 10,000 amperes and be thermal-magnetic type.

Properly rated equipment circuit breaker(s) shall be provided for the equipment complement shown on the plans. Breaker sizes shown on plans are representative only and may vary based on equipment submitted and approved. Contractor shall coordinate all breaker sizes and curve characteristics with selected equipment and manufacturer recommendations.

Radio Interference Suppressor

All cabinets shall be equipped with a radio interference suppressor installed at the circuit breaker. The suppressor shall provide a minimum attenuation of 50 dB over a frequency range of 200 kHz to 75 MHz. The suppressor shall be hermetically sealed in a substantial metal case filled with a suitable insulation compound.

The suppressor terminals shall be nickel plated, brass studs of sufficient external length to provide space for connection of two appropriately sized conductors and shall be so mounted that the terminals cannot be turned in the case. The suppressors shall be designed for operation at 125 VAC, 60 Hz at the proper current rating as determined by the Contractor per the equipment complement as indicated on the plans. The suppressors shall meet applicable EIA specifications and shall be approved by UL.

Power Cable Input and Junction Terminals

Power distribution blocks suitable for use as a power feed and junction points shall be furnished and installed for two and three wire circuits as indicated on the plans. The line side of each circuit shall be capable of handling the number of wires required. Terminal blocks shall be sized to accommodate each wire required without a reducing splice. Splices shall only be performed where approved by the Engineer. Any splices performed in the cabinet shall be done via terminal blocks.

Terminal Blocks

Terminal blocks shall be accessible to the extent that it shall not be necessary to remove any electronic equipment from the cabinet to make an inspection or connection. Terminal blocks shall be two position multiple pole barrier type. Shorting bars shall be provided in each of the positions provided along with an integral marking strip. Terminal blocks shall be so arranged that they shall not upset the entrance, routing, and connection of incoming field conductors. All terminals shall be suitably identified by legends permanently affixed and attached to the terminal blocks. No electrically alive parts shall extend beyond the protection afforded by the barriers. Doubling up conductors on one terminal should be avoided and only performed where the terminals are listed for such purpose and approved by the Engineer. Use bridging clips or

additional terminals as necessary.

AC terminal blocks shall be Underwriter's Laboratory approved for 600 Volts AC minimum and shall be suitable for outdoor use. Terminals used for field connections shall secure conductors by means of a #10-32 nickel or cadmium plated brass binder head screw. Terminals used for interwiring connections, but not for field connections, shall secure conductors by means of a #6-32 nickel or cadmium plated brass binder head screw.

As a minimum, all connections to and from the electronic equipment shall terminate to an interwiring type block unless otherwise directed by the Engineer. These blocks will act as intermediate connection points for all electronic equipment inputs and outputs.

All return and equipment grounding wiring shall terminate to the ground bus installed in the cabinet.

Warning Labels

Contractor shall include warning labels required by applicable NFPA, ANSI, and UL standards. Warning labels shall comply with ANSI Z525.4 – Standard for Product Safety Signs and Labels. All panels with multiple power sources shall contain the warning “WARNING: Multiple power sources. Disconnect all sources prior to maintenance” or similar. Submit all label wording and layouts for approval prior to fabrication.

Cabinet Grounding

A solid copper ground bus bar shall be permanently affixed to the inside surface of a cabinet wall. The point of contact between the ground bus and cabinet wall shall have less than 1 ohm resistance. The copper ground bus bar shall have a minimum of 20 connector points, each capable of securing at least one #10 conductor. The ground bar shall also accommodate one #4 conductor for the main grounding connection. AC return and equipment ground wiring shall return to the ground bus bar. Cabinet shall have a grounding stud on the body and bonding provision on the door. Door shall be bonded to the body.

All cabinets shall be grounded in accordance with other sections of these Specifications. Work of this item shall include all materials required to properly ground the cabinets to the station ground grid at stations; or structural steel at PECK Bridge.

Power Line Surge Protector

A power line surge protector shall be installed in each cabinet between the load side of the input power circuit breaker and ground. The surge protector shall not dissipate any energy and shall not provide any series impedance during standby operation. The units shall return to non-shunting mode after the passage of any surge and shall not allow the shunting of AC power.

The surge protector shall have the following minimum characteristics:

Working Voltage: 120VAC Single Phase
Protection Mode: Common Mode (L/G and N/G) and Differential Mode (L/N)
Nominal UL Discharge Current (I_n , 8/20 μ s): 20kA
Maximum Discharge Current (I_{max} , 8/20 μ s withstand): 165kA
Maximum Discharge Current (I_{imp} , 10/350 μ s withstand): 50kA total
Short Circuit Current Rating: 100kA
UL 1449, Type 1/Type 2 Device
Fault Indicator Window
Operating Temperature: -40°C to 80°C

Base Mounted Cabinet Foundation and Concrete Pad Requirements

All materials labor and incidentals to install the Cabinets shall be included in these items, including foundations, surface preparation, excavation, drilling, channels, hardware and other items required for a complete installation.

All materials and construction methods shall conform to the applicable sections of the Standard Specifications Section 10.02 Light Standard and Traffic Control Foundations and Section 10.17 service Entrance and Cabinet.

Construction Methods:

The Plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details of departures and reasons therefore shall be submitted as soon as practicable for written approval of the Engineer. Contractor shall ensure any rerouting required does not adversely affect the system.

Substitutions of products and materials of other Sections may affect cabinet size, layout, and equipment required in the cabinets. Contractor shall ensure all substitutions are coordinated with the design and the installation conforms to all Contract requirements and local codes.

Make field inspections necessary in order to prepare accurate shop drawings in accordance with existing conditions. Submit shop drawings coordinated with existing conditions and all other work for approval prior to performing any installation. Include plans, elevations, sections, details, and attachments as needed. Drawings should indicate site specific installation details including showing the exact equipment locations, mounting details, conduit runs, conduit entry, riser diagrams, wiring diagrams, and other details necessary for complete review. No cabinet shall be installed without an approved layout, wiring diagrams, and other associated shop drawings.

Mounting and other modifications shall not affect the NEMA 4X or 3RX rating of the enclosure.

Base Mounted Cabinets installed on station platforms and PECK Bridge shall require a concrete pad as indicated on the plans. All other Base Mounted Cabinets shall be installed on concrete foundations. All mounting hardware shall be stainless steel and all installation methods shall conform to the requirement set forth in Connecticut DOT Standard Publication 816.

All materials labor and incidentals to install the Cabinets shall be included in these items, including foundations, excavation, drilling, grounding, surface preparation, channels, hardware and other items required for a complete installation.

Documentation

Each field cabinet shall be supplied with three (3) copies of the Final Cabinet Wiring Diagram. One (1) copy shall be placed in a clear plastic envelope and left in the cabinet. Two (2) copies shall be delivered to the Engineer.

Assembly

CCTV Cabinets shall be assembled in a controlled environment and factory tested before being delivered to the work site and installed. Refer to “NOTICE TO CONTRACTOR - Acceptance Testing” for additional information.

Testing:

Refer to “NOTICE TO CONTRACTOR – Acceptance Testing” for overall testing requirements and additional information. Testing shall include all components and wires installed in the cabinet and also the installation of the cabinet itself comply with contract specification and approved drawings.

Method of Measurement:

The work will be measured for payment by the actual number of each complete furnished, installed, inspected, and tested.

Basis of Payment:

The work under this item shall be paid for at the contract unit price per each unit furnished and installed, which price shall include all material, tools, equipment, labor, and work incidental thereto.

Pay Item

Pay Unit

CCTV Cabinet – Base Mounted
CCTV Cabinet – PECK Bridge

Each
Each

CCTV Cabinet – Base Mounted Foundation	Each
CCTV Cabinet – Concrete Pad	Each

ITEM #1112237A – REMOTE CCTV CABINET
ITEM #1112247A – REMOTE SWITCH CABINET BASE

Descriptions:

Under this item, the Contractor shall furnish and install Remote CCTV Cabinets (Cabinets) at the locations shown in the plans and as directed by the Engineer. The cabinets are also referred to as “Remote Switch Cabinets.”

The Cabinets shall house the CCTV field equipment supplied under this and other Contract items, including but not limited to remote CCTV switches, a duplex receptacle, light, surge suppression equipment and other equipment as shown in the Plans.

The Remote CCTV Cabinets shall not have internal components requiring ventilation and shall be rated NEMA Type 4X.

Materials:

The Cabinets shall be provided complete with all internal components and all mounting hardware necessary to provide for the installation of equipment as described in the plans and Contract Documents. Cabinets shall be sized as shown in the plans. Changes in Cabinet size to accommodate equipment proposed by the Contractor shall require approval by the Engineer.

Product Data: Submit Manufacturer’s literature and catalog cuts for all products/materials to the Engineer for review and approval.

The Contractor shall submit a detailed layout diagram for each type of Cabinet layout specified for review by the Engineer. Only Cabinets with approved layouts will be accepted under this Contract item.

Remote CCTV Cabinet Requirements

The Cabinet shall be constructed of 14 gauge Type 316L stainless steel, with fully welded seams, and measure approximately 24” wide x 24” tall x 10” deep. The cabinet shall be rated as a NEMA Type 4X enclosure. The Contractor shall coordinate final size of enclosure with all equipment to be installed and their required clearance.

All devices shall be hardwired. Plug-in devices are not acceptable.

All components incorporated into the cabinet shall have a minimum operational temperature range of -13°F to 158°F (-25°C to 70°C) unless otherwise noted.

The Cabinet shall have a continuously hinged full size door on the front, equipped with a heavy-

duty pad-lockable handle with three-point locking mechanisms sized to fit a standard MNR communications padlock.

Provisions shall be made in the Cabinet for the installation of all equipment that is provided and installed inside the Cabinet under other Contract items.

In addition the following equipment shall be provided in all Cabinet configurations as part of this Contract item:

- a) One main circuit breaker
- b) One duplex receptacle (GFCI).
- c) Surge protection for power lines
- d) LED light that turns on when the door is opened.
- e) Cabinet Finish - The cabinet exterior shall be smooth #4 brush finish.
- f) Circuit breakers properly sized for the equipment to be installed in the cabinet.
- g) Drawing pocket on door. Documentation shall be provided in a weather-protective sleeve/envelope or shall be laminated.
- h) Tamper switch – A tamper switch shall be installed such that each door is monitored for door status. Tamper switches shall be wired to the alarm inputs of the Cisco switch installed in the cabinet and configured to report through the Network Monitoring System. Switches shall be wired in a normally closed configuration where the circuit opens when the door opens.
- i) Protective Vent – Furnish a protective vent to equalize pressure within the sealed cabinet and reduce condensation within the enclosure to protect the electronic equipment. Vent shall meet the following requirements:
 - 1. IP66, IP67, IP68, and IP69k rated
 - 2. Operating temperature of -40°C to 125°C per IEC 60068-2-1, 60068-2-2, and 60068-2-14.
 - 3. Humidity testing at 85°C at 85% RH for 1000 hours per IEC 600-2-78.
 - 4. Salt resistance per IEC 60068-2-11 and 60068-2-52.
 - 5. Corrosive gas testing per GR-3108-CORE
 - 6. Fungus resistance per ASTM G-21
 - 7. UL 94-V0 f1 flammability and UV resistance
 - 8. Hail impact resistance per IEC 62108 10.9
 - 9. Humidity freeze withstand per IEC 62108 10.8
 - 10. Shall be Gore Polyvent XL / M32x1.5 with backing nut or approved equal

Cabinets and their final configurations shall conform to requirements of the National Electrical

Code (NFPA 70), National Electrical Safety Code, and all other local codes.

Electrical Requirements

Wiring

All cabinet wiring, where connected to terminal strips, relays, switches, radio interference suppressor, etc., shall be identified by the use of insulated pre-printed sleeving slipped over the wire before attachment of the lug or the completion of the connection. The wire markers shall carry the legend in plain words with sufficient details so that a translating sheet will not be required.

All wires shall be cut to the proper length before assembly. No wires shall be doubled back to take up slack. Wires shall be neatly laced into cables with nylon lacing and/or Velcro ties. Cables shall be secured with nylon cable clamps. Furnish and install a complete cable management system to control cable bend radius, provide strain relief, and provide a neat and workmanlike appearance.

All electrical connections in the cabinet, including relays, terminal strips, etc., shall have sufficient clearance between each terminal and the cabinet to provide an adequate distance to prevent a leakage path or physical contact under stress. Where these distances cannot be maintained, barriers must be provided. All equipment grounds shall run directly and independently to the ground bus. The interconnect cabling shall be routed such that when the doors are closed, they do not press against the cables or force the cables against the various components inside the cabinets.

All wiring containing AC line voltage shall be routed and bundled separately and/or shielded from all low voltage circuits. Clearances required by NFPA 70 (National Electrical Code) shall be maintained at all times.

All conductors and live terminals or parts which could be hazardous to maintenance personnel shall be covered with suitable insulating materials.

All wiring containing AC line voltage shall be a minimum size of #12 AWG and conform to XHHW-2 in accordance with other contract provisions. All other electrical conductors used in the cabinet wiring shall be #22 AWG or larger with a minimum of 19 strands. Conductors shall conform to Mil Spec #MIL-W-16878D, type B or D. All conductor specifications shall be coordinated with the equipment requirements. Cat 5e cabling shall conform to the requirements of other sections. Cabling that does not extend outside the cabinet, and all cabinet grounding cabling, shall be considered part of this Item and will not be paid separately.

The AC return and equipment ground wiring shall be electrically isolated from each other and the energized AC wiring by an insulation resistance of at least 10 Megaohms when measured at 250 VAC. Return and equipment grounding wiring shall be color coded white and green

respectively.

GFCI Duplex Outlet

In addition to any outlets required for equipment service, all cabinets shall be furnished with a 125VAC convenience outlet with integral ground fault current interrupt (GFCI), protected by a circuit breaker. The receptacle shall be a NEMA Type 5-15R outdoor, weather-resistant duplex receptacle located so that no electrical hazard shall exist when used by service personnel.

Circuit Breaker(s)

The cabinet circuit breakers shall be approved and listed by Underwriter's Laboratories (UL 489). Supplemental breakers (UL 1077) are not acceptable. The operating mechanisms shall be enclosed, trip free from operating handle on overload, and trip indicating. Breakers shall have a minimum interrupt capacity of 10,000 amperes and be thermal-magnetic type.

Properly rated equipment circuit breaker(s) shall be provided for the equipment complement shown on the plans. Breaker sizes shown on plans are representative only and may vary based on equipment submitted and approved. Contractor shall coordinate all breaker sizes and curve characteristics with selected equipment and manufacturer recommendations.

Radio Interference Suppressor

All cabinets shall be equipped with a radio interference suppressor installed at the circuit breaker. The suppressor shall provide a minimum attenuation of 50 dB over a frequency range of 200 kHz to 75 MHz. The suppressor shall be hermetically sealed in a substantial metal case filled with a suitable insulation compound.

The suppressor terminals shall be nickel plated, brass studs of sufficient external length to provide space for connection of two appropriately sized conductors and shall be so mounted that the terminals cannot be turned in the case. The suppressors shall be designed for operation at 125 VAC, 60 Hz at the proper current rating as determined by the Contractor per the equipment complement as indicated on the plans. The suppressors shall meet applicable EIA specifications and shall be approved by UL.

Power Cable Input and Junction Terminals

Power distribution blocks suitable for use as a power feed and junction points shall be furnished and installed for two and three wire circuits as indicated on the plans. The line side of each circuit shall be capable of handling the number of wires required. Terminal blocks shall be sized to accommodate each wire required without a reducing splice. Splices shall only be performed where approved by the Engineer. Any splices performed in the cabinet shall be done via terminal blocks.

Terminal Blocks

Terminal blocks shall be accessible to the extent that it shall not be necessary to remove any electronic equipment from the cabinet to make an inspection or connection. Terminal blocks shall be two position multiple pole barrier type. Shorting bars shall be provided in each of the positions provided along with an integral marking strip. Terminal blocks shall be so arranged that they shall not upset the entrance, routing, and connection of incoming field conductors. All terminals shall be suitably identified by legends permanently affixed and attached to the terminal blocks. No electrically alive parts shall extend beyond the protection afforded by the barriers. Doubling up conductors on one terminal should be avoided and only performed where the terminals are listed for such purpose and approved by the Engineer. Use bridging clips or additional terminals as necessary.

AC terminal blocks shall be Underwriter's Laboratory approved for 600 Volts AC minimum and shall be suitable for outdoor use. Terminals used for field connections shall secure conductors by means of a #10-32 nickel or cadmium plated brass binder head screw. Terminals used for interwiring connections, but not for field connections, shall secure conductors by means of a #6-32 nickel or cadmium plated brass binder head screw.

As a minimum, all connections to and from the electronic equipment shall terminate to an interwiring type block unless otherwise directed by the Engineer. These blocks will act as intermediate connection points for all electronic equipment inputs and outputs.

All return and equipment grounding wiring shall terminate to the ground bus installed in the cabinet.

Warning Labels

Contractor shall include warning labels required by applicable NFPA, ANSI, and UL standards. Warning labels shall comply with ANSI Z525.4 – Standard for Product Safety Signs and Labels.

All panels with multiple power sources shall contain the warning “WARNING: Multiple power sources. Disconnect all sources prior to maintenance” or similar. Submit all label wording and layouts for approval prior to fabrication.

Cabinet Grounding

A solid copper ground bus bar shall be permanently affixed to the inside surface of a cabinet wall. The point of contact between the ground bus and cabinet wall shall have less than 1 ohm resistance. The copper ground bus bar shall have a minimum of 20 connector points, each capable of securing at least one #10 conductor. The ground bar shall also accommodate one #4 conductor for the main grounding connection. AC return and equipment ground wiring shall return to the ground bus bar. Cabinet shall have a grounding stud on the body and bonding

provision on the door. Door shall be bonded to the body.

All cabinets shall be grounded in accordance with other sections of these Specifications. Work of this item shall include all materials required to properly ground the cabinets to the station ground grid at stations; or structural steel at PECK Bridge.

Power Line Surge Protector

A power line surge protector shall be installed in each cabinet between the load side of the input power circuit breaker or fuse and ground. The surge protector shall not dissipate any energy and shall not provide any series impedance during standby operation. The units shall return to non-shunting mode after the passage of any surge and shall not allow the shunting of AC power.

The surge protector shall have the following characteristics:

- Working Voltage: 120VAC Single Phase
- Protection Mode: Common Mode (L/G and N/G) and Differential Mode (L/N)
- Nominal UL Discharge Current (I_n , 8/20 μ s): 20kA
- Maximum Discharge Current (I_{max} , 8/20 μ s withstand): 165kA
- Maximum Discharge Current (I_{imp} , 10/350 μ s withstand): 50kA total
- Short Circuit Current Rating: 100kA
- UL 1449, Type 1/Type 2 Device
- Fault Indicator Window
- Operating Temperature: -40°C to 80°C

Remote Switch Cabinet Base Requirements

All materials labor and incidentals to install the Cabinets shall be included in these items, including foundations, surface preparation, excavation, drilling, hardware and other items required for a complete installation.

Where located on station platforms, remote CCTV cabinets shall have a stainless steel base as shown on the Plans, made of the same material with the same finish as the cabinet and by the same manufacturer, when available. The stainless steel base shall be mounted on 6" concrete pad.

All materials and construction methods shall conform to the applicable sections of the Standard Specifications Section 10.02 Light Standard and Traffic Control Foundations and Section 10.17 service Entrance and Cabinet.

Construction Methods:

The plans indicate the extent and the general location and arrangement of the work. The Contractor shall study the plans and details so that the work will be properly located and readily accessible. If conflicts occur necessitating departures from the plans, the Contractor shall submit details of departures and reasons therefore shall be submitted as soon as practicable for written approval of the Engineer. Contractor shall ensure any rerouting required does not adversely affect the system.

Substitutions of products and materials of other Sections may affect cabinet size, layout, and equipment required in the cabinets. Contractor shall ensure all substitutions are coordinated with the design and the installation conforms to all Contract requirements and local codes.

Make field inspections necessary in order to prepare accurate shop drawings in accordance with existing conditions. Submit shop drawings coordinated with existing conditions and all other work for approval prior to performing any installation. Include plans, elevations, sections, details, and attachments as needed. Drawings should indicate site specific installation details including showing the exact equipment locations, mounting details, conduit runs, conduit entry, riser diagrams, wiring diagrams, and other details necessary for complete review. No cabinet shall be installed without an approved layout, wiring diagrams, and other associated shop drawings.

Mounting and other modifications shall not affect the NEMA 4X rating of the enclosure.

The Remote CCTV Cabinets shall be installed at the locations shown in the plans. Cabinets mounted on station platforms require a concrete pad and stainless steel base. All mounting hardware shall be stainless steel and all installation methods shall conform to the requirement set forth in Connecticut DOT Standard Specifications Form 816.

All materials labor and incidentals to install the Cabinets shall be included in these items, including foundations, excavation, drilling, surface preparation, channels, hardware and other items required for a complete installation.

Documentation

Each field cabinet shall be supplied with three (3) copies of the Final Cabinet Wiring Diagram. One (1) copy shall be placed in a clear plastic envelope and left in the cabinet. Two (2) copies shall be delivered to the Engineer.

Assembly

Remote CCTV Cabinets shall be assembled in a controlled environment and factory tested before

being delivered to the work site and installed. Refer to “NOTICE TO CONTRACTOR - Acceptance Testing” for additional information.

Testing:

Refer to “NOTICE TO CONTRACTOR – Acceptance Testing” for overall testing requirements and additional information. Testing shall include all components and wires installed in the cabinet and also the installation of the cabinet itself comply with contract specification and approved drawings.

Method of Measurement:

Remote CCTV Cabinet will be measured for payment by the number of “Each” complete furnished, installed, inspected, grounded, and tested.

Remote Switch Cabinet Base will be measured for payment by the number of “Each” complete furnished, installed, inspected, grounded, and tested.

Basis of Payment:

The work under this item shall be paid for at the contract unit price per each “Remote CCTV Cabinet” and “Remote Switch Cabinet Base” furnished and installed, which price shall include all material, tools, equipment, labor, and work incidental thereto.

<u>Pay Item</u>	<u>Pay Unit</u>
Remote CCTV Cabinet	Each
Remote Switch Cabinet Base	Each



August 15, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mark Alexander
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Subject: Certificate of Permission #201609241-MG
Metro North Railroad Bridge 08038R, Fairfield

Dear Mr. Alexander:

Enclosed please find a copy of the certificate of permission ("certificate") which is being issued pursuant to your application of August 4, 2016. Your attention is directed to the conditions of the enclosed certificate. All work must conform to that which is specifically authorized by this certificate. Any work in tidal wetlands or waterward of the high tide line in tidal, navigable and coastal waters of the State which has not been authorized by a valid permit or certificate is a violation of state law and subject to enforcement action by the Department of Energy and Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the certificate. Please note that Appendix B of the certificate has been enclosed for your convenience to comply with Connecticut General Statutes Section 22a-363g. Also, the Permit Notice, found at the back of your authorization, must be posted at the work area while the work is being undertaken. Please refer to the SPECIAL TERMS AND CONDITIONS of your certificate for further details.

If you have not already done so, you should contact your local Planning and Zoning Office to determine local permit requirements for your project. Also, your activity may be eligible for General Permit authorization from the U.S. Army Corps of Engineers ("Corps"). Most maintenance and reconstruction activities require no further authorization from the Corps. Other activities, generally involving work in tidal wetlands or other special aquatic sites, and in or near a federal Navigation Project or involving filling, must receive written authorization from the Corps prior to beginning work. The State of Connecticut will automatically forward this certificate to the Corps for its determination of General Permit eligibility. You do not need to apply directly to the Corps unless they notify you. For more information regarding this federal process, you may write to the Corps New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts, 02254 or call 978-318-8335 or 800-343-4789.

Sincerely,



Micheal P. Grzywinski
Senior Environmental Analyst
Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse

Enclosure – COP #201609241-MG (original cover letter, and Permit Notice; COP copy)

cc: File #201609241-MG (original COP; copy cover letter, Permit Notice)
via e-mail:

Municipal CEO for Fairfield

Army Corps, c/o Susan Lee, Susan.K.Lee@usace.army.mil

Tim Casey, STV Incorporated, tim.casey@stvinc.com

CERTIFICATE OF PERMISSION

Certificate No: 201609241-MG

Municipality: Town of Fairfield

Site of Activity: Sasco Creek off property located at catenary structures 647 and 648
Metro North Railroad Bridge 08038R

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander, Transportation Assistant Planning Director
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Pursuant to section 22a-363b of the Connecticut General Statutes (“CGS”) and in accordance with CGS sections 22a-359 to 22a-363g and 22a-98 and the Regulations of Connecticut State Agencies sections 22a-426-1 to 22a-426-9 (the Water Quality Standards) effective September 10, 2013, a certificate of permission (“certificate”) is hereby granted to retain an existing railroad bridge crossing and catenary lines and to install fiber optic cables on existing catenary structures for railroad infrastructure improvements as is more specifically described below in the SCOPE OF AUTHORIZATION. The work performed shall conform to the terms and conditions of this certificate.

*******NOTICE TO CERTIFICATE HOLDERS AND CONTRACTORS*******

UPON INITIATION OF ANY WORK AUTHORIZED HEREIN, THE CERTIFICATE HOLDER ACCEPTS AND AGREES TO COMPLY WITH ALL TERMS AND CONDITIONS OF THIS CERTIFICATE. FAILURE TO CONFORM TO THE TERMS AND CONDITIONS OF THIS CERTIFICATE MAY SUBJECT THE CERTIFICATE HOLDER AND ANY CONTRACTOR TO ENFORCEMENT ACTIONS, INCLUDING INJUNCTIONS AS PROVIDED BY LAW AND PENALTIES UP TO \$1,000.00 PER DAY PURSUANT TO THE ADMINISTRATIVE CIVIL PENALTY POLICY DESCRIBED IN SECTIONS 22a-6b-1 THROUGH 22a-6b-15 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES.

SCOPE OF AUTHORIZATION

The Certificate Holder is hereby authorized to conduct the following work as described in application number 201609241-MG, including one location map and eleven (11) sheets of plans received August 4, 2016, submitted by the Certificate Holder to the Commissioner of Energy and Environmental Protection (“Commissioner”) and attached hereto:

1. retain an existing bridge crossing and catenary lines over Sasco Creek; and
2. install conduits on existing catenary towers, including associated brackets and fiber optic cables.

SPECIAL TERMS AND CONDITIONS

1. Not later than two (2) weeks prior to the commencement of any work authorized herein, the Certificate Holder shall submit to the Commissioner, on the form attached hereto as Appendix A, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
2. The Certificate Holder shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Certificate Holder's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit. At the work area the contractor(s) shall, whenever work is being performed, make available for inspection a copy of this permit and the final plans for the work authorized herein.
3. The Certificate Holder shall post the attached Permit Notice in a conspicuous place at the work area while the work authorized herein is undertaken.
4. All work authorized herein shall be conducted using land-based equipment.
5. Except as specifically authorized by this certificate, no equipment or material including, but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site, nor shall any wetland or watercourse be used as a staging area or accessway other than as provided herein.
6. All waste material generated by the performance of the work authorized herein shall be disposed of by the Certificate Holder at an upland site approved for the disposal of such waste material, as applicable. The Certificate Holder shall not allow any waste material to enter Sasco Creek.

GENERAL TERMS AND CONDITIONS

1. All work authorized by this certificate shall be completed within three (3) years from date of issuance of this certificate ("work completion date") in accordance with all conditions of this permit and any other applicable law.
 - a. The Certificate Holder may request a one-year extension of the work completion date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to said work completion date. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall

be the Commissioner's sole discretion to grant or deny such request.

- b. Any work authorized herein conducted after said work completion date or any authorized one-year extension thereof is a violation of this certificate and may subject the Certificate Holder to enforcement action, including penalties, as provided by law.
2. In conducting the work authorized herein, the Certificate Holder shall not deviate from the attached plans, as may be modified by this certificate. The Certificate Holder shall not make de minimis changes from said plans without prior written approval of the Commissioner.
3. The Certificate Holder may not conduct work waterward of the coastal jurisdiction line or in tidal wetlands at this certificate site other than the work authorized herein, unless otherwise authorized by the Commissioner pursuant to CGS section 22a-359 et. seq. and/or CGS section 22a-28 et. seq.
4. The Certificate Holder shall maintain all structures or other work authorized herein in good condition. Any such maintenance shall be conducted in accordance with applicable law including, but not limited to, CGS sections 22a-28 through 22a-35 and CGS sections 22a-359 through 22a-363g.
5. In undertaking the work authorized hereunder, the Certificate Holder shall not cause or allow pollution of wetlands or watercourses, including pollution resulting from sedimentation and erosion. For purposes of this certificate, "pollution" means "pollution" as that term is defined by CGS section 22a-423.
6. Upon completion of any work authorized herein, the Certificate Holder shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.
7. The work specified in the SCOPE OF AUTHORIZATION is authorized solely for the purpose set forth in this certificate. No change in purpose or use of the authorized work or facilities as set forth in this certificate may occur without the prior written authorization of the Commissioner. The Certificate Holder shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this certificate, request authorization from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
8. The Certificate Holder shall allow any representative of the Commissioner to inspect the work authorized hereunder at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certificate.
9. This certificate is not transferable without prior written authorization of the Commissioner. A request to transfer a certificate shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Certificate Holder's obligations under this certificate shall not be affected by the passage of title to the certificate site to any other person or municipality until such time as a transfer is authorized by the Commissioner.

10. Any document required to be submitted to the Commissioner under this certificate or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:
- Permit Section
Office of Long Island Sound Programs
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034
Fax # (860) 424-4054
11. The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this certificate, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this certificate, the word "day" as used in this certificate means calendar day. Any document or action which is required by this certificate to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
12. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by Certificate Holder and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."
13. In evaluating the application for this certificate the Commissioner has relied on information and data provided by the Certificate Holder and on the Certificate Holder's representations concerning site conditions, design specifications and the proposed work authorized herein, including but not limited to representations concerning the commercial, public or private nature of the work or structures authorized herein, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
14. In granting this certificate, the Commissioner has relied on all representations of the Certificate Holder, including information and data provided in support of the Certificate Holder's application. Neither the Certificate Holder's representations nor the issuance of this certificate shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.

- 15. In the event that the Certificate Holder becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this certificate or of any document required hereunder, the Certificate Holder shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the Certificate Holder shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the Certificate Holder shall comply with any dates which may be approved in writing by the Commissioner. Notification by the Certificate Holder shall not excuse noncompliance or delay and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the Commissioner in writing.
- 16. This certificate may be revoked, suspended, or modified in accordance with applicable law.
- 17. The issuance of this certificate does not relieve the Certificate Holder of their obligations to obtain any other approvals required by applicable federal, state and local law.
- 18. This certificate is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

Issued on August 12, 2016.

STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION



Brian P. Thompson, Director
Office of Long Island Sound Programs
Bureau of Water Protection & Land Reuse

Certificate of Permission No. 201609241-MG, Fairfield
Connecticut Department of Transportation

OFFICE OF LONG ISLAND SOUND PROGRAMS

APPENDIX A

**TO: Permit Section
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127**

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Certificate No: 201609241-MG, Fairfield

CONTRACTOR 1: _____

Address: _____

Telephone #: _____

CONTRACTOR 2: _____

Address: _____

Telephone #: _____

CONTRACTOR 3: _____

Address: _____

Telephone #: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

PERMITTEE: _____
(signature) (date)



PERMIT NOTICE

This Certifies that Authorization to perform work below the Coastal Jurisdiction Line and/or within Tidal Wetlands of coastal, tidal, or navigable waters of Connecticut

Has been issued to: **Connecticut Department of Transportation**

At this location: **Fairfield Creek off Metro North Railroad Bridge 08038R, Fairfield**

To conduct the following: **install fiber optic conduits and cables.**

Permit #: 201609241-MG

Issued on: August 12, 2016

This Authorization expires on: **August 12, 2019**

This Notice must be posted in a conspicuous place on the job during the entire project.

Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street • Hartford, CT 06106-5127
Phone: (860) 424-3034 Fax: (860) 424-4054
⁶⁰
www.ct.gov/deep

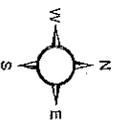


Map data maintained by the Connecticut Departments of Environmental Protection and Public Health. Map printed by the Connecticut Department of Transportation. NDD8 Data v. June 2015

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 Quadangle: 108 - WESTPORT

USGS LOCATION MAP
NETWORK INFRASTRUCTURE UPGRADES - PHASE II

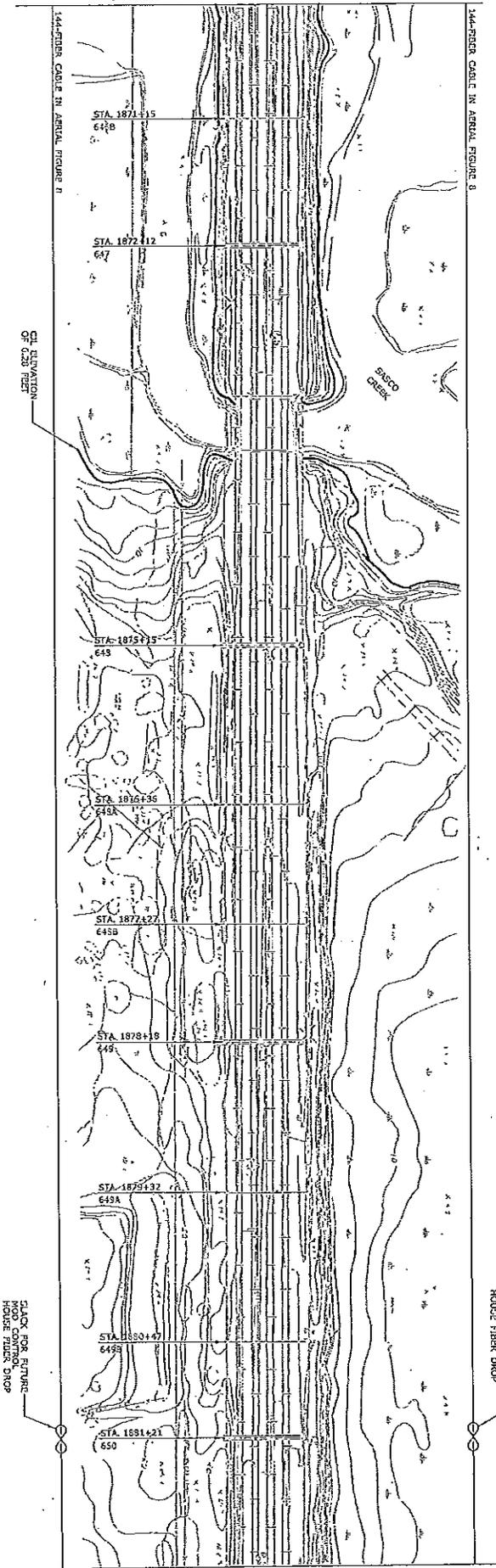
Project No. 300-178 (Saco Creek Crossing)
Town of Fairfield



Connecticut Department of Transportation
 2800 Berlin Tpk., Newington, CT 06131

MATCH LINE - SEE DWG. NO. FCI-305

STRUCTURE ID #	STRUCTURE TYPE	ATTACHMENT TYPE	ATTACHMENT HEIGHT	GROUNDING TYPE	GROUNDING CLASS	GROUNDING CODE	MISCELLANEOUS	NOTES & REMARKS
646B	DC	D-2	19'	G-2	2	18.5	FIG. 1	NOTE 3
647	DC	D-1	19'	G-2	2	18.5	FIG. 1	NOTE 3
648	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649B	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649C	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649D	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649E	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649F	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649G	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649H	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649I	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649J	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649K	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649L	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649M	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649N	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649O	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649P	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649Q	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649R	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649S	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649T	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649U	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649V	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649W	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649X	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649Y	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649Z	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3



MATCH LINE - SEE DWG. NO. FCI-307

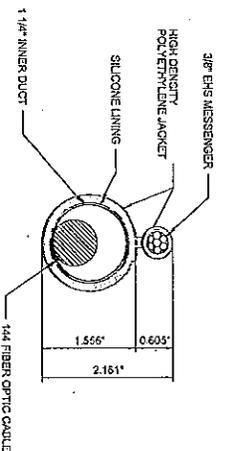
STRUCTURE ID #	STRUCTURE TYPE	ATTACHMENT TYPE	ATTACHMENT HEIGHT	GROUNDING TYPE	GROUNDING CLASS	GROUNDING CODE	MISCELLANEOUS	NOTES & REMARKS
646B	DC	D-2	19'	G-2	2	18.5	FIG. 1	NOTE 3
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648	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649B	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649C	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
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649J	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649K	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649L	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649M	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
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649S	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649T	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649U	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649V	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649W	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649X	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649Y	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3
649Z	DC	D-1	20'	G-2	2	18.5	FIG. 1	NOTE 3

- NOTES:
- REMOVE EXISTING PLATFORM MOUNTED ON FIELD SIDE OF STR. #520.
 - FOR CABLE ROUTING SCHEDULE NOTES, ABBREVIATIONS, AND LEGEND, SEE DWG. FCI-300.
 - RELOCATE EXISTING EQUIPMENT AS NEARBY TO ACCOMMODATE NEW ATTACHMENT.

PROJECT NO. 300-0178
 DRAWING NO. FCI-306
 SCALE 1"=40'
 DATE 11/11/03
 WESTPORT TO STRATFORD CABLE ROUTING PLAN CAT. NO. 646B TO 650
 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION
 NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
 CONTRACT NO. 300-0178
 DRAWING NO. FCI-306
 SCALE 1"=40'
 DATE 11/11/03

AERIAL DUCT AND MESSENGER STRAND PROPERTIES

DESIGN ITEM	UNITS	MESSENGER	FIGURE 8 AERIAL DUCT (NOTE 1)
WIRE CABLE CHARACTERISTICS		30" / 7.5" STRAND	
MATERIAL		STEEL (EHD) (GALV)	
DIAMETER (EQUIVALENT DIAMETER)	IN	0.30	(2.191)
CROSS-SECTIONAL AREA	IN ²	0.073	
WEIGHT	LB/FT	0.273	0.891
RADIAL THICKNESS OF ICE	IN		0.5
WEIGHT OF ICE	LB/FT	1.067	
TOTAL CABLE WEIGHT WITH ICE			2.358
BREAKING LOAD	LB	13,450	
EQUIVALENT SPAN	FT	300	
MODULUS OF ELASTICITY	PSI	20 x 10 ⁶	
COEFFICIENT OF EXPANSION	/°F	6.5 x 10 ⁻⁶	



1 1/4" FIGURE 8 AERIAL DUCT WITH
30" MESSENGER STRAND

MESSENGER TENSION AND SAGS

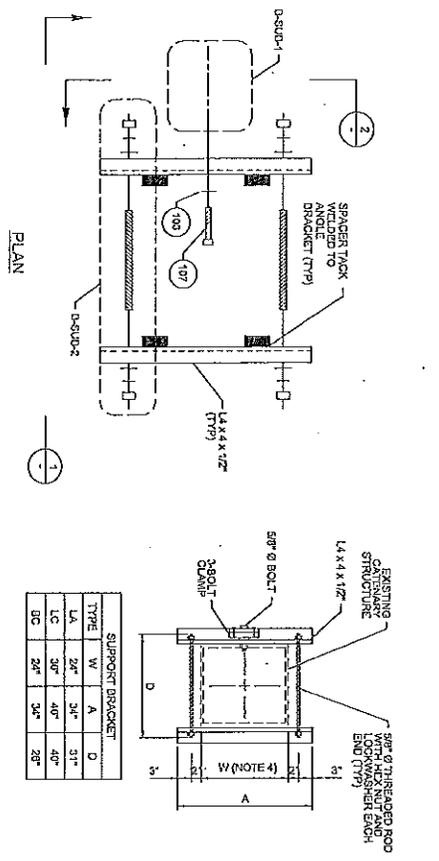
LOADING CONDITION	WIND (LB/FT)	WEIGHT (LB/FT)	TENSION (LB)	SAG (FT)	FSG
NO WIND @ 90°	0	0.091	2930	3.00	0.04
50 MPH WIND, 1/2" ICE @ 0°	2.030	2.330	5831	6.31	2.70
40 MPH WIND, 1/2" ICE @ 0°	1.070	2.330	6262	6.07	2.80
50 MPH WIND @ 90°	1.385	0.691	5046	4.80	4.32
50 MPH WIND @ 90°	3.734	0.691	5722	7.47	2.88
NO WIND, NO ICE @ 19°	0	0.091	3030	2.28	4.33
NO WIND @ 120°	0	0.091	2020	3.79	7.02
NO WIND, 1/2" ICE @ 30°	0	2.330	4965	5.73	3.30

BLOWOFF AND VERTICAL SAG (FT)

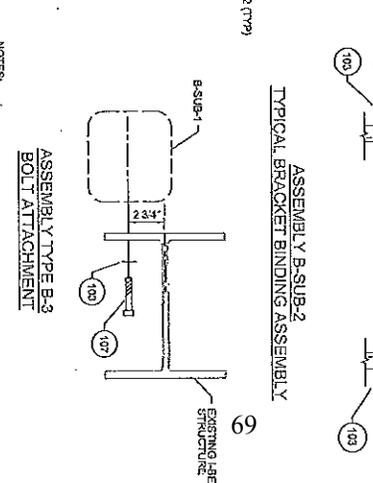
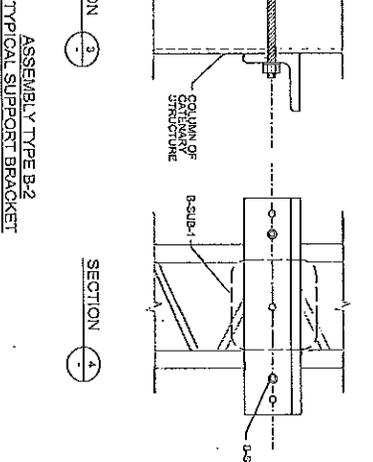
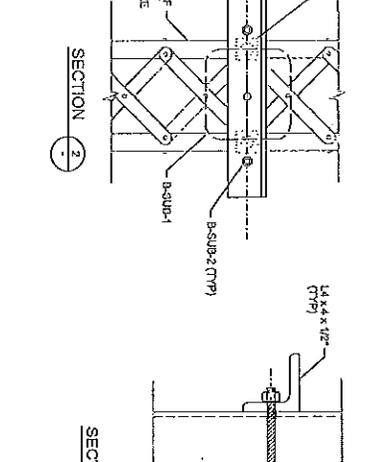
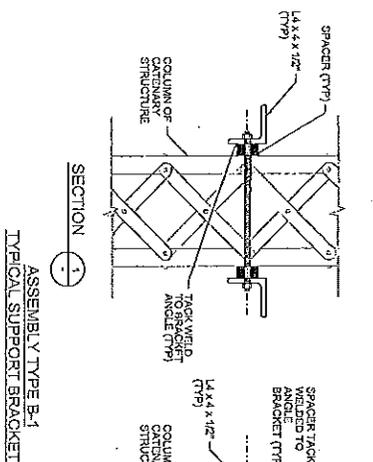
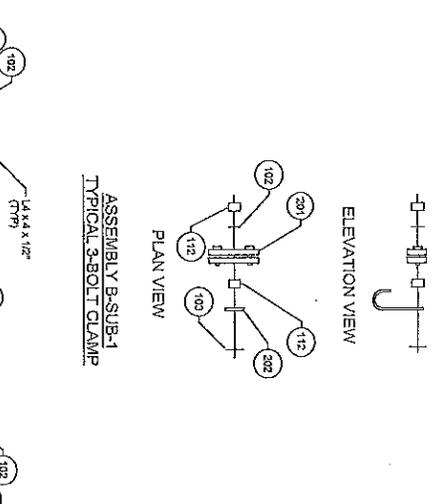
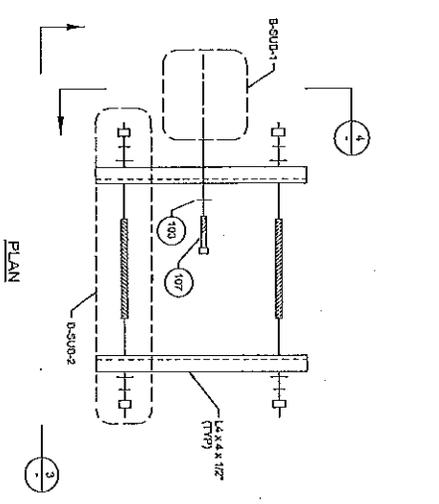
SPAN (FT)	50 MPH WIND @ 90°		40 MPH WIND, 1/2" ICE @ 0°	
	BLOWOFF	VERTICAL SAG	BLOWOFF	VERTICAL SAG
100	0.49	0.24	0.25	0.55
110	0.59	0.23	0.31	0.80
120	0.70	0.24	0.38	0.78
130	0.83	0.40	0.45	0.05
140	0.90	0.47	0.50	1.07
150	1.10	0.54	0.57	1.23
160	1.25	0.61	0.65	1.40
170	1.41	0.69	0.73	1.58
180	1.59	0.77	0.82	1.76
190	1.77	0.86	0.91	1.95
200	1.96	0.96	1.01	2.10
210	2.16	1.05	1.12	2.42
220	2.37	1.10	1.23	2.05
230	2.50	1.20	1.34	2.00
240	2.62	1.28	1.40	3.10
250	3.06	1.48	1.58	3.43
260	3.31	1.51	1.71	3.70
270	3.59	1.74	1.85	4.00
280	3.83	1.87	1.98	4.30
290	4.11	2.01	2.13	4.61
300	4.40	2.15	2.28	4.63
310	4.70	2.29	2.43	5.27
320	5.01	2.45	2.58	5.01

- NOTES:**
1. REQUIREMENTS OF AIRLINE CABLE SUPPORTING REQUIRE A SPECIAL WHICH INCLUDES THE MESSENGER STRAND, 1 1/4" DUCT AND FIBER OPTIC CABLE PER DURA-LINE OR APPROVED EQUAL.
 2. FOS = FACTOR OF SAFETY.
 3. SAGS AND TENSIONS SHOWN IN THE TABLES ARE BASED ON AN EQUIVALENT SPAN OF 300 FT.
 4. A UNIFORM WEIGHT OF 0.100 LB/FT IS ASSUMED FOR 144 FIBER OPTIC CABLE.

DATE		PROJECT NO.		PROJECT TITLE		SCALE	
DESIGNER		CHECKED BY		APPROVED BY		DATE	
<p style="font-size: small;">THE INFORMATION CONTAINED ON THIS DRAWING IS THE PROPERTY OF WESTPORT TO STRATFORD. IT IS TO BE USED ONLY FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREON. NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF WESTPORT TO STRATFORD.</p>				<p style="text-align: center;">WESTPORT TO STRATFORD FIGURE 8 CABLE DETAILS, TENSION AND SAGS</p>			
<p style="text-align: center;">STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>				<p style="text-align: center;">WESTPORT TO STRATFORD FIGURE 8 CABLE DETAILS, TENSION AND SAGS</p>			
<p style="text-align: center;">NOT TO SCALE</p>				<p style="text-align: center;">PM/PM SCC</p>			
<p style="text-align: center;">04.02</p>				<p style="text-align: center;">04.02</p>			

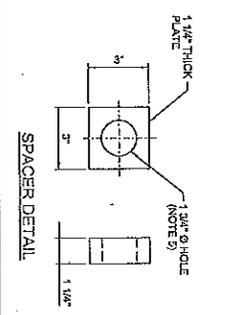


TYPE	W	A	D
LA	24"	34"	31"
LC	30"	40"	40"
BC	24"	34"	28"



BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUAL)
		B-SUB-1	B-SUB-2	B-1	B-2	
102	5/8\"/>					
103	5/8\"/>					
107	5/8\"/>					
108	5/8\"/>					
112	5/8\"/>					
201	3 BOLT CLAMP	1	-	-	-	-
202	1 LOCK	1	-	-	-	-
B-SUB-1	3 BOLT CLAMP ASSEMBLY	-	-	1	1	1
B-SUB-2	BRACKET BINDING ASSEMBLY	-	-	2	2	-
-	SPACER	-	-	4	-	-

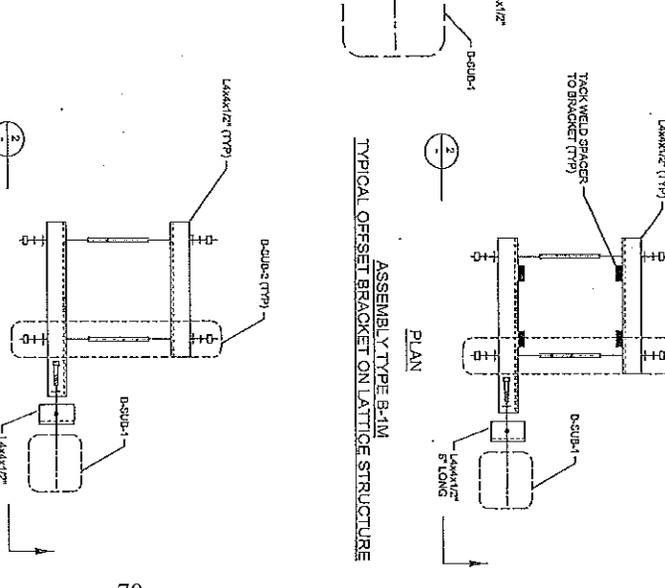
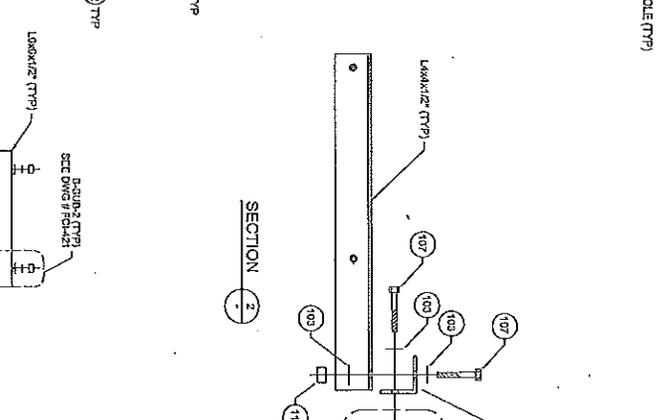
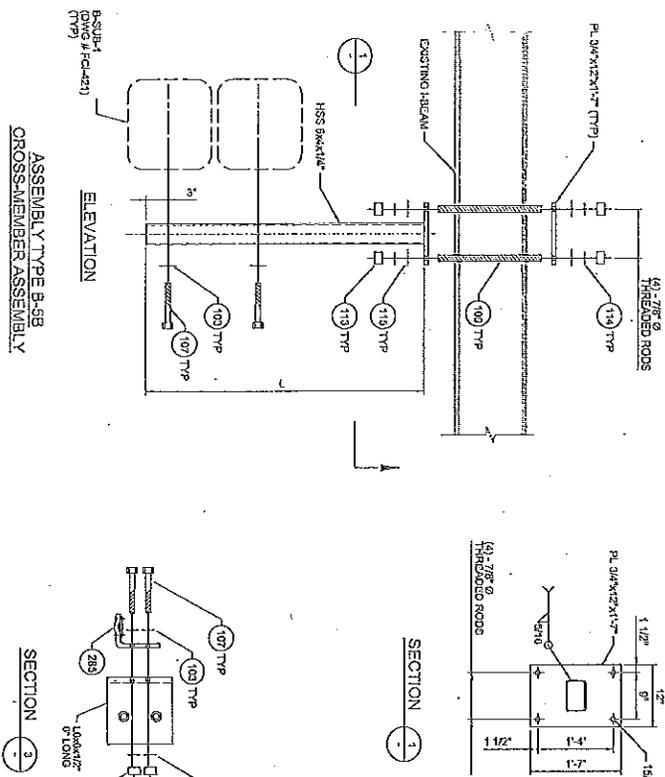


- NOTES:**
1. ALL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION UNLESS OTHERWISE NOTED. ALL FIELD CUTS SHALL RECEIVE TOUCH UP PAINT.
 2. PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
 3. TORQUE ALL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
 4. LENGTH OF STEEL BRACKET AND ROSS VASIES DEPENDING ON STRUCTURE TYPE CONTRACTOR SHALL VERIFY ALL MEASUREMENTS PRIOR TO FABRICATION AND INSTALLATION.
 5. HOLE IN SPACER TO ALLOW FOR PROPER FIT ON RIVETED CANTENARY STRUCTURES. CONTRACTOR TO VERIFY RIVET HEAD SIZE FOR DIAMETER OF HOLE IN SPACER.
 6. FOR DRILLING LOCATIONS OF STRUCTURAL ANGLES, SEE DWG # FCI-422.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

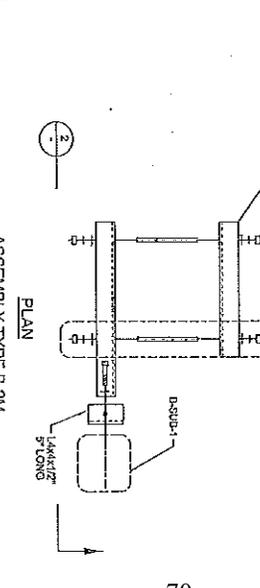
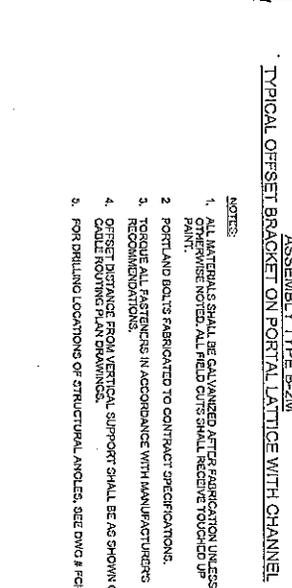
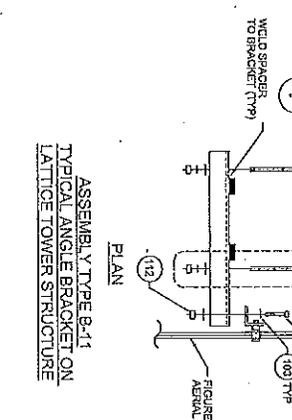
WESTPORT TO STARTFORD
ASSEMBLY DETAILS
SHEET 1 OF 4

300-0178
FCI-421
04.019



BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY FOR ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUAL)
		B-SB	B-1M	B-2M	B-11	
100	8/16 WASHER	2	3	3	0	HUBBELL / CHANGE 8000
107	8/16 A307 BOLT	2	2	2	4	PORTLAND BOLT (SEE NOTE 2)
109	7/16 A307 THREADED ROD	4	1	1	4	FIELD CUT
112	5/16 HEAVY HEX NUT	1	1	1	1	PORTLAND BOLT
113	7/16 HEAVY HEX NUT	8	1	1	1	HUBBELL / CHANGE P3089490
114	7/16 LOCK WASHER	8	1	1	1	HUBBELL / CHANGE P30897
285	WASHER SUPPORT BRACKET	1	1	1	1	
D-SUB-1	3-BOLT CABLE CLAMP ASSEMBLY (SEE DWG # FC1-421)	2	1	1	1	
D-SUB-2	BRACKET DIVIDING ASSEMBLY (SEE DWG # FC1-421)	2	2	2	2	
—	SPACER (DWG # FC1-421)	—	4	—	4	



- NOTES:**
1. ALL MATERIALS SHALL BE GALVANNEZED AFTER FABRICATION UNLESS PAINT.
 2. PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
 3. TORQUE ALL FASTENERS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
 4. OFFSET DISTANCE FROM VERTICAL SUPPORT SHALL BE AS SHOWN ON CABLE ROUTING PLAN DRAWINGS.
 5. FOR DRILLING LOCATIONS OR STRUCTURAL ANGLES, SEE DWG # FC1-422.

THE MANUFACTURER, DESIGNER, ENGINEER OR ARCHITECT SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREIN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE ACCURACY OF THE INFORMATION CONTAINED HEREIN.

SCALE AS NOTED

DATE: 04/02/24

PROJECT: WESTPORT TO STRATFORD

SHEET: ASSEMBLY DETAILS SHEET 4 OF 4

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE: WESTPORT TO STRATFORD

DRAWING TITLE: ASSEMBLY DETAILS

SHEET: SHEET 4 OF 4



August 15, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mark Alexander
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Subject: Certificate of Permission #201609249-MG
Metro North Railroad Bridge 08043R, Fairfield

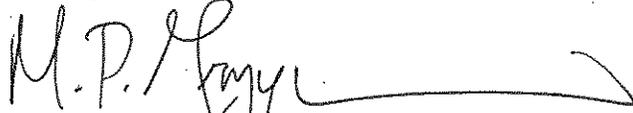
Dear Mr. Alexander:

Enclosed please find a copy of the certificate of permission ("certificate") which is being issued pursuant to your application of August 4, 2016. Your attention is directed to the conditions of the enclosed certificate. All work must conform to that which is specifically authorized by this certificate. Any work in tidal wetlands or waterward of the high tide line in tidal, navigable and coastal waters of the State which has not been authorized by a valid permit or certificate is a violation of state law and subject to enforcement action by the Department of Energy and Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the certificate. Please note that Appendix B of the certificate has been enclosed for your convenience to comply with Connecticut General Statutes Section 22a-363g. Also, the Permit Notice, found at the back of your authorization, must be posted at the work area while the work is being undertaken. Please refer to the SPECIAL TERMS AND CONDITIONS of your certificate for further details.

If you have not already done so, you should contact your local Planning and Zoning Office to determine local permit requirements for your project. Also, your activity may be eligible for General Permit authorization from the U.S. Army Corps of Engineers ("Corps"). Most maintenance and reconstruction activities require no further authorization from the Corps. Other activities, generally involving work in tidal wetlands or other special aquatic sites, and in or near a federal Navigation Project or involving filling, must receive written authorization from the Corps prior to beginning work. The State of Connecticut will automatically forward this certificate to the Corps for its determination of General Permit eligibility. You do not need to apply directly to the Corps unless they notify you. For more information regarding this federal process, you may write to the Corps New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts, 02254 or call 978-318-8335 or 800-343-4789.

Sincerely,



Micheal P. Grzywinski
Senior Environmental Analyst
Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse

Enclosure – COP #201609249-MG (original cover letter, and Permit Notice; COP copy)

cc: File #201609249-MG (original COP; copy cover letter, Permit Notice)
via e-mail:

Municipal CEO for Fairfield
Army Corps, c/o Susan Lee, Susan.K.Lee@usace.army.mil
Tim Casey, STV Incorporated, tim.casey@stvinc.com

CERTIFICATE OF PERMISSION

Certificate No: 201609249-MG

Municipality: Town of Fairfield

Site of Activity: Mill River off property located at catenary structures 671 and 672 Metro North Railroad Bridge 08043R

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander, Transportation Assistant Planning Director
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Pursuant to section 22a-363b of the Connecticut General Statutes (“CGS”) and in accordance with CGS sections 22a-359 to 22a-363g and 22a-98 and the Regulations of Connecticut State Agencies sections 22a-426-1 to 22a-426-9 (the Water Quality Standards) effective September 10, 2013, a certificate of permission (“certificate”) is hereby granted to retain an existing railroad bridge crossing and catenary lines and to install fiber optic cables on existing catenary structures for railroad infrastructure improvements as is more specifically described below in the SCOPE OF AUTHORIZATION. The work performed shall conform to the terms and conditions of this certificate.

*******NOTICE TO CERTIFICATE HOLDERS AND CONTRACTORS*******

UPON INITIATION OF ANY WORK AUTHORIZED HEREIN, THE CERTIFICATE HOLDER ACCEPTS AND AGREES TO COMPLY WITH ALL TERMS AND CONDITIONS OF THIS CERTIFICATE. FAILURE TO CONFORM TO THE TERMS AND CONDITIONS OF THIS CERTIFICATE MAY SUBJECT THE CERTIFICATE HOLDER AND ANY CONTRACTOR TO ENFORCEMENT ACTIONS, INCLUDING INJUNCTIONS AS PROVIDED BY LAW AND PENALTIES UP TO \$1,000.00 PER DAY PURSUANT TO THE ADMINISTRATIVE CIVIL PENALTY POLICY DESCRIBED IN SECTIONS 22a-6b-1 THROUGH 22a-6b-15 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES.

SCOPE OF AUTHORIZATION

The Certificate Holder is hereby authorized to conduct the following work as described in application number 201609249-MG, including one location map and eleven (11) sheets of plans received August 4, 2016, submitted by the Certificate Holder to the Commissioner of Energy and Environmental Protection (“Commissioner”) and attached hereto:

1. retain an existing bridge crossing and catenary lines over the Mill River; and
2. install conduits on existing catenary towers, including associated brackets and fiber optic cables.

SPECIAL TERMS AND CONDITIONS

1. Not later than two (2) weeks prior to the commencement of any work authorized herein, the Certificate Holder shall submit to the Commissioner, on the form attached hereto as Appendix A, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
2. The Certificate Holder shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Certificate Holder's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit. At the work area the contractor(s) shall, whenever work is being performed, make available for inspection a copy of this permit and the final plans for the work authorized herein.
3. The Certificate Holder shall post the attached Permit Notice in a conspicuous place at the work area while the work authorized herein is undertaken.
4. All work authorized herein shall be conducted using land-based equipment.
5. Except as specifically authorized by this certificate, no equipment or material including, but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site, nor shall any wetland or watercourse be used as a staging area or accessway other than as provided herein.
6. All waste material generated by the performance of the work authorized herein shall be disposed of by the Certificate Holder at an upland site approved for the disposal of such waste material, as applicable. The Certificate Holder shall not allow any waste material to enter the Mill River.

GENERAL TERMS AND CONDITIONS

1. All work authorized by this certificate shall be completed within three (3) years from date of issuance of this certificate ("work completion date") in accordance with all conditions of this permit and any other applicable law.
 - a. The Certificate Holder may request a one-year extension of the work completion date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to said work completion date. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall

be the Commissioner's sole discretion to grant or deny such request.

- b. Any work authorized herein conducted after said work completion date or any authorized one-year extension thereof is a violation of this certificate and may subject the Certificate Holder to enforcement action, including penalties, as provided by law.
2. In conducting the work authorized herein, the Certificate Holder shall not deviate from the attached plans, as may be modified by this certificate. The Certificate Holder shall not make de minimis changes from said plans without prior written approval of the Commissioner.
3. The Certificate Holder may not conduct work waterward of the coastal jurisdiction line or in tidal wetlands at this certificate site other than the work authorized herein, unless otherwise authorized by the Commissioner pursuant to CGS section 22a-359 et. seq. and/or CGS section 22a-28 et. seq.
4. The Certificate Holder shall maintain all structures or other work authorized herein in good condition. Any such maintenance shall be conducted in accordance with applicable law including, but not limited to, CGS sections 22a-28 through 22a-35 and CGS sections 22a-359 through 22a-363g.
5. In undertaking the work authorized hereunder, the Certificate Holder shall not cause or allow pollution of wetlands or watercourses, including pollution resulting from sedimentation and erosion. For purposes of this certificate, "pollution" means "pollution" as that term is defined by CGS section 22a-423.
6. Upon completion of any work authorized herein, the Certificate Holder shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.
7. The work specified in the SCOPE OF AUTHORIZATION is authorized solely for the purpose set forth in this certificate. No change in purpose or use of the authorized work or facilities as set forth in this certificate may occur without the prior written authorization of the Commissioner. The Certificate Holder shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this certificate, request authorization from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
8. The Certificate Holder shall allow any representative of the Commissioner to inspect the work authorized hereunder at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certificate.
9. This certificate is not transferable without prior written authorization of the Commissioner. A request to transfer a certificate shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Certificate Holder's obligations under this certificate shall not be affected by the passage of title to the certificate site to any other person or municipality until such time as a transfer is authorized by the Commissioner.

10. Any document required to be submitted to the Commissioner under this certificate or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:

Permit Section
Office of Long Island Sound Programs
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034
Fax # (860) 424-4054

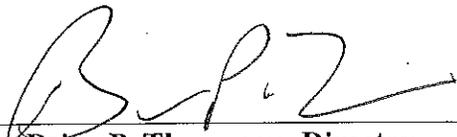
11. The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this certificate, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this certificate, the word "day" as used in this certificate means calendar day. Any document or action which is required by this certificate to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
12. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by Certificate Holder and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."
13. In evaluating the application for this certificate the Commissioner has relied on information and data provided by the Certificate Holder and on the Certificate Holder's representations concerning site conditions, design specifications and the proposed work authorized herein, including but not limited to representations concerning the commercial, public or private nature of the work or structures authorized herein, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
14. In granting this certificate, the Commissioner has relied on all representations of the Certificate Holder, including information and data provided in support of the Certificate

Holder's application. Neither the Certificate Holder's representations nor the issuance of this certificate shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.

15. In the event that the Certificate Holder becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this certificate or of any document required hereunder, the Certificate Holder shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the Certificate Holder shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the Certificate Holder shall comply with any dates which may be approved in writing by the Commissioner. Notification by the Certificate Holder shall not excuse noncompliance or delay and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the Commissioner in writing.
16. This certificate may be revoked, suspended, or modified in accordance with applicable law.
17. The issuance of this certificate does not relieve the Certificate Holder of their obligations to obtain any other approvals required by applicable federal, state and local law.
18. This certificate is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

Issued on August 12, 2016.

STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION



Brian P. Thompson, Director
Office of Long Island Sound Programs
Bureau of Water Protection & Land Reuse

Certificate of Permission No. 201609247-MG, Bridgeport
Connecticut Department of Transportation

OFFICE OF LONG ISLAND SOUND PROGRAMS

APPENDIX A

**TO: Permit Section
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127**

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Certificate No: 201609249-MG, Fairfield

CONTRACTOR 1: _____

Address: _____

Telephone #: _____

CONTRACTOR 2: _____

Address: _____

Telephone #: _____

CONTRACTOR 3: _____

Address: _____

Telephone #: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

PERMITTEE: _____

(signature)

(date)



PERMIT NOTICE

This Certifies that Authorization to perform work below the Coastal Jurisdiction Line and/or within Tidal Wetlands of coastal, tidal, or navigable waters of Connecticut

Has been issued to: **Connecticut Department of Transportation**

At this location: **Mill River off Metro North Railroad Bridge 08043R, Fairfield**

To conduct the following: **install fiber optic conduits and cables.**

Permit #: 201609249-MG

Issued on: August 12, 2016

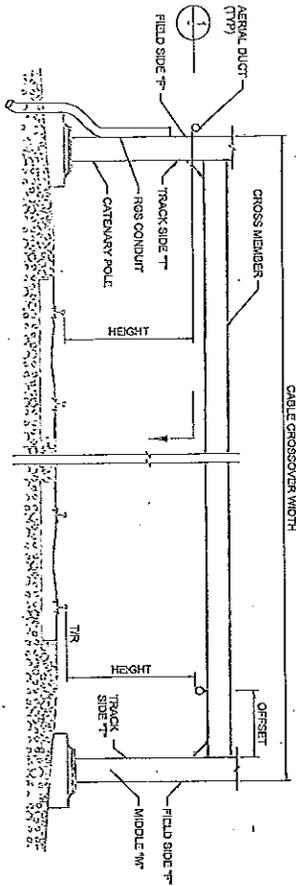
This Authorization expires on: **August 12, 2019**

This Notice must be posted in a conspicuous place on the job during the entire project.

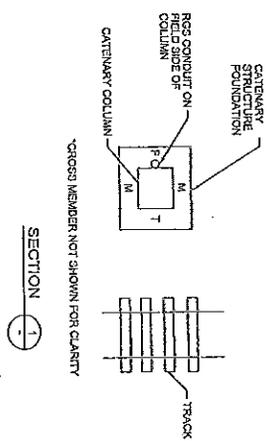
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street • Hartford, CT 06106-5127
Phone: (860) 424-3034 Fax: (860) 424-4054
www.ct.gov/deep

AERIAL CABLE ROUTING SCHEDULE DESCRIPTIONS

- CATEGORY**
- STRUCTURE ID # INDICATES THE IDENTIFICATION NUMBER OF THE SUPPORTING STRUCTURE IF APPLICABLE
 - STRUCTURE TYPE DESIGNATES THE TYPE OF STRUCTURE THAT THE CABLE IS TO BE ATTACHED.
 - ATTACHMENT TYPE DESIGNATES THE APPLICABLE ATTACHMENT TYPE TO BE USED.
 - ATTACHMENT SIDE DESIGNATES THE SIDE OF THE STRUCTURE THAT THE SUPPORTING CABLE WILL BE ATTACHED RELATIVE TO THE TRACK.
 - ATTACHMENT HEIGHT DESIGNATES THE HEIGHT OF THE CABLE ATTACHMENT, MEASURED FROM THE TOP OF HIGH RAIL OF ADJACENT TRACK TO BOTTOM OF AERIAL DUCT, UNLESS OTHERWISE NOTED.
 - OFFSET DESIGNATES THE HORIZONTAL DISTANCE BETWEEN THE AERIAL CABLE AND THE NEAREST VERTICAL MEMBER OF THE SUPPORTING STRUCTURE. THIS DISTANCE IS MEASURED FROM THE FACE OF THE VERTICAL MEMBER TO THE CENTERLINE OF THE CABLE.
 - BONDING TYPE DESIGNATES THE BONDING/GROUNDING TYPE TO BE USED.
 - CONDUIT CABLE DROP PROVIDES CONDUIT AND RIGID DROP INFORMATION.
 - CABLE CONFIGURATION ARRANGEMENT OF CABLE AND CONDUIT ROUTING ON THE SUPPORTING STRUCTURE.
 - MISCELLANEOUS DESIGNATES ANY MISCELLANEOUS IN-SITU ASSUMPTIONS TO BE INSTALLED.
 - NOTES & REMARKS PROVIDES ADDITIONAL INFORMATION, OR INDICATES SPECIAL CIRCUMSTANCES TO BE TAKEN INTO CONSIDERATION AT A GIVEN SUPPORT LOCATION.



- STRUCTURE TYPE**
- AD ANCHOR BRIDGE
 - AF A-FRAME
 - BC DUAL TUP CHANNEL WITH PLATES
 - HT HIGH TOWER STRUCTURE
 - LA PORTAL LATTICE WITH ANGLE LEGS
 - LC PORTAL LATTICE WITH CHANNEL LEGS
 - TP TRANSMISSION POLE
 - WALL WALL/BRIDGE ADJUTMENT
 - WP WOOD POLE



DRAWING INDEX FOR CABLE ROUTING SCHEDULE

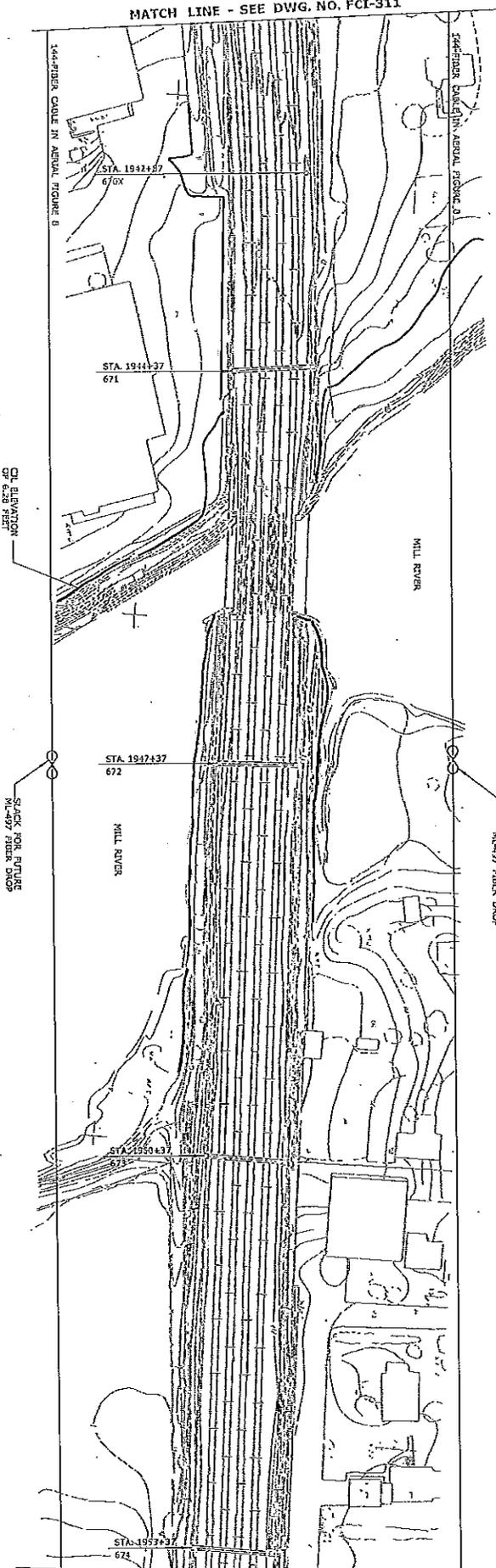
STRUCTURE ID #	AS SHOWN ON DRAWING
STRUCTURE TYPE	SEE DWGS FOR-408 THRU FOR-418
ATTACHMENT TYPE	SEE DWGS FOR-411 THRU FOR-420
ATTACHMENT SIDE	SEE DETAIL THIS SHEET
ATTACHMENT HEIGHT	SEE DETAIL THIS SHEET
OFFSET	SEE DETAIL THIS SHEET
BONDING TYPE	SEE DWGS FOR-440 THRU FOR-444
CONDUIT CABLE DROP	SEE DWGS FOR-370 THRU FOR-410
CABLE CONFIGURATION	SEE DWGS FOR-361 THRU FOR-395
MISCELLANEOUS	AS SHOWN ON DRAWING
NOTES & REMARKS	AS SHOWN ON DRAWING

NOTE:
 1. COMMUNICATION CABLES AND TRAVELER'S USE SHOWN AS SINGLE LINE DIAGRAMS. ROUTING HEREIN IS FOR REFERENCE AND DO NOT REFLECT ACTUAL ROUTING. REFER TO CABLE SUPPORT SCHEDULES AND NOTES FOR ATTACHMENT AND ROUTING DETAIL.

<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>PROJECT TITLE: NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2</p>	<p>CONTRACT NO: 300-0178</p> <p>PROJECT NO: FCI-300</p> <p>DATE: 03.013</p>
<p>DESIGNED BY: FM</p> <p>CHECKED BY: SCC</p> <p>NOT TO SCALE</p>	<p>WESTPORT TO STRATFORD TO STRATFORD RAILROAD RENEWAL AND IMPROVEMENT PROJECT PHASE 2 CABLE ROUTING SCHEDULE</p>	<p>270 Independence 160 Main Street Hartford, CT 06103</p>

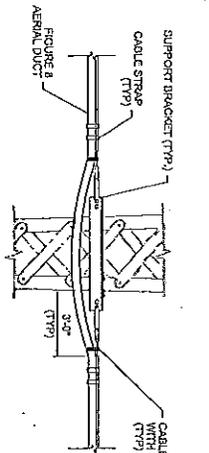
MATCH LINE - SEE DWG. NO. FCI-311

STRUCTURE ID #	670X	671	672	673	674
STRUCTURE TYPE	WV	DA	DA	DA	LA
ATTACHMENT TYPE	F	F	F	F	B-1
ATTACHMENT HEIGHT	17.5'	20.5'	19.5'	20.5'	20.5'
OFFSET	-	-	-	-	-
BONDING TYPE	-	G-1	-	-	-
CONDUIT CABLE DROP	FIG. 1B	FIG. 1	FIG. 1	FIG. 1	FIG. 1
CABLE CONFIGURATION	-	5B-1	5B-1	5B-1	-

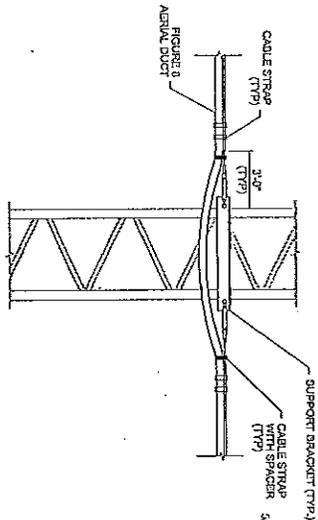


PROJECT TITLE: NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW HAVEN LINE PHASE 2
 DRAWING TITLE: WESTPORT TO STRATFORD CABLE ROUTING PLAN CAT. NO. 670X TO 674
 PROJECT NO.: 308-0178
 DRAWING NO.: FCI-312
 SCALE: 1" = 40'
 DATE: 08/20/10
 DESIGNED BY: [Signature]
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]
 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION
 PROJECT NO. 308-0178

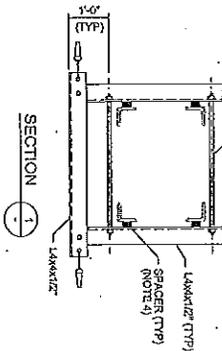
NOTE:
 1. FOR CABLE ROUTING SCHEDULE NOTES, ABBREVIATIONS, AND LEGEND, SEE DWG. FCI-308.



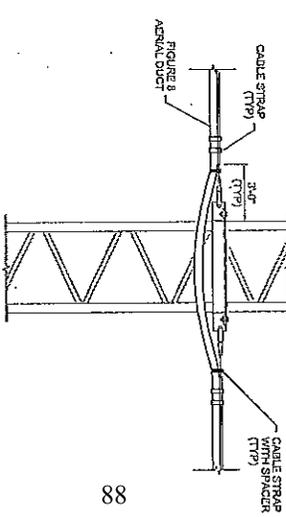
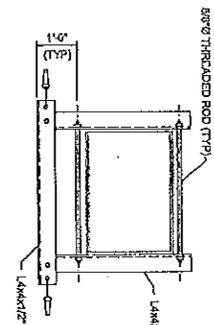
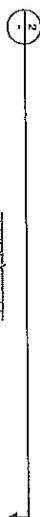
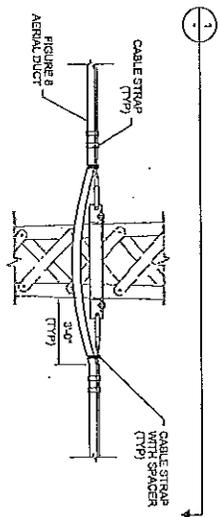
TYPE D-1
TYPICAL LATTICE STRUCTURE DEAD END
(SEE ASSEMBLY DETAILS ON DWG # FC-427)



TYPE D-2
TYPICAL CHANNEL STRUCTURE DEAD END
(SEE ASSEMBLY DETAILS ON DWG # FC-427)

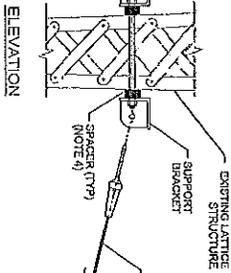


TYPE D-1M
TYPICAL OFFSET DEAD END BRACKET ON
LATTICE STRUCTURE
(SEE ASSEMBLY DETAILS ON DWG # FC-428)

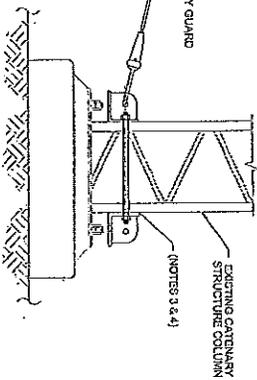


TYPE D-2M
TYPICAL OFFSET DEAD END BRACKET ON
LATTICE CHANNEL STRUCTURE
(SEE ASSEMBLY DETAILS ON DWG # FC-428)

- NOTES:
1. FOR GENERAL NOTES SEE DWG. C-462.
 2. FOR ABREVIATIONS AND LEGEND SEE DWG. C-408.
 3. DOWN GUY BRACKET SHALL BE INSTALLED AS CLOSE TO THE BASE OF THE STRUCTURE AS POSSIBLE.
 4. SPACERS SHALL BE WELDED TO SUPPORT BRACKETS AS REQUIRED TO ALLOW SPACERS FIT ON OFFSETTED LATTICE STRUCTURES. SEE SPACER DETAIL ON DWG # FC-424. IN ADDITION, ALL WELDED AREAS SHALL BE TREATED WITH TOUCH-UP COOL GALVANIZING COMPOUND.
 5. SEE DRAWING # FC-440 FOR GROUNDING DETAILS.

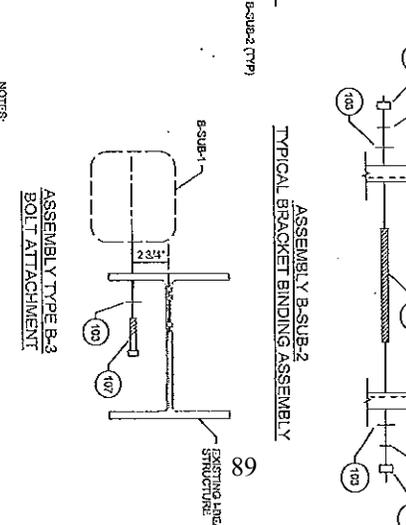
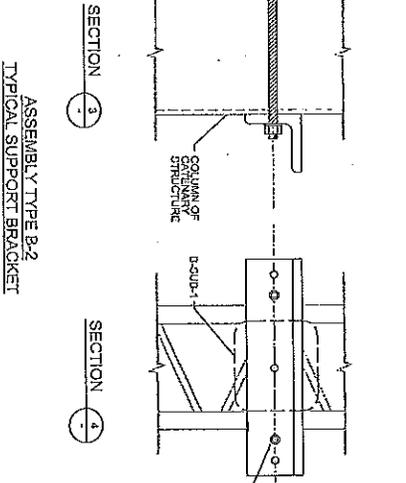
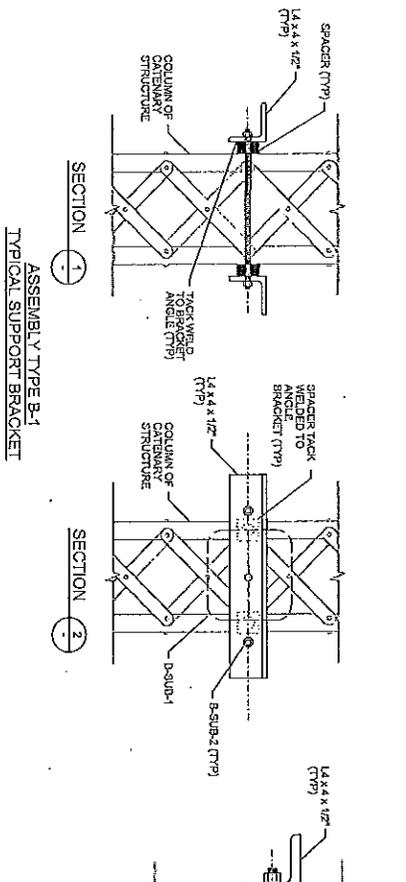
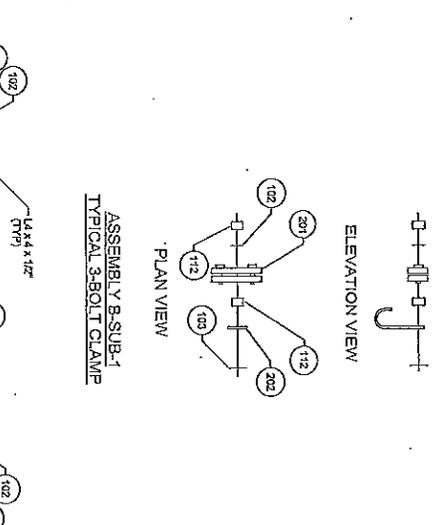
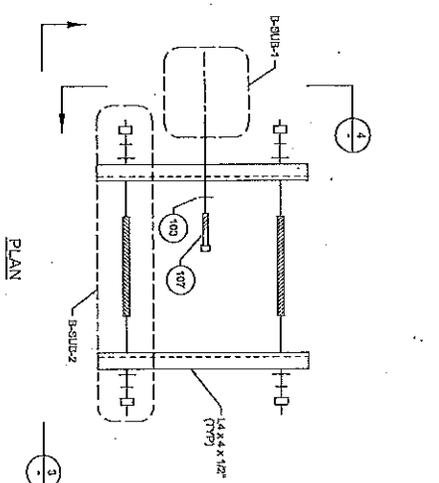
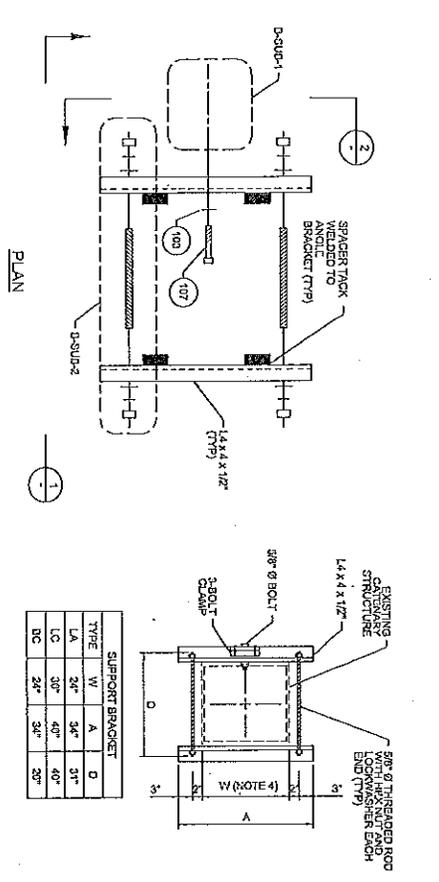


TYPE D-3
DEAD END BRACKET
(SEE ASSEMBLY DETAILS ON DWG # FC-428)



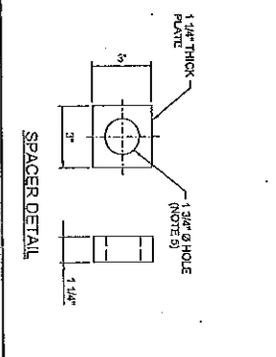
TYPE D-3A
DOWN GUY BRACKET
(SEE ASSEMBLY DETAILS ON DWG # FC-428)

PROJECT NO.	300-0176
DRAWING TITLE	WESTPORT TO STRATFORD DEAD END ATTACHMENTS
DATE	FCT-427
REVISION NO.	04.015
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
DESIGNED BY	AVI Incorporated 105 Route Road Middletown, CT 06451
APPROVED BY	[Signature]
DATE	04/20/18
PROJECT NO.	300-0176
DRAWING TITLE	WESTPORT TO STRATFORD DEAD END ATTACHMENTS
DATE	FCT-427
REVISION NO.	04.015
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
DESIGNED BY	AVI Incorporated 105 Route Road Middletown, CT 06451
APPROVED BY	[Signature]
DATE	04/20/18
PROJECT NO.	300-0176
DRAWING TITLE	WESTPORT TO STRATFORD DEAD END ATTACHMENTS
DATE	FCT-427
REVISION NO.	04.015
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
DESIGNED BY	AVI Incorporated 105 Route Road Middletown, CT 06451
APPROVED BY	[Signature]
DATE	04/20/18
PROJECT NO.	300-0176
DRAWING TITLE	WESTPORT TO STRATFORD DEAD END ATTACHMENTS
DATE	FCT-427
REVISION NO.	04.015
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
DESIGNED BY	AVI Incorporated 105 Route Road Middletown, CT 06451
APPROVED BY	[Signature]
DATE	04/20/18



BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUAL)
		D-SUB-1	D-SUB-2	B-1	D-2	
102	SPR. LOCK WASHER	1	2	1	1	HUBBELL / CHANCE 889
103	SPR. WASHER	1	2	1	1	PORTLAND BOLT (SEE NOTE 2)
107	SPR. & ANGLE BOLT	1	1	1	1	FIELD CUT AS REQUIRED
108	SPR. & ANGLE THREADED ROD	1	1	1	1	PORTLAND BOLT
112	SPR. HEAVY HECKMUT	2	2	1	1	ELECTRIC MOTION EM0830
201	3 BOLT CLAMP	1	1	1	1	MAGEANI POWER SYSTEMS Z238C
202	J HOOK	1	1	1	1	
B-SUB-1	3 BOLT CABLE CLAMP ASSEMBLY	1	1	1	1	
B-SUB-2	BRACKET BINDING ASSEMBLY	1	1	1	1	
...	SPACER	1	1	1	1	



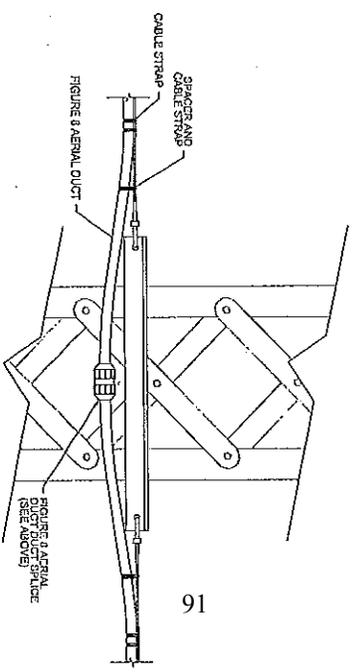
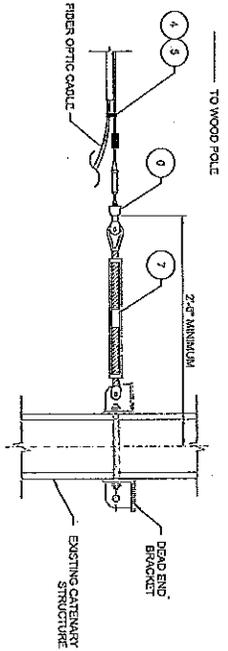
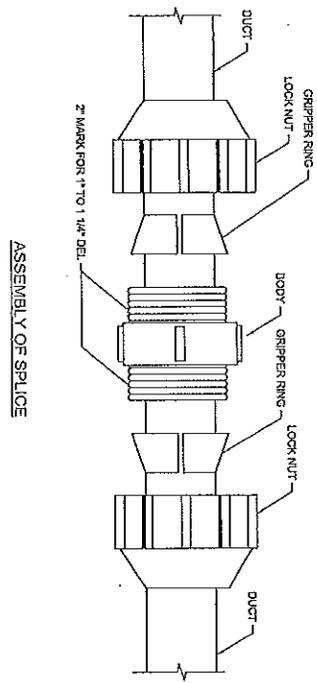
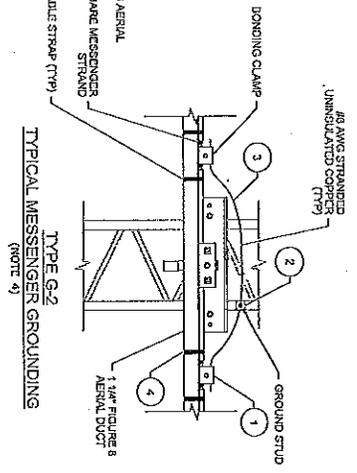
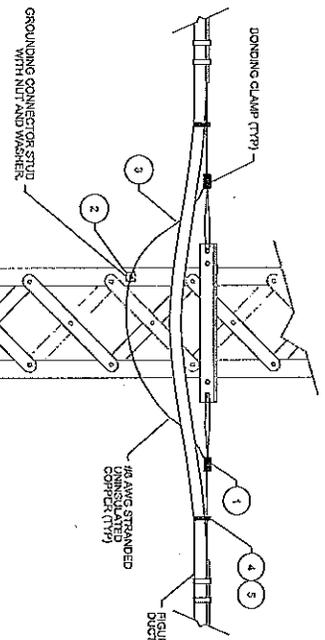
NOTES:

- ALL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION TOUCHED UP PAINT.
- PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
- TORQUE ALL FASTENERS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- LENGTH OF STEEL BRACKET AND RODS VARIES DEPENDING ON STRUCTURE TYPE. CONTRACTOR SHALL VERIFY ALL DIMENSIONS PRIOR TO FABRICATION AND INSTALLATION.
- HOLE IN SPACER TO ALLOW FOR ROPE/FIT ON RIVETED CATENARY DIMENSIONS SHALL BE SPACER DIMENSIONS. HOLE IN SPACER DIMENSIONS SHALL BE SPACER DIMENSIONS. HOLE IN SPACER DIMENSIONS SHALL BE SPACER DIMENSIONS.
- FOR DRILLING LOCATIONS OF STRUCTURAL ANGLES, SEE DWG #104-422.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

WESTPORT
TO STARTFORD
ASSEMBLY DETAILS
SHEET 1 OF 4

PROJECT NO. 300-0178
DATE: FCT-421
04.019



TYPICAL MESSENGER GROUNDING
(NOTE 4)

- NOTES:**
1. GROUNDING SHALL OCCUR AT EVERY 1200 FEET MAXIMUM. MESSENGER STRANDS SHALL BE GROUNDING AT ALL DEAD END LOCATIONS.
 2. HOLE SHALL BE DRILLED NO LESS THAN ONE INCH FROM EDGE OF STEEL STRUCTURE FOR SERVICE POST GROUNDING STUD AND USING MASONRY DRILL WITH STEEL STRUCTURE SHALL BE WORK WASHERS AND NUTS TO ENSURE MECHANICAL AND ELECTRICAL CONNECTION TO STRUCTURAL STEEL AND SHALL BE TREATED WITH APPROVED ANTI-OXIDANT GREASE AFTER INSTALLATION.
 3. FOR DETAILS OF MESSENGER GROUNDING SEE SPECIFICATIONS, TYPE G.
 4. TYPICAL BONDING SHOWN, APPLIED TO ALL METALLIC STRUCTURE TYPES.

BILL OF MATERIALS

REF #	DESCRIPTION	TYPE G-1	TYPE G-2	TYPE IS-1	MANUFACTURER PART # / DETAIL (OR APPROVED EQUIV.)
1	BONDING CLAMP	2	2	-	ELECTRIC MOTION DM4811
2	GROUND CONNECTOR STUD	1	1	-	THOMAS & BETTS 4522SL
3	36 AWG STRANDED COPPER WIRE, UNINSULATED	AS REQUIRED	AS REQUIRED	1	POWER & TEL #924-0811/22233
4	1/4" FIGURE 8 AERIAL DUCT, LENGTH AS REQ'D S.S.	AS REQUIRED	AS REQUIRED	1	POWER & TEL #924-0859/76
5	CABLE SPACER	2	-	1	INTELISE INC #022472-2000
6	CLIPPING /TYPE SPEC. STRAIN INSULATOR	-	-	1	MIDORIAL #703442130NK
7	JAW-EYE FORKED STEEL TURNBUCKLE	-	-	1	-

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE: NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2

PROJECT NO: WESTPORT TO STRATFORD

DATE: 04.029

300-0178
FCI-440



August 15, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mark Alexander
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Subject: Certificate of Permission #201609243-MG
Metro North Railroad Bridge 08045R, Fairfield

Dear Mr. Alexander:

Enclosed please find a copy of the certificate of permission ("certificate") which is being issued pursuant to your application of August 4, 2016. Your attention is directed to the conditions of the enclosed certificate. All work must conform to that which is specifically authorized by this certificate. Any work in tidal wetlands or waterward of the high tide line in tidal, navigable and coastal waters of the State which has not been authorized by a valid permit or certificate is a violation of state law and subject to enforcement action by the Department of Energy and Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the certificate. Please note that Appendix B of the certificate has been enclosed for your convenience to comply with Connecticut General Statutes Section 22a-363g. Also, the Permit Notice, found at the back of your authorization, must be posted at the work area while the work is being undertaken. Please refer to the SPECIAL TERMS AND CONDITIONS of your certificate for further details.

If you have not already done so, you should contact your local Planning and Zoning Office to determine local permit requirements for your project. Also, your activity may be eligible for General Permit authorization from the U.S. Army Corps of Engineers ("Corps"). Most maintenance and reconstruction activities require no further authorization from the Corps. Other activities, generally involving work in tidal wetlands or other special aquatic sites, and in or near a federal Navigation Project or involving filling, must receive written authorization from the Corps prior to beginning work. The State of Connecticut will automatically forward this certificate to the Corps for its determination of General Permit eligibility. You do not need to apply directly to the Corps unless they notify you. For more information regarding this federal process, you may write to the Corps New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts, 02254 or call 978-318-8335 or 800-343-4789.

Sincerely,



Micheal P. Grzywinski
Senior Environmental Analyst
Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse

Enclosure – COP #201609243-MG (original cover letter, and Permit Notice; COP copy)

cc: File #201609243-MG (original COP; copy cover letter, Permit Notice)

via e-mail:

Municipal CEO for Fairfield

Army Corps, c/o Susan Lee, Susan.K.Lee@usace.army.mil

Tim Casey, STV Incorporated, tim.casey@stvinc.com

CERTIFICATE OF PERMISSION

Certificate No: 201609243-MG

Municipality: Town of Fairfield

Site of Activity: Fairfield Creek off property located at catenary structures 707 and 708 Metro North Railroad Bridge 08045R.

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander, Transportation Assistant Planning Director
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Pursuant to section 22a-363b of the Connecticut General Statutes (“CGS”) and in accordance with CGS sections 22a-359 to 22a-363g and 22a-98 and the Regulations of Connecticut State Agencies sections 22a-426-1 to 22a-426-9 (the Water Quality Standards) effective September 10, 2013, a certificate of permission (“certificate”) is hereby granted to retain an existing railroad bridge crossing and catenary lines and to install fiber optic cables on existing catenary structures for railroad infrastructure improvements as is more specifically described below in the SCOPE OF AUTHORIZATION. The work performed shall conform to the terms and conditions of this certificate.

*******NOTICE TO CERTIFICATE HOLDERS AND CONTRACTORS*******

UPON INITIATION OF ANY WORK AUTHORIZED HEREIN, THE CERTIFICATE HOLDER ACCEPTS AND AGREES TO COMPLY WITH ALL TERMS AND CONDITIONS OF THIS CERTIFICATE. FAILURE TO CONFORM TO THE TERMS AND CONDITIONS OF THIS CERTIFICATE MAY SUBJECT THE CERTIFICATE HOLDER AND ANY CONTRACTOR TO ENFORCEMENT ACTIONS, INCLUDING INJUNCTIONS AS PROVIDED BY LAW AND PENALTIES UP TO \$1,000.00 PER DAY PURSUANT TO THE ADMINISTRATIVE CIVIL PENALTY POLICY DESCRIBED IN SECTIONS 22a-6b-1 THROUGH 22a-6b-15 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES.

SCOPE OF AUTHORIZATION

The Certificate Holder is hereby authorized to conduct the following work as described in application number 201609243-MG, including one location map and nine (9) sheets of plans received August 4, 2016, submitted by the Certificate Holder to the Commissioner of Energy and Environmental Protection (“Commissioner”) and attached hereto:

1. retain an existing bridge crossing and catenary lines over Fairfield Creek; and
2. install conduit on existing catenary towers, including associated brackets and fiber optic cables.

SPECIAL TERMS AND CONDITIONS

1. Not later than two (2) weeks prior to the commencement of any work authorized herein, the Certificate Holder shall submit to the Commissioner, on the form attached hereto as Appendix A, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
2. The Certificate Holder shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Certificate Holder's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit. At the work area the contractor(s) shall, whenever work is being performed, make available for inspection a copy of this permit and the final plans for the work authorized herein.
3. The Certificate Holder shall post the attached Permit Notice in a conspicuous place at the work area while the work authorized herein is undertaken.
4. All work authorized herein shall be conducted using land-based equipment.
5. Except as specifically authorized by this certificate, no equipment or material including, but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site, nor shall any wetland or watercourse be used as a staging area or accessway other than as provided herein.
6. All waste material generated by the performance of the work authorized herein shall be disposed of by the Certificate Holder at an upland site approved for the disposal of such waste material, as applicable. The Certificate Holder shall not allow any waste material to enter Fairfield Creek.

GENERAL TERMS AND CONDITIONS

1. All work authorized by this certificate shall be completed within three (3) years from date of issuance of this certificate ("work completion date") in accordance with all conditions of this permit and any other applicable law.
 - a. The Certificate Holder may request a one-year extension of the work completion date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to said work completion date. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall

be the Commissioner's sole discretion to grant or deny such request.

- b. Any work authorized herein conducted after said work completion date or any authorized one-year extension thereof is a violation of this certificate and may subject the Certificate Holder to enforcement action, including penalties, as provided by law.
2. In conducting the work authorized herein, the Certificate Holder shall not deviate from the attached plans, as may be modified by this certificate. The Certificate Holder shall not make de minimis changes from said plans without prior written approval of the Commissioner.
3. The Certificate Holder may not conduct work waterward of the coastal jurisdiction line or in tidal wetlands at this certificate site other than the work authorized herein, unless otherwise authorized by the Commissioner pursuant to CGS section 22a-359 et. seq. and/or CGS section 22a-28 et. seq.
4. The Certificate Holder shall maintain all structures or other work authorized herein in good condition. Any such maintenance shall be conducted in accordance with applicable law including, but not limited to, CGS sections 22a-28 through 22a-35 and CGS sections 22a-359 through 22a-363g.
5. In undertaking the work authorized hereunder, the Certificate Holder shall not cause or allow pollution of wetlands or watercourses, including pollution resulting from sedimentation and erosion. For purposes of this certificate, "pollution" means "pollution" as that term is defined by CGS section 22a-423.
6. Upon completion of any work authorized herein, the Certificate Holder shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.
7. The work specified in the SCOPE OF AUTHORIZATION is authorized solely for the purpose set forth in this certificate. No change in purpose or use of the authorized work or facilities as set forth in this certificate may occur without the prior written authorization of the Commissioner. The Certificate Holder shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this certificate, request authorization from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
8. The Certificate Holder shall allow any representative of the Commissioner to inspect the work authorized hereunder at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certificate.
9. This certificate is not transferable without prior written authorization of the Commissioner. A request to transfer a certificate shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Certificate Holder's obligations under this certificate shall not be affected by the passage of title to the certificate site to any other person or municipality until such time as a transfer is authorized by the Commissioner.

10. Any document required to be submitted to the Commissioner under this certificate or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:

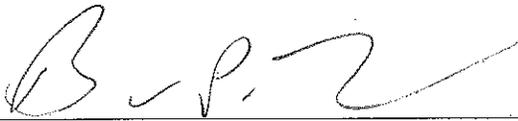
Permit Section
Office of Long Island Sound Programs
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034
Fax # (860) 424-4054

11. The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this certificate, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this certificate, the word "day" as used in this certificate means calendar day. Any document or action which is required by this certificate to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
12. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by Certificate Holder and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."
13. In evaluating the application for this certificate the Commissioner has relied on information and data provided by the Certificate Holder and on the Certificate Holder's representations concerning site conditions, design specifications and the proposed work authorized herein, including but not limited to representations concerning the commercial, public or private nature of the work or structures authorized herein, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
14. In granting this certificate, the Commissioner has relied on all representations of the Certificate Holder, including information and data provided in support of the Certificate Holder's application. Neither the Certificate Holder's representations nor the issuance of this certificate shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.

15. In the event that the Certificate Holder becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this certificate or of any document required hereunder, the Certificate Holder shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the Certificate Holder shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the Certificate Holder shall comply with any dates which may be approved in writing by the Commissioner. Notification by the Certificate Holder shall not excuse noncompliance or delay and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the Commissioner in writing.
16. This certificate may be revoked, suspended, or modified in accordance with applicable law.
17. The issuance of this certificate does not relieve the Certificate Holder of their obligations to obtain any other approvals required by applicable federal, state and local law.
18. This certificate is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

Issued on August 12, 2016.

STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION



Brian P. Thompson, Director
Office of Long Island Sound Programs
Bureau of Water Protection & Land Reuse

Certificate of Permission No. 201609243-MG, Fairfield
Connecticut Department of Transportation

OFFICE OF LONG ISLAND SOUND PROGRAMS

APPENDIX A

TO: Permit Section
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Certificate No: 201609243-MG, Fairfield

CONTRACTOR 1: _____

Address: _____

Telephone #: _____

CONTRACTOR 2: _____

Address: _____

Telephone #: _____

CONTRACTOR 3: _____

Address: _____

Telephone #: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

PERMITTEE: _____

(signature)

(date)



PERMIT NOTICE

This Certifies that Authorization to perform work below the Coastal Jurisdiction Line and/or within Tidal Wetlands of coastal, tidal, or navigable waters of Connecticut

Has been issued to: **Connecticut Department of Transportation**

At this location: **Fairfield Creek off Metro North Railroad Bridge 08045R, Fairfield**

To conduct the following: **install fiber optic conduit and cables.**

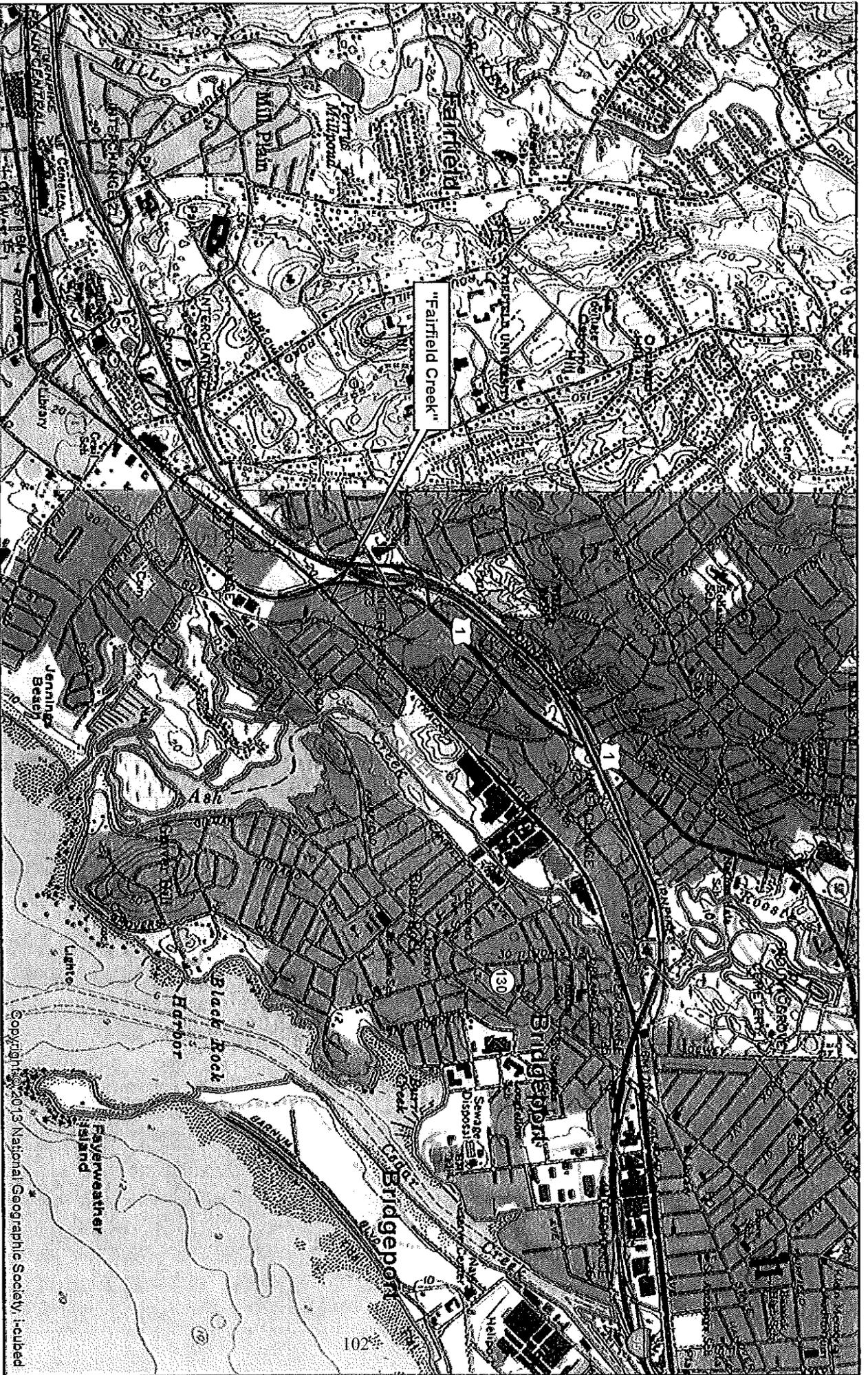
Permit #: 201609243-MG

Issued on: August 12, 2016

This Authorization expires on: **August 12, 2019**

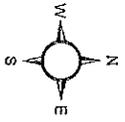
This Notice must be posted in a conspicuous place on the job during the entire project.

Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street • Hartford, CT 06106-5127
Phone: (860) 424-3034 Fax: (860) 424-4054
www.ct.gov/deep



Map data maintained by the Connecticut Departments of Environmental Protection and Public Health. Map printed by the Connecticut Department of Transportation. NDD8 Data v. June 2016

USGS LOCATION MAP
NETWORK INFRASTRUCTURE UPGRADES - PHASE II
 Project No. 300-178 (Fairfield Creek Crossing)
 Town of Fairfield

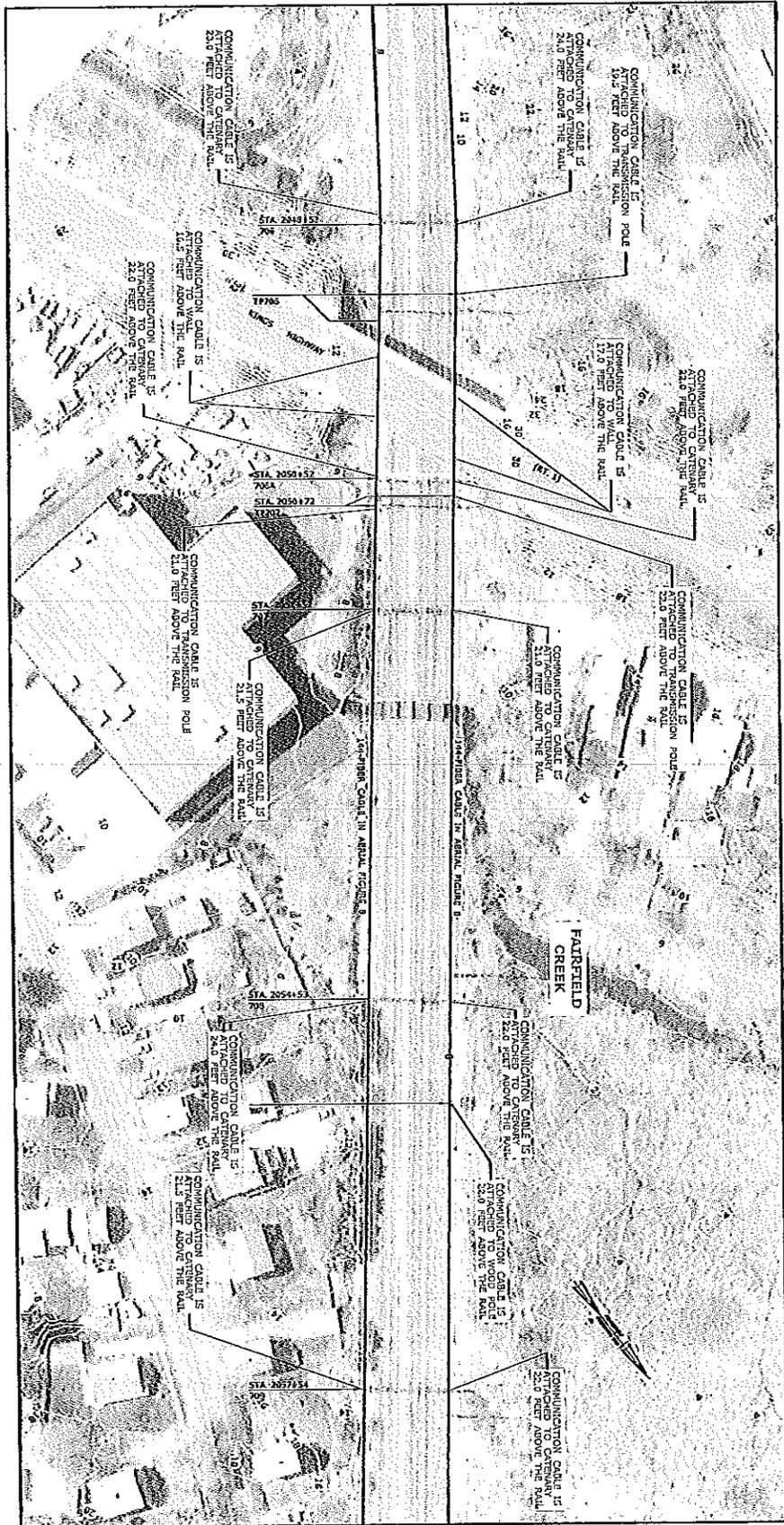


Quadrangle: 109 - Bridgeport



Connecticut Department of Transportation
 2800 Berlin Tpk., Newington, CT 06131

Copyright © 2013 National Geographic Society. Included

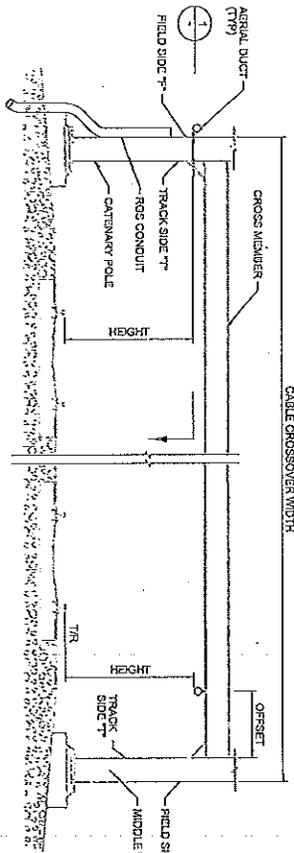


NOTE:
 1. THE COASTAL JURISDICTION LINE (CJL) ELEVATION FOR THE TOWN OF FAIRFIELD IS 5.2 FEET (NAVD83).

PROJECT TITLE	FAIRFIELD	PROJECT NO.	300-0173
DATE		DATE	
SCALE	1" = 40'	SCALE	1" = 40'
DESIGNED BY	JP/JP	CHECKED BY	JK
DRAWN BY	JK	DATE	
PROJECT NO.	300-0173	PROJECT NAME	FAIRFIELD CREEK
PROJECT LOCATION	FAIRFIELD CREEK	PROJECT DESCRIPTION	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PLAN VIEW
PROJECT OWNER	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT CONTACT	
PROJECT ADDRESS		PROJECT PHONE	
PROJECT CITY		PROJECT FAX	
PROJECT STATE	CONNECTICUT	PROJECT ZIP	
PROJECT COUNTY	FAIRFIELD	PROJECT ELEVATION	
PROJECT DISTRICT		PROJECT SHEET	03
PROJECT SUB-DISTRICT		PROJECT TOTAL SHEETS	

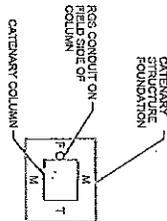
AERIAL CABLE ROUTING SCHEDULE DESCRIPTIONS

CATEGORY
INDICATES THE IDENTIFICATION NUMBERS OF THE SUPPORTING STRUCTURE IF APPLICABLE.
STRUCTURE ID #
DESIGNATES THE TYPE OF STRUCTURE THAT THE CABLE IS TO BE ATTACHED.
ATTACHMENT TYPE
DESIGNATES THE APPLICABLE ATTACHMENT TYPE TO BE USED.
ATTACHMENT SIDE
REQUIRES TO THE SIDE OF THE STRUCTURE THAT THE SUPPORTING CABLE WILL BE ATTACHED RELATIVE TO THE TRACK.
ATTACHMENT HEIGHT
DESIGNATES THE HEIGHT OF THE CABLE ATTACHMENT MEASURED FROM THE TOP OF HIGH RAIL OF ADJACENT TRACK TO BOTTOM OF AERIAL DUCT, UNLESS OTHERWISE NOTED.
OFFSET
DESIGNATES THE HORIZONTAL DISTANCE BETWEEN THE AERIAL CABLE AND THE NEAREST VERTICAL MEMBER OF THE SUPPORTING STRUCTURE. THIS DISTANCE IS MEASURED FROM THE FACE OF THE VERTICAL MEMBER TO THE CENTERLINE OF THE CABLE.
BONDING TYPE
DESIGNATES THE BONDING/GROUNDING TYPE TO BE USED.
CONDUIT CABLE DROP
PROVIDES CONDUIT AND HIDER DROP INFORMATION.
CABLE CONFIGURATION
ARRANGEMENT OF CABLE AND CONDUIT ROUTING ON THE SUPPORTING STRUCTURE.
MISCELLANEOUS
DESIGNATES ANY MISCELLANEOUS IN-SPRAY ASSEMBLIES TO BE INSTALLED.
NOTES & REMARKS
PROVIDES ADDITIONAL INFORMATION OR INDICATES SPECIAL CIRCUMSTANCES TO BE TAKEN INTO CONSIDERATION AT A GIVEN SUPPORT LOCATION.

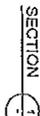


DRAWING INDEX FOR CABLE ROUTING SCHEDULE

STRUCTURE ID #	AS SHOWN ON DRAWING
STRUCTURE TYPE	SEE DWGS PG-403 THRU PG-408
ATTACHMENT TYPE	SEE DWGS PG-411 THRU PG-420
ATTACHMENT SIDE	SEE DETAIL THIS SHEET
ATTACHMENT HEIGHT	SEE DETAIL THIS SHEET
OFFSET	SEE DETAIL THIS SHEET
BONDING TYPE	SEE DWGS PG-440 THRU PG-444
CONDUIT CABLE DROP	SEE DWGS PG-215 THRU PG-216
CABLE CONFIGURATION	SEE DWGS PG-361 THRU PG-364
MISCELLANEOUS	AS SHOWN ON DRAWING
NOTES & REMARKS	AS SHOWN ON DRAWING



GROSS MEMBER NOT SHOWN FOR CLARITY



- STRUCTURE TYPE:**
- AB ANCHOR BRIDGE
 - AF AFFRAME
 - BF BUILT-UP CHANNEL WITH PLATES
 - BT HIGH TOWER STRUCTURE
 - LA PORTAL LATTICE WITH ANGLE LEGS
 - LC PORTAL LATTICE WITH CHANNEL LEGS
 - TR TRANSMISSION POLE
 - TR WALL WALL-BRIDGE ADJUTANT
 - WP WOOD BRIDGE (PODSKY)
 - WP WOOD POLE

NOTE:
1. COMMUNICATION CABLES AND BACRYNAX ARE SHOWN AS SINGLE LINE DIAGRAMS. ROUTING SCHEDULES ARE SHOWN FOR EAST OF REFERENCE AND DO NOT REFLECT ACTUAL ROUTING. REFER TO CABLE SUPPORT SCHEDULES AND NOTES FOR ATTACHMENT AND ROUTING DETAILS.

DATE	PROJECT TITLE	TOWN	SCALE
02.013	WESTPORT TO STRATFORD	WESTPORT	300'-0/175'
DESIGNER	PROJECT NO.	DATE	PROJECT NO.
SCC	100-818-A	02.013	100-818-A
NOT TO SCALE	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	271 Independence Blvd. Suite 208B Milford, CT 06461	300'-0/175' FCI-300 02.013
PROJECT NO.	PROJECT TITLE	TOWN	SCALE
100-818-A	WESTPORT TO STRATFORD	WESTPORT	300'-0/175'

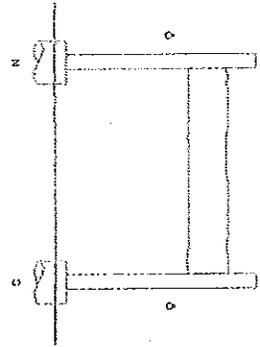


FIG. 1

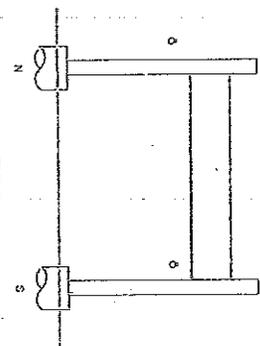


FIG. 2

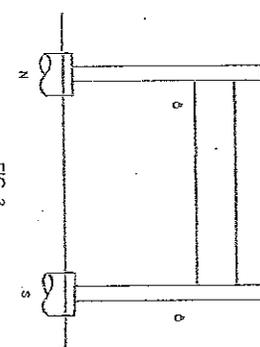


FIG. 3

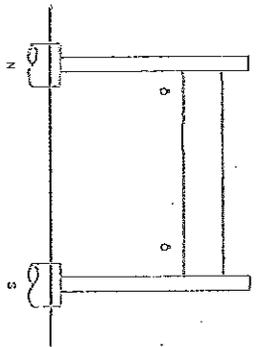


FIG. 4

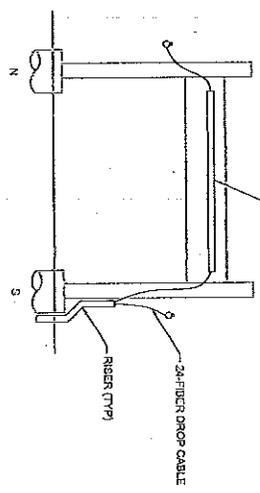


FIG. 5

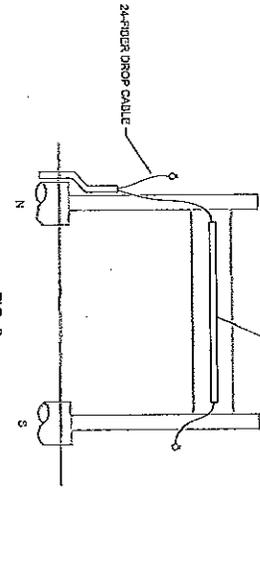


FIG. 6

- NOTES
1. VIEW IS LOOKING IN EAST DIRECTION FOR ALL FIGURES SHOWN.
 2. 'N' AND 'S' DESIGNATE NORTH AND SOUTH SIDE OF RIGHT-OF-WAY RESPECTIVELY.

PROJECT NO.	CONTRACT DESCRIPTION	DATE	SCALE	DESIGNED BY	CHECKED BY	DATE	PROJECT TITLE	DATE	PROJECT NO.					
THE APPROVED, SIGNATURE OF THE CONTRACTOR SHALL BE OBTAINED FROM THE CONTRACTOR'S OFFICE AND SHALL BE SUBMITTED TO THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION FOR REVIEW AND APPROVAL. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY EASEMENTS AND RIGHTS-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY EASEMENTS AND RIGHTS-OF-WAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY EASEMENTS AND RIGHTS-OF-WAY.							STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION			CITY Incorporated DATE 08/11/2014 PROJECT TITLE NETWORK INFRASTRUCTURE DEGRADE HAVEN LINE PHASE 2			WESTPORT TO STRATFORD CABLE CONFIGURATIONS SHEET 1 OF 4	
NOT TO SCALE							PM SOC			300-0171 03.057				

AERIAL DUCT AND MESSENGER STRAND PROPERTIES

DESIGN ITEM	UNITS	MESSENGER	FIGURE 8 AERIAL DUCT (NOTE 1)
WIRE CABLE CHARACTERISTICS	-	3/8" 7-STRAND	
MATERIAL	-	STEEL (ASTM A42-1)	
DIAMETER (EQUIVALENT DIAMETER)	IN	0.30	(2.10")
CROSS-SECTIONAL AREA	IN ²	0.070	
WEIGHT	LB/FT	0.273	0.281
RADIAL THICKNESS OF ICE	IN		0.5
WEIGHT OF ICE	LB/FT		1.022
TOTAL CABLE WEIGHT WITH ICE	LB/FT		2.358
BREAKING LOAD	LB	19,400	
EQUIVALENT SPAN	FT	200	
MODULUS OF ELASTICITY	PSI	29 X 10 ⁶	
COEFFICIENT OF EXPANSION	1/IN	6.5 X 10 ⁻⁶	

MESSENGER TENSION AND SAGS

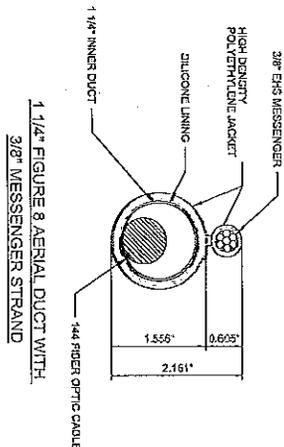
LOADING CONDITION	WIND (LB/FT)	WEIGHT (LB/FT)	TENSION (LB)	SAG (FT)	FOG
NO WIND @ 0°F	0	0.267	2550	3.00	0.04
30 MPH WIND, 1/2" ICE @ 0°F	2.030	2.300	6531	0.31	2.79
40 MPH WIND, 1/2" ICE @ 0°F	4.070	2.530	5520	0.07	2.03
50 MPH WIND, 1/2" ICE @ 0°F	1.395	0.691	3965	4.90	4.35
30 MPH WIND @ 0°F	0	0.267	3720	7.47	2.03
NO WIND, NO ICE @ -10°F	0	0.261	3000	2.25	4.63
NO WIND @ 150°F	0	0.261	2000	3.79	7.02
NO WIND, 1/2" ICE @ 32°F	0	2.250	4650	5.73	3.30

BLOWOFF AND VERTICAL SAG (FT)

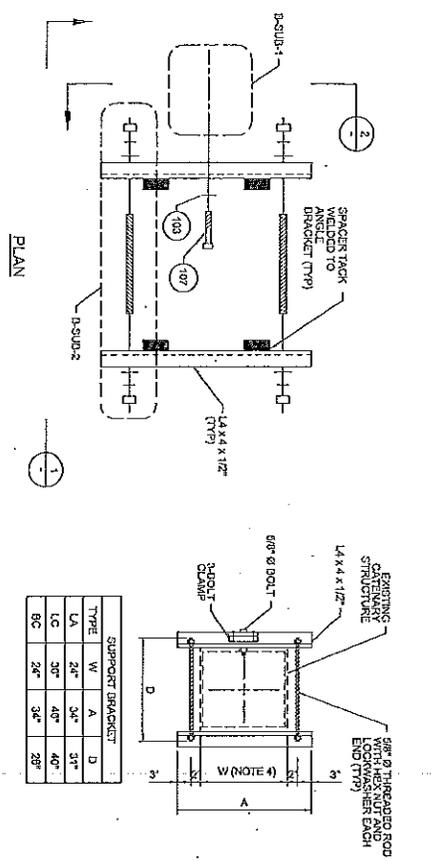
SPAN (FT)	35 MPH WIND @ 0°F		40 MPH WIND, 1/2" ICE @ 0°F	
	BLOWOFF	VERTICAL SAG	BLOWOFF	VERTICAL SAG
100	0.48	0.24	0.25	0.25
110	0.59	0.20	0.31	0.30
120	0.70	0.16	0.36	0.37
130	0.80	0.14	0.43	0.40
140	0.90	0.12	0.50	0.47
150	1.00	0.10	0.57	0.54
160	1.10	0.09	0.65	0.61
170	1.20	0.08	0.73	0.69
180	1.30	0.07	0.82	0.77
190	1.40	0.06	0.91	0.85
200	1.50	0.05	1.01	0.94
210	1.60	0.05	1.12	1.03
220	1.70	0.04	1.23	1.12
230	1.80	0.04	1.34	1.21
240	1.90	0.03	1.46	1.30
250	2.00	0.03	1.58	1.40
260	2.10	0.03	1.71	1.50
270	2.20	0.02	1.83	1.60
280	2.30	0.02	1.96	1.70
290	2.40	0.02	2.09	1.80
300	2.50	0.02	2.23	1.90
310	2.60	0.01	2.37	2.00
320	2.70	0.01	2.51	2.10

NOTES:

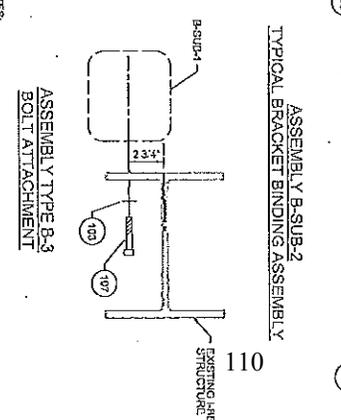
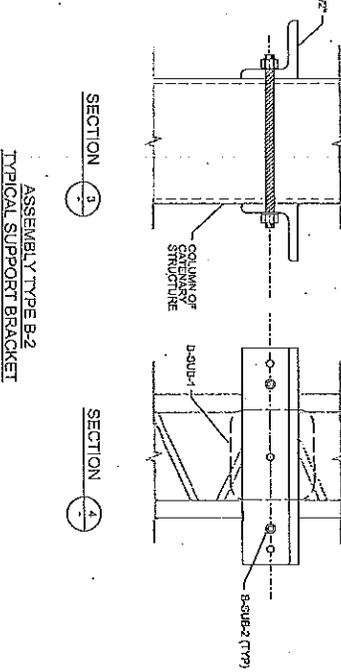
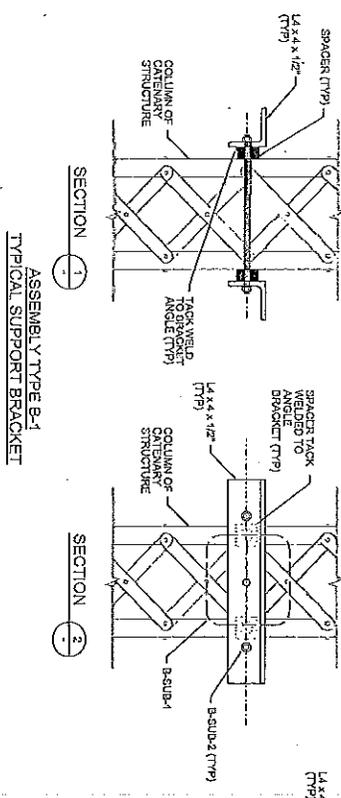
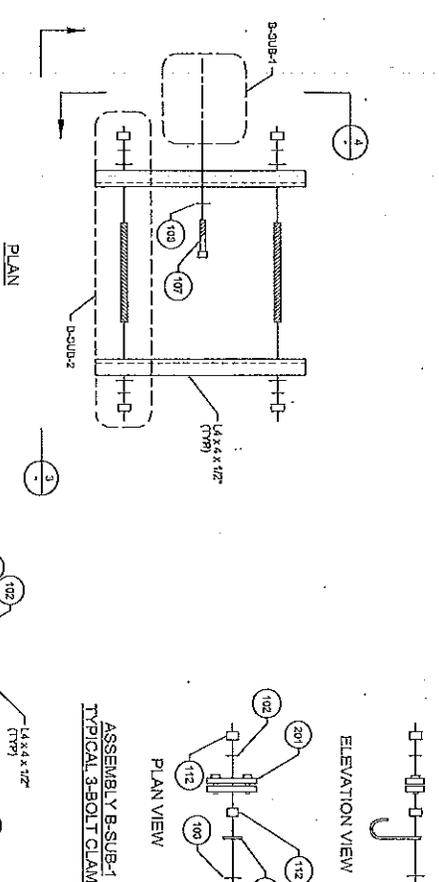
1. CONSISTS OF ENTIRE CABLE SUPPORTING FIGURE 8 SYSTEM, WHICH INCLUDES THE 1 1/2" AERIAL DUCT, AND FIBER OPTIC CABLE.
2. FOG = FACTOR OF SAFETY.
3. SAGS AND TENSIONS SHOWN IN THE TABLES ARE BASED ON AN EQUIVALENT SPAN OF 300 FT.
4. A UNIFORM WEIGHT OF 54.98 LB/FT IS ASSUMED FOR 144 FIBER OPTIC CABLE.



DATE		DRAWN BY		CHECKED BY		APPROVED BY		PROJECT NO.	
<p style="text-align: center;">THE ENGINEER, INCORPORATED, ENGINEERS ARCHITECTS 1000 WESTPORT ROAD, WESTPORT, CT 06880 TEL: (203) 261-1111 FAX: (203) 261-1112 WWW: WWW.ENRINC.COM</p>								PROFESSIONAL PW/PM BY SCC NOT TO SCALE	
STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION								PROJECT TITLE NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2	
WESTPORT TO STRATFORD FIGURE 8 CABLE DETAILS, TENSION AND SAGS								PROJECT NO. 300-017S DRAWING NO. FCI-401 DATE 04.02	

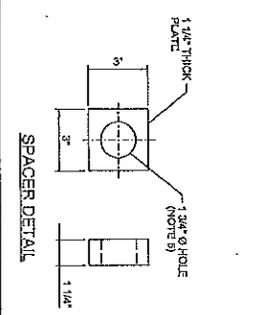


SUPPORT BRACKET				
TYPE	W	A	D	I
VA	24"	34"	31"	
LC	30"	40"	40"	
BC	24"	34"	28"	



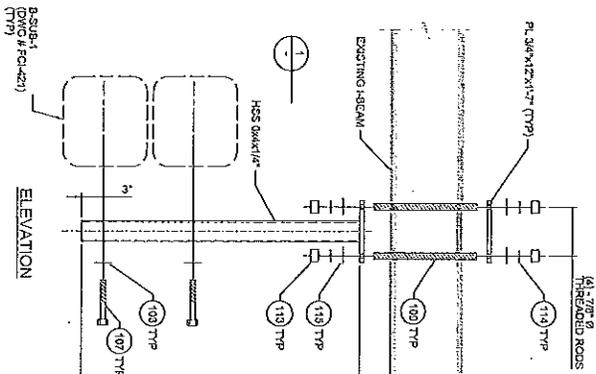
BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUAL)
		B-SUB-1	B-SUB-2	B-1	B-2	
102	5/8" LOCK WASHER	1	2	-	-	HUBBELL CHANCE 400
103	5/8" WASHER	1	2	1	1	HUBBELL CHANCE 400
107	5/8" X 42 1/2" A307 THERCADO ROD	-	1	1	1	PORTLAND BOLT REE NOTE 23
112	5/8" HEAVY HEX NUT	2	2	-	-	PORTLAND BOLT
201	3 BOLT CLAMP	1	-	-	-	ELECTRIC MOTION DIVISION
202	J-HOOK	1	1	1	1	MAGNETAN POWER SYSTEMS 22296
B-SUB-1	3 BOLT CABLE CLAMP ASSEMBLY	-	-	1	1	
B-SUB-2	SPACER BINDING ASSEMBLY	-	2	2	2	

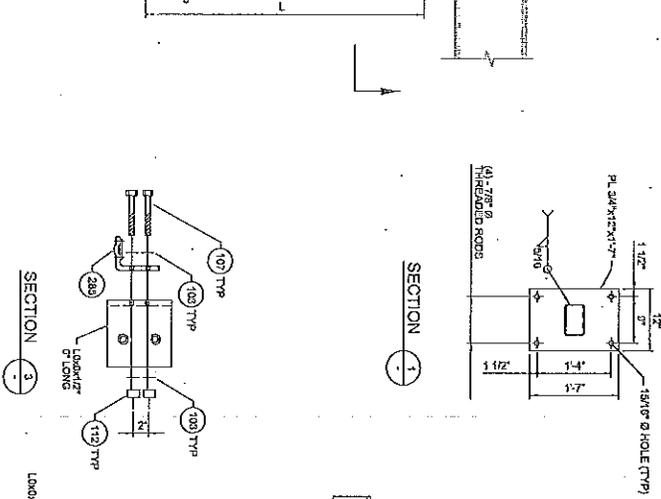


- NOTES:**
- ALL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION UNLESS OTHERWISE NOTED. ALL FIELD CUTS SHALL RECEIVE TOLERANCE OF FINISH.
 - PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
 - MANUFACTURER'S RECOMMENDATIONS.
 - LENGTH OF STEEL BRACKET AND ROD Varies DEPENDING ON STRUCTURE TYPE. CONTRACTOR SHALL VERIFY ALL MEASUREMENTS PRIOR TO FABRICATION AND INSTALLATION.
 - HOLE IN SPACER TO ALLOW FOR PROPER FIT ON INVERTED CANTENARY STRUCTURES. CONTRACTOR TO VERIFY FIT ON SITE FOR DIAMETER OF HOLE IN SPACER.
 - FOR DRILLING LOCATIONS OF STRUCTURAL ANGLES, SEE DWG # RD-422.

THE MANUFACTURER, INCLUDING SUBCONTRACTORS, SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION.	CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION.
SCALE AS NOTED	SCALE AS NOTED
WESTPORT TO STARTFORD NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2	WESTPORT TO STARTFORD NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
SHEET 1 OF 4	SHEET 1 OF 4

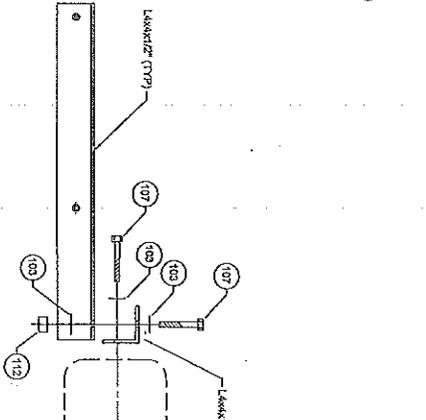


ASSEMBLY TYPE B-5B
CROSS-MEMBER ASSEMBLY

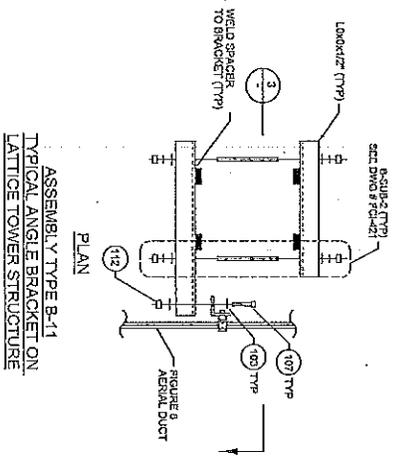


BILL OF MATERIALS

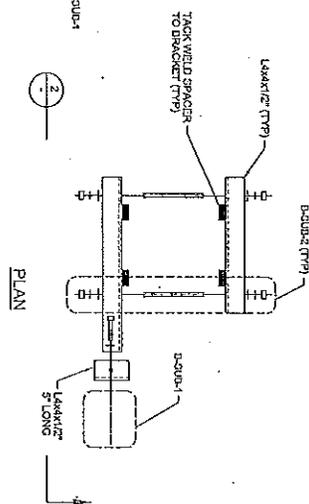
REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUIV)
		B-5B	B-1A	B-2B	B-11	
103	8/16 WASHER	2	3	3	0	HUBBELL / CHANGE 9003
107	3/8\"/>					



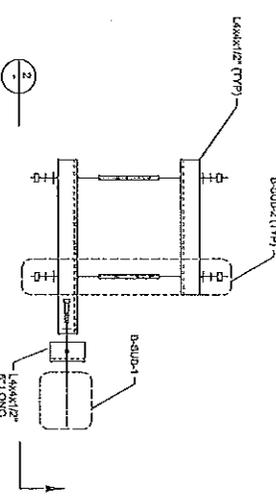
SECTION 2



ASSEMBLY TYPE B-11
TYPICAL ANGLE BRACKET ON
LATTICE TOWER STRUCTURE



ASSEMBLY TYPE B-1M
TYPICAL OFFSET BRACKET ON LATTICE STRUCTURE



ASSEMBLY TYPE B-2M
TYPICAL OFFSET BRACKET ON PORTAL LATTICE WITH CHANNEL

- NOTES:**
1. ALL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION UNLESS OTHERWISE NOTED. ALL FIELD CUTS SHALL RECEIVE TOUCHED UP PAINT.
 2. PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
 3. TORQUE ALL FASTENERS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
 4. OFFSET DETERMINED FROM VERTICAL SUPPORT SHALL BE AS SHOWN ON CABLE ROUTING PLAN DRAWINGS.
 5. FOR DRILLING OPERATIONS OF STRUCTURAL ANGLES, SEE DWG # FD-422.

<p>DATE: _____</p> <p>SCALE: AS NOTED</p>	<p style="text-align: center;">STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p> <p style="text-align: center;">DESIGNED BY: PV/M/N CHECKED BY: SCG</p>	<p style="text-align: center;">WESTPORT TO STRATFORD</p>	<p style="text-align: center;">NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW HAVEN LINE PHASE 2</p> <p style="text-align: center;">SHEET 4 OF 4</p>
<p>THE INFORMATION CONTAINED HEREIN IS THE PROPERTY OF THE STATE OF CONNECTICUT. IT IS TO BE USED ONLY FOR THE PROJECT AND LOCATION SPECIFICALLY IDENTIFIED HEREIN. IT IS NOT TO BE REPRODUCED, COPIED, OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE EXPRESS WRITTEN PERMISSION OF THE STATE OF CONNECTICUT.</p>		<p>PROJECT NO.: _____</p> <p>CONTRACT NO.: _____</p> <p>DATE: _____</p>	

August 15, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mark Alexander
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Subject: Certificate of Permission #201609244-MG
Metro North Railroad Bridge 08047R, Bridgeport & Fairfield

Dear Mr. Alexander:

Enclosed please find a copy of the certificate of permission (“certificate”) which is being issued pursuant to your application of August 4, 2016. Your attention is directed to the conditions of the enclosed certificate. All work must conform to that which is specifically authorized by this certificate. Any work in tidal wetlands or waterward of the high tide line in tidal, navigable and coastal waters of the State which has not been authorized by a valid permit or certificate is a violation of state law and subject to enforcement action by the Department of Energy and Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the certificate. Please note that Appendix B of the certificate has been enclosed for your convenience to comply with Connecticut General Statutes Section 22a-363g. Also, the Permit Notice, found at the back of your authorization, must be posted at the work area while the work is being undertaken. Please refer to the SPECIAL TERMS AND CONDITIONS of your certificate for further details.

If you have not already done so, you should contact your local Planning and Zoning Office to determine local permit requirements for your project. Also, your activity may be eligible for General Permit authorization from the U.S. Army Corps of Engineers (“Corps”). Most maintenance and reconstruction activities require no further authorization from the Corps. Other activities, generally involving work in tidal wetlands or other special aquatic sites, and in or near a federal Navigation Project or involving filling, must receive written authorization from the Corps prior to beginning work. The State of Connecticut will automatically forward this certificate to the Corps for its determination of General Permit eligibility. You do not need to apply directly to the Corps unless they notify you. For more information regarding this federal process, you may write to the Corps New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts, 02254 or call 978-318-8335 or 800-343-4789.

Sincerely,



Micheal P. Grzywinski
Senior Environmental Analyst
Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse

Enclosure – COP #201609244-MG (original cover letter, and Permit Notice; COP copy)

cc: File #201609244-MG (original COP; copy cover letter, Permit Notice)
via e-mail:

Municipal CEO for Bridgeport & Fairfield
Army Corps, c/o Susan Lee, Susan.K.Lee@usace.army.mil
Tim Casey, STV Incorporated, tim.casey@stvinc.com

CERTIFICATE OF PERMISSION

Certificate No: 201609244-MG

Municipalities: City of Bridgeport and Town of Fairfield

Site of Activity: Ash Creek off property located at catenary structures 729 and 730 Metro North Railroad Bridge 08047R

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander, Transportation Assistant Planning Director
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Pursuant to section 22a-363b of the Connecticut General Statutes (“CGS”) and in accordance with CGS sections 22a-359 to 22a-363g and 22a-98 and the Regulations of Connecticut State Agencies sections 22a-426-1 to 22a-426-9 (the Water Quality Standards) effective September 10, 2013, a certificate of permission (“certificate”) is hereby granted to install fiber optic cables on existing catenary structures for railroad infrastructure improvements as is more specifically described below in the SCOPE OF AUTHORIZATION. The work performed shall conform to the terms and conditions of this certificate.

*******NOTICE TO CERTIFICATE HOLDERS AND CONTRACTORS*******

UPON INITIATION OF ANY WORK AUTHORIZED HEREIN, THE CERTIFICATE HOLDER ACCEPTS AND AGREES TO COMPLY WITH ALL TERMS AND CONDITIONS OF THIS CERTIFICATE. FAILURE TO CONFORM TO THE TERMS AND CONDITIONS OF THIS CERTIFICATE MAY SUBJECT THE CERTIFICATE HOLDER AND ANY CONTRACTOR TO ENFORCEMENT ACTIONS, INCLUDING INJUNCTIONS AS PROVIDED BY LAW AND PENALTIES UP TO \$1,000.00 PER DAY PURSUANT TO THE ADMINISTRATIVE CIVIL PENALTY POLICY DESCRIBED IN SECTIONS 22a-6b-1 THROUGH 22a-6b-15 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES.

SCOPE OF AUTHORIZATION

The Certificate Holder is hereby authorized to conduct the following work as described in application number 201609244-MG, including one location map and ten (10) sheets of plans received August 4, 2016, submitted by the Certificate Holder to the Commissioner of Energy and Environmental Protection (“Commissioner”) and attached hereto:

1. install conduits on existing catenary towers spanning Ash Creek, including associated brackets and fiber optic cables.

SPECIAL TERMS AND CONDITIONS

1. Not later than two (2) weeks prior to the commencement of any work authorized herein, the Certificate Holder shall submit to the Commissioner, on the form attached hereto as Appendix A, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
2. The Certificate Holder shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Certificate Holder's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit. At the work area the contractor(s) shall, whenever work is being performed, make available for inspection a copy of this permit and the final plans for the work authorized herein.
3. The Certificate Holder shall post the attached Permit Notice in a conspicuous place at the work area while the work authorized herein is undertaken.
4. All work authorized herein shall be conducted using land-based equipment.
5. Except as specifically authorized by this certificate, no equipment or material including, but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site, nor shall any wetland or watercourse be used as a staging area or accessway other than as provided herein.
6. All waste material generated by the performance of the work authorized herein shall be disposed of by the Certificate Holder at an upland site approved for the disposal of such waste material, as applicable. The Certificate Holder shall not allow any waste material to enter Ash Creek.

GENERAL TERMS AND CONDITIONS

1. All work authorized by this certificate shall be completed within three (3) years from date of issuance of this certificate ("work completion date") in accordance with all conditions of this permit and any other applicable law.
 - a. The Certificate Holder may request a one-year extension of the work completion date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to said work completion date. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall be the Commissioner's sole discretion to grant or deny such request.

- b. Any work authorized herein conducted after said work completion date or any authorized one-year extension thereof is a violation of this certificate and may subject the Certificate Holder to enforcement action, including penalties, as provided by law.
2. In conducting the work authorized herein, the Certificate Holder shall not deviate from the attached plans, as may be modified by this certificate. The Certificate Holder shall not make de minimis changes from said plans without prior written approval of the Commissioner.
3. The Certificate Holder may not conduct work waterward of the coastal jurisdiction line or in tidal wetlands at this certificate site other than the work authorized herein, unless otherwise authorized by the Commissioner pursuant to CGS section 22a-359 et. seq. and/or CGS section 22a-28 et. seq.
4. The Certificate Holder shall maintain all structures or other work authorized herein in good condition. Any such maintenance shall be conducted in accordance with applicable law including, but not limited to, CGS sections 22a-28 through 22a-35 and CGS sections 22a-359 through 22a-363g.
5. In undertaking the work authorized hereunder, the Certificate Holder shall not cause or allow pollution of wetlands or watercourses, including pollution resulting from sedimentation and erosion. For purposes of this certificate, "pollution" means "pollution" as that term is defined by CGS section 22a-423.
6. Upon completion of any work authorized herein, the Certificate Holder shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.
7. The work specified in the SCOPE OF AUTHORIZATION is authorized solely for the purpose set forth in this certificate. No change in purpose or use of the authorized work or facilities as set forth in this certificate may occur without the prior written authorization of the Commissioner. The Certificate Holder shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this certificate, request authorization from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
8. The Certificate Holder shall allow any representative of the Commissioner to inspect the work authorized hereunder at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certificate.
9. This certificate is not transferable without prior written authorization of the Commissioner. A request to transfer a certificate shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Certificate Holder's obligations under this certificate shall not be affected by the passage of title to the certificate site to any other person or municipality until such time as a transfer is authorized by the Commissioner.

10. Any document required to be submitted to the Commissioner under this certificate or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:

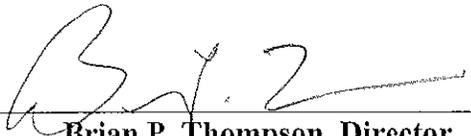
Permit Section
Office of Long Island Sound Programs
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034
Fax # (860) 424-4054

11. The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this certificate, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this certificate, the word "day" as used in this certificate means calendar day. Any document or action which is required by this certificate to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
12. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by Certificate Holder and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."
13. In evaluating the application for this certificate the Commissioner has relied on information and data provided by the Certificate Holder and on the Certificate Holder's representations concerning site conditions, design specifications and the proposed work authorized herein, including but not limited to representations concerning the commercial, public or private nature of the work or structures authorized herein, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
14. In granting this certificate, the Commissioner has relied on all representations of the Certificate Holder, including information and data provided in support of the Certificate Holder's application. Neither the Certificate Holder's representations nor the issuance of this certificate shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.

15. In the event that the Certificate Holder becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this certificate or of any document required hereunder, the Certificate Holder shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the Certificate Holder shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the Certificate Holder shall comply with any dates which may be approved in writing by the Commissioner. Notification by the Certificate Holder shall not excuse noncompliance or delay and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the Commissioner in writing.
16. This certificate may be revoked, suspended, or modified in accordance with applicable law.
17. The issuance of this certificate does not relieve the Certificate Holder of their obligations to obtain any other approvals required by applicable federal, state and local law.
18. This certificate is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

Issued on August 12, 2016.

STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION



Brian P. Thompson, Director
Office of Long Island Sound Programs
Bureau of Water Protection & Land Reuse

Certificate of Permission No. 201609244-MG, Bridgeport and Fairfield
Connecticut Department of Transportation

OFFICE OF LONG ISLAND SOUND PROGRAMS

APPENDIX A

TO: Permit Section
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Certificate No: 201609244-MG, Bridgeport and Fairfield

CONTRACTOR 1: _____

Address: _____

Telephone #: _____

CONTRACTOR 2: _____

Address: _____

Telephone #: _____

CONTRACTOR 3: _____

Address: _____

Telephone #: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

PERMITTEE: _____

(signature)

(date)



PERMIT NOTICE

This Certifies that Authorization to perform work below the Coastal Jurisdiction Line and/or within Tidal Wetlands of coastal, tidal, or navigable waters of Connecticut

Has been issued to: **Connecticut Department of Transportation**

At this location: **Ash Creek off Metro North Railroad Bridge 08047R, Bridgeport & Fairfield**

To conduct the following: **install fiber optic conduits and cables.**

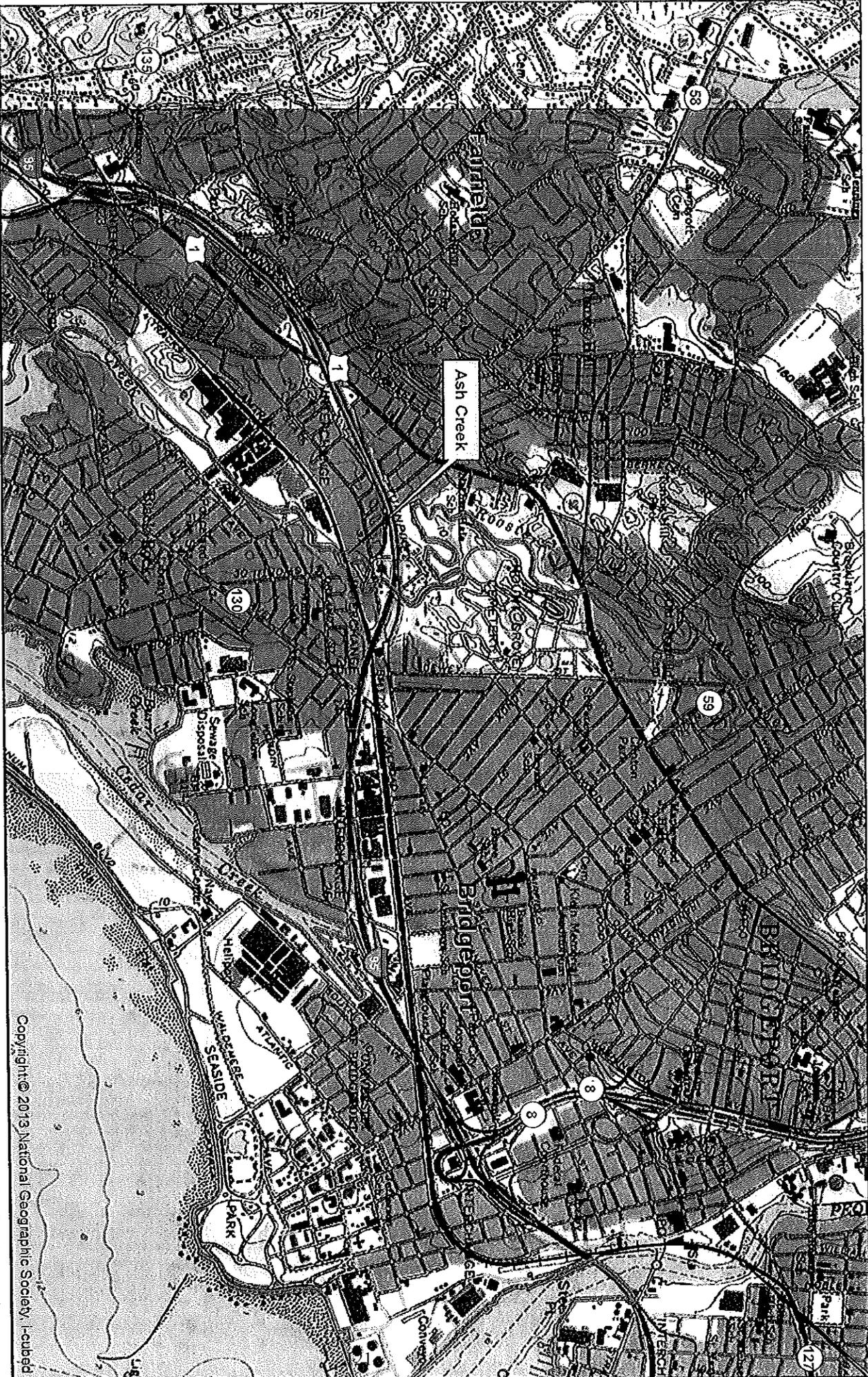
Permit #: 201609244-MG

Issued on: August 12, 2016

This Authorization expires on: **August 12, 2019**

This Notice must be posted in a conspicuous place on the job during the entire project.

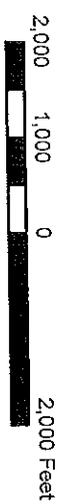
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street • Hartford, CT 06106-5127
Phone: (860) 424-3034 Fax: (860) 424-4054
¹²⁰
www.ct.gov/deep



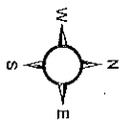
Map data maintained by the Connecticut Departments of Environmental Protection and Public Health. Map printed by the Connecticut Department of Transportation. NDD8 Data v. June 2016

Copyright © 2013 National Geographic Society. I-cubed

Quadrangle: 109 - Bridgeport



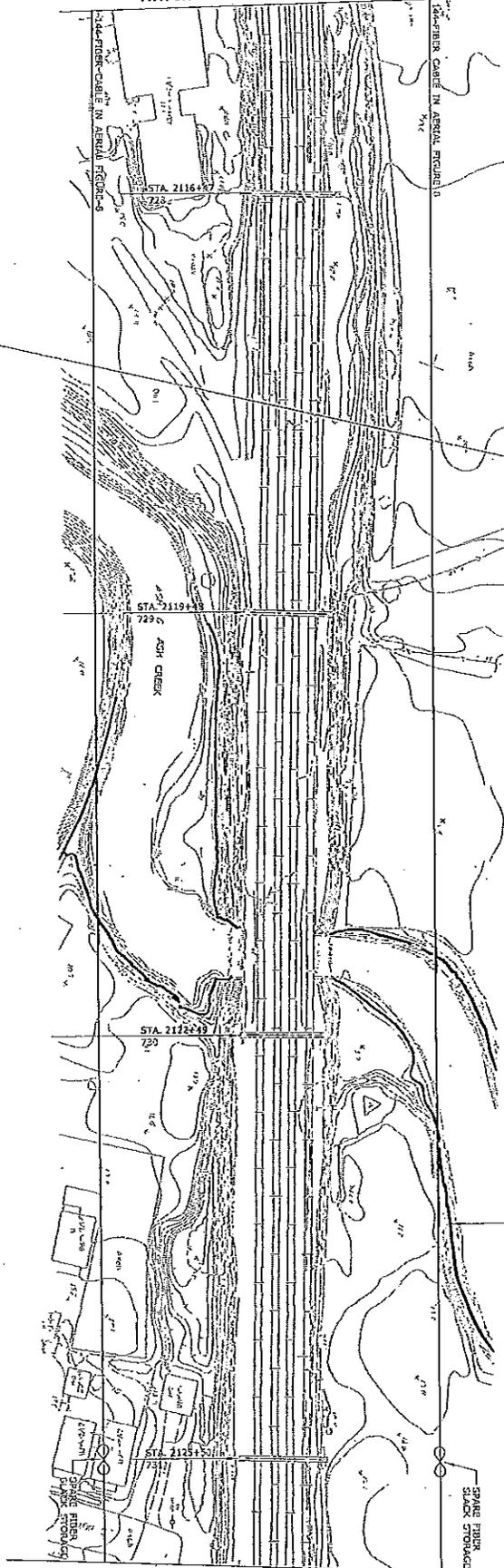
USGS LOCATION MAP
NETWORK INFRASTRUCTURE UPGRADES - PHASE II
 Project No. 300-178 (Ash Creek Crossing)
 Town of Fairfield




Connecticut Department of Transportation
 2800 Berlin Tpk., Newington, CT 06131

MATCH LINE - SEE DWG. NO. FCI-326

STRUCTURE ID #	728	729	730	731
STRUCTURE TYPE	LA	LA	LA	LA
ATTACHMENT TYPE	B-1	B-1	B-1	B-1
ATTACHMENT SIDE	F	F	F	F
ATTACHMENT HEIGHT	10'	18.5'	10'	18.5'
OPERSE	-	-	-	-
BONDING TYPE	-	G-2	-	G-1
CONDUIT CABLE DROP	-	-	-	-
CABLE CONFIGURATION	FIG. 1	FIG. 1	FIG. 1	FIG. 1
MISCELLANEOUS	-	-	-	SI-1
NOTES & REMARKS	-	-	-	-



MATCH LINE - SEE DWG. NO. FCI-328

STRUCTURE ID #	728	729	730	731
STRUCTURE TYPE	LA	LA	LA	LA
ATTACHMENT TYPE	B-1	B-1	B-1	B-1
ATTACHMENT SIDE	F	F	F	F
ATTACHMENT HEIGHT	20'	20.5'	10'	18'
OPERSE	-	G-2	-	G-1
BONDING TYPE	-	-	-	-
CONDUIT CABLE DROP	-	-	-	-
CABLE CONFIGURATION	FIG. 1	FIG. 1	FIG. 1	FIG. 1
MISCELLANEOUS	-	-	-	SI-1
NOTES & REMARKS	-	-	-	-

NOTE
1. FOR CABLE ROUTING SCHEDULE, NOTES, ABBREVIATIONS,
AND LEGEND, SEE DWG. NO. FCI-328.

PROJECT NUMBER	728	729	730	731
SHEET NO.	1	2	3	4
DATE				
DESIGNED BY				
CHECKED BY				
APPROVED BY				
 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION				
NETWORK INFRASTRUCTURE UPGRADE PLAN SECURITY NEW PHASE 2				
WESTPORT TO STRATFORD CABLE ROUTING PLAN CAT. NO. 728 TO 731				
300-6178 PROJECT NO. FCI-327 SHEET NO.				

AERIAL DUCT AND MESSENGER STRAND PROPERTIES

DESIGN ITEM	UNITS	MESSENGER	FIGURE 8 AERIAL DUCT (NOTE 1)
WIND CABLE CHARACTERISTICS		3/8" / 7-STRAND	
MATERIAL		STEEL (GALV)	
DIAMETER (EQUIVALENT DIAMETER)	IN	0.30	2.161
GROSS-SECTIONAL AREA	IN ²	0.079	
WEIGHT	LB/FT	0.273	0.881
WEIGHT OF ICE	LB/FT		0.3
TOTAL CABLE WEIGHT WITH ICE	LB/FT		1.085
BREAKING LOAD	LB	15,400	2,390
EQUIVALENT SPAN	FT	300	
MODULUS OF ELASTICITY	PSI	29 x 10 ⁶	
Coefficient of Expansion	7/8"	0.3 x 10 ⁻⁶	

MESSENGER TENSION AND SAGS

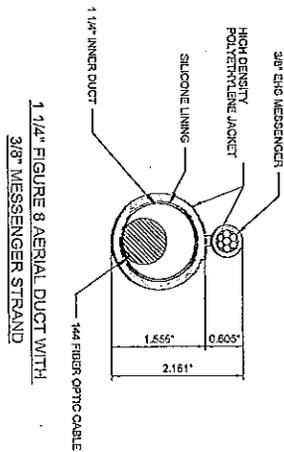
LOADING CONDITION	WIND (LBF/FT)	WEIGHT (LBF/FT)	TENSION (LBS)	SAG (FT)	FOG
NO WIND @ 80°F	0	0.281	2520	3.00	6.04
50 MPH WIND, 1/2" ICE @ 94°	2,038	2,338	5331	6.31	2.10
40 MPH WIND, 1/2" ICE @ 94°	1,070	2,305	5228	6.07	2.89
50 MPH WIND @ 80°F	1,395	0.281	3585	4.30	4.32
50 MPH WIND @ 00°F	2,724	0.281	5720	7.47	2.89
NO WIND, NO ICE @ -18°F	0	0.281	3379	2.25	4.45
NO WIND @ 110°F	0	0.281	2020	3.79	7.02
NO WIND, 1/2" ICE @ 32°F	0	2,300	4,895	5.73	3.16

BLOWOFF AND VERTICAL SAG (FT)

SPAN (FT)	55 MPH WIND @ 00°F		40 MPH WIND, 1/2" ICE @ 00°F	
	BLOWOFF	VERTICAL SAG	BLOWOFF	VERTICAL SAG
100	0.49	0.24	0.26	0.33
110	0.59	0.29	0.31	0.40
120	0.70	0.34	0.36	0.47
130	0.83	0.40	0.42	0.55
140	0.96	0.47	0.50	0.62
150	1.10	0.54	0.57	0.70
160	1.25	0.61	0.65	0.78
170	1.41	0.68	0.73	0.86
180	1.58	0.77	0.82	0.95
190	1.77	0.86	0.91	1.04
200	1.96	0.96	1.01	1.13
210	2.16	1.06	1.12	1.22
220	2.37	1.18	1.23	1.31
230	2.58	1.29	1.34	1.40
240	2.82	1.39	1.46	1.49
250	3.06	1.49	1.58	1.58
260	3.31	1.61	1.71	1.67
270	3.56	1.74	1.83	1.76
280	3.83	1.87	1.95	1.85
290	4.11	2.01	2.13	1.94
300	4.40	2.15	2.28	2.03
310	4.70	2.29	2.43	2.12
320	5.01	2.45	2.59	2.21

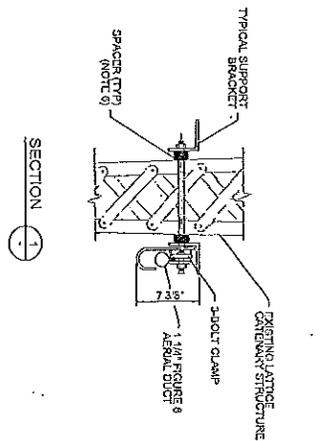
NOTES:

1. CONSISTS OF ENTIRE SELF-SUPPORTING FIGURE 8 SYSTEM WHICH INCLUDES THE MESSENGER STRAND, 1 1/4" DUCT, AND FIBER OPTIC CABLE PER DOWNLINE ON APPROVED EQUAL.
2. FOG = FACTOR OF SAFETY.
3. SAGS AND TENSIONS SHOWN IN THE TABLES ARE BASED ON AN EQUIVALENT SPAN OF 300 FT.
4. A UNIFORM WEIGHT OF 0.180 LB/FT IS ASSUMED FOR 144 FIBER OPTIC CABLE.

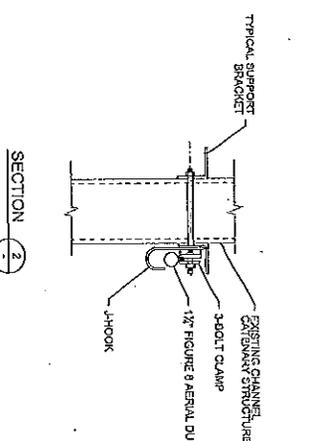
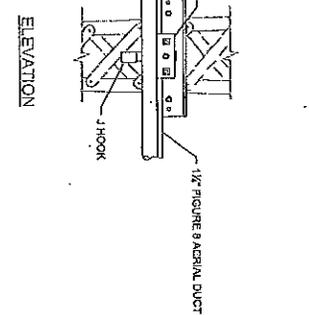


1 1/4" FIGURE 8 AERIAL DUCT WITH 3/8" MESSENGER STRAND

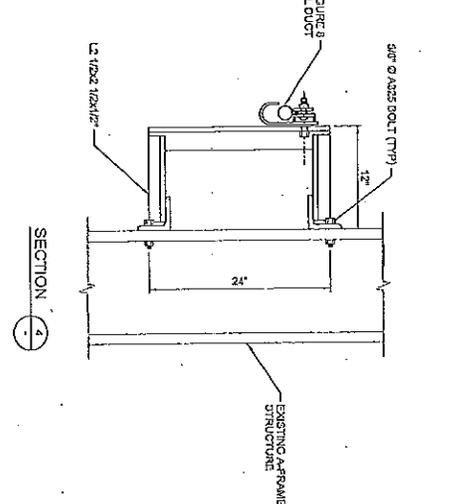
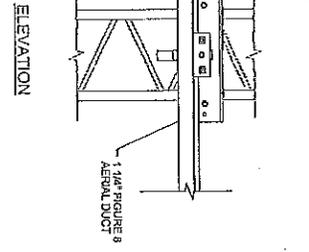
PROJECT NO.	PROJECT TITLE	DATE
300-0178	WESTPORT TO STRATFORD NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2	04.02
DESIGNED BY	PROJECT NO.	DATE
FCI-401	300-0178	04.02
CHECKED BY	PROJECT TITLE	DATE
FCI-401	WESTPORT TO STRATFORD NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2	04.02
APPROVED BY	PROJECT NO.	DATE
FCI-401	300-0178	04.02
DATE	PROJECT TITLE	DATE
04.02	WESTPORT TO STRATFORD NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2	04.02



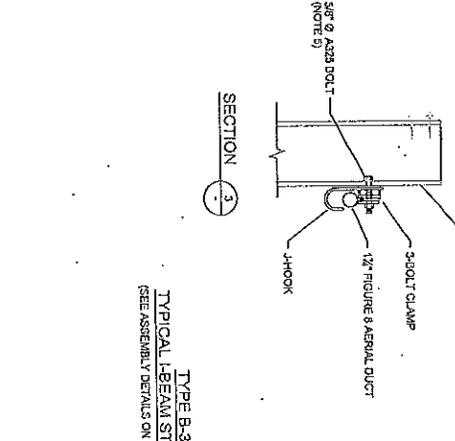
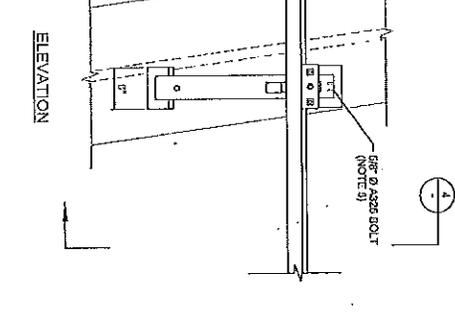
SECTION 1
TYPICAL PORTAL LATTICE WITH CHANNEL
(SEE ASSEMBLY DETAILS ON DWG # FC1-421)



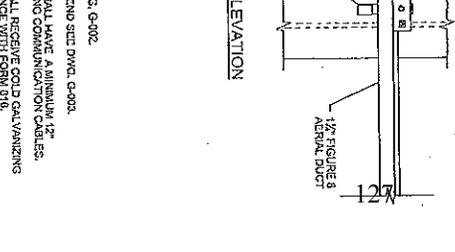
SECTION 2
TYPICAL BEAM STRUCTURE
(SEE ASSEMBLY DETAILS ON DWG # FC1-421)



SECTION 1
TYPICAL LATTICE STRUCTURE
(SEE ASSEMBLY DETAILS ON DWG # FC1-421)

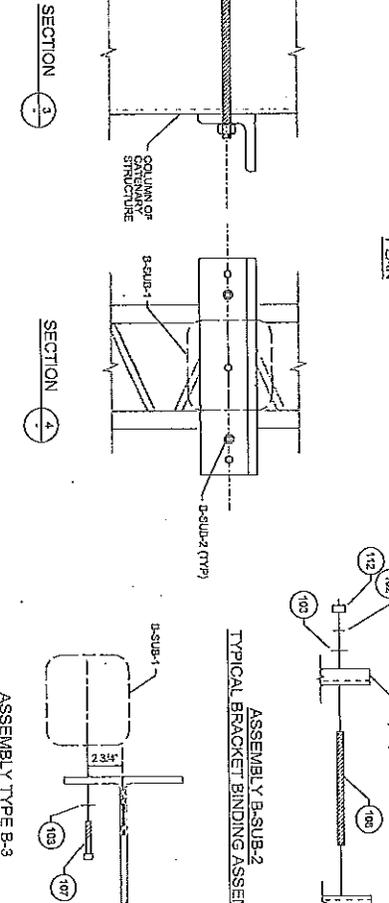
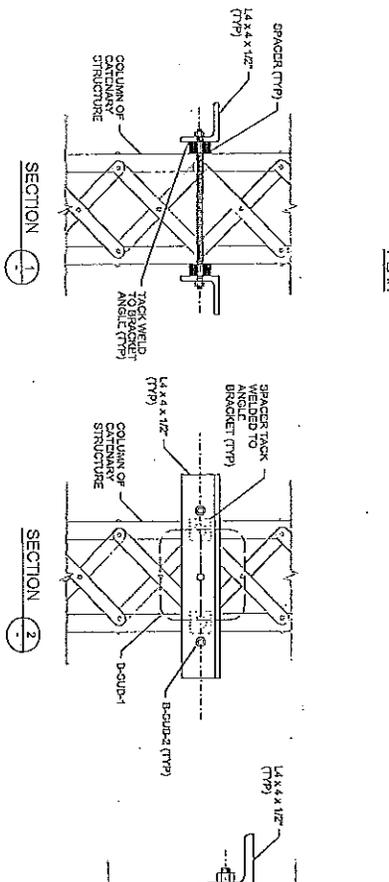
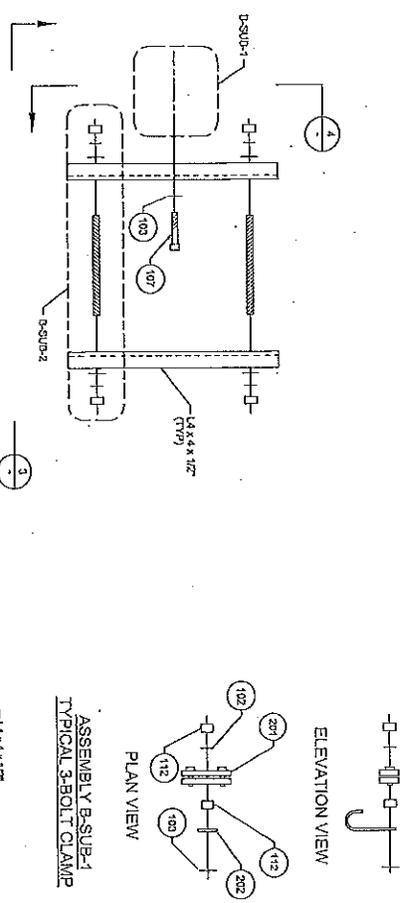
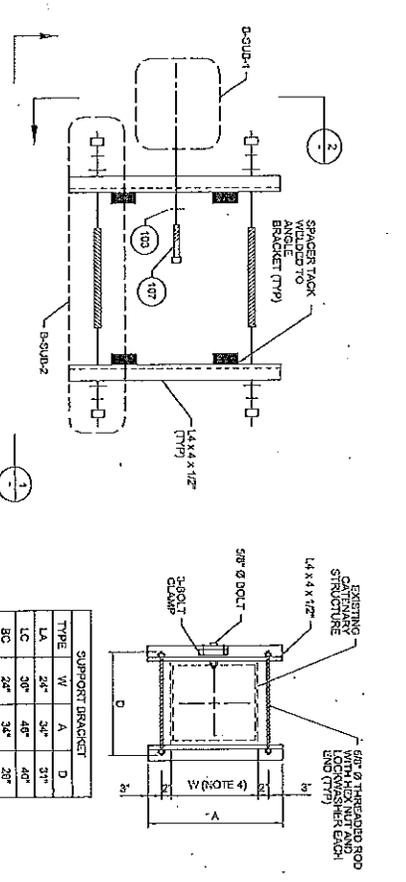


SECTION 2
TYPICAL BEAM STRUCTURE
(SEE ASSEMBLY DETAILS ON DWG # FC1-421)



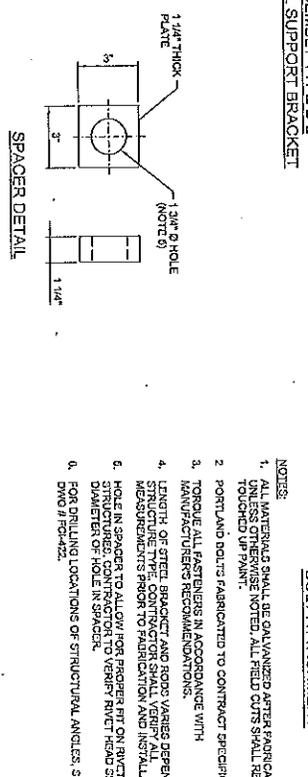
- NOTES:**
1. FOR GENERAL NOTES SEE DWG. G-002.
 2. FOR ABREVIATIONS AND LEGEND SEE DWG. G-003.
 3. THE FIGURE 8 AERIAL DUCT SHALL HAVE A MINIMUM 12\"/>

PROJECT NO.	300-0178
DATE	FCI-411
REVISED DATE	04.09
PROJECT DESCRIPTION	WESTPORT TO STRATFORD ATTACHMENT DETAILS
SHEET NO.	SHEET 1 OF 4
SCALE	AS SHOWN
DESIGNED BY	SCC
CHECKED BY	PM
APPROVED BY	APPROVED
DATE	
<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	
<p>31V Infrastructure 100 Park Road Hartford, CT 06111</p>	
<p>NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2</p>	



BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART # / DETAIL (OR APPROVED EQUAL)
		B-SUB-1	B-SUB-2	B-1	B-2	B-3
102	JIF LOCK WASHER	1	2	1	1	1
103	1/8" WASHER	1	2	1	1	1
107	5/8" Ø A325 BOLT	1	2	1	1	1
108	5/8" Ø A325 THREADED ROD	1	2	1	1	1
112	5/8" HEAVY HEX NUT	2	2	1	1	1
201	3 BOLT CLAMP	1	1	1	1	1
202	J-HOOK	1	1	1	1	1
B-SUB-1	3 BOLT CABLE CLAMP ASSEMBLY	1	1	1	1	1
B-SUB-2	BRACKET BINDING ASSEMBLY	1	1	1	1	1
-	SPACER	1	1	1	1	1



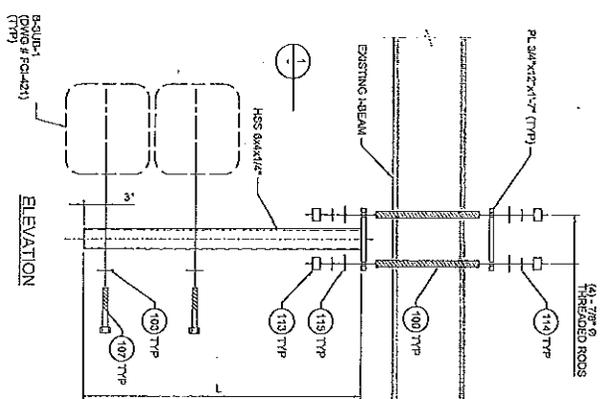
STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

WESTPORT TO STARTPORT
ASSEMBLY DETAILS
SHEET 1 OF 4

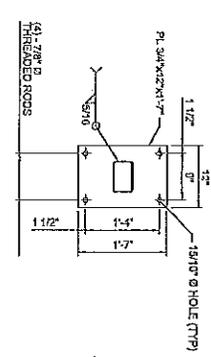
300-0128
FCI-421
04.019

NOTES:

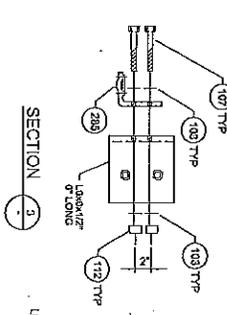
- MATERIALS SHALL BE GALVANIZED AFTER FABRICATION UNLESS OTHERWISE NOTED. ALL FIELD CUTS SHALL RECEIVE TOUCHED UP PAINT.
- PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
- TORQUE ALL FASTENERS IN ACCORDANCE WITH HANDBOOK'S RECOMMENDATIONS.
- LENGTH OF STEEL BRACKET AND ROD VARIES DEPENDING ON MANUFACTURER'S PRACTICE TO FABRICATION AND INSTALLATION. MEASURE PARTS PRIOR TO FABRICATION.
- HOLE IN SPACER TO ALLOW FOR RESERVE PIT ON UNITS CANTENARY DIAMETER OF HOLE IN SPACER.
- FOR DRILLING LOCATIONS OF STRUCTURAL ANGLES, SEE DWG # FC-422.



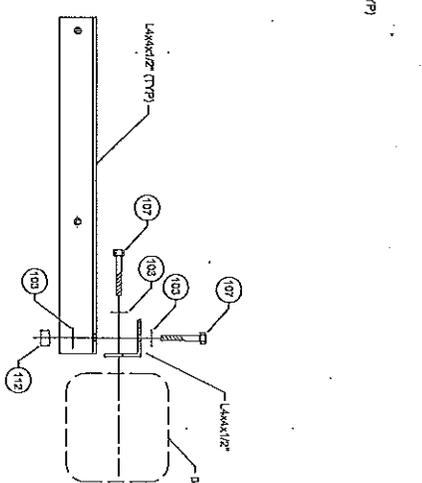
ASSEMBLY TYPE B-5B
CROSS-MEMBER ASSEMBLY



SECTION 1

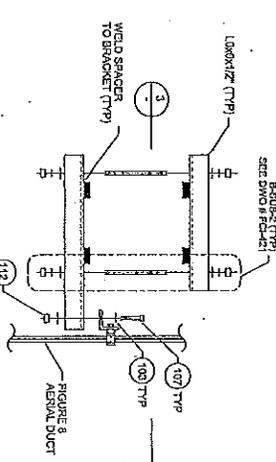


SECTION 3



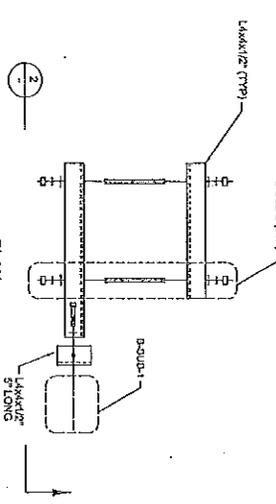
PLAN

ASSEMBLY TYPE B-1M
TYPICAL OFFSET BRACKET ON LATTICE STRUCTURE



PLAN

ASSEMBLY TYPE B-11
TYPICAL ANGLE BRACKET ON
LATTICE TOWER STRUCTURE



PLAN

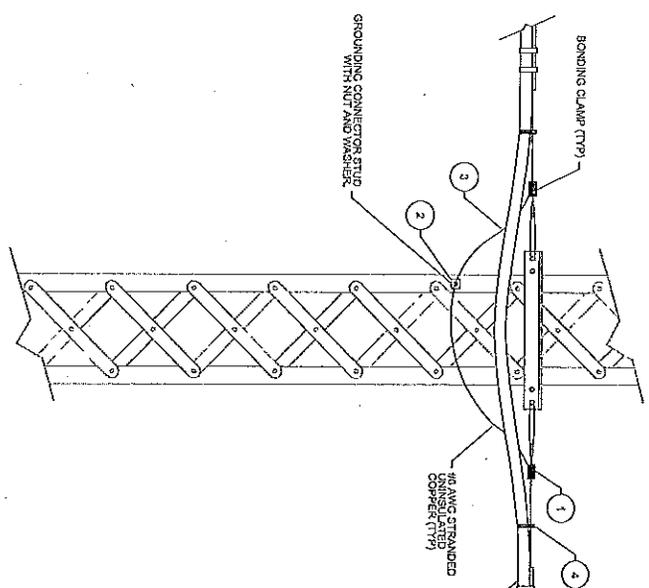
ASSEMBLY TYPE B-2M
TYPICAL OFFSET BRACKET ON PORTAL LATTICE WITH CHANNEL

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY				MANUFACTURER PART #/DETAIL (OR APPROVED EQUIV.)
		D-50	D-104	B-2M	B-1	
103	6/8 WASHER	2	3	3	8	HUBBELL / CHANCE 8806
107	5/8 x 12 AS2S BOLT	2	2	2	4	PORTLAND BOLT (SEE NOTE 2)
109	7/8 x 12 THREADED ROD	4	4	1	4	FIELD BOLT
112	6/8 HEAVY HEX NUT	1	1	1	1	PORTLAND BOLT
113	7/8 HEAVY HEX NUT	8	8	1	1	HUBBELL / CHANCE 8806/8809
114	7/8 LOCK WASHER	8	8	1	1	HUBBELL / CHANCE 8808/8807
200	WASHER SUPPORT BRACKET	1	1	1	1	
B-SUB-1	3/4x12 CABLE CLAMP ASSEMBLY (SEE DWG # FC-421)	2	1	1	1	
D-SUB-2	BRACKET BANDING ASSEMBLY (SEE DWG # FC-421)	2	2	2	2	
-	SPACER (DWG # FC-421)	4	4	1	4	

BILL OF MATERIALS

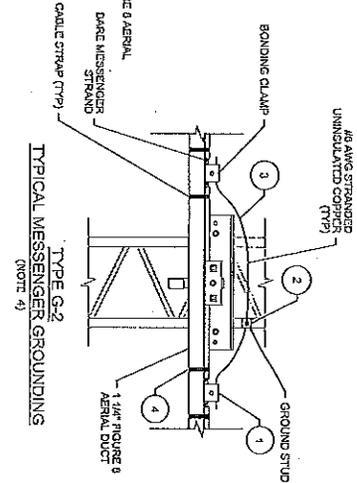
- NOTES:
1. ALL MATERIALS SHALL BE GALVANIZED AFTER FABRICATION UNLESS OTHERWISE NOTED. ALL FIELD CUTS SHALL RECEIVE TOUCHED UP PAINT.
 2. PORTLAND BOLTS FABRICATED TO CONTRACT SPECIFICATIONS.
 3. TORQUE ALL FASTENERS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
 4. OFFSET DISTANCE FROM VERTICAL SUPPORT SHALL BE AS SHOWN ON CABLE ROUTING PLAN DRAWINGS.
 5. FOR DRILLING LOCATIONS OF STRUCTURAL ANGLES SEE DWG # FC-422.

PROJECT NO.	300-0178
DATE	04/02/22
SCALE	AS NOTED
DESIGNED BY	PM/MN
CHECKED BY	SCC
APPROVED BY	SCC
DATE	04/02/22
PROJECT TITLE	WESTPORT TO STRATFORD
SHEET NO.	ASSEMBLY DETAILS
TOTAL SHEETS	4 OF 4
CONTRACT NO.	FCI-424
CONTRACT DATE	04/02/22
CONTRACT DESCRIPTION	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2
CONTRACT LOCATION	WESTPORT TO STRATFORD
CONTRACT DRAWING NO.	ASSEMBLY DETAILS
CONTRACT SHEET NO.	4 OF 4
CONTRACT DATE	04/02/22
CONTRACT DESCRIPTION	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY PHASE 2
CONTRACT LOCATION	WESTPORT TO STRATFORD
CONTRACT DRAWING NO.	ASSEMBLY DETAILS
CONTRACT SHEET NO.	4 OF 4
CONTRACT DATE	04/02/22

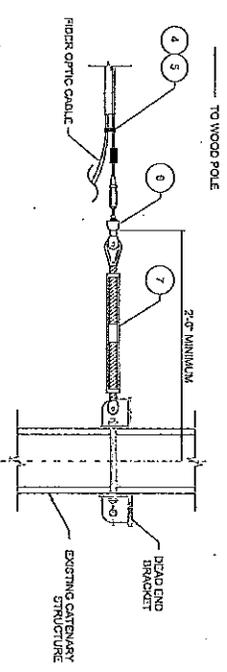


TYPE G-1
TYPICAL MESSENGER GROUNDING
(NOTE 4)

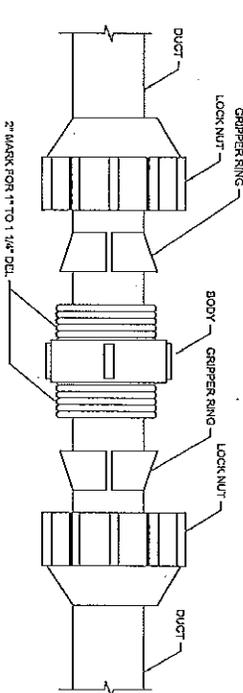
- NOTES:
- GROUNDING SHALL OCCUR AT EVERY 700 FEET MAXIMUM. MESSENGER STRANDS SHALL BE GROUNDING AT ALL DEAD END LOCATIONS.
 - HOLES SHALL BE DRILLED NO LESS THAN ONE INCH FROM EDGE OF STEEL STRUCTURE FOR SERVICE FOOT GROUNDING STUD AND USING MACHINE DRILL BITS. STEEL STRUCTURE SHALL BE PREPARED AND STUD SHALL BE SECURED WITH FLANGED LOCK CONNECTION TO STEEL STRUCTURE AND SHALL BE TREATED WITH APPROVED ANTI-OXIDANT GREASE AFTER INSTALLATION.
 - FOR DETAILS OF MESSENGER GROUNDING SEE SPECIFICATIONS.
 - TYPICAL BONDING SHOWN APPLIES TO ALL METALLIC STRUCTURE TYPES.



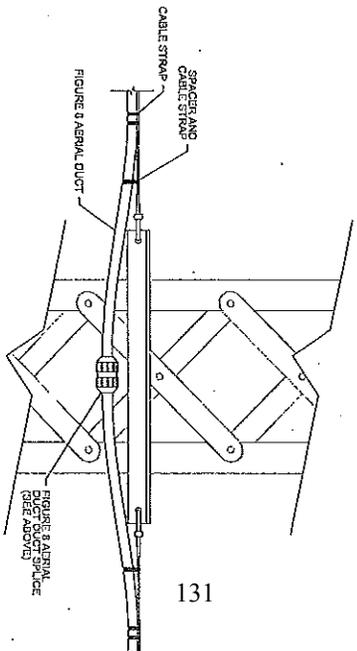
TYPE G-2
TYPICAL MESSENGER GROUNDING
(NOTE 4)



IS-1
ISOLATION DETAIL BETWEEN WOOD POLE AND EXISTING CATENARY STRUCTURE



ASSEMBLY OF SPLICE



COMPLETED SPLICE
TYPICAL AERIAL DUCT COMPRESSION SPLICE
DUPLICATE (FOR TECHNOLOGY) PART NO. 062502310V (OR APPROVED EQUIVA)

BILL OF MATERIALS

REF #	DESCRIPTION	QUANTITY PER ASSEMBLY	MANUFACTURER PART # / DETAIL (OR APPROVED EQUIVA)
1	BONDING CLAMP	2	TYPE G-1
2	GROUND CONNECTOR STUD	1	TYPE G-2
3	1/8\"/>		
4	CABLE STRAP	AS REQUIRED	AS REQUIRED
5	CABLE / EYE SPOOL STRAIN INSULATOR	2	AS REQUIRED
6	JAW EYE FORGED STEEL TURNBUCKLE	1	AS REQUIRED
7		1	AS REQUIRED

PROJECT NO. SHEET NO. SHEET 1 OF 2	 STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	PROJECT TITLE NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW HAVEN PHASE 2	DRAWING TITLE WESTPORT TO STRATFORD GROUNDING DETAILS SHEET 1 OF 2
THE ENGINEER, INCLUDING CONTRACTOR, SHALL BE RESPONSIBLE FOR THE DESIGN OF THE WORK WHICH SHALL BE INDICATED BY THE WORDS WHICH ARE IN ITALICS.	APPROVED BY: _____ PROJECT MANAGER: _____ DATE: _____	PROJECT NO.: _____ SHEET NO.: _____ SHEET 1 OF 2	PROJECT NO.: _____ SHEET NO.: _____ SHEET 1 OF 2

August 15, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mark Alexander
Connecticut Department of Transportation
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Subject: Certificate of Permission #201609247-MG
Metro North Railroad Bridge 08064R, Bridgeport

Dear Mr. Alexander:

Enclosed please find a copy of the certificate of permission ("certificate") which is being issued pursuant to your application of August 4, 2016. Your attention is directed to the conditions of the enclosed certificate. All work must conform to that which is specifically authorized by this certificate. Any work in tidal wetlands or waterward of the high tide line in tidal, navigable and coastal waters of the State which has not been authorized by a valid permit or certificate is a violation of state law and subject to enforcement action by the Department of Energy and Environmental Protection and the Office of the Attorney General.

Your initiation of authorized activities will be relied upon as your agreement to comply with the terms and conditions of the certificate. Please note that Appendix B of the certificate has been enclosed for your convenience to comply with Connecticut General Statutes Section 22a-363g. Also, the Permit Notice, found at the back of your authorization, must be posted at the work area while the work is being undertaken. Please refer to the SPECIAL TERMS AND CONDITIONS of your certificate for further details.

If you have not already done so, you should contact your local Planning and Zoning Office to determine local permit requirements for your project. Also, your activity may be eligible for General Permit authorization from the U.S. Army Corps of Engineers ("Corps"). Most maintenance and reconstruction activities require no further authorization from the Corps. Other activities, generally involving work in tidal wetlands or other special aquatic sites, and in or near a federal Navigation Project or involving filling, must receive written authorization from the Corps prior to beginning work. The State of Connecticut will automatically forward this certificate to the Corps for its determination of General Permit eligibility. You do not need to apply directly to the Corps unless they notify you. For more information regarding this federal process, you may write to the Corps New England Division, Regulatory Branch, 696 Virginia Road, Concord, Massachusetts, 02254 or call 978-318-8335 or 800-343-4789.

Sincerely,



Micheal P. Grzywinski
Senior Environmental Analyst
Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse

Enclosure – COP #201609247-MG (original cover letter, and Permit Notice; COP copy)

cc: File #201609247-MG (original COP; copy cover letter, Permit Notice)
via e-mail:

Municipal CEO for Bridgeport
Army Corps, c/o Susan Lee, Susan.K.Lee@usace.army.mil
Tim Casey, STV Incorporated, tim.casey@stvinc.com



CERTIFICATE OF PERMISSION

Certificate No: 201609247-MG

Municipality: City of Bridgeport

Site of Activity: Pequonnock River off property located at catenary structures 783B and 783E Metro North Railroad Bridge 08064R

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander, Transportation Assistant Planning Director
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Pursuant to section 22a-363b of the Connecticut General Statutes (“CGS”) and in accordance with CGS sections 22a-359 to 22a-363g and 22a-98 and the Regulations of Connecticut State Agencies sections 22a-426-1 to 22a-426-9 (the Water Quality Standards) effective September 10, 2013, a certificate of permission (“certificate”) is hereby granted to install fiber optic cables on existing catenary structures for railroad infrastructure improvements as is more specifically described below in the SCOPE OF AUTHORIZATION. The work performed shall conform to the terms and conditions of this certificate.

*******NOTICE TO CERTIFICATE HOLDERS AND CONTRACTORS*******

UPON INITIATION OF ANY WORK AUTHORIZED HEREIN, THE CERTIFICATE HOLDER ACCEPTS AND AGREES TO COMPLY WITH ALL TERMS AND CONDITIONS OF THIS CERTIFICATE. FAILURE TO CONFORM TO THE TERMS AND CONDITIONS OF THIS CERTIFICATE MAY SUBJECT THE CERTIFICATE HOLDER AND ANY CONTRACTOR TO ENFORCEMENT ACTIONS, INCLUDING INJUNCTIONS AS PROVIDED BY LAW AND PENALTIES UP TO \$1,000.00 PER DAY PURSUANT TO THE ADMINISTRATIVE CIVIL PENALTY POLICY DESCRIBED IN SECTIONS 22a-6b-1 THROUGH 22a-6b-15 OF THE REGULATIONS OF CONNECTICUT STATE AGENCIES.

SCOPE OF AUTHORIZATION

The Certificate Holder is hereby authorized to conduct the following work as described in application number 201609247-MG, including one location map and ten (10) sheets of plans received August 4, 2016, submitted by the Certificate Holder to the Commissioner of Energy and Environmental Protection (“Commissioner”) and attached hereto:

1. install conduits on existing catenary towers spanning the Pequonnock River, including associated brackets and fiber optic cables.

SPECIAL TERMS AND CONDITIONS

1. Not later than two (2) weeks prior to the commencement of any work authorized herein, the Certificate Holder shall submit to the Commissioner, on the form attached hereto as Appendix A, the name(s) and address(es) of all contractor(s) employed to conduct such work and the expected date for commencement and completion of such work, if any.
2. The Certificate Holder shall give a copy of this permit to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). The Certificate Holder's contractor(s) shall conduct all operations at the site in full compliance with this permit and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this permit. At the work area the contractor(s) shall, whenever work is being performed, make available for inspection a copy of this permit and the final plans for the work authorized herein.
3. The Certificate Holder shall post the attached Permit Notice in a conspicuous place at the work area while the work authorized herein is undertaken.
4. All work authorized herein shall be conducted using land-based equipment.
5. Except as specifically authorized by this certificate, no equipment or material including, but not limited to, fill, construction materials, excavated material or debris, shall be deposited, placed or stored in any wetland or watercourse on or off-site, nor shall any wetland or watercourse be used as a staging area or accessway other than as provided herein.
6. All waste material generated by the performance of the work authorized herein shall be disposed of by the Certificate Holder at an upland site approved for the disposal of such waste material, as applicable. The Certificate Holder shall not allow any waste material to enter the Pequonnock River.

GENERAL TERMS AND CONDITIONS

1. All work authorized by this certificate shall be completed within three (3) years from date of issuance of this certificate ("work completion date") in accordance with all conditions of this permit and any other applicable law.
 - a. The Certificate Holder may request a one-year extension of the work completion date. Such request shall be in writing and shall be submitted to the Commissioner at least thirty (30) days prior to said work completion date. Such request shall describe the work done to date, what work still needs to be completed, and the reason for such extension. It shall be the Commissioner's sole discretion to grant or deny such request.

- b. Any work authorized herein conducted after said work completion date or any authorized one-year extension thereof is a violation of this certificate and may subject the Certificate Holder to enforcement action, including penalties, as provided by law.
2. In conducting the work authorized herein, the Certificate Holder shall not deviate from the attached plans, as may be modified by this certificate. The Certificate Holder shall not make de minimis changes from said plans without prior written approval of the Commissioner.
3. The Certificate Holder may not conduct work waterward of the coastal jurisdiction line or in tidal wetlands at this certificate site other than the work authorized herein, unless otherwise authorized by the Commissioner pursuant to CGS section 22a-359 et. seq. and/or CGS section 22a-28 et. seq.
4. The Certificate Holder shall maintain all structures or other work authorized herein in good condition. Any such maintenance shall be conducted in accordance with applicable law including, but not limited to, CGS sections 22a-28 through 22a-35 and CGS sections 22a-359 through 22a-363g.
5. In undertaking the work authorized hereunder, the Certificate Holder shall not cause or allow pollution of wetlands or watercourses, including pollution resulting from sedimentation and erosion. For purposes of this certificate, "pollution" means "pollution" as that term is defined by CGS section 22a-423.
6. Upon completion of any work authorized herein, the Certificate Holder shall restore all areas impacted by construction, or used as a staging area or accessway in connection with such work, to their condition prior to the commencement of such work.
7. The work specified in the SCOPE OF AUTHORIZATION is authorized solely for the purpose set forth in this certificate. No change in purpose or use of the authorized work or facilities as set forth in this certificate may occur without the prior written authorization of the Commissioner. The Certificate Holder shall, prior to undertaking or allowing any change in use or purpose from that which is authorized by this certificate, request authorization from the Commissioner for such change. Said request shall be in writing and shall describe the proposed change and the reason for the change.
8. The Certificate Holder shall allow any representative of the Commissioner to inspect the work authorized hereunder at reasonable times to ensure that it is being or has been accomplished in accordance with the terms and conditions of this certificate.
9. This certificate is not transferable without prior written authorization of the Commissioner. A request to transfer a certificate shall be submitted in writing and shall describe the proposed transfer and the reason for such transfer. The Certificate Holder's obligations under this certificate shall not be affected by the passage of title to the certificate site to any other person or municipality until such time as a transfer is authorized by the Commissioner.
10. Any document required to be submitted to the Commissioner under this certificate or any contact required to be made with the Commissioner shall, unless otherwise specified in writing by the Commissioner, be directed to:

Permit Section
Office of Long Island Sound Programs
Department of Energy and Environmental Protection
79 Elm Street
Hartford, Connecticut 06106-5127
(860) 424-3034
Fax # (860) 424-4054

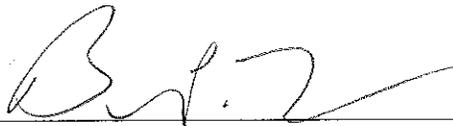
11. The date of submission to the Commissioner of any document required by this certificate shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this certificate, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is personally delivered or the date three (3) days after it is mailed by the Commissioner, whichever is earlier. Except as otherwise specified in this certificate, the word "day" as used in this certificate means calendar day. Any document or action which is required by this certificate to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed on or before the next day which is not a Saturday, Sunday, or a Connecticut or federal holiday.
12. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this certificate shall be signed by Certificate Holder and by the individual or individuals responsible for actually preparing such document, each of whom shall certify in writing as follows: "I have personally examined and am familiar with the information submitted in this document and all attachments and certify that based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief, and I understand that any false statement made in this document or its attachments may be punishable as a criminal offense."
13. In evaluating the application for this certificate the Commissioner has relied on information and data provided by the Certificate Holder and on the Certificate Holder's representations concerning site conditions, design specifications and the proposed work authorized herein, including but not limited to representations concerning the commercial, public or private nature of the work or structures authorized herein, the water-dependency of said work or structures, its availability for access by the general public, and the ownership of regulated structures or filled areas. If such information proves to be false, deceptive, incomplete or inaccurate, this certificate may be modified, suspended or revoked, and any unauthorized activities may be subject to enforcement action.
14. In granting this certificate, the Commissioner has relied on all representations of the Certificate Holder, including information and data provided in support of the Certificate Holder's application. Neither the Certificate Holder's representations nor the issuance of this certificate shall constitute an assurance by the Commissioner as to the structural integrity, the engineering feasibility or the efficacy of such design.
15. In the event that the Certificate Holder becomes aware that they did not or may not comply, or did not or may not comply on time, with any provision of this certificate or of any

document required hereunder, the Certificate Holder shall immediately notify the Commissioner and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. In so notifying the Commissioner, the Certificate Holder shall state in writing the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and the Certificate Holder shall comply with any dates which may be approved in writing by the Commissioner. Notification by the Certificate Holder shall not excuse noncompliance or delay and the Commissioner's approval of any compliance dates proposed shall not excuse noncompliance or delay unless specifically stated by the Commissioner in writing.

16. This certificate may be revoked, suspended, or modified in accordance with applicable law.
17. The issuance of this certificate does not relieve the Certificate Holder of their obligations to obtain any other approvals required by applicable federal, state and local law.
18. This certificate is subject to and does not derogate any present or future property rights or powers of the State of Connecticut, and conveys no property rights in real estate or material nor any exclusive privileges, and is further subject to any and all public and private rights and to any federal, state or local laws or regulations pertinent to the property or activity affected hereby.

Issued on August 12, 2016.

STATE OF CONNECTICUT
DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION



Brian P. Thompson, Director
Office of Long Island Sound Programs
Bureau of Water Protection & Land Reuse

Certificate of Permission No. 201609247-MG, Bridgeport
Connecticut Department of Transportation

OFFICE OF LONG ISLAND SOUND PROGRAMS

APPENDIX A

**TO: Permit Section
Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127**

Certificate Holder: Connecticut Department of Transportation
c/o Mark Alexander
2800 Berlin Turnpike
P.O. Box 317546
Newington, CT 06131-7546

Certificate No: 201609247-MG, Bridgeport

CONTRACTOR 1: _____

Address: _____

Telephone #: _____

CONTRACTOR 2: _____

Address: _____

Telephone #: _____

CONTRACTOR 3: _____

Address: _____

Telephone #: _____

EXPECTED DATE OF COMMENCEMENT OF WORK: _____

EXPECTED DATE OF COMPLETION OF WORK: _____

PERMITTEE: _____

(signature)

(date)



PERMIT NOTICE

This Certifies that Authorization to perform work below the Coastal Jurisdiction Line and/or within Tidal Wetlands of coastal, tidal, or navigable waters of Connecticut

Has been issued to: **Connecticut Department of Transportation**

At this location: **Pequonnock River off Metro North Railroad Bridge 08064R, Bridgeport**

To conduct the following: **install fiber optic conduits and cables.**

Permit #: 201609247-MG

Issued on: August 12, 2016

This Authorization expires on: August 12, 2019

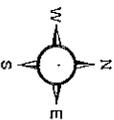
This Notice must be posted in a conspicuous place on the job during the entire project.

Department of Energy and Environmental Protection
Office of Long Island Sound Programs
79 Elm Street • Hartford, CT 06106-5127
Phone: (860) 424-3034 Fax: (860) 424-4054
www.ct.gov/deep



Map data maintained by the Connecticut Departments of Environmental Protection and Public Health. Map printed by the Connecticut Department of Transportation. NDD8 Data v. June 2016

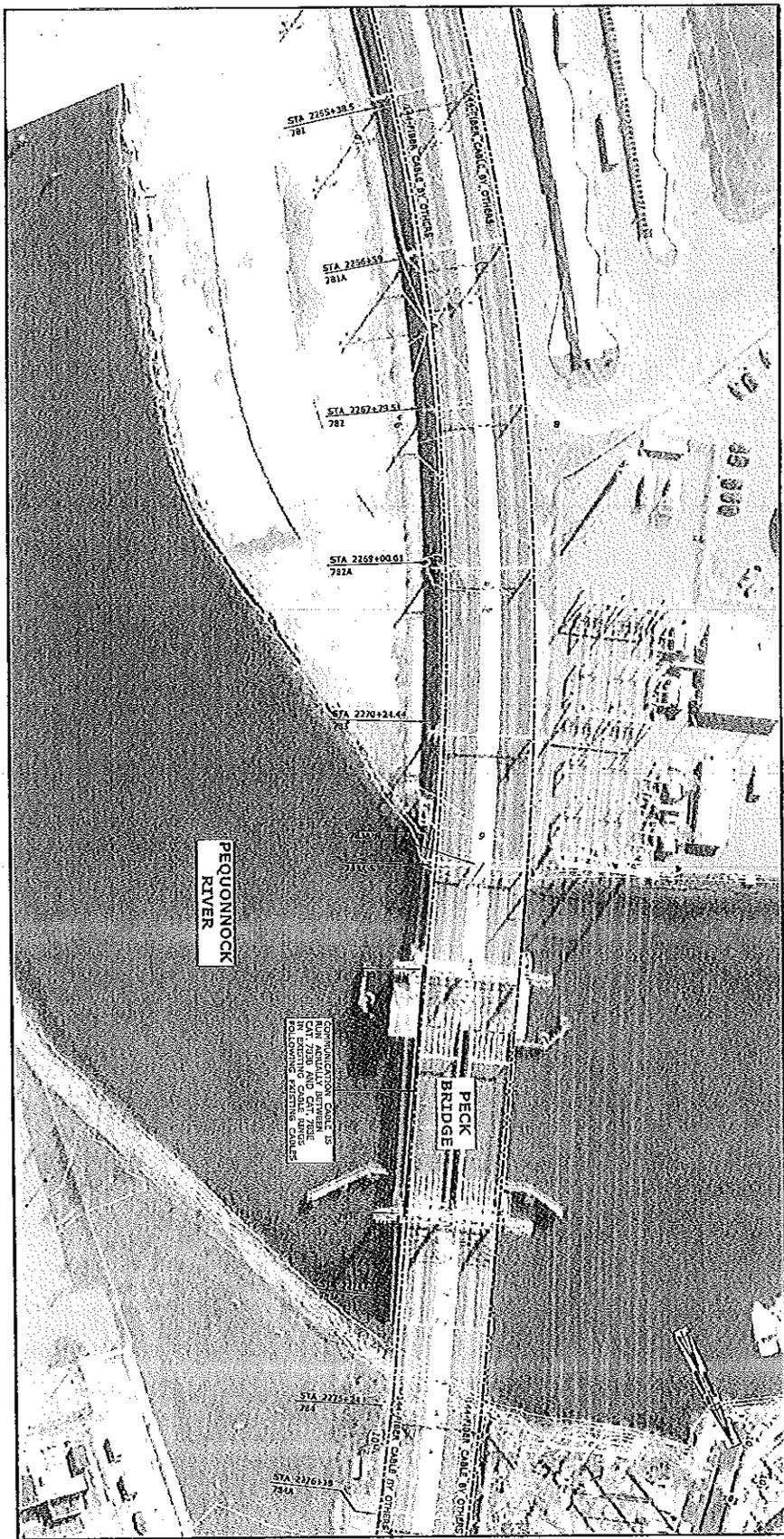
USGS LOCATION MAP
NETWORK INFRASTRUCTURE UPGRADES - PHASE II
 Project No. 300-178 (Peck Bridge Crossing)
 Town of Fairfield



Quadrangle: 109 - Bridgeport



Connecticut Department of Transportation
 2800 Berlin Tpk., Newington, CT 06131



CONNECTION POINT IS
 NON-ADJUSTABLE BEARING
 ON PIER OF OLD BRIDGE
 FOLLOWING EXISTING FORMS

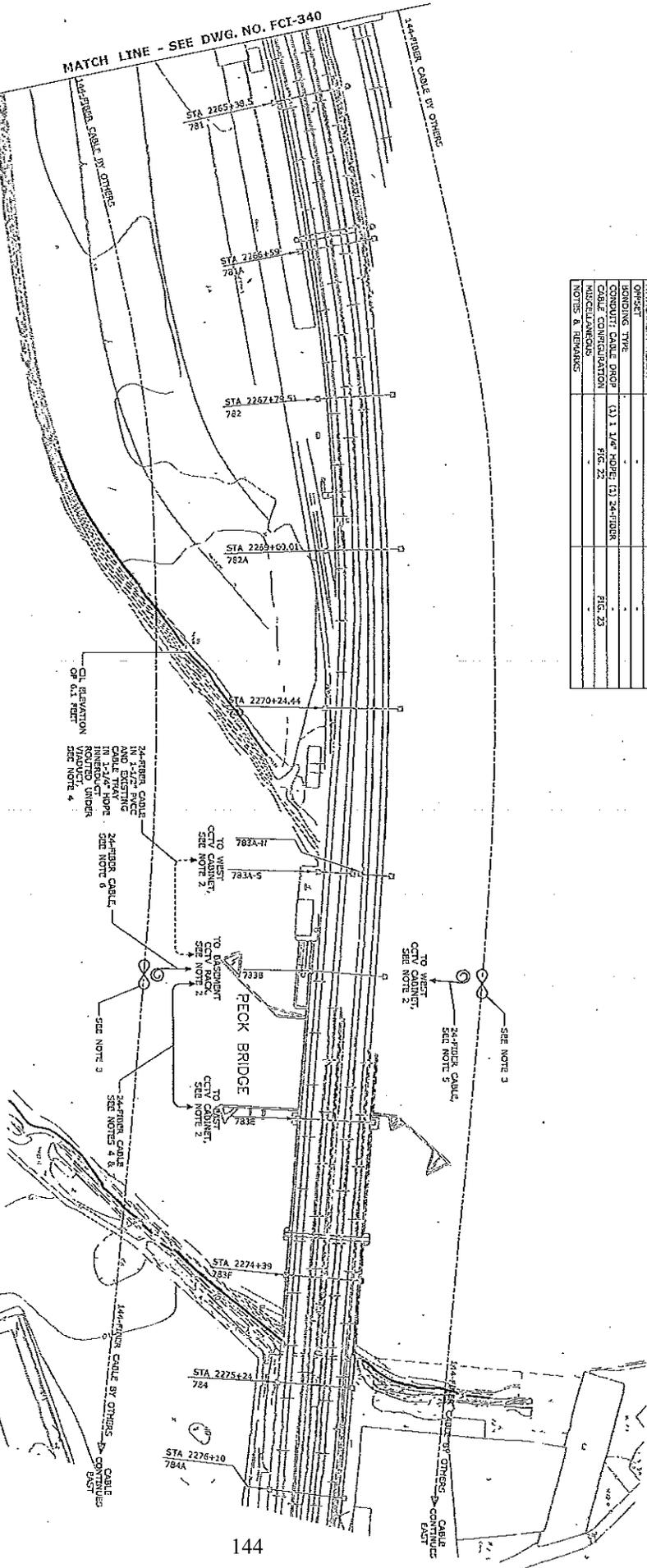
NOTE:
 1. THE COASTAL JURISDICTION LINE (CJL) ELEVATION FOR
 THE CITY OF BRIDGEPORT IS 5.0 FEET (NAVD83).

PROJECT NO.	300-0178
DATE	05
REVISIONS	
DESCRIPTION	BRIDGEPORT
SCALE	AS SHOWN
DESIGNER	PEQUONNOCK RIVER
CHECKER	PLAN VIEW
APPROVED	
DATE	
PROJECT NO.	300-0178
DATE	05
REVISIONS	
DESCRIPTION	BRIDGEPORT
SCALE	AS SHOWN
DESIGNER	PEQUONNOCK RIVER
CHECKER	PLAN VIEW
APPROVED	
DATE	
PROJECT NO.	300-0178
DATE	05
REVISIONS	
DESCRIPTION	BRIDGEPORT
SCALE	AS SHOWN
DESIGNER	PEQUONNOCK RIVER
CHECKER	PLAN VIEW
APPROVED	
DATE	

PROJECT NO.	300-0178
PROJECT TITLE	WESTPORT TO STRATFORD
DATE	10/1/81
DESIGNER	FCI-341
SCALE	AS SHOWN
DATE	10/1/81
PROJECT NO.	300-0178
PROJECT TITLE	WESTPORT TO STRATFORD
DATE	10/1/81
DESIGNER	FCI-341
SCALE	AS SHOWN
DATE	10/1/81

STRUCTURE ID #	782D	782E
STRUCTURE TYPE	HT	HT
ATTACHMENT TYPE	C-1	C-1
ATTACHMENT SIDE	N	N
ATTACHMENT HEIGHT	-	-
CONDUIT: CABLE DROP	(2) 1 1/4" HOPE (2) 24-FIBER	(2) 1 1/4" HOPE (1) 24-FIBER
CABLE CONFIGURATION	FIG. 22	FIG. 23
MISCELLANEOUS		
NOTES & REMARKS	NOTE 7	NOTE 7

STRUCTURE ID #	782D	782E
STRUCTURE TYPE	HT	HT
ATTACHMENT TYPE	C-1	NONE
ATTACHMENT SIDE	N	
ATTACHMENT HEIGHT	-	-
CONDUIT: CABLE DROP	(1) 1 1/4" HOPE (1) 24-FIBER	
CABLE CONFIGURATION	FIG. 25	FIG. 25
MISCELLANEOUS		
NOTES & REMARKS		



- NOTES:**
- BACKGROUND REFLECTS RECK BRIDGE REGULATORY BUILDING AND FENCING LOCATIONS VARY.
 - SEE DWG. PACK FOR RECK BRIDGE DROP SCHEMATIC AND ADDITIONAL DETAILS.
 - ROUTING 144-FIBER CABLE WILL BE CONTROLLED ON STR. 4790A.
 - RUNNER AND INSTALL 24-FIBER CABLES BETWEEN CONTROL HOUSE BASHWAY AND CTV CABINETS ON VIADUCT.
 - (2) 24-STAND FIBER CABLES WILL BE CONTROLLED ON STR. 4790A AND (1) 24-STAND FIBER CABLE AND INSTALL CABLE BETWEEN STR. 4785 AND WEST CTV CABINET. LEAVE SLACK FOR SHEDDING BY HAND.
 - (2) 24-STAND FIBER CABLES WILL BE CONTROLLED ON STR. 4785 AND (1) 24-STAND FIBER CABLE AND INSTALL CABLE BETWEEN STR. 4785 AND EAST CTV CABINET. LEAVE SLACK FOR SHEDDING BY HAND.
 - RUN 24-FIBER CABLE SEPARATELY BETWEEN STR. 4785 AND WEST CTV CABINET AND BETWEEN STR. 4785 AND EAST CTV CABINET IN 1 1/2\"/>

FOR CABLE ROUTING SCHEDULE NOTES, ABBREVIATIONS, AND LEGEND, SEE DWG. FCI-340.

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

PROJECT TITLE
NETWORK INFRASTRUCTURE
UPGRADE FOR SECURITY
NEW LINE
PHASE 2

PROJECT NO.
300-0178

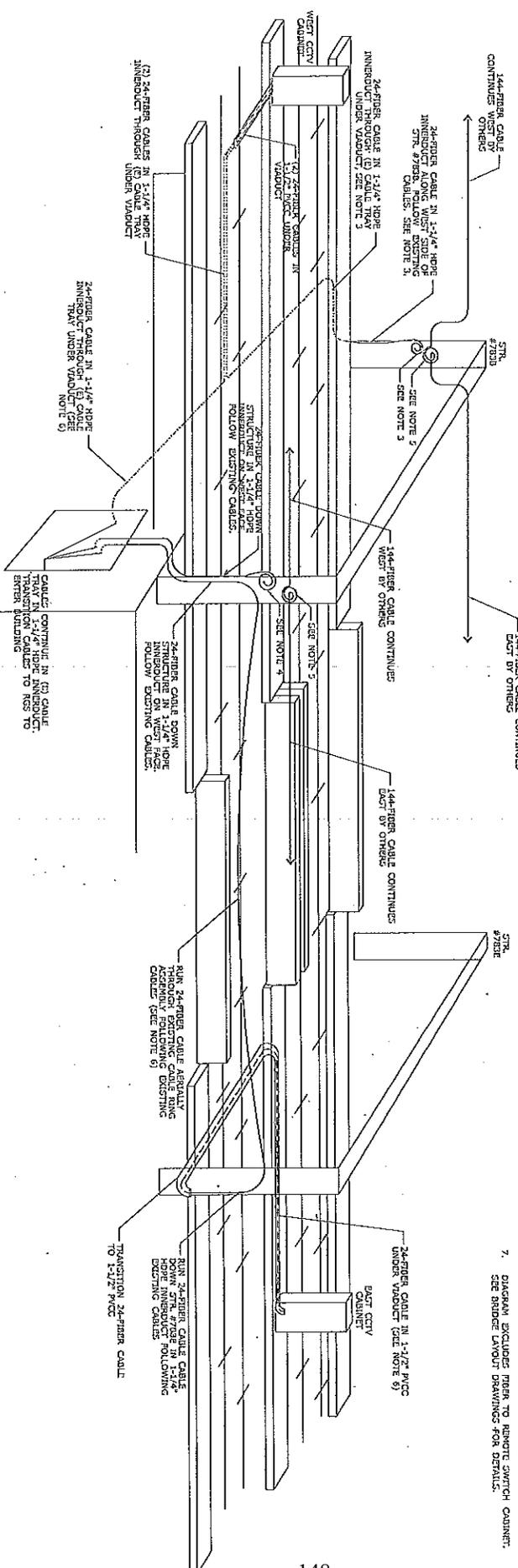
PROJECT TITLE
WESTPORT
TO STRATFORD

DATE
10/1/81

DESIGNER
FCI-341

SCALE
AS SHOWN

DATE
10/1/81



- NOTES:
1. SEE DWG. FC1-510 THRU FC1-512 FOR BRIDGE LAYOUT.
 2. OTHER STRUCTURES AND CONCRETS ARE MEDIUM; NOT SHOWN FOR CLARITY.
 3. (2) EXISTING 24-FIBER CABLES WILL BE COILED ON SOUTH SIDE OF EAST CITY CABINET. (1) 24-FIBER CABLE AND INSTALL CABLE BETWEEN EAST CITY AND WEST CITY CABINET AS SHOWN. LEAVE SLACK AT STR. #720B FOR SPACING BY MFR. OTHER CABLE SHALL REMAIN.
 4. (2) EXISTING 24-FIBER CABLES WILL BE COILED ON SOUTH SIDE OF EAST CITY CABINET. (1) 24-FIBER CABLE AND INSTALL CABLE BETWEEN EAST CITY AND WEST CITY CABINET AS SHOWN. LEAVE SLACK AT STR. #720B FOR SPACING BY MFR. OTHER CABLE SHALL REMAIN.
 5. 144-FIBER CABLES WILL BE COILED ON STR. #720B BY OTHERS.
 6. FURNISH AND INSTALL 24-FIBER CABLES FROM EAST CITY CABINET TO BASEMENT, AND FROM WEST CITY CABINET TO BASEMENT.
 7. DIAGRAM EXCLUDES MFR. TO REMOTE SWITCH CABINET. SEE BRIDGE LAYOUT DRAWINGS FOR DETAILS.

<p>STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION</p>	<p>PROJECT TITLE: WESTPORT TO STRATFORD FIBER DROP SCHEMATIC</p>
<p>PROJECT NO.: FC1-619</p>	<p>DATE: 06/01/14</p>
<p>DESIGNED BY: CH</p>	<p>SCALE: NOT TO SCALE</p>
<p>CONTRACT NO.: 14-100</p>	<p>CONTRACT DESCRIPTION: WESTPORT TO STRATFORD FIBER DROP SCHEMATIC</p>

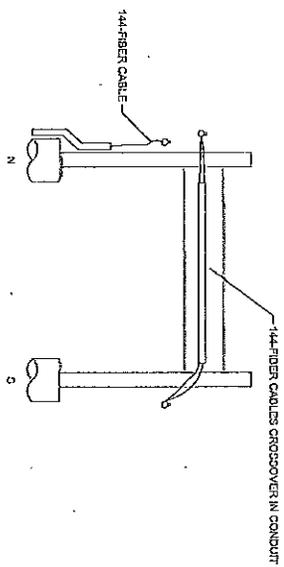


FIG. 21

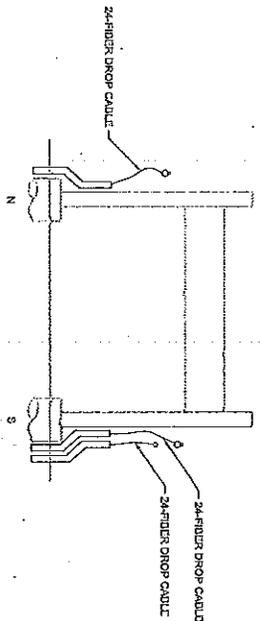


FIG. 22

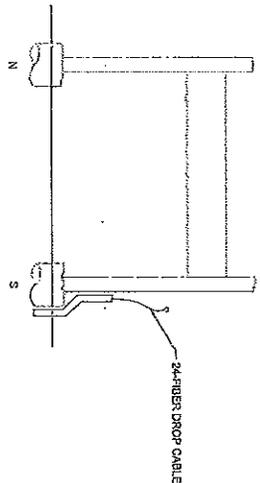


FIG. 23

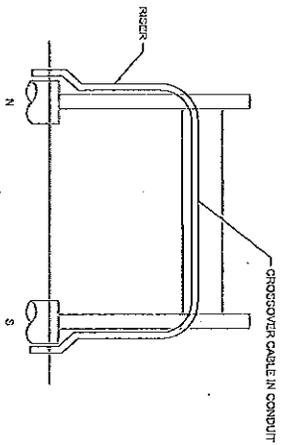


FIG. 24

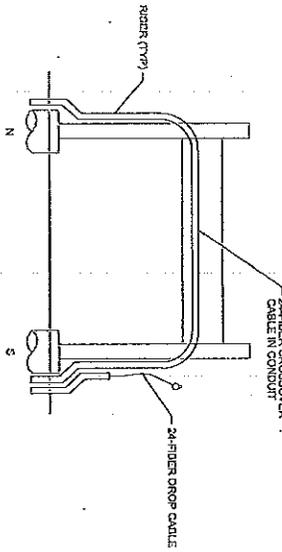


FIG. 25

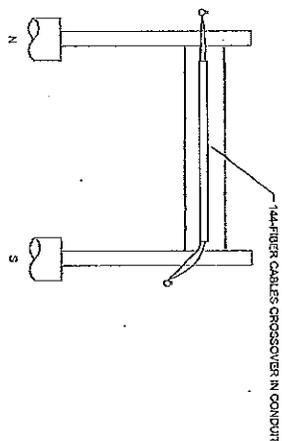


FIG. 26

- NOTES:
1. VIEW IS LOOKING IN EACH DIRECTION FOR ALL FIGURES SHOWN.
 2. 'N' AND 'S' DESIGNATE NORTH AND SOUTH SIDE OF RIGHT-OF-WAY RESPECTIVELY.

PROJECT NO.	300-0178
DATE	03/06/00
PROJECT DESCRIPTION	WESTPORT TO STRATFORD CABLE CONFIGURATIONS SHEET 4 OF 4
DESIGNED BY	SCG
CHECKED BY	PM
APPROVED BY	NOT TO SCALE
STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	165 PARK ROAD, MIDDLETOWN, CT 06451
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
PROJECT NO.	300-0178
DATE	03/06/00
PROJECT DESCRIPTION	WESTPORT TO STRATFORD CABLE CONFIGURATIONS SHEET 4 OF 4
DESIGNED BY	SCG
CHECKED BY	PM
APPROVED BY	NOT TO SCALE
STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	165 PARK ROAD, MIDDLETOWN, CT 06451
PROJECT TITLE	NETWORK INFRASTRUCTURE UPGRADE FOR SECURITY NEW PHASE 2
PROJECT NO.	300-0178
DATE	03/06/00
PROJECT DESCRIPTION	WESTPORT TO STRATFORD CABLE CONFIGURATIONS SHEET 4 OF 4
DESIGNED BY	SCG
CHECKED BY	PM
APPROVED BY	NOT TO SCALE
STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	165 PARK ROAD, MIDDLETOWN, CT 06451

