



INVITATION TO BID

FINANCE DEPARTMENT

GREGORY N. L'HEUREUX
Finance Director

KRISTIE BRADBURY
Deputy Finance Director

COLLEEN C. SELBERG
Purchasing Agent

Bid #30-14

City Dark Fiber Infrastructure

Proposals are being requested for furnishing and installation of "Open Access" Dark Fiber to the City of South Portland, Maine as specified below, in the attached General Specifications, Proposal and Contract, and Project Specifications, will be received by the City Purchasing Agent, Room 105, City Hall, 25 Cottage Road, South Portland, Maine until 2:00 P.M., Thursday, June 5, 2014, at which time they will be publicly opened and read aloud. Proposals received after that time and date shall not be accepted.

Proposals shall be submitted with a KMZ file printout and a spreadsheet explaining all costs in sealed envelopes, plainly marked "RFP #30-14 for City Dark Fiber Infrastructure" and shall be addressed to the Purchasing Agent at the above address.

Each proposal must be accompanied by a deposit of 5% of the amount bid. This may be properly certified check, bank treasurer's check, bank cashier's check, bank money order, cash, or a bid bond. Checks and money orders shall be made payable to the City of South Portland and will be deposited in its account. Such deposits will be returned to bidders within a reasonable amount of time after signing of contract.

All material offered on this bid shall be brand new and the latest type available. Bidder will state in their bid the make and model number, if any, and guarantee of the materials they are offering and will include a catalog or descriptive literature with their bid clearly showing the material on which they are bidding.

Questions regarding the work specifications may be directed to Chris Dumais, Information Technology Director at 207-767-7681 or e-mail at cdumais@southportland.org and arrangements to schedule a voluntary site visit may also be made by contacting Chris.

Since a prompt completion time is desired, the completion time as well as the price may be made a factor in determining the award of this bid.

It is the custom of the City of South Portland to pay its bills within 20 to 30 days following completion of work and receipt of bills for all work covered by the contract. In submitting bids under attached specifications bidders should take into consideration all discounts, both trade and time, allowed in accordance with the above payment policy. All bidders should quote net prices, therefore, exclusive of all Federal Excise Taxes.

The City of South Portland reserves the right to waive all informalities in bids, to accept any bid, or any portion thereof, or to reject any or all bids should it be deemed in its best interest to do so. Except as otherwise required by law or as specifically provided to the contrary herein, the award of this bid shall be governed by the City's purchasing ordinance.

Colleen C. Selberg
Purchasing Agent

Mailing address: P.O. Box 9422, South Portland, ME 04116-9422
Telephone (207) 767-3201, Fax (207) 767-7620

BID SPECIFICATIONS FOR CITY DARK FIBER INFRASTRUCTURE

GENERAL SPECIFICATIONS

The City of South Portland, Maine (herein called the "City"), invites bids submitted with a KMZ file printout and a spreadsheet explaining all costs.

The City may consider informal, any bid not prepared and submitted in accordance with the provisions hereof, and may waive any informalities in, or reject, any and all bids. Any bid may be withdrawn prior to the scheduled time for the opening of bids or authorized postponement thereof. Any bid received after the time and date specified shall not be considered. No bidder may withdraw a bid within sixty (60) days after the actual date of the opening thereof.

PREPARATION OF PROPOSAL

Proposals must be submitted with a KMZ file printout and a spreadsheet explaining all costs before bid can be considered for award. All bid prices must be clearly marked as onetime or ongoing costs. The City prefers no ongoing costs.

Proposals shall contain no recapitulation of the work to be done. Each bidder is required to state in his proposal his name and place of residence; the names of all persons interested with him; also that it is made without any connection with any other person making any proposal for the above work.

All bids must be submitted in sealed envelopes bearing on the outside the name of the bidder, his address, and the name of the project for which the bid is being submitted. If forwarded by mail, the sealed envelope containing the proposal and marked as directed above, must be enclosed in another envelope addressed as specified in the proposal form and preferably by "registered mail".

At the time of the opening of bids, each bidder will be presumed to have inspected the site and to have read and to be thoroughly familiar with the Plans and Contract documents including all addenda. The failure or omission of any bidder to examine the site or to receive any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

The Contractor shall make his proposal from his own examinations and estimates, and shall not hold the City, its agents, employees or independent engineer or his agents, hired by the City, responsible for or bound by any schedule. If any error in any plan, drawing, specification or direction, relating to anything to be done under this contract, comes to his knowledge, he should report it at once to the City.

Any item of material, equipment or labor not mentioned in these specifications, but which is required to complete specified project, must be included in the bid by the bidder.

SITE VISIT

Before submitting proposals, bidders are advised to visit the job site for the purpose of familiarizing themselves with all existing conditions and take their own measurements, etc. Failure to visit the job site may be grounds for rejection by the City of a submitted bid.

QUALIFICATION OF BIDDERS

The City may make such investigation as it deems necessary to determine the ability of the bidder to perform the work, and the bidder shall furnish to the City all such information and data for this purpose as the City may request. The City reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the City that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted. The City may require pre-qualification data from bidders unknown to it.

BID SECURITY

Each bid must be accompanied by a deposit of 5% of the amount bid. This may be properly certified check, bank treasurer's check, bank cashier's check, bank money order, cash, or a bid bond. Checks and money orders shall be made payable to the City of South Portland and will be deposited in its account. Such deposits will be returned to bidders within a reasonable amount of time after signing of contract.

DAMAGES FOR FAILURE TO ENTER INTO CONTRACT

If the successful bidder fails to sign and return the contract with the required certificate of insurance and performance bond within 14 days after notification by the City that it is ready for signature, his bid will lapse at the election of the City and his bid deposit shall be forfeited and retained by the City as an agreed amount of liquidated damages. Should any bidder withdraw his bid prior to contract signing, his deposit will be retained by the City as an agreed amount of liquidated damages.

ADDENDA AND INTERPRETATIONS

No interpretation of the meaning of the plans, specifications, or other contract documents will be made to any bidder orally. Every request for such interpretation should be in writing, addressed to the Purchasing Agent, City of South Portland, P.O. Box 9422, South Portland, ME 04106, and to be given consideration, must be received at least five (5) days prior to the date fixed for the opening of bids. Any and all such interpretations and any supplemental instructions will be in the form of written addenda to the specifications which, if issued, will be mailed or faxed to all prospective bidders, at the respective addresses furnished for such purposes, not later than one (1) day prior to the date fixed for the opening of bids. Failure of any bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligation under his bid as submitted. All addenda so issued shall become part of the contract documents.

AWARD OR REJECTION OF BIDS

The contract will be awarded to the lowest responsible bidder complying with the conditions of the Invitation for Bids, provided his bid is reasonable and it is to the interest of the City to accept it. The bidder to whom the award is made will be notified at the earliest possible date. The City, however, reserves the right to reject any and all bids and to waive any informality in bids received, and to accept any bid whenever such rejection, waiver or acceptance is in the interest of the City. The City also reserves the right to reject the bid of a bidder who has previously failed to perform properly or complete on time contracts of a similar nature, or a bid of a bidder who is not in a position to perform the contract. To better ensure fair competition, and to permit a determination of the lowest bidder, bids obviously unbalanced may be rejected by the City at its discretion.

AGREEMENT/CONTRACT

The successful bidder will be required to sign a standard City contract. See attached Agreement.

PERFORMANCE AND PAYMENT BONDS

If the contract price is \$10,000.00 or more, the successful bidder shall provide a performance bond and a labor and material payment bond each in the full amount of the bid. If the contract price is greater than \$1,000.00 but less than \$10,000.00, the Director of Finance shall re-quire surety in such form and amount as he deems necessary.

TIME OF COMPLETION

Since prompt starting and completion times are desired, they may be considered a factor in determining the award of this bid. Bidders will state in the proposal the number of working days to elapse after signing of contract after which they will start the work, and the number of working days after which they will complete the work according to the specifications.

The contractor shall prosecute the work continuously until completion.

INSURANCE

The successful bidder shall agree to save the City harmless from all losses, costs or damages caused by his acts or those of his agents and will provide a certificate of insurance for Public Liability and Automobile Liability coverage in the amount of not less than \$1,000,000.00 combined single limit for personal or bodily injury, death and property damage, protecting the contractor and the City from all such claims, and Worker's Compensation Insurance. The City disclaims any and all responsibility for injury to contractors, their agents or others while examining the job site or at any other time. See Section 8 of attached Agreement.

EXEMPTION FROM SALES TAX

Materials and equipment purchased for permanent installation in this project will be exempt from the State sales tax. Each bidder shall take this exemption into account in calculating his bid price for the work.

PERMITS AND LICENSES

All permits and licenses necessary for the prosecution of the work shall be secured and paid by the bidder.

MATERIALS AND APPLIANCES

The successful bidder shall furnish all labor, materials, and equipment necessary to do this work as specified in a workmanlike and orderly manner and all work shall be performed in accordance with the best trade practice.

GUARANTEE OF LABOR, MATERIALS AND EQUIPMENT

See Network Fiber Specifications, **page 13**, Section 1, sub-section 9.

PROTECTION AND RESTORATION OF PROPERTY

All waste material shall be removed from the site and area left clean upon completion of work. Any equipment or building structure damaged by successful bidder shall be repaired or replaced to the satisfaction of the owner.

STATUTORY REQUIREMENTS IN GENERAL

All work to be furnished to the City shall be performed with equipment, methods, and use of personnel in conformance with the pertinent Occupational Safety and Health Act Requirements of all existing and future State and Federal laws.

CITY OF SOUTH PORTLAND

AGREEMENT

THIS AGREEMENT is made this XX day of XXXXXXXX 2014, by and between the CITY OF SOUTH PORTLAND, a municipal corporation existing under the laws of the State of Maine and located in the County of Cumberland, State of Maine (hereinafter "CITY"), and XXXXXXXX (hereinafter "CONTRACTOR"),
WITNESSETH:

In consideration of the mutual covenants and conditions contained herein, the CITY and the CONTRACTOR agree as follows:

SPECIFICATIONS:

1. The CONTRACTOR shall furnish all of the material and perform all of the work shown on the drawings and described in the specifications entitled: Bid #30-14 City Dark Fiber Infrastructure and contractors proposal dated XXXXXXXX, 2014 which are attached hereto and made a part hereof, and the CONTRACTOR covenants that it shall do everything required by this Agreement, the Special Provisions of the Agreement, the Specifications, and the Drawings in return for payment as provided herein.

COMPLETION DATE:

2. The work to be performed under this Agreement shall be started on or before XXXXXXXX and fully completed by XXXXXXXX.

CONTRACT PRICE:

3. The CITY shall pay the CONTRACTOR for the performance of the Agreement the sum of \$XXXXXX.

PERFORMANCE BOND:

4. The CONTRACTOR shall furnish to the CITY at the time of the execution of this Agreement a performance bond and a labor and material payment bond each in the amount of \$XXXXXX executed by a surety company satisfactory to the CITY, guaranteeing the performance and payment by the CONTRACTOR

GUARANTEE:

5. The CONTRACTOR shall guarantee his work against any defects in workmanship and materials for a period of one year from the date of the CITY's written acceptance of the project.

PERMITS AND LICENSES:

6. Permits and licenses necessary for the prosecution of the work shall be secured and paid by the CONTRACTOR.

CITY'S RIGHT TO TERMINATE CONTRACT:

7. If the CONTRACTOR should be adjudged a bankrupt, or if it should make a general assignment for the benefit of creditors, or if a receiver should be appointed on account of its insolvency, or if it should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if it should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, and ordinances, or otherwise be guilty of a substantial violation of any provision of the Agreement, then the CITY when sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the CONTRACTOR, and his surety, seven (7) days written notice, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools and appliances thereon and finish the work by whatever method it may deem expedient. In such case the CONTRACTOR shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the Agreement price shall exceed the expense of the finishing the work, including compensation for additional architectural, managerial and administrative services, such excess shall be paid to the CONTRACTOR. If such expense shall exceed such unpaid balance, the CONTRACTOR shall pay the difference to the CITY.

CONTRACTOR'S LIABILITY INSURANCE:

8. The CONTRACTOR shall not commence work under this Agreement until he has obtained all insurance required under this paragraph and such insurance has been approved by the CITY, nor shall the CONTRACTOR allow any subcontractor to commence work on his subcontract until all similar insurance required of subcontractor has been so obtained and approved.

- (a) **Commercial General Liability** to include products and completed operations, and blanket contractual. The limits of liability shall be as follows:

Bodily Injury and Property Damage	\$1,000,000
Personal Injury and Advertising Injury	\$1,000,000
Per Project Aggregate	\$1,000,000
General Aggregate	\$2,000,000
Products and Completed Operations Aggregate	\$2,000,000
Medical Payments	\$10,000

(b) Business Automobile Liability

The CONTRACTOR shall maintain and cause all sub-contractors and lower tier contractors to maintain business automobile liability insurance covering all owned, non-owned, leased, rented or hired automobiles (symbol 1). The limits of liability shall be as follows:

Bodily Injury and Property Damage	\$1,000,000
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Automobile physical damage coverage shall be at the option of the CONTRACTOR, all sub-contractors and lower tier contractors. The CITY shall not be liable for physical loss or damage to any owned, non-owned, leased, rented or hired automobile.

(c) Workers' Compensation Insurance

The CONTRACTOR shall maintain and cause all sub-contractors and lower tier contractor's to maintain Workers' Compensation and Employers Liability in accordance with the laws and regulations of the State of Maine. The limits of liability provided shall be as follows:

Coverage A: Statutory
Coverage B: \$100,000/\$500,000/\$100,000

(d) Professional Liability

If the CONTRACTOR is an Architect, Engineer or Surveyor, they shall maintain a policy of insurance to pay on their behalf whatever amounts that may become legally required to pay on account of an error, omission or negligent act.

Limits of Liability shall be as follows:

\$1,000,000 per occurrence and in the aggregate site specific.

It is a requirement that this policy be maintained for a period of three (3) years following completion of the project.

- (e) **Certificates of Insurance** of the types and in the amounts required shall be delivered to the CITY prior to the commencement of any work by the CONTRACTOR, subcontractor or lower tier contractor or any person or entity working at the direction or under control of the CONTRACTOR. The CONTRACTOR shall assume the obligation and responsibility to confirm insurance coverage for all sub-contractors or lower tier contractors who will participate in the project.
- (f) The Certificate of Insurance and the policies of insurance shall include a sixty (60) day notice to the CITY of cancellation, non-renewal or material change in coverage or form.
- (g) It is recommended that the CITY be named as an Additional Insured on the General Liability and Automobile Liability policies.
- (h) The CONTRACTOR and his surety shall indemnify and save harmless the CITY, his officers and employees from all suits, actions or claims of any character brought because of any injuries or damage received or sustained by any person, persons or property on account of the operations of the said CONTRACTOR; or on account of or in consequence of any neglect in safeguarding the work; or through use of unacceptable materials in construction of the work; or because of any act or omission, neglect, or misconduct of said CONTRACTOR; or because of any claims or amounts recovered from any infringements or patent trademark, or copyright; or from any claims or amounts arising or recovered under the "Workmen's Compensation Act" or of any other law, ordinance, order or decree; and so much of the money due to the said CONTRACTOR under and by virtue of his/her contract as shall be considered necessary by the CITY for such purpose, may be retained; or in case no money is due, his surety may be held until such suit or suits, action or actions, claim or claims, for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the CITY.

(i) **Waiver of Subrogation**

Payment of any claim or suit including any expenses incurred in connection therewith by the CITY, or any insurance company on behalf of the CITY shall not constitute a waiver of subrogation against the CONTRACTOR, sub-contractors or any lower tier contractor in the event that such claim or suit was caused by or contributed to as a result of the negligent acts of the CONTRACTOR, any sub-contractors or lower tier contractors.

(j) **Construction Agreement**

The CONTRACTOR shall and does hereby agree to indemnify , save harmless and defend the CITY from the payment of any sum or sums of money to any person whomsoever on account of claims or suits growing out of injuries to persons, including death, or damages to property, caused by the CONTRACTOR, his employees, agents or sub-contractors or in any way attributable to the performance and execution of the work herein contracted for, including (but without limiting the generality of the foregoing), all claims for service, labor performed, materials furnished, provisions and suppliers, injuries to persons or damage to property, liens, garnishments, attachments, claims, suits, costs, attorney's fees, costs of investigation and defense. It is the intention of this paragraph to hold the CONTRACTOR responsible for the payment of any and all claims, suits, or liens, of any nature character in any way attributable to or asserted against the CITY, or the CITY and the CONTRACTOR, which the City may be required to pay. In the event the liability of the CONTRACTOR shall arise by reason of the sole negligence of the CITY and/or the sole negligence of the CITY's agents, servants or employees, then and only then, the CONTRACTOR shall not be liable under the provisions of this paragraph.

DAMAGES:

9. The CONTRACTOR shall defend, indemnify and save harmless the CITY and all persons acting for or in behalf of it against all claims for injuries (including death), loss or damage, arising out of the performance out this contract.

LIENS:

10. Neither the final payment nor any part of the retained percentage shall become due until the CONTRACTOR, if required, shall deliver to the CITY a complete release of all liens arising out of the Agreement, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as it has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed; but the CONTRACTOR may, if any subCONTRACTOR refuses to furnish a release or receipt in full, furnish a bond satisfactory to the CITY to indemnify it against any lien. If any lien remains unsatisfied after all payment are made, the CONTRACTOR shall refund to the CITY all moneys that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

ASSIGNMENT:

11. Neither party to the Agreement shall assign the Agreement or sublet it as a whole without the written consent of the other, nor shall the CONTRACTOR assign any moneys due or to become due to it hereunder, without the previous written consent of the CITY.

SUBCONTRACTS:

12. The CONTRACTOR shall not sublet any part of this Agreement without the written permission of the CITY. The CONTRACTOR agrees that it is as fully responsible to the CITY for the acts and omissions of its subCONTRACTORS and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

USE OF PREMISES:

13. The CONTRACTOR shall confine its apparatus, the storage of materials and operations of its workers to limits indicated by law, ordinance and permits and shall not otherwise unreasonably encumber the premises with its materials. If any part of the project is completed and ready for use, the CITY may, by written and mutual consent, without prejudice to any of its rights or the rights of the CONTRACTOR, enter in and make use of such completed parts of the project. Such use or occupancy shall in no case be construed as an acceptance of any work or materials.

CLEANING UP:

14. The CONTRACTOR shall at all times keep the premises free from accumulation of waste materials or rubbish caused by its employees or work, and at the completion of the work it shall remove all its rubbish from and about the project, and all its tools, scaffolding and surplus materials and shall leave its work "broom-clean" or its equivalent, unless more exactly specified. In case of dispute, the CITY may remove the rubbish and charge the cost to the CONTRACTOR.

PAYMENTS:

15. The CITY shall make payments on account of the Agreement as follows:

within 20 to 30 days upon satisfactory completion and acceptance by the CITY and receipt of bill for all work covered by the contract. The CITY holds as retainage ten percent (10%) until fifty percent (50%) of the work has been completed, retainage shall then be reduced to five percent (5%) for the balance of the project. At no time prior to the final release of retainage shall the retainage be less than five percent (5%) of the adjusted Contract sum based on any future Change Orders.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement on the day and year first above written.

CITY OF SOUTH PORTLAND, MAINE

BY: _____
Witness

BY: _____
James Gailey
City Manager

CONTRACTOR

BY: _____
Witness

BY: _____

Project Specifications

The City of South Portland is seeking proposals for a multi-phase "Open Access" Dark Fiber project. The primary phase will pull fiber from 25 Cottage Road, 30 Anthoine Street, and 637 Highland Avenue to various locations. The City is looking to lock in prices for the future phases of the project that will be specified at the end of this section. Proposals for future revenue sharing partnerships will also be accepted,

The CONTRACTOR for the City of South Portland will be responsible for running fiber optic cable(s), to the locations as specified below. This CONTRACTOR must participate in the "OPEN ACCESS PROVIDER" model and show proof of participation. The CONTRACTOR shall be responsible for determining the best path routing of the cable. The CONTRACTOR shall be responsible for obtaining any pole attachment rights, or use of conduit as required. The CONTRACTOR shall be responsible for the ongoing support and repair of all fiber run. The CONTRACTOR shall run the fiber optic cable into each municipal building specified and will fusion splice a minimum of 6 fibers in the Fiber Distribution Units at all locations. The exceptions will be 25 Cottage Road and 30 Anthoine Street with 24 fibers and 637 Highland Avenue with 12 fibers.

Phase One Locations of Fiber

25 Cottage Road – 24 Strands Terminated

- 2 – Strands to 21 Nelson Road
- 2 – Strands to 637 Highland Avenue
- 2 – Strands to 487 Broadway
- 2 – Strands to 111 Waterman Drive
- 4 – Strands to 30 Anthoine Street*

30 Anthoine Street – 24 Strands Terminated

- 2 – Strands to 111 Waterman Drive
- 2 – Strands to 637 Highland
- 4 – Strands to 25 Cottage Road*

637 Highland Avenue – 12 Strands Terminated

- 2 – Strands to 240 Ocean Avenue

120 Wescott Road – 12 Strands Terminated

- 2 – Strands to 34 James Baka Drive (West End Fire Station)

Future Phases Locations of Fiber

Phase 2 - 120 Wescott Road – Existing Terminated Strands

- 2 – Strands to 637 Highland Avenue
- 2 – Strands to 240 Ocean Street

Phase 3 - 929 Highland Avenue (New Facility to be built) – 12 Strands Terminated

- 2 – Strands to 25 Cottage Road
- 2 – Strands to 30 Anthoine Street

Cable Specifications

I. New Project Construction Guidelines

1. **General.** Subject to Section 7.1 of the Agreement, the intent of this Part I is to delineate the general specifications and standards for the underground and aerial portions of the Strands **CONTRACTOR** shall construct any new facilities for **THE CITY OF SOUTH PORTLAND** at a level of quality no less than what **CONTRACTOR** constructs for itself or for any other similarly situated customer. **CONTRACTOR** may deviate from the specifications and standards described below in those instances where either strict compliance is not feasible due to physical (including environmental and geological) conditions, right-of-way issues or code restrictions or other generally accepted standards that mandate deviation. For all Strands which have already been constructed prior to the date of a Service Order, **CONTRACTOR** shall, to the extent of its knowledge, inform **THE CITY OF SOUTH PORTLAND** of any deviations from the Specifications set forth below.

2. New Underground Construction.

a. Material.

- i. Steel casings will be minimum ASTM A252 Grade 2.
- ii. Any exposed steel conduit, brackets or hardware (i.e., bridge attachments) will be galvanized.
- iii. Hand holes will have a minimum 20,000 pound loading rating with 6 to 12 inches of cover.
- iv. Manholes will have a minimum H-20 loading rating.

b. **Minimum Depths.** Minimum cover required in the placement of conduit will be 36 inches, except where geologically unfeasible or in the following instances:

- i. Subject to permission from property owners, which **CONTRACTOR** will use commercially reasonable efforts to obtain, the minimum cover in borrow ditches adjacent to roads, highways, railroads, and interstate will be 36 inches

below the clean-out line or existing grade, whichever is greater.

- ii. The minimum cover across streams, river washes and other waterways will be 36 inches below the clean-out line or existing grade, whichever is greater.
 - iii. At locations where conduit crosses other subsurface utilities or other structures, the conduit will be installed to provide a minimum of 12 inches of vertical clearance; otherwise the conduit will be installed under the existing utility or other structure.
 - iv. In rock, the conduit will be placed to provide a minimum of 8 inches below the surface of the solid rock with a steel or concrete cap, or 18 inches below the surface of the rock or provide a minimum of 42 inches of total cover, whichever requires the least rock excavation. HDPE conduit will be back-filled with 2 inches of select materials (bedding) and 4 inches of select cover in rock areas.
 - v. In the case of the use/conversion of existing steel pipelines or salvaged conduit systems, the existing depths will be considered adequate.
- c. Buried Cable Warning Tape. All conduit will be installed with buried cable warning tape except where existing steel pipelines or salvaged conduit systems are used. The warning tape will generally be placed at a depth of 12 inches below grade and directly above the conduit.
- d. Conduit Construction.
- i. Conduits may be placed by means of trenching, plowing, jack and bore, or directional bore. Conduit will generally be placed on a level grade parallel to the surface, with only gradual changes in grade elevation.
 - ii. Steel conduit will be joined with threaded collars, Zap-Lok or welding.

- iii. Railroad crossings will be encased in steel conduit where required.
- iv. All underground crossings of major streams, rivers, bays and navigable waterways will be placed in either HDPE Schedule 40 or greater or steel conduit at a minimum depth of 20 feet below the bottom of the waterway.
- v. All conduits placed on DOT bridges will be bulletproof fiberglass where allowed by the authority and all other bridges galvanized steel conduit will be installed.
- vi. All conduits placed on bridges will have expansion joint placed at each structural (bridge) expansion joint or at least every 100 feet, whichever is the shorter distance.

e. Innerduct Installation.

- i. HDPE innerducts, where utilized, will be 1-1/4 inches.
- ii. HDPE innerduct(s), where utilized, will be encased by a PVC or steel conduit
- iii. HDPE innerduct(s) will extend beyond the end of all conduits a minimum of 18 inches.

f. Cable Installation.

- i. The fiber optic cable will be installed using a powered pulling winch and hydraulic powered assist pulling wheels. The maximum pulling force to be applied to the fiber optic cable will be 600 pounds.
- ii. Bends of small radii (less than 20 times the outside diameter of the cable) and twists that may damage the cable will be avoided during cable placement.
- iii. The cable will be lubricated and placed in accordance with the cable manufacturer specifications.
- iv. A pulling swivel break-away rated at 600 pounds will be used at all times.

- v. When necessary to provide continuity for underground sections, all splices will be contained in a hand hole or manhole if geologically feasible. Provided, however, that all splices will be contained in an appropriate splice case or other secure enclosure.
 - vi. Space permitting, a minimum of 13 feet of slack cable will be left in all intermediate hand holes or manholes.
 - vii. A minimum of 50 feet of slack cable from each cable end will be left in all splice locations.
 - viii. A minimum of 100 feet of slack cable will be left in all Regeneration and ILA Facilities.
- g. Manholes and Hand Holes.
- i. Hand holes and manholes placed in traveled surface streets be HS-20 loading rated and will have locking lids or 5 star bolt system for securing the manhole.
- h. Cable Markers (Warning Signs). Cable markers will be installed at all changes in cable running line directions, waterways, subsurface utilities, hand holes and at both sides of street, highway, bridge or railroad crossings. At no time will any markers be spaced more than 1000 feet apart. Markers will be positioned so that they can be seen from the location of the cable and generally set facing perpendicular to the cable running line.
- i. Compliance. All work will be done in strict accordance with federal, state, local and applicable private rules and laws regarding safety and environmental issues, including those set forth by OSHA and the EPA. In addition, all work and the resulting fiber system will comply with the current requirements of all governing entities (FCC, NEC, DEC, and other national, state, and local codes).
- j. As Built Drawings. As-built drawings will contain a minimum of the following:
- i. Information showing the location of running line, relative to permanent land marks, including but not limited to, railroad mileposts, boundary crossings and utility crossings.

- ii. Manhole and hand hole locations
- iii. Conduit information (type, length, expansion joints, etc.)
- iv. Notation of all deviations from specifications (depth, etc.)
- v. ROW detail (type, centerline distances, boundaries, waterways, road crossings, known utilities and obstacles)
- vi. Cable marker locations and stationing
- vii. Fiber Optic Cable Data (type, manufacturer, reel lds, sequentials, slack coils, splice points, etc.)
- viii. Metro area scale will not exceed 1 inch = 200 feet
- ix. Rural area scale will not exceed 1 inch = 500 feet

3. New Aerial Cable Construction.

a. General Precautions.

- i. Care will be taken to avoid cable damage during handling and placing. Avoid sharp bends and take precautions to prevent crushing the cable during placement. Such damage may alter the transmission characteristics to the extent that the cable section will have to be replaced.
- ii. Cable pulling tensions and bending radii will not exceed manufacturer's recommendations.
- iii. Cable reels will be transported in an upright position.
- iv. Personnel involved in placing aerial fiber optic cable will be familiar with standard practices and precautions and with manufacturers' specifications.

b. Aerial Cable Placement.

- i. Conventional aerial construction techniques will be used in the placement of fiber optic cable.
- ii. Cable tension will be monitored as the cable is pulled through cable rollers.

- iii. Cable rollers will be spaced at a maximum interval of 35 feet. Type "B" rollers will be used. Contractors are required to provide sufficient rollers and pull-line to place at least 5 km of cable in a single pull.
- iv. Aerial cable guides will be used where necessary.
- v. 6M-suspension strand will be used and tensioned with a strand dynamometer for construction of cable on newly placed poles, cable will be sagged in to match existing cables elsewhere on the pole.
- vi. Strand will be placed, as specified on engineering plans and as directed by the pole CONTRACTOR/governing entity.
- vii. Cable will be lashed per BELLCORE standards.
- viii. A swamp anchor with a 15-inch diameter plate and a 2-inch diameter extra heavy galvanized pipe rod will be used in wetland areas.
- ix. 1-1/2" galvanized steel U-guards (or as specified) will be placed over cable at all dip poles from 12 inches below ground level to 24 inches below the cable suspension strand.
- x. Plastic cable warning tags will be placed at every pole.
- xi. Through wetland areas, strand dead ends will be made no further than 5,000 feet apart.
- xii. Preformed guy grips will be used for all suspension strand dead ends, as well as at both ends of guy wires.
- xiii. An adapter will be placed from the U-guard to a 4-foot long, 4-inch diameter PVC sweep that connects to a minimum 1-foot long, 4-inch diameter section of PVC that connects to hand holes.

II. Fiber Specifications

The intent of this Part II is to delineate the manufacturer specifications for any Fiber Optic Cable installed in the future by **CONTRACTOR** and the conduit housing the Cable.

1. **Fiber.** **CONTRACTOR** shall furnish Single Mode Fibers that meet or exceed the performance specifications set forth below:

- a. Attenuation at 1310 nm = 0.35 dB/km max
- b. Attenuation at 1550 nm = 0.25 dB/km max
- c. Attenuation at 1625 nm = 0.30 dB/km max
- d. Zero Dispersion wavelength = 1312nm typical (between 1302nm and 1322nm)
- e. Wavelength cutoff < 1260nm typical
- f. Dispersion slope = < .0902ps typical
- g. Mode Field Diameter = 9.2+/- 0.4 μ m at 1310 nm & 10.4 +/-0.8 at 1550 nm typical
- h. Cladding Diameter = 125.0 +/- 1.0 μ m
- i. Core/Clad Concentricity <= 0.5 μ m

2. **Conduit or Innerduct**

- a. OSP Conduit SDR 13.5
- b. 1-1/4" (inside diameter)
- c. High density polyethylene (HDPE) duct
- d. Tensile yield 3000 psi
- e. Flexural modulus 80,000 to 110,000 psi
- f. Smoothwall inside & outer
- g. Un-lubricated

Acceptance Testing Specifications

1. Splicing and Testing. **CONTRACTOR** will perform all splicing and testing with industry accepted equipment. **CONTRACTOR** will perform two stages of testing during the construction of a new fiber cable Segment. Optical Time Domain Reflectometer ("OTDR") and power meter tests will be taken as soon as fiber connectivity has been achieved with **CONTRACTOR** bi-directionally verifying and recording the continuity of all licensed strands. The pigtail terminations will also be qualified at this stage using an OTDR and a minimum 1 km launch reel.
 - a. During the initial construction, it is only possible to measure the licensed strands from one direction. Because of this, splices may be preliminarily qualified during construction with an OTDR from only one direction. The profile alignment system or light injection detection system on the fusion splicer may also be used to qualify splices. All measurements at this stage of construction will be taken at 1550 nm.
 - b. After **CONTRACTOR** has completed end-to-end connectivity on the licensed strands, bi-directional OTDR span and power meter testing will be done. These measurements must be made after the splice manhole or hand hole is closed in order to check for macro-bending problems. Continuity tests will be done to verify that no licensed strands have been "frogged" or crossed in any of the splice points. OTDR traces will be taken and splice loss measurements recorded. **CONTRACTOR** will store OTDR traces in an electronic format and on data sheets. Loss measurements will be recorded using an industry-accepted laser source and a power meter. Copies of all electronic testing data and tables will be provided to **THE CITY OF SOUTH PORTLAND**.
 - c. The OTDR traces will be taken and power loss measurements will be made at 1550 and 1625 nm and performed bi-directionally on the licensed strands.
2. Splicing Standards. The splicing standards are as follows:
 - a. During installation, the objective for each splice is a loss of 0.15 dB or less. If, after three attempts, **CONTRACTOR** is not able to produce a loss value of less than 0.15 dB, then 0.25 dB will be

acceptable. If, after two additional attempts, a value of less than 0.25 dB is not achievable, then the splice will be marked as Out-of-Spec ("OOS") on the data sheet. Each splicing attempt will be documented on the data sheet.

- b. During end-to-end testing of a span (a span will be the licensed strands between points of interconnection with THE CITY OF SOUTH PORTLAND or third party facilities), the objective for each splice is a bi-directional average loss of 0.15 dB or less.
- c. The maximum allowable splice and connection loss for the licensed strands is 0.26dB/km, including all fiber, splice, pigtail and connector losses (excluding any loss resulting from interconnection with the **THE CITY OF SOUTH PORTLAND** collocation space).
- d. The entire fiber optic cable system will be properly protected from foreign voltage and grounded with an industry-accepted system. For non-armored cable industry standard bonding and grounding techniques shall be used.
- e.