City of Tacoma

Tacoma Power/Transmission & Distribution

ADDENDUM NO. 3 **DATE:** 04/17/25

REVISIONS TO:
Request for Bids Specification No. PT24-0296F
On-Call Telecommunication System Outside Plant Maintenance and Construction

NOTICE TO ALL BIDDERS:

This addendum is issued to clarify, revise, add to or delete from, the original specification documents for the above project. This addendum, as integrated with the original specification documents, shall form the specification documents. The noted revisions shall take precedence over previously issued specification documents and shall become part of this contract.

REVISIONS TO THE SUBMITTAL DEADLINE:

The submittal deadline has been changed to 11:00 a.m., Pacific Time, Tuesday, May 6th, 2025.

REVISIONS TO THE GENERAL INFORMATION AND REQUIREMENTS:

Additional Question and Answer period will be open until **3pm on Thursday, April 24th**. Questions can be submitted to Aaron Bratton, Senior Buyer, via email to abratton@cityoftacoma.org. Subject line to read:

PT24-0296F – Telecomm System Outside Plant Construction/Maintenance – *VENDOR NAME*

The City will post answers by **5pm on Friday, April 25th**.

REVISIONS TO THE SPECIAL PROVISIONS:

Updated Section 1.01.2 for Scope of work to include an item added to the Price Proposal Pages under item #33 – Mobilization fee for Emergency Call-Outs.

Updated Section 2.02 to include added item - #33 – Mobilization fee for Emergency Call-Outs.

Added Section 1.05.3 for information regarding Emergency Call-Outs/Unscheduled Maintenance.

Updated language is Section 1.04.5A to include Liquidated Damages for non-response to Emergency Call-Outs/Unscheduled Maintenance.

Replace Special Provisions Section (Appendix A) in its entirety with the attached version marked as Addendum 3.

City of Tacoma

REVISIONS TO THE PROPOSAL PAGES:

Added line item #33 to address Emergency Call-Outs.

Replace Proposal Pages section (Appendix B) in its entirety with the attached version marked Addendum 3.

NOTE: Acknowledge receipt of this addendum by initialing the corresponding space as indicated on the signature page. Vendors who have already submitted their bid/proposal may contact the Purchasing Division at 253-502-8468 and request return of their bid/proposal for acknowledgment and re-submittal. Or, a letter acknowledging receipt of this addendum may be submitted in an envelope marked Request for Bids Specification No. PT24-0296F Addendum No. 3. The City reserves the right to reject any and all bids, including, in certain circumstances, for failure to appropriately acknowledge this addendum.

cc: Erica Pierce/T&D Contract Program Manager
Chris Bodine/T&D HFC Power Field Operations Supervisor

SECTION 1 – SPECIAL PROVISIONS

1.01 – PROJECT DESCRIPTION

The work to be performed under these specifications and contract provides for the construction and maintenance of aerial and underground outside plant to support the deployment of fiber and or a hybrid fiber-coaxial (HFC) transmission system. The contract includes the construction of both aerial and underground facilities in urban, rural, commercial and industrial areas for placement of coaxial and fiber optic cable, splicing and equipment installation of power supplies, amplifiers and other items required to provide for a complete and operable two-way HFC transmission system. The contract also provides for the activation and certification of HFC plant.

1.01.1 – Facilities Placement

The City maintains its existing facilities and networks largely in public Right of Way, but also on private property, and in utility and City easement areas. Any installation, construction or other activities within the Right of Way shall follow the requirements stated in the City's standards, with modifications according to franchise, city, county, state or other utility or Right of Way operating agencies (e.g., railroads), or as directed by City representatives. Installation and construction on private property and/or within easements shall follow the City's construction standards as well as any specific requirements of the easements. Contractors working on this project must comply with all Regional Road Maintenance Endangered Species Act Program Guidelines, please see the State of Washington website for more information: Regional Road Maintenance ESA Program | CRAB

1.01.2 – Scope of Work

The contractor shall be issued either an Aerial or Underground work packet containing all pertinent information including work order, prints and permits.

Each work packet shall meet the equivalent of the contractor's daily crew rate described in bid items 30 and 31:

Item 30 Aerial crew is defined as 1-Lineman, 1-Driver / Ground man and Line truck / Cable Trailer, including all necessary tools.

Item 31 Underground crew is defined as 1-Equipment operator, 1-Driver / ground man, 1 Backhoe and 1- Truck with Equipment

In the event the work packet does not meet the equivalent of the contractors' daily crew rate the packet shall be subject to a one time set up fee as described in bid item 32. If an emergency call-out is required to start work immediately, the project/work packet shall be subject to a one time set up fee as described in bid item 33. It is the City's intent to issue work packets containing units equal to or greater than the contractor's daily crew rate and group the work by area whenever possible.

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1.01.3 – Project Scope Adjustment

Per section 1.16 of the General Provisions, the City of Tacoma reserves the right to increase or decrease the quantities of any items under this Contract and pay according to the unit prices quoted in the Proposal (with no adjustments for anticipated profit).

1.02 – PROJECT LOCATION

The work to be performed under this contract is located within the Tacoma Power's Electrical Service Area (Appendix A).

1.03 – PRE-BID EXAMINATION OF SITE

72 hours after assignment of project, complete with drawings and work packet, the bidder agrees to be responsible for examining the site(s). Bidder is responsible to have compared them with these specifications and contract drawings, and to be satisfied as to the facilities and difficulties attending the execution of the proposed contract (such as uncertainty of weather, floods, nature and condition of materials to be handled and all other conditions, special work conditions including work schedules, obstacles and contingencies) before the delivery of his/her bid submittal. No allowance will be subsequently made by the City on behalf of the bidder by reason of any error or neglect on the bidder's part, for such uncertainties as aforesaid.

1.03.1 – Bidder Responsibility

By entering into the contract, the contractor represents that he/she has inspected in detail the drawings included with the specification documents and has become familiar with all the physical and local conditions affecting the potential project and/or the project site. Any information provided by the City to the contractor, relating to existing conditions on, under, or to the project and/or site including, but not limited to information pertaining to hazardous material abatement and other conditions affecting the project site, represents only the opinion of the City as to the location, character, or quantity of such conditions and is provided only for the convenience of the contractor. The contractor shall draw his own conclusions from such information and make such tests, reviewed and analyses as he deems necessary to understand such conditions and to prepare his proposal.

1.03.2 – Bidder Verification and Reporting of Errors, Inconsistencies, and/or Omissions

72 hours after assignment of project, complete with drawings and work packet, the contractor shall take field measurements and verify field conditions and shall carefully compare such field measurements and conditions and other information known to the contractor with the contract documents before commencing activities. Errors, inconsistencies or omissions discovered shall be reported to the City at once.

The contractor shall carefully study and compare any assigned work documents with each other and shall at once report to the City errors, inconsistencies or omissions discovered. If the contractor performs any construction activity knowing it involves a recognized error, inconsistency or omission in the contract documents without such

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notice to the City, the contractor shall assume the risk and responsibility for such performance and shall bear an appropriate amount of the attributable costs for correction.

1.04 – COMMENCEMENT, EXECUTION AND COMPLETION

The contractor will be required to execute the contract, provide a payment bond, performance bond and certificate of insurance within ten (10) calendar days after the award of the contract. The contractor shall begin the work to be performed in the contract within seven (7) calendar days after the date of notification to commence work. Notification to commence work may either be by letter or, if no letter is issued, by agreement at the pre-construction conference that will be confirmed by letter.

1.04.1 – Award Date of Contract

The Award Date of Contract is the date of the contract award letter issued by the City of Tacoma Purchasing Division after approval of the Public Utility Board.

1.04.2 – Term of Contract

The term of this contract is from the date of award per Section 1.04.1 through the subsequent 24-month period. Three one-year contract extensions may be considered if Tacoma Power finds that it is in its best interest to extend the contract under the same terms and conditions of the original contract. Any contract extension will follow the procedures listed by the City of Tacoma Purchasing Division (refer to Section 1.17 of the General Provisions).

1.04.3 – Payment and Performance Bonds

The Contractor shall provide a payment bond and performance bond, including power of attorney, for 100 percent (100%) of the contract award Revised bonding totals may be reviewed at time of contract renewal. The City's bond forms must be used.

1.04.4 – Performance Measurement

Following issuance of a work packet the contractor must be on site and prepared to begin construction work within five (5) calendar days. This work is inclusive of all bid items listed in the proposal sheets that will be required to provide for a complete and operable 2-way hybrid fiber coaxial network.

1.04.5 – Failure to Perform

If the contractor fails to maintain this minimum rate of construction per section 1.04.3, he shall be placed on formal notice in writing by the project manager and be given fourteen (14) calendar days to provide evidence satisfactory to the project manager that the minimum construction rate can and will be maintained. If the contractor fails to provide evidence satisfactory to the project manager, then the City may impose any or all of the following:

1.04.5A – Assessment of Liquidated Damages

The project manager may assess liquidated damages in the amount of $1,000 per calendar day for each day the contractor is not on site and working as described in section 1.04.4, Performance Measurement. The City will assess liquidated damages in accordance with Section 3.14 of the General Provisions.

The project manager may assess liquidated damages in the amount of $180 per hour for 1) Initial failure to respond to notification for Emergency Call-Out/Unscheduled Maintenance and 2) each additional hour in excess of the initial response time.

1.04.5B – Adjustment in Quantity of Work

The project manager may decrease the quantities of work or areas of work set forth on the proposal and specification and award portions of that work to other contractors.

1.04.5C – Termination of Work

The project manager may terminate the contract and make payment for work completed to date, with no allowance for anticipated profit or demobilization.

1.05 – CONTRACT WORK TIMES

Contract work times shall be 7:00 AM - 3:30 PM, Monday through Friday excluding holidays, described in Section 2.14 of the General Provisions or as otherwise approved by the City.

1.05.1 – Overtime – Contractor Initiated

If the contractor elects to work on a Saturday, Sunday, holiday or longer than the designated contract work times, for the purposes of City personnel, such work shall be considered overtime work. On all such overtime work, a City supervisor or inspector must be present. The contractor shall reimburse the City for the full amount of the costs for City employees who must work any such overtime hours. It shall be the City's decision as to when a supervisor or inspector is required.

1.05.2 – Overtime – City Initiated

However, if the City orders work to be performed on overtime, all City employees' overtime costs will be at no expense to the contractor.

1.05.3 – Emergency Call-Outs/Unscheduled Maintenance

At time of contract award, contractor will furnish a contact person and phone number that can be contacted to arrange team members to respond to an emergency call-out request. Awarded contractor shall be available for dispatch twenty-four (24) hours a day, seven (7) days a week. Contractor shall acknowledge receipt of notification by telephone ("Respond") as soon as possible but in no event shall the response time for emergency

call-outs activity be more than 1 hour, unless delayed by a Force Majeure Event, beyond the reasonable control of the contractor. TPU also reserves the right to solicit a different vendor for emergency response if a call is not returned within 6 hours.

1.06 – QUALIFICATION OF CONTRACTORS

1.06.1 – Qualified Bidders

Only contractors experienced in the construction of aerial and underground hybrid fiber coaxial (HFC) Networks, and with a record of successful completion of jobs of similar scope will be considered. The bidder must complete the Contractor's Record of Prior Contracts Form attached to this specification at the time of submitting his bid. The City will be the sole judge of the bidder's ability to meet the requirements of this paragraph.

1.06.2 – Evaluation of Bidders

In addition to the bid evaluation factors set forth in City Code Section 1.06.262 the following criteria will be used to evaluate and determine the successful bidder:

Past successful performance as a General Contractor for contracts with a minimum value of $2,500,000 for the type of work and within the time frame as specified herein.

Verifiable experience and past successful performance of projects of similar scope and size as listed on the “Contractor’s Record of Prior Contracts Form” to include projects where activation and certification of two-way CATV and Fiber Plant were performed.

List and quantity of equipment owned by Contractor and any Subcontractor to be used on this project including year, model and general condition of each piece of equipment specific to the type of work to be performed,

Prices stated on the bid Proposal Forms. Prices stated by the contractor will be evaluated and compared to local industry prices established by similar work functions performed in Western Washington.

1.06.3 – Evaluation of Sub-Contractors

Contractor shall include in the submittal package, a list of all subcontractors to be used on this project including the type(s) of work to be performed. Include address, telephone number, and references for relevant experience throughout the past five (5) years. This requirement is in addition to the requirement to provide the list of subcontractors with the bid proposal pursuant to General Provisions Section 3.16.

1.07 – SPECIFICATIONS AND DRAWINGS

The following examples and specifications are made part of the contract.

Drawings can be found in Appendix A immediately following Special Provisions section.

Drawings for Construction

Drawing No.	Title - Standard Drawings
No. 1	Tacoma Power Electrical Service Area Map
No. 2	Work Area Vicinity Map – City of Lakewood
No. 3	Work Area Vicinity Map – City of Fife
No. 4	Work Area Vicinity Map – North East County
No. 5	Work Area Vicinity Map – Pierce County
No. 6	Sample - Telecommunications Project Design Map SWL-38
No. 7	Sample – Telecommunications Project Design Map NEF-18
No. 8	Sample - Telecommunications Project Design Map NEC-1
No. 9	Sample – Telecommunications Project Design Map SEC-45
No. 10-15	Sweep Graph (6 pgs.)
No. 16-18	Concrete Driveway Entrances Types 1, 2, 3
No. 19-20	Concrete Curb and Gutters
No. 21	Concrete Sidewalks

1.07.1 – Availability of original drawings once work is assigned

Sample drawings are included in this specification packet for reference. When work is assigned, reduced-sized print copies will be included in the work packet as drawing attachment. Original drawings may be inspected by prospective bidders upon request in the office of the HFC Field Operations Manager – Tacoma Power, at 3628 South 35th Street, Tacoma, Washington 98409 between the hours of 9:00 a.m. and 11:00 a.m.

1.07.2 – Coax design drawings

Included with this specification are coax design drawings for aerial and underground work to be constructed in the identified Hub areas. These drawings generally reflect node layouts in their respective area. Design drawings to be issued by the work packet.

1.07.3 – Drawings after award when work is assigned

The contractor shall be issued reproducible work packets containing all pertinent information including work order, prints and permits once work is assigned. It shall be

the contractor's responsibility to provide sufficient sets of drawings for building and as-built purposes.

1.07.4 – Job-Site Requirement for drawings

The contractor shall keep on the job site copies of all as-built drawings, and shall, at all times, give the project manager access thereto.

1.08 – EVALUATION OF BIDS

The award of this contract will not be based on cost alone as other factors and criteria are equally important. See Special Notice to Bidders for more information.

1.08.1 – Primary Evaluation Criteria

The contract will be awarded to the lowest and best responsible bidder satisfying these Specifications, provided such bid is reasonable and in the best interest of the City to accept. The City, however, reserves the right to reject any and all bids and to waive any informality in bids received. The City reserves the right to let the contract to the lowest and best responsible bidder whose bid will be most advantageous to the City, price and any other factors considered.

1.08.2 – Incidental Factors

Other incidental elements or factors, whether or not specifically provided for in this specification, which would affect the final cost to and the benefits to be derived by the City, may be considered in determining the award of the contract. In addition, the City may consider the bid evaluation factors set forth in City of Tacoma Municipal Code Section 1.06.262. The final award decision will be based on the best interests of the City. The City has the sole and exclusive discretion to decide which contractor best meets the City's needs.

1.08.3 – Additional Factors

In addition to General Provisions Section 1.08, the following factors will be used in bid evaluation:

- Minimum requirements as stated in section 1.06 of the Special Provisions.

1.08.4 – Cause for Rejection of Bid

Material misstatements concerning completed actions by the bidder in any sworn statement or failure to complete and submit any form may render this bid non-responsive and shall be cause for rejection of the bid.

END OF SECTION

SECTION 2 - MEASUREMENT AND PAYMENT

2.01 – ADMINISTRATION

The City inspector or project manager in coordination with the contractor shall make all measurements and determine all quantities and amounts of work done for progress payments under the contract.

2.01.1 – Measurement Period

Upon completion of each work packet, the project manager shall make an estimate of the work completed or done by the contractor, and such estimates will be made by measurement or approximation at the option of the project manager.

2.01.2 – Suspension of Work

In case work is suspended, nearly suspended, or in case only unimportant progress is being made, the project manager may, at his discretion, make progress estimates at longer intervals than once a month.

2.01.3 – Unit Quantities Specified

Quantities indicated in the proposal are for bidding and contract purposes only. Quantities and measurements supplied or placed in the work and verified by the project manager and contractor determine payment.

2.01.4 – Adjustments to Unit Prices

Requests for escalation of unit prices for Items 30a,b,c,d and 31a,b,c,d of Proposal Pages are limited to the percent change in the Washington State Prevailing Wage Rates posted by the Department of Labor and Industries.

For the first 12 months of the project, prevailing wage rates will be based on the prevailing wage in effect at the time of the submittal deadline and will serve as a base for any requested price adjustment.

Price escalation may be allowed on unit pricing on the anniversary date of the contract award.

Contractor will be required to submit all proposed price escalation/de-escalation in writing to the Tacoma Power contract manager, 30 days prior to each contract period anniversary.

Any proposed adjustment in price must be beyond the control of the Contractor and supported by written documentation due to changes in the prevailing wage rates for King, Lewis, Mason, Pierce, Grays Harbor or Thurston Counties for the appropriate positions. Unit prices may receive a maximum increase equal to the percent change in the prevailing wage rates for that position and only when requested in writing by the Contractor.

In the event that the City and the Contractor cannot agree on an adjustment request, the City may terminate the contract.

Pricing for all other items to remain fixed for the duration of the contract.

2.01.5 – Unit Prices

The unit bid prices shall be full and complete compensation for the contract work stated together with all appurtenances incidental thereto, including materials, equipment, tools, labor, and all the costs to the contractor for completing the contract in accordance with the plans, specifications, and instructions of the project manager.

2.01.6 – Deletion of Bid Items

The City reserves the right to delete any bid item from the contract by notifying the contractor in writing of its intent. The only monies due the contractor for deleted work would be for materials already purchased.

2.01.7 – Incidental costs

All work not specifically called out in these specifications but required to construct a complete and operable 2-way HFC system, structures or amenities shall be considered incidental to the contract.

2.01.8 – Non-payment for rejected or surplus products

Payment will not be made for any of the following:

- Products wasted or disposed of in a manner that is not acceptable
- Products determined as unacceptable before or after placement
- Products not completely unloaded from the transporting vehicle
- Products placed beyond the lines and levels of the required work
- Products remaining on hand after completion of the work
- Loading, hauling and disposing of rejected products
- Inoperable products deemed to underperform by the project manager
- Products not meeting technical performance criteria

2.02 – PROPOSAL ITEMS

Item No. 1 FURNISH AND INSTALL 1/4" EHS STRAND AND HARDWARE FOR COAXIAL/FIBER OPTIC CABLE

Measurement — Shall be measured by the strand foot, pole to pole, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required for the installation, grounding, bonding, and framing of strand. Work includes placement of all clamps, bolts, miscellaneous hardware, and all safety measures, including traffic control and reel tender with two-way communications, traveling grounds, and any pole line construction functions to meet NESC, NEC and, state, and local requirements.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 2 MAKE READY CONSTRUCTION – STRAIGHT LINE POLES

Measurement — Shall be measured by the pole, complete and ready for strand installations.

Payment — The unit price shall be full compensation for all costs associated with the labor and materials for moving, raising, lowering, adjusting, and transferring to new pole, tree trimming, or removing communications lines to make legal and appropriate space, within the communications space, on the pole to locate strand or other equipment. Work considered incidental to this item include traffic control, rearrangement of communication system drop cables, risers, multiple cables, grounds, bonds, guys, arms, and any other attachment or rearrangements to the pole.

Note: Tacoma Power will perform Major Make-Ready and tree trimming work before contractor work begins. In some instances, a competent line person may be required to work in the Supply Zone which will necessitate the contractor to provide a “qualified employee” as outlined in WAC 296-45-065 and the NESC Part 4, Section 42, Rule 420B. Documentation will be required.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 3 MAKE READY CONSTRUCTION – CORNER, "T" LEAD, AND DEAD END POLES

Measurement — Shall be measured by the pole, complete and ready for strand installations.

Payment — The unit price shall be full compensation for all costs associated with the labor and materials for moving, raising, lowering, adjusting, and transferring to new pole, tree trimming, and removing communications lines to make legal and appropriate space, within the communications space, on the pole to locate strand or other equipment. Work considered incidental to this item include traffic control, rearrangement of communication system drop cables, risers, multiple cables, grounds, bonds, guys, arms, and any other attachments or rearrangements to the pole.

Note: Tacoma Power will perform Major Make-Ready and tree trimming work before contractor work begins. In some instances, a line person may be required to work in the Supply Zone which will necessitate the contractor to provide a "qualified employee" as outlined in WAC 296-45-065 and the NESC Part 4, Section 42, Rule 420B. Documentation will be required.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 4 FURNISH AND INSTALL 1/4" EHS or 3/8" STRAND AND HARDWARE FOR GUYING

Measurement — Shall be measured per each guy, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required for the installation of a 1/4" or 3/8" guy. Work includes grounding, bonding, clamps, bolts, miscellaneous hardware, connecting to existing or new anchors, placing guy guards, insulators, brush trimming, hand digging to expose anchor eyes, traffic control, all safety measures, and any pole line construction necessary to meet NESC, NEC and, state, and local requirements.

Pole to pole and head guys will be paid at strand footage price.

Removal and disposal of existing guy materials that are replaced is considered incidental to this work.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 5 LASH CITY-FURNISHED COAXIAL CABLE (SINGLE CABLE)

Measurement — Shall be measured by the Active Cable Bearing Strand (A.C.B.S.) foot, pole-to-pole, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment including lashing wire, lashing clamps, zinc straps, markers, ty-raps, etc. to lash a single City-furnished coaxial cable to the strand. Expansion loops will be placed on all output cables, and on “T” lead cables. Only Lemco model G-120 or approved equal mechanical loop bender tools will be used to hold loops in place until lashing is complete to the next pole. All cable lashing will be double lashed.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 6 LASH MULTIPLE CITY-FURNISHED COAX CABLES

Measurement — Shall be measured by the Active Cable Bearing Strand (A.C.B.S.) foot, pole-to-pole, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment including lashing wire, lashing clamps, zinc straps, markers, ty-raps, etc. to lash multiple City-furnished coaxial cables to the strand. Tails must be pulled at all devices where multiple cables are present. At all locations where multiple coaxial cables are installed, the cables shall be doublelashed, regardless of location.

Expansion loops will be placed on all uncut output cables, and on “T” lead cables. Only Lemco model G-120 or approved equal mechanical loop bender tools will be used to hold loops in place until lashing is complete to the next pole.

This item shall be bid as additional and separate strand footage from lashed single cable.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 7 DE-LASH AND RE-LASH CITY-FURNISHED CABLES

Measurement — Shall be measured by the Active Cable Bearing Strand (A.C.B.S.) foot, pole-to-pole, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment including lashing wire, lashing clamps, zinc straps, markers, ty-raps, etc. to de-lash existing cables, delete cables and re-lash remaining coax and fiber cables separately. All cables shall be double-lashed, regardless of location. Expansion loops will be placed on all uncut output cables, and on “T” lead cables. Only Lemco model G-120 or approved equal mechanical loop bender tools will be used to hold loops in place until lashing is complete to the next pole.

Placement of additional new cables will be paid for under Items 5 and 6 single or multiple cables as described in those items.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 8 LASH CITY-FURNISHED FIBER (SINGLE SHEATH)

Measurement — Shall be measured by the Active Fiber Bearing Strand (A.F.B.S.) foot, pole-to-pole, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment including lashing wire, lashing clamps, zinc straps, markers, ty-raps, snowshoes, brackets, etc. to lash a single City-furnished fiber optic sheath only to strand or coax cabled strand. All safety measures, including traffic control and reel tender with two-way communications will be the responsibility of the contractor. All fiber optic cables shall be double-lashed. This work includes back lashing for the storage of 10% excess slack cable at 1000’ intervals and pulling of splicing tails. Protection of the fiber against damage and vandalism is the responsibility of the contractor from point of issue. All runs are to be installed in continuous lengths. Under no circumstances is any optical fiber to be severed at any point other than those specified on the plans without prior written permission. Contractor will be responsible for any physical damage or performance issues as a result of mishandling or improper installation techniques.

It is the contractor’s responsibility to notify the Tacoma Power inspection division when a fiber reel has been pulled to the designated splice location before cutting the fiber to ensure adequate storage has been provided. Fiber placement must conform to Section 8.03.6.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 9 COAXIAL ELECTRONIC ACTIVE AND PASSIVE SPLICING AND ACTIVATION

Measurement — Shall be measured by the Active Cable Bearing Strand (A.C.B.S.) or Cable Bearing Trench Foot of delivered two-way operating plant.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment to perform the following work under this bid item in all aerial and underground areas.

Bid item includes grounding, bonding, forming of cables, strapping and splicing of all cables and fittings and placement of amplifiers and accessories, 2-port, 4-port, and 8-port taps, directional couplers, two-way splitters, three-way splitters and power inserters whether self-terminating or not. Install heat shrink on all fittings. Install terminators and filters as required, install tap brackets on all taps, passives and amplifiers, and include security termination fittings over all customer ports. Provide brackets and hardware as needed for all devices. Install grounds and bonds on all active electronic devices as specified. Also included is installation of all forward and reverse pads and equalizers as posted on design maps, fuses, thermals, and other associated equipment. Select AC voltage range to 90 volts in all amplifiers. Torque all housings to manufacturer specifications using Tacoma Power approved torque wrenches, and all other splicing tools must be approved and of the type recommended by the equipment manufacturers.

As a part of the splicing function, contractors are required to activate the forward plant to 870Mhz +/- 2db.

Signal ingress testing must be performed on active reverse plant, verifying no ingress signals meeting a 72db Carrier to Ingress standard. Ingress testing will be reviewed, inspected and verified by Tacoma Power Inspection staff. This test consists of connecting an H/P spectrum analyzer to the reverse optical receiver, at the Hub location, and placing the analyzer on “Max Hold” for a period of 24 hours. Ingress interference cannot exceed 72db Carrier to Ingress over a 24-hour period.

Detail:
STEP 1: Verification of amplifier housing:
Pre-Installation
A: Check that all pad and Eq locations are installed per call out blocks B: Verify AC Voltage is set to 90V!
Post-Installation
A: Set DC Power Pack Voltage to 24V!
B: Set RF Output Levels per system specs

STEP 2: All Amplifier Locations, Store the following files:
A: Input Tilt File
B: Output Forward Sweep
C: Output Return Sweep

(Note- return sweep is used as a tool to view the return spectrum and to set levels)

STEP 3: Line End Recording:

A: Store a Tilt File
B: Store a Forward sweep file
C: Store a Return sweep file
D: Reinstall port terminators on line end tap

STEP 4: Providing Fire off Documentation (see drawings no. 8-13 in Appendix A)

A: Provide hard and soft copies all files for backup
B: Print all Tilt, Forward, and Return Sweep Files
C: Report any and all low-level issues to Tacoma Power Personnel.

STEP 5: System Ingress Testing:

A: Ingress testing will be conducted.
B: A 24 HR MAX HOLD TEST will be performed.
C: After a passing 24HR Test and final ingress drive-out with the Technical staff present to verify (noise floor of the return spectrum is clean from any impulse noise, CPD's, and any other interferences), Tacoma Power staff will except the node.

All aerial, multiple devices locations will require installing each piece of equipment on opposite sides of a pole using .715 jumper cables to connect the equipment. Any locations having a cable direction change will require additional cable slack to create a loop-back. The use of housing-to housing and/or 90 connectors will only be permitted in underground locations. Any exceptions must be pre-approved by Tacoma Power's project inspectors.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 10 INSTALL CITY-FURNISHED STANDBY AERIAL POWER SUPPLY WITH UNDERGROUND BATTERIES AND VAULT

Measurement — Shall be measured by per each, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, equipment, grounding, weather-head, conductors, pole risers, wiring connections and termination's, disconnect and over-current protection, to aerial power supply. Additional work includes splicing the power inserter and alt box in the cabinet and providing and installing up to 50 feet of power conductors installed to the power transformer. The contractor will be issued a NO FEE electrical permit from Tacoma Power. Tacoma Power work crews will coordinate for inspection and service hook-up.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 11 INSTALL CITY-FURNISHED STANDBY UNDERGROUND POWER SUPPLY CABINET AND BATTERIES & VAULT

Measurement — Shall be measured by per each CABINET, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, equipment, grounding, weather-head, risers, and any necessary hardware to install underground power supply, batteries and SSB. Additional work includes splicing the power inserter and alt box in the cabinet and providing and installing up to 75 feet of power conductors installed to the power transformer.

The contractor will be issued a NO FEE electrical permit from Tacoma Power.

Tacoma Power work crews will coordinate for inspection and service hook-up. All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 12 ROCKSAW TRENCH, MINIMUM 6" WIDE WITH 18" COVER USING CONTROL DENSITY BACKFILL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2" PVC pipe or 4" PVC. (See System Design) Work considered incidental to this bid item includes hand digging and trenching to expose existing utility substructure and to extend trench to a pedestal or pole, including boring under curb and gutter, and under sidewalk, concrete and asphalt replacement, and all other digging required for placement of the facilities.

This work is defined as that excavation which takes place within the City Rights of Way or in the Utility easements of private roads. Additional work to be performed under this bid item includes notification of Utilities Locator, backfilling with control density fill, replacement of asphalt wearing surface including 18" grind as required, potholing for utilities in roadway including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition. Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All rocksaw and grinding equipment must have a trench evacuation conveyer system to load trench materials directly into a dump truck. All asphalt replacement must meet or exceed a 92% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction. The testing will be managed and paid for by Tacoma Power.

All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 13 BACKHOE TRENCH, MINIMUM 12” WIDE WITH 18” COVER USING CONTROL DENSITY BACKFILL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2” PVC pipe or 4” PVC. (See System Design) Work considered incidental to this bid item includes hand digging and trenching to expose existing utility substructure and to extend trench to a pedestal or pole, including boring under curb, gutter and sidewalk. Concrete and asphalt replacement, and all other digging required for placement of the facilities is also considered incidental to this bid item. This work is defined as that excavation which takes place within the City Rights of Way or in the Utility easements of private roads. Additional work to be performed under this bid item includes notification of Utilities Locator, backfilling with control density fill, replacement of asphalt wearing surface including 18” grind as required, potholing for utilities in roadway including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition. Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All trench spoils must be loaded directly into a dump truck. Grinding equipment must have a trench evacuation conveyer system to load trench materials directly into a dump truck.

All asphalt replacement must meet or exceed a 92% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction. The testing will be managed and paid for by Tacoma Power.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 14 TRENCH 12” WIDE WITH 24” COVER USING NATIVE MATERIAL BACKFILL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2” PVC pipe or 4” PVC pipe.

Work considered incidental to this bid item includes hand digging/trenching to expose existing utility substructure, boring under driveways, across roadways, under sidewalks, curbs and gutters and to extend trench to a pedestal or pole.

This work is defined as that excavation which takes place within the City Rights of Way or in the Utility easements of private roads. Additional work to be included under this bid item includes notification of Utilities Locator, potholing for utilities in roadway, including asphalt and concrete replacement, open cut of roadway, if required, including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition.

Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All asphalt replacement must meet or exceed a 92% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction. The testing will be managed and paid for by Tacoma Power.

All backfill material must meet or exceed a 95% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction.

All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 15 TRENCH 12” WIDE WITH 36” COVER USING NATIVE MATERIAL BACKFILL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2” PVC pipe or 4” PVC pipe. Work considered incidental to this bid item includes hand digging/trenching to expose existing utility substructure, boring under driveways, across roadways, under sidewalks, curbs and gutters and to extend trench to a pedestal or pole and any other digging required for placement of the facilities.

This work is defined as that excavation which takes place within the City Rights of Way or in the Utility easements of private roads. Additional work to be included under this bid item includes notification of Utilities Locator, providing and placement of warning ribbon, potholing for utilities in roadway, including asphalt and concrete replacement, open cut of roadway, if required, including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition.

Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All backfill material must meet or exceed a 95% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction.

All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 16 TRENCH 12” WIDE WITH 36” COVER WITH 2”CONCRETE CAP USING NATIVE MATERIAL BACKFILL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2” PVC pipe or 4” PVC pipe and cover with 2 inches of concrete prior to backfill. This work is defined as that excavation which takes place within the County Rights of Way or in the Utility easements of private roads.

Work considered incidental to this bid item includes hand digging/trenching to expose existing utility substructure, and to extend trench to a pedestal or pole and any other digging required for placement of the facilities, includes notification of Utilities Locator, providing and placement of approved warning ribbon, potholing for utilities in roadway, open cut of roadway, if required, including asphalt and concrete replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition. Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All backfill material must meet or exceed a 95% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction.

All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 17 TRENCH 12” WIDE WITH 36” COVER UNDER WEDGE CURB USING 5/8” MINUS GRAVEL BACKFILL MATERIAL

Measurement — Shall be measured by the trench foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench and to place City-furnished 2” PVC pipe or 4” PVC pipe in the roadway under the wedge curb.

This work is defined as that excavation which takes place within the County Rights of Way. Work considered incidental to this bid item includes hand digging/trenching to expose existing utility substructure, and to extend trench to a pedestal or pole and any other digging required for placement of the facilities, all costs associated with the labor, materials and equipment for the placement of structural fill material including transportation and disposal of unsuitable material, notification of Utilities Locator, providing and placement of warning ribbon, potholing for utilities in roadway, replacement of asphalt wedge curb up to 18’’ in width with Class “B” asphalt concrete to Pierce County standards, open cut of roadway, saw-cutting, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition.

Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All backfill material must meet or exceed a 95% compaction test, as required and specified in the Washington State Standards for Road, Bridge, and Municipal Construction and by local jurisdiction.

All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 18 INSTALL UNDERGROUND SERVICE CONDUIT

Measurement — Shall be measured by the per each unit, complete and in place.

Payment — The per each unit price shall be full compensation for all costs associated with the labor, materials, and equipment required to open a trench, plow or bore to place City-furnished 1" roll pipe from the City Rights of Way to a customer's power meter with 12" of cover minimum.

Work considered incidental to this bid item includes hand digging/trenching to expose existing utility substructure, boring or plowing to extend trench to a pedestal or pole. Additional work to be included under this bid item includes notification of Utilities Locator, potholing for utilities, placement of drop vaults and cleanup and restoring properties to their original condition. Also, all conduits must be proofed, trimmed to specifications, and fitted with City approved conduit caps.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 19 UNDERGROUND PUSHING

Measurement — Shall be measured per Lineal Foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment necessary to horizontally push across existing roadways, driveways, beneath sidewalks, curbs and gutters or other areas as directed by the City.

Pushes must accommodate 2" or 4" conduit as directed by the City. Work incidental to this bid item shall include the placement of all City Furnished PVC pipe, excavation and restoration of bore pits including asphalt/concrete removal and replacement, and for the complete restoration of landscape materials.

Additional work to be included under this bid item includes notification of Utilities Locator, potholing for utilities in roadway, including asphalt and concrete replacement, open cut of roadway, if required, including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition. Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 20 DIRECTIONAL BORING

Measurement — Shall be measured per Lineal Foot, complete and in place for the following:

1 run of 2” conduit
2 runs of 2” conduit
3 runs of 2” conduit

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment necessary to directionally bore across existing roadways, driveways, beneath sidewalks, curbs and gutters or other areas as directed by the City.

Bores must accommodate 2” roll conduit as directed by the City. Bid item shall include incremental pricing for multiple ducts. Work incidental to this bid item shall include the placement of all Contractor-Furnished roll duct, excavation and restoration of bore pits including asphalt/concrete removal and replacement, and for the complete restoration of landscape materials.

Also, all conduits must be proofed with detectable poly tape or cabled, trimmed to published specifications, and fitted with City approved conduit caps before asphalt is replaced. Additional work to be included under this bid item includes notification of Utilities Locator, potholing for utilities in roadway, including asphalt and concrete replacement, open cut of roadway, if required, including asphalt replacement, placement of vaults, boxes and drop pedestals, small pedestals, medium pedestals, large pedestals, and optical node pedestals and cleanup and restoring properties to their original condition. Containment of boring compounds is the responsibility of the contractor. All vacant conduits must have a locatable pull tape installed.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 21 PLACE ENCLOSURES

Measurement — Shall be measured by each enclosure in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment necessary to place City-furnished vaults, small pedestals and large pedestals over previously installed conduits. Additional work to be included under this bid item includes conduit trimming, conduit cap placement supplied by contractor, placement of ground rods and # 6 ground wire, cleanup and restoring properties to their original condition.

All safety measures, including traffic control, are the responsibility of the contractor.

This bid item does not include work to be performed under bid items 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20. This bid item shall be used only with the approval of Tacoma Power's inspection staff.

Item No. 22 PROOF EXISTING CONDUITS

Measurement — Shall be measured by the linear duct foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment for proofing previously installed conduits with contractor supplied locatable pull tape; through manholes, vaults, pedestals and risers. Conduit trimming and conduit cap placements are considered incidental to this work.

All safety measures, including traffic control, are the responsibility of the contractor.

This bid item does not include work to be performed under bid items 12, 13, 14, 15, 16, 17, 18, 19, 20, 25, 26 and 27. This bid item shall be used only with the approval of Tacoma Power's inspection staff.

Item No. 23 CUT, REMOVE AND RESTORE CONCRETE

Measurement — Shall be measured by the square foot, complete and in place

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required for saw cutting and removing concrete, hauling and disposal to a legal dump site obtained and paid for by the contractor. Additional work considered incidental to this bid item shall include restoring the affected areas to the standards required by the local jurisdictions where the work is being performed. Concrete will be replaced to its original depth and finish. It is the contractor's responsibility to provide adequate site protection against vandalism while the concrete is curing.

This bid item does not include concrete work to be performed under bid items, 12, 13, 14, 15, 16, 17, 19 and 20. This bid item shall be used only with the approval of Tacoma Power's inspection staff for miscellaneous work not included in other bid items and not caused by contractor negligence.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 24 CUT, REMOVE AND RESTORE UP TO 3" THICK ASPHALT, BEYOND AND NOT INCLUDING 18" GRIND

Measurement — Shall be measured by the square foot, complete and in place

Payment — The unit price shall be full compensation for all costs associated with the labor, materials, and equipment required for saw cutting, grinding and removing asphalt, hauling and disposal to a legal dump site obtained and paid for by the contractor. Additional work considered incidental to this bid item includes restoring the affected areas to the standards required by the local jurisdictions where the work is being performed.

This bid item does not include asphalt work to be performed under bid items 12, 13, 14, 15, 16, 17, 19 and 20. This bid item shall be used only with the approval of Tacoma Power's inspection staff for miscellaneous work not included in other bid items and not caused by contractor negligence.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 25 FURNISH AND INSTALL RISER ASSEMBLIES

Measurement — Shall be measured by per each, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, hardware, materials and equipment necessary for framing and digging for the placement of a riser up to 30 feet in length on wood poles. All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 26 INSTALL CITY FURNISHED QR .715 COAXIAL CABLE IN CONDUIT

Measurement — Shall be measured by the linear trench foot per duct, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment for the installation of City-furnished QR 715 coaxial cable through previously installed conduit, manholes, vaults, pedestals and risers. Slack loops and tails, conduit trimming, and conduit cap placements are considered incidental to this work. A City approved pulling lubricant must be used at all locations.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 27 INSTALL CITY FURNISHED RG6 OR RG11 COAXIAL CABLE IN CONDUIT

Measurement — Shall be measured by the linear trench foot per duct, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment for the installation of City-furnished RG6 or RG11 coaxial cable through previously installed conduit, manholes, vaults, pedestals and risers. Slack loops and tails, conduit trimming, and conduit cap placements are considered incidental to this work.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 28 INNERDUCT PLACEMENT

Measurement — Shall be measured by innerduct foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor and equipment for the installation of City-furnished 1-1/4'' inner-duct through previously installed conduit, manholes, vaults, pedestals and risers. Conduit proofing, trimming and capping with City approved inner-duct plugs is considered incidental to this work.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 29 INSTALL CITY FURNISHED FIBER OPTIC CABLE IN CONDUIT

Measurement — Shall be measured by the linear duct foot, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment for the placement of City-furnished fiber optic cable and locate wire through previously installed conduit, manholes, vaults, pedestals and risers and includes all handling of the cable to avoid any cutting or damage of the cable. Contractor will be responsible for performance testing of fiber after installation and will be required to provide the City with OTDR test results confirming fiber is useable for intended purpose. Slack loops and tails, conduit trimming, and conduit cap placements are considered incidental to this work. This work includes back pulling for the storage of 10% excess slack cable at approximately 1000 ft. intervals and pulling of splicing tails.

Protection of the fiber against damage and vandalism is the responsibility of the contractor from point of issue until all testing and documentation has been released and verified to owner. All runs are to be installed in continuous lengths. Under no circumstances is any optical fiber to be severed at any point other than those specified on the plans without prior written permission. Placement of all fibers will include reel test before and full OTDR documentation after placement.

It is the contractor's responsibility to notify the Tacoma Power inspection division when a fiber reel has been pulled to the designated splice location before cutting the fiber to ensure adequate storage has been provided.

Fiber placement and splicing must conform to the attached Fiber Proofing and Certification Specification.

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 30 AERIAL CREW RATE

Measurement — Shall be measured by the hour.

Payment — The unit price shall be full compensation for all costs associated with the labor, supervision, and equipment required to perform aerial telecommunications type work not covered in any other bid items.

These labor rates shall meet current prevailing wage standards and conform to the guidelines in General Provisions section 3.08 of this contract.

Itemized price for each of the following:
1- Lineman
1- Driver / Ground man
1- Laborer
1- Splicer
1- Line truck / Cable Trailer, including all necessary tools
1- Splicing vehicle

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 31 UNDERGROUND CREW RATE

Measurement — Shall be measured by the hour.

Payment — The unit price shall be full compensation for all costs associated with the labor, supervision, and equipment required to perform underground telecommunications type work not covered in any other bid items.

These labor rates shall meet current prevailing wage standards and conform to the guidelines in General Provisions section 3.08 of this contract.

Itemized price for each of the following:
1- Equipment operator
1- Driver / Ground man
1- Laborer
1- Splicer
1- Splicing vehicle
1- Backhoe
1- Trucks with Equipment

All safety measures, including traffic control, are the responsibility of the contractor.

Item No. 32 SET UP FEE

Measurement — Shall be measured per each work packet.

Payment — The unit price shall be added to an Aerial or Underground work packet that does not meet the contractor's daily crew rate as described under 1.01.2 Scope of Work.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 33 MOBILZATION FEE FOR EMERGENCY CALL-OUTS

Measurement — Shall be measured per each call-out with assigned project/work packet.

Payment — The unit price shall be called out as a separate line item on invoicing. This fee will be in addition to daily crew rate needed for the scope of work for the call-out as described under 1.01.2 Scope of Work.

All safety measures, including traffic control, will be the responsibility of the contractor.

Item No. 34 STRUCTURAL FILL – 5/8" MINUS GRAVEL

Measurement — Shall be measured by the ton, complete and in place.

Payment — The unit price shall be full compensation for all costs associated with the labor, materials and equipment for the placement of structural fill 5/8" minus gravel material including transportation and compaction and disposal of unsuitable material.

Placement of structural fill material will be in lieu of native material deemed not suitable for backfill and shall be approved by the project manager. The inspector will collect truck tickets.

Item No. 35 FORCE ACCOUNT

Measurement & Payment — If the contract calls for work or materials to be paid for by force account, payment amounts will be determined as outlined in Section 1-09.6 - FORCE ACCOUNT of the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction as published by the Washington State Department of Transportation. 2025 Standard Specifications for Road, Bridge, and Municipal Construction

All force account items must be agreed to in writing before work begins.

END OF SECTION

SECTION 3 - PROJECT COORDINATION

3.01 – PROJECT MANAGER

The project manager for this project with whom the contractors shall coordinate all activities will be provided upon contract execution.

3.02 – MEETINGS

3.02.1 – Pre-Construction Meeting

Following assignment of work, the project manager will notify the selected bidder of the time and date of the pre-construction meeting to be held at the project location or at a location to be determined in the Tacoma Public Utilities Administration Complex, 3628 South 35th Street, Tacoma, Washington.

3.02.2 – Minutes of Pre-Construction Meeting

Minutes of the pre-construction meeting will be sent to the contractor and all meeting attendees. Recipients of the pre-construction meeting minutes will be required to direct any comments or changes to these minutes to the project manager within seven (7) days from the date of receipt. If no changes or comments are received within the seven (7) days, the meeting minutes will become part of the project file.

3.02.3 – Project Phase Meetings

The project manager will schedule meetings at the project site prior to each major phase or section of work; prior to installing major pieces of equipment as identified by the project manager; and on an as-needed basis. Attendance is required of the contractor, site superintendent and major subcontractors at all such meetings. The project manager will notify the contractor of all required site meetings during the pre-construction meeting. Agenda will follow the same format as the pre-construction conference for applicable items. Minutes of each meeting will be kept by the project manager and become part of the project file.

3.03 – PERMITS

The City will be responsible for procurement of all work permits to authorize the contractor to trench and install the telecommunication facilities within any City Rights of Way.

3.03.1 – Electrical Permits

The Power Division will issue to the contractor a NO FEE electrical permit. The City of Tacoma shall perform electrical inspection.

3.04 – FIELD ENGINEERING

3.04.1 – Survey Reference Points

The contractor shall protect survey control points, monuments and other survey control within the City Rights of Way during construction.

3.04.2 – Damage, destruction, or loss of Survey Reference Points

Promptly report to the project manager the loss or destruction of any survey control point. Survey control damaged by the contractor shall be replaced by City forces and paid for by the contractor.

3.04.3 – Establishment of Project Boundaries by Engineer

The project manager shall establish the lines for location of the work items listed in the proposal. Contractor's work shall conform to the horizontal and vertical controls unless deviations are obtained from the project manager.

3.04.4 – Adjustment of Portion of Project

The project manager may adjust or relocate any portion of the project to meet site requirements or to improve the project without additional compensation to the contractor, provided such adjustments do not represent appreciable costs for additional labor and materials as determined by the project manager.

3.04.5 – Contractor Responsibility

Based upon the information provided by the project manager, all other lines and detail surveys necessary for the execution and completion of the work shall be established and maintained by the contractor.

After the project manager has given lines and grades for any part of the work, the contractor shall be held responsible for the proper execution of the work to such lines and grades.

3.04.6 – Audit of Progress by Project Manager

The project manager reserves the right to check all work, have free access to all work, and shall have the full cooperation of the contractor in so doing.

3.05 – COORDINATION WITH OTHERS

3.05.1 – Traffic Control

Contractor shall provide temporary facilities, barricades and make other temporary modifications as necessary to keep the existing roads and fire lanes in operation during the construction period.

3.05.2 – Electrical Transmission and Distribution Conductors

Existing transmission lines, distribution lines, and utility lines will be encountered during the course of this project. These service systems will remain electrically energized and functional during construction except as otherwise provided for in these specifications.

3.05.3 – Coordination of Work with the City

The contractor shall be responsible for coordinating and scheduling the work to be performed by the City so that it coincides with the work.

3.06 – DIVISION OF WORK

3.06.1 – Material Furnished and installed by contractor

The contractor shall furnish and pay for all necessary materials (except City-furnished) and shall provide all labor, tools, equipment and superintendent, and perform all work incidental to the completion of the project as contemplated by this contract in accordance with the plans, specifications, and instructions of the project manager.

3.06.2 – Coordination with T&D Warehouse for materials

It shall be the responsibility of the contractor to provide two business days' notice prior to obtaining the City-furnished material from the Tacoma Power Warehouse, 3628 South 35th Street (rear), Tacoma, Washington, between the hours of 10:00 AM and 3:00 PM on regular City working days with his own forces and equipment. All materials received by the contractor shall become his responsibility and he shall be liable for any material lost or damaged after receipt.

3.07 – MAKE READY WORK ON POLES

3.07.1 – Electrical Utility & Communication Worker Safety Space

Tacoma Power will perform Major Make-Ready work before contractor work begins to provide as much pole contact space as possible for the HFC system to be installed. The most current edition of ANSI Standard C2 – National Electric Safety Code, regulates this space.

3.07.2 – Communication Attachment Space

The contractor shall be responsible for rearrangement of communications facilities to create the 40" safety space. In some instances a lineperson may be required to work in the Supply Zone which will necessitate the contractor to provide a "qualified employee" as outlined in WAC 29645-065 and the NESC Part 4, Section 42, Rule 420B. Written documentation will be required.

3.08 – DIFFERING SITE CONDITION/CHANGE ORDERS

Differing site conditions shall be administered in accordance with the subsections below. All deviations from agreed upon work process shall be agreed upon by the project manager in writing.

3.08.1 – Subsurface Conditions

The contractor shall promptly, and before conditions are disturbed, notify the project manager or the field representative of problems with subsurface conditions at the site, problems or conflicts in the plans or specifications or problems on construct ability.

3.08.2 – Filing of Claims for change orders

No claim by the contractor under this differing site condition shall be allowed except as agreed upon in writing with the project manager.

Whenever possible, the contractor shall submit in advance and in writing, a proposal for changes in the scope of work and/or contract amount. This proposal shall be either accepted or rejected in writing by the project manager prior to work commencing.

3.08.3 – Short Notice Change Orders

When time is short, the contractor shall notify the City extra work is required or the City shall notify the contractor that extra work is needed and at a minimum, the project manager shall issue a handwritten notice to proceed. In such cases, said handwritten notice will not be considered as agreement that such work is extra. Within seven (7) days, the contractor shall submit a written proposal for changes in the scope of work and/or contract amount.

3.09 – CONSTRUCTION PROGRESS SCHEDULES

3.09.1 – Schedule Format

Prepare schedules as a horizontal bar chart with separate bar for each major portion of work or operation, identifying the first workday of each week as directed by the project manager.

3.09.2 – Content of Project Schedule

This schedule shall be activity-oriented showing as nearly as can be determined the starting and completion dates of each event. The schedule shall show the materials delivery, structure erection, and installation. It will include the start and completion of each major civil, mechanical and electrical item of work critical to the general contractor's operation.

Show complete sequence of construction, by activity, with dates for beginning and completion of each element of construction.

Identify each task by the appropriate proposal bid item number.

3.09.3 – Submittals of Schedules

Submit initial schedules within five (5) working days after assignment of a project. After review, if the project manager requires changes, resubmit required revised data within 5 (5) working days. This may be adjusted per job at TPU’s convenience.

END OF SECTION

SECTION 4 - QUALITY CONTROL

4.01 – REFERENCE STANDARDS

Reference to standards, specifications, manuals or codes of any technical society, organization, or association, or to the laws or regulations of any governmental authority, whether such reference be specific or by implication, shall mean the latest Standard Specification manual, code, or laws or regulations in effect at the time of opening of bids (or on the effective date of the agreement if there were no bids), except as may be otherwise specifically stated. However, no provision of any referenced standard, specification, manual, or code (whether or not specifically incorporated by reference in the contract documents) shall be effective to change the duties and responsibilities of City, contractor, or project manager, or employees from those set forth in the contract documents.

Any part of the work not specifically covered by these specifications shall be performed in accordance with the applicable section of the latest Edition of the "Standard Specifications for Road, Bridge and Municipal Construction" as prepared by the Washington State Department of Transportation and the Washington State Department of Public Works Association (APWA) as amended by the latest APWA Amendment No. 1 and the latest City of Tacoma Amendment No.1.These specifications will herein be referred to as the Standard Specifications.

4.02 – INSPECTION, TESTING AND CERTIFICATION

Construction inspection for the City shall be coordinated through the project manager or others as the City may designate and as the construction situation may dictate. The City inspector will be responsible for insuring that the contractor is complying with the contract plans and specifications.

4.02.1 – Pre-final Inspection

Contractor shall notify the project manager in writing when all work or portions of work are complete and ready for inspection. The project manager will make a "punch list" and forward the results of same to the contractor who shall promptly correct any deficiencies noted.

4.02.2 – Final Inspection

Contractor shall notify the project manager in writing when all punch list deficiencies have been completed. The project manager will promptly set a time for final inspection at which time the project manager and contractor shall jointly inspect the work. The contractor will promptly correct any further deficiencies noted.

4.03 – COUNTY/CITY PERMIT INSPECTIONS

As part of the construction permits provided by the applicable City department, an inspector from the city will inspect the various phases of construction. The contractor shall follow the requirements of the permits from the city.

END OF SECTION

SECTION 5 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

5.01 – UTILITIES

5.01.1 – Electric Service

Power will not be provided for this project.

5.01.2 – Telephone Service

The City will not provide telephone service for the contractor.

5.01.3 – Water

The City will not provide water to the contractor for this project.

5.01.4 – Sanitary Facilities

Contractor(s) shall provide for the sanitary necessities of all persons employed on the project, beginning with the first person employed and shall be of the chemical type. Such conveniences shall be erected and maintained by the contractor, in the number, manner, and place approved by the project manager immediately upon commencing work. The Sanitation Laws of the State of Washington and any applicable county sanitary laws shall be complied with.

5.02 – JOB SHACK & MATERIALS STORAGE AREA

5.02.1 – Location & Size of Job shack

The contractor shall supply a job shack where construction plans shall be kept. The shack shall be large enough to keep "AS-BUILT" plans and provide access to City inspectors and project managers as required.

5.02.2 – Contents of Job shack

The contractor shall keep on the job site a full-size copy of the drawings and specifications and shall at all times give the project manager access thereto.

5.02.3 – Storage area

The contractor will acquire a storage area for staging materials for construction. These storage areas shall be capable of protecting both contractor and City-furnished materials from damage, effects of weather and theft. It shall be the contractor’s sole responsibility to provide security for all City-furnished materials and equipment once received from Tacoma Power’s warehouse. The storage area shall be large enough to adequately store one week’s worth of work.

5.03 – ROADWAY AND TRAFFIC CONTROL

5.03.1 – Traffic Coordination

All traffic controls on this project shall adhere to the latest edition of the "Manual on Uniform Traffic Control Devices" and Washington Administrative Code 296-155-305. Adequate access shall be provided for local and emergency vehicular traffic through the project area at all times.

5.03.2 – Coordination with City Traffic Engineering staff

Portions of the work contemplated under this contract will require the blockage of certain streets and sidewalks. Tacoma Power will not be responsible for any traffic control matters. The contractor is fully responsible for coordinating with the City traffic engineer on all matters pertaining to the movement of vehicular and pedestrian traffic past the project area, and all costs shall be incidental to the project.

It is the contractor's responsibility to provide all traffic control and signing for the project to the satisfaction of the area traffic engineer within the City or county in which work is being performed, all costs shall be incidental to the project.

5.03.3 – Traffic Signs and Signals

The contractor shall be responsible for all temporary signing or barricades placed at the job site to control traffic and protect the public from construction areas.

The supply, placement, and maintenance of all traffic controls shall be the responsibility of the contractor and shall be in accordance with the "Manual on Uniform Traffic Control Devices." and Washington Administrative Code 296-155-305.

5.03.4 – Traffic Control Plan

The lead person of the job site crew will familiarize the flaggers with the job site, proposed activities, and their expectations for performance. When flaggers are used on a job that will last more than one day, the employer, responsible contractor and/or project owner must keep on-site, a current site-specific traffic control plan per MUTCD standards.

5.04 – DUST CONTROL

The contractor shall take reasonable measures to prevent unnecessary dust. Earth surfaces subject to dusting shall be kept moist with water or by application of a chemical dust suppressant. Dusty materials in piles or in transit shall be covered when practicable to prevent blowing.

5.04.1 – Protection from Dust

Buildings or operating facilities, which may be affected adversely by dust, shall be adequately protected from dust. Existing or new machinery motors, instrument panels, or similar equipment shall be protected by suitable dust screens. Proper ventilation shall be included with dust screens.

5.05 – TEMPORARY DRAINAGE PROVISIONS

Contractor shall provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property. Contractors working on this project must comply with all Regional Road Maintenance Endangered Species Act Program Guidelines.

5.06 – POLLUTION CONTROL

Contractor shall prevent the pollution of drains and watercourses by sanitary wastes, sediment, debris, and other substances resulting from construction activities. No sanitary wastes will be permitted to enter any drain or watercourse other than sanitary sewers. No sediment, debris, or other substances will be permitted to enter sanitary sewers and reasonable measures will be taken to prevent such materials from entering any drain or watercourse. Contractors working on this project must comply with all Regional Road Maintenance Endangered Species Act Program Guidelines.

END OF SECTION

SECTION 6 - MATERIAL AND EQUIPMENT

6.01 – QUALITY OF WORKMANSHIP AND MATERIALS

6.01.1 – Workmanship

The contractor shall employ only competent, skillful, and orderly persons to do the work, and whenever the project manager administering the contract shall notify the contractor in writing that any person on the work is, in his opinion, incompetent, disorderly or otherwise unsatisfactory, the contractor shall forthwith discharge such persons from the work and shall not again employ them on this contract. Work shall conform to the highest industry standards.

6.01.2 – Materials

Materials shall be delivered to the project site in the manufacturer's original containers, bundles or packages unopened with the seals unbroken and the labels intact. Each type of material shall be of the same make and quality throughout. Manufactured articles, materials and equipment shall be installed in accordance with each manufacturer's written directions, unless otherwise specified.

SECTION 7 - CONTRACT CLOSEOUT

7.01 – DOCUMENTS REQUIRED UPON COMPLETION OF WORK

7.01.1 – Close out procedures

The contractor shall notify the project manager in writing when identified tasks are complete and ready for inspection. The project manager will make the inspection, forward the results of it to the contractor, who shall promptly correct any deficiencies noted.

The contractor shall notify the project manager in writing when all punch list deficiencies have been completed. The project manager will promptly set a time for final inspection, at which time the project manager and the contractor shall jointly inspect the work. The contractor will promptly correct any deficiencies noted.

7.01.2 – Final Documentation

Upon completion of the work and before final payment is made, the contractor shall deliver to the project manager, in addition to such other items specified in these specifications, the following documents:

7.01.2A – "AS-BUILT" Drawings

"As Built" maps MUST accompany invoices or claims for work completed. All mapping revisions must be submitted with daily production reports and will not be accepted until "As Built" information is documented and signed off by designated City Inspector.

Underground Rock Saw or Trenching As-built Procedure:

- Inspector white lines with the contractor, all changes will be marked on our prints and the contractor's prints.
- Rock-saw work begins and pipe is placed, all pipes must be proofed before paving.
- Conduit is cabled by competent person able to read design prints.
- Pave Rock-saw patch and complete all restoration.
- Contractor turns in as-built weekly or as work on a street is completed.
- Inspector walks out production with contractor and verifies walk out footages on contractor as-built.
- Tacoma Power Inspection staff transfers as-built information onto master as-built.
- Plant is spliced and activated.
- Construction notifies Technical of all field changes before activation begins.
- Technical certifies node.
- Technical notifies Construction of any changes or punch list items.
- As-built is turned into Engineering.

Aerial Changes:

- All aerial changes will be identified and approved by aerial Inspector.
- Contractor will provide an as-built with changes marked.
- Inspector will transfer as-built information to master as-built.
- Plant is spliced and activated.
- Construction notifies Technical of all field changes before activation begins.
- Technical certifies node.
- Technical notifies Construction of any changes or punch list items.
- As-built is turned into Engineering.

Joint Trench As-built Procedure if cabled by Contract Staff:

- Contractor proofs pipe to verify design.
- Inspector verifies design and any changes will be marked on Click! and contractor prints at that time.
- Cable is pulled.
- Contractor turns in as-built weekly or as project is completed.
- Inspector verifies footage.
- Tacoma Power Inspector will transfer as-built info to master as-built.
- Plant is spliced and activated.
- Construction notifies Technical of all field changes before activation begins.
- Technical certifies node.
- Technical notifies Construction of any changes or punch list items.
- As-built is turned into Engineering

"AS-BUILT" drawings and specifications of new or revised existing work, shown in red ink, shall be provided by the general contractor and all other subcontractors, including all addendum's, change orders, deviations, changes, elevations, and dimensions of their work from the construction documents. This documentation shall include any deviation or Tacoma Power approved changes made during the course of construction.

END OF SECTION

SECTION 8 – FIBER OPTIC AND COAXIAL CABLE PLANT

8.01 – GENERAL

8.01.1 – Section Includes

This section will provide for the construction of aerial and underground fiber optic and coaxial cable plant to support the deployment and maintenance of a hybrid fiber-coaxial (HFC) transmission network. The work consists of both overhead and underground facilities including coaxial and fiber optic cable, splicing of coaxial and fiber optic cable and equipment, installation of power supplies, amplifiers and other items required to provide for a complete and operable two-way HFC network including activation and certification of CATV plant, and as further described in these specifications.

8.01.2 – Regulatory Requirements

- Comply with all necessary ordinances and public works requirements.
- Maintain street Rights of Way egress, fire and life safety lanes.
- WISHA requirements for all work shall be strictly adhered to.

8.02 – PRODUCTS

8.02.1 – General

The City will provide certain items to the contractor for installation as specified. The contractor is responsible for the proper care, handling and storage of all material provided to the contractor by the City, including protection from weather, freezing, water damage, impact and static discharge.

The contractor shall supply all passive and support hardware required for construction. This shall include, but not be limited to, strand, pre-formed ends, guys, anchors, hardware, cross-arms, extension arms, ground rods and ground wire, clamps, cable brackets, lashing wire, bonding material, warning tape, conduit caps and other items as further required for a complete and operable HFC transmission network and as identified in Part 2.02 of this section.

8.02.2 – General Materials Contractor Supplied

8.02.2A – Grounding and Bonding Clamps

Bolt-on grounding and bonding clamps shall be as manufactured by Thomas & Betts, Type K-UL for all copper to copper, strand to copper and strand-to-strand applications.

8.02.2B – Ground Rods

Ground rods shall be Blackburn model BBN 002949, 8-foot long, 3/4" diameter, or engineer approved equal.

8.02.2C – Ground Wire

#6 AWG soft-drawn, bare copper ground wire.

8.02.2D – Heat Shrink

Provide CANUSA-EMI CFTV-1500 City MID: 808070TC heat-shrink tubing with pre-applied adhesive or engineer-approved equal. At minimum, shrink ratio of unheated to heated tubing shall be 3 to 1. Heat shrink shall form a watertight seal around the cable and fittings and overlap aluminum jacket by 2”, and shall have a heat indicator stripe that changes from blue to black after the tubing has been properly heated.

8.02.3 – Contractor Supplied Aerial Materials

8.02.3A – Strand

1/4" and 3/8” galvanized extra high strength steel strand, rated to a minimum 6600/9100/10,000 must be used as applicable for guys.

8.02.3B – Pre-formed Dead-ends

Provide pre-formed dead-ends as manufactured by Preformed Line Products, model #’s GDE - 1104, 1106, 2121 and 2123, composed of seven individual wires, appropriate for interface to strand, with seven-wire manufacture and appropriate weave for strand.

8.02.3C – Lashing Wire

Provide stainless steel lashing wire, 0.038” in diameter, with a tensile strength of 95 psi. All hardware must be pre-approved by Tacoma Power inspection staff.

8.02.3D – Guards, Insulators and Guy Markers

Provide tree guards / cable guards to protect coaxial cable and fiber optic cables from abrasion at each suspension clamp and from damage by trees and limbs. Guards shall be sized as required for the cable diameter and area to be protected.

Provide 8-foot yellow, full round guy markers as sold by Tele-Wire Stock #HDW 002867, to enhance the visibility of down guys at each guy location.

8.02.3E – Pole Hardware

Pole hardware shall include all machine bolts, nuts and washers, corner attachments, sidewalk guy fittings, suspension c lamps (three bolt, flat and curved), tap brackets, cross-over clamps, guy hooks, guy clamps and screws, gains, thimble eyes, extension brackets, and grounding equipment. All material must be 5/8-inch construction for ¼-inch strand and be hot dipped galvanized. All hardware must be pre-approved by Tacoma Power inspection staff; no used hardware will be accepted.

8.02.3F – Lashing Clamps

Provide lashing clamps sized for ¼-inch strand as manufactured by Diamond, Type D model #2609010, or engineer approved equal. Clamps shall use double-ended stud bolts, washers and free running nuts. Clamps shall be hot-dipped galvanized steel. Plates shall be two-piece "D" type construction.

8.02.3G – Cable Zink Straps

Provide Diamond 10", 16", 22" Zinc straps or engineer approved equal.

8.02.3H – Aerial Fiber Slack Storage

Provide fiber-loop storage units as manufactured by Antec Model FOSS-2, 3, and 5 or engineer approved equal, for attachment to strand to support slack fiber in aerial plant. Units shall be provided with tap brackets for connection to strand.

8.02.3H.1 – Cable Ties

Heavy cable ties shall be used for fiber storage units& all mid entry slack loops ty-rap every 12''.

Approved: Thomas & Betts CAT NO TY527MX.

8.02.4 – Contractor Supplied Underground Materials

8.02.4A – Detectable Polyester Pull Rope

Provide any necessary rope for install coax or fiber cables. All spare conduits must have a locatable footage tape installed prior to final inspection. Approved Part # CONDUX 08099203

8.02.4B – Pulling Lubricant

Provide polymer-based lubricant appropriate for the cable jackets. Lubricants shall be approved for use by the coaxial and fiber optic cable manufacturers. Lubricant shall have a freezing point of -7 degrees Celsius or colder, with stability to 90 degrees Celsius. Material shall be non-toxic, non-staining and shall have a coefficient of friction of 0.15 minimum.

Approved part: POLYWATER #J-128, PT Technologies #61101, AQUA-GEL II # 31-371

8.02.4C – Concrete

Concrete shall be WSDOT Class 3000, no hand/sack mix is accepted as specified in Section 6.02.3(2) of the WSDOT Standard Specifications. 2025 Standard Specifications for Road, Bridge, and Municipal Construction

Ingredient	Lbs.	S.G.	Volume
Cement	517	3.15	2.63
Silica Fume	0	2.20	0.00
Fly Ash	0	2.20	0.00
Steel Fiber	0	3.50	0.00
#467	0	2.70	0.00
#67	0	2.70	0.00
1/2" X 3/8”	0	2.70	0.00
#8	1635	2.69	9.74
Bldg-sand	1610	2.65	9.74
Pavg-sand	0	2.65	0.00
Water	251	1.00	4.02
Polyheed 997	0.0 oz.		
Glenium 3000 NS	0.0 oz.		
Pozzolith NC534	0.0 oz.		
Pozzolith 100XR	0.0 oz.		
MBAE90	2.5 oz.		1.08
Pozzolith 200N			
Total	**4013 lbs.**		**27.21**
Calc. Unit Wt.	147.47		
W/C Ratio	0.49		
Slump	4”-5” Max		
Coarse Aggregate	209		
Intermediate Aggregate	1731		
Fine Aggregate	1305		
Total Aggregate Wt.	3245		
Sand / Paste Ratio	1.186		
Sand / Aggregate Ratio	0.402		
Combined Coarse Agg.	0.126		
Mortar Volume	57%		
Design Air Content	4.00%		

Holroyd Company Mix Design Holroyd Mix # 5535A or approved equal 1 Cu. Yd. S.S.D.

8.02.4D – Control Density Fill

Control density fill (CDF) material for street crossings as required by the City Inspector. CDF shall conform to the following specifications:

Holroyd Company Mix Design Holroyd Mix # CDF50PD or approved equal 1 Cu. Yd. S.S.D.

Ingredient	Lbs.	S.G.	Volume
Cement	50	3.15	0.25
Silica Fume	0	2.20	0.00
Fly Ash	300	2.20	2.19
Steel Fiber	0	3.50	0.00
#467	0	2.70	0.00
#67	0	2.70	0.00
#4 x #16		2.70	0.00
#8	0	2.68	0.00
Bldg-sand	2545	2.65	15.40
Pavg-sand	0	2.65	0.00
Water	300	1.00	4.81
Polyheed 997	0.0 oz.		
Glenium 3000 NS	0.0 oz.		
Pozzolith NC534	0.0 oz.		
Rheocell 30	0.0 oz.		0
MBAE90	10.0 oz.		4.46
Pozzolith 200N	0.0 oz.		
Total	**3195 lbs.**		**27.11**
Calc. Unit Wt.	117.85		
W/C Ratio	0.86		
Slump	10”		
Coarse Aggregate	0		
Intermediate Aggregate	199		
Fine Aggregate	2346		
Total Aggregate Wt.	2545		
Sand / Paste Ratio	1.958		
Sand / Aggregate Ratio	0.922		
Combined Coarse Agg.	0.000		
Mortar Volume	96%		
Design Air Content	17.00%		

8.02.4E – Asphalt Emulsion Coating

Emulsion coating (AEC) is an asphalt-based sealer used to fill minor cracks and depressions to develop a smoother, more attractive, longer-lasting surface. AEC shall conform to the following specifications:

- A-100 Type – CSS1-H AASHTO M208
- Uniformity – ASTMD – 977-91&97& AASHTO M140-88
- Cone Penetration @ 77 degrees F
- AEC shall be used in the following proportions.
- No less than 30 sq ft per gallon of undiluted sealer per square yard applied in two coats.
- A-100 can be mixed with up to three pounds of silica sand per gallon.
- A-100 may be mixed with water from 10 to 25 percent depending on surface conditions dictated by the City.

8.02.4F – Asphalt Concrete Pavement

Unless otherwise referenced or modified, quality control and quality standards for the furnishing and placement of asphalt concrete pavement shall be as specified in the State of Washington Standard Specifications for Road, Bridge, and Municipal Construction - latest edition.

All asphalt shall be Class B. Aggregates for asphalt Class B shall conform to the requirements of the WSDOT Standard Specifications paragraph 9-03.8 for Class “B” asphalt concrete.

Bituminous materials shall meet the requirements of the WSDOT Standard Specification paragraph 9-02.1(4) for viscosity grade AR-4000W. Seal edge of patch with Click! Network approved washed sand immediately after placing AR-4000.

Asphalt emulsion tack coat shall be CSS-1 conforming to the requirements of the WSDOT Standard Specifications paragraph 9-02.2 and shall be diluted 50/50 with water.

8.02.4G – Landscaping

All landscaping material to include, but not be limited to beauty bark, landscaping gravel, shrubs, retaining walls, concrete edging strip, brickwork, and fences necessary for site restoration, unless otherwise noted.

8.02.4H – Duct Plugs

All duct plugs shall be sized for the duct and inner-duct that they are installed and be water and dust tight.

Provide blank duct plugs for unused and empty duct and inner-duct such as Jack-moon 12D148U or approved equal. Blank duct plugs shall be equipped with a tie-off point for pull ropes. Conduit plugs such as Multi-cap SS CA-200 or an approved equal shall be sized for the conduit in which they are to be installed and placed after cabling.

Provide duct plugs to seal around cables exiting duct and inner-duct such as Simplex 125090SB or an approved equal. Duct plugs of this type shall have at least two- (2) minimum and up to four- (4) cable penetrations and openings shall be sized for the cables installed. Penetrations in this type of plug shall be equipped with a blank duct plug with pull rope tie off.

8.02.4I – Structural Fill

Structural fill shall be 1-1/4” minus or 5/8” minus.

8.02.4J – Jet Line

Pull-line, synthetic, untwisted parallel strands, bound together with spiral jacket binder 335 tensile, approximately 240 LB. knot breaking point, package weight approximately 10 LBS, shrink wrapped tubes with center dispensing feature.

APPROVED:

- RACEWAYS TECHNOLOGY
- CONTINENTAL WESTERN # 350M #027-001
- CONTINENTAL WESTERN # 3500M

8.02.4K – Riser Clamps for 2” PVC

Conduit riser clamps shall be hot dipped galvanized steel, 2-piece with hex-head bolt and nut to fit 1-5/8” “Uni-strut” type channel. Strap must be hot dipped galvanized per ASTM Standard A386/A1-53 after fabrication.

ELECTRO-GALVANIZING WILL NOT BE ACCEPTED.

APPROVED:

- B-LINE B2013HDG
- UNISTRUT P1117HG
- MORFAB 200-HDG
- SUPERSTRUT 702-2 HDG

8.02.4L – Riser Clamps for 4" PVC

Conduit riser clamps shall be hot dipped galvanized steel, 2-piece with hex-head bolt and nut to fit 1-5/8" "Uni-strut" type channel. Strap must be hot dipped galvanized per ASTM Standard A-386/A1-53 after fabrication.

ELECTRO-GALVANIZING WILL NOT BE ACCEPTED.

APPROVED:

- B-LINE B2017HDG
- UNISTRUT P1121HG
- MORFAB 400-HDG
- SUPERSTRUT 702-4 HDG
- POWERSTRUT PS1100 4HDG

8.02.4M – Conduit Roll Duct 2"

Conduit, roll duct, 2", inside diameter 2.010", outside diameter 2.375", minimum wall thickness 0.176", weight 52lb./100ft, manufactured in compliance with ASTM D-3035. The inside diameter shall be minimum 2". The wall thickness shall be outside diameter controlled to SDR 13.5 rating. The outside surface shall be smooth wall, and the inside surface shall be either smooth wall or longitudinally ribbed. Approved: Vikamatic #2SDR13.5

8.02.4N – Bracket, 15", Pole Riser, Galvanized

15" long standoff bracket, hot dipped galvanized. Reference material standards drawing "standoff bracket".

8.02.4O – Bracket, 24", Pole Riser, Galvanized

24" long standoff bracket, hot dipped galvanized. Reference material standards drawing "standoff bracket".

8.03 – EXECUTION

8.03.1 – General Requirements

All construction shall be in accordance with the requirements stated herein, as well as the codes, regulations, ordinances, permits, easements, and other documentation for the project.

8.03.1A – Conduct at Work site

The contractor shall conduct all work in a way that reduces any inconveniences to the property owners and general public. Disturbance and impedance of traffic shall be kept to a minimum, and at no time shall a property owner be barred from

entering or exiting their property, nor shall commercial, industrial and retail properties be impacted in such a way as to impede the access of customers, deliveries or services to and from the properties.

8.03.1B – Completion of Work

When work is complete in an area, the Rights of Way and private property shall be restored as close as possible, to the original condition. The contractor shall use care to avoid damage to fences, trees, shrubs, flowers, etc. Keep disturbance of the ground surface by equipment to a minimum. Streets, driveways, sidewalks and all other landscape areas will be swept or washed clean, using appropriate means. The contractor shall be careful not to let pets out of fenced yards.

8.03.1C – Field Supervision and Communication

All contractors will provide a non-working project manager. In addition, the City specifies the contractor will provide one (1) non-working supervisor for up to each ten (10) workers.

8.03.1C.1 – Field Supervisor Duties

Field supervisor's duties will include providing all required documentation, safety, quality control, and daily completion time. Field supervisors will not splice or be involved in physical construction. Their job will be to oversee their crews.

8.03.1D – Communications for Field Personnel

All contractors will provide communications for their field personnel. Pagers and telephones are required for each field supervisor. If the supervisor leaves the construction site, a telephone and pager must be left with the supervisor's appointed replacement for the period of their absence. Contractor will coordinate communications using equipment compatible with City’s system as required by the project manager, cost of adaptation to be paid by contractor.

8.03.1E – Security of Material and Equipment

The contractor shall be responsible for twenty-four-hour security for any material or equipment left on the job site for any period of time, throughout the life of this project.

8.03.2 – Aerial Construction

The contractor shall perform the construction of aerial facilities, including the installation of:

- Strand
- Cabling (both fiber optic cable and coaxial cable)
- Hardware
- Framing
- Lashing
- Bonding
- Splicing, Electronics and Activation
- Grounding

This shall include the installation of the following equipment:

- Amplifier
- Optical Nodes
- Couplers
- Splitters
- Power Inserters
- Taps
- Power Supplies
- All other passive and active equipment required for a complete and operable 2-way HFC system and as shown on the plans.

8.03.2A – Verification of readiness

The contractor IS required to show evidence of verification of no leakage or ingress interference as a condition of “complete and operable two-way HFC system.”

8.03.3 – Anchors and Guying

The contractor shall install strand, and guying as required to support the HFC systems. Guying will be installed to prevent damage to utility poles, whether owned by the City or others, due to the weights and tensions added to the poles by the installation of new strand and cable.

The contractor is responsible for any damage his crews may cause to utility poles or peripheral equipment.

8.03.3A – Anchors

TACOMA POWER CREWS WILL SET ALL ANCHORS

8.03.3B – Downguys

Guying of poles shall be done to counter-balance the pull of the cable and keep the poles plumb and upright.

All guy wires must maintain proper clearances. Install guy guards at all new locations.

All guys shall be bonded to the strand, using #6 BC wire and bonding clamps.

8.03.3B.1 – Guying Methods

Use of different guying methods is allowed as follows:

Method	Description
Overhead Guys	Overhead guys are strand running from the attachment point of one pole to the attachment point of an adjacent pole. Overhead guys shall be used at all crossings where there is not adequate room for a down guy to take the strain off the strand.
Head Guys	Head guys shall be used at the end of a strand run or at a corner where the strand changes direction.
Line Guys	Line guys are placed in the middle of a straight pole line to reinforce the line. Use the line guy in long straight runs where the extra support is needed, or as directed by the City.
Side Guys	Side guys shall be placed crosswise to the line of the strand. Side guys shall be used to reinforce a pole line against an unbalanced side pull by the strand of 20 degrees or less, such as those encountered where the pole line rounds a curve or changes angle.
Sidewalk Guys	Sidewalk guys shall be used with a horizontal strut at least eight feet above a sidewalk to clear the sidewalk, where the guying crosses a sidewalk or walkway. Use sidewalk type guy installation where the correct down guy lead-length-ratio cannot be obtained and a pole-to-pole guy is not used.
Joint Guys	Often, existing CATV guys can be removed and replaced with a guy sufficient in capacity to support both current CATV operator tensions and the added tension of HFC Network. Typically this will be a 3/8-inch guy placed on new frame installed on behalf of HFC Network. Consult with Tacoma Power inspectors for guidance when in doubt.

8.03.3B.2 – Splices in Guy Wire

No splices will be allowed in overhead guys or down guys. Strand splices placed at pole are to be placed so that they do not interfere with any equipment installations. In any case, strand splices are to be a maximum of 5 feet and a minimum of 1 foot from pole with no mid span splices being allowed. Use only pre-form type strand splices.

8.03.3B.3 – Auxiliary Eyes

Contractor shall use auxiliary eyes only where they already exist, unless prior authorization has been received from the City. The contractor shall attach to existing power, telephone or CATV anchors whenever possible.

8.03.3B.4 – Existing CATV Guys

Existing CATV guys may be replaced by a new down guy engineered with capacity of handling combined strain of the existing CATV system plus the new Click! Network attachment.

8.03.3B.5 – Crossing Instate Highways, Rivers & Railroads

All strands must be double dead-ended when crossing Interstate Highways, rivers and railroads and anchored using expanding anchors.

8.03.4 – Pole Framing, Stranding, Grounding and Bonds

8.03.4A – Hardware and Framing

Install hardware, framing and supporting hardware as required herein and in accordance with the manufacturer's requirements, and in compliance with the minimum clearances for communications construction as listed in the latest edition of the National Electric Safety Code (NESC).

8.03.4A.1 – Boring new holes in poles

Contractor shall not attempt to place a new hole within 6" of an existing bore location. Bolts shall not extend more than 2" beyond nut.

8.03.4B – Strand Installation

All cable shall be supported by 1/4" EXTRA HIGH STRENGTH, MINIMUM STRENGTH 6,660 LBS. strand as specified herein; however, 5/16" strand shall be used at all Interstate Highway and River crossings that exceed 300 feet. All strands must be double dead-ended when crossing Interstate Highways, rivers and railroads and anchored using expansion type anchors.

8.03.4C – Attachment to poles

On all poles, attach the strand to the street side, unless other communications carriers are located on the field side of the pole unless otherwise approved by the project manager. The installation of strand shall be completed in such a manner as to maintain all clearances particularly climbing space, and across streets, alleys, driveways, must maintain 18'' of clearance at all active location, etc. Strand shall be placed with care to avoid damaging adjacent utility and other telecommunications companies' equipment and public property.

8.03.4D – Adjustment of other Communications facilities

Contractor shall rearrange existing communications facilities (e.g., fire alarm, CATV, traffic control systems, etc.) as directed and approved by the project manager or his designees, to allow for the proper installation of the City HFC system strand. At no time will existing facilities be disconnected, cut, damaged or otherwise disrupted unless proper notifications and instructions are granted. When unmanageable situations arise, the contractor will notify the project manager who will make arrangements with the existing communications systems to arrange for corrections and rearrangements.

8.03.4E – Safety Rules

Contractor shall strictly adhere to all local, state and federal safety laws governing the installation of strand. When installing strand, an approved traveling ground shall be used at all times.

Prior to installation, the contractor shall familiarize himself with the field conditions and any requirements of permits, easements and other documentation. Prior to pulling strand, ground the strand at the first pole with a traveling ground roller connected to an effective electrical ground. A strand reel tender with two-way communications, need to be stationed as appropriate, with visibility to the reel.

8.03.4F – Clearances from other utilities

Care shall be exercised during the installation and pulling of strand to avoid contact with power lines. Strand shall be placed with proper minimum clearances between telephone, cable, power and other communication systems.

Final sag of strand and cable will be a minimum of 30" from power at mid-span and 40 inches at the pole contact. Final sag of strand and cable shall be 12" minimum at mid-span from other communications, and at the pole contact. When sagging strand keep in mind that cable(s), when lashed, will increase sag and adjust accordingly when pulling strand tension.

8.03.4G – Strand Breaks

Strand brakes must be placed at the poles on both sides of all street, railroad, and power crossings.

8.03.4H – Sagging of strand

Strand should be tensioned to 35% and sagged at 6” in a 200-foot span. Since this project is built on Joint Use Poles, care must be taken to sag strands and cables consistent with other users. Maximum span lengths between poles shall not exceed 400 feet without the prior approval of the project manager.

8.03.4I – Suspension Clamps

All suspension clamps shall be tightened after the installation of strand and/or cable.

At strand cross-overs, a minimum of 12” of separation shall be maintained between suspension clamps. Both strands at a cross-over shall be bonded together. Cross-over clamps shall be used at mid-span locations to secure HFC Network strand only.

Curved suspension clamps shall be used when the strand makes a slight turn from a straight line.

This type of clamp may be used for a turn up to 20°, and poles greater than 3 feet out of lead. The pole must be down guyed at this point to oppose any side pull.

8.03.4J – Clearances to Power Risers

Whenever the strand is attached to a pole that has power or cable risers, maintain a minimum 2” clearance from all parts. This can be accomplished by locking the suspension clamp a maximum 3” from the pole on the support bolt. If this is not sufficient, other means of attachment will be necessary, such as fiberglass or metal arm.

8.03.4K – Tree Trimming

Contractor shall be responsible for determining and complying with local requirements for tree trimmings, including securing permits if necessary. When trees cannot be trimmed, strand shall be pulled through the trees using a rope passed through at the appropriate height. Cable guards shall be installed at all locations where tree limbs may come in contact with the cable and strand. Any major tree trimming or trees contacting Power will be referred to Tacoma Power or your inspector.

8.03.4L – Reduced Tension Spans (Slack Spans)

All slack spans will not be greater than 100 feet and shall use false dead-end construction techniques.

8.03.4M – Strand Pulling & hardware

Strand is not to be pulled over hardware or through a suspension clamp on the setup pole. A wire rope block or butt chain will be used.

8.03.5 – Grounding and Bonding

When installing grounds and bonds, care shall be taken to ensure that all connections are secure and tight. At every amp location ground to pole vertical, contractor must ground line ends not coax line ends.

8.03.5A – Frequency of Grounding

The HFC system plant shall be grounded to reduce the electrical shock hazard caused by overhead power lines. The grounding standard is to ground the first, last and every tenth pole in any given continuous line. For pole leads or sections of more than two (2), but less than 13, the contractor shall ground at the first and last poles.

8.03.5B – Grounding at Equipment

In addition, grounds will be placed at all active locations to include all node, amplifier stations and line extender locations. Use existing power or telephone grounds. If no other ground exists within 1 pole either direction, install a ground rod and wire. Each power supply shall have its own ground rod and wire.

8.03.5C – Installation of New Ground Rods

New ground rods installed shall be copper-clad steel, 3/4" in diameter and eight (8) feet in length. Ground rods on aerial shall be located 12” from the pole base, with the top of the rod 6” below the surface. Ground rods shall be driven. All locating for rod installations is the responsibility of the contractor.

8.03.5D – Installation of Ground Wire

Ground wires shall be #6 AWG bare soft-drawn copper wire stapled to the pole at ground level. It shall be routed below the surface of the soil and connected to the ground rod with a 5/8” ground clamp.

8.03.5E – Ground Connectors

The ground wire shall be connected to the strand with a bolt-on clamp, sized for the size of the strand and ground wire. Crimp-on connectors shall not be used. Connectors shall never be used on pre-formed strand splices or dead-ends. The copper wire shall be installed in the brass side of the clamp, and the strand shall

be installed in the galvanized side of the clamp. Ground wires shall not extend beyond the end of the clamp.

8.03.5F – Bonding to other utilities

Where two (2) or more support strands, whether cable, telephone, power, or a combination of these, run in the same vertical or horizontal plane, they shall be bonded together. The contractor shall use #6 AWG BC and bonding clamps. All double dead-ends, guys, pole crossovers shall be bonded.

8.03.5G – Bonding on Riser Poles

Bond the strand at all grounding and riser locations whether the ground is power, telephone CATV or HFC. Ground wires shall not extend beyond the end of the clamp.

8.03.6 – Aerial Coaxial & Fiber Cable Construction

Cable shall be installed after the strand installation is complete and approved. Cables shall be pulled using a pulling grip on each cable, with appropriate tensioning on the cable.

8.03.6A – Setting of Reel Brakes on Tensioner

Tension on reel brakes shall be set such that the reel does not run on when pulling is stopped.

8.03.6B – Application of Cable Rollers

Cable rollers shall be installed on the strand every 30 to 50 feet, depending on span length, with multiple cable rollers used where more than one (1) cable is to be installed. Install all 45° and 90° rollers as required by curves and corners. On driveway and street crossings, install several rollers to maintain clearance. Roller axis shall be perpendicular to the ground.

8.03.6C – Slack cable

At the end of each pull, slack cable shall be pulled back onto the reel.

8.03.6D – Communication on Long Pulls

On long pulls, personnel with two-way radios in contact with all other members of the work crew shall be stationed to observe and advise on the pull and at the reel, identifying problems and hazardous situations.

8.03.6E – Maximum number of Corners to be pulled

In aerial applications, cable shall not be pulled around more than two (2) 90° corners.

8.03.6F – Application of Cable Guards

At each pole and where appropriate, the contractor shall install appropriately sized cable guards to protect the coaxial cable and fiber from abrasion at the pole or the support hardware.

8.03.6G – Installation of Fiber Optic Cable

Fiber optic cable shall be installed over the coaxial cable using its own doublelash. Fiber optic cable shall be installed in accordance with the manufacturer's recommendations and requirements. Fiber shall be protected from damage and abrasion during and after construction, from contact with equipment, tools, hardware and other sources of damage.

8.03.6G.1 – Expansion Loops at Poles

Expansion loops are not required for fiber optic cable; at poles, a moderate amount of slack will be left as the fiber passes under the suspension clamp only.

8.03.6G.2 – Fiber Slack Loops

Fiber slack loops of approximately 200' at approximately 1000' intervals will be installed at locations approved by the project manager. Fiber splicing tails of 50' to 400' (or as directed by the engineer) will be pulled and secured to the strand at designated splice locations.

8.03.6G.3 – Fiber optic Splice

Fiber optic splice cases and storage racks shall be supported from the strand using tap brackets.

8.03.6H – Expansion Loops

Expansion loops shall be formed in the cable with a Lemco Model # G120 Mechanical Bender, during the cabling function, to keep consistent loops while lashing. Splicers may use Mullen Board M-200 (Hand Board) to form loops, as tension is relieved while splicing. Loops are necessary for the movement of the coaxial cable due to thermal effects.

8.03.6H.1 – Depth of Loop

The depth of the loop will be not more than 6" and not less than 5", regardless of the number of cables at any given location, as measured from the bottom of the cable before the loop to the bottom of the loop in the flat area of the loop.

8.03.6H.2 – Forming of Loops

Expansion loops and loop back cables shall be formed with a City approved bending board or mechanical loop forming tool. Cables shall always be formed with a mechanical loop-forming tool. Loops shall never be formed by hand.

The loop forming tool or forming board must remain in position until the lasher has been transferred and the next span of cable is lashed to the next pole. If a forming board is used, the lineman must hold the cable up into the board until the next span has been lashed the proper distance.

Leave adequate spare cable for the forming of loops and splicing of equipment, particularly the loop back location.

8.03.6H.3 – Frequency of Expansion Loops

Loops shall be formed at every pole and must be formed using a loop forming board. When both distribution and feeder are located on the same strand, the expansion loop will contain both cables and the feeder cable dictates loop location. Include all through cables in all loops, with the exception of fiber optic cables.

Where an obstruction exists at a pole, the loop may need to be further out from the pole. If the obstruction is a splice box or other object that will need access, leave adequate working space for linemen and repair crews to work in the future.

8.03.6H.4 – Cable Zink Straps

Cable zinc straps shall be used at all loops and at all poles. All zinc straps must be put on loosely by hand only and properly spaced a minimum from the end of any bend in the cable, at least 4 inches back from any bend in the cable.

8.03.6H.5 – Equipment Loops

All locations where the cables are spliced during construction must have input and output expansion loops.

8.03.6I – Lashing

Lashers shall be sized for the cable bundle being placed. All distribution and feeder runs will be double lashed, unless on a fiber run.

8.03.6I.1 – Pulling of Lashers

A lasher and cable pusher shall be used. Lashers shall be pulled by hand with a pull rope, and under no circumstances will they be pulled with a vehicle. Slack cable shall be rolled back onto the reel.

8.03.6I.2 – Application of Lashing Wire

Lashing wire shall be wrapped off around the strand at least 4 to 6 times and terminated between the washers on the lashing clamp. Excess lashing wire shall be tucked trimmed off at the clamp. Lashing clamps will be placed approximately 4 to 6 inches inside the expansion loops. Install an additional clamp when fiber is added to the strand.

8.03.7 – Underground Construction

Underground construction shall consist of the installation of coaxial cable and fiber optic cable, either in conduit or innerduct.

8.03.7A – Installation and Safety Procedures

Before starting any underground cable placement operation, all personnel must be thoroughly familiar with the installation and safety procedures and precautions. The items listed herein do not comprise a complete list of safety requirements or procedures.

8.03.7B – Traffic Control

Traffic control, flagging and signage will comply with the latest edition of the Manual of Uniform Traffic Control Devices (MUTCD).

8.03.7C – Ignition Sources

No smoking or open flame or sparking device shall be used around open manholes, handholes, or during the pulling of cable, or when any solvents or other flammable materials are present.

8.03.7D – Communication during pulling operations

Two-way radio communication shall be maintained between work crews involved in construction, particularly crews involved in feeding and pulling cables at locations that are separated, or where visual and verbal communication is hampered by obstructions, equipment, structures or other conditions.

8.03.7E – Methods of installation

The placing of underground cable shall be accomplished by a combination of wheel trenching, backhoe or boring. Local conditions will dictate the methods and materials used, as well as the utility locates and requirements of permits and easements.

Limit all trenching and boring to the amount of cable, fiber or conduit that can be placed, restored to full completion by the end of each week. No holes, demolished concrete or asphalt or any other incomplete restoration shall be left over night. Any exceptions must be pre-approved in writing by the project manager.

8.03.7F – Covering and Barricading of Trenches

Properly cover and barricade all trenches and boring pits as needed and as required by permits, local construction codes, and all governing bodies, with a minimum of cones and flags during daylight and flashers after dusk. Limit all openings in the ground to what can be closed up the same day. All safety precautions must be taken to protect personnel and the public during construction.

8.03.7G – Natural Gas Leaks

Use extreme care when trenching. If the smell of gas is detected, all equipment shall be shut off and the Gas Company shall be notified immediately. Under no circumstances will any equipment be started or moved. All work crews and the public shall be kept from the area until the gas is shut off.

8.03.7H – Digging on Private Property

Before digging on any private property, consult with the property owner regarding the presence and location of sprinkler pipes and heads. In the presence of a sprinkler system, the contractor shall hand dig around the sprinkler system before trenching or plowing begins. The contractor shall be responsible for notifying property owners of their intent to use privately maintained Right of Way areas for any purpose during the scope of the project.

8.03.7I – Operating of construction Equipment

Only qualified personnel shall operate construction equipment. The work crews shall follow the recommendations, requirements and operating procedures for all construction equipment.

8.03.8 – Pre-Survey of Specific Job Sites

Prior to the start of construction, the contractor shall visit the project area and identify and address the following issues:

- Traffic control to (ensure fire lanes remain open)
- Existence of other utilities
- Safety precautions for work crews and the public
- Easement and permit requirements and conditions
- Special rigging and equipment requirements

8.03.9 – Trenching and Boring

The contractor shall install all City furnished roll duct, PVC, couplings, and sweeps as required along the alignment indicated on the contract drawings. Installation includes excavation, backfilling, and restoration in accordance with these specifications.

8.03.9A – Trench Safety Systems

The contractor shall furnish a trench safety system at all locations where required by Washington State Law. This section applies to trench excavation, excavated in excess of four (4) foot depth.

8.03.9B – Work not specifically addressed by this specification

Any part of the work not specifically covered by these specifications shall be performed in accordance with applicable sections of the latest edition of the Standard Specifications for Road, Bridge, and Municipal Construction.

8.03.9C – Excavation

The contractor shall excavate for the conduits to the minimum depth as specified in the bid item or as required by field conditions encountered to provide clearance for various utilities as directed by the City Inspector.

The bottom of all trenches shall be smooth, uniform, free of all loose rocks, stone, other sharp objects, and foreign material. Hand dig where large rocks are encountered and as directed by the City Inspector.

8.03.9C.1 – Backfill Material

If, in the opinion of the City inspector, the material being removed from a trench is deemed not acceptable for use as backfill, the contractor shall dispose of non-suitable material to a legal dumpsite and replace with structural fill.

8.03.9C.2 – Compaction of trench backfill

Backfill shall be tamped as directed by the City inspector. Compaction shall be 95-percent of maximum density as determined by the Washington Densometer Method outlined in the Washington State Highway Department's Construction Manual or as designated by the project manager. Backfill for mechanical compaction shall be placed in successive horizontal layers of loose material not more than 8” in depth prior to compaction. The contractor shall allow the City to test the density of the backfill at any point during the operation. If the density of the compacted backfill does not meet the specified requirements, the contractor shall continue compacting until the specified density is attained.

8.03.9C.3 – Trenching across Lawns

When trenching crosses lawns, the contractor shall remove a strip of grass 12" wide. Sod shall be rolled up and stored until trenching and backfilling is complete. Sod shall be kept damp until 72 hours after it has been replaced. Dirt removed from trenches across lawns shall be stored on tarps to prevent damage to the lawn. The contractor may, at the discretion of the City inspector and with the prior approval, hydro seed grass areas disturbed by trenching.

8.03.9D – Rock saw or Wheel Trenching

Where the Rock saw or Wheel trench method is used, the contractor shall raise the saw at existing utility crossings to just cut the asphalt 2 feet before and after the marked locations. The contractor shall hand dig the area between these limits to expose the existing utility.

8.03.9E – Road Crossings

Wherever required by City inspector, hard surfaces such as streets, driveways, sidewalks, and parking lots with concrete or asphalt construction, shall be crossed using boring techniques. Contractor shall flag, or visually locate all existing utilities, which are in direct line of the bore direction regardless of depth. Open cutting of hard-surfaces is not allowed except as preapproved by the City and the permitting authority having jurisdiction.

8.03.9E.1 – Backfill for Street Crossings

Control density fill (CDF) shall be used at street crossings and other areas, if required by the City inspector.

8.03.9E.2 – Application of CDF as Backfill Material

CDF, when used, shall be discharged from the mixer by any reasonable means into the area to be filled. The CDF shall be brought up uniformly to the elevation shown on the drawings. CDF shall not be placed on frozen ground. CDF patching, mixing and placing may be started if weather conditions are favorable, when the temperature is at 34 degrees F and rising. At the time of placement, CDF must have a temperature of at least 40 degrees F. Mixing and placing shall stop when temperature is 38 degrees F or less and falling. Each filling stage shall be as continuous an operation as is practicable. Excavated section to be filled with CDF shall be contained at either end of the section by bulkhead or earth fill. The contractor shall provide steel plates for all road crossings and when deemed necessary by the City inspector.

8.03.9E.3 – Open Cutting Pavement

Open-cutting of streets or other hard surfaces (driveways, parking lots, etc.), either for the full length of the surface, a portion of the length, or for windows for guide holes, are permitted only as approved in advance by the municipal government inspector and the City. Contractor shall provide 1'' plywood or better for all driveway crossings for homeowner ingress and egress.

8.03.9E.4 – Repair of Cut Pavement

Streets or hard surface cuts shall be repaired and restored as required by the municipal inspector and the permit. Resurfacing and patching of cuts shall be flush and level with the surrounding pavement, with proper compaction and backfill. Include concrete, asphalt, sealing, tack coating, and other items as required. Where special tints or additives have been added to concrete, the contractor shall restore the concrete to match the existing as closely as possible, allowing for variations in coloring due to weathering and other effects. Contractor shall provide 1'' plywood or better for all driveway crossings for homeowner ingress and egress.

8.03.9F – Railroad Crossings

Bores shall also be used under rail beds and across Washington State Department of Transportation Right of Way as required, within the requirements of these entities.

8.03.9G – Removal of Waste debris from Job Site

All materials and debris that are removed shall be hauled to a legal waste site that has been secured by the Contractor and shall be disposed of in such a manner as to meet all requirements of State, County, and Municipal regulations regarding health, safety, and public welfare. Dumping of excavated material along the City's waterfront is expressly prohibited. The cost of all debris and material removal shall be incidental to the contract.

8.03.9H – ASPHALT PLACEMENT

Asphaltic concrete shall be mixed and delivered at temperatures specified in Section 5-04.3 of the WSDOT Standard Specifications. Mix, handle, batch, haul, roll, and compact asphalt concrete in accordance with the applicable portions of Section 5-04.3 of the WSDOT Standard Specifications except that the maximum thickness for a single course shall be 2-1/2 inches.

8.03.9H.1 – Application of Asphaltic Emulsion

Apply asphaltic emulsion tack coat in accordance with Section 5-04.3 of the WSDOT Standard Specifications. Unless otherwise directed, apply at a rate of 0.12 - 0.15 gallons per square yard of dilution at all junctions of new pavement with existing pavement and at all junctions of new pavement with existing concrete structures.

8.03.9H.2 – Edge Sealing

For sealing the edges after placing the asphaltic concrete patch, use AR4000, and then sand immediately with City approved washed sand to prevent tracking. THIS REQUIREMENT WILL BE STRICTLY ENFORCED.

8.03.9H.3 – Asphalt Compaction

All asphalt shall attain a minimum of 92% compaction as determined by WSDOT Test Method 705. THIS REQUIREMENT WILL BE STRICTLY ENFORCED.

8.03.10 – Roll Duct and/or PVC Placement

The contractor shall excavate for the conduits to the minimum depth as specified in the bid item or as required by field conditions encountered to provide clearance for various utilities as directed by the City Inspector.

8.03.10A – Placement of Conduit

Conduit shall be placed in the center of the trench, lying flat to the bottom of the trench. Conduits running parallel in the trench shall not cross. The bottom of the trenches shall be graded smooth. Where rock, soft spots, and/or sharp-edged materials are encountered, the bottom shall be excavated for an additional 3”, filled and tamped level with the original bottom with sand or earth free from particles that would be retained on a ¼-inch sieve.

8.03.10B – Pulling Line

Contractor is required to install a locatable pull rope in all ducts not receiving cable.

8.03.10C – Conduit under Roadways

Unless otherwise stated, conduit shall be placed with CDF encasement at all locations within existing paved roadways.

8.03.10D – Protection of conduit

During construction, partially completed duct lines shall be protected from the entrance of debris such as mud, sand and dirt, by means of suitable conduit plugs.

8.03.10D.1 – Duct Plugs

Provide duct plugs on all duct and inner-duct, whether empty or occupied, to prevent the entry of water, gas, dirt or rodents. Duct plugs sized for the duct or inner-duct shall be used. Where no cable is installed, a blind plug with a tie off for a pull rope shall be installed. Where one or more cables are installed, the contractor shall provide and install a duct plug that provides support and protection for the duct and cables installed.

8.03.11 – Underground Cable Placement

This section covers the general installation of both coaxial and fiber optic cable.

8.03.11A – Handling of Cable

Cable shall be handled with the proper care and in accordance with the recommendations of the manufacturer. No cable shall be bent into a smaller radius than allowed by the manufacturer, nor shall pulling tensions exceed those allowed by the manufacturer, nor shall any installation tool or method be used which is not in accordance with the manufacturer's requirements. Specific care shall be given to pulling fiber optic cable to avoid exceeding the allowed bending radius and the installation and in-place tensions.

8.03.11B – Cable Pulling

Cables shall be pulled down with the feed-in point at the highest elevation. Use flexible cable feeds to convey cables through the opening and into the duct runs. Cable slack shall be accumulated at each junction box where space permits by training the cable around the interior to form one complete loop. Minimum allowable bending radii or greater shall be maintained in forming such loops.

8.03.11B.1 – Use of Cable Lubricant

Lubricant shall be used when pulling cable into conduit. Lubricants shall be those specifically recommended by the cable manufacturer. Lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings, nor will it adversely affect inner-duct or conduit. Under no circumstances will soap be used for pulling lubrication. All lubricants must be City approved as specified in Section 8.02.4B (Contractor supplied materials).

8.03.11B.2 – Pulling Multiple Cables

Install cables simultaneously where more than one cable is being installed in same duct or innerduct. Use pulling lubricant where necessary to install inner-duct. Use a pulling means, including fish tape, rope, and basket weave grips, which will not damage the cables, duct or inner-duct. Breakaway swivels shall be used to prevent damage to the cable due to snags or over tensioning.

8.03.11B.3 – Maximum Cable Pulling Tensions

Maximum cable pulling tensions shall be calculated per manufacturer's recommendations. Fiber, elastic rope, steel or wire rope may be used for cable pulling. A dynamometer graduated to indicate the tension on the cable being pulled can be used, or the contractor shall adapt a rope harness properly sized to limit pull tension to the value indicated. Any combination of a group of cables to be pulled into a duct shall not exceed the sum of individual tension of each cable plus 15%.

8.03.11C – Coaxial Cable Installation at Pedestals and Vaults

Where coaxial cable is brought up for splicing in locations where pedestals are to be set, slack cable shall be extended to a height above grade equal to the top of the pedestal to be installed and tied off to a stake. At hand-holes and vaults, at least 36" of all coaxial cables shall be coiled in the vault for splicing. At hand-holes, at least 96" of all cables shall be left coiled in the handhole, racked in the saddles provided. No extra payment shall be made for slack cable pulled and stored in this fashion.

8.03.12 – Fiber Optic Cable Installation Criteria

Install fiber optic cables and associated equipment and devices in accordance with industry standards and manufacturer's written instructions. Cables shall be installed in conduit or innerduct as noted in the drawings.

8.03.12A – Installation of Fiber Optic Cable

Install fiber optic cable without damage to fibers, cladding, or jacket. Ensure that manufacturer's recommended pulling tensions are not exceeded. The cable tension shall be monitored at all times with a dynamometer and recorder, and the records of all pulls shall be submitted to City for approval. Cable subjected to tensions and/or stresses greater than those allowed by the manufacturer shall be removed and replaced at no cost to the City, including the replacement cost of any and all cables supplied by the City to the contractor.

8.03.12B – Pulling Multiple Cables

Install fiber optic cables simultaneously where more than one (1) cable is being installed in same duct or inner-duct. Use pulling lubricant where necessary; lubricant compound used must not deteriorate cable materials and shall be approved for use by the cable manufacturer. Under no circumstances will soap be used for pulling lubrication. Use a pulling means, including fish tape, rope, and basket weave grips, which will not damage the fiber media, duct or inner-duct. All lubricants must be City approved as specified in Section 8.02.4B (Contractor supplied materials).

8.03.12C – Minimum Bending Radius

Use wheels, pulling sheaves and cable guides to maintain fiber optic cable bending radius. Do not at any time bend cables to smaller radii than minimums recommended by manufacturer. For long underground pulls, the contractor shall use center-pulling techniques, including laying the cable in a figure eight to avoid kinking or tangling.

8.03.12D – Cable Splices

No splices are allowed, except at indicated splice points. All splicing shall be fusion, using the fusion splicing equipment approved by the City, and using the splice kits and housings provided by the City.

8.03.12E – Cable Storage

Where slack or excess cable or inner-duct is exposed, such as in hand-holes, the cable or innerduct shall be neatly bundled and racked.

8.03.12F – Identification OF Fiber Optic Cable

At all locations where the fiber optic cable or its enclosing inner-duct is exposed, it shall be identified with a warning sign attached to the cable or inner-duct with cable ties.

8.03.12G – Length of Cable for Splicing

In locations with fiber optic cable, 50 to 150 feet (or as directed by the engineer) of slack shall be left on each cable end for splicing, except at optical nodes, where a minimum of 100 feet of slack fiber shall be racked and mounted in the pedestal. The contractor in the locations noted shall install additional slack. No extra payment shall be made for slack cable pulled and stored in this fashion.

8.03.13 – Pedestals, Vaults and Handholes

Pedestals shall be placed at the time the conduit is installed. The cable ends should extend to the top of the pedestal with the input and output marked. If the pedestal cannot be placed at the same time, the cable ends should extend 4 feet above finished grade and be attached to a stake.

If in an area of tall grass and brush, place a taller stake that can be seen over any undergrowth. Paint the top of the stake orange.

8.03.13A – Installation of Amplifiers, Line extenders directional couplers, splitters, taps and splices

All amplifiers, line extenders, directional couplers, splitters, taps and splices shall be installed in above ground pedestals unless specifically required by local code. Vaults and hand-holes shall be installed only in the locations shown on the construction plans and as approved by the City. Minimum cable storage at all amp locations will be 8’.

All equipment should be attached to the mounting brackets in the pedestal or enclosure or to a non-corrosive metal stake or rod.

8.03.13B – Setting of Enclosures and Pedestals

Enclosures shall be installed level and at the proper depth in the ground at final grade that they are designed to. Pedestals should be set back in the easement from the curb. Normal placement for enclosures is at the property line. If a driveway extends close to the property line, the pedestal should be set several feet away from the driveway. In a joint trench a bypass trench should be dug around power transformer locations.

8.03.13C – Setting of Handholes

Hand-holes shall be installed in accordance with manufacturer's recommendations and as indicated on the drawings. Raceways entering hand-holes shall be terminated flush at the wall, with end bells. Provide leveling rings and concrete collars to match slope of hand-hole top with slope of adjacent grade as needed. For slope above 15-percent from grade; provide 8-inch-thick retaining wall, anchored to hand-hole.

8.03.14 – Risers

8.03.14A – Riser Sweeps

Risers shall have a minimum 24” PVC or metal sweep (except for 6” conduit, which will have a 48” sweep) from the trench level to the pole or building, connected to the PVC duct using a GRS to PVC adapter. The sweep shall be terminated above grade and sealed to prevent water, dirt, or rodents from plugging the conduit until such time as the riser is installed.

8.03.14B – Risers in heavy traffic locations

Risers in heavy traffic locations or areas subject to possible impact from trucks or other vehicles shall have added protection. A steel bumper or steel bumper with concrete pillar shall be used, as approved by the City.

8.03.15 – Grounding and Bonds

8.03.15A – Frequency of Grounding

Coaxial cable shall be grounded at every amplifier, line end, and power transformer locations. Distribution lines shall be grounded at least every 1000 feet plus at each amplifier and at the last tap in each run. Every power supply shall be grounded.

8.03.15A.1 – Grounding Installation

Grounding shall be accomplished by bonding to an existing power or telephone ground with #6 copper wire, or placing a new eight-foot, 3/4" diameter, copper-clad steel ground rod in undisturbed soil at the pole base or adjacent to the pedestal, connected with #6 copper wire between the rod and the equipment or items(s) requiring bonding at every devise except as approved by inspector.

8.03.15B – Bonding application

All equipment, whether passive or active, shall be bonded to prevent injury or death to workers and the public, as well as damage to equipment and systems.

8.03.15B.1 – Power Supplies

All power supplies should be bonded to the power company ground.

8.03.15B.2 – Metal Enclosures

All metal enclosures must be bonded to the equipment they enclose. This can be accomplished by attaching the bare metal surface of the line equipment to the bare metal surface of the enclosure-mounting bracket. Attaching a #6 copper wire from the line equipment or cable to the enclosure bonding/grounding lug.

8.03.15B.3 – HFC Equipment and Enclosures

All HFC equipment and enclosures with exposed metallic parts must be bonded to power and telephone equipment and enclosures that are within 8 feet of each other.

8.04 – Equipment Installation

8.04.1 – Fiber Optic Cable Installation

8.04.1A – Fiber Splicing

Where fiber optic cables are to be spliced together, the contractor shall use a fusion splicer. Fusion splices shall be in accordance with all recommendations and requirements of the cable manufacturer and shall have a loss of no greater than 0.1 dB per splice. All splices shall be contained in and/or supported by a splice rack or break out kit, provided by the City for this purpose.

8.04.1B – Coaxial Splicing and Equipment Installation

The contractor shall perform the construction of aerial and underground coaxial facilities, including the installation of strand, hardware, framing, bonding, grounding, cabling (both fiber optic cable and coaxial cable), lashing, splicing and level balancing to within +/- 2 dB. This shall include the installation of amplifiers and optical nodes, couplers, splitters, power inserters, taps and power supplies and all other passive and active equipment required for a complete and operable two-way HFC system and as shown on the plans.

8.04.1B.1 – Evidence of Performance

Contractors are required to show evidence of passing ingress and signal leakage testing on all submitted systems. All pads and equalizers both forward and reverse must be installed as posted on the plans as specified in Item 9 of the Special Provisions.

8.04.1B.2 – Close Coupling

Close coupling of equipment will not be allowed, except in underground applications and where necessary as dictated by design.

8.04.1B.3 – Supply of Fittings

The City shall supply fittings for coaxial components, including housing-to-housing, terminators, and fittings for cable entry into equipment to the contractor.

8.04.1B.4 – Installation of Connectors, fittings and terminators

Connectors, fittings and terminators shall be installed in accordance with the manufacturer's requirements and recommendations, using the appropriate fittings for the cable and equipment installed.

8.04.1B.5 – Application of Heat Shrink

Connectors and fittings shall be covered with heat shrink after splicing is complete. Heat shrink shall be installed in accordance with the manufacturer's requirements.

8.04.1B.6 – Jacket Stripping

Care shall be exercised when splicing to avoid damage to the aluminum sheath of the cable. No nicks, dents or cuts are allowed. A Cablematic JST 715QR jacket-strip tool must be used to remove the outer jacket of all cables. Knives and straight blades are not allowed. A manufacturer-approved Cablematic CST 715QR combination cable prep tool must be used to remove the sheath and dielectric.

8.04.1B.7 – Cleaning of Conductors

Center conductors of cables must be cleaned with a Lemco Y-190 cleaning tool or approved equal. Knives and torches shall not be used to clean the center conductor under any circumstances.

8.04.1C – Aerial Installation

Pole-mounted equipment shall be attached to the strand wire with the hardware provided by the manufacturer and in accordance with the manufacturer's requirements.

8.04.1C.1 – Installation on Poles

Aerial equipment shall be installed on the input side of the pole, within 18 inches of the pole, allowing for the presence of expansion loops. The input side of the pole is the side closest to the source of the forward path (i.e., 54 to 750 MHz bandwidth). Amplifiers, couplers and splitters shall be installed to allow the output cables to be routed along strand routing with a minimum number of bends, and avoiding doubling back wherever possible.

8.04.1C.2 – Tap Brackets

Tap brackets shall be used to support all equipment and place them in proper alignment with the expansion loops or the ports of other equipment to which they connect.

8.04.1C.3 – Taps for services

Taps for feeding customers shall be installed on the input side of the pole, and shall be placed closest to the pole when installed with other equipment to allow ease of access for installers. Taps shall always be installed with stand-off brackets.

8.04.1D – Underground Installation

Equipment shall be supported by the pedestal and stake with bolts as provided for this purpose by the manufacturer.

8.04.1D.1 – Grounding of Equipment

All pedestals containing active components (mini-bridgers, line extenders and optical nodes) shall have grounding systems installed at the pedestal with complete bonding of the pedestal to the ground rod prior to installation of the active equipment.

8.04.1D.2 – Stripping of Cables

Remove armor wrap (if present) and flooding compounds with the tools and materials approved by the cable manufacturer. No flammable compounds shall be used to clean the cable.

8.04.1E – Power Supply Installation

Power supply installation, whether underground or overhead, shall conform to local electric codes and requirements. Pole-mounted installations shall meet with the approval of the local power utility.

8.04.1E.1 – Location of Power Supplies

Power supplies shall only be mounted on poles identified and approved by the project manager.

8.04.1E.2 – Pole-Mounted of Power Supplies

Power supplies shall be mounted on the opposite side of traffic of pole, 10 feet above grade or higher, but shall not interfere with climbing space, or other utilities.

8.04.1E.2A – Electrical Service Connection – Pole-Mounted Installations

Power supplies shall be connected to the power secondary with a conduit riser with weather head, a magnetic disconnect with over current protection sized according to the NEC. The disconnect shall be connected to the power supply with liquid-tight flexible metal conduit and shall be mounted on or below the power supply. Power conductors from the secondary to the power supply shall be #6 AWG minimum, sized per the NEC.

8.04.1E.2B – Grounding and Bonding

All power supplies shall be bonded and grounded as stated elsewhere in this document, including the installation of a ground rod as required.

8.04.1E.3 – Pad-Mounted Power Supplies

Where ground mounted power supplies are to be installed, ground rods and grounding wires shall be installed in undisturbed soil prior to installation of the power supply.

8.04.1E.3A – Pedestal

Install the underground supply in the pedestal, supporting it properly, and install the disconnect and over current protection as described generally above.

8.04.1E.3B – Grounding and Bonding

The pedestal location for the power supply shall be bonded to the grounding system prior to installation of the supply.

8.04.1E.4 – Installation of Batteries

For all standby power supplies, install the batteries prior to activation.

8.04.1E.5 – Electrical Conductor

All cable between the power supply and the power inserter or amplifier shall be .715” CommScope QR Cable provided by the City.

8.04.2 – Fiber optic System Testing and reporting

8.04.2A – Fiber Test Plan

Prior to installation, submit a test plan to the resident project manager for approval. At minimum, the test plan shall include the requirements defined below. Test plans shall include sample forms for documenting cable losses, splice losses and connector losses.

8.04.2B – Fiber Testing

Prior to usage, test all equipment and components in accordance with manufacturers published test procedures. In addition, test the cable installation with an optical time domain reflectometer (OTDR) with strip chart and magnetic media recording capability and anomaly resolution to within one foot in runs up to 1,000 feet in length.

8.04.2C – Frequency of Testing

Cable tests using an OTDR shall be performed during the following phases of construction:

- Cable on reel.
- Cable segments after installation.
- Cable system after any splices.
- Cable system after termination with connectors.
- End to end testing of entire completed system.

8.04.2D – Fiber Component Testing & reporting

Test all cable segments for faulty connectors, splices, and termination's and for the integrity of the cable and its component parts. Replace malfunctioning or damaged items with new materials, then retest until satisfactory performance is achieved. Provide complete detailed reports of the results of all cable segment and system tests.

Test all splices and connectors and document losses in each, demonstrating compliance with stated requirements. (See Attached "Proofing Fiber Cables.")

8.04.2E – Components failing test

Any sections of cable, splices and connectors that fail to meet specified requirements shall be removed and replaced by the contractor at no cost to the City.

8.04.3 – Coaxial Testing and Reporting

8.04.3A – Cable inspection

All cable shall be physically inspected upon receiving reels. Items to look for include damage to the reel, scrapes in the outer jacket, flattened or misshapen cable, and indentations in the cable. If any of the preceding is evident, inspect the reel to see the extent of damage and notify vendor or refuse delivery.

8.04.3B – Component Testing & reporting

Contractors are required to submit systems that pass all signal leakage and ingress testing as well as levels within +/- 2 dB across the band for both forward and reverse systems. All pads and equalizers for forward and reverse must be installed in amplifiers and operating levels set per operational specifications and verified at ALL end of line locations. City technical staff will sweep and certify both forward and reverse systems, which will authorize systems for payment to contractors.

8.04.3C – Components failing test

All cable and equipment will be proofed after installation to identify any damages or improper splicing that might have occurred during installation. Poor signal levels, signal leakage and ingress interference, or sudden “roll-off” of frequency or inconsistent sweep trace quality across a span will result in non-acceptance and require repair and or replacement by the contractor. (See attached Sample Documentation Information).

END OF SECTION

PROPOSAL PAGES

ITEM #	ITEM TITLE	SHALL BE MEASURED BY…	ESTIMATED QUANTITY	PRICE PER UNIT	EXTENDED PRICE
1	FURNISH AND INSTALL 1/4" EHS STRAND AND HARDWARE FOR COAXIAL/FIBER OPTIC CABLE	The strand foot, pole to pole, complete and in place	200,000	$	$
2	MAKE READY CONSTRUCTION—STRAIGHT LINE POLES	The pole, complete and ready for strand installations	1200	$	$
3	MAKE READY CONSTRUCTION—CORNER, 'T' LEAD, AND DEAD END POLES	The pole, complete and ready for strand installations	800	$	$
4	FURNISH AND INSTALL 1/4" OR 3/8" STRAND AND HARDWARE FOR GUYING	Per each guy, complete and in place	50	$	$
5	LASH CITY-FURNISHED COAXIAL CABLE (SINGLE CABLE)	The Active Cable Bearing Strand (A.C.B.S.) foot, pole to pole, complete and in place	25,000	$	$
6	LASH MULTIPLE CITY-FURNISHED COAXIAL CABLES	The Active Cable Bearing Strand (A.C.B.S.) foot, pole to pole, complete and in place	10,000	$	$
7	DE-LASH AND RE-LASH CITY FURNISHED CABLES	The Active Cable Bearing Strand (A.C.B.S.) foot, pole to pole, complete and in place	50,000	$	$
8	LASH CITY-FURNISHED FIBER (SINGLE SHEATH)	The Active Fiber Bearing Strand (A.F.B.S.) foot, pole to pole, complete and in place	200,000	$	$
9	COAXIAL ELECTRONIC ACTIVE AND PASSIVE SPLICING AND ACTIVATION	The Active Cable Bearing Strand (A.C.B.S.) or Cable Bearing Trench Foot of delivered 2 way operating plant	1,000	$	$
10	INSTALL CITY-FURNISHED STANDBY AERIAL POWER SUPPLY WITH UNDERGROUND BATTERIES AND VAULT	Per each, complete and in place	1	$	$
11	INSTALL CITY-FURNISHED STANDBY UNDERGROUND POWER SUPPLY CABINET AND BATTERIES AND VAULT	Per each cabinet, complete and in place	1	$	$

12	ROCKSAW TRENCH, MINIMUM 6" WIDE WITH 18" COVER USING CONTROL DENSITY	The trench foot, complete and in place		1,000	$	$
13	BACKHOE TRENCH, MINIMUM 12" WIDE WITH 18" COVER USING CONTROL DENSITY BACKFILL	The trench foot, complete and in place		100	$	$
14	TRENCH 12" WIDE WITH 24" COVER USING NATIVE MATERIAL BACKFILL	The trench foot, complete and in place		6,000		
15	TRENCH 12" WIDE WITH 36" COVER USING NATIVE MATERIAL BACKFILL	The trench foot, complete and in place		500	$	$
16	TRENCH 12" WIDE WITH 36" COVER WITH 2" CONCRETE CAP USING NATIVE MATERIAL BACKFILL	The trench foot, complete and in place		100	$	$
17	TRENCH 12" WIDE WITH 36" COVER UNDER WEDGE CURB USING 5/8"MINUS GRAVEL BACKFILL MATERIAL	The trench foot, complete and in place		100	$	$
18	INSTALL UNDERGROUND SERVICE CONDUIT	The each, complete and in place		100	$	$
19	UNDERGROUND PUSHING	Lineal foot, complete and in place		100	$	$
20	DIRECTIONAL BORING	Lineal foot, complete and in place	1-2"	1,000	$	$
			2-2"	1,000	$	$
			3-2"	1,000	$	$
21	PLACE ENCLOSURES	Shall be measured by each enclosure in place	a. Vaults	50	$	$
			b. small pedestals	100	$	$
			c. large pedestals	50	$	$
22	PROOF EXISTING CONDUITS	Shall be measured by the linear duct foot, complete and in place		30,000	$	$
23	CUT, REMOVE AND RESTORE CONCRETE	Square foot, complete and in place		100	$	$
24	CUT, REMOVE AND RESTORE UP TO 3" THICK ASPHALT, BEYOND AND NOT INCLUDING 18" GRIND	Square foot, complete and in place		1,000	$	$
25	FURNISH AND INSTALL RISER ASSEMBLIES	Per each, complete and in place		40	$	$
26	INSTALL CITY-FURNISHED QR .715 COAXIAL CABLE IN CONDUIT	Linear trench foot per duct, complete and in place		50,000	$	$

ITEM #	ITEM TITLE	SHALL BE MEASURED BY...		ESTIMATED QUANTITY	PRICE PER UNIT	EXTENDED PRICE
27	INSTALL CITY-FURNISHED RG6 OR RG11 COAXIAL CABLE IN CONDUIT	Linear trench foot per duct, complete and in place		1,000	$	$
28	INNERDUCT PLACEMENT	The innerduct foot, complete and in place		3,000	$	$
29	INSTALL CITY-FURNISHED FIBER OPTIC CABLE IN CONDUIT	Linear trench foot per duct, complete and in place		50,000	$	$
30	AERIAL CREW RATE	Per hour	a. Lineman	400	$	$
			b. Driver/Ground man	400	$	$
			c. Laborer	400	$	$
			d. Splicer	10	$	$
			Splicing Vehicle	10		
			Line truck/Cable Trailer	400	$	$
31	UNDERGROUND CREW RATE	Per hour	a. Equipment Operator	400	$	$
			b. Driver/Ground Man	400	$	$
			c. Laborer	1000	$	$
			d. Splicer	2000	$	$
			Splicing Vehicle	2000	$	$
			Backhoe	400	$	$
			Trucks with Equipment	1000	$	$
32	SET UP FEE	Per each work packet.		1	$	$
33	MOBILIZATION FEE FOR EMERGENCY CALL-OUTS	Per each call-out, inclusive for entire crew		1	$	$
34	STRUCTURAL FILL – 5/8"MINUS GRAVEL	The ton, complete and in place		500	$	$
35	FORCE ACCOUNT			1	Lump Sum	$150,000
	PRE-TAX SUBTOTAL (including Force Account)					**$**
	****Retail Sales Tax @ 10.3%** (Note Section 1.13 of General Provisions)					**$**
	TOTAL					**$**

**Sales tax is determined by the location where services are conducted ("destination based")