RIVERSIDE PUBLIC UTILITIES

Board Memorandum

BOARD OF PUBLIC UTILITIES **DATE: NOVEMBER 13, 2023**

SUBJECT: ORANGECREST SUBSTATION TO SPRINGS SUBSTATION FIBER OPTIC CABLE UPGRADE; WORK ORDER NO. 2224356 IN THE AMOUNT OF $649,000

ISSUE:

Consider approving the capital expenditure for Work Order No. 2224356 in the amount of $649,000 for the Orangecrest Substation to Springs Substation Fiber Optic Cable Upgrade Project.

RECOMMENDATION:

That the Board of Public Utilities approve the capital expenditure for Work Order No. 2224356 in the amount of $649,000 for the Orangecrest Substation to Springs Substation Fiber Optic Cable Upgrade Project.

BACKGROUND:

Riverside Public Utilities (RPU) operates an advanced broadband fiber optic cable network that facilitates secure and efficient communication between electrical substations and the utility operations center. This network is designed primarily to support Operational Technology (OT) applications, including critical systems such as Supervisory Control and Data Acquisition (SCADA), radio communications, and teleprotection.

These applications are fundamental in sustaining the seamless functioning of our utility grid, requiring a network that can guarantee high-speed and real-time data transmission. The fiber network offers a high bandwidth capacity and low latency, which are instrumental in accommodating the complex data transmission requirements of OT applications. In addition, fiber optics are inherently secure, offering immunity to electromagnetic interference and resistance to many types of eavesdropping attacks prevalent in traditional copper lines.

Currently, the network includes a 12-strand fiber optic aerial cable and underground fiber cable that connects the Orangecrest Substation to the Springs Substation, which was installed in 1994. The fiber optic cable route between these two substations consists of three segments:

Segment One: This segment, measuring 9,300 feet, connects the Orangecrest Substation to the Mission Grove cross-connect. The fiber optic cable is mounted along an existing overhead pole line composed of wooden and steel poles.

Segment Two: This segment, extending 9,400 feet, forms the connection between the Mission Grove cross connect and the Alessandro cross connect. The fiber optic cable in this segment is housed within an existing underground conduit.

Segment Three: Fiber Optic cable from Alessandro Cross connected to Springs Substation is 7,000 feet long with 4,200 in existing Underground conduit and the remaining 2,400 feet supported and attached along an existing overhead pole-line composed of wooden and steel poles.

DISCUSSION:

In the mid-2000s, RPU embarked on an initiative to improve the fiber optic infrastructure, transitioning from 12-strand to 144-strand fiber optic cables. This transition aimed to expand the network's capacity and maintain its reliability and efficiency. As we near the completion of this initiative, only the segment between Springs and Orangecrest Substation remains with the original 12-strand configuration. Upon its upgrade, the entirety of RPU's fiber optic network will operate on the 144-strand system.

Additionally, the existing cable connecting Orangecrest Substation to Springs Substation, installed in 1994, has deteriorated over the years and reached its 25-year design life. Moreover, all fibers in this segment are fully utilized by RPU and other City departments, leaving no spare strands for further connectivity.

To address this issue, RPU will replace the current cables with the new 144-strand standard. This upgrade will enhance the network's capacity, reliability, and redundancy, crucial for maintaining uninterrupted electric service for our customers. Fiber optic customers will be contacted in advance, and any downtime will be coordinated based on their operating requirements during the cut-over to the new cable.

Given the deteriorated condition of the cable and its maximum capacity utilization, there's no viable alternative to this project. Economically, the most prudent course of action is to leverage the existing routing and infrastructure for the replacement. Failure to do so will not only impact operational efficiency but also increase future costs and potential risks.

The scope of work includes replacing 12,100 feet of aerial fiber optic cable and 13,600 feet of underground cable, totaling 25,700 feet with the new 144-strand fiber. This includes installation on existing poles, underground conduits, cross-connect cabinets, and testing and commissioning of the new network. The old cable and related pole attachments will be removed.

RPU crews will construct and install the fiber optic cable upgrade. Associated with this project is civil infrastructure work, including the installation of additional conduits and trenching, which will be contracted through the RPU Contractor’s panel.

The project/fiscal breakdown is as follows:

Project and Fiscal Breakdown		
Work Type	Performed By:	Amount ($)
Project Management and Engineering	RPU Engineering Staff	$50,000
Civil Construction	Contractor Panel	$40,000

Fiber Installation Work	RPU Field Forces	$350,000
Fiber Termination, Testing, and Commissioning	RPU Testing	$10,000
Material Procurement		$140,000
Contingency (10%)		$59,000
Work Order Total:		**$649,000**
Anticipated Start Date:		**January 2024**
Anticipated Duration:		**9 Months**

STRATEGIC PLAN ALIGNMENT:

This item contributes to **Strategic Priority 6 - Infrastructure, Mobility and Connectivity and Goal 6.2** – Maintain, protect, and improve assets and infrastructure within the City's built environment to ensure and enhance reliability, resiliency, sustainability, and facilitate connectivity. This item aligns with each of the five Cross-Cutting Threads as follows:

This item aligns with each of the five Cross-Cutting Threads as follows:

1. **Community Trust** – The fiber upgrade will increase capacity and reliability of RPUs fiber network that will decrease the risk of failure of city communications thus helping the city to keep essential facilities and services online, which results in greater public good.

2. **Equity** – RPU endeavors to provide safe and reliable electric service to all its customers. Since RPU's fiber optic network is an interconnected network, upgrades made to individual parts of the system improve the reliability of the overall system, thereby providing an equitable benefit to all customers.

3. **Fiscal Responsibility** – RPU is a prudent steward of public funds and ensures responsible management of the City's financial resources while providing quality public services to all. This item represents fiscal responsibility through the appropriation of funds to upgrade aging infrastructure, which benefits the services provided to the city. RPU Engineering has investigated and identified the availability of existing infrastructure to minimize the cost of upgrading the fiber optic network.

4. **Innovation** – RPU is committed to identifying creative solutions to meet the needs of our community members effectively and efficiently by providing reliable infrastructure improvements by upgrading our fiber optic network.

5. **Sustainability & Resiliency** – RPU is meeting the community's changing needs and preparing for the goals set by the city. The fiber upgrade will harden and increase the resiliency and energy efficiency of the city and RPU's communications networks and infrastructure.

FISCAL IMPACT:

The total fiscal impact is $649,000. Sufficient funds are available in Electric City-Wide Communications Network Account No. 6130000-470664.

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Attachments:

1. Project Site Map
2. Presentation