

**South Side Regional Connectivity Ring
Technical Guidance for Scope of Work
100% Design**

I. Introduction

The Hampton Roads Planning District Commission (HRPDC) is requesting proposals from qualified consultants for the completion of final/100% design work for the South Side Fiber Ring, which will interconnect the five South Side Cities of Chesapeake, Norfolk, Portsmouth, Suffolk and Virginia Beach with the subsea cables that have landed in Virginia Beach. This South Side Fiber Ring is envisioned as the first phase of a regionally interconnected fiber network that will extend to the Peninsula and western portions of the region in subsequent phases.

The consultant selected for the 100% Design Work will have demonstrated experience in the design of fiber optic networks. The deliverables from this 100% Design Work will produce the necessary design drawings, specifications, permits and environmental clearances to allow this project to proceed to construction in a timely manner. In addition, the 100% Design Work shall include provisions to address applicable cyber security regulations, issues and concerns. The 30% Design Work and Regional Connectivity Ring Master Plan that was completed by the South Side Cities will be used as a starting point for this final design work.

A governance structure is being proposed to manage the Regional Connectivity Ring that will produce the formation of a Regional Broadband Authority. Until such time as the Authority is formed, the HRPDC will serve as the main point of contact for this initiative.

The following technical specifications for the proposed fiber ring have been developed by a regional committee of Chief Information Officers (CIOs). These technical specifications will be included in a Request for Proposals that will be released for this project.

II. Requested Services

1. OSP Design and Fiber Route Planning Services

- A. Develop clear, concise, and accurate designs for each new RCR segment to mitigate issues and increase project success.
- B. Provide all viable route options, accurate information, new industry technology, new products, and industry best practices to allow HRPDC to select the most optimal solution.

- C. Adhere to the standards and best practices set forth by preceding Southside fiber optic projects.
- D. The proposed fiber optic network design will be comprised of all underground fiber.
- E. Provide design drawings compatible with and ready for use in Esri's ArcGIS software, specifically in shapefile format or feature class files contained inside a file geodatabase. Design drawings must also be correctly georeferenced (i.e., all elements of the drawing must be comprised of coordinate points or geometry that correctly correspond to the coordinates of their real-world counterparts) and to scale. Required projected coordinate system for use is "NAD 1983 State Plane Virginia South FIPS 4502 Feet"(ESRI:102747).
- F. Expected to produce comprehensive computerized design maps and detailed CAD drawings of entire route and route options, including underground splice enclosures, handhole placements and any associated equipment necessary for network construction.
- G. The contractor will provide on-site field/site surveys and vault location requirements as required.
- H. Provide, for underground facility, conduit design, conduit detailing, handhole detailing, prepare all forms and documentation for approval of conduit construction and/or installation, and verify as-builts.
- I. Is required to act on HRPDC's behalf in rights-of-way negotiations and communicate with local and state governmental jurisdictions so underground infrastructure requirements are met.
- J. Is required to provide, consolidated field notes and electronically store in a format approved by HRPDC.
- K. Provide detailed site drawings, permit detail drawings and overview maps in an electronic format approved by HRPDC.
- L. Appropriately label all network components (conduit, handholes, vaults, etc.) based upon industry best practices and adhere to HRPDC labeling requirements.
- M. Be responsible for staking the route and producing computerized maps in an electronic format approved by HRPDC.
- N. Cities have the ability to inform the Selected Contractor of any changes in conduit specifications after the 100% design has been completed. The design

will reflect the default RCR specifications but will then be adapted to consider city specific requirements for their planned future growth. These additional costs will be absorbed by the cities themselves.

2. Technical Requirements

- A. Backbone fiber must be 288-strands.
- B. Fiber will not be direct buried installed in conduit.
- C. Main demarcation point: Will be determined as part of the design.
- D. Size of conduit:
 - a. The agreed upon standard conduit is 2" x 3", other conduit sizes as recommended by the selected consultant will be considered. A final decision will be made when complete pricing is received.
- E. Placement of handholes (pull boxes):
 - a. Handholes will be placed for fiber pull through only, no splicing will be considered.
- F. Size of vaults:
 - a. Sizing of vaults to accommodate multiple conduit entries and multiple fiber entries.
 - b. JB3s will be considered as standard, but in some cases and as suggested by the engineering firm we may need to use larger sizes in some areas (i.e. main intersections, high density areas).
- G. Recommended 10" conduits using MaxCell conduit attachments at railroad, bridge, interstate, road, and body of water crossings.
 - a. The CIOs agreed to adhere to the permits and regulations of the cities, when crossing a railroad and or other crossings that may require other specs.
 - b. The engineering firm can identify available conduit through natural crossings, but the Authority will secure the rights to the use of the conduit. Additional cost and additions to the scope will be considered if design in required.
- H. Engineering firm to specify required depth of conduit per cities specifications (each city has different requirements).
- I. Splice points will have no less 100ft of coil slack. If no splicing is proposed, there shall be no less than 100ft of fiber coil.
- J. Minimum bend radius:
 - a. We will make sure the engineering firm understands what minimum bend radii are acceptable based on universal standards

- K. Acceptable depth:
 - a. The Contractor will communicate with each city to determine the acceptable depth.
- L. Storage loops:
 - a. Each city has their own specifications. The specifications will be added for the RFP documentation.
- M. Distance between boxes:
 - a. Vaults will be 250 feet apart for high density areas and could be placed as far as 1500 feet apart for lower density and even farther for long hauls. Engineering firm's recommendations will be considered.

III. Statement of Needs

- A. The Selected Contractor and its team members should have experience with community land use planning, infrastructure planning, geospatial analysis, and economic analysis.
- B. The Selected Contractor and its team should have experience with engaging multiple cities and coordinating between their GIS departments.
- C. It is required that a kick-off meeting will be held within 30 days of the effective date of the contract between the Selected Contractor, the Organizer, and the participating cities. At this meeting, the Selected Contractor will:
 - a. Present a final scope of work and timeline for completion of all aspects of the project
 - b. Supply the Organizer with a list of documents, information, and other materials needed to complete the project.
- D. It is required that the completed RCR 100% design will include, at minimum, the following sections:
 - a. An executive summary
 - b. Applicable GIS data
 - c. Detailed design drawings data and information (completed with the necessary engineering seals) that will allow the project to move to construction, including information related to right-of-way, design, specifications, environmental clearance and permitting.
 - d. CAD drawings showing each segment of the route following the specifications laid out in this RFP.
 - e. Design safeguards to address issues related to cyber security
- E. It is required that the Selected Contractor make presentations to the

Planning Commissions and City Councils of the cities and other public bodies as required that succinctly provide any requested information from any overseeing party.

- F. An agreement that all work produced by the Selected Contractor shall be the property of the Organizer.

IV. Contractor Responsibilities

Advisors will provide network design services for the Regional Authority dark fiber-optic network buildout, which includes approximately 103 fiber route miles, using a combination of existing traffic conduit and new construction, as proposed in the recently adopted RCR Master Plan. Tasking for the network design and engineering process include:



















- A. Provide Professional Engineer (PE) approved (if required) formal network design and engineering based on the conceptual design contained in the 30% MasterPlan.
- B. Provide revised plans and associated cost estimates to the City at 60%, 90%, and 100% design completion milestones. The 90% and 100% completion milestones shall also include draft and final specifications, respectively.
- C. Design will consist of single-mode fiber placed underground in new (proposed) conduit systems.
- D. Perform outside plant walkout and staking, as needed, to validate design, confirm existing utilities, and collect necessary information for permitting agencies.
- E. Create base maps, which include parcels/addresses and other information needed to design the network.
- F. Includes cost of independent PE certification, if required, by funding source.
- G. Create a design and layout of fiber-optic trunk line (backbone) and distribution laterals including:
 - a. Underground path (route) determinations using the best and least expensive construction methods to allow potential network connections along said route.
 - b. Field data collection to include, but not limited to:
 - Road widths
 - Right-of-way widths

- Hard points or standing structures within Right-of-ways
 - Define size and type of fiber and conduit
 - Determine network access point and vault locations
 - Select location, type, and size of handholes (Vaults) or manholes
 - Determine splicing, patching and termination locations
 - Wiring limits for fiber vaults
- H. Establish construction methods (e.g. bore, plow, trench) and practices.
- I. Provide detailed underground design using ESRI© ARCGIS™ software.
- J. Obtain all necessary permitting (e.g. County, City, Utility, VDoT, etc.) and easements. (Actual fees for permits to be paid by the Regional Authority directly.)
- K. Develop general notes and specifications.
- L. Detailed tabbing of labor and materials (project cost estimates).
- M. Detailed project cost estimates (labor and materials).
- N. Provide regular progress updates during bi-weekly management remote meetings with the Regional Authority to present current status and address any issues with meeting notes.

V. Electronic Resources

The conduit and fiber data sets **will be provided to the Contractor upon award of the RFP**. This data will assist the Contractor in determining fiber routing and network design. Prior to an awarded contract, the Contractor will be required to sign a non-disclosure agreement with HRPDC.

Fiber and Vault Data
Sources

Organization	Metadata Description	File Format				
		PDF	Excel	KML / KMZ	SHP	CAD
City of Chesapeake	Vault Locations					
City of Norfolk	Vault Locations					
City of Portsmouth	Vault Locations					
City of Suffolk	Vault Locations					
City of Virginia Beach	Vault Locations					
HRPDC	RCR Master Plan					
HRPDC	30% Design Drawings					

VI. Expenses

Normal and customary expenses such as mileage to meetings are allowed. The estimated costs for printing documents listed above are to be identified as anticipated expenses in the Task Order budget estimate.

VII. Data and Deliverables

Expected deliverables for this project include:

- Printed and electronic versions of the design documents
- Present/Review at 60%
- Present/Review at 90%
- 100% design review and acceptance
- GIS/CAD files
- Permitted drawings and maps

All data layers, infographics, or other materials generated or created for this project and all deliverables will be property of the Hampton Roads Planning District Commission.