Information
Technology &
Telecommunications

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# Request for Expressions of Interest and Information (RFEI)

# on

# New York City Wireless Network (NYCWiN) Operations and Maintenance Services

## PIN: 85815RFEI0010

## RELEASED: March 4, 2015

## RESPONSES DUE: April 3, 2015, 2:00PM (EST)

All questions and requests for additional information concerning this RFEI should be submitted no later than April 3, 2015, 2:00PM (EST) directed to Margaret Budzinska, the Authorized Agency Contact Person, at:

| | |
|---|---|
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| E-Mail Address: | acco@doitt.nyc.gov |

**Response Date and Time and Location:**

**Date:** **April 3, 2015**

**Time:** **2:00PM (EST)**

**Location:** Responses to this RFEI shall be submitted to the New York City Department of Information Telecommunications and Technology

By mail: 255 Greenwich Street- 9th Floor
New York, New York 10007
Attn: Margaret Budzinska

The Response Package should include two (2) hard copies and five (5) flash drives containing all materials pertaining to your response.

**Submission Process and Conditions**

This RFEI is intended only to elicit comments and information for the purposes of informing City with respect to the matters raised.

**Note: THIS RFEI IS NOT A PROCUREMENT.**

Potential service providers and other responders to this RFEI should note that no contracts or other agreements for the NYCWiN Operations and Maintenance Services will be awarded pursuant to this RFEI. Responding, or not responding to some or all of this RFEI will neither increase nor decrease any provider's chances of being awarded a contract from a subsequent solicitation issued by DoITT, if any, for relevant services. No information provided by the Department of Information Technology and Telecommunications ("DoITT") or any other City agency in this RFEI is intended to constitute a representation or warranty binding on the City or DoITT and it is not the intention of DoITT that any reader of, or responder to this RFEI will rely on information contained in the RFEI without independent investigation.

**Incurring Costs**

DoITT shall not liable for any costs or expenses incurred by respondents in the preparation and production of a response to this RFEI.

**Response Requirements**

DoITT requires that responses be returned in electronic format along with paper submissions. DoITT can accept a variety of electronic formats including MS-Word, MS-Excel, MS-PowerPoint, Portable Document Format (.pdf) files or other industry standard file types.

**RFEI Response Clarifications**

DoITT may seek additional information (clarifying or otherwise) following the receipt and consideration of RFEI Responses. This may be through phone discussions, meetings or correspondence, and may be with an individual respondent, a subset of respondents, or all respondents.

It is not expected that information supplied by a respondent in its response will be confidential. In the event a respondent believes that specific information it must submit to respond fully and completely to this RFEI should be treated confidentially by DoITT, it should so advise DoITT in writing. In such a case, DoITT will attempt to treat the information as confidential proprietary information, consistent with legal requirements. Any allegedly proprietary information contained in a response must be clearly designated as such, and should be separately bound and labeled with the words "Proprietary Information". Appropriate reference to this separately bound information must be made in the body of the response. MARKING THE ENTIRE RESPONSE AS PROPRIETARY WILL RESULT IN THE RESPONSE BEING RETURNED TO THE RESPONDENT UNREAD. Respondents should be aware, however, that DoITT may be required, pursuant to the New York State Freedom of Information Law ("FOIL") (New York Public Officers

Law Section 87 et seq.), and to disclose a written response or portion thereof submitted in connection with this RFEI. In the event that such disclosure is requested by a third party, DoITT will provide notice to the respondent as far in advance as practicable of any deadline for responding and shall consult with the respondent to evaluate the extent to which such information may be withheld from disclosure under the provisions of FOIL. Consistent with the requirements of FOIL, the final determination whether such information may be withheld from disclosure shall be made by DoITT. In the event that DoITT determines that information may not be withheld, DoITT will attempt to provide the respondent with timely notice of intent to disclose in order that the respondent may invoke any rights or remedies to prevent disclosure to which it believes it may be entitled under the law. The respondent expressly acknowledges and agrees that neither DoITT nor the City of New York will have any liability to the respondent in the event of disclosure of materials designated by the respondent as "Proprietary Information".

**Respondent Questions**

All questions, clarifications, and other comments regarding this RFEI should be directed to Margaret Budzinska via email at acco@doitt.nyc.gov or by telephone 212-788-6510 no later than March 16, 2015 by 2:00PM (EST). Responding organizations should submit written responses to:

New York City Department of Information Technology and Telecommunications

255 Greenwich Street, 9th Floor

New York, NY 10007

Attn: Margaret Budzinska

Please title all e-mails, written correspondence, and responses using PIN: 85815RFEI0010

Questions and answers to all questions will be compiled, publically posted and shared with all vendors that have either submitted questions or registered their interest in the RFEI.

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# 1. INTRODUCTION

The Department of Information Technology & Telecommunications ("DoITT"), is releasing this Request for Expression of Interest and Information ("RFEI") to solicit information from interested parties regarding viable operational models for the citywide wireless network (NYCWiN), and to better understand the different practical operational models available. NYCWiN is a fully interoperable, IP-based network. The most advanced municipal network of its kind, NYCWiN enables the transmission of government data in real time throughout the city. The network consists of approximately 400 network sites providing full coverage across the city's entire 305 square miles.

The RFEI identifies three possible operational models for NYCWiN; however, the City of New York ("City") is interested in receiving information on any other viable operational model(s). The respondents should use Section 3.6 of this document to provide information regarding other operational models that differ from those listed below. Responders should provide information on how they would address the requirements (functional, non-functional, and transition) identified in the plan as well as identifying any other additional information helpful to the City.

The operational models currently being considered are:

1) A City owned and vendor managed NYCWiN operational model for operations and maintenance (O&M) services. This is the current operational model in place.

2) A transfer of ownership of the current NYCWiN infrastructure and operations to a third party. The third party would provide a lease or charge back model to the City.

3) A complete transfer of users and services from the current NYCWiN network to a carrier network or carrier-like network/service.

Additionally, the City of New York is interested in recommendations to develop and expand upon the citywide broadband infrastructure and to improve access to high-speed Internet for residents and visitors. Universal, affordable high-speed internet access is an essential part of expanding economic opportunity for every New Yorker and creating a more inclusive city where everyone can succeed.

To that end, the City seeks recommendations from any interested respondents that provide for ways that leverage the existing NYCWiN infrastructure (379 sites with nearly 100 percent coverage of the City's 305 square miles) for initiatives that help spur economic development, improve resident and visitor experience and promote innovation in the City while providing greater access to resources. In Section 3.7, respondents are encouraged to offer ideas and recommendations that would support the goals providing free or affordable access to broadband. Innovative financial and operational models are encouraged.

### 1.1 Purpose

The purpose of this RFEI is to:

- The City is interested in understanding how the proposed operational models could lower the operating costs of NYCWiN, while maintaining or improving the existing level of service and resiliency. In summary, the City is looking for responders to answer the following question:
    - Which operational model does the respondent believe is the best model for the City and why?
- Gather information on the technical and administrative issues related to NYCWiN operational models and operations and maintenance (O&M) services.
- Gain an understanding of the operational and management issues arising from transferring ownership of the current NYCWiN infrastructure and operation to a third party. This would include the option of a complete transfer of the system and a bill back service model.
- Gain an understanding of the operational and management issues arising from a complete transfer of services from the current NYCWiN network to a carrier network or carrier-like network/service.
- Gain an understanding of the potential operating and support costs for the different operating models.

Additionally, responses will be used to gauge the level of interest in the vendor community for providing NYCWiN-like services. Information obtained may be used to develop a needs requirement upon which future procurement might be based.

Responses to this RFEI will be reviewed by representatives from across New York City's Mayoral agencies, boards, and commissions.

## 2. EXISTING NYCWIN O&M SERVICES

NYCWiN is a City-owned Universal Mobile Telecommunications System Time Division Code Division Multiple Access ("UMTS TD-CDMA") based wireless broadband data network deployed throughout the five boroughs of New York City for use with the City's public safety and public service agencies. NYCWiN is managed by DoITT and utilizes a cellular style technology operating in the licensed 2.5 GHz frequency band. NYCWiN provides wireless communications at the street level to City agencies and access to the agency and city backend systems by-way-of CityNet, extending the capabilities of the City's workforce and providing better service to the City's residents, businesses and visitors.

The network provides for the secure transfer of critical information and data and is transforming the way the City delivers its services by automating and streamlining time consuming and labor intensive transactions and processes.

NYCWiN uses a cellular based architecture with radio access nodes (RANs) throughout all five boroughs to provide ubiquitous coverage and access to mobile users. NYCWiN is designed to provide 95% or better coverage throughout the five boroughs of New York and provides for the following system level requirements:

- Power resiliency:
  - 24 hour battery back-up or equivalent
- Coverage requirements:
  - ≥95% in-street coverage
  - Mobile coverage up to 70 mph
- Current bandwidth minimums:
  - 1.2 Mbps Downlink
  - 450Kbps Uplink
  - No rate cap applied allowing for higher throughput
- Current latency minimums:
  - 250 ms or less 50 percent of the time
  - 500 ms or less 95 percent of the time
- Redundant datacenters

Each RAN is designed to have redundant paths to both the Primary Network Operations Datacenter and Alternate Network Operations Datacenter through either wired backhaul connections or microwave backhaul connections. The Primary Network Operations Datacenter and Alternate Network Operations Datacenter have fully redundant core components as well as fully redundant connectivity between each facility, providing for a double-redundant system architecture. The Primary Network Operations Datacenter and Alternate Network Operations Datacenter also have redundant connectivity to the CityNet network providing redundant paths for connectivity to City and agency applications. These Datacenters are connected to primary and secondary operations centers located within the City from which the network is managed, see figure 1.

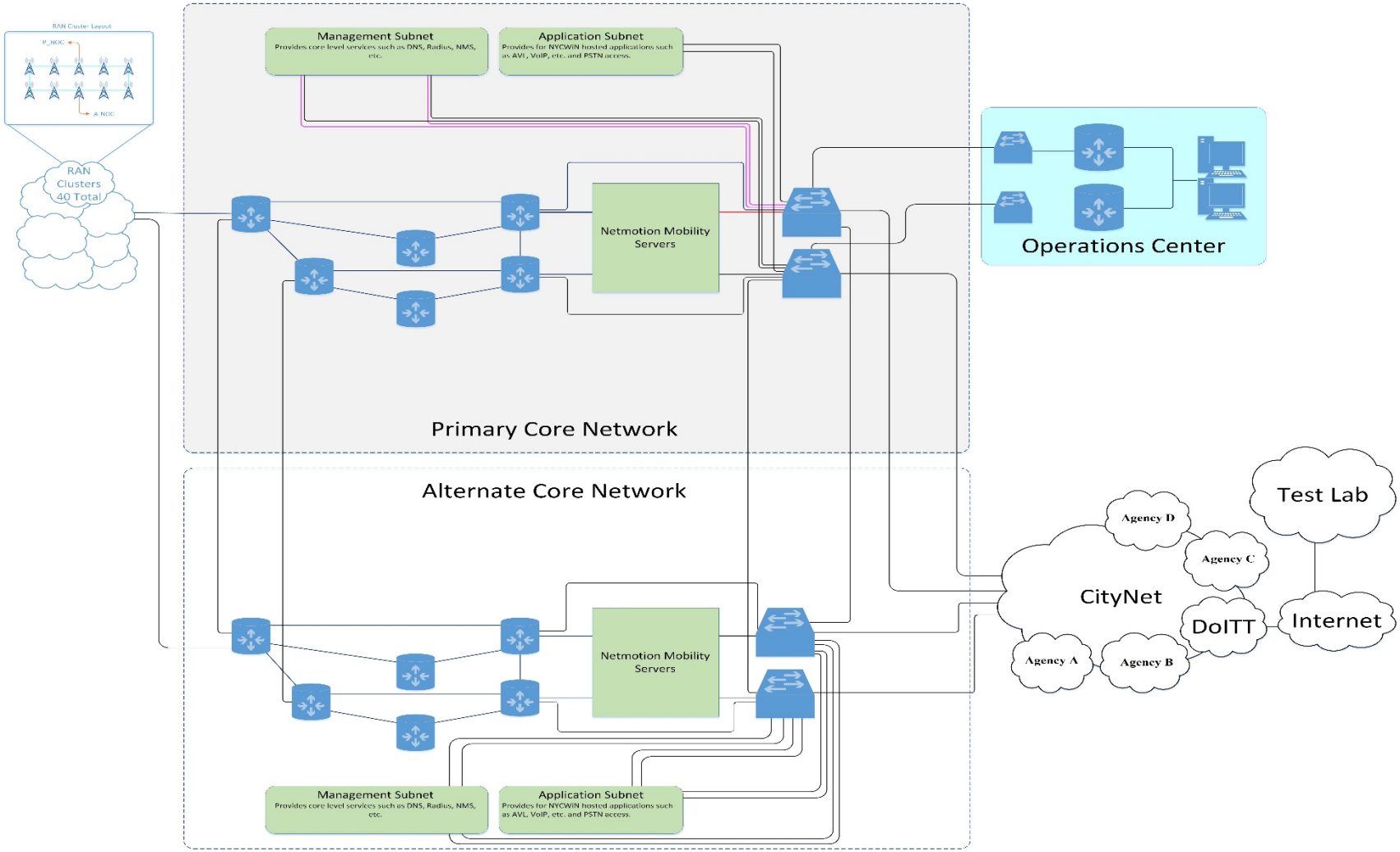


**Figure 1: High level diagram of the NYCWiN architecture.**

The network was completed and operational in 2009, DoITT is now focusing its efforts on assisting city agencies with transitioning existing applications or incorporating new applications onto NYCWiN. Accomplishing this will ensure that NYCWiN is utilized to its fullest potential. At the same time, DoITT must operate NYCWiN in the most fiscally efficient manner possible. It must look for ways to cut costs and save money where it can but continue to provide the highest quality of service to its users.

## 2.1 Option 1 – Vendor managed NYCWiN O&M Services

This option is for a continuation of the operations and maintenance services that are currently provided. Vendors will work with the City and the current provider of services to develop a transition plan so that the existing NYCWiN users and services are not impacted.

The vendor managed O&M Services are described in detail below and include:

- Engineering Services
- Property Management and Legal Services
- Operations Services
- Product Development Services
- Contract Administration and Order/Proposal Development

As the NYCWiN environment begins to age, certain components will reach end-of-life and will no longer be supported by the manufacturer. The vendor must have experience in evaluating new technologies and be able to provide replacement recommendations. These recommendations will include new mobile modem solutions for existing and future agency customers, microwave components, RF infrastructure and networking components and monitoring systems.

### 2.1.1 Engineering Services

#### *2.1.1.1 Network engineering services*

The vendor must be capable of providing technical services to the DoITT engineering team as it pertains to the network architecture and system design. These services are comprised of network and system level components such as quality of service (QoS) design, testing and implementation, routing protocol and configuration review, server and system level integration, component level recommendations and migration as products become obsolete, etc.

The vendor must also provide engineering services in support of a transition to IPv6. As the IT industry and pertinent infrastructures adopt and migrate toward the improved addressing capacity and features of IPv6, support for IPv4 will fade. DoITT began the transition to IPv6 in 2011 for the CityNet network. This transition required extensive planning and preparation to minimize adverse impact while maximizing benefits to the network, applications and users. A similar effort is necessary to plan for transitioning the NYCWiN network to IPv6. The vendor must have experience in the overall planning process and will

provide the engineering resources required to ensure a smooth and effective migration to an IPv6 NYCWiN network.

City agencies seek to further utilize NYCWiN in an effort to reduce costs and have access to viable alternatives to carrier-based options. The vendor must be able to support this by providing recommendations for solutions, impact and risk analyses, assist in the design review and provide subject matter expertise during the implementation phases of agency initiatives. The vendor must have experience in capacity planning, collecting and analyzing utilization trending information, etc. to support such initiatives as remote office connectivity, temporary field office connectivity, continuity of business operations and redundancy capabilities for new agency initiatives and system enhancements.

**Services currently provided include:**

- Network design, prototyping, testing & development
- Off-site testing facility
- Key Performance Indicator (KPI) analysis and reporting
- Trend analysis and reporting
- Service Level Agreements
- Quality of Service Engineering
- IPv6, Cellular, Carrier level services
- Tier 3 TAC Engineering
- Remedy system management
- Oracle system management (e.g. database administrator)
- Script development for internal systems
- Application integration and engineering

*2.1.1.2 RF Engineering Services*

The suitability and success of broadband wireless communications depends on a variety of factors. DoITT is looking for vendors who are experienced with the design and operations of broadband wireless systems like NYCWiN and are knowledgeable in analysis and evaluation of environmental issues, RF performance and degradation issues and have the ability to provide testing and measurement techniques and data collection methodologies. Vendors should have the ability to employ post processing methodologies and tools, perform drive test analyses, model tuning, spectrum planning, KPI analysis, morphology analysis, noise, SNR, BER, SIR, frequency planning, and interference analysis in order to allow DoITT engineers and technical personnel to manage and maintain performance of RF related systems. Solutions may vary from simple adjustments to the transmitting equipment (e.g. slight changes to antenna tilt azimuth) to more complex design changes such as frequency and/or spectrum redesign (e.g. cell splitting). The vendor should be well versed in broadband wireless communications performance analysis and make specific recommendations based on identified anomalies (e.g. background noise-floor levels, signal-to-noise ratio, RF interference levels and sources).

Services currently provided include:

- Ongoing network optimization
- KPI analysis and reporting
- Annual drive testing
- Interference analysis and mitigation
- 3G/4G cellular design & engineering
- Service Level Agreements
- Quality of Service Engineering
- Vendor interaction
- Tier 3 TAC Engineering
- Application integration and engineering

#### *2.1.1.3 LTE Design Services*

NYCWiN was built to Public-Safety specifications with an emphasis on reliability and redundancy to ensure the highest and most reliable performance of the network, even in the event of a catastrophic event. Technology advances in network design allow the city to take advantage of higher data rates and the ability to deploy commercial off-the-shelf ("COTS") products to agencies to support their needs and help lower their costs. The Long Term Evolution (LTE) architecture is the next step in providing a higher level of service to the City of New York and its agencies. It is envisioned that LTE Advanced (3GPP Release 10) will be the baseline minimum deployment. However, the City expectations for future enhancements to the 3GPP global broadband wireless standards (VoLTE, 5G, etc.) are such that the vendor should include periodic technology updates so that NYCWiN remains current with the technologies deployed by the Tier 1 commercial carriers.

Vendor engineers should be well versed in LTE as well as the national FirstNet initiative to build a public safety network. The implementation of LTE will touch upon many aspects of NYCWiN from the core network architecture, the RF coverage footprint, end user devices and the Radio Access Node sites (RANs).

A transformation to LTE will take more than a switch to new radios and packet IP technology. It will require proper planning in order for DoITT to fully capitalize on LTE and IP technology attributes to build a sustainable service model for the future. The vendor, as part of its project development services will be expected to actively advise, assist, and aid DoITT in developing and implementing plans and best practices including, but not limited to:

- Information Technology strategies, programs, and standards.
- Application-development and maintenance/support processes.
- Risk assessment and mitigation measures.
- Compliance monitoring to ensure that projects adhere to the guidelines established by the Federal Communications Commissions' Emergency Response Interoperability Center (ERIC); rules and regulations stipulated by the National Telecommunications and Information Administration (NTIA); and New York City strategies and standards.

Furthermore, a transition to LTE will require an assessment of the NYCWiN core network and its ability to support the requirements necessary to deploy LTE. The vendor must be able to provide the necessary engineering resources and analysis to ensure that any proposed design changes will meet the specific requirements to support an LTE environment.

*2.1.1.4 Microwave Engineering Services*

A critical component of NYCWiN is the microwave back haul network. The vendor must be able to provide analysis of microwave design changes and operational changes impacting the microwave system. A reconfiguration of the microwave backhaul network has the potential to not only isolate major radio access node sites, but could also disrupt data traffic on large portions of the entire system. To avoid this possibility, vendors must be able to thoroughly analyze and simulate the viability of the "to-be" design using data traffic analysis and optimization tools and methodologies.

Vendor must have experience in providing analysis on a per link basis to assure spectrum and link quality compliance.

Services currently provided include:

- License filing
- Microwave design
    - Path Analysis
    - Interference Analysis
    - Site Acceptance
    - Link Acceptance
- KPI analysis and reporting
- Tier 3 TAC Engineering
- Site Management and site visits
- Microwave Relocation Services
- Line of Site (LOS) services (provide information on performing the service and how they do it)
- Integration services (installation, A&E, Permitting, etc.)

*2.1.1.5 Security Engineering Services*

NYCWiN is a public safety network and as such the vendor should have experience in security best practices for public safety. The vendor will have experience in network security design and implementation to ensure that NYCWiN enhancements maintain the appropriate levels of security required by a public safety network and meet the security requirements of the City, which may include State, Federal and other security criteria such as, but not limited to, HIPPA, SAS70, etc. The vendor will assist in testing and developing agency implementation documentation and deployment plans. The vendor must be able to provide analysis of any security testing results and recommendations in order to ensure that new system enhancements are secure and that the recommendations follow best practices, are cost effective and provide the City with the best possible solution to address vulnerabilities.

Services currently provided include:

- Monitoring, Trending and Analysis
- Design, prototyping, testing & development
- Annual Security Scan
- Reporting
- Security plan development
- System configuration and deployment
- Tier 3 TAC Engineering

- Adherence to the Citywide Information Security Policies and Standards.

*2.1.1.6 Hosting environment services*

NYCWiN offers dedicated hosting of services and applications to the City and its agencies. Hosting is provided on Windows or Unix/Linux blade servers providing both shared and dedicated infrastructure. The systems are designed and maintained to meet the same standards as the core network equipment and are backed up and monitored by the NOC. Technical services such as hardware and software setup and configuration, maintenance, hardware replacement, technical support, patching, updating and monitoring are included in the service provided.

*2.1.1.7 Disaster Recovery and Continuity of Operations*

Disaster recovery is defined as the replication and hosting of physical or virtual servers to provide failover in the event of a man-made or natural catastrophe. Inherent in the redundant design of NYCWiN is a level of disaster recovery that allows for continuity of operations at the core in the event of a major disaster. However, planning and continuity of operations for the RANs requires planning and is not without challenges. Some of those challenges are:

- Transportation of generators
- Health & Safety rules impacting fuel transport for generators
- D/R Field operations
- Sites and facilities in flood zones or flood-prone areas
- Resiliency redundancy and/ or diversity of back haul network
- Diversity and resiliency of commercial power and communication network to NOC and other critical network components

The selected vendor will be responsible to:

- Provide experience in developing disaster recovery plans and resiliency measures following industry best practices in environments similar to NYCWiN.
- Cooperate with DoITT in the development, testing, and execution of contingency and disaster recovery plans including implementation of appropriate resiliency measures, and in the testing of

equipment, services, and facilities to be used in the event of a disaster affecting the services, at no additional cost to DoITT.

- Maintain a monitoring and notification process that would notify the City of the loss or degradation of public safety related services.
- Notify the City immediately of any major network topography or Network Operations Center (NOC)/Network Management Center (NMC) changes, reductions in redundant network elements and any other fundamental change that could affect the diversity or redundancy of the City's services.
- Work with the City, communication and commercial power providers to develop strategies to minimize and mitigate risk in the event of a disaster.

2.1.2 Property Management and Legal Services

Property management services include the following:

- Lease Administration
- Site acquisition, negotiation of lease agreements, ability to secure permits and approvals, conducting negotiations for preferred leasing terms and development of standard Memorandum of (MOU) documents.
- Enter into contractual agreements to the benefit of the City.
- Facilitating the approval, maintenance, and execution of leases, submission of lease amendments, and submission of MOU documents as needed.
- Zoning and Permitting Approval
- Identification of permitting requirements, submission of permits and applications along with the required exhibits, and follow up to expedite the approval of permitting and applications.
- Site Engineering
- Preparation of drawings and exhibits to support the lease negotiation process and permit application.
- Provide engineering services for connecting to the backhaul (microwave or carrier) interface as well as the interface with the building structural, electrical, and mechanical systems.

Other functions include arranging electrical service for each RAN site and for the Network Operations Centers, along with paying the electric utility bill each month for these locations in the network.

Property management is also responsible for ensuring that all sites are in compliance with FCC and OSHA RF Safety exposure rules and requirements.

- Other services currently provided include:
- Utilities
- Licensing
- Negotiations
- Siterra (Site management database service)

- Architectural & Engineering Services
- Construction
- Permitting
- Site Maintenance

### 2.1.3 Operations Services

An environment as large and complex as the NYCWiN system requires significant system configuration documentation, run books and procedural documents to allow for consistent, orderly and reliable operation. As the NYCWiN environment continues to grow and change, documentation governing the Microwave system, RF environment, network infrastructure fabric, helpdesk and network operations center management will need to be maintained.

Operational, procedural and quality assurance services should be provided for ongoing and new initiatives, some of which are:

- The NYC Department of Transportation (DOT) utilizes NYCWiN to enable central monitoring and remote programming of traffic patterns for its day-to-day operations at approximately 13,000 intersections during rush hours, emergencies, and special events. Deployment of this remote capability over NYCWiN provides the agency a significant cost savings and enables several key initiatives such as Midtown In-Motion and Real-Time Passenger Information.
- The Fire Department New York (FDNY) is leveraging NYCWiN by allowing personnel to take advantage of broadband applications such as EPCR to provide lifesaving assistance to the residents and visitors of the City.
- The New York Department of Environmental Protection (DEP) utilizes NYCWiN to provide for monitoring of a waste water management system, which is based on SCADA.
- There are currently several agencies using or planning to use video applications on NYCWiN including the Mayor's Office, Office of Emergency Services and NYPD among others.

#### *2.1.3.1 Network Operations Services*

The Network Operations Center is an integrated operational environment in which the NOC Operators are responsible for monitoring component failures, communication line alarms (such as bit errors, framing errors, line coding errors, and circuits down) and other performance issues that may affect the network and that may require special attention to avoid degraded service..

The NOC systems provide information about the network and its operations by gathering and presenting data about the specific network element managers that reside on NYCWiN. The NOC serves as the central service dispatch point for all service requests.

Primary responsibilities of NOC personnel include:

- Real-time Network monitoring
- Incident response

- Communications management
- Reporting problems

The NOC is staffed for continuous operation – twenty-four hours per day, seven days per week, and three hundred and sixty-five days per year (24 x 7 x 365). The NOC is staffed with trained and experienced technical personnel, able to effectively diagnose system alarms, and dispatch appropriate service personnel on a timely basis.

NOC functionality and responsibilities includes:

- Trouble ticketing
- Trouble ticket tracking
- Network operations
- User subscription and validation
- NOC management for both the Primary and Alternate NOC facilities
- Fault management
- Configuration management
- Asset management
- Accounting management
- Performance management
- Report generation

A key function of the NYCWiN NOC is the integrated Network Management System (NMS). The NMS provides a view of the network, its health status, operational status, and performance criteria. The existing system design provides the framework necessary to operate and control network and system functions and management of service level agreements (SLAs).

The NOC systems also provide integrated tools for the control of network operations, fault management, configuration management, performance management, inventory and asset management, and reporting functions.

The system performance parameters are continuously monitored through the use of automated tools, such as Nagios, Splunk, etc. These tools automatically collect performance data and track technical performance parameters against thresholds set by Systems Engineering. The primary NOC interface for providing services is Remedy. Remedy allows the NOC staff access to necessary applications, information, and controls for maintaining the managed components on NYCWiN.

The NOC operators are also responsible for continuously monitoring the systems for alarm conditions based upon performance thresholds. When a fault is detected and confirmed the NOC staff initiate troubleshooting and repair actions. Depending on the priority, severity, and duration of the failure, the NOC staff initiates, at predetermined intervals, higher levels of technical and management escalation. Throughout this process, the NOC staff maintains status updates in the Remedy trouble ticket system.

#### *2.1.3.2 Field Operation Services*

NYCWiN currently maintains dedicated on-site technician(s) to support 24/7/365 maintenance operations. The technician(s) provide maintenance service without regard to the nature (i.e., emergency or routine) of the service requested, by responding immediately to a service request and rendering continuous effort to remedy the failure or defect.

Field Operation Services is responsible for performing semi-annual site inspections. Site inspections consist of visual, mechanical, electronic inspections, and verification procedures recommended by the original equipment manufacturer for all hardware and equipment enclosures.

Semi-annual preventative maintenance programs are established for back-up power systems (DC power plant and external batteries). These preventative maintenance programs include visual, mechanical, electronic inspections, and verification of the back-up power system to ensure that the back-up power system is performing to all manufacturers' defined technical and environmental specifications.

In addition to the visual, mechanical, electronic inspections and verification procedures recommended by the original equipment manufacturers, functional verification and restoration procedures at each site are performed on a semi-annual basis.

Services currently provided include:

- Technical support for field operations
- Inventory control and warehousing services
- Construction site visit and repair services
- Site inspections of site hardware on a semi-annual basis
- Planned (scheduled) maintenance

### 2.1.4 Product Development Services

Product development is defined as the process of developing a new product or service for the market and is considered the preliminary step in product or service development. This process is utilized to develop a product that competes with a particular product/service or may be done to improve an already established product. New product development is essential to any business that must keep up with changing trends and technology changes or enhancements.

Software and hardware prototypes are developed in response to City or agency requests, as well as support efforts to keep the current product sets viable.

Engineering services in all areas (Network, RF and Security) provide a coordinated approach to product and application development. These groups are responsible for performing needs assessments and system requirements studies with City stakeholders to understand, assess, document strategic goals and objectives and assist in mapping out functional, technical and operational requirements for new products or applications. As part of these efforts the engineering teams are responsible for the coordination of

project kickoff meetings, status meetings and technical discussions with project participants, supporters and as many key stakeholders as possible. Services currently provided include:

- Hardware design, prototyping, testing & development services
- Software design, prototyping, testing & development services

2.1.5 Contract Administration and Order/Proposal Development

Contract Administration involves those activities between the vendor and the City from the time the contract is awarded until the work has been completed and accepted or the contract terminated, payment has been made, and disputes have been resolved. Contract administration constitutes a key part of the ongoing process on NYCWiN between the vendor and the City. As such, some of the responsibilities include:

- Review, evaluate and approve contract change orders, amendments, addendums, and releases;
- Coordination with City purchasing staff, legal counsel, and outside entities;
- Development, fulfillment and auditing of contract requirements;
- Develop and review proposals, contract specifications and provisions for compliance;
- Ensure that all contracts adhere to City requirements;
- Monitor contracts to ensure compliance and to expedite completion of contract agreements;
- Work closely with other departments and outside agencies and organizations in reviewing specifications, requests for proposals/qualifications, contracts and/or other related services.
- Development of orders and proposals for new applications, hardware, and services, as well as for corrective measures such as relocation or repair of systems due to events outside of vendor control.

## 2.2 Option 2 – Provide NYCWiN Functionality as a Service through the transfer of assets

This option is for transferring ownership of NYCWiN to a third party. This would include the option of a complete transfer of the system to a third party and a bill back service model. The vendor will work with the City and the current provider of services to develop a transition plan so that the existing NYCWiN users and services are not impacted. The system must also maintain QoS capabilities with a defined set of users having priority over other users. The third party must have the ability to perform all of the services listed in option 1 and should include those services in the cost model proposed.

The following services and items, although not all inclusive, would need to be considered for the effective deployment of this model:

- Site maintenance schedules and reporting.

- Engineering services for the design and deployment of new service models to City entities.
- Service support for all service types utilized by DoITT and other agencies.
- Support for additional services and/or emerging technologies.
- Operations, administrative and maintenance support, including centralized billing, for all service types utilized.
- Construction services in order to provide service to a building and/or deliver services to non-standard facilities.
- Notify DoITT, and public safety entities at least five days in advance of any planned service outages and/or scheduled maintenance. Notification would include impacted coverage areas and an estimate of the outage timeframe.
- Allow for a designated trial period for testing and evaluating equipment without additional charges or fees.
- Activate service on new devices within 1 hour of a request for activation.
- Continually update the product catalog of wireless device models available to the City.
- Provide a standard warranty of not less than 1-year, instruction manuals/documentation, and shipping/delivery where applicable.
- Adherence to the Citywide Information Security Policies and Standards as published on the internet at http://www.nyc.gov/infosec, when implementing or providing services.

### 2.2.1 Engineering Services

#### *2.2.1.1 Network engineering services*

The vendor must be capable of providing technical services to the DoITT engineering team as it pertains to the network architecture and system design. These services are comprised of network and system level components such as quality of service (QoS) design, testing and implementation, routing protocol and configuration review, server and system level integration, component level recommendations and migration as products become obsolete, etc.

The vendor must also provide engineering services in support of a transition to IPv6. As the IT industry and pertinent infrastructures adopt and migrate toward the improved addressing capacity and features of IPv6, support for IPv4 will fade. DoITT began the transition to IPv6 in 2011 for the CityNet network. This transition required extensive planning and preparation to minimize adverse impact while maximizing benefits to the network, applications and users. A similar effort is necessary to plan for transitioning the NYCWiN network to IPv6. The vendor must have experience in the overall planning process and will provide the engineering resources required to ensure a smooth and effective migration to an IPv6 NYCWiN network.

City agencies seek to further utilize NYCWiN in an effort to reduce costs and have access to viable alternatives to carrier-based options. The vendor must be able to support this by providing recommendations for solutions, impact and risk analyses, assist in the design review and provide subject matter expertise during the implementation phases of agency initiatives. The vendor must have

experience in capacity planning, collecting and analyzing utilization trending information, etc. to support such initiatives as remote office connectivity, temporary field office connectivity, continuity of business operations and redundancy capabilities for new agency initiatives and system enhancements.

As the NYCWiN environment begins to age, certain components will reach end-of-life and will no longer be supported by the manufacturer. The vendor must have experience in evaluating new technologies and be able to provide replacement recommendations. These recommendations will include new mobile modem solutions for existing and future agency customers, microwave componentry, RF infrastructure and networking components and monitoring systems.

Services currently provided include:

- Network design, prototyping, testing & development
- Off-site testing facility
- Key Performance Indicator (KPI) analysis and reporting
- Trend analysis and reporting
- Service Level Agreements
- Quality of Service Engineering
- IPv6, Cellular, Carrier level services
- Tier 3 TAC Engineering
- Remedy system management
- Oracle system management (e.g. DBA)
- Script development for internal systems
- Application integration and engineering

*2.2.1.2 RF Engineering Services*

The suitability and success of broadband wireless communications depends on a variety of factors. DoITT is looking for vendors who are experienced with the design and operations of broadband wireless systems like NYCWiN and are knowledgeable in analysis and evaluation of environmental issues, RF performance and degradation issues and have the ability to provide testing and measurement techniques and data collection methodologies. Vendors should have the ability to employ post processing methodologies and tools, perform drive test analyses, model tuning, spectrum planning, KPI analysis, morphology analysis, noise, SNR, BER, SIR, frequency planning, and interference analysis in order to allow DoITT engineers and technical personnel to manage and maintain performance of RF related systems. Solutions may vary from simple adjustments to the transmitting equipment (e.g. slight changes to antenna tilt azimuth) to more complex design changes such as frequency and/or spectrum redesign (e.g. cell splitting). The vendor should be well versed in broadband wireless communications performance analysis and make specific recommendations based on identified anomalies (e.g. background noise-floor levels, signal-to-noise ratio, RF interference levels and sources).

Services currently provided include:

- Ongoing network optimization

- KPI analysis and reporting
- Annual drive testing
- Interference analysis and mitigation
- 3G/4G cellular design & engineering
- Service Level Requirements
- Service Level Agreements
- Quality of Service Engineering
- Vendor interaction
- Tier 3 TAC Engineering
- Application integration and engineering

*2.2.1.3 Microwave Engineering Services*

A critical component of NYCWiN is the microwave back haul network. The vendor must be able to provide analysis of microwave design changes and operational changes impacting the microwave system. A reconfiguration of the microwave backhaul network has the potential to not only isolate major radio access node sites, but could also disrupt data traffic on large portions of the entire system. To avoid this possibility, vendors must be able to thoroughly analyze and simulate the viability of the "to-be" design using data traffic analysis and optimization tools and methodologies.

Vendor must have experience in providing analysis on a per link basis to assure spectrum and link quality compliance. At a minimum the following activities will occur at each site:

- Path Analysis
- Interference Analysis
- Site Acceptance
- Link Acceptance

Services currently provided include:

- License filing
- Microwave design
- KPI analysis and reporting
- Tier 3 TAC Engineering
- Site Management and site visits
- Microwave Relocation Services
- Line of Site (LOS) services (provide information on performing the service and how they do it)
- Integration services (installation, A&E, Permitting, etc.)

*2.2.1.4 LTE Design Services*

- NYCWiN was built to Public-Safety specifications with an emphasis on reliability and redundancy to ensure the highest and most reliable performance of the network, even in the event of a

catastrophic event. Technology advances in network design allow the city to take advantage of higher data rates and the ability to deploy commercial off-the-shelf ("COTS") products to agencies to support their needs and help lower their costs. The Long Term Evolution (LTE) architecture is the next step in providing a higher level of service to the City of New York and its agencies. Vendor engineers should be well versed in LTE as well as the national FirstNet initiative to build a public safety network. The implementation of LTE will touch upon many aspects of NYCWiN from the core network architecture, the RF coverage footprint, end user devices and the Radio Access Node sites (RANs).

- A transformation to LTE will take more than a switch to new radios and packet IP technology. It will require proper planning in order for DoITT to fully capitalize on LTE and IP technology attributes to build a sustainable service model for the future. The vendor, as part of its project development services will be expected to actively advise, assist, and aid DoITT in developing and implementing plans and best practices including, but not limited to:
  - Information Technology strategies, programs, and standards.
  - Application-development and maintenance/support processes.
  - Risk assessment and mitigation measures.
  - Compliance monitoring to ensure that projects adhere to the guidelines established by the Federal Communications Commissions' Emergency Response Interoperability Center (ERIC); rules and regulations stipulated by the National Telecommunications and Information Administration (NTIA); and New York City strategies and standards.
- Furthermore, a transition to LTE will require an assessment of the NYCWiN core network and its ability to support the requirements necessary to deploy LTE. The vendor must be able to provide the necessary engineering resources and analysis to ensure that any proposed design changes will meet the specific requirements to support an LTE environment.

#### *2.2.1.5 Security Engineering Services*

NYCWiN is a public safety network and as such the vendor should have experience in security best practices for public safety. The vendor will have experience in network security design and implementation to ensure that NYCWiN enhancements maintain the appropriate levels of security required by a public safety network and meet the security requirements of the City.

Services currently provided include:

- Monitoring, Trending and Analysis
- Design, prototyping, testing & development
- Annual Security Scan
- Reporting
- Security plan development
- System configuration and deployment
- Tier 3 TAC Engineering

*2.2.1.6 Hosting environment services*

NYCWiN offers dedicated hosting of services and applications to the City and its agencies. Hosting is provided on Windows or Unix/Linux blade servers providing both shared and dedicated infrastructure. The systems are designed and maintained to meet the same standards as the core network equipment and are backed up and monitored by the NOC. Technical services such as hardware and software setup and configuration, maintenance, hardware replacement, technical support, patching, updating and monitoring are included in the service provided.

*2.2.1.7 Disaster Recovery and Continuity of Operations*

- Disaster recovery is defined as the replication and hosting of physical or virtual servers to provide failover in the event of a man-made or natural catastrophe. Inherent in the redundant design of NYCWiN is a level of disaster recovery that allows for continuity of operations at the core in the event of a major disaster. However, planning and continuity of operations for the RANs requires planning and is not without challenges. Some of those challenges are:
    - Transportation of generators
    - Health & Safety rules impacting fuel transport for generators
    - D/R Field operations
    - Sites and facilities in flood zones or flood-prone areas
    - Resiliency redundancy and/ or diversity of back haul network
    - Diversity and resiliency of commercial power and communication network to NOC and other critical network components
- The selected vendor will be responsible to:
- Provide experience in developing disaster recovery plans and resiliency measures following industry best practices in environments similar to NYCWiN.
- Cooperate with DoITT in the development, testing, and execution of contingency and disaster recovery plans including implementation of appropriate resiliency measures, and in the testing of equipment, services, and facilities to be used in the event of a disaster affecting the services, at no additional cost to DoITT.
- Maintain a monitoring and notification process that would notify the City of the loss or degradation of public safety related services.
- Notify the City immediately of any major network topography or Network Operations Center (NOC)/Network Management Center (NMC) changes, reductions in redundant network elements and any other fundamental change that could affect the diversity or redundancy of the City's services.
- Work with the City, communication and commercial power providers to develop strategies to minimize and mitigate risk in the event of a disaster.

### 2.2.2 Property Management and Legal Services

Property management services include the following:

Lease Administration

- Site acquisition, negotiation of lease agreements, ability to secure permits and approvals, conducting negotiations for preferred leasing terms and development of standard Memorandum of (MOU) documents.
- Facilitating the approval, maintenance, and execution of leases, submission of lease amendments, and submission of MOU documents as needed.

Zoning and Permitting Approval

- Identification of permitting requirements, submission of permits and applications along with the required exhibits, and follow up to expedite the approval of permitting and applications.

Site Engineering

- Preparation of drawings and exhibits to support the lease negotiation process and permit applications.
- Provide engineering services for connecting to the backhaul (microwave or carrier) interface as well as the interface with the building structural, electrical, and mechanical systems.

Other functions include arranging electrical service for each RAN site and for the Network Operations Centers. Property management is also responsible for paying the electric utility bill each month for these locations in the network.

Property management is also responsible for ensuring that all sites are in compliance with FCC and OSHA RF Safety exposure rules and requirements.

- Services currently provided include:
- Utilities
- Licensing
- Negotiations
- Siterra (Site management database service)
- A&E Services
- Construction
- Permitting
- Site Maintenance

### 2.2.3 Operations Services

Operational, procedural and quality assurance services should be provided for ongoing and new initiatives, some of which are:

- The NYC Department of Transportation (DOT) utilizes NYCWiN to enable central monitoring and remote programming of traffic patterns for its day-to-day operations at approximately 13,000 intersections during rush hours, emergencies, and special events. Deployment of this remote capability over NYCWiN provides the agency a significant cost savings and enables several key initiatives such as Midtown In-Motion and Real-Time Passenger Information.
- The Fire Department New York (FDNY) is leveraging NYCWiN by allowing personnel to take advantage of broadband applications such as EPCR to provide lifesaving assistance to the residents and visitors of the City.
- The New York Department of Environmental Protection (DEP) utilizes NYCWiN to provide for monitoring of a waste water management system, which is based on SCADA.
- There are currently several agencies using or planning to use video applications on NYCWiN including the Mayor's Office, Office of Emergency Services and NYPD among others.

#### *2.2.3.1 Network Operations Services*

The Network Operations Center is an integrated operational environment in which the NOC Operators are responsible for monitoring component failures, communication line alarms (such as bit errors, framing errors, line coding errors, and circuits down) and other performance issues that may affect the network and that may require special attention to avoid degraded service..

The NOC systems provide information about the network and its operations by gathering and presenting data about the specific network element managers that reside on NYCWiN. The NOC serves as the central service dispatch point for all service requests. Primary responsibilities of NOC personnel include:

- Network monitoring
- Incident response
- Communications management
- Reporting problems

The NOC is staffed for continuous operation – twenty-four hours per day, seven days per week, and three hundred and sixty-five days per year (24 x 7 x 365). The NOC is staffed with trained and experienced technical personnel, able to effectively diagnose system alarms, and dispatch appropriate service personnel on a timely basis.

NOC functionality and responsibilities includes:

- Trouble ticketing
- Trouble ticket tracking
- Network operations
- User subscription and validation
- NOC management for both the Primary and Alternate NOC facilities
- Fault management
- Configuration management

- Asset management
- Accounting management
- Performance management
- Report generation

The NOC operators are also responsible for continuously monitoring the systems for alarm conditions based upon performance thresholds. When a fault is detected and confirmed the NOC staff initiate troubleshooting and repair actions. Depending on the priority, severity, and duration of the failure, the NOC staff initiates, at predetermined intervals, higher levels of technical and management escalation. Throughout this process, the NOC staff maintains status updates in the Remedy trouble ticket system.

*2.2.3.2 Field Operation Services*

The NYCWiN currently maintains dedicated on-site technician(s) to support 24/7/365 maintenance operations. The technician(s) provide maintenance service without regard to the nature (i.e., emergency or routine) of the service requested, by responding immediately to a service request and rendering continuous effort to remedy the failure or defect.

Field services is responsible for performing semi-annual site inspections. Site inspections consist of visual, mechanical, electronic inspections and verification procedures recommended by the original equipment manufacturer for all hardware and equipment enclosures.

Semi-annual preventative maintenance programs are established for back-up power systems (DC power plant and external batteries). These preventative maintenance programs include visual, mechanical, electronic inspections and verification of the back-up power system to ensure that the back-up power system is performing to all manufacturers' defined technical and environmental specifications.

In addition to the visual, mechanical, electronic inspections and verification procedures recommended by the original equipment manufacturers, functional verification and restoration procedures at each site are performed on a semi-annual basis.

Services currently provided include:

- Technical support for field operations
- Inventory control and warehousing services
- Construction site visit and repair services
- Site inspections of site hardware on a semi-annual basis
- Planned (scheduled) maintenance

2.2.4 Product Development Services

Product development is defined as the process of developing a new product or service for the market and is considered the preliminary step in product or service development. This process is utilized to develop a product that competes with a particular product/service or may be done to improve an already

established product. New product development is essential to any business that must keep up with changing trends and technology changes or enhancements.

Software and hardware prototypes are developed in response to City or agency requests, as well as support efforts to keep the current product sets viable.

Engineering services in all areas (Network, RF and Security) provide a coordinated approach to product and application development. These groups are responsible for performing needs assessments and system requirements studies with City stakeholders to understand, assess, document strategic goals and objectives and assist in mapping out functional, technical and operational requirements for new products or applications. As part of these efforts the engineering teams are responsible for the coordination of project kickoff meetings, status meetings and technical discussions with project participants, supporters and as many key stakeholders as possible. Services currently provided include:

- Hardware design, prototyping, testing & development services
- Software design, prototyping, testing & development services

2.2.5 Contract Administration and Order/Proposal Development

Contract Administration involves those activities between the vendor and the City from the time the contract is awarded until the work has been completed and accepted or the contract terminated, payment has been made, and disputes have been resolved. Contract administration constitutes a key part of the ongoing process on NYCWiN between the vendor and the City. As such, some of the responsibilities include;

- Review, evaluate and approve contract change orders, amendments, addendums, and releases;
- Coordination with City purchasing staff, legal counsel, and outside entities;
- Development, fulfillment and auditing of contract requirements;
- Develop and review proposals, contract specifications and provisions for compliance;
- Ensure that all contracts adhere to City requirements;
- Monitor contracts to ensure compliance and to expedite completion of contract agreements;
- Work closely with other departments and outside agencies and organizations in reviewing specifications, requests for proposals/qualifications, contracts and/or other related services.

Another key component required by the City is the development of orders and proposals for new applications, hardware, and services. The City, in the ongoing effort to provide agencies with the means necessary to operate more efficiently, requires the vendor to provide services such as the development of proposals and orders to implement new applications, hardware and services as well as for corrective measures such as relocation or repair of systems due to events outside of vendor control.

Required Services

- Maintain continuity of critical services
- Minimize the risk of service failure in the event of disasters and emergencies
- Reduce service costs

- Provide for managed growth and expansion of the current services.
- Provide options for existing services.
- Provide any and/or all of the following services to one or more locations: Managed WAN, Managed LAN, Managed IP VPN
- Application Hosting Service which houses web-enabled and non-web-enabled sites in a secure environment with 24x7 support with fast, reliable, and scalable bandwidth resources.
- Provide for the management and daily tasks associated with maintaining 24x7 application availability.

### 2.3 Option 3 – Provide NYCWiN Functionality as a Service through a Carrier-Based architecture

This option is for transferring NYCWiN services to a Carrier-Based model. This would include support of approximately 22,000 of the following types of users and devices:

- Broadband users and devices
    - Automatic Vehicle Location (AVL) devices
    - DOT (traffic controllers, cameras, etc.)
    - NYPD (vehicles, cameras, etc.)
    - FDNY (EMS, vehicles, cameras, etc.)
    - Other agencies
- VoIP (Callbox)

The system must have QoS capabilities, with these users having priority over other public/commercial users.

The following services and items would need to be considered for the effective deployment of this model:

- Transition of existing services from existing contractors in an orderly and minimally disruptive manner. This would also include the development and implementation of pilots per user type to ensure that the transition does not adversely impact the client base. The pilot will involve working with the individual agencies to ensure that functional requirements are met.
- Service support for all service types utilized by DoITT and other agencies.
- Support for additional services and/or emerging technologies.
- Operations, administrative and maintenance support, including centralized billing, for all service types utilized.
- Construction services in order to provide service to a building and/or deliver services to non-standard facilities.
- Notify DoITT and public safety entities at least five days in advance of any planned service outages and/or scheduled maintenance. Notification would include impacted coverage areas and an estimate of the outage timeframe.

- Allow for a designated trial period for testing and evaluating equipment without additional charges or fees.
- Activate service on new devices within 1 hour of a request for activation.
- Continually update the product catalog of wireless device models available to the City.
- Provide a standard warranty of not less than 1-year, instruction manuals/documentation, and shipping/delivery (inside) where applicable for User.
- Adherence to the Citywide Information Security Policies and Standards as published on the internet at http://www.nyc.gov/infosec, when implementing or providing services.

2.3.1 Required Services

- Maintain continuity of critical services
- Minimize the risk of service failure in the event of disasters and emergencies
- Reduce service costs
- Provide for managed growth and expansion of the current services.
- Provide options for existing services
- Provide any and/or all of the following services to one or more locations: Managed WAN, Managed LAN, Managed IP VPN
- Application Hosting Service which houses web-enabled and non-web-enabled sites in a secure environment with 24x7 support with fast, reliable, and scalable bandwidth resources
- Provide for the management and daily tasks associated with maintaining 24x7 application availability

As part of the response, a high level transition plan for each service type will be provided which describes how the transition of a service from the current infrastructure to the vendor's service could be accomplished, while eliminating or minimizing transition costs.

2.3.2 Disaster Recovery and Business Continuity

Cooperate with DoITT in the development, testing, and execution of contingency and disaster recovery plans including implementation of appropriate resiliency measures, and in the testing of equipment, services, and facilities to be used in the event of a disaster affecting the services, at no additional cost to DoITT.

Work with the City to develop strategies to minimize and mitigate risk in the event of a disaster.

Maintain a monitoring and notification process, via email, that would notify the City of the loss or degradation of public safety related services (e.g. site outages, scheduled maintenance, site upgrades, etc.).

Notify the City immediately of any major network topography or Network Operations Center (NOC)/Network Management Center (NMC) changes, reductions in redundant network elements and any other fundamental change that could affect the diversity or redundancy of the City's services.

Provide and maintain a "Disaster Avoidance and Recovery Plan" that includes the location (including floor) and business continuity capabilities of the Contractor's central office(s) and wire center(s), including:

- Mitigation plans detailing how coverage is maintained in the event of a site failure.
- Battery back-up and emergency generator capabilities
- Other resiliency measures
- Redundancy, resiliency and/ or diversity for back haul network
- Resiliency and diversity communication and commercial power to NOC and other critical network components

2.3.3 Minimum System Requirements

In addition to providing specific agency requirements, the following system level requirements must be met:

- Current power resiliency requirements:
  - 24 hour battery back-up or equivalent
- Current coverage requirements:
  - ≥95% in-street coverage
  - Mobile coverage up to 70 mph
- Current bandwidth minimums:
  - 1.2 Mbps Downlink
  - 450Kbps Uplink
  - No rate cap applied allowing for higher throughput
- Current latency requirements:
  - 250 ms or less 50 percent of the time
  - 500 ms or less 95 percent of the time
- Redundant datacenters

# 3. INFORMATION SOLICITED

In the context of the above options, the City seeks information from interested parties by responding to each of the questions in this section.

The City welcomes all comments about operational and maintenance operational models but is particularly interested in receiving comments regarding the three options outlined in Section 2.

### 3.1 General Questions

#### 3.1.1 Company Information

Please complete the following "Company Profile" table:

| | |
|---|---|
| Company Name | |
| Location of Division serving New York City | |
| Headquarters Location | |
| URL of Company Web Site | |
| Contact Name | |
| Contact Title | |
| Contact Email Address | |
| Contact Phone Number | |
| Number of Years of experience in this service offering | |
| Business Size – Annual Revenue | |
| Primary Type of Service(s) Provided | |

#### 3.1.2 Definitions

Please provide your company's standard definition for the following terms, using examples to illustrate as needed.

| | |
|---|---|
| Operations | |

| | |
|---|---|
| Maintenance | |
| Integrated Services | |

3.1.3 Services Provided

Describe the services offered by your company and the corresponding service delivery models, including type of service and deployment model (public, private, community).

**Response:**

3.1.4 Government Experience

*3.1.4.1 Have you delivered operations and maintenance services to any public sector jurisdictions (Federal, State, Local government)? If so, please identify those entities, describe the services provided and the length of service.*

**Response:**

*3.1.4.2 Describe your familiarity with applicable New York City laws and regulations (e.g. prevailing wage).*

**Response:**

*3.1.4.3 Describe your recommended approach to collaboration and coordination with other NYC agencies.*

**Response:**

3.1.5 Vendor Relationships

*3.1.5.1 Do you offer any discount levels to government entities?*

**Response:**

## 3.2 Information Solicited – Option 1

### 3.2.1 Engineering Services

In the context of the above strategy, section 2.1, the City seeks information from interested parties by responding to each of the questions in this section.

The vendor must be capable of providing technical services to the DoITT engineering team as it pertains to the network architecture and system design, RF design and operations of broadband wireless systems like NYCWiN, large scale microwave backhaul design, and carrier class security services. Other services to be provided include: disaster recovery planning and continuity of operations functions as well as application hosting services and management.

*3.2.1.1 Can you provide all of the network engineering services as described in Section 2.1.1.1? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.2 Describe your approach to providing the network engineering services.*

**Response:**

*3.2.1.3 Describe your experience providing similar network engineering services.*

**Response:**

*3.2.1.4 Can you provide all of the RF engineering services as described in Section 2.1.1.2? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.5 Describe your approach to providing the RF engineering services.*

**Response:**

*3.2.1.6 Describe your experience providing similar RF engineering services.*

**Response:**

*3.2.1.7 Can you provide all of the LTE design services as described in Section 2.1.1.3? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.8 Describe your approach to providing the LTE design services.*

**Response:**

*3.2.1.9 Describe your experience providing similar LTE design services.*

**Response:**

*3.2.1.10 Can you provide all of the microwave engineering services as described in Section 2.1.1.4? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.11 Describe your approach to providing the microwave engineering services.*

**Response:**

*3.2.1.12 Describe your experience providing similar microwave engineering services.*

**Response:**

*3.2.1.13 Can you provide all of the security engineering services as described in Section 2.1.1.5? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.14 Describe your approach to providing the security engineering services.*

**Response:**

*3.2.1.15 Describe your experience providing similar security engineering services.*

**Response:**

*3.2.1.16 Can you provide all of the hosting services as described in Section 2.1.1.6? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.17 Describe your approach to providing the hosting services.*

**Response:**

*3.2.1.18 Describe your experience providing similar hosting services.*

**Response:**

*3.2.1.19 Can you provide all of the disaster recovery and continuity of operation services as described in Section 2.1.1.7? If not, please list the services you are unable to provide.*

**Response:**

*3.2.1.20 Describe your approach to providing disaster recovery, resiliency and continuity of operation services.*

**Response:**

*3.2.1.21 Describe your experience providing similar disaster recovery, resiliency and continuity of operation services.*

**Response:**

3.2.2 Property Management and Legal Services

Property management services include the following: Lease Administration, Zoning and Permitting Approval, Site Engineering, coordination with utilities, and managing compliance with FCC and OSHA requirements.

*3.2.2.1 Can you provide all of the property management and legal services as described in Section 2.1.2? If not, please list the services you are unable to provide.*

**Response:**

*3.2.2.2 Describe your approach to providing property management and legal services.*

**Response:**

*3.2.2.3 Describe your experience providing similar property management and legal services.*

**Response:**

3.2.3 Operations Services

Operations services include NOC management and oversight, documentation maintenance, development and review governing the microwave system, RF environment, network infrastructure fabric, and helpdesk and network operations center management. Other key services include: ongoing technical services, operational, procedural and quality assurance services, field services and maintenance services and inventory control.

*3.2.3.1 Can you provide all of the network operation services as described in Section 2.1.3.1? If not, please list the services you are unable to provide.*

**Response:**

*3.2.3.2 Describe your approach to providing the network operation services.*

**Response:**

*3.2.3.3 Describe your experience providing similar network operation services.*

**Response:**

*3.2.3.4 Can you provide 24x7 technical support for field operations as described in Section 2.1.3.2?*

**Response:**

*3.2.3.5 Describe your approach to providing the field operations services.*

**Response:**

*3.2.3.6 Describe your experience providing similar field operations services.*

**Response:**

3.2.4 Product Development Services

The vendor must be able to support efforts that include the development of software and hardware prototyping and development in response to City or agency requests as well as support efforts to keep the current product sets viable.

*3.2.4.1 Can you provide all of the product development services as described in Section 2.1.4? If not, please list the services you are unable to provide.*

**Response:**

*3.2.4.2 Describe your approach to providing the product development services.*

**Response:**

*3.2.4.3 Describe your experience providing similar product development services.*

**Response:**

3.2.5 Contract Administration and Order/Proposal Development

The vendor must support contract administration functions which include, but are not limited to the review, evaluation and approval of contract change orders, amendments and addendums, and provide coordination with City purchasing staff, legal counsel, and outside entities as necessary. Contract administration will work closely with the City in the development of orders and proposals for new applications, hardware, and services to provide agencies with the means necessary to operate more efficiently and to provide services outside the scope of the NYCWiN contract.

*3.2.5.1 Can you provide all of the services for developing internal orders for products and services as described in Section 2.1.5? If not, please list the services you are unable to provide.*

**Response:**

*3.2.5.2 Can you provide the services for developing proposals as described in Section 2.1.5? If not, please list the services you are unable to provide.*

**Response:**

*3.2.5.3 Describe your approach to providing internal orders and proposal development services.*

**Response:**

*3.2.5.4 Describe your experience providing similar internal orders and proposal development services.*

**Response:**

3.2.6 Pricing and Costs

*3.2.6.1 Please provide a rough order of magnitude (ROM) cost for Operations and Maintenance services*

**Response:**

*3.2.6.2 For a typical state or local government client, please break the total operations and maintenance costs into percentage for the following categories (with a total of 100%):*

- Engineering Services
- Property Management and Legal Services
- Operations Services
- Product Development Services
- Contract Administration

**Response:**

*3.2.6.3 Please provide a rough order of magnitude (ROM) cost for Order and Proposal Development services.*

**Response:**

*3.2.6.4 If available, please provide a bill or cost model as an attachment to your response.*

**Response:**

### 3.3 Information Solicited – Option 2

In the context of the above strategy, section 2.2, the City seeks information from interested parties by responding to each of the questions in this section.

3.3.1 Engineering Services

The vendor must be capable of providing technical services to the DoITT engineering team as it pertains to new deployment models, emerging technology, and prototyping and testing.

Network Engineering Services to be provided include, but are not limited to:

- Network design, prototyping, testing & development
- Off-site testing facility
- Key Performance Indicator (KPI) analysis and reporting
- Trend analysis and reporting
- Service Level Agreements
- Service Level Requirements
- Tier 3 TAC Engineering
- Application integration and engineering

*3.3.1.1 Can you provide all of the network engineering services as described in Section 2.2.1.1? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.2 Describe your approach to providing the network engineering services*

**Response:**

*3.3.1.3 Describe your experience providing similar network engineering services.*

**Response:**

RF Engineering Services to be provided include, but are not limited to:

- KPI analysis and reporting

- Annual drive testing
- Interference analysis and mitigation
- 3G/4G cellular design & engineering
- Service Level Agreements
- Service Level Requirements
- Quality of Service Engineering
- Vendor interaction
- Tier 3 TAC Engineering

*3.3.1.4 Can you provide all of the RF engineering services as described in Section 2.2.1.2? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.5 Describe your approach to providing the RF engineering services.*

**Response:**

*3.3.1.6 Describe your experience providing similar RF engineering services.*

**Response:**

Microwave Engineering Services to be provided include, but are not limited to:

- License filing
- Microwave design
- KPI analysis and reporting
- Tier 3 TAC Engineering
- Site Management and site visits
- Microwave Relocation Services
- Line of Site (LOS) services (provide information on performing the service and how they do it)
- Integration services (installation, A&E, Permitting, etc.)

*3.3.1.7 Can you provide all of the microwave engineering services as described in Section 2.2.1.3? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.8 Describe your approach to providing the microwave engineering services.*

**Response:**

*3.3.1.9 Describe your experience providing similar microwave engineering services.*

**Response:**

*3.3.1.10 Can you provide all of the LTE design services as described in Section 2.1.1.34? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.11 Describe your approach to providing the LTE design services.*

**Response:**

*3.3.1.12 Describe your experience providing similar LTE design services.*

**Response:**

NYCWiN is a public safety network and as such the vendor should have experience in security best practices for public safety. The vendor will have experience in network security design and implementation to ensure that NYCWiN enhancements maintain the appropriate levels of security required by a public safety network and meet the security requirements of the City.

Security Engineering Services currently provided include:

- Monitoring, Trending and Analysis
- Design, prototyping, testing & development
- Annual Security Scan
- Reporting
- Security plan development
- System configuration and deployment
- Tier 3 TAC Engineering

*3.3.1.13 Can you provide all of the security engineering services as described in Section 2.2.1.5? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.14 Describe your approach to providing the security engineering services.*

**Response:**

*3.3.1.15 Describe your experience providing similar security engineering services.*

**Response:**

NYCWiN offers dedicated hosting of services and applications to the City and its agencies. Hosting is provided on Windows or Unix/Linux blade servers providing both shared and dedicated infrastructure. The systems are designed and maintained to meet the same standards as the core network equipment and are backed up and monitored by the NOC. Technical services such as hardware and software setup and configuration, maintenance, hardware replacement, technical support, patching, updating and monitoring are included in the service provided.

*3.3.1.16 Can you provide all of the hosting services as described in Section 2.2.1.6? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.17 Describe your approach to providing the hosting services.*

**Response:**

*3.3.1.18 Describe your experience providing similar hosting services.*

**Response:**

Disaster recovery is defined as the replication and hosting of physical or virtual servers to provide failover in the event of a man-made or natural catastrophe. Inherent in the redundant design of NYCWiN is a level of disaster recovery that allows for continuity of operations at the core in the event of a major disaster. However, planning and continuity of operations for the RANs requires planning and is not without challenges. Some of those challenges are:

- Transportation of generators
- Health & Safety rules impacting fuel transport for generators
- D/R Field operations
- Sites and facilities in flood zones or flood-prone areas
- Resiliency redundancy and/ or diversity of back haul network

- Diversity and resiliency of commercial power and communication network to NOC and other critical network components
- Vendors will be asked to provide experience in developing disaster recovery plans and resiliency measures following industry best practices in environments similar to NYCWiN.

*3.3.1.19 Can you provide all of the disaster recovery and continuity of operation services as described in Section 2.2.1.77? If not, please list the services you are unable to provide.*

**Response:**

*3.3.1.20 Describe your approach to providing disaster recovery, resiliency and continuity of operation services.*

**Response:**

*3.3.1.21 Describe your experience providing similar disaster recovery, resiliency and continuity of operation services.*

**Response:**

3.3.2 Property Management and Legal Services

Property management services include the following: Lease Administration, Zoning and Permitting Approval, Site Engineering, coordination with utilities, and managing compliance with FCC and OSHA requirements.

*3.3.2.1 Can you provide all of the property management and legal services as described in Section 2.2.2? If not, please list the services you are unable to provide.*

**Response:**

*3.3.2.2 Describe your approach to providing property management and legal services.*

**Response:**

*3.3.2.3 Describe your experience providing similar property management and legal services.*

**Response:**

### 3.3.3 Operations Services

Operations services include NOC management and oversight, documentation maintenance, development and review governing the microwave system, RF environment, network infrastructure fabric, and helpdesk and network operations center management. Other key services include: ongoing technical services, operational, procedural and quality assurance services, field services and maintenance services and inventory control.

*3.3.3.1 Can you provide all of the network operation services as described in Section 2.2.3.1? If not, please list the services you are unable to provide.*

**Response:**

*3.3.3.2 Describe your approach to providing the network operation services.*

**Response:**

*3.3.3.3 Describe your experience providing similar network operation services.*

**Response:**

*3.3.3.4 Can you provide 24x7 technical support for field operations as described in Section 2.2.3.2? If not, please list the services you are unable to provide.*

**Response:**

*3.3.3.5 Describe your approach to providing the field operations services.*

**Response:**

*3.3.3.6 Describe your experience providing similar field operations services.*

**Response:**

### 3.3.4 Product Development Services

The vendor must be able to support efforts that include the development of software and hardware prototyping and development in response to City or agency requests as well as support efforts to keep the current product sets viable.

*3.3.4.1 Can you provide all of the product development services as described in Section 2.2.4? If not, please list the services you are unable to provide.*

**Response:**

*3.3.4.2 Describe your approach to providing the product development services.*

**Response:**

*3.3.4.3 Describe your experience providing similar product development services.*

**Response:**

3.3.5 Contract Administration and Order/Proposal Development

The vendor must support contract administration functions which include, but are not limited to the review, evaluation and approval of contract change orders, amendments and addendums, and provide coordination with City purchasing staff, legal counsel, and outside entities as necessary. Contract administration will work closely with the City in the development of orders and proposals for new applications, hardware, and services to provide agencies with the means necessary to operate more efficiently and to provide services outside the scope of the NYCWiN contract.

*3.3.5.1 Can you provide all of the services for developing internal orders for products and services as described in Section 2.2.5? If not, please list the services you are unable to provide.*

**Response:**

*3.3.5.2 Can you provide all of the services for developing proposals as described in Section 2.5? If not, please list the services you are unable to provide.*

**Response:**

*3.3.5.3 Describe your approach to providing internal orders and proposal development services.*

**Response:**

*3.3.5.4 Describe your experience providing similar internal orders and proposal development services.*

**Response:**

3.3.6 Pricing and Costs

*3.3.6.1 Please provide a rough order of magnitude (ROM) cost for Transfer of Ownership and Operations and Maintenance services*

**Response:**

*3.3.6.2 For a typical state or local government client, please break the total operations and maintenance costs into percentage for the following categories (with a total of 100%):*

- Engineering Services
- Property Management and Legal Services
- Operations Services
- Product Development Services
- Contract Administration

**Response:**

*3.3.6.3 Please provide a rough order of magnitude (ROM) cost for Order and Proposal Development services.*

**Response:**

*3.3.6.4 If available, please provide a bill or cost model as an attachment to your response.*

**Response:**

**3.4 Information Solicited – Option 3**

In the context of the above strategy, the City seeks information from interested parties by responding to each of the questions in this section.

3.4.1 Minimum System Requirements

*3.4.1.1 Can you meet all of the minimum system requirements as described in Section 2.3.3? If not, please list the services you are unable to provide.*

**Response:**

*3.4.1.2 Describe your approach to providing the minimum system requirements.*

**Response:**

*3.4.1.3 Do you offer tiered levels of service? If so, please provide cost models and pricing structures that meet and/or exceed the minimum system requirements.*

**Response:**

3.4.2 Network Engineering Services

The vendor must be capable of providing technical services to the DoITT engineering team as it pertains to new deployment models, emerging technology, and prototyping and testing. Services to be provided include, but are not limited to:

- Network design, prototyping, testing & development
- Off-site testing facility
- Key Performance Indicator (KPI) analysis and reporting
- Trend analysis and reporting
- Service Level Agreements
- Service Level Requirements
- Tier 3 TAC Engineering
- Application integration and engineering

*3.4.2.1 Can you provide all of the network engineering services as described above? If not, please list the services you are unable to provide.*

**Response:**

*3.4.2.2 Describe your approach to providing the network engineering services*

**Response:**

*3.4.2.3 Describe your experience providing similar network engineering services.*

**Response:**

### 3.4.3 Security Engineering Services

NYCWiN is a public safety network and as such the vendor should have experience in security best practices for public safety. The vendor will have experience in network security design and implementation to ensure that NYCWiN enhancements maintain the appropriate levels of security required by a public safety network and meet the security requirements of the City.

Services currently provided include:

- Monitoring, Trending and Analysis
- Design, prototyping, testing & development
- Annual Security Scan
- Reporting
- Security plan development
- System configuration and deployment
- Tier 3 TAC Engineering
- Particular areas of interest are:
    - Authentication methods used?
    - Can the vendor meet FIPS compliancy?
    - How is data secured during transfer and at rest?
    - What auditing controls are in place? Do the controls identify who has accessed data as well as providing an audit trail of data transmission or download?
    - Data loss prevention
    - Intrusion detection
    - Intrusion prevention
    - Authentication and Encryption

*3.4.3.1 Can you provide all of the security engineering services as described above? If not, please list the services you are unable to provide.*

**Response:**

*3.4.3.2 Describe your approach to providing the security engineering services.*

**Response:**

*3.4.3.3 Describe your experience providing similar security engineering services.*

**Response:**

### 3.4.4 Hosted Services

NYCWiN offers dedicated hosting of services and applications to the City and its agencies. Hosting is provided on Windows or Unix/Linux blade servers providing both shared and dedicated infrastructure. The systems are designed and maintained to meet the same standards as the core network equipment and are backed up and monitored by the NOC. Technical services such as hardware and software setup and configuration, maintenance, hardware replacement, technical support, patching, updating and monitoring are included in the service provided.

*3.4.4.1 Can you provide all of the hosting services as described above? If not, please list the services you are unable to provide.*

**Response:**

*3.4.4.2 Describe your approach to providing the hosting services.*

**Response:**

*3.4.4.3 Describe your experience providing similar hosting services.*

**Response:**

### 3.4.5 Disaster Recovery and Business Continuity Services

Vendors are asked to provide experience in developing public safety grade disaster recovery plans and resiliency measures following industry best practices in environments similar to NYCWiN.

Particular areas of interest are:

*3.4.5.1 Provide a summary of the D/R plan testing methodology and standard support provided during tests.*

**Response:**

*3.4.5.2 What type of support is provided before, during and after a D/R test? Are there fees associated with this support?*

**Response:**

*3.4.5.3 Do you support remote access for both testing and recovery situations?*

**Response:**

*3.4.5.4 What additional fees may be incurred during testing or disaster recovery?*

**Response:**

*3.4.5.5 Do provide for coordination with commercial power utilities and other potential stakeholders?*

**Response:**

Please provide information on the type of services available for disaster recovery services. Particular areas of interest are:

*3.4.5.6 What support services are contractually guaranteed at time of disaster?*

**Response:**

*3.4.5.7 What services are provided as part of the standard contract?*

**Response:**

*3.4.5.8 What services are available for an additional fee?*

**Response:**

*3.4.5.9 What alternative service options are available in case of outages (COWs, etc.), and is there a fee?*

**Response:**

Please provide information regarding multiple declaration and regional disaster support. Particular areas of interest are:

*3.4.5.10 Is there a policy on regional disasters or multiple, simultaneous disasters when more than one subscriber invokes a disaster declaration?*

**Response:**

*3.4.5.11 How do you assign priority of access to your customers and in particular public safety users due to over-subscription?*

**Response:**

*3.4.5.12 Describe your approach to providing disaster recovery, resiliency and continuity of operation services.*

**Response:**

*3.4.5.13 Describe your experience providing similar disaster recovery, resiliency and continuity of operation services.*

**Response:**

*3.4.5.14 Product Development Services*

The vendor must be able to support efforts that include the development of software and hardware prototyping and development in response to City or agency requests as well as support efforts to keep the current product sets viable.

*3.4.5.15 Can you provide all of the product development services as described in Section 3.4.6? If not, please list the services you are unable to provide.*

**Response:**

*3.4.5.16 Describe your approach to providing the product development services.*

**Response:**

*3.4.5.17 Describe your experience providing similar product development services.*

**Response:**

*3.4.5.18 Contract Administration and Order/Proposal Development*

The vendor must support contract administration functions which include, but are not limited to the review, evaluation and approval of contract change orders, amendments and addendums, and provide coordination with City purchasing staff, legal counsel, and outside entities as necessary. Contract administration will work closely with the City in the development of orders and proposals for new applications, hardware, and services to provide agencies with the means necessary to operate more efficiently and to provide services outside the scope of the NYCWiN contract.

*3.4.5.19 Can you provide all of the services for developing internal orders for products and services as described above? If not, please list the services you are unable to provide.*

**Response:**

*3.4.5.20 Can you provide all of the services for developing proposals as described in Section 3.4.7? If not, please list the services you are unable to provide.*

**Response:**

*3.4.5.21 Describe your approach to providing internal orders and proposal development services.*

**Response:**

*3.4.5.22 Describe your experience providing similar internal orders and proposal development services.*

**Response:**

3.4.6 Pricing and Costs

*3.4.6.1 Please provide a rough order of magnitude (ROM) cost for transfer of users and services, other costs and, if applicable, tiered services, to a wireless public carrier or carrier-like service:*

**Response:**

### 3.5 Recommendation

*3.5.1.1 Please provide your recommendation on which operational model the City should implement and include rationale for your recommendation.*

**Response:**

*3.5.1.2 Also, describe the benefits and risks of each model in terms of cost, schedule, resiliency, etc.*

3.5.1.2.1 Please provide your opinion on the pros and cons of NYC owning the network.

| City-owned Network | |
|---|---|
| **Benefits** | **Risks** |
| | |
| | |
| | |
| | |
| | |

3.5.1.2.2 Please provide your opinion on the benefits and risks of NYC transitioning to a hosted network.

| Hosted Network | |
|---|---|
| **Benefits** | **Risks** |
| | |
| | |
| | |
| | |

3.5.1.2.3 Please provide your opinion on the benefits and risks of NYC transitioning to a public carrier based design.

| Public Carrier Network | |
|---|---|
| **Benefits** | **Risks** |
| | |
| | |
| | |
| | |

### 3.6 Other Viable Operational Models

The City of New York is interested in receiving information regarding other viable operational models for NYCWiN services. The description of any additional operational model(s) should meet the requirements set forth in Section 2 of this RFEI and should fully detail all of the proposed services along with any pricing/costs estimates. Please provide a response for each additional viable operational model that should be considered.

**Response:**

*3.6.1.1 Please provide your opinion on the benefits and risks of other viable operational models.*

| Respondent Option | |
|---|---|
| **Benefits** | **Risks** |
| | |
| | |
| | |
| | |

### 3.7 Innovative Uses of NYCWiN

Please provide recommendations to develop and expand upon the citywide broadband infrastructure and to improve access to high-speed Internet for residents and visitors.

The City is especially interested in solutions that could leverage the 379 NYCWiN sites, with close to complete coverage of the City's 305 square miles, to provide municipal Wi-Fi with a lower implementation cost as well as other services that will benefit communities, residents, and visitors. Responses should include thoughts on financial and technical sustainability of the proposed network. Creative financial models that reduce the City's implementation and operating costs are encouraged.

Response:

### 3.8 Other Comments

The questions asked in the preceding paragraphs are not intended to limit the comments that may be submitted.

**Response:**