# Network Design Overview

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The awarded Vendor for this project is required to meet the following equipment and service requirements, providing detailed pricing for each requirement in the quote submission:

* **Network Equipment Feature Requirements** - All equipment and related accessories must satisfy the Network Equipment Feature Requirements specified in this document.
* **Cabling Requirements** - The Vendor will be responsible for providing a detailed design and scope of work for all required cabling.
* **Internet Connection Requirements** - The Vendor will calculate and justify bandwidth requirements and procure an appropriate backhaul internet connection.
* **Network Performance Requirements** - The network must meet the specified minimum network performance thresholds.
* **Configuration and Installation Requirements** - The Vendor will configure and install all equipment to ensure proper implementation.
* **Post-Installation Field Test Requirements—Before** the network is accepted, The Vendor must perform and pass a post-installation field test to verify the performance of the installed solution.
* **Support and Maintenance** **Requirements** - The Vendor will maintain and actively monitor the network to detect, provide support for, and resolve any interruption of service.
* **Project Management Requirements** -The Vendor must provide project management services to lead the installation process.

A comprehensive plan or outline of the hardware, software, and support components of a Vendor's Wi-Fi solution will be delivered as a Network Design Overview.

To be considered for an award, the network design overview must describe in detail how the proposed solution meets all the requirements listed in the **Network Requirements** section.

In preparing the Network Design Overview, the Vendor must accurately provide network diagrams, survey photos, a predictive W-Fi survey and describe the location of key equipment and infrastructure, including any equipment located in non-public space, such as inside individual residential units.

The document must include in detail any unique or innovative aspects of the proposed solution and any potential challenges or risks that may impact the implementation or operation of the network. Responses must also include a detailed description of network support.

By providing a clear and detailed Network Design Overview, the Vendor can demonstrate their expertise and capability in delivering a W-Fi solution that meets the specific Network Design Requirements while minimizing costs and maximizing performance.

By submitting a quote, The Vendor attests that the design and equipment solution provided will meet the service level specifications in the **Network Performance Requirements** section. The vendor is fully responsible and financially liable for any design, equipment, or other alterations necessary for the solution to meet the service level requirements.

# Network Requirements

Applicants must submit a network design and project narrative with enough detail to confirm that it will meet the minimum network requirements of the program as outlined below.The Vendor is free to propose any solution that meets the following criteria:

**Network Equipment Feature Requirements**

* All wireless access points must be a minimum of W-Fi 6E with 6 GHz support.
* The solution must include a cloud-based centralized management system.
* The W-Fi network equipment must be able to support:
	+ Multiple Individualized/Private Pre-Shared Keys such as DPSK, ePSK, PPSK, iPSK, or others that provide unique logins for subscribers utilizing WPA/WPA2/WPA3 and do not require captive portal technologies
	+ Isolated private VLANs for each unit
	+ Captive Portal with individual logins and isolated networks for each unit
	+ Guest access with client isolation
	+ User account creation and management
	+ Network report generation that includes:
		- Device information
		- Application usage statistics
		- Network performance statistics
		- User/Guest login information
		- Safeguards are in place to ensure no collection of users’ personally identifiable information or, when required, that it is stored securely
* The networking equipment must include the ability to monitor and filter incoming and outgoing network traffic, including:
	+ Malicious traffic
	+ Malware
	+ Peer-to-peer file-sharing traffic

**Cabling Requirements**

* The Proposal must include a detailed cabling scope of work, including:
	+ Detailed wiring diagrams illustrating proposed locations of all cabling, network closets, access point placement, and any other equipment.
	+ Itemized material requirements.
	+ Itemized labor requirements.
	+ Detailed task breakdown
	+ Detailed timelines
	+ All cables must be tested and certified for performance.
	+ All cables must be properly labeled.
	+ A post-installation wiring diagram must be provided.

**Internet Connection Requirements**

* + The proposal must include an appropriately sized enterprise internet backhaul service.
		- Properties with 50+ units require at least a 1 gigabit (GB) symmetrical Internet service installed by enterprise-level ISP.
		- If the Vendor proposes a non-fiber internet backhaul technology, they must also include at least two quotes for fiber backhaul for comparison.
		- The Vendor must provide a detailed justification for the selected backhaul service bandwidth capacity, including calculations and factors considered.
	+ The Vendor must provide the necessary tools or processes to be compliant with all federal, state, and local statutes and regulations, including the Digital Millennium Copyright Act (DMCA) and the Communication Assistance for Law Enforcement Act (CALEA);

**Network Performance Requirements**

* + Signal Strength
		- Network signal strength must be at or above -65 dBm in all living areas of each unit and all common areas.
	+ Signal-to-Noise Ratio
		- The network signal-to-noise ratio must be at or above 25 dB in all living areas of each unit and in all common areas.
	+ Data Rate
		- Data rates must not fall below 100 Mbps download or upload per wireless client.
	+ Packet Loss
		- The Vendor must demonstrate a relative packet loss of less than 2% across the entire network over a 10-minute timeframe.
	+ Latency
		- The latency from client wireless devices to the ISP first hop router must be less than 20 ms.
	+ Throughput (max)
		- The Vendor must demonstrate through a heatmap the theoretical maximum net throughput (excluding overhead) per location, given ideal circumstances.

**Post-Installation Field Test** **Requirements**

* After the W-Fi service has been installed and configured, the Vendor will conduct field testing to verify network coverage and performance compliance at the user level.
* The network health indicators in the **Network Performance Requirements** section must be cataloged and reported at six locations provided by the building management.
* A report that includes a heatmap demonstrating the required network health indicators have been met must be generated.
* The final payment will be released only after the field test confirms that the network meets all technical requirements. If the Post-Installation Field Test detects any deficiencies in the Vendor’s design, equipment, or other issues that prevent the network from meeting the service requirements, the Vendor has thirty days to remediate the deficiencies at no cost or undue burden. Any assumptions, requirements, or caveats the Vendor requests must be stated in the Vendor’s response.

**Support and Maintenance** **Requirements**

* + The network solution and support services must fulfill all the requirements listed below. The Vendor should provide a detailed description of the services included in their support package.
		- * The system must be actively monitored by a network operations center 24/7/365, including holidays.
			* The W-Fi service must be consistent, reliable, and maintain at least 99.9% uptime.
			* Must provide monthly reports demonstrating that the service level agreement metrics in the **Network Performance Requirements** section continue to be met.
			* The Vendor must provide technical support 7 days a week.
			* The proposal must describe communication methods (e.g., phone, email, chat) and their availability to be accessible to users for reporting and staying informed about technical issues.
			* The proposal must describe the communications methods that will be used to keep the building owner informed about the implementation of and maintenance of services.
			* The service will have no user data caps or throttling unless otherwise directed by the building owner.
			* In the event of a network outage, the Vendor must provide interruption of service response time within 4 hours, and remediation must occur within 24 hours.
				+ For incident response that requires remediation, the vendor will provide unlimited onsite support.
				+ If the Vendor fails to remedy the service issue within this period, prorated credits will be applied to monthly charges.
			* The Vendor must provide the timely installation of security and system patches to all managed systems with minimal resident disruption to ensure the network is properly managed and maintained. The expected routine maintenance hours necessary must be included in annual support costs.
			* The proposal should include an explanation of how the Wi-Fi network will be able to scale to meet future demands as well as a proposed technology refresh plan that includes a proposed timeline.

**Project Management Requirements**

* + The Vendor selected will be required to project manage all work in collaboration with ISPs, cabling, construction, and all other relevant parties to ensure a timely installation.
	+ The Vendor is expected to be the single point of contact and communicate directly with other providers to align the timelines for installing the network.
	+ The Vendor will ultimately be responsible for verifying the quality of all parties and ensuring a high-performing network.