SECTION 272134

VIDEO COMMUNICATIONS – OUTDOOR WIRELESS ACCESS POINTS

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**NOTE TO SPECIFIER**

**\*\*This specification section can only be used with a written approved deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.**

The intent of the specification is to provide a wireless connection to video cameras that need to be positioned in a remote location, away from the main building, and where the cost to trench is significant and/or the trench would be need to cross a canal, body of water, tunnel, or contaminated brownfield. When needed, use this section in conjunction with Section 282305 - Integrated Security and Investigative Platform (ISIP) CCTV System.

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 3 Specification with primarily required text; therefore, most of the text cannot be edited, but there is editable text which is noted within the Section with a “Note to Specifier.” Do not revise the required paragraphs without an approved Deviation from USPS Headquarters, Facilities Program Management, through the USPS Project Manager.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
	1. SUMMARY
		1. Section includes the following:
			1. This section specifies the requirements for an outdoor wireless mesh network solution connected to the postal service network and consisting of outdoor access points, dual band omni directional antennae and wireless controllers to extend Wi-Fi coverage to remotely located standard network IP cameras.

* + 1. Related Documents:
			1. The Contract Documents, as defined in Section 011000 - Summary of Work, apply to the Work of this Section.
			2. USPS Structured Cabling System Best Practices, 01 October 2022.
			3. Additional requirements and information necessary to complete the Work of this Section may be found in other Documents.
			4. Cisco Aironet 1570 Series Outdoor Access Point Hardware Installation Guide <https://www.cisco.com/c/en/us/td/docs/wireless/access_point/1570/installation/guide/1570hig.pdf>
			5. Cisco Wireless Mesh Access Points, Design and Deployment Guide, Release 8.0 <https://www.cisco.com/c/en/us/td/docs/wireless/technology/mesh/8-0/design/guide/mesh80.html>
		2. Related Sections:
			1. Section 078400 – Fire stopping.
			2. Section 260500 – Common Work Results for Electrical.
			3. Section 270500 – Common Work Results for Communications.
			4. Section 271100 – Communications Equipment Room Fittings.
			5. Section 271300 – Communications Backbone Cabling.
			6. Section 271500 – Communications Horizontal Cabling.
			7. Section 282305 – Integrated Security and Investigative Platform (ISIP) CCTV System.
		3. Coordination:
			1. Coordinate all phases of the installation with the A/E, USPS Raleigh Telecommunication Services Wireless Team, Local IT, US Postal Inspection Services, the USPS CCTV Direct Vendor, and local onsite USPS management.
	1. REFERENCES
		1. Specified in Section 270500 – Common Work Results for Communications.
	2. DESIGN REQUIREMENTS
		1. Wireless Solution
			1. The wireless solution shall be a USPS approved “Cisco Aironet Outdoor Wireless Mesh Network” system delivering 802.11 ac Wave 1 performance and consisting of #AP1572 EAC outdoor access points, #ANT2568VG omni-directional antennae, #CT3504-K9 wireless controllers with #3504-RMNT rack mounting kits, associated software, licenses and accessories (or current replacement or successor equipment as technology continues to make rapid advancements). The wireless solution shall be compatible with all major camera manufacturers.
			2. Duplicate wireless controllers complete with dedicated power supplies and associated rack mount hardware shall be furnished to provide complete redundancy should a controller fail.
			3. The wireless controllers will require a Cisco software license: #LIC-CT3504-*X*A (replace “X” with the number of AP’s installed).
			4. Note that the locations of the outdoor access points and antennae require unobstructed, line-of-sight paths for proper video transmission.
			5. Approved requests for wireless services must be supported with a Telecom Expense Management (TEM) request (<http://tem.usps.gov/>) and submitted by the USPS Project Manager. After receiving the necessary approvals and funding, support shall be provided by the USPS Telecom Wireless Team - Wireless Network (WAP, Work Group Bridges, eTouch) Group.
		2. Cabling infrastructure
			1. The cabling from building mounted WAP’s or RAP’s located within 295 feet of their controllers shall be category 6 type. Cabling exceeding 295 feet (total horizontal and vertical length) shall be 2-strand, LOMF, OM4 armored fiber cable.
		3. Power options:
			1. AC: 100 to 277 VAC, 50/60 Hz.
			2. DC: 10 to 16 VDC.
			3. PoE Input: UPoE Compliant PSE. PoE with Cisco #AIR-PWRINU 1500-2.
			4. PoE Output: PoE+ (802.3at).
		4. Power requirements:
			1. The outdoor access point is to be powered from a continuous 24/7, 120 VAC or 12 VDC power source.
				1. The digital fixed camera (installed in conjunction with the access point) will be powered from the Wireless Access Point “WAP” using the “PoE output” and outdoor rated Cat 6 cable.
			2. All electrical power sources must be suitable for this exterior application and dependable under all operating conditions to support 24/7 video surveillance.
				1. Electrical 120 VAC circuits powering the WAP’s and cameras shall be served from dedicated, key-operated, lockable, circuit breakers. Adjacent WAP’s must be wired to separate dedicated circuits to avoid total loss of all WAP’s and cameras should a single circuit breaker fail and lose power.

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**NOTE TO SPECIFIER**

The origin of the power source will vary based on site conditions. New construction shall utilize dedicated 120 VAC circuits and hardwired final connections to serve the outdoor WAP’s and cameras. Existing remote sites requiring video surveillance may choose to utilize the existing circuits serving the site lighting luminaires to power the WAP’s and cameras. Select paragraphs 1.3 D.3., 1.3 D.4. and 1.3 D.5. accordingly.

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* + - 1. Hardwired electrical power connections are required to support the WAP and associated exterior fixed camera. A toggle type switch contained within a NEMA 4 box shall be provided at the “WAP” to disconnect the 120 VAC input power to the access point.
			2. Outdoor access points and exterior cameras are to be strap mounted to the existing site lighting poles and shall be powered from the existing continuous 120 VAC or 277 VAC site lighting circuit (luminaire mounted photo sensor, receptacle type).
				1. The outdoor WAP shall be powered from the existing site lighting circuit utilizing the “streetlight power tap” adapter and “AC/DC power” adapter (Cisco #AIR-PWR-ST-LT-R3P).
				2. Cord and plug connection shall be equipped with watertight boot.
			3. Outdoor access points and exterior cameras are to be strap mounted to the existing site lighting poles and shall be powered from the existing non-continuous, 120 VAC or 277 VAC site lighting circuits (time controlled site lighting circuits or circuits centrally controlled by a common photo sensor that are powered during night time hours only).
				1. The outdoor WAP shall be powered from the existing site lighting circuit utilizing the “streetlight power tap” adapter and “AC/DC power” adapter (Cisco #AIR-PWR-ST-LT-R3P).
				2. Cord and plug connection shall be equipped with watertight boot.
				3. WAP’s and cameras to be powered from non-continuous site lighting circuits must be provided with continuous power bridges and battery power supplies to provide continuous 24/7 operation.

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**NOTE TO SPECIFIER**

WAP’s and cameras located remote from the main building, where the cost to trench is significant or where the area to be trenched spans a canal, body of water, tunnel or contaminated brownfield can be equipped with a solar power source to provide the required 24/7 continuous power. Utilize paragraph 1.3 D.6. when a solar source is required.

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* + - 1. The outdoor access points and exterior cameras cannot be directly powered from a 120 VAC or 277 VAC power source. These WAP’s and cameras shall be powered from a continuous, 24/7 solar power source with battery reserve. The WAP shall be powered with 12 VDC input and equipped with “DC” rated, watertight, exterior, cable assemblies.
	1. SUBMITTALS
		1. The following submittals are due at the Pre-Construction Phase, in accordance with submittal requirements in Section 270500 – Common Work Results for Communications.
			1. Shop Drawings:
				1. Provide scaled drawings indicating location of outdoor access points, exterior cameras, controllers, antennae, power sources and locations of all pull points. These locations shall be field verified and coordinated with the USPS CCTV Direct Vendor and the US Postal Inspection Service. Placement shall support and align with 24/7 video surveillance equipment placed in an exterior environment and all proposed locations must inhibit public access and/or tampering.
		2. The following submittals are due Post-Construction, in accordance with the submittal requirements in Section 270500 – Common Work Results for Communications:
			1. Record Drawings.
				1. Provide scaled AutoCAD and PDF drawings indicating actual location of the outdoor access points, controllers and antennae as well as the actual routing of the installed cable, conduits and locations of all pull points. Design or shop drawings with field notes will not be accepted.
1. PRODUCTS
	1. GENERAL
		1. Raleigh Telecom Services Wireless Team will provide the outdoor access points and related equipment (antennae, PoE switches, patch cables, controllers) for the project.
		2. Typically used outdoor access point models are 802.11ac Wave 1 capable with data connection speeds up to 1.3 Gbps (@ 5 GHz) and operate on dual band, 2.4 and 5 GHz radio frequencies.
	2. POLE OR HORIZONTAL TUBE MOUNTING
		1. The Contractor shall provide mounting kits for the pole mounted access points.
			1. Access points to be vertically mounted on vertical poles with shaft diameters ranging from 2 to 6 inches shall be equipped with Cisco #AIR-ACCPMK1570-1 pole mount kits. Kit consists of a one-piece pole mount bracket and 2 adjustable steel band straps.
			2. Access points to be vertically mounted on vertical poles with shaft diameters ranging from 6 to 16 inches shall be equipped with Cisco #AIR-ACCPMK1570-2 pole mount kits. Kit consists of a one-piece pole mount bracket, a pivot bracket, 2 strap brackets and 2 adjustable steel band straps.
			3. Access points to be vertically mounted on horizontal tube supports (canopy structures, etc.) with shaft diameters ranging from 2 to 16 inches shall be equipped with Cisco #AIR-ACCPMK1570-2 pole mount kits. Kit consists of a one-piece pole mount bracket, a pivot bracket, 2 strap brackets and 2 adjustable steel band straps.
			4. The mounting bracket, mounting surface, attaching screws and anchors shall be provided to support a 50 lb. static weight.
			5. All mounts shall incorporate installer provided safety chain or cable of sufficient strength to support a 30 lb. static weight.
	3. WALL MOUNTING
		1. The Contractor shall provide mounting kits for the wall mounted access points.
			1. Access points to be vertically mounted on exterior walls shall be equipped with Cisco #AIR-ACCPMK1570-2 pole mount kits. Kit consists of a one-piece pole mount bracket, a pivot bracket, 2 strap brackets and 2 adjustable steel band straps. Note that the pivot bracket and the strap brackets, are only used for pole mounting.
			2. Appropriate mounting channels are to be provided by the Contractor.
			3. The mounting bracket, mounting surface, attaching screws and anchors shall be provided to support a 50 lb. static weight.
			4. All mounts shall incorporate installer provided safety chain or cable of sufficient endurance to support 2 times the weight of the equipment.
	4. LIGHTNING ARRESTOR
		1. Overvoltage transients can be created through lightning static discharges, switch processes, direct contact with power lines, or through earth currents. A lightning arrestor shall be provided at each outdoor WAP to limit the amplitude and duration of disturbing interference voltages and improve the overvoltage resistance of the components.
		2. Lightning arrestor shall be bonded to the “WAP” grounding electrode conductor using #6/AWG copper conductor.
		3. Basis of Design: Cisco #AIR-ACC245LA-N.

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**NOTE TO SPECIFIER**

Outdoor WAP’s powered from existing non-continuous, site lighting circuits require continuous power bridges to support 24/7 operation. Include Paragraph 2.5 accordingly.

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* 1. CONTINUOUS POWER BRIDGE
		1. Outdoor WAP’s and exterior cameras to be powered from non-continuous, 120 VAC or 277 VAC power circuits shall be equipped with continuous power bridges and battery power supplies to provide continuous, 24/7 video surveillance.
		2. Continuous power bridge shall be pole mounted below the WAP and camera and shall include the following:
			1. Enclosure
				1. 20.25 x 16 x 15 inches (H x W x D) / Weight 21 lbs empty.
				2. White powder-coated aluminum.
				3. Pole or wall mounting.
				4. Stainless steel locking, adjustable hasps.
				5. Stainless steel hinge.
				6. Convection cooling.
				7. Cable access glands located at bottom.
			2. Electronics
				1. Charge controller.

Multi-Stage, temperature compensated.

90 to 305 VAC input.

-20C to 70C operating temperature.

Transient surge protection.

35A maximum output.

40 Watt maximum load.

* + - * 1. Fuse, nominal 12 VDC output.
				2. Hydraulic magnetic circuit breakers for AC and Battery.
				3. All components prewired.
				4. Heavy duty aluminum enclosure backplane and earth ground.
			1. Battery Array
				1. 2,376 Wh (12 VDC, 198Ah at C20) / Weight 140 lbs.
				2. Battery array wired nominal 12 VDC.
				3. Sealed Gel VRLA.
				4. All wiring provided with connectors attached.
			2. Power Requirements
				1. 120 VAC / 277 VAC input.
				2. 40 Watts at 12 VDC output.
			3. Accessories
				1. Low voltage disconnect.
				2. Battery heater and blankets (cold weather climates below -20C).
			4. Warranty
				1. 5 Year factory warranty (full parts and labor).
		1. Basis of Design: Solis Energy CPB12410-312-E; Altamonte Springs, FL (407) 339-6786; [www.SolisEnergy.com](http://www.SolisEnergy.com).

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**NOTE TO SPECIFIER**

Include Paragraph 2.6 below when a solar power source is to be provided.

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* 1. SOLAR POWER SOURCE
		1. The solar power source shall be sized based on the geographical area of the site and shall provide continuous, 24/7 power to the WAP and camera.
		2. The solar power source shall be pole mounted below the WAP and camera and shall include the following:
			1. Solar Array (Dependent on Geographic Location)
				1. Minimum 300 Watts power max.
				2. Minimum 17 Volts power max.
				3. Wired nominal 12 VDC.
				4. Prewired with locking plug-in connectors.
				5. Minimum size 46.75 x 52.6 inches (L x W) / Weight 26.5 lbs.
			2. Solar Mount (per Wind Loading Requirements)
				1. Side of pole with high wind brace.
				2. Adjustable from 30 to 60 degrees.
				3. Heavy duty aluminum with stainless steel hardware.
			3. Enclosure (Dependent on Geographic Location)
				1. Minimum 31.25 x 26.25 x 18.875 inches (H x W x D) / Weight 61 lbs.
				2. Heavy duty, white powder-coated aluminum.
				3. Pole or wall mounting.
				4. Stainless steel locking, adjustable hasps.
				5. Stainless steel hinge.
				6. Convection cooling.
				7. Cable access glands located at bottom of enclosure.
			4. Electronics
				1. Charge controller.

Multi-Stage, temperature compensated.

-40C to 60C operating temperature.

PV Protection: Overload, short circuit, high voltage.

Load Protection: Overload, short circuit.

Reverse Polarity: PV, battery, load.

Transient surge protection.

* + - * 1. Fuse, nominal 12 VDC output.
				2. Hydraulic magnetic circuit breakers for PV and Battery.
				3. All components prewired.
				4. Heavy duty aluminum enclosure backplane and earth ground.
			1. Battery Array
				1. 40 Watt maximum continuous load.
				2. (3) Day battery reserve.
				3. Battery array wired nominal 12 VDC.
				4. Sealed Gel VRLA.
				5. All wiring provided with connectors attached.
			2. Warranty
				1. 5 Year factory warranty (full parts and labor)
		1. Basis of Design: Solis Energy, “Solar Power Plant (SPP Series – based on specific site location)”; Altamonte Springs, FL (407) 339-6786; www.SolisEnergy.com.
1. EXECUTION
	1. EXAMINATION
		1. Section 017300 - Execution: Verification of existing conditions before starting work.
		2. Verification of Conditions: Verify that field measurements, surfaces, substrates, and conditions are as required, and ready to receive Work.
	2. INSTALLATION
		1. The access point is designed to be installed in an outdoor environment, such as atop of a roof with stairway access from below, on external walls and on vertical and horizontal poles, such as light poles or horizontal tube structures. The Cisco #1752EAC access point must be mounted in a vertical orientation and is to be equipped with 4 vertically mounted omni-directional antennae. Ensure the base of the unit (with the LED indicators) is visible from ground level.
		2. All unused connection ports of the access point shall be capped with a connector plug to ensure watertight integrity of the enclosure.
		3. Ensure access point is mounted in such a way that all antennae and console ports are accessible for future use.
		4. Install the access point in an area where structures, trees, or hills do not obstruct radio signals to and from the access point.
		5. The access points shall be installed no lower than 10 feet AFG to avoid vandalism and no higher than 40 feet to allow support from the ground level. All access points shall be mounted at the same height.
		6. The minimum placement height shall support and align with the associated video surveillance camera equipment. Proposed locations must be situated to inhibit public access and/or tampering.
	3. GROUNDING
		1. The outdoor access point shall be grounded per the manufacturer’s recommendations.
			1. Pole mounted access points shall be bonded to a driven 3/4-inch x 10 foot copper clad ground rod using #6/AWG copper ground conductor and an exothermic weld. Those access points mounted on site lighting poles shall be bonded to the light pole ground rod; a separate ground rod is not required.
			2. Wall mounted access points shall be bonded to a driven 3/4-inch x 10 foot copper clad ground rod using #6/AWG copper ground conductor and an exothermic weld. The wall mounted access point shall also be bonded to the interior structural steel of the building using a #6/AWG copper ground conductor and bronze clamp. Exterior wall penetrations shall be sealed to avoid water intrusion.
	4. GENERAL
		1. Install the wireless mesh system using Postal-supplied Cisco Access Points and Postal or national contract-supplied IP Cameras. Provide wiring from the Main Network Room to the Root Access Point (RAP) on the building or structure and provide suitable power connections to the RAP. Coring through exterior walls and sealing of disturbed areas shall be included. USPS IT and USPS CCTV Direct Vendor will provide programming support.
		2. Outdoor access points are furnished by Raleigh Telecom Services Wireless Team and installed by the Contractor. The Contractor shall install and complete the necessary mounting assemblies prior to the attachment of the outdoor access points.
			1. Contractor shall provide pole or wall mount kits, mount the access points and antennae, complete appropriate final connections and provide suitable power provisions for a complete and operational outdoor wireless mesh CCTV network.
			2. Refer to Cisco mounting details and hardware installation guidelines contained on Cisco website.
		3. The wireless controller shall be secured within the structured cabling system main cross connect (MC) or horizontal cross connect (HC) equipment racks as approved by US Postal Inspection Services. The USPS Raleigh Wireless Team will determine final location after performing the initial site survey.
		4. Electrical 120 VAC circuits powering the WAP's and cameras shall be served from dedicated, key-operated, lockable, circuit breakers. Adjacent WAP's must be wired to separate dedicated circuits to avoid total loss of all WAP's and cameras should a single circuit breaker fail and lose power.
		5. Wireless Spectrum Survey shall be performed by the Raleigh Wireless Team after installation to validate the wireless design.

END OF SECTION

USPS MPF Specification Last Revised: 10/1/2022