

Schedule B: Scope of Work - WildfireLive Utah Fire Camera Network

Contractor shall maintain (through WISP partners) and operate the WildfireLive (WFL) camera network in Utah hosted on the AlertWildfire.org website to provide state-of-the-art early fire confirmation and situational awareness HD camera technologies for reduction of wildfire risk. PacifiCorp will benefit from technologies that are currently being developed and integrated into the WFL platform, e.g., AI event detection algorithms, improved lightening maps, map based location determination, and ongoing initiatives to combine fire camera data with satellite, air borne, and ubiquitous public videos for near-real time estimates of the fire front locations and predictive fire behavior modeling. To the degree that 3rd party 'licensed applications' may be integrated into the detection/response system there may be use restrictions for those applications. Additionally, recent software developments have improved hand-held remote device camera controls and real-time video displays. PacifiCorp will receive updates and improvements to the system as technical innovations are developed through any WildfireLive and ALERTWildfire sponsor partners. There may be restrictions on potential licensed applications; WildfireLive is currently working with range of commercial applications developers.

Software Operation, Maintenance, and Improvement:

Contractor is responsible for operating and maintaining camera systems and improving operations in interactions with PacifiCorp, to include software and supporting systems using quality workmanship that meets or exceeds industry standards. The Pan Tilt Zoom ("PTZ") near-infrared Axis cameras are configured for control by PacifiCorp and/or fire response personnel who shall have the ability to control the cameras. Cameras shall be designed and fabricated in a manner that provides a near-360° view-shed (depending on physical limitations at a particular site).

Contractor shall select and be responsible, in coordination with tower owners, for obtaining all rights needed to attach, operate and maintain the cameras on non-Company owned or leased towers with a focus on expediting camera installations while minimizing on-going Operations, Maintenance, and Improvement (OMI) costs to Company. Contractor shall coordinate with Company to optimize control of the cameras. Sufficient bandwidth capabilities will be provided by WISP subcontractors to ensure at least 1 picture frame every 10 seconds, and where possible every second, at full 1920 x 1080p (two megapixel) resolution using a jpeg compression of 30%. All technologies used shall be configured, in coordination with the Company, to enable any planned scalability to achieve improved coverage fire threat areas in Company's service area.

Camera Access and Storage:

All acquisition data feeds and image storage shall be entirely administered by Contractor. Company will not store any data and there shall be no direct acquisition feeds to/from Company. Company personnel and Company approved Local Fire Responder Agencies shall have the ability to control the cameras via a secured password through a proxy server and will have the ability to pan, tilt, and zoom the PTZ camera for early fire confirmation, situational awareness, and in extreme events to sequence evacuations. All user access to camera is through a proxy

server with encrypted user information. New software and hardware advances will provide Company 'control' of the HD PTZ cameras for remote observation (i.e., "LiveView"). "LiveView" is enabled with direct access to camera controls and provides instantaneous image updates; "LiveView" uses all bandwidth available on the circuit and is discouraged in normal use but may be valuable during emergency situations. All camera access via the proxy shall be secured and encrypted. Company will provide list of individual users and Company must approve all requests from third parties for access to control the PTZ cameras. WildfireLive shall administer requests for access within one business day of receiving a request. Software shall record the identity of the user who last performed a specific camera action. Users who have permission to move cameras shall be identified by 'user group' (e.g., USFS, BLM, State Fire personnel, Company, County Fire Departments) and 'user name', which shall be displayed and updated on the image banner when the camera is accessed and moved. The 'user name' is permanently embedded on video frame images where it is retained in the image archive. All functionality shall be available on both PC/Mac and mobile platforms, including Android and iOS.

The public shall have the ability to view the cameras via the Amazon Web Services cloud-based website and perform 15-minute to 12-hour time lapse, triangulation, and zoom. The enclosed map on the website provides current camera view-shed estimates, direct map access web-based camera services (e.g., time-lapse) and a 'valuable' current lightning heat map for remote fire-start reconnaissance. The public shall not have control of the cameras. All public data shall be deleted from the cloud buffer used for website presentations after 12 hours.

Using the acquired picture frames, one-hour movies shall be produced at the highest frame rate possible. After 30-days, the data are downsized (movie frame rate reduction) to 10 second video frames and stored throughout the duration of the contract on WildfireLive storage systems. PTZ camera data frames shall be recorded on Linux servers housed at a minimum of two secure data center locations, for data redundancy and recovery. Using the frames, one-hour movies shall be produced at the highest frame rate possible. Company will have password access to the archived data (i.e., frames, movies) stored on the Linux servers. Web services for archive access is in development, and Contractor may move data to a cloud-based service, so long as Company continues to have password access.

Contractor shall design secure infrastructure and network traffic flows with sufficient capacity to handle large increases in Internet traffic associated with significant events (i.e., accelerated website 'hits') that may drastically increase network traffic. Website implementation on Amazon AWS S3 is designed to scale with large swings in website demand and has thus far supported large traffic loads in California and elsewhere. This was first tested during the December 7, 2017 Lilac fire near San Diego, where the website quickly served 350 GB of outgoing data. Even greater scalability was required during the 2019 Kincade Fire in Sonoma County. The Contractor emphasizes this capability during these times as the public is most concerned about egress during potential evacuation. However, complex systems such as those utilized by WildfireLive can be prone to scaling issues, and WildfireLive is not responsible for maintaining 100%, 24/7 uptime of all systems and capabilities in cases of extreme internet traffic

or other downtime resulting in the normal operations of complex data systems.

Wireless Internet Service Providers (WISP) Subcontractor Management Services:

Primary physical camera installation, maintenance and data circuits are secured through subcontracts with WISPs. WISPs are regional Internet service providers offering standard Internet services to the home-based public, commercial businesses, and local/state/federal agencies. WFL negotiates agreements for camera installation and maintenance obligations and works directly with WISP technical personnel to establish and secure dedicate IP circuits from their private networks to WFL private systems. In nearly all cases, WISPs have one-point-in to their entire inventory of towers, microwave links and data systems. WISPs control their internal networks, whereas WFL establishes the optimum/desired secure connectivity protocols, with WISP technical staff. This may require a simple VPN, port-forwrd connection or a secure hardware solution (e.g., IPSEC routers). Once in place, the WISP is responsible for camera data flow from the camera tower site to the WFL connectivity point. Tower installation require tower-climbing or crane to install the camera with optimum view-shed. WISPs assume responsibility for physical camera systems owned by PacifiCorp. WFL works directly with the WISP in camera kit installation training and assuring reliable connectivity to the physical camera through the secure connection. WISPs carry sufficient insurance coverage for customer services. WISP agreements, to be negotiated, include all maintenance and break/fix terms here. WFL will handle ongoing bandwidth service payments according to terms of WFL-WISP agreements.

For new regional fire camera implementations there is a range of activities to establish secure reliable data transfers from WISPs. These include, but are not limited to, establishing and through testing of secure connectivity protocols, camera configuration, additions to public web pages, testing camera connectivity and controls, database additions for time-lapse and archive, and proxy database modifications.

Break/Fix:

Contractor shall provide real-time health monitoring for all installed cameras, network equipment and software and miscellaneous support systems and shall dispatch on-demand break/fix and calibration services for inoperable or malfunctioning units within one-business day whenever possible as the target goal (e.g., weather specific windows can cause longer delays; fires could restrict access; other natural or man-caused events can cause delays) in identifying issues or receiving a request for service from Company.

Maintenance, Up-Time and Resiliency:

Contractor shall design, operate and maintain all hardware, network and software technology to ensure maximum up-time and Contractor shall respond in one-business day to service any inoperable or malfunctioning units or as soon thereafter as reasonably possible under the circumstances.

Training:

Contractor shall provide initial and ongoing training for Company and first responder personnel in each region and/or jurisdiction to ensure all operators have sufficient knowledge as to how to access and use the fire camera system interface. The initial training class will be held at Company's control center, or on-line, and will be conducted when needed. Ongoing training classes will be performed as requested by Company, Fire Responders and Risk Reduction departments and to approved fire agency partners. Contractor will provide training to WISP partners for camera installation and coordination in ongoing operations.

Machine Learning:

Research in machine learning (e.g., Artificial Intelligence (AI) early fire detection) is ongoing and will be provided with new software releases when functional and when available under terms of any 3rd party license agreements. Contractor is also responsible for installing and configuring any software upgrades developed through these ongoing research initiatives, also for use by PacifiCorp. As with all research initiatives, extensive testing is required for utility and value of any new technology. We encourage Company personnel to participate in assessment and recommendations on innovations. Intellectual Property protection will be assured prior to roll-out of new technologies.

Budget Explanation

Software maintenance, operation costs and software upgrades during the course of the contract for the cameras is included in pricing (i.e., when significant improvements are implemented these will be implemented for PacifiCorp as well). This critical piece of the data management ALERTWildfire/WildfireLive system, includes proxy server software, custom software to poll cameras to harvest data images, network(s) configuration, secured data transmissions from cameras to WildfireLive datacenters, website research, support and development, Amazon Web Services software infrastructure.

Cybersecurity Requirements

- 1) Alert Wildfire will confirm that email sent on behalf of the service or the Business must be signed by a DomainKeys Identified Mail (DKIM) 2048 bit key, must pass a Sender Policy Framework (SPF) check, and must support Transport Layer Security (TLS). Supplier to confirm and provide technical details on email security.
- 2) Alert Wildfire to provide technical details of patch management procedures as they pertain to proposed service.

Schedule C: Services - WildfireLive - Cameras and Data Operations**DESCRIPTION OF PROCUREMENT ACTION / PROJECT SUMMARY:**

Procure complete packages of high definition cameras from ALERT Wildfire Systems (dba Wildfire Live), to be operated in the ALERT Wildfire network for the primary purpose of confirmation and/or detection of a wildfire that can facilitate a more rapid and better scaled suppression response. A camera package includes purchase of the “camera kit” itself, installation of the camera and associated equipment, and three years of services, both camera- and wireless-Internet service provider (WISP)-related, as detailed in this scope of work. After purchase and installation, PacifiCorp shall have title to the “camera kit”; following installation, ALERT Wildfire Systems will be obligated to provide the services detailed in this scope of work.

PROJECT SCOPE/SERVICES:

ALERT Wildfire Systems is responsible in conjunction with WISP partners to acquire and install the camera kit, so that the camera is fully functional at a location designated in a specific Release. For a period of three years from the date of installation, ALERT Wildfire Systems will maintain the camera with full functionality and is responsible to provide the following services:

Camera Installation and Operation:

- Initial camera setup to include inspection, network configuration, and camera programming.
- Coordinate physical installations with WISP partners, including fabrication of mounting hardware, secure networking and necessary power system additions
- Assembly, instruction, and consulting for camera “kit” installation on WISP tower services
- Coordination with WISP for camera installation, networking, data throughput and data access
- Post-install camera configuration including image acquisition parameters; determination of camera bearing; camera view “presets” at compass points and/or user-requested targets; system troubleshooting
- Ongoing updates to camera firmware for security and/or upgrades to system capabilities
- Coordination with regional fire agencies; build effective community-based wildfire risk reduction network

Network Operations Services:

- Maintenance/upgrades of custom Command-and-Control software interface (Proxy) for direct camera access, User/Group administration, and camera event logging
- Work with WISP on initial set up/configuration of telemetry paths, including any additional hardware procurement, site installation, router programming, redundant links (where necessary), and network management, as required
- Coordination with client IT personnel to transmit camera data over confederated networks employing physical security devices, VPN tunnels, port-forwards, Network Address Translation (NAT), etc.
- 24/7 monitoring services for cameras, networking components, and real-time data streams via Nagios network management software; including automatic email and/or text alerts for critical system states

Data Acquisition and Management:

- Development, maintenance, and operation of custom image acquisition software on dedicated Linux Servers (LS)

- LS at several redundant Data Center (DC) locations – primary regional system infrastructure
- Image acquisition at the fastest possible/reasonable rate, striving for 1-frame/sec (FPS).
- Configuration and operation of “on-demand” time-lapse systems on dedicated LS and networking hardware at several DC locations for redundancy
- Configuration and operation of hourly time-lapse video generation on dedicated LS clusters at DC locations
- Standard DC redundancy, failover, and recovery systems to ensure fire camera systems are functional and data are available, irrespective of issues at any particular location
- Procurement and management of storage resources as needed, currently totaling over a petabyte (1000 terabytes) of camera imagery and video for the WildfireLive network. Data rates for current 650+ cameras are nearing 1G/sec.
- DC hardware resource management (data disks, operating systems, firmware upgrades and fixes as required)

Website Development and Maintenance:

- Contribution to the standardized, high-availability website for image data presentation – (maintain high performance; system standards) - bandwidth-scaled to adapt to high user demand while maintaining a fluent User Interface (UI) interaction
- Timely updates to the website for new cameras and additional view shed coverage
- Managed upgrades to the website UI to provide new features and an improved functional environment, updates to map tools and additional real-time information (upgrades may include: MODIS imagery, fire perimeters, fire weather (red flag boundaries), etc.)
- Continued support and upgrades for improved mobile devices performance extending WildfireLive services to mobile platforms and social media (ultimately a scaling issue as many cameras are added)
- Adding additional cameras to web site (Utah site will be under the Wildfire Live logo on the <http://www.alertwildfire.org> website)

Support Services:

- 24/7 assistance (on-call) during high-risk fire conditions
- 24/7 address system outages
- 7 days/week add new users/logins
- Current manuals and onsite training (at additional cost)
- Interactive/ongoing customer service environment for software/web-site enhancements and performance issues
- 24/7 interaction with camera users in the emergency response community for improve camera utilization

PacifiCorp will determine at three years after the cameras are installed whether or not it is beneficial to continue paying for the maintenance and services costs of these cameras and will either continue to pay the costs with O&M dollars or replace the cameras altogether under a new contract that includes cameras and services.

PacifiCorp may decide there is a need for additional cameras after completion of the 14 cameras listed on Exhibit E at a later date.

SCHEDULE D PRICING SCHEDULE:

Costs and Payment Schedule:

I. Due once Cameras are received by WISP and Ownership is transferred to PacifiCorp

<u>Item</u>	<u>Price</u>	<u>Quantity</u>	<u>Extended Price</u>
Camera, 2" candy cane pipe and clamps, 2 Lightning Protection Units, POE cable – Kit - <u>Delivery to WISP responsible for installation</u>	\$4,550	14	\$63,700
Installation Costs (pass through)	\$2,500	14	\$35,000
Software/Data Startup Costs (WISP negotiation, viewshed analysis, etc)	\$3,000	14	\$42,000

II. Ongoing costs that begin on each camera's startup date:Service Costs:

- Software-related per Camera Operations Cost (To be invoiced monthly in accordance with section 5.2 of the Agreement)
 - Year 1: \$7,500 (\$625 per month for first year)
 - Year 2: \$10,500 (\$875 per month)
 - Year 3: \$10,500 (\$875 per month)

WISP Costs:

- Internet Services
 - \$625 monthly per camera, 3 year total per camera: \$22,500
 - There may be additional tower rental fees on commercial towers, ranging in the \$100-\$300 per monthly (per camera site); some sites will incur no additional fees. Any such additional fees will be documented in the applicable purchase order for each camera.

III. MiscellaneousInvoicing:

- Additional costs for taxes and freight should be included as applicable on a separate line of the invoice according to the Standard Services Agreement section 5.1.
- Invoices are to be submitted according to the Standard Services Agreement section 5.2.