

City of Glendale
Glendale Water & Power

Wildfire Mitigation Plan



Version 1.0
November 27, 2019

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Document Information

Effective Date January 1, 2020

Version 1.0 – Initial

Supersedes Version n/a

Previous Version Effective Date n/a


Update Frequency Annually

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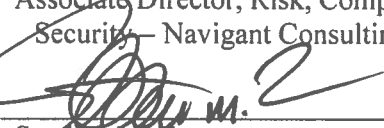


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Change Management

<i>Version</i>	<i>Description of Change</i>	<i>Change Initiator</i>	<i>Date</i>
0	Initial version	Darrell Hahn	01/15/2019
0.1	Includes Dan Scorza comments; language from Water, GPD, ISD; addition of Committee; add Draft watermark; add Executive Summary	Darrell Hahn	02/20/2019
0.2	Incorporate feedback from March 27, 2019 review meeting, April 25, 2019 meeting with Jeremy Cawn, emailed feedback from Committee, Gordon Arnold updates for ISD	Darrell Hahn	05/30/2019 07/03/2019 10/02/2019 10/18/2019
0.3	Incorporate feedback from Navigant, Atineh (public outreach)	Darrell Hahn	11/05/2019
0.4	Updates for VMP, incorporate feedback from Navigant	Darrell Hahn	11/20/2019
1.0	Updates to add Navigant report and minor changes per Navigant; accept all changes and finalize report	Darrell Hahn	11/27/2019



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Executive Summary

The City of Glendale and the Glendale Water and Power (GWP) Department recognize that the potential loss of property and human life posed by wildfires is a growing concern. On September 21, 2018, the state of California passed Senate Bill 901 (SB 901) to provide guidance to electrical utilities in mitigating the risk of wildfires ignited by the utilities' electrical assets, and to mandate electric utilities develop a plan to mitigate against wildfires.

GWP's Wildfire Mitigation Plan (Plan) details its two-pronged approach to mitigate wildfires, in which a "wildfire" requires two elements: ignition and spread.

WILDFIRE = IGNITION x SPREAD

If only one of these two elements is present, a wildfire does not result. Both ignition (a spark or other source of the initial fire) and spread (the fire is free-burning) must be present in order for a wildfire to occur.

GWP's wildfire mitigation efforts focus on 1) limiting the likelihood of ignition of localized fires from its assets and equipment, and 2) limiting the spread of localized fires into a wildfire. It is impossible to eliminate wildfires, but by reducing the likelihood of igniting fires and by containing any fires that do start, GWP's approach can significantly mitigate the risk of igniting and spreading wildfires while complying with SB 901 and other, related mandates.

To minimize the likelihood of ignition, GWP has adopted a risk-based methodology to prioritize mitigation of electrical assets that could ignite a wildfire in high-wildfire danger service areas of the City of Glendale:

1. Identify the areas of the City of Glendale that are at highest risk of igniting and spreading wildfires.
 - a. GWP has elected to use Cal Fire's Fire Threat maps, which show that approximately 62% of the City's total area is at an elevated risk of wildfires. The Glendale Fire Department has conducted its own wildfire risk assessment that validates the Cal Fire Threat maps.
 - b. Of the areas identified on these Fire Threat maps that are at an elevated risk of wildfires (namely, Tier 2 and Tier 3 zones), eliminate all areas where GWP has no electrical assets that could potentially ignite a wildfire. Where there are no GWP electrical assets, no GWP-initiated ignition is possible and no further wildfire mitigation is prioritized at this time.
 - c. Of the areas that remain, eliminate the areas where electrical assets reside within 100 feet of a private structure. The City of Glendale's Fire Department's robust Vegetation Management Program (VMP) requires homeowners to clear or manage hazardous vegetation within 100 feet of structures, reducing the intensity



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- and rate of spread of wildfires. Where the VMP limits the rate and intensity of spread, no further wildfire mitigation is currently proposed.
- d. By applying this methodology, GWP has developed a distilled map of the locations of GWP electrical assets requiring further mitigation. The land area under these electrical assets comprises approximately 0.47% of the City's total area. This map will provide guidance to prioritize wildfire mitigation efforts.
2. Determine the appropriate mitigating effort(s) at each of these remaining assets to reduce the risk of igniting or spreading wildfires, which may include one or more of the following potential solutions:
- a. Enhanced vegetation management;
 - b. Expanded asset inspections;
 - c. Fast-acting automatic protection schemes;
 - d. Use of non-wood poles;
 - e. Wider spacing on crossarms;
 - f. Stronger, composite materials on cross arms;
 - g. Conductor-spacing devices to minimize the likelihood of wire slapping;
 - h. Insulated "tree wire";
 - i. 24/7 monitoring of weather station data and HD cameras;
 - j. Move overhead conductors and assets underground;
 - k. Modify recloser settings during high-risk periods to minimize the likelihood of inadvertently reclosing in a high-wildfire risk area;
 - l. Proactive de-energization during high-wildfire risk periods.

The specific mitigating measure will depend upon the specific situation. GWP staff will evaluate each GWP asset (or logical group of assets) requiring further mitigation and evaluate all solutions based upon criteria like up-front and life-cycle costs, effectiveness in reducing risk, longevity, impact to reliability and serviceability, and alignment with long-term utility and City goals and priorities.

GWP metrics will evaluate the effectiveness of this Plan and of its wildfire mitigation, making adjustments to priorities and funding as appropriate to ensure continued successful mitigation.



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Definitions

Catastrophic Fire	See also Wildfire. A wildland or wildland urban interface fire with a fast moving front, extending over a large area (300+ acres) and/or highly destructive to lives, property or natural resources. ¹
Hazardous Vegetation	Refuse, grass, weeds, shrubs, trees, or other vegetation which are in such condition and location, or by the unique characteristics of a species, as to provide a ready fuel supply to augment the spread or intensity of a fire. ²
POU	Publicly-Owned Utilities are subject to local public control and regulation. POU's are organized in various forms including municipal districts, city departments, irrigation districts, or rural cooperatives. Municipal districts may include territories outside city limits or may not even serve the entire city. Cooperatives are owned by the customers they serve usually in rural areas. There are more than 40 POU's in the state that account for approximately a quarter of electricity supply in California. Most POU's are smaller than IOU's in the electricity sales and the number of customer accounts. ³
Red Flag Warning	The National Weather Service issues Red Flag Warnings to alert fire departments of the onset, or possible onset, of critical weather and dry conditions that could lead to rapid or dramatic increases in wildfire activity. ⁴
Wildfire	See also Catastrophic Fire. Any <i>free-burning</i> vegetative fire that initiates from an unplanned <i>ignition</i> , whether natural or human-caused, where the management objective is full suppression. ⁵ GWP considers both ignition and spread as required elements of a Wildfire.
VMP	The City of Glendale's Vegetation Management Program was developed to ensure there is adequate defensible space in the wildland-urban interface areas between the open space and homes in its hillside and canyon communities. Activities include annual inspections and review/permitting of landscape and fuel modification plans for properties in the High Fire Hazard Area. ⁶

¹ California Office of Emergency Services. <https://www.caloes.ca.gov/FireRescueSite/Documents/20040405-BRC-Final%20Report%20-%20Part%205%20of%205.pdf>

² Glendale Building and Safety Code (Sec. 4906.1.2). <https://www.glendaleca.gov/home/showdocument?id=35639>

³ California Energy Commission. https://www.energy.ca.gov/pou_reporting/background/difference_pou_iou.html

⁴ California Department of Forestry and Fire Protection. <https://www.fire.ca.gov/programs/communications/red-flag-warnings-fire-weather-watches/>

⁵ California State Hazard Mitigation Plan. https://www.caloes.ca.gov/HazardMitigationSite/Documents/011-2018%20SHMP_FINAL_Ch%208.pdf

⁶ City of Glendale Fire Department. <https://www.glendaleca.gov/government/departments/fire-department/fire-prevention-environmental-management/vegetation-management-and-bush-abatement>



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Overview

The City of Glendale's Water & Power department (GWP) has developed this wildfire mitigation plan (Plan) to protect City customers, employees, and assets against the potential dangers and costs of damage incurred as a result of wildfires inadvertently ignited by GWP electrical assets or equipment. As requirements change and condition reassessments are performed, this Plan will be updated to fully comply with updated needs.

Legislative and Regulatory Context

Senate Bill (SB) 1028, which passed into law in 2016, SB 901, which passed into law in 2018, and Assembly Bill (AB) 1054, which passed into law in 2019, intend to strengthen wildfire mitigation through oversight of public utilities under the jurisdiction of the California Public Utilities Commission (CPUC). Although the City of Glendale does not fall under the authority of the CPUC, it is likely that the requirements proposed by these Senate bills will eventually apply to the City.

- Per SB 901, all Publicly-Owned Utilities (POUs) are required to adopt a Wildfire Mitigation Plan (WMP), which shall be reviewed by an independent third-party evaluator.
- Per Assembly Bill (AB) 2911, GWP may access property as necessary, regardless of land ownership or express permission, to prune trees to maintain clearances pursuant to Section 4293 of CA Public Resources Code.
- Per AB 1054, POUs must annually submit a WMP to the California Wildfire Safety Advisory Board, which will review the Plan and provide recommendations on mitigating wildfire risk.

This document outlines the City's approach to comply with state law, as well as Public Utilities Code (PUC) section 8387 for POUs to prepare a wildfire mitigation plan by January 1, 2020, and annually thereafter.

In addition, the CPUC has published several General Orders (GOs) for overhead line design, construction, maintenance, and inspections, the application of which is intended to ensure adequate electrical service and to secure safety to persons engaged in the construction, maintenance, operation, or use of overhead lines and to the public in general. GWP shall meet or exceed the recommendations and requirements within these GOs, including GO 95 and GO 165.

Compliance

The GWP General Manager or his delegate shall support and administer this Plan to include monitoring and auditing the implementation of the Plan. The Plan shall be updated, reviewed, and approved by the General Manager of GWP on an annual basis, or as required by law. This periodic review shall ensure that the Plan is updated to comply with all state regulations and City regulations and requirements. The General Manager may elect to summarize and review the Plan with the City Manager and/or present updates to the GWP Commission and/or City Council to obtain required approvals.



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Plan Structure

As prescribed by the Plan, GWP staff shall construct, maintain, and operate its electrical system assets to minimize the likelihood of catastrophic wildfires posed by the electrical system and equipment. The Plan is comprised of the following elements:

- A. **Stakeholders.** List those City personnel and contractors who are responsible for maintaining, updating, approving, and executing this Plan.
- B. **Objectives.** Frame the Plan's objectives and the risk-based approach. See Section J for additional details on the approach.
- C. **Preventative Strategies and Programs.** To accomplish these Objectives, GWP shall pursue the following preventative strategies and programs.
 - ✓ **Capital Projects.** GWP staff shall tailor its resource plans to upgrade, enhance, and reinforce its electrical infrastructure.
 - ✓ **Operations & Maintenance (O&M) Efforts.** Staff shall also initiate contracts to address on-going, non-capital priorities, including vegetation management, system inspections, and maintenance and support of this Plan.
 - ✓ **Operational Practices.** GWP shall continue to de-energize transmission lines and distribution feeders, disable reclosers, and take any other operational steps necessary to ensure public safety during high-risk scenarios.
- D. **Metrics.** To ensure the protocols and steps taken in this Plan are effective, GWP shall establish metrics that measure and quantify the elements of this Plan.
- E. **Metrics Feedback.** GWP shall evaluate the Plan's performance and adjust this Plan to ensure these goals are achieved.
- F. **Operational Practices.** Operational practices shall aim to mitigate the risk of causing catastrophic wildfires.
- G. **Customer Outreach.** GWP shall develop a process that ensures customers are informed and aware of the potential for emergency power cutoffs.
- H. **Vegetation Management.** Tree trimming and related mitigating actions are intended to prevent inadvertent vegetation contacts to conductors or other equipment and to minimize the spread of localized fires.
- I. **System Inspections.** Periodic and on-going inspections of GWP equipment and infrastructure helps identify failing equipment that can lead to fire ignition.
- J. **Wildfire Risks and Drivers.** Describe wildfire risks to the electric utility and drivers of those risks.
- K. **Wildfire Zones.** GWP has leveraged the tiered zones developed and mapped by the California Department of Forestry and Fire Protection (Cal Fire) to identify electric utility dangers that have historically caused the most wildfire damage, as measured in acres.
- L. **Enterprise-Wide Risks.** Wildfires pose a risk not only to the energy delivery function of the electric utility, but also to the energy supply function, the water utility, and to various City functions, including Police, Fire, and Public Works.
- M. **Restoration.** Continuing its current practice, in the event of customer outages, GWP shall restore customers as safely and as quickly as possible.



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A. Stakeholders

This Plan is subject to direct oversight by the City of Glendale City Council, it is prioritized at the direction of the General Manager, and it is maintained, updated, and implemented by GWP personnel.

City Council

As the governing board overseeing GWP's operation, Glendale's elected, 5-member City Council approves funding and directs the City Manager, or her designee, to implement the key elements of this Plan. SB 901 requires the governing board (i.e., the Glendale City Council) to determine whether any portion of the geographical area where the utility's overhead electrical lines and equipment are located has a significant risk of catastrophic wildfire resulting from those electrical lines and equipment. If so, GWP must, at an interval determined by City Council, present to City Council for approval those wildfire mitigation measures the utility intends to undertake to minimize the risk of its overhead electrical lines and equipment causing a catastrophic wildfire.

City Manager

The City Manager serves as the chief executive overseeing City-wide operations, including GWP, Fire, Police, Public Works, Parks, Libraries, and other departments. The City Manager delegates oversight and tactical implementation of this Plan to the General Manager of GWP, and maintains responsibility for promoting City-wide resources to implement and support this Plan as approved by City Council.

General Manager

The GWP General Manager maintains responsibility for, and provides management commitment to, the execution of this Plan, including coordination with other department heads, with tactical and day-to-day implementation responsibilities delegated to the roles below. The General Manager shall support the Plan's implementation as developed by GWP management and staff.

Chief Assistant General Manager

The GWP Electric division shall:

- Facilitate coordination between the General Manager and other GWP Electric functions.
- Coordinate activities between Electric Engineering and Electric Construction and Operations sections.
- Coordinate directly with the Glendale Fire Department and other City Departments, as necessary, during emergency situations, including during activation of the City's Emergency Operations Center (EOC) and in implementation of the Citywide Emergency Response Plans.
- Justify and request sufficient funding to support this Plan.
- Commit management support for the Plan.



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Electrical Services Administrator

The GWP Electric Engineering section shall:

- Hold primary responsibility for maintenance of this Plan, which includes the periodic review and substantive updates. Make appropriate updates to this Plan as Cal Fire modifies the zone boundaries or makes other fundamental changes that impact this Plan.
- Coordinate with Electric Construction and Operations to provide input to the capital and O&M budgeting process in support of this Plan, including capital funds to fortify infrastructure and O&M funds for inspections and vegetation management.
- Track GWP assets within the physical boundaries of the Cal Fire zones and their respective mitigation solution(s), as applicable.
- Design and engineer enhancements to GWP equipment and infrastructure with the intent of preventing and mitigating the start and spread of wildfires by GWP assets.
- Coordinate with Dispatch to develop and document specific operational practices to be implemented during pre-determined “high wildfire danger” periods.
- Develop switching procedures and other mitigating steps on an operational basis with the aim of keeping customers energized.
- Delegate implementation of these responsibilities as appropriate.

Electrical Superintendent

The GWP Electric Construction and Operations section shall:

- Coordinate vegetation management activities in accordance with this Plan and California regulatory requirements, including oversight of contractors and the vegetation management budget.
- Coordinate with Electric Engineering to provide input to the capital and O&M budgeting process in support of this Plan, including capital funds to fortify infrastructure and O&M funds for inspections and vegetation management.
- Implement the infrastructure upgrades and enhancements as engineered by Electric Engineering in support of this Plan.
- Delegate implementation of these responsibilities as appropriate.

Deputy General Manager – Power Management

The GWP Power Marketing and Dispatch sections shall:

- Coordinate and procure replacement energy in response to planned and unplanned outages of the critical transmission corridors that provide up to approximately 200 MW of incoming energy to the City of Glendale to meet load.
- Declare and initiate rolling blackouts to customers as a preemptive action to minimize the likelihood of sparking wildfires, or as a response to the loss of energy supply that results in an imbalance between energy supply and load.
- Coordinate with Electric Engineering to develop and document specific operational practices to be implemented during pre-determined “high wildfire danger” periods.
- Delegate implementation of these responsibilities as appropriate.



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GWP Legislative Analyst

The function of the GWP Legislative Analyst can be filled at any level and shall:

- Monitor legislative developments and requirements at the local, state, and federal level.
- Communicate these requirements to GWP Stakeholders and the Wildfire Mitigation Committee.
- Facilitate coordination among City department representatives in the support and implementation of this Plan.

Public Benefits Charge Marketing Manager

The Marketing, Communications, and Outreach office of GWP shall:

- Execute education and outreach on wildfire prevention and strategy.
- Execute communication and collaboration with customers.
- Coordinate all outgoing alerts and messages to residential and business customers.
- Develop and broadcast messages as necessary via social media, the City's website, and the Reverse 911 calling system.
- Conduct media outreach.
- Coordinate messaging with GWP employees.
- Coordinate with GWP's Customer Service Call Center.
- Coordinate with the City's Public Information Office (PIO), Glendale Police Department PIO, and Glendale Fire Department PIO.
- Maintain a website devoted to wildfire and tree safety and public safety shut offs.
- Develop, distribute, and maintain all collateral items related to wildfire and tree safety and public safety shut offs.

Independent Third-Party Evaluator

As mandated by SB 901, this Plan shall be reviewed by an approved, independent, third-party evaluator to review and assess the comprehensiveness of, and GWP's compliance with, this Plan. The evaluator will also conduct a safety culture assessment of GWP. GWP shall engage the independent contractor annually, or as required by law, once the list of approved, qualified evaluators is released by the Office of Planning and Research's *Commission on Catastrophic Wildfire Cost and Recovery*.

The specific requirements for the independent third-party evaluator are mandated by SB-901 and are not repeated here.

Until this official list of evaluators is provided, GWP shall contract with industry experts to serve this function to comply with the spirit of this requirement.

Wildfire Mitigation Committee

To maximize the effectiveness of this Plan, representatives from multiple, key City departments meet quarterly, or as deemed necessary by the Committee, to review the performance of this Plan, discuss new and existing legislative requirements related to wildfire mitigation, validate the



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risk-based approach, and review and update this Plan in response to the Plan's performance and regulatory updates.

Attendees at these meetings may vary; representatives, or their delegates, from the following areas comprise the core of the cross-functional Committee:

- GWP Electric Engineering
- GWP Legislative Analyst
- GWP Electric Operations & Construction
- GWP System Dispatch
- GWP Mapping & Records
- GWP Marketing & Communications
- GWP Water
- City of Glendale Fire Department
- City of Glendale Legal Department
- City of Glendale Public Works Maintenance Services (Forestry)

Other Staffing Impacts

GWP staff acknowledge staffing deficiencies where additional, permanent (or long-term contracted⁷) staff is necessary to implement and maintain the elements of this Plan.

The staffing deficiencies reflect permanent increases in workload, including:

- Increased oversight of crews responsible for clearing trees and hazardous vegetation. There are currently two FTEs allocated to monitoring, overseeing, and directing contracted tree-trimming crews. Additional staff time is required to accommodate the increased level of tree-trimming activities and the added responsibility of clearing hazardous vegetation throughout Tier 2 and Tier 3 zones.
- Additional engineering resources to investigate, detail, engineer, and design the replacement of equipment consistent with this Plan. Replacement of overhead conductors, splices, transformers, capacitor banks, and other equipment will require engineering expertise above and beyond the current workload, as the existing assets would remain in use until replaced during life-cycle replacement.
- Additional field and real-time personnel will be needed to implement, maintain, and use the new equipment, products, and solutions that are implemented as mitigating measures. These crews are already fully subscribed and lack the capacity for permanent increases in work throughput.
- Maintaining, troubleshooting, and monitoring real-time weather or fire-detection equipment and data and systems.

⁷ Contracted resources may be utilized to supplement GWP efforts – for example, to identify hazardous vegetation clearing needs.



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B. Objectives

The primary goal of this Plan is to establish a framework to:

Engineer, construct, maintain, and operate
the GWP electric transmission and distribution system
in a manner intended to
minimize the risk of catastrophic wildfire
caused by electrical lines and equipment.

Secondary objectives include:

- ✓ Improving the resiliency of GWP's energy delivery infrastructure. GWP aims to continually assess new industry practices and technologies designed to reduce the likelihood of a disruption in service and improve the restoration of service.
- ✓ Measuring the effectiveness of the mitigating measures described in the Plan. Where a particular action, program, or protocol is determined to be unnecessary or ineffective, GWP will aim to assess whether a modification or replacement is merited. This Plan will also help determine whether more cost-effective measures could produce the same, or better, results.
- ✓ Complying with all local, state, and federal regulations related to wildfire mitigation.



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C. Preventative Strategies and Programs

GWP recognizes and acknowledges the impact of dynamic climate change in California. Direct impacts include altered weather patterns, extended summers, and dryer seasons that increase the risk of uncontrolled wildfires, especially during windy periods (e.g., Santa Ana winds).

California wildfires have been getting more intense, more destructive, and more deadly in recent years, where 2018 was the deadliest and most destructive wildfire season in California on record. 14 of the 20 largest wildfires since 1932 have occurred in the last 20 years: the size, number, and devastating impacts of wildfires are expected to continue to increase. In developing and implementing this Plan in light of these facts, GWP intends to use proven technology, work practices, and programs to enhance the performance and safety of its equipment and infrastructure to minimize the risk of causing or spreading wildfires. To accomplish this, GWP shall prioritize its:

- **Capital investments** in system hardening;
- **Operations and maintenance (O&M)** expenditures on vegetation management, system inspections, and equipment maintenance; and
- **Operational practices** on disabling reclosers, proactive de-energization, and public outreach, as well as leveraging City programs that are consistent with this Plan (e.g., VMP).

Capital Projects

GWP's capital funding includes plans to upgrade, enhance, and reinforce its electrical infrastructure to minimize the risk of its electrical system causing or spreading catastrophic wildfires. Mitigation efforts will be grouped into manageable, logical, geographically co-located collections of assets to be mitigated as a project for ease of management. Specific mitigating activities associated with wildfire mitigation will be evaluated based upon the following criteria (additional criteria may be added, as appropriate):

1. **Existing Mitigation.** The City of Glendale, including GWP and the Glendale Fire Department, has already implemented wildfire mitigation steps throughout many parts of the City. For a given set of assets, if existing mitigation measures already provide a sufficient level of protection against ignition or spread, then other assets without existing mitigation would be addressed first.
2. **Time Commitment.** Some mitigation projects can be completed quickly, while other projects require a significant investment of time, perhaps due to licensing or permitting issues.
3. **Cost.** Total investment (and on-going operating and maintenance costs) to mitigate each project will be considered, as different solutions can have different costs for a relatively equivalent outcome. For example, moving assets underground often has the highest cost, so if a lower-cost alternative can provide an equivalent level of mitigation, then selecting a higher-cost solution must provide significant advantages in some other criterion.
4. **Engineering Studies.** The most appropriate engineering solution will be determined by conducting studies that incorporate all of the above elements (existing mitigation, timeframe, and cost to implement and maintain), in addition to the specific engineering



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challenges and issues that must be overcome. For example, undergrounding a project may not be feasible given existing (conflicting) underground assets, or significant impediments to burial (e.g., rocky ground). Depending upon the outcome of these detailed engineering studies to determine corrective actions, mitigating activities may include:

- ✓ Installation of insulated overhead **conductors** (i.e., “tree wire”) in those areas where conductor contacts are likely to initiate a wildfire; as of November 2019, tree wire has been ordered and plans are being developed to convert a small stretch of overhead conductors that have been identified as requiring this mitigation. Increasing the **spacing** between conductors, as clearance requirements and easements allow, can also reduce the likelihood of palm fronds creating shorts across conductors, which could spark a wildfire.
- ✓ Leveraging **conductor-spacing devices** to minimize the likelihood of “wire slapping.”
- ✓ Where appropriate, converting existing overhead transmission and distribution assets to **underground** assets (e.g., conductors and transformers). Most new installations are underground, unless doing so would be cost-prohibitive or is otherwise infeasible.
- ✓ Replacing wood poles, which can topple and ignite new fires in high-wind conditions, with **sturdier poles**, reducing the likelihood of downed poles igniting wildfires and speeding customer restoration. This may include the use of steel poles, where applicable.
- ✓ Using stronger, **composite materials on crossarms**, e.g., fiberglass.
- ✓ Replacement of **insulators** to reduce the likelihood of overhead conductors becoming detached and contacting vegetation or other flammable materials.
- ✓ Identification, and replacement, of **splices, clamps, and connectors** on overhead conductors, where stress from heat or general use can cause downed conductors to come in contact with vegetation or other flammable materials.
- ✓ Continue current practice of replacing overhead distribution **transformers** that are over 40 years old. Studies have confirmed that transformers over 40 years old have a higher likelihood of failure, which could result in sparking or explosions that could initiate a wildfire.
- ✓ Improving **transformer resiliency** to reduce the likelihood of transformer failures (which can trigger transformer fires) and to protect transformers against the heat of a wildfire (which can also trigger transformer fires). This may include investigating more robust materials and supplies (e.g., FR3 transformer oil).
- ✓ Studying GWP’s existing set of **capacitor banks** to identify opportunities to reduce wildfire risk. For example, all capacitor banks are currently grounded, which can facilitate high fault currents (and the potential for fire); engineering can study this (and other, related) issue and potentially reduce wildfire risk by modifying its design requirements.



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- ✓ Implementing fast-acting, **automatic protection schemes** to detect broken conductors and de-energize before the conductor touches the ground.
- ✓ Replacing distribution fuses with **non-expulsive fuses** to prevent inadvertent sparking as fuses blow.
- ✓ Conducting engineering studies to identify ideal locations for **lightning arresters**, devices designed to protect equipment from the damaging effects of lightning. GWP has already installed throughout GWP's electric system, but these locations will be reevaluated for effectiveness.
- ✓ Installing **weather station** data equipment and HD camera footage to be monitored 24/7.
- ✓ Investigate **other** potential areas of risk; for example, when a fuse blows, there is the potential to create sparks that can cause a wildfire.

Based upon these, and similar, criteria, each project will be evaluated for the best-fit solution, funded through the annual budgeting process, and implemented based upon priority. These efforts are intended to reduce the likelihood of GWP equipment igniting a wildfire. GWP intends to also ensure rapid and safe restoration by improving the resiliency of its infrastructure against wildfire damage. For example, in those areas especially prone to wildfires, GWP will identify wood poles that could be replaced with non-flammable (e.g., steel or concrete) and/or taller poles. This type of action would not necessarily prevent wildfires, but it would speed restoration after a wildfire.

These activities will be on-going and are subject to adjustment, depending upon the results of GWP's investigations and studies.

Operations & Maintenance (O&M) Efforts

Prioritization of wildfire mitigation efforts includes tailoring GWP's O&M resources to meet or exceed state utility standards to minimize the risks posed by vegetation and equipment failure. Funding shall be allocated through the annual budgeting process and is subject to management and City Council approval.

- **Vegetation Management – Reduction of Ignition.** GWP's existing vegetation management program is on a two-year cycle, ensuring that all trees under power lines have been trimmed and/or assessed at least bi-annually. This program has historically focused on maximizing safety and reliability for its customers and employees, and will be enhanced to include intended mitigation of wildfire risk; vegetation management practices will be expanded to exceed minimum clearance requirements (as described in GO 95) by trimming trees down to the telecommunications layer and to clear hazardous vegetation in both Tier 2 and Tier 3 zones. GWP's more aggressive tree-trimming policy may also include trimming or removing trees that could fall onto overhead power lines from above.
- **Vegetation Management – Limiting the Spread of Wildfires.** Reducing the risk of spreading wildfires posed by hazardous vegetation near structures is achieved, in large measure, by leveraging the City of Glendale Fire Department's Hazardous Vegetation



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Program (VMP); the VMP reduces the risk of a home igniting from a nearby wildfire by ensuring that hazardous vegetation within 100 feet of the home is maintained.

- **Inspections.** Expanding asset inspections and refining its master plan to address end-of-life infrastructure management. GWP is planning to issue a Request For Proposals (RFP) in early-2020 to solicit bids from qualified engineering firms to conduct a complete assessment of all overhead and underground assets, beginning in 2020; this assessment will include pole inspections, vault inspections, and inspections of all assets connected to (or within) these assets, including (but not limited to) transformers, crossarms, insulators, conductors, cables, landings, capacitor banks, voltage regulators, and all other attachments. This program, consistent with GO 165, shall assess the condition of GWP assets and provide a mechanism to prioritize repair and replacement. Maintaining robust infrastructure will minimize the likelihood of downed power lines or failed equipment that can spark and ignite wildfires.
- **Reclosers.** Modifying recloser settings during high-risk periods to minimize the likelihood of inadvertently reclosing in a high-wildfire risk area.
- **Equipment Failure.** According to information collected by GWP staff, over 40% of equipment failures in recent GWP history were transformer failures and overhead conductor failures. GWP has instituted an on-going process to replace aged transformers, which are more likely to fail by tracking characteristics like age, installation date, manufacturer, loading factor, and size for each transformer. Currently, transformers with more than 40 service years are prioritized for replacement; this process includes an analysis to ensure new, replacement transformers maintain the proper size and loading factors. The failure of overhead conductors can ignite a fire if the line is still energized when it touches the ground; GWP is investigating technological solutions to de-energize a falling conductor before it touches the ground.



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D. Metrics

To evaluate the effectiveness of these mitigation measures, GWP intends to:

- Evaluate and measure the effectiveness of this Plan by monitoring and tracking verifiable metrics.
- Establish a baseline by inspecting the condition of its transmission and distribution assets, including poles, switches, reclosers, vaults, and transformers. Based upon these inspection results, submit annual budget requests to repair or replace equipment in a subpar condition. Continue periodic inspections consistent with GO 165.
- Incorporate lessons learned and institutional intelligence specific to GWP to revise this Plan.

Tracking of the initial set of metrics shall commence on January 1, 2020, or the earliest that the metrics can be tracked. New metrics shall be added, and existing metrics shall be modified or removed, as determined by GWP, to provide actionable data and feedback. These metrics are intended to provide a quantitative assessment of the effectiveness of the Plan over time. The metrics themselves are not as important as the trends that are quantified in the metrics; accordingly, GWP intends to prioritize its limited resources by minimizing the time spent on gathering metrics in favor of implementing mitigating measures.

As the Plan matures and its effectiveness is measured over time, the metrics will be modified and adjusted, just as the Plan itself will be modified and adjusted based upon performance, successes, and failures.

The formal list of metrics shall demonstrate results and measure the effectiveness of GWP's wildfire mitigation and will include the following:

- After any relay event, where GWP's protective relays automatically de-energize a feeder or transmission line, the following information will be collected during the post-mortem:
 1. Did the outage ignite a fire? (yes/no)
 2. If the outage ignited a fire, were first responders notified? (yes/no)
 3. If the outage ignited a fire, how large was the fire? < 1 acre, 1-50 acres, 50-300 acres, or > 300 acres
 4. If the outage ignited a fire, how many structures were impacted? 1, 2-10, 10-50, or > 50
- Number of trees trimmed by GWP.
- Number of poles replaced in Tier 2/3.
- Number of transformers replaced in Tier 2/3.
- Feet/miles of transmission/distribution lines moved underground in Tier 2/3.
- Feet/miles of tree wire installed in Tier 2/3.
- Number of standard (expulsive) fuses replaced by non-expulsive fuses.
- Glendale Fire Department average time to respond to fire incidents.



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E. Metrics Feedback

As GWP monitors and evaluates the metrics described in the previous section, it should also adjust this Plan to ensure these goals are achieved. During the annual review of this Plan, the following general questions should be reviewed with respect to the existing metrics:

- ✓ **Metric Not Met.** If a metric was not met, determine the cause. Review the metric for appropriateness – is the metric too strict, given GWP’s resources? Are additional resources required to improve the metric performance? Will additional resources have an impact on performance, or is the return on investment minimal?
- ✓ **Metric Significantly Exceeded.** If a metric was significantly exceeded, review the metric for appropriateness. It is possible that the metric is too easily achieved, making the metric meaningless.
- ✓ **New or Obsolete Metrics.** Review any proposed new metrics and determine whether existing metrics are obsolete. Experience, legislative drivers, and management priorities can trigger the development of new metrics and the retirement of obsolete metrics.
- ✓ **Adjustments Based Upon Metrics.** Based upon performance against these metrics, this Plan should be updated to adjust priorities and goals. For example, once a known issue has been mitigated, it should transition from “active construction” to “active monitoring.”



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F. Operational Practices

The City of Glendale's operational practices are coordinated across Departments and implemented independently by each Department.

Citywide

The City of Glendale's Emergency Response Plan⁸ addresses the City's planned response to extraordinary emergency situations associated with natural disasters, technological incidents, and national security emergencies. The Plan does not address normal, day-to-day emergencies or the well-established and routine procedures used in coping with such emergencies. Instead, the operational concepts reflected in the Plan focus on potential large-scale disasters which can generate unique situations requiring unusual emergency responses.

The City's Hazard Mitigation Plan⁹ provides a set of action items that, if implemented, can help reduce the risk from hazards through education and outreach programs, the development of partnerships, and the implementation of preventive activities (such as land use programs) that restrict and control development in areas subject to damage from natural hazards.

City of Glendale personnel involved in emergency response and emergency management functions are provided ongoing training, including local workshops, SEMS¹⁰ training, NIMS¹¹ training, and other special programs throughout the year. Key management and emergency personnel also attend the California Specialized Training Institute to receive in-depth training in related emergency management topics.

GWP

Engineering and field personnel will periodically review operational practices to identify preventative strategies and enhanced operational procedures to minimize and mitigate the risk of causing and/or spreading catastrophic wildfires, both during periods of high danger as well as during normal operating conditions.

The Principal Power System Operator oversees the real-time System Dispatch function and provides on-going, topical training to all Power System Operators (PSO's). At least two PSO's staff a Dispatch desk 24/7 to monitor and control GWP's electric grid while dispatching field crews to investigate and resolve problems, or to schedule work, on GWP electrical infrastructure.

⁸ <https://www.glendaleca.gov/government/departments/fire-department/other/emergency-preparedness-response/city-emergency-plans>

⁹ <https://www.glendaleca.gov/Home/ShowDocument?id=48978>

¹⁰ Standardized Emergency Management System, which unifies all elements of California's emergency management community into a single, integrated system with standardized key elements. See <https://www.caloes.ca.gov/cal-oes-divisions/planning-preparedness/standardized-emergency-management-system> for more information.

¹¹ The Federal Emergency Management Agency's (FEMA's) National Incident Management System, which guides all levels of government, nongovernmental organizations (NGO), and the private sector to work together to prevent, protect against, mitigate, respond to, and recover from incidents. See <https://www.fema.gov/national-incident-management-system> for more information.



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The Substation Operations Training Program includes training on system protection and trouble response; topics include discussions on preemptive de-energization, rolling blackouts, and automatic system protection schemes. This training is provided to all new PSO's, as well as to seasoned PSO's on an annual basis.

Operationally, the PSO retains the authority and obligation to de-energize electrical equipment, subtransmission lines, and/or distribution feeders in the event of a high wildfire danger. The decision to preemptively de-energize GWP equipment is described further in GWP Standard Operating Procedure SOP-021 and is based upon multiple factors, including Red Flag Warnings, system conditions, and other operational considerations. The PSO considers several factors before de-energizing overhead lines during periods of extreme wildfire danger:

- Hospitals
- Elder care facilities
- Communications equipment (e.g., cell phone towers, pole-mounted cell sites)
- City of Glendale Public Works facilities (e.g., sewer)
- First responder facilities, including police, fire, and local government facilities
- Community information facilities (e.g., radio equipment).
- GWP Water Division and Crescenta Valley Water District systems, which maintain water quality, water supply, and water pressure to residents and to the Glendale Fire Department for fighting fires.

De-energization is always the PSO's option of last resort, given the potential impacts of de-energization as described below (e.g., traffic signals, air conditioning during high temperatures, lack of electricity to water facilities to fight fires, etc.). In the event preemptive de-energization is initiated, every attempt to minimize the number of affected customers is made by sectionalizing only the effected feeders or transmission lines.

Per SOP-021, it is GWP's policy to preemptively de-energize overhead transmission and distribution lines and to disable automatic reclosers in the Tier 2 or Tier 3 zones during periods of extreme wildfire danger, or at other times as deemed necessary by GWP, with the intent of reducing the risk of igniting a wildfire from energized equipment.

During these periods of extreme wildfire danger, if a protective scheme (e.g., relay or recloser) automatically de-energizes a feeder, GWP crews will physically patrol a feeder to identify and clear the cause of the protective action before any attempts to re-energize the circuit are attempted.

The benefits of preemptive de-energization are offset by the challenges and potential dangers of widespread and extended power outages during periods of high temperatures. As discussed in **L. Enterprise-Wide Risks**, the supply of safe drinking water, water for firefighting, infrastructure used for public safety, and the overall impacts of power outages could all potentially be



Glendale Water & Power Wildfire Prevention and Mitigation Plan

compromised. Therefore, the decision to de-energize customers must be the solution of last resort after all wildfire mitigation efforts have been exhausted.

The PSOs conduct and complete annual and periodic training on their job responsibilities, processes, procedures, and practices. This training includes their authority to de-energize customers as needed to prevent potential ignitions during extreme fire conditions, as well as during periods where there is insufficient energy supply to meet load requirements. SOP-021 is also covered in this training, including notification requirements before initiating planned de-energization of customers. System conditions can change rapidly, so in an emergency, the PSO may opt to de-energize first, then conduct the required notifications.

While the PSOs determine whether and when de-energization is necessary, the field crews work in tandem with the PSOs to conduct field switching (as necessary, and as directed by the PSOs), patrol de-energized lines prior to re-energization, and repair damage to equipment and lines discovered during patrols. This is consistent with their usual duties and is folded into their standard job responsibilities and practices.

Energy Supply and Procurement Contingencies

Should the Los Angeles Department of Water & Power (LADWP), Southern California Edison (SCE), or other utilities elect to de-energize major transmission corridors during periods of extreme fire danger (which usually correlate with periods of high electrical loads), the City will be forced to procure replacement energy from alternate energy sources to meet load.

Given GWP's load and contingency obligations during periods of peak load, the loss of a major transmission line could result in the loss of 100 MW or more of imported energy. Options to replace this energy are limited to local generation capability (e.g., Grayson) or purchases of energy that rely upon LADWP transmission. Most GWP transmission is closely tied to LADWP transmission, meaning the loss of GWP transmission likely includes the loss of LADWP transmission, further straining the local transmission grid. When GWP's transmission capacity is curtailed during periods of high load, LADWP is unlikely to have excess transmission capacity to sell to GWP, at any price; even if GWP could find an energy provider, it would be unlikely to be delivered to the Glendale (69 kV) side of the Air Way receiving station.

The next option would be to generate the energy locally (e.g., Grayson). The proposed repowered Grayson power plant must be sufficient to accommodate the loss of 100 MW of transmission import capability, which reflects the amount of transmission capacity that would be lost if the Pacific Direct Current Intertie (PDCI) transmission line were to be de-energized. However, should this local generation not be available when needed (for example, if the repower were to not occur), GWP would have insufficient capability to meet its load and contingency obligations while the PDCI were de-energized.



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In the event GWP is unable to procure energy delivered to the Air Way receiving station or to generate the replacement energy locally, it would be forced to initiate rolling blackouts to balance its load with delivered energy. These rollouts would continue until the lost transmission capability is restored. In other words, preemptive de-energization of transmission lines, initiated by a party other than GWP, could result in rolling blackouts within the City of Glendale. In the scenario where an outside agency's actions caused a lack of energy supply to the City of Glendale, advanced notification to customers would likely not be possible given that the energy shortage would occur with no more than a few hours' notice, though "best efforts" would be initiated to provide notice when possible.

GWP Dispatch maintains a rolling blackout schedule that is initiated at the direction of the Integrated Resource Planning Administrator or delegate.



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G. Customer Outreach

Prevention and Strategy

GWP will maintain a multi-level outreach and education strategy to create public awareness of fire threats, fire prevention, and support during a wildfire or a de-energizing event. GWP will work with the public, community leaders, and other agencies to collaboratively discuss fire-safety processes regarding public safety. These collaborations will provide forums for public education and opportunities to exchange improvement ideas and practices.

GWP partners with first responders, health care facilities, and operators of telecommunications infrastructures. GWP, in coordination with the Glendale Fire Department, proactively alerts customers on the Life Support list it maintains. GWP will create and maintain a Public Safety Power Shutoff webpage for its website at <https://www.glendaleca.gov/wildfiremitigation> to provide information on power shut offs and fire mitigation plans, and a link to this page from the main GWP website will also be added. This webpage will be used to ask customers to update their GWP account information and emergency contact preferences, and to provide a link to both the login page to GWP account information and to the Everbridge Emergency Contact Information webpage. GWP will develop informational brochures on wildfire mitigation safety and what to do when a de-energizing event is called, referencing the website in all collateral items produced and distributed. On the dedicated Public Safety Wildfire Mitigation webpage, customers will be able to find the following information:

- GWP's adopted Wildfire Mitigation Plan;
- Information on how GWP mitigates wildfire risk;
- Emergency preparedness tips and guide;
- Information on what not to do during Red Flag Warnings (e.g., BBQs, smoking outdoors, throwing ashes out, etc.);
- Links to any additional resources;
- Links to GWP Account Information & Everbridge Emergency Notification sign-ups;
- Frequently-Asked Questions (FAQs) on the power shut-off process.

De-Energization (Public Safety Shutoff Event)

During an extreme weather event, GWP will actively provide customer outreach and support through a targeted communications strategy, with the goal of providing as much advance notice as possible. GWP will inform its customers of expected severe weather conditions and directly notify affected customers through established points of contacts such as email, phone, text, and/or push notifications. GWP will also alert customers through its social media platforms, alert the media, work with the City's Fire and Police PIO offices and websites, and post rolling messages on local television (GTV6) and on the City's and GWP's websites. GWP can initiate automated pre-recorded phone calls to customers in the impacted areas, advising when the outages are called and directing customers to the dedicated GWP website for up-to-date information. Pre-recorded IVR (Interactive Voice Response) messages will have real-time recorded information informing customers that may be impacted. GWP will also post messages on its website and through its Mobile App and In-Home Digital Display program for targeted



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push messaging. Messaging will increase in urgency as the certainty of a Public Safety Power Shutoff approaches. Finally, in addition to alerting its customers, GWP will also notify, as a priority, first responders' PIO offices, health care facilities' communication offices, and the offices of the building engineers, the Chief Executive Officer (CEO), and operators of telecommunications infrastructure.

For customers on Life Support, GWP, if notified, will contact these customers through phone calls. Two phone attempts will be made, and an email will be sent if there is an email address on file. If no response is received, GWP will dispatch a field crew to contact the Life Support customer. GWP will also keep local news and radio outlets informed.

Timing of notifications

When GWP determines a preemptive de-energization is required, either because another entity's actions suddenly limits GWP's energy supply (e.g., Southern California Edison initiates a Public Safety Power Shutoff – PSPS – on a transmission line that impacts GWP's incoming transmission capacity) or due to the PSO's system assessment, GWP will provide advance notifications in three phases:

1. Advance notification (when possible)
 - 48 hours before electricity is turned off
 - 24 hours before electricity is turned off
2. Shutoff notification just before electricity is turned off
3. Notifications during the event

Post event notifications will be provided to notify customers that power has been restored.



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H. Vegetation Management

As described in this Plan, the majority of acreage burned by wildfires triggered by electric utilities was determined to be due to vegetation contacts and equipment failure. GWP oversees a contracted arborist that implements GWP's vegetation management program intended to mitigate the risk posed by vegetation contacts. This program is consistent with **General Order (GO) 95 – Rules for Overhead Electric Line Construction**, including the clearance requirements described in **Section III – Requirements for All Lines, Rule 35 Vegetation Management**. GWP staffs Line Clearance Forestry Supervisors who spend the majority of their time in the field, overseeing the contractor and monitoring vegetation under GWP transmission and distribution lines. These Supervisors are typically certified arborists who identify all trees that need trimming, direct the contractor to specific trees and/or areas that require trimming, and then confirm afterward that the identified trees have been trimmed to GWP standards.

Although the highest wildfire risk is presented in the Tier 2 and Tier 3 zones of the City, the Supervisors monitor the entire City for dangers posed by vegetation under GWP lines.

In fiscal year 2018-2019, GWP budgeted approximately \$800,000 to fund a contractor to conduct tree-trimming activities as directed by GWP staff. For the fiscal year 2019-2020, GWP has increased its tree-trimming budget by approximately \$200,000 for enhanced tree-trimming activities; these enhancements may include larger clearances, expansion of tree-trimming to nearby trees not directly under power lines, and other clearing of hazardous vegetation near power lines.

As part of its risk assessment to prioritize mitigation efforts, GWP has engaged the City of Glendale's Fire Department to leverage its Vegetation Management Program (VMP). The VMP was developed to ensure there is adequate defensible space around buildings in the wildland-urban interface. Activities include annual inspections and review/permitting of landscape and fuel modification plans for properties in the high wildfire hazard area. Property owners are required to maintain a 100-foot radius of defensible space (i.e., remove hazardous vegetation) around all property structures, including homes, backhouses, sheds, etc. The majority of GWP's electrical assets also reside within this 100-foot radius, so even if a localized fire were ignited by failed GWP equipment, the likelihood of this fire igniting nearby buildings would be reduced. Therefore, GWP can focus its resources on mitigating electrical assets that are outside of the zones covered by the VMP. The VMP facilitates GWP's ability to focus on mitigation of electrical assets on a subset of its assets, potentially improving the success and rate of its mitigation efforts.



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I. System Inspections

As described in this Plan, the majority of acreage burned by wildfires triggered by electric utilities was determined to be due to vegetation contacts and equipment failure. GWP leverages GO 165 requirements as a “best practice” to provide guidance on system inspections that are intended to identify failing equipment that may ignite a fire.

As part of its Master Plan, still in development as of this writing, GWP intends to conduct a system inventory that includes a system-wide inspection of its poles, streetlights, vaults, and all equipment and assets connected to, or contained within, these assets. GWP funding and capital improvement priorities will be adjusted, based upon the results of these inspections, to replace and harden equipment and assets that are flagged as requiring replacement. This system-wide assessment will commence in 2020, as conducted by a qualified, contracted engineering firm that will formally inspect and assess of all overhead and underground assets. As assets are inspected, GWP will remediate based upon these inspection results and will issue work orders to address any problems that were observed: replace poles, repair equipment, etc. The completed inspection report will establish a baseline condition assessment of system assets; this program will establish the new inspection program going forward, and GWP staff will conduct all subsequent assessments as part of an on-going inspection program, consistent with the requirements of GO 95 and GO 165.

GWP has dedicated staff who are responsible for the preventative and routine inspections, construction, installation, maintenance, and repair of all transmission and distribution assets. Beginning with the 2019-2020 fiscal year, GWP has budgeted capital and O&M funds related to wildfire mitigation, including system hardening, substation and distribution automation, and vegetation management.

The City of Glendale’s VMP, managed by the Glendale Fire Department, includes annual inspections of properties in the high fire hazard areas of the City to ensure compliance with its defensible space standards (see Exhibit B).



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J. Wildfire Risks and Drivers

The City of Glendale's wildfire risk is driven by controllable and uncontrollable factors. The City's topography consists of both a highly-developed urban center and mountainous open spaces with frequently dry vegetation; this diversity adds complexity to GWP's wildfire mitigation efforts and requires a surgical approach to tailored mitigation efforts in each area of the City. Climate change exacerbates the already hot, dry weather common to Glendale, as well as the seasonal winds, as discussed in **Section C. Preventative Strategies and Programs**, and is assumed to only exacerbate GWP's wildfire risk going forward, namely with respect to making dry fuel available for ignition and for spread. This Plan focuses on preventing wildfires from being caused by inadvertent vegetation contacts with, or failures of, GWP electric utility equipment. Prevention of wildfires ignited by other causes (e.g., intentionally-set fires, accidental human-caused fires, etc.) are not considered.

GWP aims to reduce the risk of starting and spreading wildfires, acknowledging that it is not feasible to achieve zero risk. To that end, GWP has adopted a risk-based approach to prioritize capital improvements, Operations and Maintenance (O&M) work, and changes to operating procedures to achieve the objective stated in **Section B** of this Plan.

This prioritization leverages historical data that measures the relative size (in this case, measured in acreage of burned land) of California wildfires and that describes the causes of the wildfires.

Historical data confirms that the majority of acreage burned was due to vegetation contacts and equipment failure.

To quantify the size (in acreage) of historical fires, 2012-2016 wildfire statistics from Cal Fire¹² indicate:

- **74% of the acres burned were due to fires initiated by vegetation contacts** – i.e., trees touching power lines, causing sparks and starting fires. Plentiful brush and undergrowth can also facilitate rapid expansion of wildfires once the initial spark is provided.
- The majority of the acreage burned due to vegetation contacts occurred in 2015, which skews the acreage burned due to vegetation contacts. Ignoring the vegetation contact fires in 2015, **67% of the total acres burned were caused by equipment failure** – i.e., failed hardware that possibly sparked or exploded and started fires.
- The majority of the acreage burned due to equipment failure occurred in 2013, which skews the acreage burned due to equipment failure. Ignoring the vegetation contact fires in 2015 and the equipment failure fires in 2013, **46% of the total acres burned were caused by lines down** – i.e., energized power lines that touched the ground and started fires. Equipment and hardware failures are discussed in more detail below.

¹² “2012 Wildfire Activity Statistics,” “2013 Wildfire Activity Statistics,” “2014 Wildfire Activity Statistics,” “2015 Wildfire Activity Statistics,” “2016 Wildfire Activity Statistics,” *Historical Wildfire Activity Statistics (Redbooks)*, http://www.fire.ca.gov/fire_protection/fire_protection_fire_info_redbooks. (Accessed September 21, 2018)

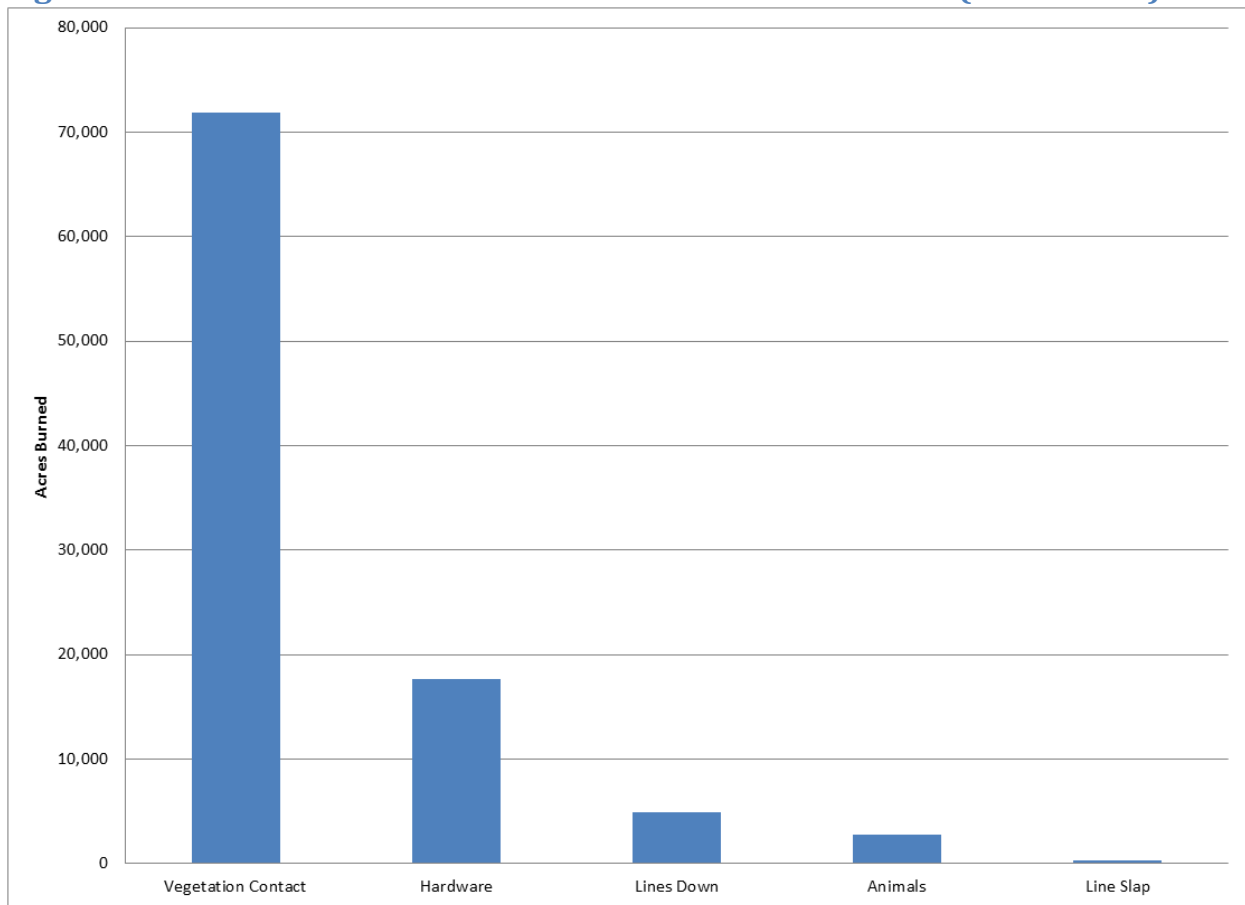


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- The acreage burned due to animals (e.g., squirrels shorting lines and starting a fire) and line slap (transmission lines touching during high winds) was negligible.

The chart below summarizes this data.

Figure 1. California Wildfires Attributed to Electric Utilities (2012-2016)

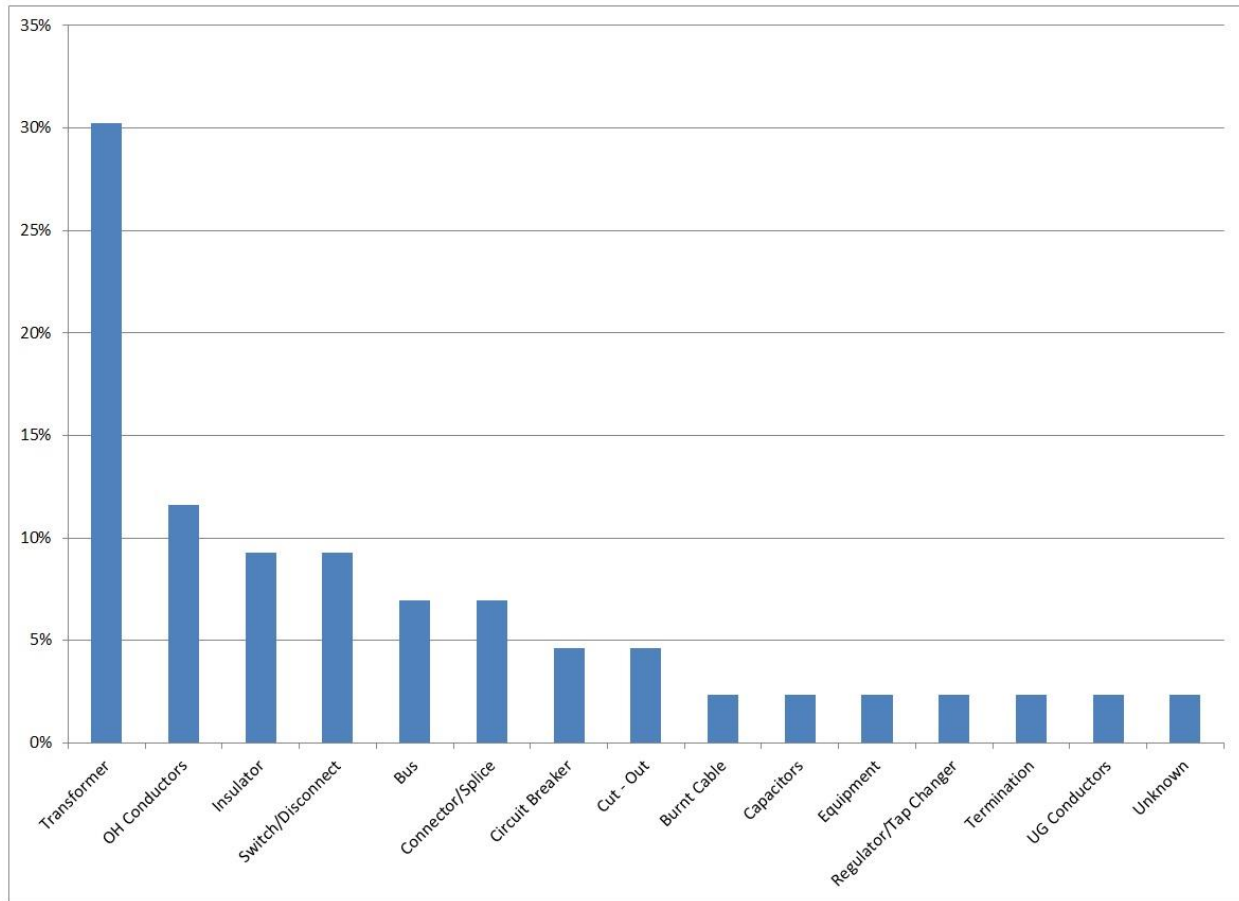


GWP concurs that its own risks stem largely from vegetation contacts and equipment failure. Equipment failures from 2009 – 2018, based upon historical GWP data, show that the largest number of equipment failures came from transformers, overhead conductors, insulators, and switches and disconnects. The chart below summarizes this data.



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Figure 2. GWP Equipment Failure (2009 - 2018)



GWP's transformer-replacement program prioritizes life-cycle replacement of transformers that are over 40 years old to minimize the likelihood of transformer failures igniting wildfires.

As part of its review of assets in the Tier 2 and Tier 3 zones, GWP Electric Engineering has identified overhead feeder and transmission line sections at highest risk of igniting and spreading wildfires. These sections will be analyzed on a case-by-case basis for the most appropriate mitigation approach, as discussed in **Section C**.



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K. Wildfire Zones

GWP has leveraged the tiered zones developed and mapped by Cal Fire; the Glendale Fire Department's independent wildfire zone assessment¹³ correlates strongly with Cal Fire's maps and assigns similar levels of risk to these areas. GWP does not anticipate making any changes to these maps and accepts them as provided. In addition, Section 7 of the City's Hazard Mitigation Plan contains the City's independent assessment of wildfire risk within the City of Glendale. CalFire's methodology reflects the risk of a wildfire igniting and spreading by classifying each area within the City of Glendale as Tier 1 (low risk), Tier 2 (elevated risk), or Tier 3 (extreme risk).

The Fire Area Map in Exhibit A shows that, as of 2018, approximately 48% of the City of Glendale falls within Tier 2 and 14% falls within Tier 3. GWP intends to prioritize its efforts to mitigate wildfire hazards within these areas, which cover nearly 62% of the City's area.

GWP and the Glendale Fire Department, working in concert, significantly reduce the wildfire risk imposed by hazardous vegetation:

- GWP's aggressive, City-wide tree-trimming program, consistent with GO 95, reduces the likelihood of trees coming in contact with live transmission and distribution wires.
- The City of Glendale's Vegetation Management Program (VMP) reduces the intensity and rate of spread of a wildfire near buildings, reducing the risk that nearby buildings will be ignited. The majority of GWP's electrical assets reside within 100 feet of structures on private property (where property owners are required to manage vegetation), so only 0.47% of the City's Tier 2 and Tier 3 land area contains GWP electrical assets that require additional mitigation to reduce the risk of igniting a spreading wildfire; this is compared to the nearly 62% of the City's area that is within the Tier 2 and Tier 3 zones.

By applying this risk-based approach of focusing wildfire mitigation resources on GWP's overhead resources in unmitigated areas, only 0.47% of the City of Glendale contains GWP assets that require additional mitigation.

By applying prudent vegetation management programs, GWP has decreased the City of Glendale's wildfire exposure from 62% of its land area to 0.47%, a 99.5% decrease; this reduction in scope provides clear guidance on the remaining areas requiring additional wildfire mitigation. Figure 3 summarizes the impact of the existing mitigating measures, and Figure 4 graphically illustrates the level of mitigation currently in place. GWP intends to focus its added wildfire mitigation efforts and resources on mitigating the remaining electrical assets in these Tier 2 and Tier 3 zones.

¹³ City of Glendale's High Fire Hazard Area map, <https://www.glendaleca.gov/home/showdocument?id=50019>



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Figure 3. GWP Assets Currently Mitigated vs. Requiring Additional Mitigation

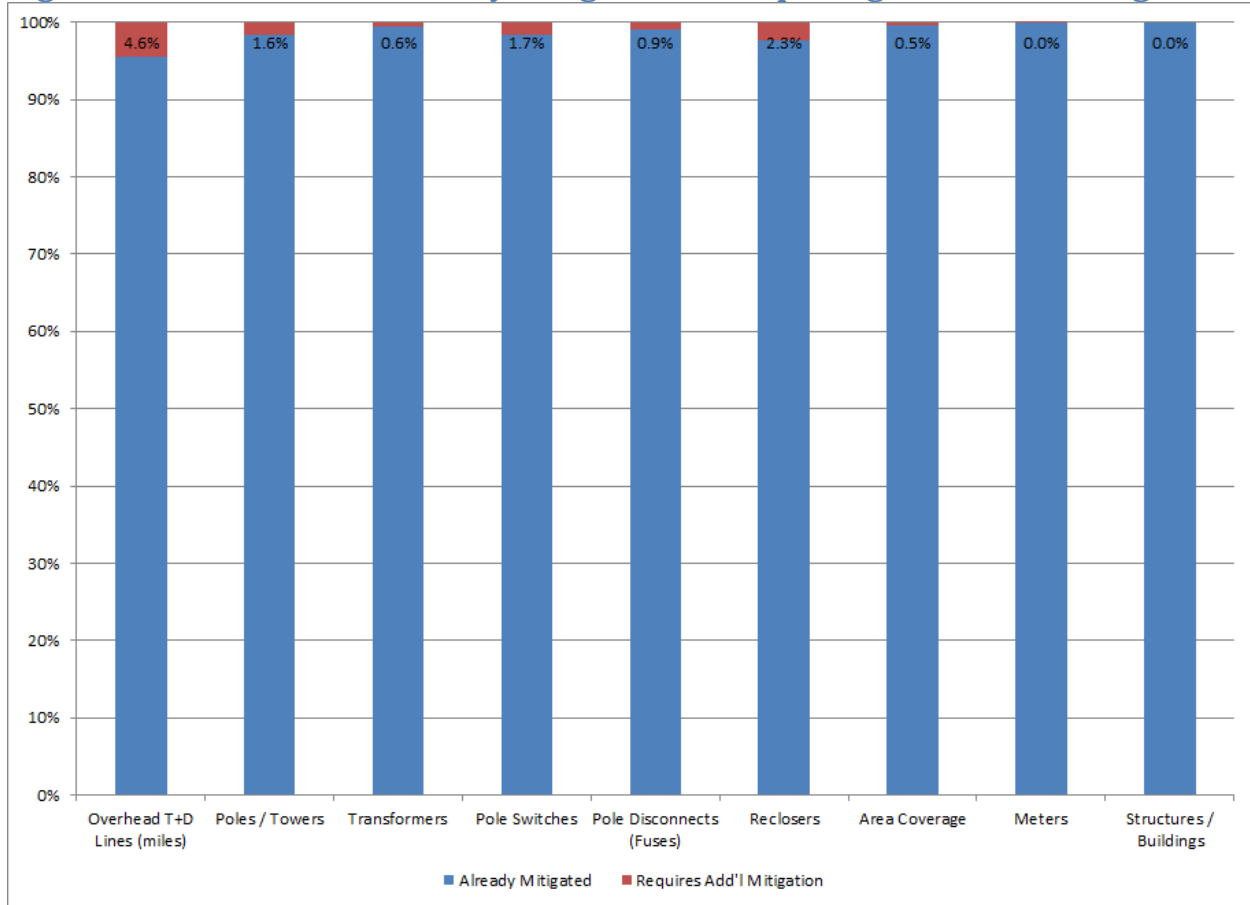
	Total Assets				Liable Assets Requiring Additional Mitigation				Reduction	Requires Additional Mitigation
	Tier 1	Tier 2	Tier 3	Citywide	Tier 1	Tier 2	Tier 3	Citywide		
Overhead T+D Lines (miles)	206.2	60.6	15.6	282.4	-	9.6	3.4	13.0	95.4%	4.6%
Poles / Towers	11,303	2,899	703	14,905	-	185	60	245	98.4%	1.6%
Transformers	3,528	673	165	4,366	-	23	3	26	99.4%	0.6%
Pole Switches	523	108	16	647	-	10	1	11	98.3%	1.7%
Pole Disconnects / Fuses	1,098	232	49	1379	-	7	5	12	99.1%	0.9%
Reclosers	28	12	3	43.0	-	1	0	1	97.7%	2.3%
Area Coverage	38%	48%	14%	100%	-	0.29%	0.18%	0.47%	99.5%	0.5%
Electric Meters	77,524	10,889	1,945	90,358	-	5	1	6	100.0%	0%
Structures / Buildings	44,469	11,622	2,248	58,339	-	0	0	0	100.0%	0%

Note: Some values are rounded to conserve space on the page



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Figure 4. GWP Assets Currently Mitigated vs. Requiring Additional Mitigation





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L. Enterprise-Wide Risks

This Plan discusses mitigating steps and measured intended to “protect City customers, employees, and assets against the potential dangers and costs of damage incurred as a result of wildfires inadvertently initiated by GWP electrical assets and equipment.”¹⁴ These dangers and

¹⁴ See

Definitions

Catastrophic Fire	See also Wildfire. A wildland or wildland urban interface fire with a fast moving front, extending over a large area (300+ acres) and/or highly destructive to lives, property or natural resources.
Hazardous Vegetation	Refuse, grass, weeds, shrubs, trees, or other vegetation which are in such condition and location, or by the unique characteristics of a species, as to provide a ready fuel supply to augment the spread or intensity of a fire.
POU	Publicly-Owned Utilities are subject to local public control and regulation. POUs are organized in various forms including municipal districts, city departments, irrigation districts, or rural cooperatives. Municipal districts may include territories outside city limits or may not even serve the entire city. Cooperatives are owned by the customers they serve usually in rural areas. There are more than 40 POUs in the state that account for approximately a quarter of electricity supply in California. Most POUs are smaller than IOUs in the electricity sales and the number of customer accounts.
Red Flag Warning	The National Weather Service issues Red Flag Warnings to alert fire departments of the onset, or possible onset, of critical weather and dry conditions that could lead to rapid or dramatic increases in wildfire activity.
Wildfire	See also Catastrophic Fire. Any <i>free-burning</i> vegetative fire that initiates from an unplanned <i>ignition</i> , whether natural or human-caused, where the management objective is full suppression. GWP considers both ignition and spread as required elements of a Wildfire.
VMP	The City of Glendale’s Vegetation Management Program was developed to ensure there is adequate defensible space in the wildland-urban interface areas between the open space and homes in its hillside and canyon communities. Activities include annual inspections and review/permitting of landscape and fuel modification plans for properties in the High Fire Hazard Area.

Overview, page 1.



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costs also apply to functions and departments other than the GWP electrical division, including the GWP Water Division, Glendale Information Services, Glendale Police, and Glendale Fire.

The primary impacts of a wildfire are the potential for preemptive de-energization of one or more feeders and evacuation of high-danger areas during an active wildfire.

GWP – Water Division

GWP’s Water Division serves over 200,000 residents through 34,000 service connections to residential units and businesses and is an essential partner in public safety by ensuring sufficient water supply to the City of Glendale’s over 3,000 fire hydrants. In order to provide this service, water needs to be pumped from the various points of delivery to the end users.

Due to the topography of the City of Glendale, water is delivered by gravity to the “downtown” area of the City and pumped from this elevation up to the canyons and hills and to the northern elevations of the City. Specifically, the hydraulic elevation, or grade, of the City’s downtown is 724 feet and the highest water service elevation is at 2,483 feet, with several elevations in between. These areas primarily rely upon water storage tanks, which can supply a few hours of water for firefighting purposes to extinguish single structure fires as originally planned and designed when these neighborhoods were developed.

Many of these areas are in what could be called “native brush/urban” interfaces; reliable power to the water facilities can be restricted by wildfires or by proactive de-energization. Since the City has historically had a reliable, local source of generation at the Grayson Power Plant, the water system has not been required to install permanent back-up generation at its facilities. If electrical service to GWP’s pump stations were unavailable for more than a few hours, GWP would be unable to provide additional water to an area where a large brush fire could be occurring. It is estimated that the planning, design, and installation of permanent on-site generation to power critical water facilities would cost around \$10 million; on-going maintenance and operations would be an added annual budgeted expense.

Glendale Information Services

Among its myriad functions, the Information Services Department (ISD) maintains the Citywide radio communications system. Each radio site has unique characteristics and a different degree of resiliency against wildfires and loss of GWP power, depending upon the location and the degree of load on the radio system (more transmitters or more microwave radio links mean a greater power requirement). Each site has a backup battery plant capable of running the entire radio site and, with one exception, has an on-site generator with automatic start and an automatic transfer switch. An additional generator has been budgeted for fiscal year 2019-2020, and there are plans to increase some battery capacity in fiscal year 2019-2020.

The radio system can run for several days without recharging the batteries (i.e., no generator). ISD has telemetry to report the loss of primary (GWP) power and the status of the generator



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(running or not), and they are aware of the GWP circuits that feed each site. For those sites not supplied by GWP, they have relationships for information sharing with the site owner and/or other tenants to make each other aware of planned and unplanned outages, as well as site access issues. Therefore, loss of GWP power would not have a significant impact unless the outage were to last for several days; resiliency against wildfires would be dependent upon the intensity and proximity of the wildfire, as physical access would nominally not be required to ensure uninterrupted operation.

The radio system “Master Site” is located near downtown Glendale and ISD also maintains a large battery plant, a fixed generator, and a manual transfer switch with terminals appropriate to connect to any suitable generator there.

During past power outages impacting these radio sites, ISD has recommended that GWP prioritize power restoration to GWP customers since ISD can ensure continued operation for several days without GWP power.

Glendale Police Department

Wildfires and power outages, planned and unplanned, impact the Glendale Police Department (GPD) directly (“First-Order Impacts”), other City services with Police effects (“Second-Order Impacts”), and the community in general (“Third-Order Impacts”).

First Order Impacts:

1. **Diesel Backup.** GPD has a 13,500 gallon diesel fuel tank, which provides no more than 95 hours of run time if the tank is full when an extended power outage begins. Typically, these tanks are not kept full and the tank volume fluctuates.
2. **Loss of Data Center.** GPD’s data center is not backed up outside of the City. As a result, evacuation due to wildfires or a long-term power loss that extends beyond the diesel backup means an inability to access local criminal justice records until the evacuation is lifted or power is restored. These records can include information supporting arrest warrants, involving active investigations, or related to critical missing persons – this accounts for all records-related functions.
3. **Access to Fuel for Vehicles.** GPD’s automotive fuel supplies require power to pump. Thus a loss of power beyond their diesel support means the fleet is drastically limited. They do not have a tanking capacity so would need to execute an emergency contract for fuel services in an area unaffected by power outages, or secure an emergency tanker from another source. The Los Angeles (LA) County Sheriff does not have an emergency tanker, so they would be forced to wait for a tanker from the California Governor’s Office of Emergency Services (Cal OES), or they would drive somewhere to purchase fuel commercially.

Second Order Impacts:

1. **Citywide Fuel for Vehicles.** The City as a whole has access to 115,000 gallons of tanked diesel fuels and a limited capacity to support moving fuel supplies from site to



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site. This tanked fuel would have to support all City operations. In all likelihood, mission-critical activities like Fire, Police, GWP, and Public Works would be given nearly equal priority in these supplies in the event of evacuation or loss of GWP power. If the fuel is unreachable due to evacuations or wildfire, the capacity of this fuel is further restricted.

2. **Police Radio Towers.** Police radio towers use an uninterruptable power supply (UPS) consisting of batteries and generator backup.
3. **Emergency 911 Calls.** If the 911 system fails at the Glendale Police building or the building is evacuated due to wildfires, calls roll over to Verdugo Fire. Depending on the location, extent, and duration of a power outage or wildfire, both centers could go down or become unreachable. Neighboring agency facilities have insufficient desk space to accommodate rolling calls to them, even if GPD sent personnel.
4. **Internet.** Citywide data connectivity to the Internet, including GPD access, requires GWP power. If the City's primary data center goes down, GPD loses its Internet connectivity to the outside world.
5. **Prisoner Impacts.** With an extended loss of GWP power, GPD would experience hindered water deliveries to the police building. They have limited supplies of drinking water, and dealing with wastewater / sewage would become an issue. With a loss of power to the police building or an evacuation, the prisoner population would need to be transported offsite and GPD could no longer hold or book arrestees locally.

Third Order Impacts:

1. **Streetlights.** Extended loss of power to the streetlights would increase traffic collisions and dramatically snarl traffic, especially if coupled with a localized evacuation. GPD does not have sufficient staff to manually run traffic control, even at the City's major intersections.
2. **Gas Stations.** Extended loss of power to area gas stations would limit local fuel supplies, even to the extent that some residents would enter emergency situations because they are stranded. For example, kids at school may need to be picked up, or people requiring medical care may need transportation.
3. **Hospitals.** Evacuation or extended loss of power to area hospitals, if closure was forced, would result in patients being sent to distant facilities. Currently the limited ambulance capacity would be strained by long-range transports, impacting both GPD and GFD.
4. **Grocery Stores.** Extended loss of power or a mass evacuation would impact grocery stores. Reductions in food supply would impact the most vulnerable. Many of the City's residents have limited transport ability (primarily, the elderly) who are unable to walk to the corner store for food and supplies.
5. **Uninhabitable Areas.** Extended loss of power could create whole neighborhoods that are not serviced by GWP – first power, then water. Eventually, these neighborhoods become uninhabitable. Based upon observations after wildfires, situations like this require increased services on the order of 300% to 500%.



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6. **Cellular Services.** The area cellular telephone systems rely upon GWP power and have a limited battery backup. Once the battery backup fails, the cellular network breaks down and citizens will be limited in their ability to care for themselves or request aid.

Glendale Fire Department

Wildfires and power outages, planned and unplanned, directly impact the Glendale Fire Department (GFD). However, the GFD has mitigating measures in place to ensure continued operations.

1. **Backup Generators:** GFD has diesel backup power generators at all GFD fire stations. There is sufficient fuel, when full, for 90 to 560 hours of emergency power generation at each station, depending on the size of the generator at the station.
2. **Verdugo Dispatch:** Dispatch has a UPS (Uninterruptable Power Supply) with a manual transfer switch to accommodate multiple electric feeds. On a full charge, the backup batteries can run dispatch operations for 10 hours. After 10 hours, dispatch will rely on diesel backup generators at Fire Station 21.



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M. Restoration

GWP restores power after a wildfire or preemptive de-energization in a similar manner, ensuring the assets are in a safe condition prior to re-energization.

GWP maintains a list of reclosers that are disabled in the event of a Red Flag Warning or as determined necessary by the Power System Operators based upon system conditions. These devices are disabled during periods of extreme wildfire danger to minimize the likelihood of inadvertently sparking a fire upon automatic re-energization. Upon restoration, the reclosers will be re-enabled to perform normally.

GWP maintains a list of transmission and distribution lines that must be manually patrolled prior to re-energization, in the event the lines were automatically (e.g., via relay action) or manually (through Power System Operator action) de-energized. System Dispatch notifies GWP staff that the lines are being patrolled in anticipation of re-energization. During these patrols, GWP personnel ensure that structures and equipment are not damaged – e.g., poles are upright, conductors are attached, transformers are in place, there are no trees or other vegetation in contact with overhead conductors, etc.

During these patrols, if equipment or assets are found in a suboptimal condition, GWP personnel will coordinate to repair the equipment and restore service. To facilitate repairs, GWP maintains a minimum level of spare distribution transformers, conduit, cables and conductors, other equipment, and associated parts in its warehouse. When minimum thresholds are reached, the warehouse automatically orders a pre-determined number of units to restore warehouse stock in anticipation of the next emergency.

In the event GWP lacks the personnel, equipment, or parts to rapidly restore service, it can leverage mutual assistance and mutual aid programs with neighboring utilities. In these cases, neighboring utilities can quickly offer personnel, equipment, and parts to safely and quickly restore service to customers.



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N. Plan Maintenance and Inspection Effectiveness

This Plan is intended to be a “living document,” providing guidance to GWP on funding and operational priorities, yet with sufficient flexibility to be updated based upon new data and feedback from those responsible for its implementation.

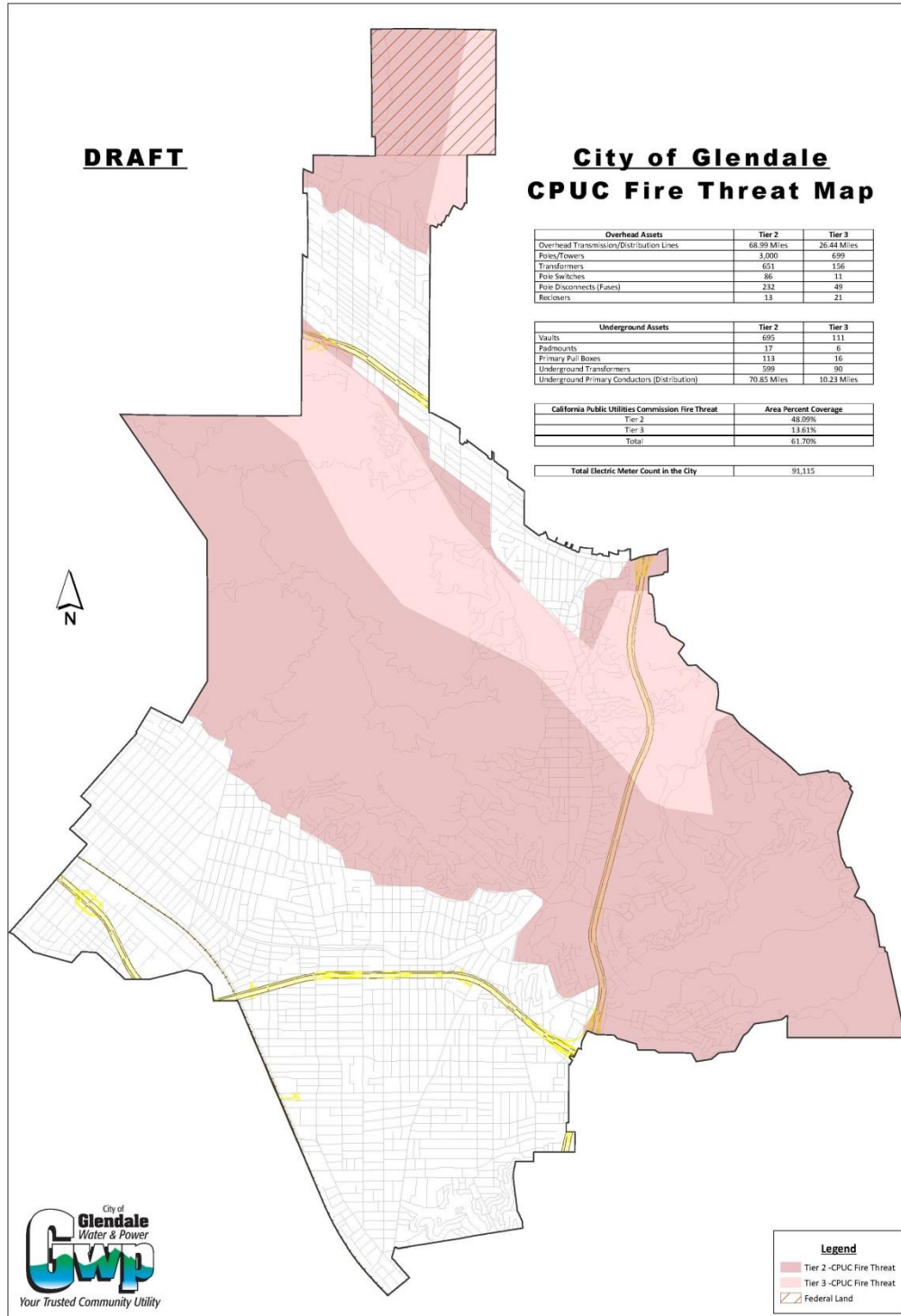
As described in **D. Metrics** and **E. Metrics Feedback**, GWP’s metrics are intended to measure the effectiveness of this Plan. As the metrics are collected and analyzed, the Plan’s effectiveness will be evaluated and, as necessary, the Plan will be modified in response to that feedback. The Wildfire Mitigation Plan Committee will meet quarterly, or as needed, to review the Plan metrics and compare against operational performance – specifically, the Committee will assess each metric and, with the benefit of hindsight and added experience, determine the metric’s effectiveness. The Plan will be reviewed annually and circulated through GWP management, City of Glendale management, and the City of Glendale’s City Council for review and approval. This review process will include making updates to the Plan to correct any Plan deficiencies.

As discussed in **C. Preventative Strategies and Programs, Operations & Maintenance (O&M) Efforts**, GWP will contract with an engineering firm to conduct a complete system inspection of all poles, vaults, and associated/attached equipment. GWP staff will oversee these inspections and will assign qualified personnel to monitor and audit the inspections to ensure that they are conducted in a consistent and thorough manner. As changes to the process are required, GWP staff will be empowered to initiate those changes with the contracted inspectors. Once completed, this set of system inspections will establish a condition baseline. GWP will then use internal staff to launch an on-going inspection program, using the contractor inspection plan as a basis, to ensure system assets continue to be monitored and inspected on a regular basis.



Glendale Water & Power Wildfire Prevention and Mitigation Plan

Exhibit A. City of Glendale Fire Threat Map

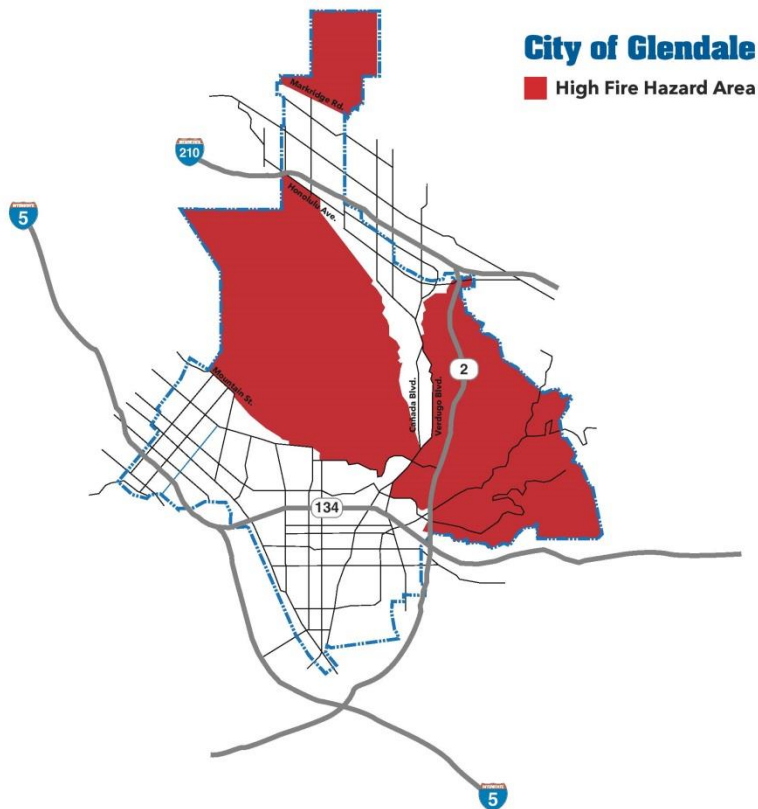




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Exhibit B. Vegetation Management Program (VMP)

The two-page VMP brochure below was up-to-date as of the date of this Plan. For the latest version, please see <https://www.glendaleca.gov/government/departments/fire-department/fire-prevention-environmental-management/vegetation-management-and-bush-abatement>.



Defensible Space Standards for the High Fire Hazard Areas of Glendale



*Annual inspections to ensure
adequate defensible space
begin May 1st.*



Glendale Fire Prevention Bureau
780 Flower St., Glendale, CA 91201

GlendaleFire.com
(818) 548-3814

Note: Oak, bay and sycamore trees are protected in the City of Glendale. For more information call (818) 548-3950 or visit GlendaleTrees.org.

   @GlendaleFireCa



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Exhibit B. Vegetation Management Program (VMP), continued

DEFENSIBLE SPACE

Creating and maintaining defensible space is essential for increasing your home's chance of surviving a wildfire. It's the buffer that homeowners are required to maintain on their property between a structure and the plants, brush and trees or other items surrounding the structure that could catch fire. This space is needed to slow the spread of wildfire and improves the safety of firefighters defending your home.

Two zones make up the required 100 feet of defensible space.

ZONE 1

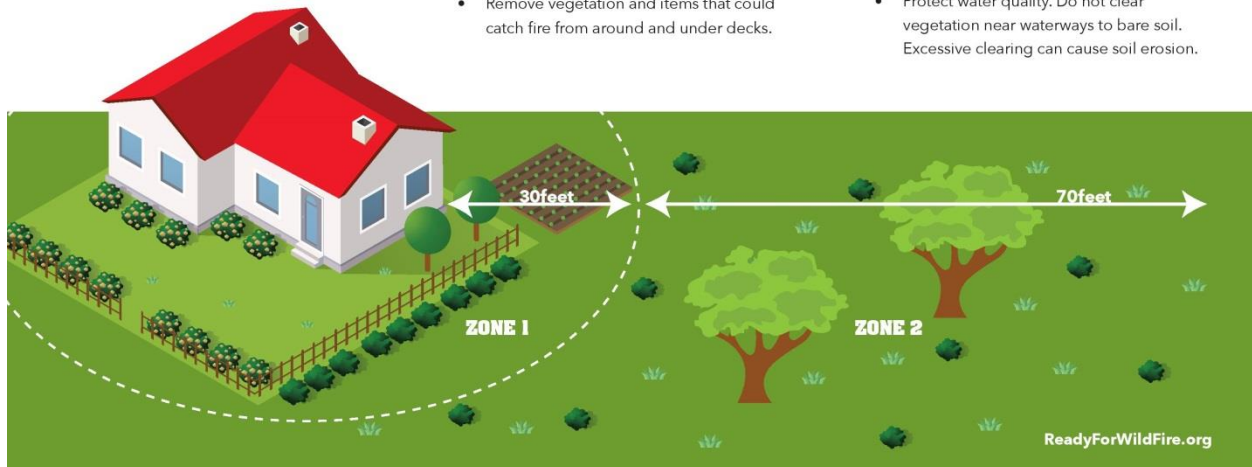
Extends **30 feet** out from buildings, decks, and other structures

- Remove all dead plants, grass and weeds.
- Remove dead or dry leaves and pine needles from your yard, roof and rain gutters.
- Trim trees regularly to keep branches a minimum of 10 feet from other trees.
- Remove dead branches that hang over your roof, and keep branches 10 feet away from your chimney.
- Remove or prune flammable plants and shrubs near windows.
- Remove vegetation and items that could catch fire from around and under decks.

ZONE 2

Extends **30 to 100 feet** out from buildings, decks, and other structures

- Cut or mow annual grass down to a maximum height of 4 inches.
- Create a minimum horizontal spacing of 20 feet between shrubs and trees.
- Create a minimum vertical spacing of 6 feet between grass, shrubs and the lowest branches on a tree.
- Remove fallen leaves, needles, twigs, bark, cones, and small branches. However, they may be permitted to a depth of 4 inches if erosion control is an issue.
- Protect water quality. Do not clear vegetation near waterways to bare soil. Excessive clearing can cause soil erosion.





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Exhibit C. Third-Party Independent Assessment

Attached is Navigant's final *Wildfire Mitigation Plan Independent Evaluation* assessing GWP's Wildfire Mitigation Plan, dated November 27, 2019.

Wildfire Mitigation Plan Independent Evaluation

Prepared for:

Glendale Water and Power



Submitted by:
Navigant, A Guidehouse Company
35 Iron Point Circle
Suite #225
Folsom, CA 95630

guidehouse.com

November 27, 2019

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DISCLAIMER

This report was prepared by Navigant Consulting, Inc., n/k/a Guidehouse Inc. (“Navigant”),¹ for Glendale Water and Power. The work presented in this report represents Navigant’s professional judgment based on the information available at the time this report was prepared. Navigant is not responsible for the reader’s use of, or reliance upon, the report, nor any decisions based on the report. **NAVIGANT MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESSED OR IMPLIED.** Readers of the report are advised that they assume all liabilities incurred by them, or third parties, as a result of their reliance on the report, or the data, information, findings and opinions contained in the report.

¹ On October 11, 2019, Guidehouse LLP completed its previously announced acquisition of Navigant Consulting Inc. In the months ahead, we will be working to integrate the Guidehouse and Navigant businesses. In furtherance of that effort, we recently renamed Navigant Consulting Inc. as Guidehouse Inc.

EXECUTIVE SUMMARY

Glendale Water and Power (GWP) contracted with Navigant Consulting, Inc. n/k/a Guidehouse Inc. (Navigant) to engage in an independent evaluation of its Wildfire Mitigation Plan (Plan or WMP). This independent evaluation report (Report) describes the technical review and evaluation provided by Navigant. Navigant performed this evaluation in October and November 2019 and completed the Report on November 27, 2019. Navigant's project team reviewed detailed information related to the Plan and assessed GWP's procedures related to the Plan.

The Plan was prepared as a response to Senate Bill (SB) 901, which was signed into law on September 21, 2018. SB 901 resulted in a number of provisions and directives, among which includes the requirement for electric utilities to prepare and adopt Plans within 2019 and revise and update the Plan annually thereafter. These requirements are codified in the California Public Utilities Code (PUC) Section 8387 for publicly-owned utilities (POUs).

Navigant evaluated the Plan based on the statutory requirements of PUC Section 8387 as it relates to POUs. This PUC Section was amended on July 12, 2019 as a result of the signing of California's Assembly Bill (AB) 1054 into law. The POUs are now subject to the guidance provided by the California Wildfire Safety Advisory Board² and mandatory cyclical reviews. The required elements for a WMP have not been modified by this new legislation. This Report meets GWP's requirements under PUC Section 8387(c), which mandate an independent evaluation of GWP's Plan. The Report was developed to satisfy the statutory requirement for public review. This Report underlies the required evaluation by the Board of Directors at a public meeting, scheduled for December 17, 2019. The Report includes the following:

- Background of the legislative history requiring WMPs and their independent evaluations
- Approach and methodology evaluating the Plan's comprehensiveness
- GWP's Plan elements and their compliance with SB 901 and PUC Section 8387 WMP elements and directives
- An evaluation of the Plan's presented metrics to assess the effectiveness of the overall Plan
- Determinations and results

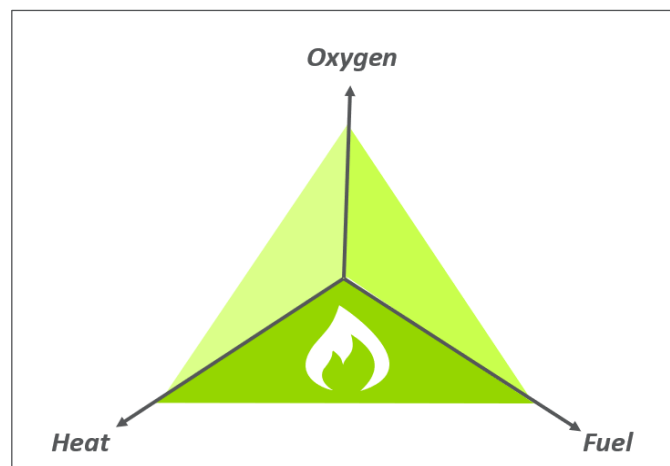
Based on relevant experience in grid hardening and resiliency, natural disaster response, prior experience in WMP development, and active tracking of wildfire legislative and regulatory proceedings Navigant has concluded that GWP's WMP is comprehensive in accordance with PUC section 8387.

² Due for implementation in 2020.

1. BACKGROUND

In recent years, California has seen an increase in utility equipment-involved, catastrophic wildfires. The unique geographic profile of California and the impacts of climate change, including continued dry conditions, high winds, and elevated heat index risk from global rising temperatures, have led to elongated fire seasons. The state is also experiencing increased levels of vegetation fuel due to the wet winters, hotter summers following a seven-year drought, and past fire suppression efforts. This increasingly abundant dry vegetation is the leading driver of wildfires. The levels of dry vegetation fuel have been aggravated by a destructive bark beetle infestation that continues to impact the health of the state's forested areas, further increasing fire risk. These fuel-rich environments, coupled with intensified climatological conditions with high wind gusts and natural electrical infrastructure risks, produce the conditions conducive to potential wildfire ignition. The three attributes that provide optimal conditions for a fire ignition are illustrated through the graphic in Figure 1.

Figure 1: Fire Triangle



Disastrous wildfire threat is a well-known and shared priority among electric utilities in California. The recent spike in utility-involved wildfire incidents since the 2015 wildfire season and the significant financial and livelihood impacts associated with them have led to more formalized efforts to ensure safe operations of electric utility equipment and greater investment in wildfire mitigation efforts.³ Specifically, the state has approved legislation that strengthens governmental and regulatory oversight of wildfire prevention implementation activities, utility Wildfire Mitigation Plans (WMPs or Plans), and proper dispersal of state funds to wildfire victims. In an effort to minimize future devastating occurrences through risk-driven wildfire prevention, electric utilities, including cooperatives, were mandated, by Senate Bill (SB) 901 (Senator Bill Dodd, 2018), to prepare and annually adopt a WMP before January 1, 2020. This effort is foundational to the state's prioritized goal of minimizing the potential of devastating fires in future years.

1.1 SB 901 – Wildfire Mitigation Plans

On September 21, 2018, Governor Jerry Brown signed SB 901 into law. The bill directs electrical utilities to annually prepare WMPs that include several mitigation and response elements in each utility's strategies, protocols, and programs. Each electric utility is to prepare and adopt a comprehensive WMP

³ California Public Utilities Commission, 2019. "Fire Incident Data Reports for Investor-Owned Utilities," <https://www.cpuc.ca.gov/fireincidentsdata/>.

before January 1, 2020. The requirements for publicly-owned utilities (POUs) are presented in Public Utilities Code (PUC) Section 8387. Details relating to POU requirements are discussed in Section 2 of this WMP evaluation report (Report).

1.1.1 AB 1054 Statutory Modifications

On July 12, 2019, Governor Gavin Newsom signed Assembly Bill (AB) 1054 into law. This bill was developed with the consideration of the Governor's Strike Force effort to develop prioritized strategies to help the state achieve its decarbonization goals. AB 1054 aims to mitigate the intensity of wildfire impacts through several initiatives separate from those actions required of electric utilities. SB 901 directed the Office of Planning and Research to establish a Commission on Catastrophic Wildfire Cost Recovery (SB 901 Commission) with the goal of addressing utility wildfire liability, cost responsibility and victim support, and issues with insurance availability and affordability. On June 18, 2019, the SB 901 Commission presented to the state Legislature, findings and recommendations on the issues discussed at public workshops over the course of several months. This, in part with Governor Newsom's Wildfire Reform Package, resulted in legislation that culminated in the provisions listed in AB 1054.

AB 1054 includes directives to establish the Wildfire Safety Division at the California Public Utilities Commission (CPUC) and the state's Wildfire Safety Advisory Board. POUs will their WMPs by July 1 of each year starting in 2020 for review by and recommendations from the Wildfire Safety Advisory Board. No less than every three years, POUs are required to comprehensively update their WMPs. This change is included in this evaluation as a reference for future requirements.

1.2 Glendale Water and Power Plan Preparation

Glendale Water and Power (GWP) is a department within the City of Glendale. Its service territory is approximately 31 square miles. GWP's primary goal is to provide reliable and sustainable water and electricity services to its local community. As a POU, GWP has no fiduciary obligations to shareholders and its actions and decisions are governed by the City Council and ultimately to the citizens of Glendale.

GWP prepared its first WMP pursuant to SB 901 directives. The Plan aims to address each of the required elements presented by PUC Section 8387 and ultimately reduce the risk of contributing to utility-involved wildfire events through Plan execution and metric tracking. GWP will post its plan to its website for public review following its anticipated approval by City Council on December 17, 2019.

1.2.1 Independent Evaluation Services

PUC Section 8387(c) directs POUs to procure services for an independent evaluation (IE) of the comprehensiveness of the WMP. In January 2020, upon commencement of the California Wildfire Safety Advisory Board, guidelines and further details related to the scope and timelines of future IEs will be discussed and reviewed. In its present⁴ form, the provisions of PUC Section 8387 state that the independent evaluator shall be experienced in "assessing the safe operation of electrical infrastructure" and will perform an assessment to determine the comprehensiveness of the Plan.⁵

GWP sought out IE services to assess the comprehensiveness of its WMP pursuant to PUC Section 8387(c) prior to presenting the final WMP to City Council and contracted Navigant Consulting, Inc., n/k/a Guidehouse Inc. (Navigant) in October of 2019 to undertake an assessment of its Plan based on

⁴ The CPUC has just begun its investigation to develop a list of recognized independent evaluators by March of 2021.

⁵ It is recognized that this requirement does not yet include a clear definition of comprehensiveness.

Navigant's prior experience with assessing the safe operation of electrical infrastructure, including grid-hardening and WMPs, with an emphasis on electrical equipment, public, and personnel safety.

Emergent practices will materialize as evolving legislative action and technology advances continue to shape wildfire mitigation and safety efforts. Understanding this, Navigant performed a comparison of the wildfire mitigation investments undertaken by other utilities throughout California as well as relied on the team's experience in working directly with utilities to develop their WMPs and data collection practices along with prior experience related to grid hardening and electric safety assessments. This Report presents the results of Navigant's WMP IE. The following section describes the methodology in executing this evaluation.

Navigant Identification of Qualifications

Navigant provides IE services throughout the United States. Navigant's grid-related IE projects include storm hardening, wildfire mitigation, resiliency assessments, advanced technology suitability, among others. Our approach includes an evaluation of data considered, suitability of tracking metrics – both frequency and trends analysis - and an evaluation of key performance indicators. Navigant assesses the efficacy of tools for creating sufficient awareness and for effectiveness of understanding overall WMP's intended and actual impacts. Navigant also leverages experience developing "Metrics and Benefits Reporting Plans" to gauge cost-effectiveness of activities and alignment of plans to intentions. Navigant understands GWP's publicly-owned business practices relative to IOUs, through our experience developing WMPs for two IOUs and our continued tracking of related CPUC dockets intended to refine strategies that carry an effective Plan.⁶

Navigant continues to track proceedings, pending legislation, and other developments surrounding utility wildfire risk. Our team remains active with WMP engagements across jurisdictions and risk profiles. As part of maintaining high acumen of prudent mitigation strategies, Navigant participates in forums focused on innovative wildfire mitigation strategies—further expanding our industry knowledge. Navigant provides thought leadership and advisory services related to WMP and other resiliency innovative technologies to the California Energy Commission and has supported their system hardening and fire prevention efforts since 2008. Additionally, Navigant's reach into grid resiliency and disaster-related hardening extends across the United States including island grids, such as Puerto Rico, recovering from recent, weather-related catastrophes.

⁶ Navigant provided technical services to Liberty Utilities (CalPeco Electric) and Bear Valley Electric Service (BVES) immediately prior to and within the 2019 calendar year. The services resulted in support of the development and filing of their respective WMPs to the CPUC on February 6, 2019. Navigant continued to support BVES in development of their Data Collection for WMP report, filed on July 30, 2019.

2. EVALUATION SCOPE AND APPROACH

At the time of this IE, the guidelines and requirements were not available to POUs regarding the structure or determination of comprehensiveness pursuant to PUC Section 8387(c). In lieu of this formalized directive, Navigant completed this evaluation based on industry standard practices, our experience developing and reviewing WMPs and other grid hardening activities, our active tracking of wildfire legislative and regulatory proceedings and, most importantly, a comparison of the specific criteria in PUC Section 8387(b)(2) to the specific wildfire-related plans outlined in GWP's WMP.

2.1 Evaluation Parameters

Figure 2 represents the attributes comprising the methodology and approach of the evaluation.

Figure 2: Contributing Factors to Evaluate the Plan



2.1.1 Provisional Requirements

As mentioned above, the requirement for electric utilities and corporations to develop WMPs emerged from the directives of SB 901 and associated statutory modifications. With respect to POUs, the nested subsections under PUC Section 8387(b)(2) outline the required elements to be included in the Plan. See Table 1 for the complete statutory compliance list.

Table 1: POU Requirements for the WMP

PUC Section 8387 <i>(as amended on July 12, 2019)</i>
<p>(a) Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.</p>
<p>(b) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, prepare a wildfire mitigation plan. After January 1, 2020, a local publicly owned electric utility or electrical cooperative shall prepare a wildfire mitigation plan annually and shall submit the plan to the California Wildfire Safety Advisory Board on or before July 1 of that calendar year. Each local publicly owned electric utility and electrical cooperative shall update its plan annually and submit the update to the California Wildfire Safety Advisory Board by July 1 of each year. At least once every three years, the submission shall be a comprehensive revision of the plan.</p>
<p>(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:</p>
<p>(A) An accounting of the responsibilities of persons responsible for executing the plan.</p>
<p>(B) The objectives of the wildfire mitigation plan.</p>
<p>(C) A description of the preventive strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.</p>
<p>(D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.</p>
<p>(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.</p>
<p>(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</p>
<p>(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.</p>
<p>(H) Plans for vegetation management.</p>
<p>(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.</p>
<p>(J) A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility's or electrical cooperative's service territory. The list shall include, but not be limited to, both of the following:</p>
<p>(i) Risks and risk drivers associated with design, construction, operation, and maintenance of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.</p>
<p>(ii) Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.</p>
<p>(K) Identification of any geographic area in the local publicly owned electric utility's or electrical cooperative's service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire-threat district based on new information or changes to the environment.</p>

(L) A methodology for identifying and presenting enterprise wide safety risk and wildfire-related risk.
(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.
(N) A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:
(i) Monitor and audit the implementation of the wildfire mitigation plan.
(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.
(iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.
(3) The local publicly owned electric utility or electrical cooperative shall, on or before January 1, 2020, and not less than annually thereafter, present its wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies, and interested parties, and shall verify that the wildfire mitigation plan complies with all applicable rules, regulations, and standards, as appropriate.
(c) The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on the internet website of the local publicly owned electric utility or electrical cooperative, and shall present the report at a public meeting of the local publicly owned electric utility's or electrical cooperative's governing board.

2.1.2 Industry Knowledge and Regulatory Proceedings

The state's priority towards abating future catastrophic wildfire events is demonstrated through aggressive measures, directing utilities to enhance their protocols for fire prevention, public communications, and response. That collection of information is presented in a comprehensive WMP. While POU's are directed to develop this Plan prior to January 1, 2020, Navigant recognizes that California utilities subject to CPUC jurisdiction have filed their respective Plans on February 6, 2019. Navigant has tracked docketed proceedings and maintains a presence in state activities and workshops surrounding wildfire prevention. Understanding that GWP is not subject to CPUC regulations, the insight gained from this related experience is leveraged in assessing GWP's Plan relative to its risk profile and industry position.

2.2 Evaluation Approach

To perform an assessment of the comprehensiveness of the Plan, Navigant used the following described approach.

2.2.1 Statutory Compliance

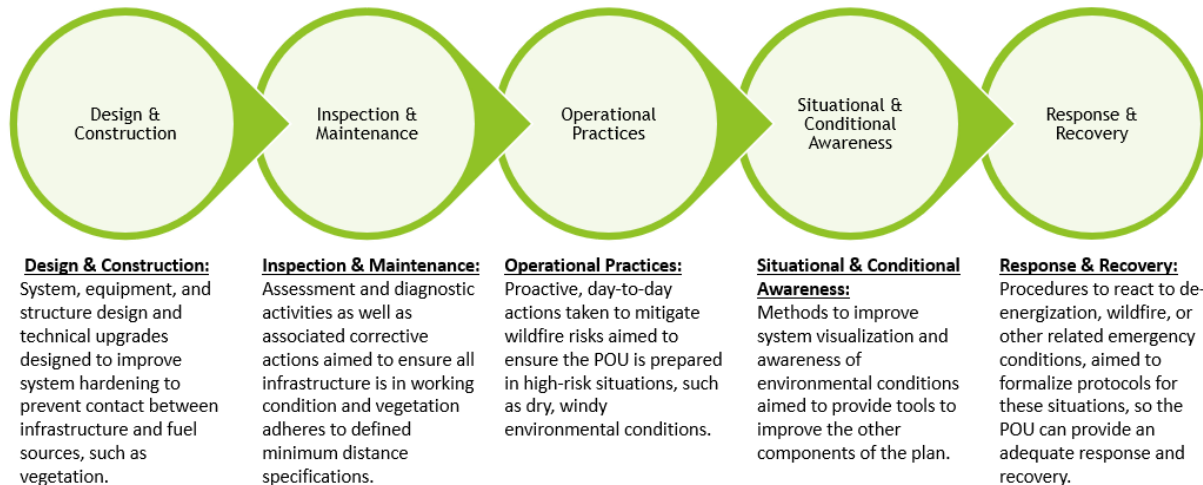
Navigant sought to determine compliance with the provisional requirements laid out in SB901 as codified in PUC Section 8387. The Plan's alignment with the statutory requirement is presented in Appendix A. GWP's mitigation measures are not required to exceed the statutory requirements.

2.2.2 Industry Wildfire Mitigation Practices Comparison

Accepted practices for wildfire mitigation have been discussed and presented at numerous events, such as the Wildfire Technology Innovation Summit, held on March 20-21, 2019. Additionally, Plans approved

by the CPUC have garnered significant insight from the industry at large. Navigant’s understanding of an effective Plan draws on comparisons from existing WMPs and industry practices and is summarized according to business practice categories described in Figure 3.

Figure 3: Mitigation Strategy Overview



Expertise in these critical elements facilitated Navigant’s review of the comprehensiveness of GWP’s WMP. While not all of these strategies are present in or applicable to GWP’s Plan, due to GWP’s size, location, and operational characteristics, Navigant’s understanding of collected utility strategies demonstrated throughout the state are summarized below:

- **Inspection and maintenance of distribution transmission and substation assets** including conducting system patrols and ground inspections, using technological inspection tools, managing predictive and electrical preventative maintenance, and conducting vegetation inspections and management, vulnerability detection such as Light Detection and Ranging (LiDAR) inspection; and geospatial and topography identification, geographic information system (GIS) mapping data. A key component is identifying collected data elements through each program and understand how that data is used and shared to improve utility practices.
- **Vegetation management** that includes routine preventative vegetation maintenance; corrective vegetation management and off-cycle tree work; emergency vegetation clearance, prioritized for portions of the service territory the lie in high hazard zones, quality control processes; and resource protection plan, including animal and avian mitigation programs.
- **System hardening** that includes pole replacement, non-expulsion equipment, advanced fuses, tree attachment removal, less flammable transformer oil, covered wire and wire wrap, and undergrounding where cost beneficial.
- **Operational practices** including communications and mustering plans under varying degrees of wildfire risk. Plans to deactivate automatic reclosers, de-energization of “at risk” area powerlines based on type of facility (overhead bare conduction, high voltage, etc.), tree and vegetation density, available dry fuel, and other factors that make certain locations vulnerable to wildfire risk.
- **Situational awareness** including obtaining information from devices and sensors on actual system, weather and other wildfire conductivity conditions, two-way communication with agencies and key personnel. Programs such as online feeds and websites such as the National Fire Danger Rating System. Situational awareness should help achieve a shared understanding of actual conditions and serve to improve collaborative planning and decision making.

- **De-Energization actions** triggered and prioritized by forecasted extreme fire weather conditions; imminent extreme fire weather conditions; validated extreme fire weather conditions; and plans for re-energization when weather subsides to safe levels. Manual or automatic capabilities exist for implementation.
- **Advanced Technologies** including Distribution Fault Anticipation technology, tree growth regulators, pulse control fault interrupters, oblique and hyper-spectral imagery; advanced transformer fluids; advanced LiDAR, and advanced SCADA, to reduce electrical ignition while also helping to mitigate power outages and equipment damage.
- **Emergency Preparedness, Outreach and Response communications** before, during, and after emergencies including but not limited to engaging with key stakeholders that include critical facilities and served customers; local governments, critical agencies such as California Department of Forestry and Fire Protection (CAL FIRE), local law enforcement agencies and other first responders, hospitals, local emergency planning committees, other utility providers, California Independent System Operator, and the utility's respective Board. Coordination agreements such as Mutual Assistance should be leveraged. Community outreach plan should inform and engage first responders, local leaders, land managers, business owners and others.
- **Customer support programs** including financial assistance and support for low-income customers; billing adjustments; deposit waivers; extended payment plans; suspension of disconnection and non-payment fees; repair processing and timing; access to utility representatives; and access to outage reporting and emergency communications. Consideration of languages in addition to English. Identification of priority customers, such as first responders and local agencies, health care providers, water and telecommunication facilities, groups that assist children, elderly, mobility impaired, and other vulnerable populations.

2.2.3 Value Determination of Plan Metrics

Metrics for tracking the Plan's progress intend to allow the utility to refresh information as trends become clearer. Based upon the discussion included in the CPUC's Phase 2 of the SB 901 proceeding docket, interests in metric development and underlying data collection are beginning to take shape. While these determinations do not directly influence the public power sector, insight has been leveraged to employ effective metrics.⁷

⁷ CPUC Order Instituting Rulemaking to Implement Electric Utility Wildfire Mitigation Plans Pursuant to SB 901 (2018) (Rulemaking 18-10-007) https://apps.cpuc.ca.gov/apex/f?p=401:56:0::NO:RP,57,RIR:P5_PROCEEDING_SELECT:R1810007.

3. GWP WMP PLAN ELEMENTS

Navigant reviewed the Plan elements and determined whether the activities supported the intention to deploy an effective WMP. This determination incorporated individual elements as well as underlying data sources that further described data collection methodologies and implementation procedures to ensure measures are carried out and also tracked. This understanding also informs internal reviews and subsequent updates for future Plan iterations.

Navigant found that GWP's WMP meets the statutory requirements of comprehensiveness PUC Section 8387. In this section, we review the WMP's elements and their purpose relative to the development and successful execution of the WMP. A table comparing each subsection of PUC Section 8387 to the significant sections of the WMP can be found in Appendix A.

3.1 Objectives and Overview of Preventative Strategies and Programs

PUC Section 8387

(B) The objectives of the wildfire mitigation plan.

(C) A description of the preventive strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.

GWP has clearly stated objectives in Section B of the WMP. GWP's primary objective refers to minimizing the probability that GWP's transmission and distribution system may be the origin or contributing source for the ignition of a wildfire. The secondary objective is to improve the resiliency of GWP's electric system by assessing new industry practices and technologies to reduce the likelihood of a disruption in service or improve the restoration of service. The third and fourth objectives relate to measuring the effectiveness of the mitigating measures in the WMP and to complying with all regulations related to wildfire mitigation.

Section C of the Plan identifies and categorizes GWP's preventative strategies and programs for wildfire mitigation into three areas:

- **Capital Investments:** This program of work is primarily based on system hardening strategies to upgrade, enhance, and reinforce GWP electrical infrastructure. For example, GWP is currently evaluating strategies such as insulated overhead conductors, increased conductor spacing, undergrounding, pole replacement, crossarm upgrades, insulator replacement, and transformer replacement.
- **Operations & Maintenance (O&M):** This program of work includes mitigation strategies related to vegetation management, system inspections, and equipment maintenance.
- **Operational Practices:** These practices include disabling reclosers, proactive de-energization, public outreach, and other City programs that support wildfire mitigation.

These programs and strategies are discussed in more detail in the sections below.

3.1.1 Risk Assessment & Drivers

PUC Section 8387

(J) A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility's or electrical cooperative's service territory. The list shall include, but not be limited to, both of the following:

(i) Risks and risk drivers associated with design, construction, operation, and maintenance of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.

(ii) Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.

(L) A methodology for identifying and presenting enterprise-wide safety risk and wildfire-related risk.

GWP evaluates its wildfire risk based on historical data related to wildfires in California from 2012-2016. The utility found that the primary risks identified for fire initiation were vegetation contacts, electrical equipment failures and downed power lines. GWP broke down its equipment failure risk into the specific types of equipment failure to further prioritize its system hardening efforts. The risks associated with design, construction, operation and maintenance are driven primarily by equipment failure.

Section J of the Plan also discusses the topographic and climatological risk drivers in its service territory. Specifically, GWP has both urban areas and mountainous areas with frequent dry vegetation. According to the CPUC's Fire Area Map, approximately 48% of the City of Glendale falls within Tier 2 and 14% falls within Tier 3 or High Fire Threat Areas. GWP expects climate change to continue to exacerbate its wildfire risk and it intends to prioritize its efforts to mitigate wildfire hazards within these high-threat areas.

3.1.2 Asset Overview & Service Territory

PUC Section 8387

(K) Identification of any geographic area in the local publicly owned electric utility's or electrical cooperative's service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire-threat district based on new information or changes to the environment.

As described in Section K of the WMP, 62% of GWP's service territory falls into CPUC Tier 2 and Tier 3 high fire threat areas. Exhibit A of GWP's WFMP provides a map with GWP's Tier 2 and Tier 3 portions of its service territory. The Glendale Fire Department also conducted an independent wildfire zone assessment and its findings align with the CPUC map designations.

The GWP plan has not identified any portion of its system which should be included in a higher risk zone than is currently established and is not making any recommendations to the expand the area of a high fire threat district.

3.1.3 Wildfire Prevention Strategies

PUC Section 8387

(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.

(H) Plans for vegetation management.

(I) Plans for inspections of the local publicly owned electric utility's or electrical cooperative's electrical infrastructure.

3.1.3.1 Disabling Reclosers and De-Energization Protocols

Section F of the Plan describes GWP's operational practices to preemptively deenergize overhead transmission and distribution lines and to disable automatic reclosers in its Tier 2 and Tier 3 zones during periods of extreme wildfire danger. The plan references a dispatch center that is operated 24 hours per day and staffed with dispatchers that are trained in pre-emptive de-energization and rolling blackouts. The details of this policy are in GWP Standard Operating Procedure SOP-021: Public Safety Power Shut Off Policy. The Plan describes the general weather and fire conditions when de-energization will be considered and the consideration of impacts of loss of power to various priority loads. The SOP itself is specific to requiring the GWP dispatcher to make appropriate notifications and implement power shutoffs and disabling automatic reclosers and on its system in areas affected by Red Flag Warnings issued by the National Weather Service.

3.1.3.2 Vegetation Management

Section H of the Plan states that GWP's vegetation management program is consistent with GO 95. GWP contracts out most of its vegetation management work; however, it does have Line Clearance Forestry Supervisors who identify the areas that need trimming, oversee the contractors, and confirm the vegetation is trimmed according to GWP standards. GWP states that the annual budget for vegetation management work was increased by 25% to incorporate enhanced vegetation management practices supporting wildfire mitigation efforts.

GWP included a description of the Glendale Fire Department's Vegetation Management Program, which is designed to maximize clearance and minimize fuels on private and commercial property within 100 feet of structures. This reduces the likelihood of fires as well as the rate and intensity of fire spread on private land and allows GWP efforts to be focused on the higher Tier 2 and Tier 3 risk areas.

3.1.3.3 Infrastructure Inspections

In Section I, GWP references GO 165 as its guidance for system inspections. GWP's master plan is still in development but will include a baseline inspection and inventory of all electric system equipment. This baseline inspection will be conducted beginning in 2020. In addition to using this baseline inspection to prioritize implementation of mitigation strategies, it will also be used to establish and initiate an ongoing periodic inspection program.

3.1.4 Response & Restoration

PUC Section 8387

(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.

(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.

3.1.4.1 Event Communication

In Section G of its WMP, GWP describes the tools and procedures it will use to notify customers impacted by de-energization, including:

- Customer notification through email, phone, text, push notifications, social media platforms, media alerts, work with the City's Fire and Police PIO offices and websites, and rolling messages on local television (GTV6) and on the City's and GWP's websites.
- Pre-recorded IVR (Interactive Voice Response) messages with real-time recorded information informing customers that may be impacted.
- Post messages on its website and through its Mobile App and In-Home Digital Display program for targeted push messaging.
- Notifications to first responders' PIO offices, health care facilities' communication offices, and the offices of the building engineers, the Chief Executive Officer (CEO), and operators of telecommunications infrastructure.
- Contact Life Support customers through two phone attempts and an email. If no response is received, GWP will dispatch a field crew to contact the Life Support customer.

If GWP determines a preemptive de-energization is required, the utility plans to send advance notifications to customers 48-hours before, 24 hours before, just before, during the event and once power has been restored.

3.1.4.2 Restoration

Section M describes how GWP plans to restore power after a wildfire or preemptive de-energization. This follows GWP's typical restoration process. Specifically, GWP maintains a list of reclosers that are disabled in the event of a Red Flag Warning or as determined necessary by the Power System Operators based upon system conditions. Upon restoration, these reclosers will be re-enabled to perform normally. Several steps occur prior to re-energization, including:

- GWP manually patrols specific transmission and distribution lines in the event the lines were automatically or manually de-energized
- System Dispatch notifies GWP staff that the lines are being patrolled in anticipation of re-energization.

- During these patrols, if equipment or assets are found in a suboptimal condition, GWP personnel will coordinate to repair the equipment and restore service
- In the event GWP lacks the personnel, equipment, or parts to rapidly restore service, it can leverage mutual assistance and mutual aid programs with neighboring utilities.

3.1.5 Metrics & Plan Monitoring

PUC Section 8387

(A) An accounting of the responsibilities of persons responsible for executing the plan.

(D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.

(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.

(N) A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:

(i) Monitor and audit the implementation of the wildfire mitigation plan.

(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.

(iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.

3.1.5.1 Responsibilities of Persons Responsible for Executing the Plan

Section A describes roles and responsibilities of individuals responsible for administration and implementation of GWP's WMP. The responsibilities related to plan administration include roles for oversight, coordination between City departments, resources and funding, and review and updates to the Plan. Roles and responsibilities for implementation are specified for operations, maintenance & inspections, infrastructure enhancement and communications. In addition to individual roles and responsibilities, the Plan also establishes a wildfire mitigation committee with a role to monitor effectiveness and recommend updates based on performance and changes to regulation.

3.1.5.2 Metrics

Section D of GWP's WMP provides GWP's proposed metrics to monitor the performance of its Plan. The metrics are intended to result in measurable, tracked results illustrating the efficacy of the Plan through to successful implementation. Tracking these metrics will also inform appropriate revisions and updates to the Plan in future years. There are no set standards for metric development as they remain unique to a utility's approach in fire prevention and Plan execution.

The statutory requirements for the inclusion of metrics are found in PUC Section 8387(b)(2)(D) and (E) where utilities are directed to present these metrics and address how prior metrics impact the proposed metrics for the next version of the Plan. The eight proposed metrics in GWP's 2019 WMP (shown in Table 5 below) serve as GWP's first version, providing no previous metrics with which to compare. These

proposed metrics meet the statutory requirements and will assist in providing insight on the effectiveness of the Plan in future years.

Table 2: GWP Proposed Metrics

Specific metric	Indicator	Criteria
Relay event where GWP's protective relays automatically de-energize a feeder or transmission line	Count of events	For each outage meeting this criteria, GWP will track (1) If the outage ignited a fire? (2) If yes, were first responders notified? (3) If yes, how large was the fire? (4) If yes, how many structures were impacted?
Trees trimmed	Count of trees	
Poles replaced	Count of poles	
Transformers replaced	Count of transformers	
Feet/miles of T&D lines moved underground in Tier 2/3	Count of miles underground	
Feet/miles of tree wire installed in Tier 2/3	Count of tree wire installed	
Non-expulsive fuse replacements	Count of fuses	
GFD average time to respond to fire incidents	Minutes	

3.1.5.3 Monitoring and Auditing the Plan

GWP plans to present its WMP to the Glendale City Council on an annual basis and have an independent evaluator review the Plan. The WMP specifies that the General Manager has authority to delegate monitoring and audit of the implementation of the Plan.

GWP will be conducting a comprehensive system inspection for baseline conditions beginning in 2020. The results of this baseline inspection will be used to identify and prioritize deficiencies and establish implementation of corrective actions. The Plan also assigns the Wildfire Mitigation Committee responsibility to meet on a periodic basis and review performance of the plan.

The Plan's section on metrics identifies additional measures that may be used to monitor the effectiveness of plan implementation and to make adjustments and modifications as needed.

3.1.5.4 Annual Review

In accordance with PUC Section 8387(b)(3), the WMP will be reviewed at least annually. The review will include assessments of the WMP's programs and performance. As part of this process, GWP will monitor and audit the implementation of the WMP, identify and correct deficiencies, and monitor and audit the effectiveness of electrical line and equipment inspections, including inspections carried out by contractors. The Plan and the Independent Evaluator report will be presented annually at a public meeting of the Glendale City Council.

4. INDUSTRY PRACTICES COMPARISON

In consideration of industry-accepted and demonstrated mitigation measures, Navigant provided a comparison against approved California utility Plans where comparable to GWP's service territory, risk profile, and equipment within the HFTD Tier 2 and Tier 3 areas. Highlighted strategies for effective wildfire mitigation are represented in Table 2.

Covered Conductors

Covered conductors are any conductors (wires) protected by layers of insulation, making the conductors protected against inadvertent contacts. These wires are designed to withstand inadvertent contact with vegetation or other debris without starting a fire.

Throughout California, and in many areas of the country, the use of bare overhead wire has been the standard. Bare wire has demonstrated a high-level of reliability in adverse weather conditions such as lightning.

GWP is evaluating current construction practices for overhead distribution lines in HFTD and will identify and implement new practices as part of their capital program. It has already purchased insulated overhead conductors for a small stretch of its line and is considering the applicability of this mitigation in other areas.

Disabling Reclosing Operations

Disabling reclosing refers to the ability to turn off the functionality of substation breakers and reclosers to attempt to isolate fault conditions and re-energize (turn back on) areas of the electric grid. Traditionally, electrical circuits were designed to automatically open and close to detect and isolate faults. In many cases, the relays would make two or three attempts to isolate a fault condition. Each reclosing attempt could cause an electrical spark, which could be a source of ignition. Disabling reclosing significantly reduces the number of potential ignition sources.

GWP maintains SOP-21 which is a protocol for operations during high fire threat conditions. In the event of a PSPS, this procedure includes disabling reclosers. Automatic reclosers are then re-enabled following the termination or cancellation of a Red Flag Warning issuance after patrolling the lines.

GWP's approach to disabling reclosing is appropriate and consistent with the practices of other utilities.

Non-Expulsive Fuse Devices

Fuses (Fusing) refer to protective devices that defend the distribution system from faulted or damaged lines and equipment. GWP is considering using non-expulsive fuses in its HFTDs. This is consistent with the practices being performed by the other utilities in the state.

4.1 Mitigation Strategies Assessment

The following describes the scoring determinations of the benchmarking practice. Navigant weighed strategies that have been demonstrated globally, as well as from those proposed by state utilities. As expressed in Figure 4, this benchmarking practice supports efforts to determine the Plan's comprehensiveness when investigating the mitigation measures proposed in GWP's WMP. This assessment is designed to confirm prudent measures as proposed by GWP and did not result in any material findings that would result in non-compliance or lack of comprehensive Plan elements.

Figure 4: Determinations for Benchmarking



Meets the state and federal requirements and aligns with the identified benchmarking practices



The Plan does not effectively describe the mitigation measure to warrant a sound determination or the strategy does not align with the presented best practice strategy. For the purpose of this evaluation, exploratory considerations of proposed best practice measures would fall under this category.





The strategy does not apply to GWP or their risk exposure to wildfire events



The selected strategies represented in Table 2 include both statutory requirements that exist as industry standards for POUs as well as accepted industry practices within the state.


Table 2 Industry Practice Strategy Comparison Matrix

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<i>Situational Awareness / Weather Conditions</i>					
Investing or investigating in opportunities to procure weather stations for instantaneous weather condition reporting	Having access to internal mechanisms to track fire conditions (high wind, dry conditions, high heat), will aid in responding to and preventing potential fires by enacting related protocols during fire watch conditions	Especially in HFTD, weather stations would allow GWP personnel to have access to real-time monitoring of these areas	GWP is working with SCE to determine if weather stations could be installed in its service territory.		GWP is investigating opportunities to procure weather stations.
Instantaneous weather conditions web-based portal and GIS data sharing capabilities; weather monitoring	Real-time, weather update tracking allows deepened awareness of the conditions that may lead to a spark or ignition. The weather station servers are able to capture and record several weather and meteorological attributes, allowing forecasting scenarios and learning experiences from high-risk events. The presentation and visualization of this data through GIS monitoring applications will assist future risk models and fire prevention planning	Weather stations should have the ability to capture and interpret the information sent in real-time for operations that warrant mitigation measures.	The Dispatch Center closely monitors NOAA weather reporting for Red Flag Warnings and notifies a GWP staff via email re: 7-day, 3-day, and 24-hour notices for turn-off of power.		GWP relies on the Dispatch Center for daily weather notifications.



Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
Cameras with night vision mode capability atop of electrical structures	Visual inspections can be enhanced through the use of cameras with high definition and night vision capabilities. This measure improves response times in addressing risk incidents and de-energization	GWP has facilities within HFTD that would benefit from additional visibility into the regions with greatest threat of ignition or fire spread.	As part of its capital program, GWP is looking into HD cameras that can be monitored 24/7.		GWP is considering camera installation for additional visibility.
System Hardening / Design & Construction					
Replacing bare wires with covered conductors	Covered wire is a well-demonstrated prevention method to sparks / ignitions during severe weather conditions. Several utilities are employing pilot programs of covered wire replacement of distribution lines, prioritizing HFTD for implementation.	GWP has an applicable overhead distribution line within the HFTD that would benefit from additional hardening such as covered wire replacement for existing, legacy bare wire.	GWP has ordered insulated overhead conductors for a small stretch of overhead conductors in high fire threat areas.		GWP is replacing bare wires with covered conductors in a small area of its service territory.

Wildfire Mitigation Plan Independent Evaluation

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<p>New or planned electrical lines (distribution and transmission) that are designed to withstand working loads under the stress above design standards to address high wind speeds</p>	<p>As new capital infrastructure plans are developed, it would be prudent to consider resilient design standards that can withstand sustained winds and gusts that occur during Red Flag Warning periods.</p>	<p>New line construction standards are taken into consideration in accordance with GO95.</p>	<p>GWP is considering changes to its design requirements for electrical lines to further mitigate wildfires.</p>		<p>GWP is considering this as part of its capital program.</p>
<p>Steel or composite poles swapped out for wood poles, at minimum, within the HFTD or fireproofing wooden poles (fire resistant material coating)</p>	<p>When considering pole replacement strategies, when applicable, composite or steel poles can reduce the risk that wood poles present. At minimum, fire retardant material can be coated to temporarily enhance the ability to prevent fire spread or impact the stability of the structure under fire threat.</p>	<p>While pole remediation activities exist, such as additional clearing, coring to test structural integrity, and coating mechanisms, when new poles are considered for high fire severity zones, more resilient designs should be a consideration.</p>	<p>As part of its capital program, GWP is considering replacing wood poles with sturdier poles to reduce the likelihood of downed poles igniting wildfires. This may include the use of steel poles, where applicable.</p>		<p>GWP is considering this as part of its capital program.</p>



Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<p>Pole loading assessment and remediation</p>	<p>Carry out programs that address pole loading issues and inspections that would result in remediation to infrastructure.</p>	<p>GWP must comply with PRC 4292 for pole clearing activities for vegetation risk and should also maintain awareness of the decay and structural integrity of aged or impacted poles within the service territory.</p> <p>General Order 165 is considered a "best practice" by many public owned utilities. GO 165 Section III A (5) defines "Intrusive" inspection as one involving movement of soil, taking samples for analysis, and/or using more sophisticated diagnostic tools beyond visual inspections or instrument reading.</p>	<p>GWP has instituted an on-going process to replace aged transformers, which are more likely to fail by tracking characteristics like age, installation date, manufacturer, loading factor, and size for each transformer. Currently, transformers with more than 40 service years are prioritized for replacement; this process includes an analysis to ensure new, replacement transformers maintain the proper size and loading factors.</p>		<p>GWP is consistent with GO 165.</p>

Wildfire Mitigation Plan Independent Evaluation


Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
Expulsion fuse device change out to current-limiting (non-expulsive) fuses	<p>Traditional fuses pose a fire risk due to the ignited material that can be expelled. Best practices for mitigating this risk is to change out these fuses with non-expulsive fuses</p> <p>A protective device coordination study achieves an optimum balance between equipment protection and selective isolation that is consistent with the operating requirements of power systems.</p>	<p>High fire threat areas would benefit from the replacement of traditional fuses with ones that minimize sparks and arcs</p> <p>Electrical systems use fuses and circuit breakers to protect electrical equipment. Equipment failures and other anomalies may cause a short circuit. Risks are reduced within High Fire Threat Areas when a short circuit impacts only that portion of the system where the failure occurs.</p>	GWP is considering replacing distribution fuses with non-expulsive fuses to prevent inadvertent sparking as fuses blow.		The use of non-expulsive fuses is under consideration but there are currently no plans for installation.
Tree attachment removals	This practice involves the removal of electrical infrastructure fastened to trees for infrastructural support but can be a source of ignition. The removal of these legacy devices may reduce electrical spark risk.	Tree attachments in HFTD present a risk of fire ignition.	N/A GWP does not have any tree attachments.		N/A

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<i>Vegetation Management</i>					
<p>Routine vegetation inspections in accordance with: Public Resources Code (PRC) 4292 & 4393, FAC 003-4, General Order (GO) 95 Rule 35 and Appendix E, and ANSI A300</p>	<p>State and federal compliance for vegetation management and inspection, as well as California Public Utilities Commission GO 95, which is accepted as industry standard amongst all utilities. (Community and investor owned).</p>	<p>PRC sections 4293 and 4293; and GO 95 is required by the CPUC for investor owned utilities.</p>	<p>GWP meets the standards of PRC sections 4292, 4293 and the GO 95 Appendix E guidelines.</p>	●	<p>GWP vegetation management program is consistent with GO 95.</p>
<p>LiDAR Technology for vegetation management inspections</p>	<p>Where foot patrols or normal helicopter patrols are insufficient to evaluate the right-of-way (ROW) clearance, utilities use LiDAR technology to identify trees along the ROW border that can potentially contact with lines during high wind events.</p>	<p>LiDAR is demonstrated as an effective tool for transmission level inspection of dense vegetation within the corridor and adjacent to the easement area.</p>	<p>GWP does not have vegetation types that justify the use of LiDAR technology.</p>	○	<p>N/A</p>


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Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<p>Hazardous tree/vegetation identification and removal protocols and programs</p>	<p>Recording and tagging trees that pose risks to adjacent electrical equipment or are dead/dying are considered prudent efforts for vegetation management practices</p>	<p>Within the high fire risk area, danger trees could pose a greater potential to catch on fire or contribute to fire spread. Addressing, through identification and surveying, as well as implementing remediation activities will result in further wildfire risk reduction</p>	<p>GWP does remove trees that could fall into overhead power lines.</p>		<p>GWP identifies trees and removes them if they have potential of falling into lines.</p>
<p>Off-Cycle / Call-in vegetation removal or corrective work, especially during the fire season</p>	<p>Off-cycle practices of vegetation inspection and management</p>	<p>Within GWP's service territory and particularly within the high fire risk area, impact trees could pose a greater potential to catch on fire or contribute to fire spread. Addressing, through identification and surveying, as well as implementing remediation activities will result in further wildfire risk reduction</p>	<p>GWP is working closely with the GFD to enhance vegetation management and corrective work during fire season.</p>		<p>GWP works with GFD to perform increased evaluation of and management of vegetation within the HFTD. This is in line with industry practices.</p>


Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination
<i>Emergency Response & Recovery</i>				
<p>Notify critical facilities and public safety partners, which may include first responders, incident origin law enforcement, acute health care facilities, essential service providers, related governing local and state agencies, adjacent jurisdictions, vulnerable populations, and the Independent System Operator (ISO) (for transmission level de-energization).</p>	<p>Following a sequence of events in contacting public safety partners and impacted community facilities will enable quicker response in reacting to an emergency event (such as a wildfire or de-energization). Utilities should describe their processes to notify critical facilities as it applies to their service territory and impacted communities as well as grid operators.</p>	<p>Notification practices targeting key stakeholders are crucial during emergency events such as storms and wildfires.</p>	<p>The GWP WFMP states that it will proactively notify customers on a “Life Support” via direct telephone contact. GWP has created a Wildfire Mitigation and Power Shutoff web page with a link to this page provided within the report.</p> <p>GWP states that public communications will also be made via email, phone, text, social media and through local television. Protocols contained in the plan indicate that when time allows notifications will be made in advance three stages prior to de-energization. Status updates will be provided during de-energization and notification following restoration.</p>	<p>The notification process to critical facilities and public safety partners is articulated in the WMP.</p>

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<p>Incident Command Team / Emergency Operations frameworks in the event a de-energization event or wildfire incident occurs</p>	<p>Using the State Emergency Management System (SEMS) framework, which is determined on the Federal Emergency Management Agency (FEMA) structure for incident command protocols will ensure prepared and adequately trained staff to respond in effective communication manners as well as respond to risk events in a sequence of effective procedures</p>	<p>GWP leverages the SEMS framework in designing emergency response protocols. A designated team or group of individuals should have the ability to relay information and make informed decisions during emergency response events.</p>	<p>Glendale will work with other City Departments including Fire and Police to respond to an emergency incident and establish an incident command in accordance with the SEMS and NIMS frameworks.</p>		<p>This is not specifically addressed in the WMP but as a City Department GWP can call upon Fire and Police.</p>

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination
<p>Coordination with stakeholder agencies/entities with routine meetings to discuss emergency preparedness needs and areas of improvement, etc.</p>	<p>Communicating with vested stakeholders during wildfire mitigation activities, PSPS events, and general strategy development will help drive efforts to better align with the risk profile of the utility's service and asset territory. These efforts should occur throughout the year and wildfire mitigation plan planning process</p>	<p>The City of Glendale has planning, communication, and coordination obligations pursuant to SEMS.</p> <p>GWP works closely with other City departments to assure effective communications and coordination.</p>	<p>City of Glendale personnel involved in emergency response and emergency management functions are provided ongoing training, including local workshops, SEMS training, NIMS training, and other special programs throughout the year. Key management and emergency personnel also attend the California Specialized Training Institute to receive in-depth training in related emergency management topics.</p>	<p>GWP coordinates with other agencies on emergency preparedness.</p>

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<i>De-Energization & Recloser Operations</i>					
<p>Disabling reclosers through blocking reclosing operations (distribution level) in the HFTD during the fire season and/or during Red Flag Warnings issued by the National Weather Service (or as fire risk potential designates)</p>	<p>Disabling reclosing reduces the number of potential ignition events during a fault condition</p>	<p>Reclosing operations should be defined within the Plan as per statute. Operational best practices align with having settings that align with fire potential weather conditions to prevent potential ignition</p>	<p>GWP developed and maintains SOP-21 which is a protocol for operations during high fire threat conditions. In the event of a Red Flag Warning, this procedure includes disabling reclosers for the circuits designated on Tier 2 and Tier 3 affected circuits.</p>		<p>GWP provides a protocol for recloser operations during Red Flag Warnings.</p>

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination	
<i>Internal Operations and Inspection Practices</i>					
<p>Ground patrol as well as aerial inspection practices</p>	<p>Routine ground patrols are implicit practices in equipment and vegetation inspection protocols. Increasing the frequency, especially in the HFTD, presents as effective preventative measures and ensures the integrity of electrical equipment. Aerial inspections, by way of helicopters, will lead to greater coverage of the service territory and areas adjacent to required clearances</p>	<p>Ground patrols are a required strategy in ensuring safe and reliable delivery of electricity. When access concerns arise, aerial inspections provide better coverage in surveying and inspecting electrical equipment throughout the utility service territory</p>	<p>GWP intends to conduct a system inventory that includes a system-wide inspection of its poles, streetlights, vaults, and all equipment and assets connected to, or contained within, these assets.</p> <p>The City of Glendale's vegetation management program, managed by the Glendale Fire Department, includes annual inspections of properties in the high fire hazard areas of the City to ensure compliance with its defensible space standards.</p>		<p>GWP plans to conduct a baseline inspection followed by more regular inspections.</p>
<p>Wildfire Infrastructure Protection Teams</p>	<p>An internal team to help coordinate efforts to ensure the Plan is being followed as well as coordinating efforts to enhance the Plan's strategies and quality check that activities are being performed and tracked aligning with the Plan</p>	<p>An internal team to prepare and protect physical aspects of the electric system as well as ensure effective mitigation measures are carried out would be a prudent activity to pursue</p>	<p>GWP works with other departments of the City to mitigate the threat of wildfires, including fire, CalFire, police, public works, and more.</p>		<p>As GWP further develops its Wildfire Mitigation Plan, development of Wildfire Infrastructure Protection Teams should be considered.</p>

Identified Practice Strategy	Mitigation Rationale	Glendale Applicability	Plan Elements	Determination
<p>Infrared corona scanning and high definition imagery technology for inspection practices along with visual inspections</p>	<p>Infrared and ultraviolet (Corona) light cameras are typically mounted to helicopters with special attention to splices, conductor connection/attachment points, and insulators for a detailed visual of electrical equipment</p>	<p>Infrared is an accepted practice that enables better awareness of the utility's equipment</p>	<p>GWP does not currently use this assessment technology to supplement its inspection program.</p>	 <p>As GWP bolsters its inspection program it should consider adding these inspection technologies.</p>

5. RESULTS & DISCUSSION

Navigant concluded this assessment on November 26~~7~~, 2019. Over the course of reviewing GWP's WMP and supporting documentation, Navigant captured takeaways and findings that align the Plan with state laws and effective wildfire measure demonstration. GWP's Plan appropriately responds to each of the required elements of PUC Section 8387, which is detailed in Appendix A. The following describes the assessment and resulting findings of the Plan's proposed and established mitigation measures as it applies to safe, reliable operation of all electric infrastructure and wildfire prevention and response.

Report Conclusions

After internal review of the latest version of the WMP and associated data collection products, Navigant concludes this Report with the following:

1. GWP's WMP aligns appropriately with PUC Section 8387 and includes all required elements.⁸
2. GWP's Plan is determined to be comprehensive as described throughout this Report.
3. The implementation and completion of GWP's plan to perform a comprehensive baseline inspection of its electrical system in 2020, and accelerate and improve its inspection program more generally, is a key element to establishing a robust inspection program and ensure the Plan as published is effective.

⁸ Following acceptance of this Report, GWP will post the Report and results online for public view. The Report is scheduled for presentation to the City Council at a public meeting in December 2019. Accomplishing these follow-up tasks will meet all required statutory provisions up until presenting the final WMP to the City Council.

APPENDIX A. STATUTORY COMPLIANCE MATRIX

Required Statutory Element	Plan Section Reference(s)	GWP Plan Elements (Summarized)	Meets Section Elements (Determination)
(a) Each local publicly owned electric utility and electrical cooperative shall construct, maintain, and operate its electrical lines and equipment in a manner that will minimize the risk of wildfire posed by those electrical lines and equipment.			
(b) (1) The local publicly owned electric utility or electrical cooperative shall, before January 1, 2020, prepare a wildfire mitigation plan. After January 1, 2020, a local publicly owned electric utility or electrical cooperative shall prepare a wildfire mitigation plan annually and shall submit the plan to the California Wildfire Safety Advisory Board on or before July 1 of that calendar year. Each local publicly owned electric utility and electrical cooperative shall update its plan annually and submit the update to the California Wildfire Safety Advisory Board by July 1 of each year. At least once every three years, the submission shall be a comprehensive revision of the plan.			
(2) The wildfire mitigation plan shall consider as necessary, at minimum, all of the following:			
(A) An accounting of the responsibilities of persons responsible for executing the plan.	Section A	Section A describes roles and responsibilities of individuals responsible for administration and implementation of the WFMP. The responsibilities related to plan administration include roles for oversight, coordination between city departments, resources and funding, and review and update to the plan. Roles and responsibilities for implementation are specified for Operations, Maintenance & Inspections, Infrastructure	Yes

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		Enhancement and Communications. In addition to individual roles and responsibilities, the plan also establishes a wildfire mitigation committee with a role to monitor effectiveness and recommend updates based on performance and changes to regulation.	
(B) The objectives of the wildfire mitigation plan.	Section B	GWP clearly identifies four specific objectives of the WFMP. The objectives specifically identify minimizing risk of catastrophic wildfire caused by electrical equipment, maintaining electric service, improving system resilience, monitoring effectiveness of the plan and revising mitigation methods as needed. Plan also identifies an objective to comply with all regulations related to wildfire mitigation.	Yes
(C) A description of the preventive strategies and programs to be adopted by the local publicly owned electric utility or electrical cooperative to minimize the risk of its electrical lines and equipment causing catastrophic wildfires, including consideration of dynamic climate change risks.	Section C	<p>GWP plan acknowledges and discusses the risk and impact on its wildfire plan due to the dynamic climate change in California. The WFMP addresses its strategies in three categories. Capital Projects, Maintenance and Operational Practices.</p> <p>The capital projects section generally describes Asset changes and upgrades which would harden Glendale’s system and reduce the probability of a fire being started by GWP equipment. The section contains a robust list of strategies and projects to be evaluated for mitigation. Actual implementation will be prioritized based on considerations stated in the plan and on a baseline inspection assessment to be initiated in 2020.</p> <p>The Maintenance section addresses programs and efforts to reduce risk of ignition and to reduce risk of spread of wildfire. It includes the existing Vegetation Management program which is also required under Section H of PUC 8387.</p> <p>GWP states this program is being enhanced to mitigate wildfire risk by increasing clearance requirements in all zones and clear vegetation in tier 2 and 3 zones. Reducing risk of fire spread is addressed by reference to the City’s Hazardous</p>	Yes

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		<p>Vegetation Program administered by the Fire Department</p> <p>The City's Hazardous Vegetation Program was included as an attachment to the draft plan. GWP also references equipment inspection programs and states these will be enhanced to address end of life component failure. This will be part of the baseline inspections to be conducted beginning in 2020.</p> <p>While disabling reclosers is listed in this section. The strategies related to Operational Practices is discussed in more detail in Section F of the WFMP.</p>	
<p>(D) A description of the metrics the local publicly owned electric utility or electrical cooperative plans to use to evaluate the wildfire mitigation plan's performance and the assumptions that underlie the use of those metrics.</p>	<p>Section D</p>	<p>GWP's use of metrics are described including the generic statement for the basis of the metrics to provide a quantitative assessment of effectiveness of the plan. Eight metrics are identified which include to metrics related to fire initiation from the electric system and fire department response time to metrics monitoring the implementation of GWP's mitigating strategies for system hardening (pole and transformer upgrades and conductor replacement) and metrics related to vegetation management.</p>	<p>Yes</p>
<p>(E) A discussion of how the application of previously identified metrics to previous wildfire mitigation plan performances has informed the wildfire mitigation plan.</p>	<p>Section E</p>	<p>GWP was not previously required to have a Wildfire Mitigation plan. Therefore, specific information related to previous metrics may not be available. GWP has explained in this section how it will review and revise its plan in the future based on as assessment of metric performance.</p>	<p>Yes</p>
<p>(F) Protocols for disabling reclosers and deenergizing portions of the electrical distribution system that consider the associated impacts on public safety, as well as protocols related to mitigating the public safety impacts of those protocols, including impacts on critical first responders and on health and communication infrastructure.</p>	<p>Section F</p>	<p>This section contains the protocols for disabling reclosers, including a general discussion of conditions required and the responsibilities for decisions on modifying recloser operation. GWP references and existing procedure "SOP-021" for use by dispatch personnel which addresses pre-emptive de-energization of overhead transmission lines and disabling reclosers in Tier 2 and 3 wildfire hazard zones.</p>	<p>Yes</p>

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		<p>GWP also states that annual training related to pre-emptive de-energization is provided to its dispatch personnel. The GWP Plan also addresses rolling load shed protocols based on the potential impact of loss of external resources due to pre-emptive de-energization by utilities which supply GWP (SCE and LADWP) during high wildfire risk conditions in the Southern California area.</p> <p>The section includes narrative on consideration of power loss impacts on public safety and first responders as well as mitigating activities (sectionalizing when possible and minimizing duration of de-energization when possible).</p>	
<p>(G) Appropriate and feasible procedures for notifying a customer who may be impacted by the deenergizing of electrical lines. The procedures shall consider the need to notify, as a priority, critical first responders, health care facilities, and operators of telecommunications infrastructure.</p>	<p>Section G</p>	<p>The GWP WFMP includes language on customer notification including using multiple communication methods and public outreach programs. In addition, the GWP WFMP states that it will proactively notify customers on a “Life Support” via direct telephone contact.</p> <p>GWP plans to create a Power Shutoff web page and communicate the link to this resource.⁹</p> <p>GWP states that public communications will also be made via email, phone, text, social media and through local television. Protocols contained in the plan indicate that when time allows notifications will be made in advance three stages prior to de-energization. Status updates will be provided during de-energization and notification following restoration.</p> <p>Details of supporting procedures and documents not available.</p>	<p>Yes</p>

⁹ Link to the Power Shutoff web page or status or planned implementation date for the Power Shutoff web page should be included in the WFMP

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<p>(H) Plans for vegetation management.</p>	<p>Section H</p>	<p>Plan contains a summary description of vegetation management practices and states consistency with California General Order 95.</p> <p>GWP uses contractors to perform VM work, overseen by supervisors who are described as “typically” certified arborists. Description of VM program includes inspection/identification, and post work completion inspections. GWP states that the annual budget for Vegetation Management work was increased by 25% to incorporate enhanced vegetation management practices supporting wildfire mitigation efforts.</p> <p>GWP included a description of the Glendale Fire Departments Vegetation Management Program which is designed to maximize clearance and minimize fuels on private and commercial property within 100 ft of structures. This reduces the risk of propagating fires in occupied areas and allows GWP efforts to be focused on the higher Tier 2 and Tier 3 risk areas.</p>	<p>Yes</p>
<p>(I) Plans for inspections of the local publicly owned electric utility’s or electrical cooperative’s electrical infrastructure.</p>	<p>Section I</p>	<p>GWP references GO 165 as guidance for system inspections.</p> <p>The City’s master plan is still in development but will include a baseline inspection and inventory of all electric system equipment. This baseline inspection will be conducted beginning in 2020. In addition to using this baseline inspection to prioritize implementation of mitigation strategies, it will also be used to establish and initiate an ongoing periodic inspection program.</p>	<p>Yes</p>
<p>(J) A list that identifies, describes, and prioritizes all wildfire risks, and drivers for those risks, throughout the local publicly owned electric utility’s or electrical cooperative’s service territory. The list shall include, but not be limited to, both of the following:</p>	<p>Section J & K Section I</p>	<p>GWP identifies risks of wildfires based on historical data related to wildfires in California from 2012-2016. Primary risks identified for fire initiation were vegetation contacts and electrical equipment failures and downed power lines.</p>	<p>Yes</p>

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<p>(i) Risks and risk drivers associated with design, construction, operation, and maintenance of the local publicly owned electric utility's or electrical cooperative's equipment and facilities.</p>	<p>Section J & K Section I</p>	<p>GWP broke down equipment failure risk into the specific types of equipment failure which indicated higher probabilities of failure which can be used to prioritize efforts at system hardening. The risks associated with design, construction, operation and maintenance are driven primarily by equipment failure.</p>	<p>Yes</p>
<p>(ii) Particular risks and risk drivers associated with topographic and climatological risk factors throughout the different parts of the local publicly owned electric utility's or electrical cooperative's service territory.</p>	<p>Section J & K Section I</p>	<p>Topographic and climatological risk drivers are referenced in the plan.</p> <p>GWP accepts and recognizes the fire zones established by Cal Fire which are based on considerations of topographic and climatological risks such as climate change, drought, population encroachment on forest lands, tree mortality and the associated hazardous distribution of fuels in California's forest.</p> <p>The GWP system includes areas in all three fire zones with approximately 62% of its service territory in Tier 2 and Tier 3 zones.</p> <p>GWP discusses its risk-based focus on wildfire mitigation that has been successful so far to reduce the area needing additional mitigation in the high-risk areas to 0.47% of its service territory.</p>	<p>Yes</p>
<p>(K) Identification of any geographic area in the local publicly owned electric utility's or electrical cooperative's service territory that is a higher wildfire threat than is identified in a commission fire threat map, and identification of where the commission should expand a high fire-threat district based on new information or changes to the environment.</p>	<p>Section K Exhibit B</p>	<p>Language addresses percentages of GWP in each Tier with the density of infrastructure in each. Additionally, the Plan has an Exhibit B with a map of High Fire Hazard Area. The GWP wildfire mitigation plan explains that its Fire Department has performed an independent wildfire zone assessment to validate the Cal Fire maps and has assigned similar level of risk to the wildfire hazard zones identified in the Cal Fire maps. 14% of the service territory falls into Tier 3, 48% into tier 2 and the remaining 38% are in Tier 1 risk zones.</p> <p>The GWP plan has not identified any portion of its system which should be included in a higher risk zone than is currently established and is not making</p>	<p>Yes</p>

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		any recommendations to the expand the area of a high fire threat district.	
(L) A methodology for identifying and presenting enterprise wide safety risk and wildfire-related risk.	Section F, H, J, K, L	<p>Section F has language included for city wide training which looks to cover the presenting portion. Section H includes GWP's risk assessment approach. Sections J and K have multiple methods of risks and risk drivers. Page 32 has a graphical representation of zones around a home that could be held responsible for presenting wildfire-related risk.</p> <p>As a city, the scope of Glendale's enterprise and the associated risks are discussed in Section L. In addition to the Electric Department, the City includes GWP Water Division, Glendale Information Services, Glendale Police, and Glendale Fire. The GWP plan describes and presents the risks and potential impacts on the various city services and ultimately the impact on the residents and businesses in the City based on wildfire considerations.</p>	Yes
(M) A statement of how the local publicly owned electric utility or electrical cooperative will restore service after a wildfire.	Section M	Section M discusses GWP's strategy and plans with respect to restoration power following a public safety power shutoff. The section includes required inspections prior to energy restoration and a spare equipment strategy. This section also briefly describes the restoration of reclosers to normal operation when conditions permit.	Yes
(N) A description of the processes and procedures the local publicly owned electric utility or electrical cooperative shall use to do all of the following:			
(i) Monitor and audit the implementation of the wildfire mitigation plan.	Section N	<p>Section N summarizes the processes for monitoring effectiveness of the plan which are discussed in greater detail in Section D and E related to metrics.</p> <p>Plan (Section A) addresses the intended use of a third-party evaluator for assessment of the comprehensiveness and ongoing compliance with the plan.</p>	Yes

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		Plan assigns the Wildfire Mitigation Committee responsibility to meet on a periodic basis and review performance of the plan.	
(ii) Identify any deficiencies in the wildfire mitigation plan or its implementation, and correct those deficiencies.	Section N	<p>Plan specifies General Manager authority to delegate monitoring and audit of the implementation of the plan.</p> <p>The sections on Metrics and Metrics feedback identify specific measures that may be used to monitor the effectiveness of plan implementation the list of possible metrics includes equipment inspections and discuss adjustments and modifications based on a review of the metrics.</p>	Yes
(iii) Monitor and audit the effectiveness of electrical line and equipment inspections, including inspections performed by contractors, that are carried out under the plan, other applicable statutes, or commission rules.	Section N	<p>GWP will be conducting a comprehensive system inspection for baseline conditions beginning in 2020. The results of this baseline inspection will be used to identify and prioritize deficiencies and establish implementation of corrective actions.</p> <p>Section H, which addresses the Vegetation Management program explicitly identifies confirmation inspections following vegetation work. Processes for monitoring the effectiveness of the vegetation inspections are not explicitly identified but are included as a proposed metric to be monitored and reviewed for effectiveness.</p>	Yes

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<p>(3) The local publicly owned electric utility or electrical cooperative shall, on or before January 1, 2020, and not less than annually thereafter, present its wildfire mitigation plan in an appropriately noticed public meeting. The local publicly owned electric utility or electrical cooperative shall accept comments on its wildfire mitigation plan from the public, other local and state agencies, and interested parties, and shall verify that the wildfire mitigation plan complies with all applicable rules, regulations, and standards, as appropriate.</p>		<p>GWP will present its WMP to the City Council at a public meeting in December 2019.</p>	<p>Yes</p>
<p>(c) The local publicly owned electric utility or electrical cooperative shall contract with a qualified independent evaluator with experience in assessing the safe operation of electrical infrastructure to review and assess the comprehensiveness of its wildfire mitigation plan. The independent evaluator shall issue a report that shall be made available on the internet website of the local publicly owned electric utility or electrical cooperative, and shall present the report at a public meeting of the local publicly owned electric utility's or electrical cooperative's governing board.</p>		<p>GWP contracted with Navigant Consulting, Inc. to perform an independent evaluation of its WMP. Qualifications are described in Section 1.</p>	<p>Yes</p>