CITY OF LA VERNE

COMMUNITY WILDFIRE PROTECTION PLAN

February 20, 2014

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Community Wildfire Protection Plan
Mutual Agreement Page

The Community Wildfire Protection Plan developed for the City of La Verne:

Was collaboratively developed. Interested parties and federal land management agencies managing land in the vicinity of the City of La Verne have been consulted.

This plan identifies and prioritizes areas for hazardous fuel reduction treatments and recommends the types and methods of treatment that will protect the City of La Verne.

This plan recommends measures to reduce the ignitability of structures throughout the area addressed by the plan.

The following entities mutually agree with the contents of this Community Wildfire Protection Plan:

Recommended by: _____
Pete Jankowski
Fire Chief, City of La Verne

Approved by: _____
Don Kendrick
Mayor, City of La Verne

Approved by: _____

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1. INTRODUCTION

Wildfire has been a natural part of the ecosystem in Southern California for thousands of years; however, the influx of human development over the last 100+ years has significantly altered that system. Wildfires that once burned naturally across the landscape, now pose a significant threat to human life and property. The characteristics of these wildfires have also changed, such as the frequency in which they burn and how intensely they burn. These changes are not only linked to urban growth, but also drought conditions, non-native invasive plants, and climate change. Wildfires in Southern California are inevitable; however, the loss of human life can be prevented and the loss and/or damage to homes, businesses, infrastructure, and other human development can be significantly reduced through thoughtful urban planning.

The City of La Verne Community Wildfire Protection Plan (CWPP) is the result of a City-wide planning effort to evaluate and identify the wildfire threat, develop strategies that enhance wildfire protection, and protect human life and the City's assets. The development of this CWPP includes extensive data gathering, existing planning documents, collaboration with stakeholders, and a science-based assessment of the potential wildfire threat. As a result of these efforts, stakeholders were able to identify areas with the highest wildfire threat and have developed mitigation actions needed to enhance protection of the City from wildfire.

This CWPP is consistent with objectives and policies set forth in the 2003 Healthy Forests Restoration Act (HFRA) and the City of La Verne's General Plan, Parks & Community Services Master Plan, Natural Hazard Mitigation Plan, Strategic Plan, and City Fire Codes.

1.1 PURPOSE OF THE PLAN

The primary purpose of this CWPP is to protect human life and reduce the loss of assets such as property, critical infrastructure, and natural and cultural resources due to wildfire. This CWPP serves to guide future actions of property-owners, business-owners, La Verne Fire Department, City staff, and other interested parties in their efforts to reduce the wildfire threat to the City.

The recommendations presented in this CWPP are intended to guide the preparation of future site-specific hazard mitigation. The implementation of this plan is subject to available funding, other City priorities, and environmental review under the California Environmental Quality Act (CEQA).

1.2 GOALS AND OBJECTIVES

The goals and objectives developed for this CWPP are based on stakeholder's input received during public outreach and in the City's existing plans (Table 1).

Table 1 CWPP Goals and Objectives

Goals	Objectives
Minimize the wildland fire threat to life safety.	• Identify specific areas within the City with the greatest potential wildfire threat • Develop guidelines to mitigate these hazards and risks.

Reduce the threat to assets at risk from a wildfire; including homes, critical infrastructure, natural and historic resources and recreational opportunities.	• Utilize a City-wide assessment to develop specific guidelines for the protection of assets at risk • Prioritize high hazard areas for potential hazard mitigation treatments • Develop recommendations for homeowners to enhance the potential survivability of their personal assets which may be at risk • Develop fuel treatment strategies for all lands
Balance wildfire protection strategies with natural resource sustainability	• Assure mitigation strategies are implemented with the highest regard to protecting visual quality • Assure that mitigation strategies are sensitive the best management practices regarding historical, cultural and natural resources • Prioritize the removal of non-native species when designing wildfire hazard mitigation strategies
Develop a Plan that will enhance the City's opportunities to compete for grant funding to address the existing wildfire hazard	• Identify grant funding sources within the CWPP • Develop a CWPP that meets or exceeds the requirements of the 2003 HFRA

1.3 POLICY AND REGULATORY FRAMEWORK

Knowledge of policies and regulations ensure a path of compliance for the wildfire mitigation recommendations presented in this CWPP. The following summarizes federal, state, and City policies and regulations:

1.3.1 Federal Level Policy

Disaster Mitigation Act (2000–present)

Section 104 of the Disaster Mitigation Act of 2000 (Public Law 106-390) enacted Section 322, Mitigation Planning of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, which created incentives for state and local entities to coordinate hazard mitigation planning and implementation efforts, and is an important source of funding for fuels mitigation efforts through hazard mitigation grants.

National Incident Management System (NIMS)

The City adopted NIMS, which provides a systematic, proactive approach to guide government agencies, nongovernmental organizations, and the private sector to work together to prevent, respond to, recover from, and mitigate the effects of incidents, regardless of cause, size, location, or complexity, in order to reduce the loss of life and property and harm to the environment. NIMS improves the City's ability to prepare for and respond to potential incidents and hazard scenarios.

National Fire Plan (NFP) 2000

The summer of 2000 marked a historic milestone in wildland fire records for the United States. Dry conditions (across the western United States), led to destructive wildfire events on an estimated 7.2 million acres, nearly double the 10-year average. Costs in damages including fire suppression activities were approximately 2.1 billion dollars. Congressional direction called for substantial new appropriations for wildland fire management. This resulted in action plans, interagency strategies, and the Western Governor's Association's "*A Collaborative Approach for Reducing Wildland Fire Risks to Communities and the Environment - A 10-Year Comprehensive Strategy - Implementation Plan*", which collectively became known as the National Fire Plan. This plan places a priority on collaborative work within communities to reduce their risk from large-scale wildfires.

Healthy Forest Initiative (HFI) 2002 ⇨ Healthy Forest Restoration Act (HFRA) 2003

In August 2002, the Healthy Forests Initiative (HFI) was launched with the intent to reduce the severe wildfires risks that threaten people, communities, and the environment. Congress then passed the Healthy Forests Restoration Act (HFRA) on December 3, 2003 to provide the additional administrative tools needed to implement the HFI. The HFRA strengthened efforts to restore healthy forest conditions near communities by authorizing measures such as expedited environmental assessments for hazardous fuels projects on federal land. This Act emphasized the need for federal agencies to work collaboratively with communities in developing hazardous fuel reduction projects and places priority on fuel treatments identified by communities themselves in their CWPPs.

1.3.2 State Level Policy

California Environmental Quality Act (CEQA)

The 1970 CEQA has evolved into one of the most prominent components of community planning in California. It requires state and local agencies to follow a protocol of analysis and public disclosure of environmental impacts in proposed projects and to include feasible measures to mitigate those impacts. Any proposed hazardous fuel treatment project recommended in this CWPP must comply with CEQA regulations.

California Strategic Fire Plan (updated 2012)

This statewide plan is a strategic document, which guides fire policy for much of California. The plan is aimed at reducing wildfire risk through pre-fire mitigation efforts tailored to local areas through assessments of fuels, hazards, and risks.

California State Multi-Hazard Mitigation Plan, draft (updated 2013)

The purpose of the State Multi-Hazard Mitigation Plan (SHMP) is to significantly reduce deaths, injuries, and other losses attributed to natural- and human-caused hazards in California. The SHMP provides guidance for hazard mitigation activities emphasizing partnerships among local, state, and federal agencies as well as the private sector.

Public Resources Code Section 4290

This provision grants authority to State Board of Forestry and Fire Protection to develop and implement fire safety standards for defensible space on State Responsibility Area (SRA) lands.

Public Resources Code Section 4291

A state law, effective in January 2005, this section extends the required defensible space clearance around homes and structures from 30 feet to 100 feet for wildfire protection. The code applies to all lands that have flammable vegetation. The regulations include several requirements for how the vegetation surrounding buildings and structures should be managed to create defensible space.

Public Resources Code 4292-4296 and 14 CCR 1256: Fire Prevention for Electrical Utilities

These statutes and regulations address the vegetation clearance standards for electrical utilities. They include the standards for clearing around energy lines and conductors such as power-line hardware and power poles. These regulations are critical to wildland fire safety because of the substantial number of power lines in wildlands, the historic source of fire ignitions associated with power lines, and the extensive damage that results from power line caused wildfires in severe wind conditions.

2013 California Fire Code

This code establishes regulations affecting or relating to structures, processes, premises and safeguards regarding residences and historic buildings. The Code includes: 1) hazards of fire and explosion arising from the storage, handling or use of structures, materials or devices; 2) conditions hazardous to life, property or public welfare in the occupancy of structures or premises; 3) fire hazards in the structure or on the premises from occupancy or operation; 4) matters related to the construction, extension, repair, alteration or removal of fire suppression or alarm systems; and 5) conditions affecting the safety of fire fighters and emergency responders during emergency operations.

Government Code 51175: Very High Fire Hazard Severity Zones

This code defines Very High Fire Hazard Severity Zones and designates lands considered by the State to be a very high fire hazard.

Government Code 51189: WUI Building Standards

This code directs the Office of the State Fire Marshal to create building standards for wildland fire resistance. The code includes measures that increase the likelihood of a structure withstanding intrusion by fire (such as building design and construction requirements that use fire-resistant building materials) and provides protection of structure projections (such as porches, decks, balconies and eaves), and structure openings (such as attics, eave vents, and windows).

Government Code 65302.5: General Plan Fire Safety Element Review

This statute requires the State Board of Forestry and Fire Protection to provide recommendations to a local jurisdiction's General Plan fire safety element at the time that the General Plan is amended. While not a direct and binding fire prevention requirement for individuals, General Plans that adopt the Board's recommendations will include goals and policies that provide for contemporary fire prevention standards for the jurisdiction.

1.3.3 City Level Policy

This policy consists of all the regulatory and penal ordinances and certain of the administrative ordinances of the City of La Verne, California, codified pursuant to the provisions of Sections 50022.1—50022.8 and 50022.10 of the Government Code. Items that pertain to wildfire include:

Title 8 - Fire Department and Fire Prevention Regulations

This section discusses non-compliance liability and the accumulation and storage of flammable waste material and storage of combustible materials

Title 9 - Health and Safety

This title discusses property maintenance such as landscaping and vegetation that are fire hazards, are considered a nuisance and are declared to be unlawful.

Chapter 15 - Building and Construction

This section provides direction on the numbering of buildings, flammable roofs, fences, fire codes, fire zones, and very high fire hazard severity zone regulations. It includes the adoption by the City Council of the 2012 California Fire Code and Title 24, Part 9 of the California Code of Regulations, except such portions as deleted or modified by the La Verne Municipal Code. In addition, it discusses the modifications to the Los Angeles County Building Code and 2013 California Fire Code as adopted by the City of La Verne.

Title 16 - Subdivisions

This section addresses development capacity as it relates to fuel modification zones or green belts required by city ordnance for fire safety purposes.

Title 18 - Zoning

This title provides for hillside development overlay zones (HDOZ) supplemental standards for development of hillside areas of the City that includes fire hazard standards, access requirements, water supply, perimeter protection, fire-resistant design and material guidelines, landscaping, etc. Title 18 also includes a section on the preservation, protection, and removal of trees.

La Verne Fire Codes, adopted the 2013 California Fire Code

With three additional fire-related ordinances:

1) Requires fire sprinklers in new commercial, educational, and institutional buildings and on additions of existing buildings 5,000 square feet or more.
2) Do not allow wood roofs in new construction.
3) A HDOZ Ordinance that requires all new construction to have fire resistant building materials for structures, boxed-in eaves, fuel modification zones ranging from 100-300 feet from structures, and residential fire sprinklers. In addition, all new construction requires approval of the Fire Prevention Bureau. Fuel modification zones are enforced annually by the Fire Prevention Bureau.

La Verne General Plan (GP) 2006

This plan governs land use, transportation, resource management, noise, cultural resources, community facilities, housing, public safety, economic development, and community design.

City of La Verne Natural Hazard Mitigation Plan (2012)

This plan is a tool for all stakeholders to increase public awareness of local natural and human-made hazards and risks, while providing information about options and resources available to reduce risks by hazard mitigation measures.

City of La Verne Parks & Community Services Master Plan (2006)

Identifies long range strategies for the development of new parks and recreation facilities in La Verne that guide the orderly development, renovation, and improvement of parks, recreation facilities, programs, and services.

City of La Verne Strategic Plan (2012)

The Strategic Plan presents eight principles that guide the development of the City. These principles are service, small town virtues, quality of life, responsiveness, sound leadership, prudent financial management, and pride in achievements.

City of La Verne Municipal Code, Chapter 18.78. Preservation, Protection and Removal of Trees

The Code establishes standards and guides for the management of significant and historic trees within the City.

1.4 CWPP PROCESS

The development of a CWPP is the process whereby a community defines its own assets/values, identifies the potential wildfire threat to those assets/values, and collaboratively develops goals and objectives with a course of action to mitigate that threat to and enhance protection of assets/values from wildfire. The CWPP process

provides communities with an opportunity to influence where and how federal agencies implement fuel treatment activities on federal land, as well as how federal funds may be distributed for projects on non-federal lands.

There are three minimum requirements for a CWPP:

1. Collaboration. A CWPP must be collaboratively developed. Local officials and state officials must meaningfully involve federal agencies that manage land in the vicinity of the community and other interested parties, particularly non-governmental stakeholders.
2. Prioritized Fuel Reduction. A CWPP must identify and prioritize areas for hazardous fuel reduction treatments on both federal and non-federal land and recommend the types and methods of treatment that, if completed, would reduce the risk to the community.
3. Treatment of Structural Ignitability. A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

1.4.1 La Verne CWPP Collaboration

Several City-lead planning efforts involving wildfire protection have occurred in the past, which engaged interested stakeholders. Most recently these outreach efforts have centered on the development of this CWPP.

In 2011, the City, lead by representatives of the Fire Department, initiated the CWPP process. This effort involved outreach and information sharing with the public, Home Owner Associations (HOAs), and stakeholders in the form of public meetings and field trips. The La Verne City Council approved funding for the development of a CWPP by a contractor in August 2013. As the CWPP process progressed, the City, lead by representatives of the Planning and Fire Departments and with the assistance of the CWPP's contractor, resumed the process of community outreach.

A public meeting designed to solicit stakeholder input into the CWPP was held at the La Verne Community Center on October 1, 2013. This meeting was advertised on the City's webpage, and also on the website of the Fire Department. In addition, invitations to the meeting were distributed to the primary HOAs in the northern half of the City. The distribution of these invitations was done by the property management companies for these associations. Phone calls were made to key stakeholders, including Los Angeles County Fire Department, United States Forest Service and the California Fire Safe Council (CFSC), asking for their participation at this meeting. Despite the outreach efforts, the community meeting was only attended by representatives of County Fire, the CFSC, and employees of the City of La Verne.

In an attempt to increase awareness of this planning effort, on Saturday, October 5, 2013, La Verne held a public safety open house. The Fire Department used this opportunity to set up a booth with information about the CWPP. Three poster boards explaining the purpose and benefits of the plan, and how the plan could support the City's mission of improved fire protection was made available to the public. A representative of the Fire Department was stationed at the display to solicit input regarding the CWPP. The open house was held between the hours of 9:00 am and 3:00 pm with an estimated 1,000 community members attending.

Additional public outreach and regarding wildfire have occurred through other planning efforts. Between 2009 and 2011, three public meetings were held in support of the City's Natural Hazard Mitigation Plan (NHMP). A nine person working group was established as part of this planning effort to collect citizen input and to vet recommendations made in the NHMP. The NHMP, including the wildfire hazard mitigation section, was adopted at a City Council meeting on February 21, 2012.

Prior to finalizing the CWPP, draft copies of this document were made available to the public through the City and Fire Department's websites. Individual parties were encouraged to provide feedback to the City through the CWPP contractor.

For more information on the general CWPP Process, please visit the following websites:

- "Preparing a Community Wildfire Protection Plan – a handbook for Wildland-Urban Interface Communities" -
- California Fire Alliance

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2. COMMUNITY OVERVIEW

The City of La Verne is located approximately 30 miles east of the City of Los Angeles in Los Angeles County. The land area of the City covers 8.56 square miles and borders the San Gabriel Mountain Range and Angeles National Forest to the north, and the cities of San Dimas to the west, Claremont to the east, and Pomona to the south (See Figure 1). La Verne is a desirable place to live and visit. It was recognized by Family Circle magazine as one of "America's 10 Best Towns for Families" and the City emphasizes a first-rate quality of life that retains small town charm.

While the San Gabriel Mountains provide a beautiful backdrop to the City of La Verne, they also expose the City to potentially catastrophic wildfires. A combination of a hot, dry Mediterranean climate, steep terrain, highly flammable vegetation, and human development creates significant potential for a large and destructive wildfire in the proximity of La Verne.

2.1 ASSETS AT RISK

Assets at risk are the intrinsic values threatened by wildfire that are important to a community's way of life. Assets can include structures, infrastructure, businesses, and other tangible elements; but, assets can also include intangible values such as natural resources, sensitive species, wildlife, cultural resources, visuals resources, and a community's feelings about their community and landscape around them.

Although intangible values cannot be addressed in mitigating wildfire hazard and risk, actions can be taken to protect those assets by developing strategies that reduce the wildfire threat. The challenge is to balance the level of mitigation work required to protect one value without compromising others.

Stakeholders emphasized the importance of the following assets:

- Life safety
- Homes and neighborhoods
- Critical infrastructure
- Municipal properties
- Recreational uses
- Natural and cultural resources

2.1.1 Life Safety and Structures

Life Safety:

The protection of human life and safety is the highest priority for all mitigation strategies undertaken in the City. The May 2013 Southern California Association of Governments' Regional Council reported that La Verne has an estimated 31,461 residents that inhabit approximately 11,366 housing units.

Life safety considers both the life and physical well-being of all people in the community.

There are numerous life safety issues to consider in a wildland urban interface (WUI), such as La Verne, including evacuation versus shelter in place, vulnerable populations, limited access/egress, high-density neighborhoods, lack of defensible space, and structure vulnerability. Often during wildfires, evacuation orders are given to residents and business-owners for protection of their life safety.

The City has experienced evacuations as a result of past wildfires with approximately 100 residents evacuated during the 2002 Williams fire, mostly from the Mountain Springs Estates neighborhood, and another 400 residents were evacuated during the 2003 Grand Prix/Padua Fire.

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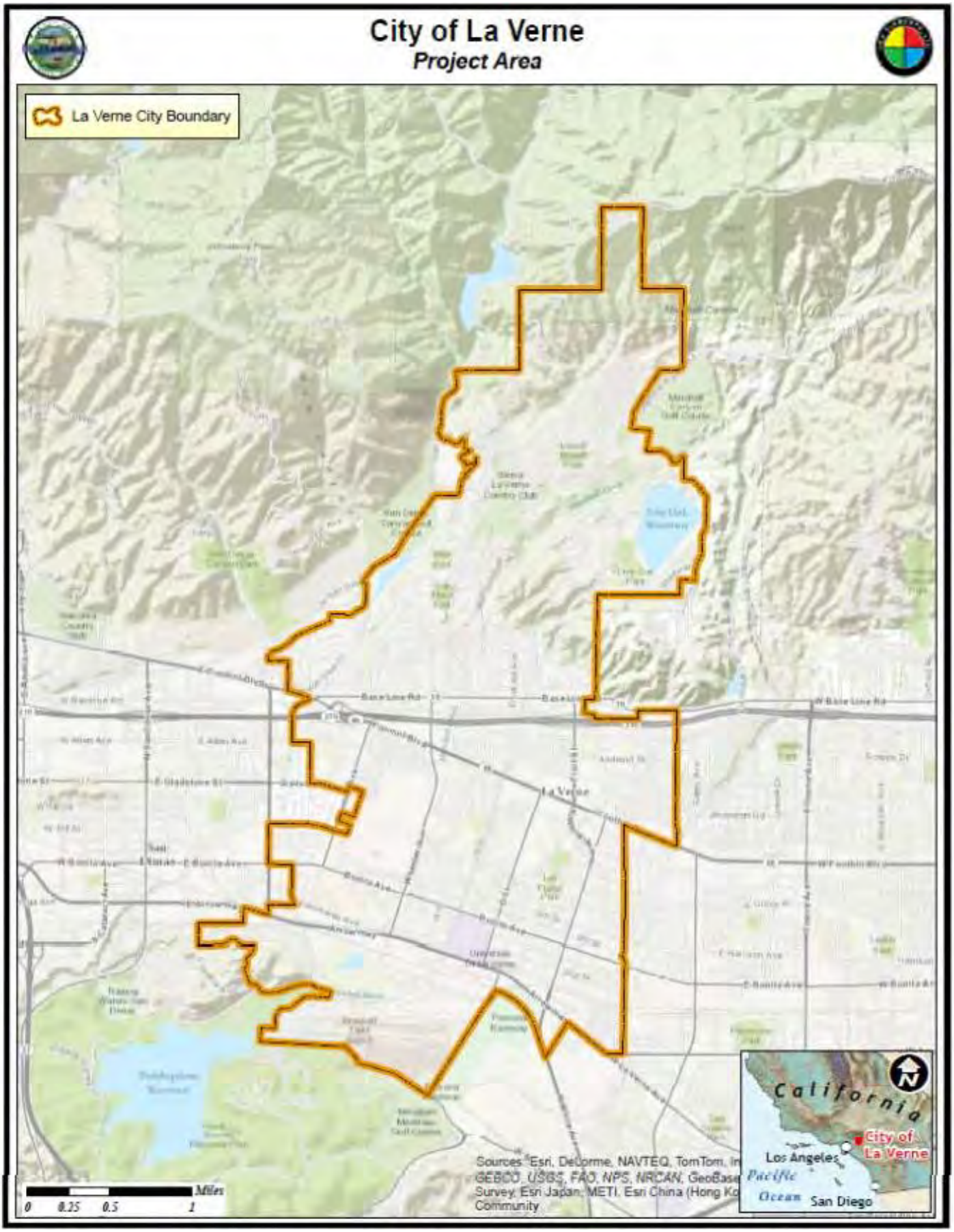
Figure 1 City of La Verne Project Area Map



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Oftentimes individuals in the WUI choose not to evacuate but stay and defend their homes and businesses, or decide to shelter in place until the fire danger passes. These actions can put their life safety at risk as well as those of firefighters and law enforcement personnel as individuals who delayed evacuation can negatively impact emergency operations of first responders.

Fast moving wildfires, such as the 2002 Williams and 2003 Padua fires, demonstrate the speed of a wildfire and the potential threat to life safety. The northern portions of the City, especially those neighborhoods north of the 210 Freeway, have limited access and egress for the residents and emergency responders. Gated access points can additionally slow egress and access. The major travel routes of San Dimas Canyon Road, Wheeler Avenue, and Esperanza Drive can become congested during a significant wildfire event slowing evacuation.

Vulnerable populations have special needs that should be addressed before a disaster such as wildfire. These populations may be less likely to respond to, cope with, and recover from a wildfire; and are less likely to get involved in wildfire mitigation activities (Ojerio, 2008). Age and physical and mental impairments can restrict mobility making it more difficult to evacuate the individuals in a disaster. Additionally, a lack of financial resources may hinder the ability for low-income populations to invest in emergency preparedness or mitigation measures or to recover from loss, while diverse languages may result in communication barriers to evacuation and support services.

> In disaster preparedness, the term "vulnerable population" includes, but is not limited to, those who are physically and/or mentally disabled (blind, cognitive disorders, mobility limitations), limited or non-English speaking, geographically or culturally isolated, medically or chemically dependent, homeless, Deaf and hard-of-hearing, frail elderly, and children.

Other populations to consider are pets and large domestic animals. Many pets and large domestic animals can face death or suffering due to poor disaster planning by their human caretakers. During a wildfire, animals can become frightened and more difficult to handle taking more time to evacuate. Many emergency shelters and evacuation centers deny admission to pets for health and safety concerns. During a disaster, people often risk their lives and the lives of others to save their pets. Additionally, homeowners are unwilling to evacuate or enter a shelter during an emergency without their animals; choosing to remain in harm's way rather than leave without their animals.

Structures:

Catastrophic wildfires have historically caused significant property losses throughout Southern California. Whether a structure is damaged or destroyed depends primarily on exterior construction material, a structure's design, housing density, placement relative to nearby homes, geographic location, and whether the home has adequate defensible space.

Each summer and fall, the City of La Verne is reminded of the likely potential for wildfires when the Santa Ana wind events blow through town. The neighborhoods north of the 210 Freeway, especially in the City's Hillside Development Overlay Zone (HDOZ) such as North La Verne and North La Verne Hillside, are substantially at risk of damage and/or loss from wildfires due their proximity to the wildland vegetation of the San Gabriel Mountains and Angeles National Forest.

Some neighborhoods within the HDOZ were built prior to the introduction of Wildland Urban Interface Fire Codes in 2008. An example of this is the Mountain Springs Estates subdivision in the northeast area of the City. Development started in 1957 and consists of approximately 80 homes within approximately 135 acres. Several homes in that area have limited access due to slope, topography or inadequate roadways and driveways that compromise the defensible space necessary for safe firefighting operations. Many of these homes have a combination of natural and non-native landscapes highly flammable pine, cypress, and eucalyptus trees.

Structure loss may occur due to wildfires, even in neighborhoods built under modern fire resistant building codes. A study of the 2007 fires in San Diego County indicated that 13% of the homes within the fire perimeters were destroyed (Rahn, 2009). Homes built under building codes enacted in 2001 had a loss rate of 4%; while homes built under codes modified in 2004 had a loss rate of only 2% (approximately 203 residences). The enactment of stringent building codes can reduce the loss of residential structures, but cannot completely eliminate the risk.

While much of the northern portion of the City was built to modern fire resistant standards, there are factors other than wood shake shingle roofs that can result in the loss of residential structures in the City. Fire Department personnel have identified the following areas of concern:

1. Wood exposures attached to homes after construction, examples include wooden fences, decks, and patio covers.
2. Wood exposures appeared to be hazardous. They included gazebos installed in back yards, weathered eaves, fascia boards, and wood siding.
3. Some homes do not have boxed in eaves.
4. Many homes have ineffective attic screens. Substandard screens will not prevent burning embers from entering potentially causing ignitions in attics during wind-driven fires.
5. Hazardous ornamental vegetation, such as cypress and pine trees, creates fire hazards if not properly maintained.
6. Leaf and litter buildup occurs in rain gutters, thus providing an ignition source for burning embers.
7. There is potential for structure loss outside of the Very High Fire Hazard Severity Zones. Because burning embers from wildfires can be carried by the wind for several miles, older homes with poorly maintained ornamental vegetation or rain gutters with flammable debris are at risk. Additionally, wood shake residential roofs still in exist in the City. Until these roofs are replaced with non-combustible Class A roofs, these homes are at risk from burning embers.

Most housing in the City are single family homes on lots of that vary widely in size. Where homes are more tightly aggregated strong winds or steep slopes can cause a wildfire to spread from structure to structure. Structure fires threaten adjacent structures and improvements with their long burning duration, extreme radiant and convective heat, and production of firebrands that are transported in the air to other structures and fuels.

2.1.2 Infrastructure and Economy

Wildfires can cause significant property, infrastructure, and economic losses that often go well beyond the traditional impact indicators. A study of the 2003 wildfires in San Diego showed that there was an estimated 15% loss of business activity (Rahn, 2009). Economic and financial losses can have long-term effects on a city's economic vitality due to destroyed businesses and the loss of tax revenue.

Restoring basic services is a top priority for public agencies and utility companies. Many companies, agencies and organizations incur significant restoration costs after a wildfire. La Verne's Department of Public Works and California Department of Transportation - Cal Trans efforts to restore roads and highways running throughout the City can include the costs of maintenance and damage assessment teams, field data collection, and replacement or repair of roads, guardrails, signage, electrical supply, culverts, and landscaping.

During the 2003 San Diego wildfires significant losses occurred to San Diego's infrastructure. The total economic impact of the wildfires on infrastructure was estimated at $147.3 million. The majority of this economic impact was associated with the loss of 3,200 utility power poles, 400 miles of wire, 400 transformers, and damage to 100 other related utility equipment (Rahn, 2009).

Short and long-term losses to critical facilities, infrastructure, and services can include:

- loss of day-to-day services to and from local businesses

- destroyed or damaged schools
- damaged roads and bridges
- damaged railroad and commuter rail
- impacts due to smoke at local airports
- loss of business
- loss of communication towers and antennas
- depleted water systems
- damaged sewer systems and water treatment plants
- contamination of municipal water supplies by ash and debris from a wildfire
- destruction of aboveground utility lines, and soil erosion or debris deposits into waterways after the fire
- disruption of electrical service due to burned power poles and damaged powerlines

It can take days, weeks, or months to repair critical infrastructure, restore services, and rebuild businesses following a wildfire.

2.1.3 Critical Facilities/Infrastructure

Facilities and infrastructure critical to La Verne's response and recovery activities include three fire stations, the police station, emergency operations center, water district facilities, thirteen reservoirs, a water treatment plant, library, bridges, roads (including major freeways such as the 10, 210, and 57 freeways and Route 30 freeway), commuter and train railways, and shelters (See Figure 2, City of La Verne's Infrastructure Map).

The City maintains 97 miles of streets and roads, 106 miles of main sewer, 130 miles of water mains, 623 catch basins, and 13 above and below ground reservoirs. These facilities and infrastructure, if damaged, can cause serious impacts to community services and, therefore, are considered "critical infrastructure". Additionally, there are "essential facilities" that are vital to the continued delivery of key government services or can significantly impact the public's ability to recover. These facilities include City Hall, community centers, schools, public library, the Metropolitan Water District of Southern California, and Brackett Airport (one of the nation's busiest general aviation airports). Damaged and/or destroyed facilities and infrastructure can significantly affect the economy of the City (La Verne Natural Hazard Mitigation Plan, 2012).

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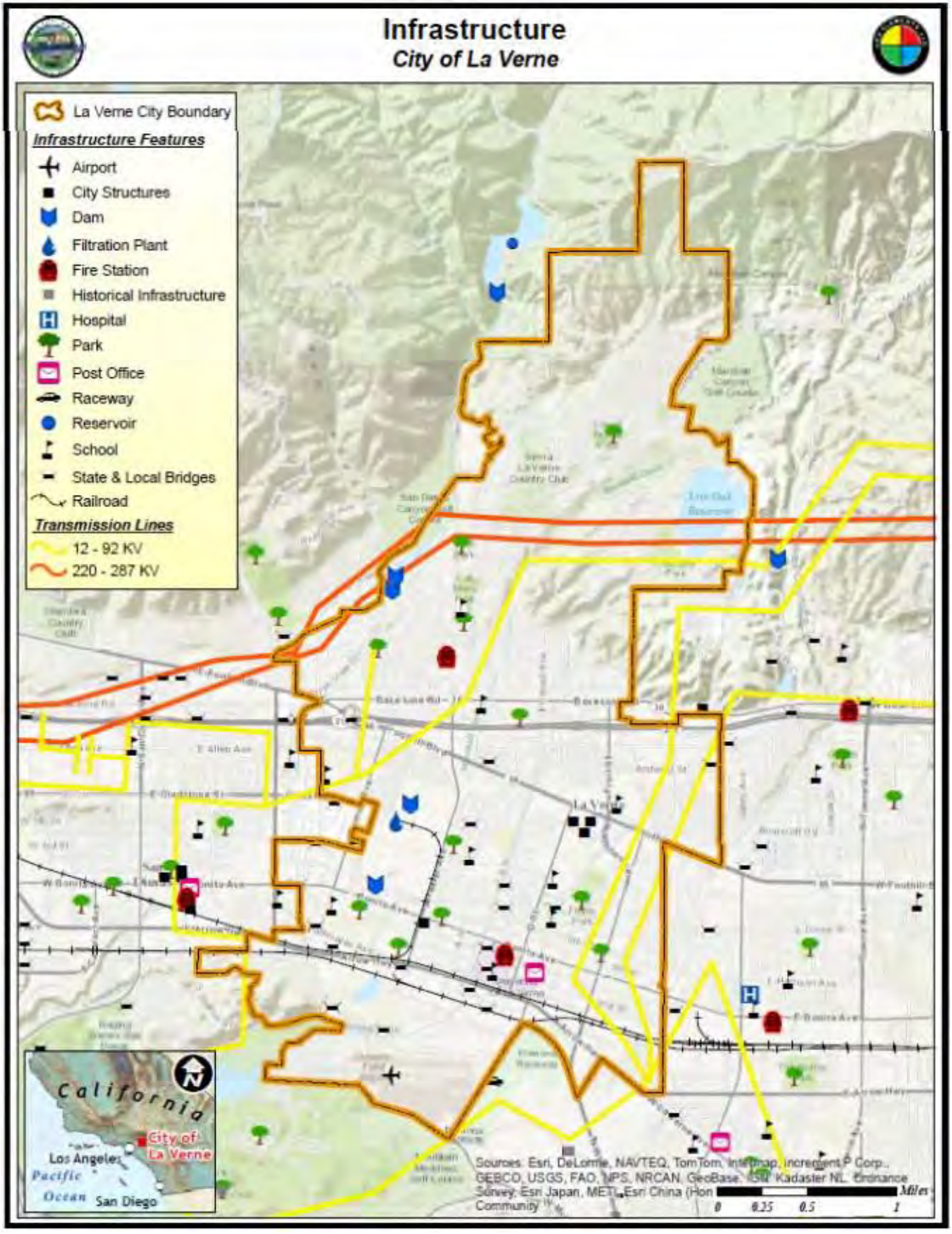
Figure 2 City of La Verne's Infrastructure Map



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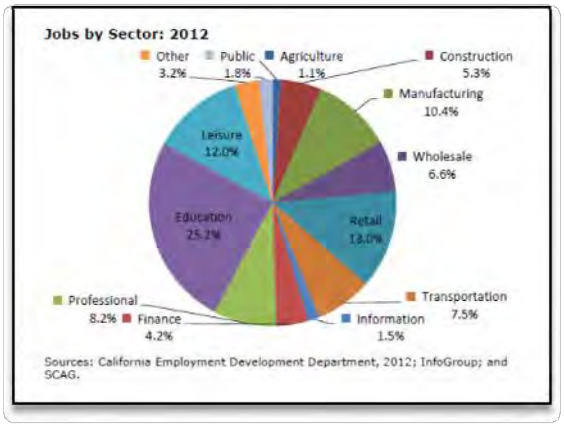
Many of the City's infrastructure and essential facilities are located south of the 210 Freeway with the exception of Fire Stations 2 and 3, and several reservoirs (La Verne General Plan, 1998).

2.1.4 Economy/Commerce

The City has a relatively small economic base and is susceptible to fluctuating market trends and damage. The potential impacts of natural disasters, such as catastrophic wildfire (La Verne General Plan, 1998) can be devastating. The primary economic base for the City is located along Foothill Boulevard, which is home to several shopping centers, restaurants, a major cineplex, national retailers and hometown merchants. Another area of the City key to business activity is the historic Lordsburg neighborhood, which includes commercial and manufacturing along Arrow Highway. Figure 3 identifies La Verne's employment structure based on 2012 data from the California Economic Development Department.

Figure 3 Percentage of Jobs by Sector in 2012



Losses or damages to businesses in the City can affect employment opportunities, increase the cost of unemployment insurance, and affect revenue to the City. The financial and social costs of wildfires demonstrate the value of reducing the wildfire threat on lives and property in La Vernes.

2.1.4 Recreation Facilities

The City of La Verne has a long history of providing for recreation for its residents designating its first developed park in approximately 1911. Parks and recreation facilities in the City are predominately developed with little to no native vegetation except for Golden Hills Wilderness Park and Marshall Canyon Regional Park. Native vegetation including grasses, small brush, and oak, Mexican Elderberry, and Black Walnut trees abound in both locations. These undeveloped open space areas protect environmental resources, provide recreational camping (Marshall Canyon Regional Park), and supports hiking, biking, and equestrian opportunities.

Marshall Canyon Park Trail

The impacts of wildfires to recreational opportunities includes the loss of recreation facilities, degradation of scenic values, loss of picnic tables, recreation related structure loss, and loss of wildlife viewing experiences. Closures due to wildfire activity or post fire resource damage can limit and/or eliminate recreational opportunities. Table 2 provides a list of the City's parks.

Table 2 City of La Verne's Parks

Name	Features	Acres
Challenger Park	Picnic tables, basketball courts	2.5
Emerald Park	Playground, sheltered picnic area, soccer field, shaded areas	3
Golden Hills Wilderness Park	Picnic tables, Nature trails	20
Heritage Park	Playground, picnic tables, nature trail, gazebo, rose garden	4
Kuns Park	Playground, picnic tables, sheltered picnic area, Oldest Tree in La Verne	2.5
Las Flores Park	2 Playgrounds, softball and soccer Fields, tennis courts, olympic-size Swimming Pool, horseshoe pit, picnic tables, sheltered picnic areas	16
Lincoln Park	Playground, picnic table	0.6
Live Oak Park	Playground, softball field, soccer field, tennis courts, picnic tables, parking lot	13
Lordsburg Park	Playground, picnic tables, half-court basketball	1
Los Encinos Park	2 Playgrounds, picnic tables, basketball courts, nature trails	7
Lowell Brandt Park	Playground, basketball courts, volleyball courts	5
Mainiero Square - Mini Park	Parking lot - major departure point for all parks and community services excursions	0.5
Mills Park	Playground, picnic tables	7
Oak Mesa Park	Playground, baseball field, soccer field, parking lot	9.5
Pelota Park	Baseball fields and parking lot	4.6
Rustic Canyon Park	Playground, picnic tables	0.5
La Verne Sports Park	Skateboard park, basketball courts, baseball field, soccer field, tennis courts, football field, track and stadium, picnic tables	21.0
Valley Rancho Mini Park	Tot lot with sand and rubber play area surfacing, four wooden picnic tables, two metal trash receptacles	0.2
Wheeler Avenue Park	Playground, softball fields, basketball courts, soccer fields, picnic tables, parking lot, snack bar	5.7

2.1.5 Cultural and Natural Resources

Cultural Resources

Cultural resources are defined as the collective evidence of the past activities and accomplishments of people. Buildings, objects, features, locations, and structures with scientific, historic, and cultural value can be considered to have cultural significance and help define the character of a community.

Historic Weber House

The City's cultural resources are an important asset to the residents and City staff. Policy in La Verne's General Plan, Strategic Plan, Old Town La Verne Specific Plan, and Lordsburg Specific Plan provide guidelines that protect and preserve historical and cultural sites in the City. These areas include archaeological sites, Lordsburg and Old Town La Verne, and historic buildings (including Dewenter Mansion, Palormes House, La Casa De Carrión House, Weber House and the Sloan Barn in Heritage Park, the Charles Straight House, and residential homes built in the 1800 and 1900s). Included in the City's policy are heritage trees that contribute to the distinctive setting of La Verne.

Many of the primary cultural and historical sites in La Verne are located in well-maintained areas; however, burning embers from wildfires may pose a threat due to the presence of receptive fuels in these areas. Fire protection planning should include awareness and understanding of the inherent hazards and risks that wildfire poses in these assets. Archaeological sites across La Verne include a variety of prehistoric stone tools and occupation sites. While these sites have likely experienced wildfire damage in the past, protection of these sites during fire suppression and fuel treatment activities is mandated under the National Historic Preservation Act.

Natural Resources

The setting surrounding and within La Verne includes natural resources and environmentally sensitive areas that exemplify key natural resource elements. The California Department of Fish and Wildlife's California Natural Diversity Database (CNDDB) inventories the status and locations of rare plants and animals in California. In the CNDDB, the Santa Ana Sucker is a threatened species and has been observed in several locations below the San Dimas Reservoir along San Dimas Canyon. In addition, in the southwest portion of the City near Brackett Field has identified that area as Critical Habitat for Coast California Gnatcatcher by the United States Fish and Wildlife Service. Figure 6 depicts known threatened and critical habitat within and adjacent to the City.

While Figure 6 depicts the areas currently identified as having threatened species or critical habitat, other natural resource areas in La Verne are both unique and diverse in species and composition. These areas include, but are not limited to:

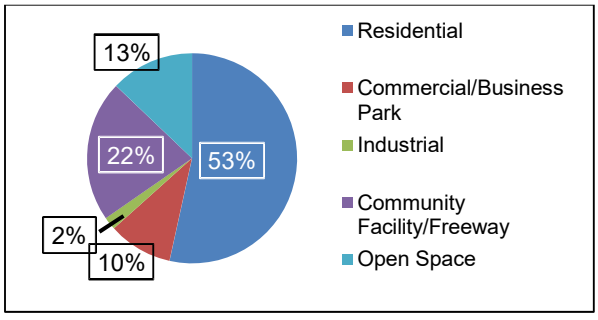
- Creek and riparian habitats
- Vernal pools
- Native vegetation such as woodlands, grasses, and chaparral habitat

2.2 LAND USE/ZONING

The La Verne General Plan states that land use decisions are based on the community's desire for quality development while retaining its small town charm. A well-balanced distribution of public and private land use is desired while separating incompatible uses and integrating complementary ones, and providing for limited growth within environmentally sensitive areas.

Land use categories include: Residential (hillside – 0-2 dwellings units/acre, low density – 0-5 dwelling units/acre, medium density – 0-10 dwelling units/acre, and high density – 0-15 dwelling units/acre), Commercial/Business Park, Industrial, Community Facilities, Open Space, and Highway Corridor. Figure 5 depicts the percent distribution of land use by category.

Figure 4 Percent Land Use Distribution by Category



The parks and open spaces in La Verne provide a highly valued component of the community. Of the land use categories, open space is a focal point when addressing the potential wildfire threat.

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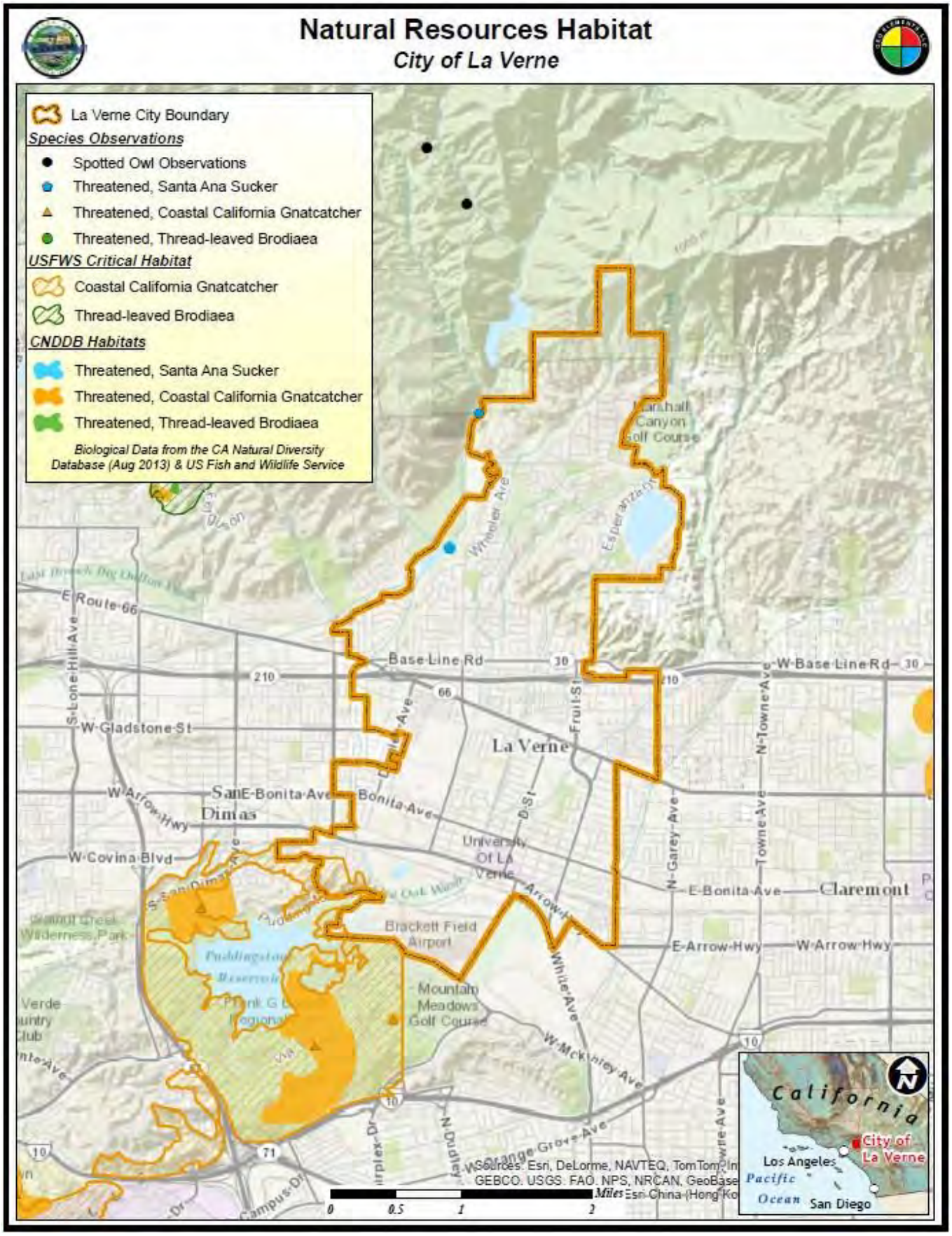
Figure 5 City of La Verne's Known Natural Resources



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2.3 FIRE PROTECTION

La Verne Fire Department provides fire protection and all-risk services for the City. The mission of the Fire Department is to preserve life, property, and the environment of the City in a safe, efficient, and cost effective manner.

The Fire Department employs thirty-three full-time and five part-time personnel supported by twenty-four Apprentice Firefighters and thirty Fire Explorers. The City's three fire stations are located at:

Fire Station 1	Fire Station 2	Fire Station 3
2061 Third Street	4785 Wheeler Avenue	5100 Esperanza Drive
La Verne, CA 91750	La Verne, CA 9175	La Verne, CA 91750

- Fire Station 1 staffs a fire command vehicle, one Type I pumper (fire engine) and one ALS Rescue. An aerial platform truck is cross-staffed as needed by members of the engine company. The station also houses one reserve Type I pumper and several support vehicles.
- Fire Station 2 staffs one Type I pumper and houses one reserve Type III pumper and one utility vehicle.
- Fire Station 3 staffs one ALS Rescue ambulance and houses one reserve ambulance.

The Fire Department receives approximately 3,000 calls annually. The scope of the Department's responsibilities includes:

- All risk incidents including fire protection, emergency medical service, hazardous materials, and general calls
- 24-hour emergency paramedic service
- Enforcement of fire codes
- Fire safety inspections
- Assist in planning and development of development standards for High Fire Hazard Areas, as well as enforcing these standards
- Community education and outreach
- Incident management team support

A review of the firefighting capability within the City indicates La Verne has an excellent firefighting infrastructure with the three fire stations, sufficient fire hydrants located throughout the City, and an excellent water delivery system.

Fire Prevention

Fire prevention involves education, enforcement and engineering. While the major wildfires that threatened La Verne started outside of the City boundary, several fires have started within the corporate boundary.

Arson fires originating outside of the sphere of influence of the City along San Dimas Canyon Road are a concern and have the potential to rapidly impact the Mountain Springs neighborhood. In an attempt to address this fire prevention concern, the City applies fire retardant along portions of San Dimas Canyon and Golden Hills Roads to prevent roadside ignitions. This fire-prevention engineering project currently undertaken by the Fire Department is paid for by funds provided by the benefitting Home Owner Association.

Fire prevention education conducted by the Fire Department is driven by community requests for inspections of their properties. In some cases, HOAs have requested wildfire safety assessments and recommendations for property improvements to prevent or limit the spread of wildfires to their property.

Enforcement is a major component of the fire prevention program. Until the early 1980's, the City allowed the sale and use of fireworks. The City banned the sale and use of fireworks after numerous structural and wildland

fires occurred due to the use of fireworks. The La Verne Police and Fire Departments are actively involved in arson investigations and exchange of information with neighboring jurisdictions.

Finally, the Department of Community Development performs a significant role in fire prevention through enforcement of building codes. The Department conducts extensive plan reviews prior to the issuance of building permits within the City.

2.3.1 Additional Fire Protection

The City has well established protocols for obtaining support from fire cooperators during an escalating wildfire. The following is a brief summary of existing agreements and mechanism through which the City can request assistance for fire suppression operations.

Automatic Aid: As a member of the California Office of Emergency Services Region 1, Operational Area B, the City has agreements in place with other local cities and Los Angeles County Fire Department to respond to wildland fires within the corporate boundary. In addition, a local agreement is in place for automatic aid from the U.S. Forest Service who will respond to reported vegetation fire north of Baseline Road.

Rotor wing aircraft (helicopters) from Los Angeles County and the U.S. Forest Service are part the automatic aid response. Fixed winged aircraft (air tankers) can be mobilized by the U.S. Forest Service, but are not part of the automatic response. Los Angeles County "super scoopers", when staffed, are part of any automatic aid response.

Master Mutual Aid: The California Disaster and Civil Defense Master Mutual Aid Agreement between the State of California, each of its counties and incorporated cities, create a formal structure for the provision of mutual aid. Once a local emergency has been declared, additional firefighting resources may be requested through the Operational Area Fire and Rescue Coordinator. If the emergency persists additional resources may be made available from the regional or state-wide system.

California Fire Assistance Agreement: This agreement between the State of California, California Emergency Management Agency (CAL OES) and California Department of Forestry and Fire Protection, and the five federal fire agencies (U.S. Forest Service, USDI National Park Service, Bureau of Land Management, Fish and Wildlife Services, and Bureau of Indian Affairs) provides the framework for coordinating the use of and reimbursement for local government fire and rescue resources used at wildfire incidents. Firefighting resources can be mobilized through the California Fire Assistance Agreement; however, reimbursement of the expenses incurred in support of the City may be required.

3. DEFINING LA **VERNE'S** WILDFIRE PROBLEM

Wildfire is part of Southern California's normal ecological processes both benefiting and damaging natural resources. However, when wildfires encroach on people and human development the results can be disastrous to the affected communities. The probability of a catastrophic wildfire occurring at any particular location within or adjacent to the City is dependent on a chain of events that includes fire ignition, fire weather, fire behavior, suppression actions taken, and the interaction of these factors.

Each year firefighters from many agencies combine efforts to successfully contain most wildfires to less than one acre. This fire suppression success is a direct result of favorable weather and fuels conditions, early fire reporting, a rapid and aggressive fire suppression response, and good access to wildfires by fire suppression resources. However, when an ignition occurs during unfavorable weather and fuel conditions, or when firefighting assets are committed to fighting simultaneous wildfires throughout Southern California, a fire has the potential to escape the efforts of initial attack firefighters.

The following section describes the City of La Verne's existing wildfire problem.

3.1 FIRE ECOLOGY

Fire ecology examines the role of fire in ecosystems and includes flora and fauna that interact with one another and with their physical environment.

Wildfire is a natural environmental occurrence in most Southern California ecosystems. Wildfires burn in nearly every landscape in California with a remarkable variety of frequency, intensity, and effects; and while wildfire is common in Southern California, when it interacts with the human environment the results often threaten life, property, and economic well being.

3.1.1 Chaparral Ecology

The landscape surrounding La Verne is a complex mosaic of grasslands, shrublands, and woodlands that form a relatively fine-grained fire environment. Chaparral vegetation species native to the area includes manzanita, ceanothus, mountain-mahogany, flannelbush, Christmas berry, cherry, oak, coffeeberry, chamise, and sugar bush. The La Verne HDOZ ordinance identifies many of these chaparral species as *"Existing Native Plants to Protect"*.

Many small fires and few large fires likely characterized the natural chaparral fire regime, with fire intensity and severity variable dependent of specific wildfire burning conditions (Keeley, J. Fotheringham, CJ, 2001). There is some disagreement over the historic fire-return interval with the local fire-return interval best estimated in the range of 35 to 100 years. Over the past several decades a significant loss of chaparral vegetation has occurred in Southern California due to urban development, agriculture, human-caused fires, and vegetation type conversion (Hauser, 2006). While wildfires burning in chaparral continue to be a threat to human development, the last significant wildfire activity in the chaparral plant community that surrounds La Verne occurred during the 2002 Williams and 2003 Padua fires.

Many chaparral species require fire to stimulate germination of their seeds and, while wildfire disturbance plays an important role in maintaining diversity in the chaparral environment, frequent fire within the chaparral plant community can lead to a loss of plant diversity. Fire frequency in the chaparral plant community is highest in the summer; however, the majority of the acres burned in this vegetation type occur in the fall.

Immediately after a fire, short-lived grasses and forbs (called "fire-followers") initially dominate the burned area. Within 2 - 5 years, chaparral seedlings and sprouting from root crowns or burls begin the process of chaparral re-

occupying a burned area. The more aggressive nature of the chaparral species can exploit deeper water reserves and will eventually shade out the forbs and grasses, replacing them in the landscape. The diversity of the chaparral plant community is dependent on long fire free periods. These fire free periods allow non-sprouting chaparral species to establish viable seed banks in the soil that germinate following the next fire event (Haidinger and Keeley 1993).

3.1.2 Riparian Oak Woodland

A key vegetative feature of the City is the riparian oak woodlands that pass through the northern portion of the community. This unique environmental feature occurs along canyon and valley bottoms within intermittent streams or at the bottom of steep drainages. Marshall Canyon and Live Oak Canyon are the two primary drainages that display oak dominated vegetation; however, other unnamed drainages that transect the City also support this vegetation type.

In general, these riparian corridors can be seen as partial barriers to wildfire spread due to the cooler, shaded environment produced by the overstory of coast live oak trees. The shaded conditions help to keep fuel moisture higher and fuel temperature lower than surrounding area. However, under downslope wind events, such as Santa Ana's, these riparian corridors can act as a wick to bring fire from the wildlands north of the City into more developed neighborhoods. Dead material and dried herbaceous fuel within these riparian corridors can aid in fire spread under moderate to strong Santa Ana weather conditions.

Marshall Canyon Trail

Under typical weather conditions, fire severity is often lower in riparian areas. Most commonly, riparian plants are scorched or the outermost portions of the tree canopies are burned during wildfire. Oak, sycamore, and willow trees are all strong sprouters and, if fire severity is low, the vegetative structure of the riparian area can quickly recover after fire. In rare cases, entire trees can be consumed. While some tree species can recover by sprouting, years are required to restore the pre-fire woodland canopy cover.

3.1.3 Ecological Enhancement

Although CWPPs focus on actions needed to reduce risks to life and property from wildfire, the development of this CWPP provides an opportunity for the community to consider the ecological needs of open spaces. Restoring the ecological resilience of a wildland vegetative area can be an effective strategy for reducing the overall risk of wildfire to a community, as well maintained riparian corridors within the City that can act as partial barriers to fire spread under all but extreme fire danger conditions (Sugihara, 2006). The open spaces within and adjacent to La Verne are an important ecological reserves for wildlife while also providing recreational enjoyment opportunities.

3.2 CLIMATE

Under the Köppen-Geiger Climate Classification System La Verne is located in a dry-summer subtropical climate often referred to as "Mediterranean", which is characterized by warm to hot, dry summers and mild to cool, wet winters. Snow occasionally falls on the mountains above the City but rarely stays more than a few days. The long dry seasons typical of the Mediterranean climate ensures a prolonged fire season every year.

3.2.1 Climate Change

Climate change is affecting California with an increase in average temperatures, fewer cold nights, lengthening of the growing season. Shifts in the water cycle have been observed with less winter precipitation falling as snow and snowmelt is occurring sooner in the year. Drought conditions are expected to become more frequent and

persistent over the 21st century. With California getting warmer, an increase in the frequency, intensity, and duration of heat waves and more hot days are expected. With the expected increase in the intensity of weather events such as heat waves and persistent droughts; increased wildfire activity is anticipated (State of California SHMP, 2010).

Climate change is expected to affect natural water sources, the frequency and behavior of wildfires, and the timing and length of fire season throughout California for years to come.

3.3 FIRE HISTORY

Fire history records indicate an increase in wildland fire size in the areas surrounding the City in recent years (See Figure 6). Over the past 20 years, La Verne has been impacted by two major wildfires. Those fires started outside the City's boundary and spread towards La Verne under Santa Ana wind events. While these strong downslope winds present the clearest wildfire hazard to the City, vegetation conditions exist across the front country of the San Gabriel Mountains that place the community at risk even under typical on-shore wind conditions. This became apparent during the 2009 Station Fire, which threatened foothill communities from Tujunga to Azusa. La Verne has been fortunate to avoid direct impact to the community from recent large fires, including the 2003 Padua and 2002 Williams fires. While the Williams fire burned within the corporate boundary of the City, *no damage to structures was reported in La Verne*; however, the fire burned a total of 62 homes and 14 outbuildings outside the City.

Table 3 List of Historical Large Wildfires - 1993-2012

Fire Name	Month/Year	Fire Size (acres)	Structures Lost (approx reported # of homes, outbuildings, etc)	Fatalities
Padua	October 2003	10,466	59	0
Williams	September 2002	38,094	76	0

3.4 LA **VERNE'S** WILDLAND FIRE ENVIRONMENT

The interaction of fuels, topography, and weather affect the likelihood of a fire starting, its direction, speed and intensity, and the firefighter's ability to control it. This section describes the wildland fire environment in and surrounding the City of La Verne.

3.4.1 Fuels

Vegetation is the primary fuel source for wildfires and is an important component in determining fire hazard. The land base within the City of La Verne is a mosaic of residential, commercial, agricultural, recreational, and industrial land uses of which approximately 13% is designated as open space. An analysis of the landscape surrounding La Verne indicates that two fuel types represent more than 53% of the total landscape. Figure 7 depicts the two prominent fuel types, including:

1. Moderate load dry climate grass-shrub
2. Moderate load dry climate shrub

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Figure 6 La Verne's Fire History Map - 1992 - 2012

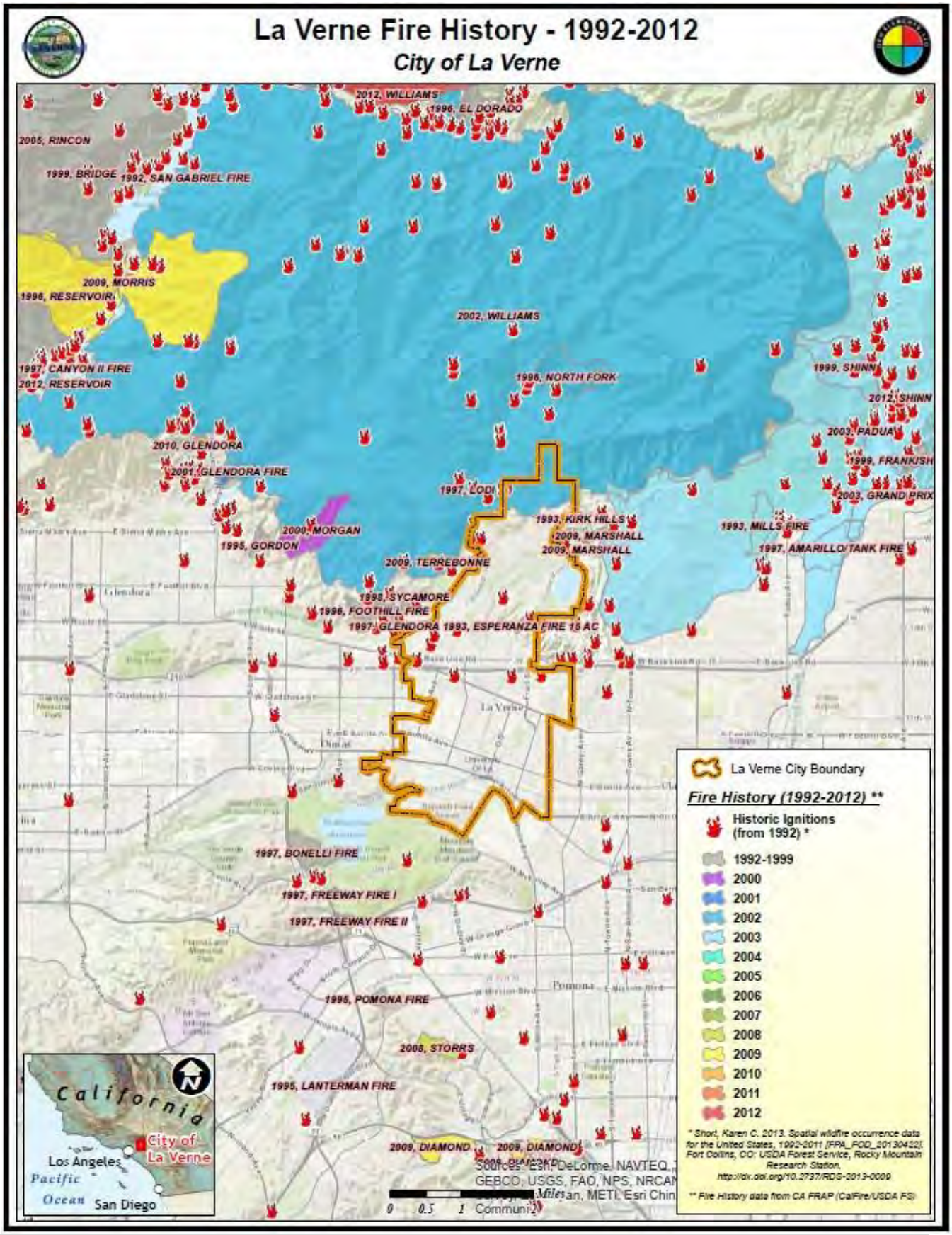

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Figure 7 Examples of Dominate Fuel Types in La Verne

Moderate load dry climate grass-shrub (left) and Moderate load dry climate shrub (right).

3.4.1.1 Fuel Characteristics

The principal characteristics of fuel that affects fire behavior are fuel moisture, amount of fuel or "fuel loading", horizontal continuity, and vertical arrangement. Each of these characteristics contributes to the spread of a wildfire. Understanding the fire behavior characteristics of wildland vegetation facilitates the development of effective fuel treatment strategies at the local and landscape level.

3.4.1.1.1 Fuel Moisture

Fuel moisture is a very dynamic variable controlled by daily, and seasonal weather. The moisture of living and dead fuel is a critical component in influencing wildland fire behavior. Vegetation is more flammable when fuel moisture levels are low and less flammable when fuel moisture levels are high. The amount of moisture in a fuel will largely determine whether fuel will burn or not.

Dead fuels act very much like a sponge absorbing or releasing moisture into the atmosphere dependent on the moisture content of the air mass. Timelag is the common unit of measure used to evaluate the length of time required for dead fuel to reach relative equilibrium with the moisture content of the atmosphere. Table 4 identifies the dead fuel moisture and timelag relationship based on fuel size.

Table 4 Dead Fuel Moisture & Timelag Relationship with Fuel Size

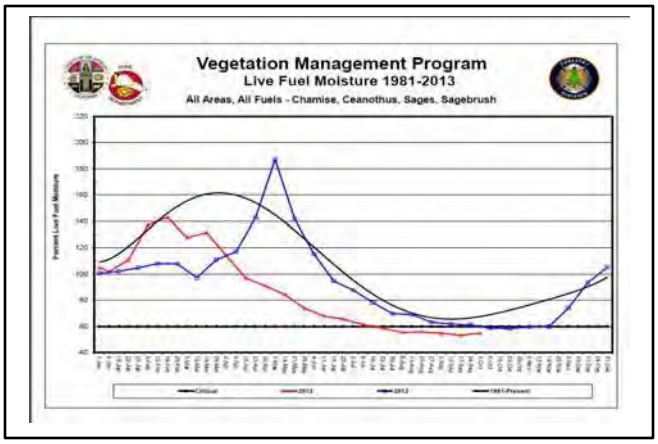
Timelag (hours)	Diameter of Fuel (inches)	Examples
1-hour	Less than ¼	Annual dead grass
10-hour	¼ to 1	Dead and down small branches and twigs
100-hour	1 to 3	Dead and down branches, logging slash
1,000-hour	3 to 8	Dead and down branches, logs, standing dead timber

Live fuel moisture is the moisture in living, growing vegetation. Live moisture is strongly influenced by internal physiological processes of a plant, but is also reflective of seasonal drying trends including the effects of drought on vegetation. Typically, live fuel moistures are highest in the spring through early summer and at their lowest from late summer until the wetting rains of winter.

Locally, live fuel moisture sampling is performed by Los Angeles County Fire Department's Forestry Division.

Figure 8 displays average fuel moisture trends based on 22 years of sampling. 2012 and 2013 live fuels moistures are shown with the average to show how current fuel moisture levels compare to the historic average.

Figure 8 Los Angeles County Fire Departments Live Fuel Moisture Sampling



3.4.1.1.2 Fuel Loadings

Fuel loadings vary greatly by fuel types. Generally, grassland areas produce fuel loadings between 1 to 5 tons per acre, while chaparral may produce 10 to 30 tons of fuel per acre. Smaller fuels effect how fast a fire will ignite and how quickly it spreads, while larger fuel influences fire intensity.

3.4.1.1.3 Horizontal Continuity

Horizontal continuity describes the uniformity or patchiness of fuels across the landscape. The horizontal continuity of the fuel affects the ability of a fire to spread. The fuel north of La Verne, in the Angeles National Forest, has recovered from the 2002 Williams fire and are once again continuous chaparral. Within the City, the open spaces are best described as isolated islands broken up by road systems and neighborhoods that create a discontinuous fuelbed. Wildfire cannot spread from one open space to another along the surface but can spread when burning embers from a wildfire are carried through the air by the smoke column or winds then dropped on to a receptive fuelbed (such as flammable ornamental vegetation, firewood piles or combustible roofs or decks).

It is important to note that fuel is the only element in the fire environment that fire managers can influence with an active fuels management program.

3.4.1.1.4 Vertical Arrangement

Vertically arranged fuels are those that can carry fire burning on the surface into the crowns or canopies of taller shrubs and trees. This fuel is commonly referred to as "ladder" fuels. This ladder fuel effect is a primary concern for ornamental eucalyptus, cypress, and pine trees or palms with dead palm fronds attached. These trees have a tendency to propagate vertical fire spread. Native oaks are considerably more resistant to vertical fire spread than are these ornamental species.

3.4.2 WEATHER

Weather is the most variable element in the wildland fire environment and the least predictable. The components of weather that specifically influence how a wildland fire will burn are temperature, relative humidity, wind, atmospheric stability, and precipitation,

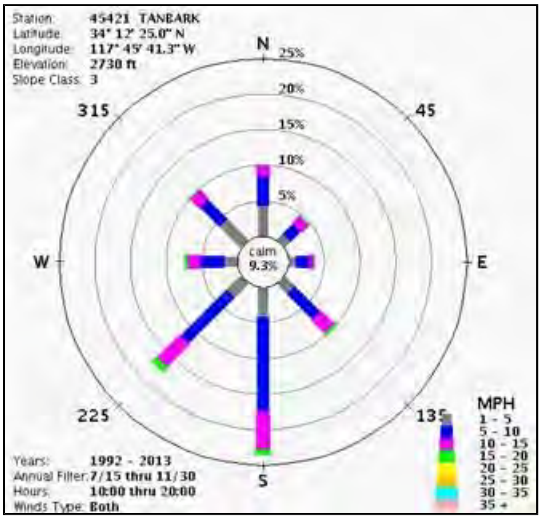
La Verne has more than 280 sunny days each year with an average high temperature of 91°F in July to an average low temperature of 38°F in January. This temperature spread represents the climatic averages for the City; however, the temperatures can vary greatly with La Verne reaching a record high of 113°F on July 22, 2006.

Rainfall patterns for Southern California are variable in nature with a few high intensity rainfall events accounting for the majority of the annual precipitation. Rainfall in the City averages 17.3 inches per year. Figure 9 presents the annual rainfall for La Verne.

Figure 9 Annual Rainfall

Based on an analysis of 20 years of weather records (July 15th to November 30th between 1982 to 2012) from the Tanbark Remote Automated Weather Stations (RAWS) located 3-miles north of the City, wind direction for this core portion of fire season are predominantly south to west (See Figure 10). Average wind speeds, excluding gusts, for this time period are approximately 6 miles per hour.

Figure 10 Wind Rose, Tanbark RAWS



Santa Ana winds can become a significant weather event beginning as early as September. This weather pattern can influence the area throughout the fall and winter months. While Santa Ana weather patterns can persist into winter, the wildfire threat associated with these winds during that time is mitigated when wetting rains begin. The severity of a fall fire season is often determined by the strength of the Santa Ana weather events and when the first wet storms of the season arrive in Southern California.

Specifically for La Verne, high temperatures, low relative humidity, and high winds can create hazardous wildfire burning conditions. Weather records indicate that between June 1 and November 30, a high 10-minute average afternoon wind of 44 mph has been reported at the Tanbark RAWS. Approximately 5% of the days during this time period had temperatures of 100°F or higher and 5% of the days also reported a relative humidity of 9% or less.

3.4.3 TOPOGRAPHY

Topography is the configuration of the earth's surface including its relief and the position of its natural and human-made features. Topography is the most stable of the elements in the fire environment but plays an important role in how a fire will burn. Topography modifies general weather by channeling wind direction, inducing slope and valley winds, creating thermal belts, producing orographic thunderstorms, and effecting how Santa Ana winds influence the City. Factors of topography that influence fire behavior include slope, aspect, terrain and elevation. Of all of the topographic features, slope steepness is the most influential on fire behavior.

Elevations in the City range from 1,000 to 2,973 feet. The terrain ranges from relatively flat land in the mid and southern portions of the City to a significant slope component in the northern 1/3 of the City where La Verne interfaces with the San Gabriel Mountains.

The City has a mostly southern aspect with some variation such as the edges of creeks and drainages. A southern aspect typically experiences longer periods of sunshine with higher temperatures, lower relative humidity, and has flashier fuel than a northern aspect.

Terrain or land configuration, such as ridges, mountain, narrow canyons, and steep drainages, affect the direction and speed of wind. San Dimas, Marshall and Live Oak Canyons are the primary drainages that influence winds in La Verne. San Dimas Canyon to the west of the City and San Antonio Canyon to the east of City are the primary Santa Ana wind corridors. The channeling effect of these canyons, as well as the sheltering influence of Glendora Ridge above the City, helps to protect La Verne from the full force of a Santa Ana wind.

3.4.4 FIRE BEHAVIOR CHARACTERISTICS

Fire behavior characteristics describe how a fire will burn, including the rate of spread, intensity and spot fire potential. The diversity of fuels and weather patterns in La Verne creates a fire environment that will support a broad spectrum of fire behavior.

Typically, the City experiences moderate fire danger conditions with light winds, minimal topographic influence in the southern portion of the City, and a discontinuous fuelbed. Wildfire burning under these conditions will likely be a relatively slow spreading surface fire with the possible involvement of single or small groups of trees. These fires are generally easily controlled by firefighters.

However, severe conditions do periodically occur in La Verne, such as during Santa Ana wind events or summer heat waves. These weather events increase fire danger throughout all areas of the City and create the conditions necessary for a dangerous wildfire.

LA VERNE: A COMMUNITY AT RISK

As defined in the report, "*Fire in the West—The Wildland/Urban Interface Fire Problem*" Wildland Urban Interface (WUI) areas are defined as areas where humans and their development meet or intermix with wildland fuel. The 2003 HFRA limits the WUI to within 1/2 mile of a community's boundary or within 1-1/2 miles when mitigating circumstances exist, such as sustained steep slopes or geographic features that aid in creating a fire break. These limits apply unless the WUI is otherwise defined in a CWPP. Because of the variability of what should be

considered wildland/urban interface in La Verne, it was necessary to refine the WUI boundary beyond the generic description provided in the HFRA (See Figure 11).

The boundary of the WUI for the City includes the entirety of the areas within the corporate boundary of the City of La Verne as well as areas outside of the City where partnerships with adjacent jurisdictions can be established to address the wildfire threat. In many cases, the WUI boundary is the 1/2-mile buffer allowed in the law while in other locations, especially the northern half of the City; the WUI extends beyond the 1/2-mile buffer to take advantage of topographic features such as ridges or human improvements such as roadways and railroad right-of ways. For the southern portion of the City with more densely urbanized areas, the WUI is defined as the corporate boundary, as there is limited need to address wildfire risk beyond what homeowners can accomplish on their own property.

3.5 DESIGNATION AS A COMMUNITY AT RISK

As a result of 2003 HFRA, the California Department of Forestry and Fire Protection (CAL FIRE) undertook the task to develop a list of "communities at risk" (CAR) and to identify the level of fire threat to these communities. CAL FIRE used three main factors to determine which communities were at risk and their level of fire threat, these factors are: 1) high fuel hazard, 2) probability of a fire, and 3) proximity of intermingled wildland fuels with urban environments.

The City of La Verne is one of 1,289 communities in California identified as a CAR, and is one of 843 of those communities that are adjacent to federal lands. The City is designated a Hazard Level Code of "3" which indicates the highest fire threat level (CAL FIRE, 2013).

The State Forester (CAL FIRE Director) has assigned the task of managing the list of CARs to the California Fire Alliance. The California Fire Alliance is a cooperative organization dedicated to the support of pre-fire principles and activities. Partnering agencies include the USDI Bureau of Land Management, CAL FIRE, U.S. Forest Service, California Fire Safe Council, USDI Bureau of Indian Affairs, Cal Emergency Management Agency, Los Angeles County Fire Department, USDI National Park Service, and U.S. Fish and Wildlife Service.

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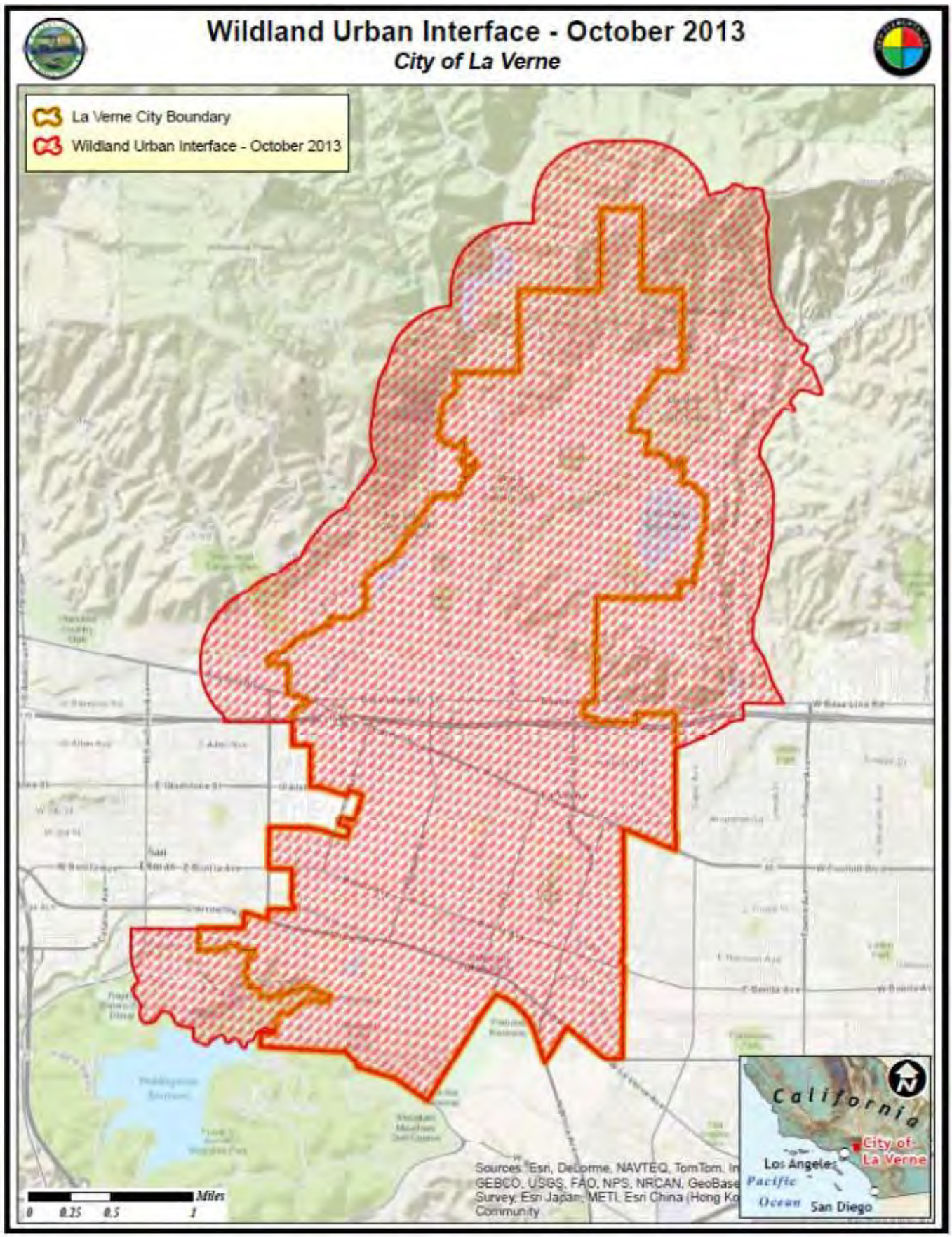
Figure 11 La Verne's Wildland Urban Interface Map



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4. WILDFIRE ASSESSMENT

This assessment utilizes potential fire behavior and historical fire occurrence to identify areas within the City with the greatest potential wildfire hazard and risk. The purpose of this assessment is not to determine the specific wildfire hazard or risk for an individual parcel but rather serves as a mechanism for identifying and prioritizing potential wildfire mitigation strategies for the City as a whole.

4.1 CALIFORNIA FIRE HAZARD SEVERITY ZONES

California state law mandated CAL FIRE to identify "fire hazard severity zones" throughout the State. As the agent of CAL FIRE, Los Angeles County Fire Department assumes the responsibility for identification of fire severity zones within the county. These fire hazard severity zones are areas that have similar burn probabilities and fire behavior characteristics that rcan esult in damage to buildings. The CAL FIRE Very High Fire Severity Zone for La Verne is shown in Figure 12).

4.2 HAZARD ASSESSMENT

The greatest wildfire threat to the City comes from fires spreading out of the Angeles National Forest or from undeveloped Los Angeles County lands east of La Verne. Wildland fuel north of Baseline Road and Thompson Creek Road is contiguous enough to provide a travel path for wildfires into the City during Santa Ana winds. These winds historically affect the City during the fall and the winter. Areas south of Baseline Road are less vulnerable to wildfire, as chaparral vegetation is less contiguous. The potential for structure damage or loss during a wildfire is still present in the areas south of Baseline Road as wood shingle roofs, leaf and litter collected in rain gutters, ornamental vegetation, or patches of chaparral vegetation may be ignited from burning embers generated from a wildfire burning in areas within or adjacent to the City.

> Wildfire hazard is a fuel complex, defined by volume, type condition, arrangement, and location that determines the degree of ease of ignition and of resistance to control.

Much of the City is designated by CAL FIRE as a Very High Fire Severity Area. The broad brush approach used by CAL FIRE does not provide the detail required for establishing hazard mitigation priorities since all Very High Fire Severity areas within the City are considered to have the same risk. Fire models were used to provide greater detail regarding where fire risk is greatest within the corporate boundary. Specific models used in this assessment include FlamMap (Version 5.0), Fire Spread Probability (FSPro) model and Fire Family Plus (Version 4.0). Wildland fire professionals using these tools can successfully apply outputs from the fire models to assess wildfire hazards and risks and to develop of fire mitigation strategies. The data used in these models were taken from a variety of sources including federal, state, and local agencies.

4.2.1 FlamMap

FlamMap is a spatial fire behavior mapping and analysis program that requires data including elevation, slope, aspect, surface fuel models, canopy cover, fuel moisture, and weather data to calculate fire behavior outputs.

The outputs from FlamMap represent surface fire potential across the landscape. FlamMap has the ability to represent fire behavior characteristics across the entirety of the City at a single point in time. Because the model evaluates the entire City under a defined set of environmental parameters, differences in potential fire behavior can be determined. Additional information on methodology and specific inputs used for FlamMap are available in Appendix B.

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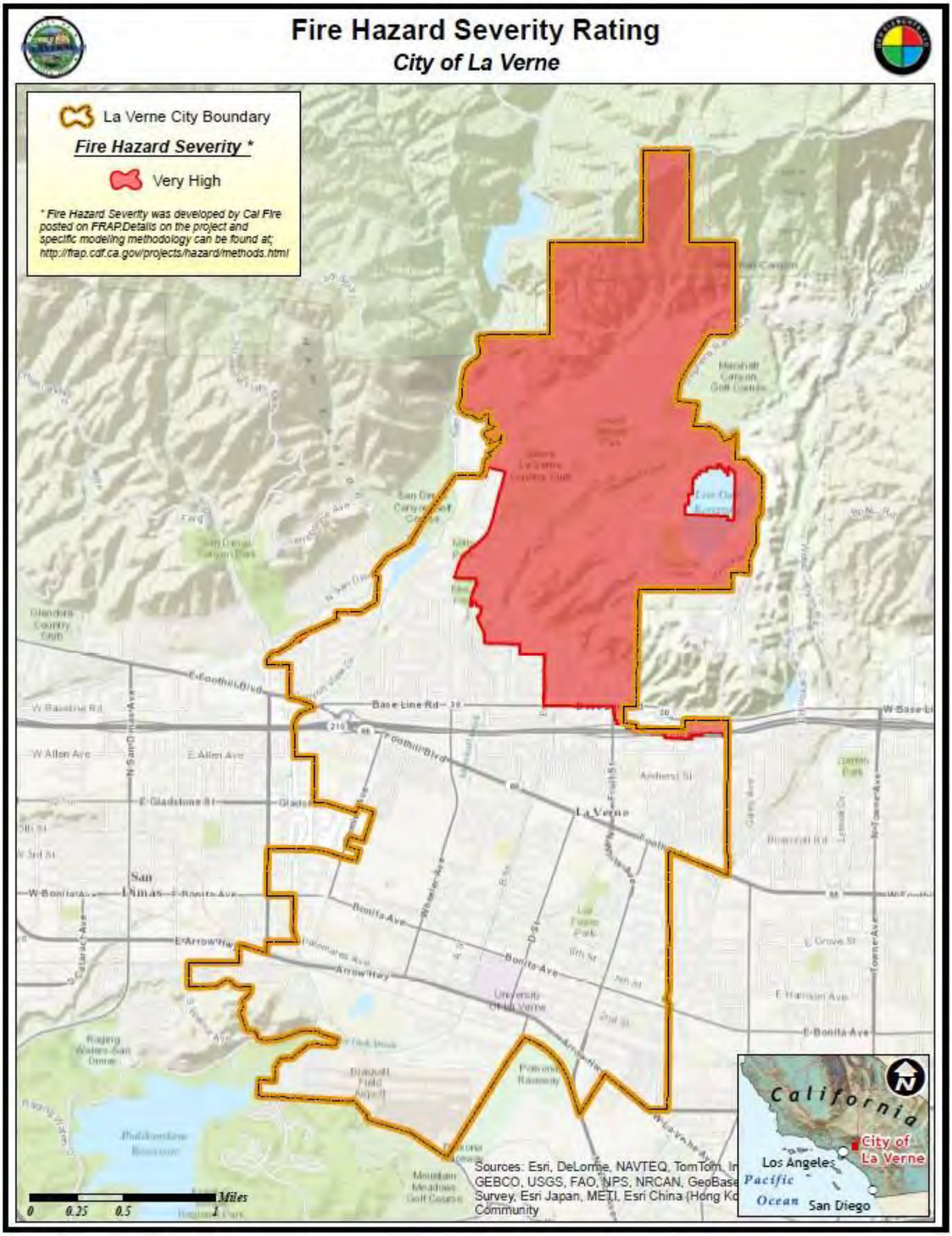
Figure 12 CAL FIRE Fire Hazard Severity Rating Map for La Verne



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4.2.2 FSPro

This model is used to assess the probable spread of a wildfire using historic weather and fire danger data. By modeling more than 1,000 potential wildfires burning under weather conditions associated with the City, probable wildfire spread can be determined. This model is useful to determine which areas of the city have the greatest potential to be impacted by a wildfire. Additional information on methodology used in the FSPro analysis is found in Appendix B.

4.2.3 Fire Family Plus

Fire Family Plus (Version 4.0) is a fire climatology and occurrence program that combines the functionality of various weather and climate programs into a single package. The model allows fire professionals to summarize and analyze weather observations for use in FlamMap and FSPro. Additional information on methodology used for Fire Family Plus is available in Appendix B.

5.2.3 Data Sources for Models

Much of the data used for fire modeling came from the Wildland Fire Decision Support System (WFDSS). The WFDSS is a national system that supports wildfire planning at the landscape level. For the purpose of this assessment elevation, slope, aspect, surface fuel model, and canopy cover data from WFDSS was utilized. Historical weather and fuel moisture data maintained in WFDSS was used to support the fire probability model. Spatial data obtained from WFDSS has a resolution of 30-meter^2 and may not capture small variations in the actual landscape.

5.2.3.1 Weather Data

Historical weather data used in the analysis came from Remote Automated Weather Station (RAWS) located at Tanbark Flat and Santa Fe Dam. Twenty years of continuous weather observations were used from these two stations. FireFamilyPlus evaluated the data based at the height of the wildfire season, June 1st through November 15th. Weather and fuel moisture data from these RAWS were utilized as inputs for FlamMap and FSPro.

5.3 HAZARD ASSESSMENT RESULTS

The results from FlamMap show areas within and immediately adjacent to the City with flame lengths in excess of 11 feet, indicating an extreme fire hazard (Figure 13). FlamMap only models surface fire conditions and the observed flame lengths during a wildfire; however, they can exceed this level as canopy fuel becomes involved in the fire. These areas of the greatest fire intensity are difficult for firefighters to control and are extremely hazardous to the safety of the public and firefighters. Assets impacted by wildfires burning at these intensities are at significant risk of loss

The Fire Suppression Interpretation Table (Table 5) is a guideline used by firefighters to measure the safety and potential effectiveness of various fireline resources based on a visual assessment of active flame length.

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Figure 13 La Verne's Fire Hazard Rating Map

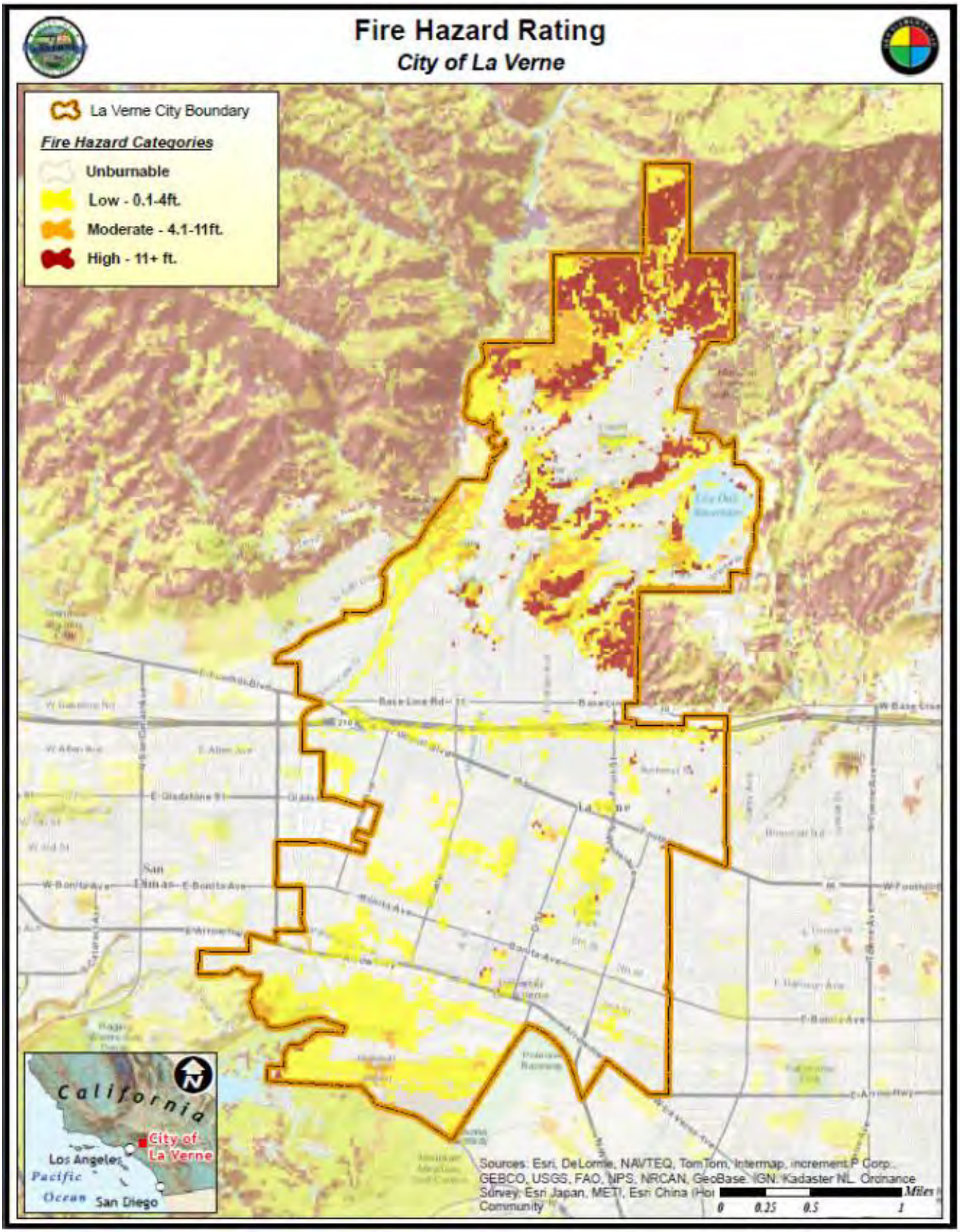

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Table 5 Fire Suppression Interpretation Table

Flame Length (feet)	Fireline Intensity (BTU/feet/ second)	Interpretations
0–4	0–100	Fires can generally be attacked at the head or flanks by persons using hand tools. Handline should hold the fire.
4–8	100–500	Fires are too intense for direct attack on the head by persons using hand tools. Handline cannot be relied on to hold fire. Equipment such as dozers, engines, and retardant aircraft can be effective.
8–11	500–1,000	Fires may present serious control problems—torching out, crowning, and spotting. Control efforts at the head of the fire will probably be ineffective.
11+	1,000+	Crowning, spotting, and major runs are common. Control efforts at the head of the fire are ineffective.
[1] Caution: These are not guides to personal safety; fires can be dangerous at any level of intensity; Wilson (1977) has shown that most fatalities occur in light fuels on small fires or isolated sections of large fires. Source: NWCG Fireline Handbook, Appendix B Fire Behavior, April 2006.		

Large portions of La Verne show no flame activity based on outputs from FlamMap. These areas appear not to be at risk from a wildfire; however, this is not an appropriate interpretation of the model outputs. Areas without flame activity are classified as an "*Urban-Unburnable*" fuel type in the data used to analyze wildfire potential. The fuels data used by FlamMap generalizes the surface fuel characteristics within a 30 meter [2] pixel, therefore areas with agricultural or urban development such as lawns, roads, parking lots or other paved areas receive the "*Unburnable*" classification. The model is not robust enough to capture flammable landscape vegetation, flammable roofs or agriculture lands with the potential to support fire spread and can under estimate the fire potential within these environments.

5.4 RISK ASSESSMENT

Risk of wildfire refers to the possibility of a wildfire occurring. There are many types of ignition sources including natural and human (accidental or deliberate). An evaluation of historical fire occurrences is important to gain a better understanding of ignition potential and can lead to development of specific prevention strategies. Ignition history can also be used to help prioritize fuel treatments as areas with a higher density of historic ignitions can be extrapolated to be a more risk of future ignitions and therefore at an overall higher risk of damage from a wildfire.

Figure 6 depicts ignition density that displays wildfire occurrences between 1993 and 2012. Clusters for ignitions can be noted along San Dimas Canyon Road, Live Oak Canyon Road and in portions of unincorporated La Verne and near Sycamore Canyon in San Dimas. The highest risk of fire occurrence comes from human activity as lightning is a rare event in the lower elevations of the San Gabriel Mountains

5.5 STRUCTURE VULNERABILITY

The sections of the City north of the 210 Freeway are vulnerable from wildfires due their proximity to the wildlands of the San Gabriel Mountains and Angeles National Forest. The structures located directly adjacent to these wildlands are at the greatest risk.

In the southern portion of the City there is potential for structure loss outside of the Very High Fire Hazard Severity Zone because burning embers can carry in the wind for up to a mile away from the main fire front and

land on receptive fuels such as flammable landscaping. In addition, leaf and litter build up on the roofs and in rain gutters of structures make them vulnerable. Van Dusen Hill and the residences on and near Sun Rose Street are at the greatest risk from wildfire due to enclaves of wildland vegetation and eucalyptus trees in this area of the City.

Research has shown repeatedly that the primary reason for structure loss during a wildfire is due to the ignitability of a structure itself. In some situations, a low intensity fire can destroy structures that are highly ignitable while structures with low ignitibility can survive high intensity fires (Cohen, 2000). A structure's characteristics (exterior construction material and design) and the heat sources within 100-200 feet dictate whether a structure will survive a wildfire (Cohen 1995; Cohen 2000; Cohen, J., Butler, B., 1998).

The risk of a structure's ignition is a direct result of radiant and convective heat exposure from a wildfire, and burning embers causing ignitions on or near vulnerable structures. Structures ignite in three ways:

- Convection: Is the transfer of energy within fluids such as air. Convective heat rises vertically – visually observed as flames and smoke columns. Flames can overwhelm a structure by direct flame impingement, which is a result of poorly developed defensible space.
- Radiation: Works much in the same way as a radiator heating a room in the wintertime. Flammable objects reach their ignition temperature causing a structure to ignite. The potential for ignition is greatly reduced as space between wildland and urban fuels is increased.
- Burning Embers: Burning material (i.e. wood shingles, tree bark, leaves) that detach from the main fire front get carried by strong convection drafts and/or winds to receptive fuel downwind. Hundreds to thousands of burning embers are produced during a wildfire and can be carried long distances by winds.

Three Forms of Structure Ignition (from www.firewise.com)

Defensible space is the space between a structure and the wildland area or neighboring structures that, under normal conditions, creates a sufficient buffer to slow or halt the spread of a wildfire to a structure. Defensible space protects a structure from direct flame impingement, radiant heat, and some burning embers and is essential for structure survivability during wildfires.

The vulnerable parts of a structure that can contribute to its ignition during a wildfire include:

- Roofing – Roof construction and maintenance has been a key factor in structure loss on many fires. It's not just the type of roofing material, but also the construction details, the condition of the material, and whether the roof is clear of burnable material (such as pine needles and other debris)
- Garages - Garages are typically not well sealed with gaps at the top, bottom and edges of doors allowing burning embers to enter. Oftentimes garages contain flammable materials that can enhance ignition potential. Garages usually have vents at various locations, especially if they contain gas furnaces or hot water heaters. These vents are easy entry points for embers.
- Siding - Flammable siding can provide a pathway for flames to reach vulnerable portions of a structure such as the eaves or windows. Siding needs a source of ignition, which in many cases includes

vegetation in close proximity to a structure, wooden decks and fences, or stacked firewood or other flammable material can provide a heat source that ignites siding.

- Vents - Soffit vents in the eaves are an easy entry point for wind-driven burning embers during a wildfire. Attic fires are not easily detected from the outside and structures have been lost when fire personnel have left the scene unaware that a fire is burning within the attic.
- Windows - Unprotected and inadequate windows can be another major entry point for fire. Windows can be broken by airborne materials or cracked by thermal expansion during a wildfire, igniting materials in the structure through radiation, convection, and/or burning embers entering a structure.
- Nooks and crannies - Little grooves, inside corners, and roof valleys all become areas where flammable debris (such as pine needles and bird's nests) have collected over time. Burning embers can land on this debris and igniting it.
- Crawlspace Vents - These areas, not just under a structure, but under decks and other attachments, are difficult to protect if they are not adequately screened. Much like vents in the attic burning embers can be carried to flammable material underneath a structure.
- Wood Fences – Firefighters have observed that wood fences, when ignited; act as a fuel source that carries fire closer to a structure. Many fences are either attached to home or close enough to present a problem.
- Wood Decks – Decks act as a source of fuel that is attached or directly adjacent to structures. When ignited by wildfire the radiant and convective heat output can ignite structures. In addition, most decks are adjacent to large windows or glass sliders. The heat from a deck fire can cause the glass to fail allowing the wildfire to enter a structure.
- Flammable landscape vegetation and/or flammable items such as firewood or flammable debris piled in close proximity to the house. As a result, structures are exposed to significant radiant and convective heat and burning embers making structures more susceptible to ignition.

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5. MITIGATION ACTION PLAN

The threat to the City of La Verne from a wildfire is ongoing; however, stakeholders can take proactive steps to mitigate this threat. Since the question is not *if* but *when* wildfires will occur, a strategy to reduce the wildfire threat to the City's assets should be developed. Equipped with the wildfire assessments from Chapter 5, the actions identified in this Action Plan were developed to mitigate those hazards and risks, thereby reducing the wildfire threat. Whether a wildfire is catastrophic or not depends on the efforts of all stakeholders – residents, local organizations, HOAs, businesses, City Staff and officials along with county, state, and federal agencies.

5.1 COMMUNITY PREPAREDNESS

Community preparedness is the ability of communities to prepare for, withstand, and recover from emergencies such as wildfire. Current land use planning, zoning regulations, and municipal codes adopted by State of California and La Verne provide the regulatory basis for preparedness, but these alone will not protect the City's assets – preparedness requires participation by all stakeholders, at all levels.

5.1.1 Emergency Preparedness Programs

The City and schools have implemented several programs to prepare the community. These include:

City of La **Verne's** Blackboard Connect

A mass notification platform used to facilitate communication and emergency preparedness. La Verne implemented Blackboard Connect so City officials can stay connected to residents and efficiently provide them with direction in the event of any disaster. Using Blackboard Connect, officials can record and send an unlimited number of personalized voice messages to home phones, businesses, local agencies and mobile phones in just minutes. The service also sends email, text messages (SMS) to mobile phones, and posts on *Facebook*, RSS feeds and *Twitter* channels. Messages can also be sent to TTY/TDD devices for people who are hearing impaired. Residents can sign up for this service at https://lavernepd.bbcportal.com/

Fire Department Public Education

The La Verne Fire Department's Fire Prevention Bureau conducts business inspections and plan review, based on the 2013 California Fire Code. The bureau also investigates fires and coordinates public education regarding fire and life safety.

School Emergency Operations Plan

Bonita Unified School District Natural Hazard Mitigation Plan - The mission of the Bonita Unified School District's Natural Hazards Mitigation Plan is to promote sound District policy designed to protect students, faculty, staff, school sites, critical support facilities, and the environment from natural hazards. This can be achieved by increasing awareness, documenting the resources for risk reduction and loss-prevention, and identifying activities to guide the District towards building a safer and more sustainable District.

University of La Verne - This Plan was established as a supplement to the administrative policies, procedures and practices followed during normal university operations. When implemented, it serves as the University of La Verne's emergency operations plan, setting forth the authorities and policies for activation, personnel emergency assignments and operational procedures.

Red Cross

The San Gabriel Pomona Valley Chapter (SGPVC) serves 1.8 million people in 44 communities from La Canada Flintridge to Pomona and Duarte to Rowland Heights. The SGPVC provides a number of training sessions that focus on disaster preparedness, first aid/disaster supply kits. The Chapter's mission is to provide disaster relief with a focus on meeting people's immediate emergency needs by providing shelter, food, and health and mental health services. For additional information, contact them at San Gabriel Pomona Valley Chapter, 430 Madeline Drive, Pasadena, CA 91105 or by phone at (626) 799-0841 or visit their website at www.redcross.org/ca/pasadena.

5.2 PROTECTING ASSETS

The protection of human life, is the City's first priority with the protection of property (i.e. homes, businesses, historic sites, infrastructure, etc) and resource assets secondary. Many citizens incorrectly assume that there will be a fire truck available to protect their homes or structures during a wildfire; however, with thousands of structures in La Verne there are simply not enough fire personnel or fire equipment to defend each structure or other asset. Often in wildfire situations, it is extremely unsafe and impossible for firefighters or residents to make an effective structure protection stand; therefore, these structures and other assets must be able to survive on their own.

The ability of firefighters to protect assets at risk depends on many factors. Firefighters arriving on scene will perform a quick assessment or "triage" to determine whether a structure is defendable. They look for access/egress issues, whether a structure has characteristics of vulnerability, hazardous material issues, adequate water sources, adequate defensible space, and whether the defensible space provides them safe operational space. The required 100-feet minimum defensible space may not be sufficient for firefighters to safely defend structures.

Defensible space includes both wildland vegetation as well as ornamental vegetation used in landscaping. Often times the ornamental vegetation can be more flammable than wildland vegetation.

Safety zone guidelines provide safe operational space guidance for firefighters protecting structures. Firefighters require a minimum distances of 4 times the height of observed or anticipated flame lengths to enhance their personal safety (Butler, B., Cohen, J.D, 2000). These safety zone guidelines assume that there is no wind or slope and convective heat from wind and/or terrain influences. Areas with these influences will need greater distances than those recommended to provide for firefighter safety.

Observations have shown that flame lengths exceeding 70-feet do occur during wildfires in this area so defensible space distances greater than 100-feet may be needed. While this is a current requirement within the Very High Severity Zone, 100-feet of defensible space is the standard for all other areas of the City.

Although the assessment in Chapter 5 provides some guidance with flame lengths, an onsite consultation with Fire Department personnel is recommended to determine whether the clearance around a structure is sufficient to provide the safe working environment required for firefighter and a citizen's life safety.

When defensible space, fuelbreaks, and area fuel treatments are integrated into a hazardous fuel mitigation strategy, the City's natural resources are also afforded an enhanced level of protection from a fire that may originate from a structure and spread into the wildland vegetation. Fuel treatments can moderate fire behavior, improve access for firefighters, and provide a safer fire ground environment allowing firefighters to better protect the City's assets.

5.2.1 Reducing Structure Ignitability

The ability of a structure to survive wildfire depends on its construction materials and the quality of the defensible space surrounding it. Burning embers from a wildfire can find the weak point in a structure and ignite it because of seemingly inconsequential factors; however, there are measures that can be taken to safeguard structures from wildfire. If a structure's vulnerability to ignition can be mitigated, the potential for a structure to survive a wildfire is enhanced, even in the absence of direct firefighter protection.

The exterior construction material and maintenance, structure design, and defensible space will determine whether a structure will survive a wildfire or not. Most actions to reduce the ignition potential of a structure are associated with the structure itself and within 100-feet of the structure. Under some circumstances reducing fire intensity, and therefore the structure ignition risk, may involve extending the 100-foot zone further depending on steepness of slopes and fire weather wind events (i.e. Santa Ana wind events).

The following mitigation actions will enhance the survivability of structures and improve life safety of citizens and emergency responders in the City of La Verne.

Table 6 Mitigation Actions

Structure Component	Mitigation Action
Defensible Space	Follow Direct Community Protection guidelines in Tables 9 & 10. Select fire resistant plants and non-combustible hardscape for the landscaping. Plants located within this area should be kept healthy and maintained frequently. For additional information on plant selection, see Los Angeles County Fire Department's website at http://fire.lacounty.gov/forestry/PDF/Approved%20Plant%20List.pdf
Addressing	Required minimum letter/number height of 3" for residential and minimum of 6" for commercial with additional posting for longer access routes
Roof	Replace wood-shake or shingle roofs with a Class-A fire-resistant type (composition, metal or tile). Openings in roofing materials, such as the open ends of barrel tiles, should be plugged to prevent ember entry and debris accumulation. Regardless of the type of roof, keep it free of bird's nests, fallen leaves, needles and branches.
Chimneys	Chimney and stovepipe openings should be screened with an approved spark arrestor cap.
Eaves	Cover the underside of the eaves with a soffit, or box in the eaves, which will reduce the ember threat. Enclose eaves with fiber cement board or 5/8-inch thick, high-grade plywood. If enclosing the eaves is not possible, fill gaps under open eaves with caulk.
Exterior Siding	Noncombustible siding materials (stucco, brick, cement board and steel) are better choices. If using noncombustible siding materials is not feasible, keep siding in good condition and replace materials in poor condition.
Windows and Skylights	Single-pane windows and large windows are particularly vulnerable. Recommend installing windows that are at least double-glazed and that utilize tempered glass for the exterior pane. The type of window frame (wood, aluminum or vinyl) is not as critical; however, vinyl frames can melt in extreme heat and should have metal reinforcements. Keep skylights free of leaves and other debris, and remove overhanging branches. If skylights are to be placed on steep pitched roofs that face large amounts of nearby fuels (a mature pine tree or another house), consider using flat skylights constructed of double-pane glass.
Vents	All vent openings should be covered with 1/8-inch or smaller wire mesh. Another option is to install ember-resistant vents. Do not permanently cover vents, as they play a critical role in preventing wood rot.
Rain Gutters	Always keep rain gutters free of bird's nests, leaves, needles and other debris. Check and clean them several times during the year.
Decks	Keep all deck materials in good condition. Consider using fire-resistant rated materials. Routinely remove combustible debris (pine needles, leaves, twigs and weeds) from the gaps between deck boards and under the deck. Enclosing the sides of the deck may reduce this type of maintenance. Do not store combustible materials under the deck.
Flammable Items	Keep the porch, deck and other areas of the home free of flammable materials (baskets, newspapers, pine needles and debris). Keep firewood stacked at least 30-feet away.

Websites with additional information include:

- WUI Fire Code at www.fire.ca.gov/fire_prevention/fire_prevention_wildland_codes.php. Rationale for the WUI Fire Building Codes is explained in the "Home Survival in Wildfire-Prone Areas" at http://anrcatalog.ucdavis.edu/pdf/8393.pdf.
- WUI building materials by the Office of the State Fire Marshal can be found at www.osfm.fire.ca.gov/strucfireengineer/pdf/bml/wuiproducts.pdf
- The Center for Fire Research and Outreach - http://firecenter.berkeley.edu
- Homeowner's Wildfire Mitigation Guide - http://groups.ucanr.org/HWMG
- Firesafe Landscape - http://ucanr.org/safelandscapes

5.2.2 Water Sources

Water sources are a critical element in a firefighter's ability to suppress a wildfire. There are approximately 1,467 fire hydrants within the City (See Figure 14); however, two improvement items were noted in the 2012 NHMP including the need for a fire hydrant at the large water tank above the Emerald Debris Basin and the need to maintain a water cistern located at the extreme northern corporate boundary along the Sunset Peak Motorway.

5.2.3 Natural and Cultural Resources

The reality is that the priority for fire protection is life safety first, followed by property then natural resources. The fire suppression actions taken to defend and protect life safety, structures, and infrastructure may not be the same for natural resources.

Wildfires in this area often burn through vegetation as a "stand replacement" fire. A stand replacement fire is a fire that either consumes or kills the majority of the dominant vegetation, thereby changing the structure and composition of the vegetation substantially. This is the natural fire regime for chaparral vegetation. A method to reduce the impacts of wildfire on natural and cultural resources is through fuel treatment. Fuel treatment activities can reduce the threat of wildfire coming from human development towards important resources and also reduce the wildfire severity should these resources burn.

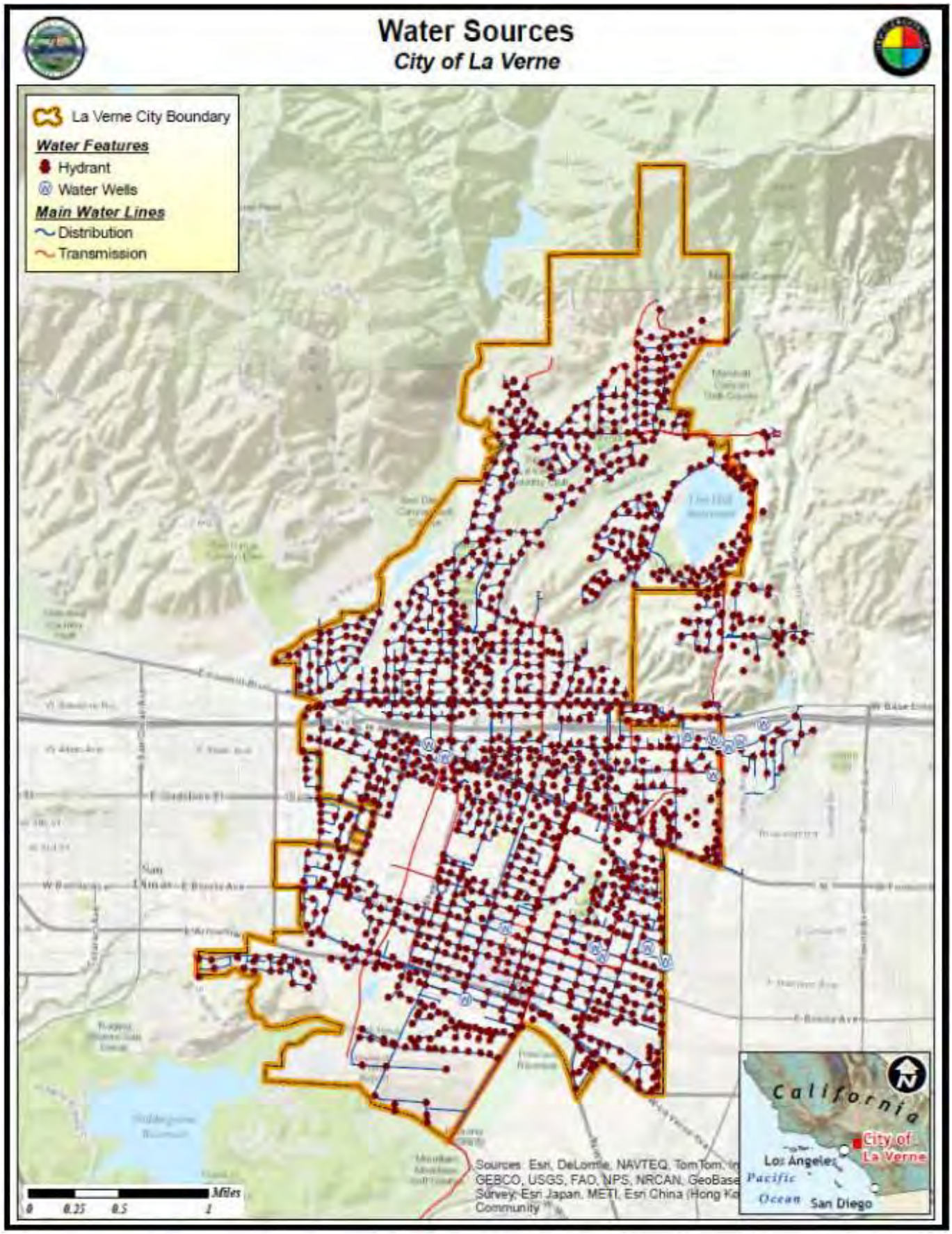
5.3 FUELS MITIGATION STRATEGY

The relationship between fuels management and wildfire effects in California's ecosystems has long been recognized. Two wildland fire researchers' views of fuels management and its relationship to wildfire are as applicable to La Verne today as they were at the time these positions were taken more than 20 years ago.

> Clive Countryman in 1974 stated, *"The only alternative to planned and managed vegetation patterns in Southern California appears to be the acceptance of great economic damage, threat to human life, and the unpleasant aesthetic and environmental effects of unmanageable wildfire."*
>
> While years later Harold Biswell of the University California, Berkeley stated that *"The management of wildland fuel has become one of the more important aspects of fire management."*

The fuel mitigation strategy outlined in this CWPP addresses La Verne's situation and provides guidance on mitigation measures based on standards associated with the City of La Verne Municipal Code, Chapter 18.68 HDOZ, Los Angeles County Code, Title 32, Article 11 of the Uniform Fire Code, Section 1117 "Clearance of Brush and Vegetation Growth" and the California Public Resources Code 4291.

Figure 14 La Verne Water Sources Map



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Fuel treatment prescriptions vary from high intensity to low intensity. Intensity is measured by the amount of vegetation treatment required to meet site-specific hazard reduction goals (i.e. high intensity treatments generally remove a greater volume of fuel than does a low intensity treatment). The goal of a fuel treatment plan is to modify potential fire behavior, thereby reduce the wildfire impacts on community assets. The fuel treatment plan for La Verne follows local and state regulations with a common objective of reducing potential fire intensity, rate of spread, and severity of fire effects. Achieving the standards of the fuel treatment plan reduces the opportunity for a wildfire to spread from undeveloped areas to structures or from human development into wildland areas.

The recommendations for hazard mitigation projects are general in nature, with site-specific analysis required to address location, access, land ownership, biological concerns, cultural resource concerns, topography, and soils required prior to implementation. The fuel treatment strategy is provided to serve as a guideline for project implementation. The tactics developed to implement this strategy consist of fuel treatment prescriptions that utilize wildfire modeling outputs, specific fuel types, topography and location relative to structures to define fuel treatment tactics.

5.3.1 Existing Fuel Treatment Activities

La Verne's Public Works Department manages the existing vegetation management program. The park maintenance division provides maintenance for City-owned landscape areas, which includes 19 parks, medians, building sites, and approximately 11,500 city trees. The division is also responsible for the administration and maintenance of nine landscape maintenance assessment districts and 623 catch basins.

HOAs or landowners are responsible for meeting fire hazard reduction standards on privately owned open spaces within established neighborhoods. Responsibility for the management of vegetation along right-of ways that traverse the City are the responsibility of the jurisdictional agency (i.e. Cal Trans, Southern California Edison, Los Angeles County Department of Public Works).

5.3.2 Vegetation Management Units

Seven Vegetation Management Units (VMUs) have been established for the purposes of identifying hazardous fuel mitigation needs (Figure 15). The VMUs all contain many acres of developed/landscaped land that do not require additional management to improve wildland fire safety and contain a mixture of both public and private lands. The VMUs are loosely based on existing HOA boundaries (i.e. Mountain Springs, La Verne - Live Oak) or prominent geographic features (i.e. Marshall Canyon, San Dimas). This alignment of the VMUs with HOAs was intentional to reduce the number of landowner associations involved in potential public and private fire hazard mitigation issues.

Table 7 Vegetation Management Units by Size

VMU Name	Unit Size (Acres)
Mountain Springs	177
Golden Hills	411
La Verne – Live Oak	366
Wilderness Park	16
Marshall Canyon	648
San Dimas	258
Van Dusen	175

Given the relative similarity of fuel types within the VMUs, treatment standards presented in Tables 9 and 10 can be utilized for all Units. Care needs to be used when addressing native trees and those trees and shrub species identified as significant within the HDOZ. A certified arborist should be consulted when the limbing of native oaks is planned to assure that tree health is maintained. In general, July and August are the preferred months to limb an evergreen oak such as coast live oak (*Quercus agrifolia*) (www.californiaoaks.org, *accessed October 2013).*

5.3.3 Private Ownership Lands

There are many privately owned parcels within the City of La Verne. When structures are present, private property owners are required to maintain defensible space per regulation found in the City of La Verne Municipal Code, Chapter 18.68 HDOZ or the California Public Resources Code 4291 as applicable. Undeveloped private lands may have a fuel structure that could promote wildfire spread and damage to private and public assets. For this reason, the fuel treatment standards presented in this CWPP can be applied as necessary to the entire land base in La Verne, regardless of ownership or status.

5.3.4 Prioritization of Fuel Treatments

The fuel management strategy provides the groundwork for treatment prioritization. The priorities promoted in this plan are:

1. Life Safety
2. Property – structures, infrastructure
3. Resources – Natural, Cultural, Visual, Recreation

The fuel treatments recommended for each of La Verne's VMUs follows a basic protocol: areas in need of treatment that are located in close proximity to dwellings or infrastructure are a higher priority for treatment than those areas that are further away from improvements. The outputs from fire modeling in Chapter 5 are factored into the prioritization process with high hazard areas (higher flame lengths) and areas closer to residences receiving a higher treatment priority (See Figure 16).

The prioritization ranking associated with this plan consists of qualitative designators - High, Moderate, or Low for locations within a VMU. The primary attributes defining these designators involve fuel and fire behavior characteristics and proximity to values. These rankings are defined as follows:

- HIGH – Severe fire behavior characteristics are expected with significant threat to assets: assets are 300-feet or less from flame lengths of 4-feet or greater.
- MODERATE – Fire behavior is expected to pose a serious threat to assets; assets are more than 300-feet from flame lengths of 4-feet or greater. Ember cast from wildfire may still ignite flammable items/vegetation adjacent to assets.
- LOW – Fire behavior poses a minimal threat to assets. Flame lengths are less than 4-feet within these portions of a VMU. Ember cast from wildfire can still ignite flammable items/vegetation adjacent to assets.

Based on an analysis of fire behavior within each VMU, Units were ranked in priority for treatment (Table 8). Units with the greatest proportion of "High" hazard areas received the highest treatment priority.

Table 8 VMU Priorities

VMU Name	Treatment Priority
Mountain Springs	1
Golden Hills	3

La Verne – Live Oak	2
Wilderness Park	4
Marshall Canyon	5
San Dimas	6
Van Dusen	7

5.3.5 Fuel Treatment Levels and Treatment Types

In a fuel treatment prescription, the amount of fuel removed varies based on vegetation type or distance from assets to be protected. The variation within a treatment prescription is referred to as the *"fuel treatment level"*. The greater the fuel treatment level, the more fuel that is removed. Fuel treatment levels generally decrease as distance increases from assets at risk from wildfire.

Fuel treatment types take on a wide assortment of forms but can generally be divided into five treatment categories – mechanical, manual, fire, biological and herbicide treatments. The fuel treatment plan for La Verne focuses on mechanical and manual treatments; however, biological (grazing) and herbicide treatments to minimize long-term maintenance of projects may also be considered.

The following are brief descriptions of the more common types of mechanical, manual and biological treatments:

Mowing

Mowing of grasses, weeds and low-shrubs is performed to rearrange the fuel into a less combustible arrangement. Fuel is generally left on site to decompose.

Mastication

Mastication is the mechanical grinding, crushing, shredding, chipping and chopping of fuel to change the fuel structure into a less combustible arrangement. There are many types of machinery that have the capacity to do the mastication work. The type of machinery used and the number of times the machinery passes over the fuel will determine the final appearance of the treatment. Treated fuels are generally left on site to decompose.

Manual Fuel Treatment

Manual fuel reduction work is a more precise but slower method of fuel treatment and tends to be the most expensive. The types of manual treatments include hand-thinning to remove small understory brush and trees, limbing of larger trees using chainsaws or pruning equipment, raking and hand-piling of surface debris, and weed-whacking grasses or low-growing shrubs.

Thinning

Tree and shrub thinning is used as a treatment to break up the continuity of the fuel structure in stands of trees or brush that have become overly dense. Thinning reduces ladder fuel or crown fuel continuity and effectively moderates crown fire behavior. In most cases, thinning is only effective as a fuel management technique when the fine surface fuels are also reduced (Agee, J., Skinner, C., 2005).

Biological Treatment

Biological treatment involves the use of domestic livestock browsing to reduce fuel loads. This method is applied primarily within the WUI in shrub or grass fuel types. Limitations/barriers for use of livestock includes the requirement for fencing, transportation costs, required access to water sources or transportation of

water, potential introduction of non-native species through animal feces and the animal's indiscriminate feeding nature.

The Los Angeles County Fire Department, Forestry Division, maintains a list of brush clearance vendors that private landowners may consider using to support their hazard mitigation needs. This list can be accessed at: http://fire.lacounty.gov/Forestry/BrushManagementHazardReductionContractors.asp. County Forestry also maintains a list of goat contractors who can be contacted concerning the use of these biological agents to mitigate hazardous fuel conditions. The vendor list is available at: http://fire.lacounty.gov/Forestry/VegetationMgmt_GoatContractors.asp.

5.3.6 Fuel Treatment Prescriptions

The fuel management prescriptions for La Verne's VMUs were developed to guide treatments that achieve a less hazardous fuel profile. Treatment types will depend largely on vegetation type, topography, project objectives, and may have limitations due to sensitive habitat, archaeological concerns, soil, water courses, and proximity to structures. It is important to understand that the fire hazard mitigation work can be costly and prone to limitations such as budget and workforce constraints.

Private landowners who wish to improve the overall fire safety of their property and improvements are encouraged to apply the standards found in Tables 9 and 10 for development of defensible space, as well as other elements from Section 6.2.1. These tables summarize the treatment standards for both Direct and Indirect Community Protection.

5.3.7 Fuel Treatment Implementation Timing – Seasonality

Most fire hazard mitigation work can be completed regardless of the season of the year; however, there are issues regarding efficiency, ecological response and fire safety that need to be addressed when planning projects.

Efficiency: In order to avoid multiple treatments in herbaceous (grass/forbs) fuel types, grasses and forbs should be allowed to fully cure prior to treatment. By allowing plants to cure prior to treatment, sprouting of these annuals will not occur. In addition, by waiting until plants are cured, it is assured that seeds have been released to the soil and that a viable crop of annuals will occur the following season.

Ecological Response: Native plants have widely varying phenology (the relationship between a periodic biological phenomenon and climatic conditions). Due to the variations in plant response to manipulation, no single time is of year is appropriate for treating all vegetation. Los Angeles County Fire, Forestry Division has expertise available to property-owners regarding the manipulation of vegetation. This assistance can be requested by contacting the Vegetation Management Unit, 12605 Osborne Street, Pacoima, CA 91331-2129, or by calling (818) 890-5720.

Fire Safety: Property-owners need to be aware that the process of performing fire mitigation work has the potential to ignite a wildfire. Contactors clearing brush in May of 2009 were believed to have ignited the Jesusita fire in Santa Barbara where 80 homes were destroyed and three firefighters were burned (Santa Barbara Independent, Ford, 2013). It is therefore important that property-owners perform hazard mitigation work thoughtfully, so that an unintended ignition of a wildfire does not occur. The Los Angeles City Fire Department provides *"Brush Clearing Tips"* that address fire safety in a brochure available at http://lafd.org/brush/brushmailer.pdf or they can contact the La Verne Fire Department directly.

Figure 15 La Verne's Vegetation Management Units Map

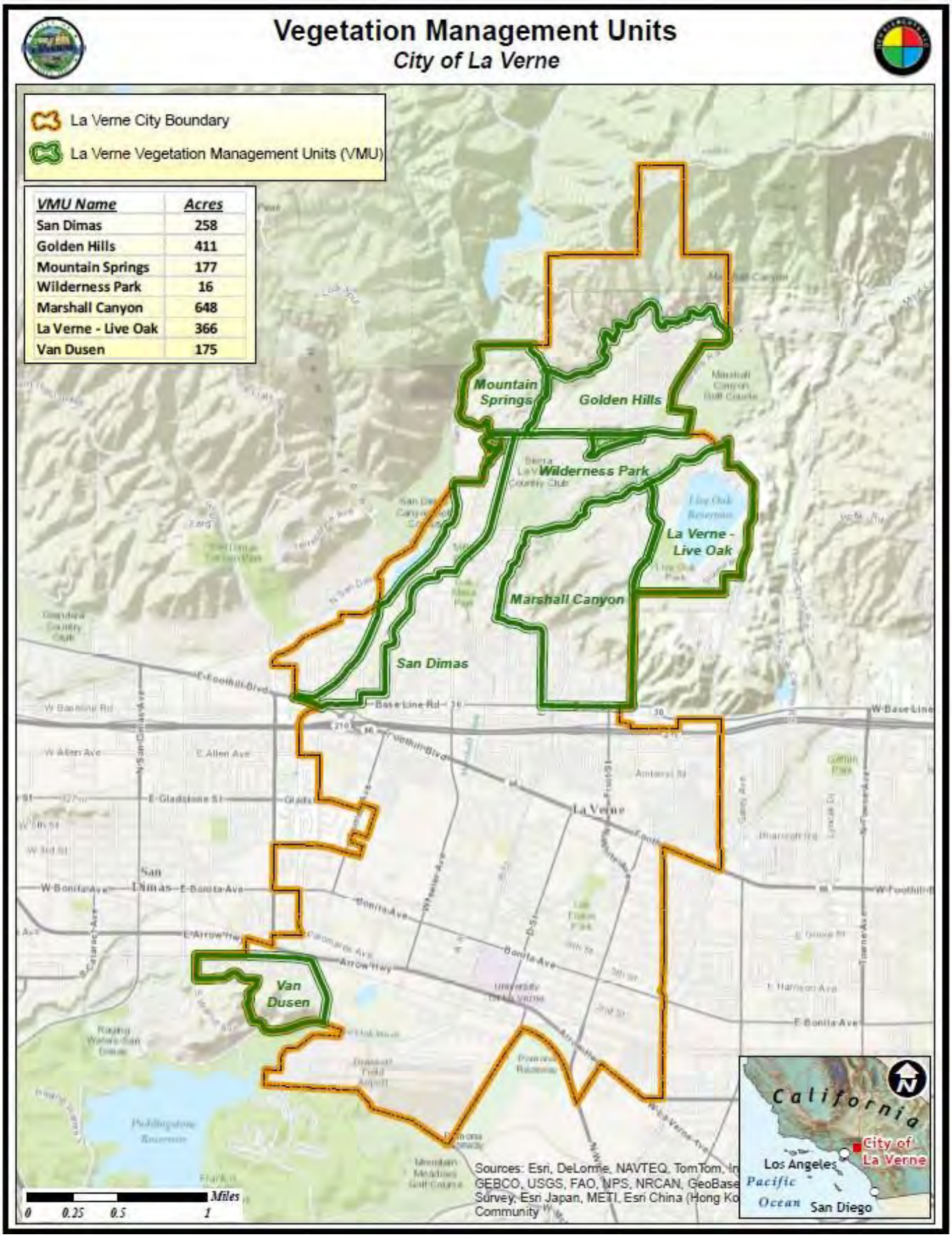

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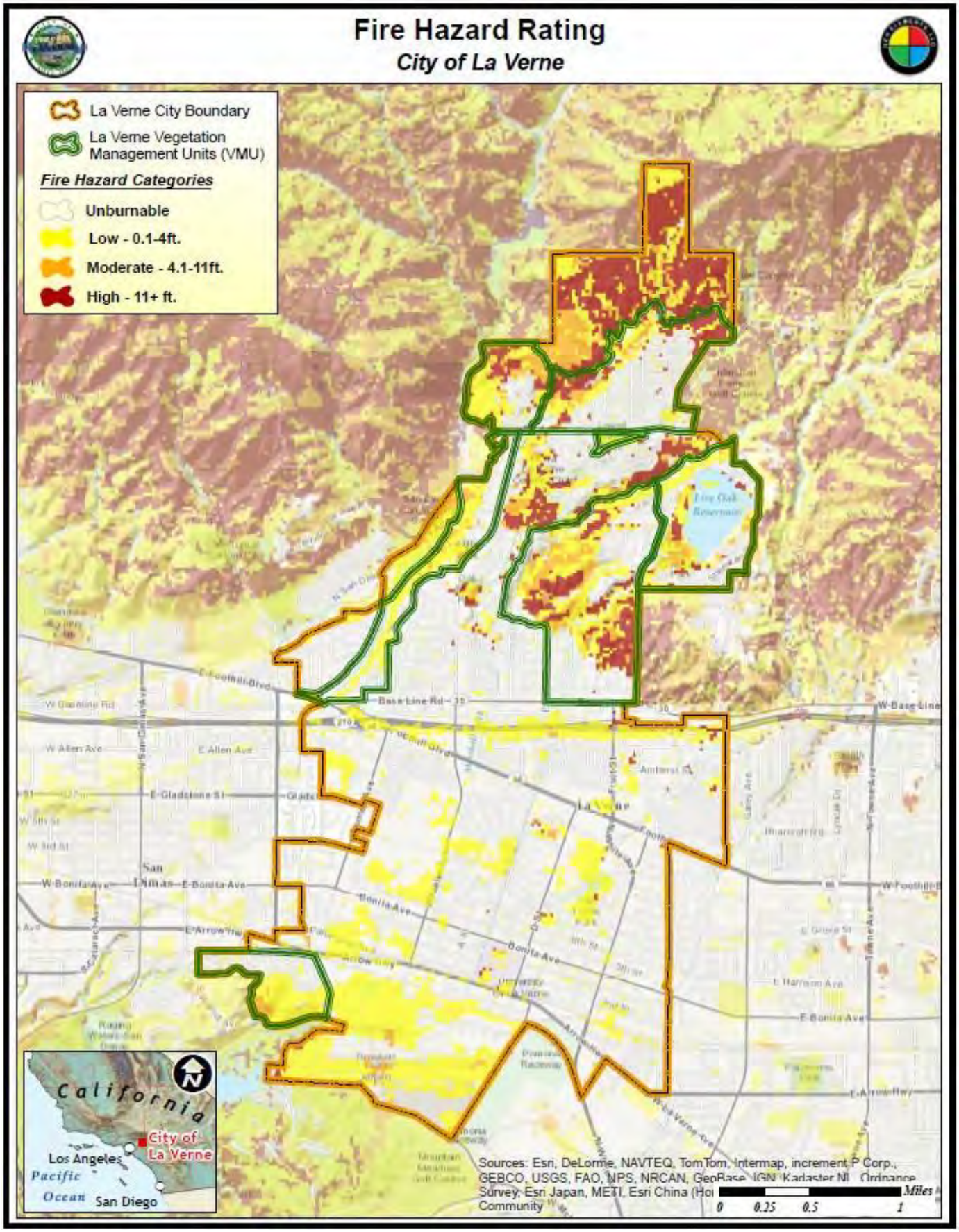
Figure 16 La Verne's Vegetation Management Units with Fire Hazard Rating Map



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Fuels Management Prescription Guidance
Direct Community Protection

Table 9 Fuel Treatment Prescription in VMUs

Location →	Primary Defense Zone (A) (0 **– 30′)***	Fuel Reduction Zone (B) **(30′ – 100′)**	Fuel Reduction Zone (C) **(100′ – 200′)**
Fuel Type ↓	Based on Defensible Space PRC - 4291		Based on Very High Hazard Fire Severity Zone Requirements
Grass/ Forbs	Reduce fuel depth to 4-inches; methods include mowing, masticating, weed-whacking, biological browsing	Same treatment as (A); longer grass in isolated open areas is acceptable	Same as treatment (B) in Very High Fire Severity Zones only
Surface dead/down material	Clear and remove from the Zone dead/down flammable materials	Reduce dead/down flammable material to < 2″ depth and < 3 tons/acre. Isolated large dead woody material is acceptable.	Reduce pockets of dead/down flammable material to < 3″ depth; < 5 tons/acre. Isolated logs acceptable.
Brush/ Shrub fuel	Remove to a spacing (between edges of brush) generally 2x brush height. Material to be removed from the Zone.	Same Treatment as (A); brush can be treated as one large shrub in more open site conditions. Dead material will be pruned from standing brush.	Less intensive brush removal; with spacing approximately 10 ft; more clumping of shrubs is acceptable. Dead material will be pruned from standing brush
Trees Overstory (without brush understory)	Thin smaller trees leaving larger trees at 10-20 ft crown spacing (based on slope, tree size and type); reduce ladder fuels by limbing lower branches 6-15 ft, or lower 1/3 of tree height on smaller trees.	Thin smaller trees leaving larger trees at approx. 10 ft crown spacing (based on slope, tree size and type); reduce ladder fuels by pruning lower branches 6 ft up, or lower 1/3 of tree height on smaller trees.	Treatment standards the same as Zone B
Trees Overstory (with brush understory)	Thinning standards the same as Trees Overstory without brush understory (A). Understory: remove brush ladder fuels.	Thinning standards same as Trees Overstory without brush understory (B). Understory: remove brush ladder fuel; intermittent patches of shrubs and small trees in openings (non-canopy) is acceptable.	Treatment standards the same as Zone B

*For further information specific to homeowner/structure mitigation measures. See Section 6.2.1

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Fuels Mitigation Prescription Guidance
Indirect Community Protection

Table 10 Prescription Guidance in VMUs

Location →	Indirect Community Protection Zone **(200'** and greater from structures)
Fuel Type ↓	
Grass/ Forbs	No treatment required.
Surface dead/down material	Chip or remove dead/down flammable materials, 1″ to 4″ in diameter. Down woody material should be scattered to reduce jackpots. Material greater than 4″ in diameter to be cut so material lays flush to the ground surface. Cut material to be separated to avoid radiant heat transfer between pieces of large woody material.
Brush/ Shrub fuel	Remove to a spacing (between edges of brush) generally 2x brush height on <20% slopes; methods include masticating or hand-cutting, biological browsing. Favor species identified in the Hillside Development Overlay Plan
Trees Overstory (without brush understory)	Maintain tree overstory to provide for a shaded environment to reduce shrub competition and promote higher fuel moistures and lower fuel temperatures. Remove or chip in place suppressed trees less than 3″ in diameter. Retain oak species where practicable. Limb lower branches to 6′ from the ground surface. Chip and cut material in place or remove. Large woody material greater than 4″ in diameter may be retained on site, but will be cut to lay flush to the ground surface and scattered to avoid jackpots.
Trees Overstory (with brush understory)	Maintain tree overstory to provide for a shaded environment to reduce shrub competition and promote higher fuel moistures and lower fuel temperatures. Cut and chip in place or remove between 50 to 75% of existing shrubs, retaining species identified in the HDOZ Plan. Remove or chip in place suppressed trees less than 3″ in diameter. Retain oak species where practicable. Limb lower branches to 6′ from the ground surface. Chip and cut material in place or remove. Large woody material greater than 4″ in diameter may be retained on site, but will be cut to lay flush to the ground surface and scattered to avoid jackpots.

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5.4 EVACUATION

Like many cities in Southern California, La Verne presents a unique challenge for evacuation due to the speed and intensity in which wildfires can burn. As presented in Section 5, wildfire is an extremely fluid and complex process with numerous environmental factors to consider such as weather, terrain, and fuels. Adding human factors associated with an evacuation such as human behavior, population density, overloaded transportation routes, vulnerable populations, and the evacuation of pets and large animals make the task of evacuation increasingly more complex. These human factors significantly increase the amount of time it takes to execute an evacuation. As a result, the decision to evacuate must be made quickly.

DURING A WILDFIRE EVENT

Evacuation is a difficult process, not only for the evacuees but also for emergency responders who are committed to facilitating the evacuation while also attempting to protect citizens and assets of La Verne.

California law authorizes law enforcement officers to restrict access to any area where a menace to public health or safety exists due to a calamity such as flood, storm, fire, earthquake, explosion, accident or other disaster. Refusal to comply is a misdemeanor (Penal Code 409.5). The Police Chief, in consultation with the La Verne Fire Department and/or an Incident Commander, has the responsibility and authority to issue an evacuation order.

During an evolving wildfire, the Police and Fire Chiefs will likely be co-located at the Emergency Operations Center (EOC) located in the Public Safety Building. The Police Chief may appoint a Police Department Captain to be the Law Enforcement Branch Director in the field working with the Fire Department and/or Incident Commander to lead the on-the-ground evacuation efforts. The Fire Department and/or Incident Commander will provide the Law Enforcement Branch Director with continual status reports on fire behavior, fire protection strategies, and potential evacuation decision points so the Law Enforcement Branch Director can manage the actual evacuations.

The Police Department will communicate the need for evacuation to the public using various communication methods, including:

- City's "*Blackboard Connect*" system will help facilitate evacuations within the City
- Cellular device using Alert System
- Emergency Alert System (EAS) supported by the National Weather Service broadcast
- Radio and television announcements and scroll
- Public address systems and announcements from emergency responders
- Door-to-door notifications
- *"Backchannel"* communications, such as Twitter

TIMING

Experience shows that evacuation planning needs to take into account how long it will take to notify residents that an evacuation is necessary, how long it will take for them to get ready and start driving out of the area, and then how long it takes to actually drive to a safe area. The location and severity of the incident will determine whether a "Voluntary" or "Mandatory" evacuation order will be issued.

- *Voluntary Evacuation*

  Areas under a Voluntary Evacuation are within the influence zone of the fire, but not imminently threatened. The Police Department will strongly urge individuals in designated evacuation areas to relocate to safer locations. The location of Evacuation Centers or areas of safe refuge should be identified in the evacuation order. Personal discretion regarding evacuation is allowed under a "voluntary

evacuation order", but is not advised. While not immediately in danger, changes in weather and/ or fire conditions could rapidly cause a threatening situation to occur.

Important Note: Preplanning for the transportation of individuals and vulnerable populations with limited access to transportation is necessary to ensure that all impacted individuals can be removed from evacuation areas. Nursing homes, schools, and senior living centers all should work with Fire and Police leadership to develop evacuation or shelter-in-place protocols (See Section 6.4.1. for more information). Evacuation locations should be identified in the evacuation order. In addition, all media (i.e. television, radio, and social media) should be kept up to date on fire's movement and evacuation information.

- *Mandatory Evacuation:*

  A Mandatory Evacuation is issued when the fire is an *immediate* threat to life and property. The Police Department will order all persons in designated evacuation areas to relocate to safer locations for their own safety. Evacuation locations or points of safe refuge should be identified in the evacuation order. Personal discretion regarding evacuation is not recommended as the decision to stay within an evacuation area places both the individual and first responders at greater risk. Whenever an area is under immediate threat, all roads in the area will be closed to incoming traffic except for emergency responders.

EMERGENCY PREFERRED EVACUATION ROUTES

The City has identified preferred evacuation routes that were developed for the General Plan (See Figure 17, City of La Verne's Primary Wildfire Evacuation Routes Map). These routes offer individuals options for rapid egress from areas of the City threatened by a wildfire.

IMPORTANT NOTE: Since wildfires are so fluid and complex, this map provides preferred evacuation routes but potential fire behavior may necessitate changes to those evacuation routes for safety reasons. As suggested in the General Plan, it is recommended that residents and business-owners become familiar with the preferred evacuation routes and potential evacuation locations.

Additional information on evacuation is available at the following links:

http://calfire.ca.gov/communications/downloads/fact_sheets/Evacuation.pdf
www.calema.ca.gov/planningandpreparedness/documents/evacuation.pdf

POTENTIAL EVACUATION LOCATIONS

Pre-identified evacuation locations are considered "safe areas" where evacuees are safe to stay while the wildfire passes. Historically, the City has used Bonita High School but other areas, such as the Pomona Fairplex and Santa Fe Dam, are also options. The initial evacuation order and subsequent evacuation updates should identify the evacuation location(s) for each incident.

Potential locations for large animal evacuation include the San Dimas Equestrian or Sycamore Park in San Dimas; however, those areas are relatively close to wildland vegetation and, depending on the fire's location and behavior, may not be safe locations. The Pomona Fairplex located south of the City should be considered for use as a large animal evacuation area; however, the City does not currently have an agreement with the operators of the Fairplex for this use.

POTENTIAL ISSUES WITH EVACUATION

- Residents and business-owners may not have established preparedness plans.

- Residents and business-owners may not choose to evacuate but stay and defend their homes/businesses or decide to shelter in place until the fire danger passes. Without fully understanding the effects of their decisions, residents and business-owner's actions can put their life safety at risk as well as that of firefighters and law enforcement personnel.
- Individuals often delay their evacuation with the intent of defending their property, or to shelter in place, or are slow to leave their homes due to packing personal items thereby jeopardize their life safety by fleeing fires in a panic.
- Vulnerable populations have special needs that are critical to address during disasters such as wildfire. These populations may be less likely to respond to, cope with, recover from wildfire, and are less likely to get involved in wildfire mitigation activities. Age, physical and mental limitations can restrict mobility making it more difficult to evacuate in a disaster. Lack of financial resources may hinder the ability for low-income populations to invest in emergency preparedness or mitigation measures as well as recover from loss. Language issues can result in communication barriers to evacuation or support services. In addition, visitors to the City are likely unfamiliar with the wildfire threat or the extent of their exposure or appropriate evacuation routes making them potentially vulnerable as well.
- Evacuating pets and large animals pose problems since panicked animals behave unpredictably and may refuse to respond to normal handling approaches.

5.4.1 Evacuation Preparedness

It is important the residents and business-owners have disaster kits and preparedness plans in place. The Fire Department has information available on their website to assist residents with emergency preparedness planning at www.lavernefire.org/ps.emergencysurvivalplan.cfm?ID=2.

Additional information can be found at:

www.ready.gov/wildfires
www.readyforwildfire.org/pre-evacuation_preparation
www.wildlandfirersg.org

Vulnerable Populations

Individuals and caregivers with special needs should have a heightened awareness of preparedness planning that addresses evacuation and proper care during a wildfire. Their preparedness plans should address the following concerns:

- Medications, equipment, or special dietary needs.
- Documentation about insurance and medical conditions.
- Coordination between emergency responders and caregivers with special vehicles who need to enter an evacuation area to facilitate evacuation.
- Transportation plans for the general public may not be suitable for family members with special needs.
- Caregivers or trusted family members should stay with vulnerable individuals at all times during an evacuation (many special needs populations can be easily upset and stressed by sudden and frightening changes).
- Short and potential long term safe areas should be preplanned.

Los Angeles County Office of Emergency Management offers a program for vulnerable populations through Specific Needs Awareness Planning (SNAP). The purpose of this registry is to facilitate the planning and implementation of disaster response by first-responder agencies to Specific Needs persons living in the County of

Los Angeles. Individuals with special needs can register at: https://snap.lacounty.gov/index.cfm?fuseaction=app.registryLogin&CFID=158197&CFTOKEN=84953146.

Additional information on vulnerable populations and emergencies is available at:

http://enla.org/wp-content/uploads/2011/06/Serving-and-Protecting-All.pdf
http://enla.org/wp-content/uploads/2011/06/saving-lives.pdf
http://enla.org/wp-content/uploads/2011/06/ESP-Disabilities-Guide-2010.pdf

Pets

Preparedness planning for pets includes:

- Plan to take animals and do not turn them loose.
- Make sure dogs and cats wear properly fitted collars with identification, vaccination, microchip and license tags.
- A pet evacuation plan should include routes, transportation needs and host sites. Share this plan with trusted neighbors.
- Exchange veterinary information with neighbors and file a permission slip with the veterinarian authorizing emergency care for animals.
- Make sure all vehicles and pet carriers needed for evacuation are serviceable and ready to be used.
- Assemble a *pet to-go bag* with a supply of food, non-spill food and water bowls, cat litter and box and a restraint (chain, leash or harness). Additional items to include are newspaper and paper towels, plastic bags, permanent marker, bleach/disinfectant solution and water buckets.
- Evacuation shelters rarely accept pets; plan ahead to make sure pets will have a safe place to take refuge before a disaster strikes. If hotels have a a no-pet policy, ask if this can be waived in the event of an emergency. Information for local pet friendly hotels or shelters is available at www.petswelcome.com. For the potential for long-term stays, compile a list of boarding facilities.

Additional information is available at the City's website at www.lavernefire.org/download.cfm?ID=38 and through the Red Cross at www.redcross.org/www-files/Documents/pdf/Preparedness/checklists/PetSafety.pdf.

Large Animals/Horse Evacuation

Emergency preparedness is important for all animals, but preparedness for large animals and horses is especially important because of their size and special transportation needs. Horses should be evacuated as soon as an evacuation warning is issued. If owners are unprepared or wait until the last minute, they may have to leave your animals behind.

The following provides information for pre-planning evacuation with large animals and horses:

1. Plan now for emergency sheltering for horses. Many designated sheltering sites may become overcrowded. Make plans now to house horses with friends, at a commercial stable or other suitable location out of the danger area. Discuss plans with everyone in your family and keep the address of emergency shelters and driving directions in an emergency kit.
2. Become involved with (or start) a neighborhood network. Neighbors can work together to help the horse owners on their street who do not have a horse trailer.
3. Make a list of emergency contacts. Keep copies in vehicles or trailer as well as in your house.
4. Take photographs and prepare a written description of each horse. Put one set in a safe place and another set in your emergency kit.

5. Have a halter and rope for each horse. Make sure halters are marked with contact information or write the information on a piece of duct tape and stick it on the halter. If a horse has medical issues or special needs, record this information on a luggage tag and attach it to the halter.
6. Microchip horses. This is an easy, inexpensive way to help identify animals.
7. Have a 3-day supply of feed and water (per horse). This is particularly important if plans are to shelter in place, but bring feed (and buckets) if evacuated. Make sure to include any medications a horse may need. Label all equipment.
8. Teach your horses how to trailer. Spend time loading and unloading horses so they are safe and willing to load.
9. Keep trucks, trailers and vans well-maintained and ready to move. Keep gas tanks full, particularly during Red Flag Warning days. Continue working with horses until confident they will load.
10. Make a Disaster Preparedness Kit. Store non-perishable supplies in a portable container such as a clean trash can, bucket or canvas duffle bag.

Additional information is available at www.lavernefire.org/download.cfm?ID=37. Also, the County of Los Angeles Department of Animal Care & Control has an Emergency Response Program that includes animal control officers and volunteers trained to deal with small and large animals during an emergency. The Emergency Response Program has specially trained and equipped teams including the Animal Rescue Field Support, Equine Response Team (ERT), and Department Animal Rescue Team (DART). For more information visit their website at: www.animalcare.lacounty.gov.

5.4.2 Repopulation

The Fire and Police departments will determine when it is safe for residents, business-owners, pets and large animals to move back into the area. Repopulating an evacuated area requires as much forethought and planning as an evacuation order. The safety of residents and emergency responders is of the utmost concern and must drive the decision of when to repopulate. Repopulation planning should begin in the EOC as soon as feasible after the evacuation to ensure that all relevant agencies and departments are engaged in the repopulation decision.

5.4.3 Evacuation Recommendation

It is recommended that the City look into opportunities and mechanisms for utilizing social media that supports B*ackchannel* communication (an example of *Backchannel* is Twitter). *Backchannel* is the practice of using networked computers to maintain a real-time online conversation alongside the primary group activity or live spoken remarks. Social media supports "*Backchannel*" communications, allowing for wide-scale interaction that can be collectively resourceful, self-policing, and provides directly sourced information that is otherwise hard to obtain (F. Fiedrich and B. Van de Walle, May 2008).

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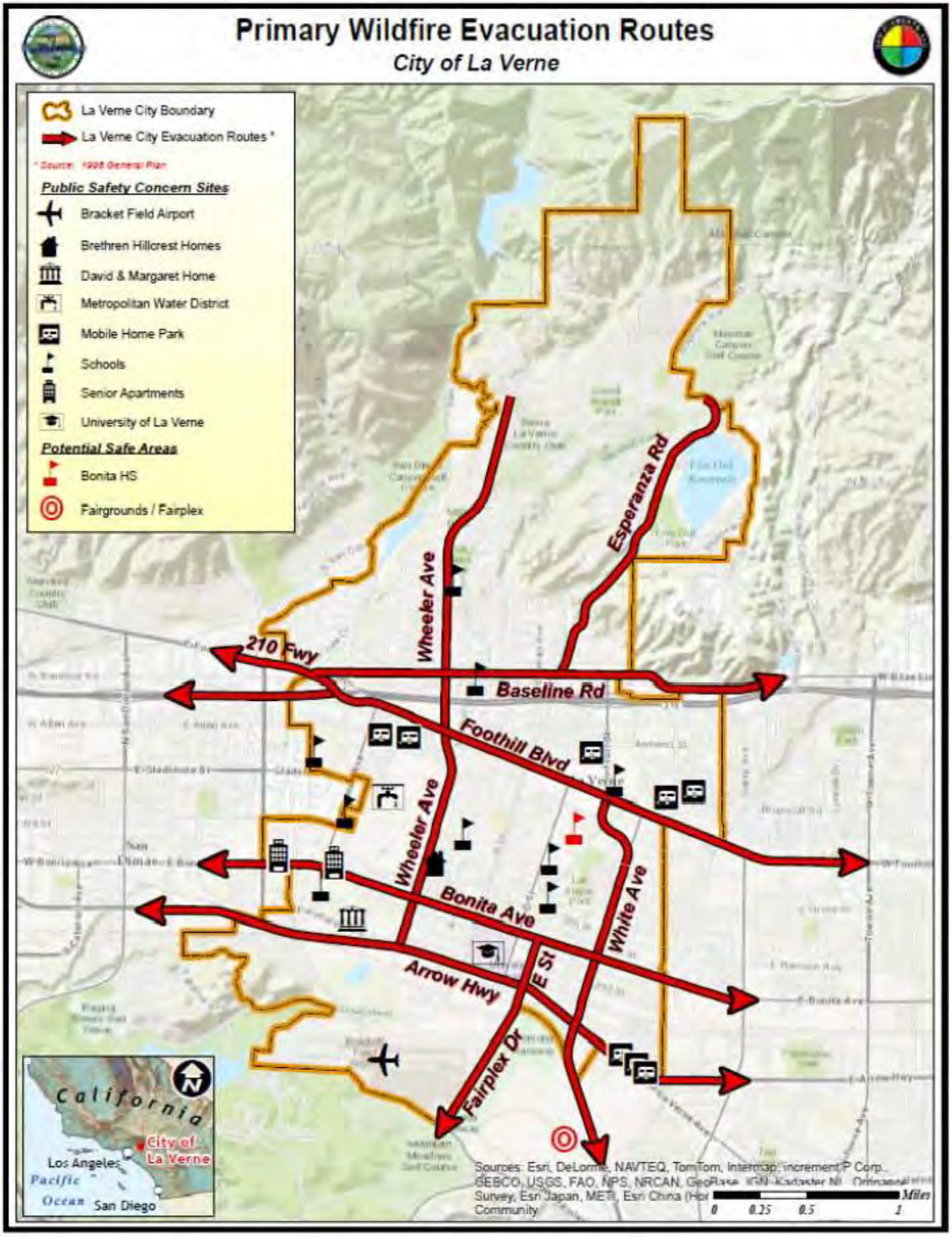
Figure 17 La Verne's Primary Wildfire Evacuation Routes Map



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6. FISCAL RESOURCES AND CONSTRAINTS

Budgetary constraints can make it difficult to address all of the needs identified in this CWPP. While La Verne has an ongoing vegetation maintenance program, addressing the needs within the larger VMUs is important to improving community wildfire safety. The City is currently expending general funds on existing fuel treatments in parks and open spaces.

At the approval of this CWPP, no general funds will be directed towards undertaking additional hazard mitigation projects. A staggered approach to the implementation of fuel treatments is likely as the City will seek external sources (i.e. grants, stewardships) to fund the projects associated with this plan.

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7. MAINTENANCE AND MONITORING

7.1 CWPP REVIEW RECOMMENDATIONS

Change is inevitable. A plan's strength is characterized by its relevance, currency, and its ability to simplify implementation. This CWPP provides a foundation for wildfire protection of the City's assets based on input from stakeholders, current policy, a wildfire assessment, and proposed mitigation strategies. Review and revision of these elements are necessary to maintain the currency of this plan.

The La Verne Fire Marshal is assigned responsibility for conducting a thorough review of this plan at 5-year intervals. Significant changes in policy, budget, and/or environmental conditions may warrant a more frequent review.

7.2 FUEL TREATMENT MONITORING

It is recommended that the City establish a monitoring program to ensure that fuel treatment activities remain effective. The importance of a sustained monitoring program is often overlooked due to workload or budget constraints.

Monitoring and evaluation of a fuel treatment establishes baseline data to draw on for decisions about maintenance treatment schedules as well as determining whether changes are needed in the treatment prescription. The primary aspects to consider in a fuel treatment monitoring program are type of monitoring/evaluation and the monitoring intervals.

A suggested method for monitoring fuel treatments is photo point monitoring. Photo point monitoring is an easy and inexpensive, yet effective, method of monitoring vegetation change. It consists of repeat photography of an area of interest over a period of time with photographs taken from the same location and the same field of view as the original photo. With appropriate site marking and documentation, photos can be precisely replicated by different people many years apart. Details on methods for photo monitoring can be found at: www.fs.fed.us/pnw/pubs/gtr526/.

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9. APPENDICES

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Appendix A - Glossary

1-Hour Timelag Fuels (a.k.a., one-hour fuels): Fuels consisting of dead herbaceous plants Fuels and roundwood less than about ¼ inch (6.4 mm) in diameter. Also included is the uppermost layer of needles or leaves on the forest floor.

10-Hour Timelag Fuels (a.k.a. ten-hour fuels): Dead fuels consisting of roundwood ¼ to l inch (0.6 to 2.5 cm) in diameter and, very roughly, the layer of litter extending from immediately below the surface to ¾ inch (1.9 cm) below the surface.

100-Hour Timelag Fuels (a.k.a., hundred-hour fuels): Dead fuels consisting of roundwood in the size range of 1 to 3 inches (2.5 to 7.6 cm) in diameter and very roughly the layer of litter extending from approximately ¾ of an inch (1.9 cm) to 4 inches (10 cm) below the surface.

1,000-Hour Timelag Fuels (a.k.a., thousand-hour fuels): Dead fuels consisting of roundwood 3 to 8 inches in diameter and the layer of the forest floor more than 4 inches below the surface.

Active Crown Fire: A fire in which a solid flame develops in the crowns of trees, but the surface and crown phases advance as a linked unit dependent on each other.

Aspect: Direction a slope faces.

Assets at Risk: People, property, ecological elements, and other human and other intrinsic values within the City. Assets at Risk are identified by stakeholders as important to the way of life in the City, and are particularly susceptible to damage from undesirable fire outcomes.

Canopy Spacing: The distance from the edge of one tree canopy to another. Crown spacing varies from open (with 10 feet or more of space between tree canopies) to closed (where trees may be growing in very close proximity with little space between them).

Crown Fire: A fire that advances from top to top of trees or shrubs more or less independent of a surface fire. Crown fires are sometimes classed as running or dependent to distinguish the degree of independence from the surface fire.

Dead Fuels: Fuels with no living tissue in which moisture content is governed almost entirely by atmospheric moisture (relative humidity and precipitation), dry-bulb temperature, and solar radiation.

Direct Attack: A method of fire suppression where actions are taken directly along the fire's edge. In a direct attack, burning fuel is treated directly, by wetting, smothering, or chemically quenching the fire or by physically separating burning from unburned fuel.

Ecosystem: A community of organisms and their physical environment interacting as an ecological unit.

Fire Behavior: The manner in which a fire reacts to the influences of fuel, weather, and topography.

Fire Education: Activities to change behaviors and attitudes about fire ecology, wildland fire and the role of fire in natural resource management. Defines the purposes for actions that provide information about and improve understanding of wildland fire.

Fire Frequency: Temporal fire occurrence described as a number of fires occurring within a defined area within a given time period.

Fire Intensity: A general term relating to the heat energy released by a fire.

Fire Potential: The likelihood of a wildland fire event measured in terms of anticipated occurrence of fire(s) and management's capability to respond. Fire potential is influenced by a sum of factors that includes fuel conditions (fuel dryness and/or other inputs), ignition triggers, significant weather triggers, and resource capability.

Fire Regime: The characterization of fire's role in a particular ecosystem, usually characteristic of particular vegetation and climatic regime, and typically a combination of fire return interval and fire intensity (i.e., high frequency, low intensity/low frequency, high intensity).

Fire Return Interval: The length of time between fires on a particular area of land

Fire Weather: Weather conditions that influence fire ignition, behavior, and suppression.

Flame Length: The distance from the base to the tip of the flaming front. Flame length is directly correlated with fire intensity.

Flaming Front: The zone of a moving fire where combustion is primarily flaming. Behind this flaming zone combustion is primarily glowing. Light fuels typically have a shallow flaming front, whereas heavy fuels have a deeper front.

Fuel: Any combustible material, which includes but is not limited to living or dead vegetation, human-built structures, and chemicals that will ignite and burn.

Fuelbreak: A natural or constructed discontinuity in a fuel profile that is used to isolate, stop, or reduce the spread of fire. Fuelbreaks may also make retardant lines more effective and serve as control lines for fire suppression actions.

Fuel Loading: The amount of fuel present expressed quantitatively in terms of weight of fuel per unit area.

Fuel Model: Mathematical descriptions of fuel properties (e.g. fuel load and fuel depth) that are used as inputs to calculations of fire danger indices and fire behavior potential.

Fuel Moisture Content: The quantity of moisture in fuels expressed as a percentage of the weight when thoroughly dried at 212 degrees Fahrenheit.

Fuel Type: An identifiable association of fuel elements of a distinctive plant species, form, size, arrangement, or other characteristics that will cause a predictable rate of fire spread or difficulty of control under specified weather conditions.

Goals: A goal is a broad statement of what you wish to accomplish, an indication of program intentions.

Ground Fire: Fire that consumes the organic material beneath the surface litter ground, such as a peat fire.

Intensity: The level of heat radiated from the active flaming front of a fire, measured in British thermal units (BTUs) per foot.

Jackpot: Heavy fuel concentration.

Ladder Fuels: Fuels that provide vertical continuity between strata, thereby allowing fire to carry from surface fuels into the crowns of trees or shrubs with relative ease. Ladder fuels help initiate and ensure the continuation of crowning.

Live Fuels: Living plants, such as trees, grasses, and shrubs, in which the seasonal moisture content cycle is controlled largely by internal physiological mechanisms, rather than by external weather influences.

Mediterranean Climate: The climate characteristic of the Mediterranean region and much of California. Typically hot, dry summers and cool, wet winters.

Objectives: They contribute to the fulfillment of specified goals and are measurable, defined, and specific.

Passive Crown Fire: Also called torching or candling. A fire in the crowns of trees in which single trees or groups of trees torch, ignited by the passing front of the fire.

Riparian: Situated or taking place along or near the bank of a watercourse.

Spotting: Refers to the behavior of a fire producing sparks or embers that are carried by the wind and start new fires beyond the zone of direct ignition by the main fire.

Strategy: The general plan or direction selected to accomplish incident objectives.

Surface Fire: Fire that burns loose debris on the surface, which includes dead branches, leaves, and low vegetation.

Surface Fuels: Fuels lying on or near the surface of the ground, consisting of leaf and needle litter, dead branch material, downed logs, bark, tree cones, and low stature living plants.

Topography: Referred to as "terrain." The term also refers to parameters of the "lay of the land" that influence fire behavior and spread. Key elements are slope (in percent), aspect (the direction a slope faces), elevation, and specific terrain features such as canyons, saddles, "chimneys," and chutes.

Understory: Term for the area of a forest which grows at the lowest height level below the forest canopy. Plants in the understory consist of a mixture of seedlings and saplings of canopy trees together with understory shrubs and herbs.

Assets at Risk: People, property, ecological elements, and other human and other intrinsic values within the City. Assets at Risk are identified by stakeholders as important to the way of life in the City, and are particularly susceptible to damage from undesirable fire outcomes.

Wildland Fire Environment: The surrounding conditions, influences, and modifying forces of fuels, topography, and weather that determine wildfire behavior.

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Appendix B - Fire Behavior Modeling Methodology

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FIRE BEHAVIOR MODELING

The landscape file (.lcp): The .lcp file was obtained from the Wildland Fire Decision Support System using the California August 27, 2010 data. This .lcp file was updated with wildfire disturbance data through December 2009 and best captures recent wildfire activity in the vicinity of the City. No modifications were made to the .lcp file given that no significant wildfire activity had occurred since the landscape data was last updated. The data resolution of the .lcp file used in the analysis is 30 meter^2.

Weather: Based on weather data from the Santa Fe Dam and Tanbark Remote Automated Weather Stations (RAWS), 90th percentile weather was developed for use in the fire behavior modeling. The data from the weather stations was weighted 50% each when developing the 90th percentile thresholds; therefore each station was an equal contributor to the weather inputs used for modeling. The data set for these two RAWS was evaluated in FireFamilyPlus for the time period July 15 through November 30. This time period was selected to represent the core of the wildfire season for La Verne.

Records from the Claremont RAWS were considered for use, but the data was incomplete and therefore this station was eliminated from consideration when developing percentile information.

The 90th percentile weather/fuel moisture data used for modeling was:

Max Temp	Min Temp	Max RH	Min RH	Dead Fuel Moisture	Live Fuel Moisture	Windspeed
98°F	68°F	22%	10%	2%,3%,7%,	71%	7 mph

Winds: The wind data use in the FlamMap analysis was based on the 90th percentile information developed from the Tanbark and Santa Fe Dam RAWS and represents a 20′ wind as measured at the weather stations. During the FSPro analysis the Tanbark RAWS was used, as FSPro does not provide the ability to weight weather station data. For the FSPro modeling exercise the 10-minute average windspeed was selected as the input value. Wind gust data, an option in FSPro, was not selected as it tends to drive the model to excessively large fires.

Wind direction used in FlamMap was set at 225°. This azimuth represents a southwest wind direction which was the prominent wind direction at both the Santa Fe and Tanbark RAWS for the analysis period.

FlamMap: FlamMap outputs for flame length were generated for the landscape area using the 90th percentile data generated from FireFamily Plus. The Burgen-Scott 40 model option was used when generating the .lcp for the analysis and these fuel models were used throughout the FlamMap analysis.

Fuel moistures used in the model were based on 90th percentile weather. The live herbaceous fuel moisture used in the model was set at 30% to represent fully cured fine fuel. This live fuel moisture percentage allows the model to consider the live herbaceous fuels associated with the fuel models as dead fuel. This is function of shifting live fuel to dead fuel at criterion live fuel mositures is only available when using the Burgan-Scott fuel models.

Live woody fuel moisture was set at 71%, the 90th percentile threshold for this fuel component. Foliar moisture was set at the models default of 100% as information regarding foliar moisture is not recorded by RAWS.

The 90th percentile data point for wind input into the model was 7 mph. Wind direction was set at 225°, the dominate wind direction for the analysis period, July 15 to November 30. The *"WindNinja"* option within FlamMap was selected to generate gridded winds for the analysis areas. Gridded winds help to account for the effects of terrain on the windfield and, in general, provide a more sophisticated analysis of the effects of wind on fire

behavior. The gridded wind function utilizes the 7 mph general wind input and modifies it across the landscape to either increase or decrease wind speeds based on the effects of topography.

FlamMap Outputs: Table 1 reflects the flame length outputs for the area within the corporate boundary of the City, displayed as a percentage of the land mass. The predominance of the *"Unburnable"* output reflects the amount of urban development within the City. The .lcp file does not consider structures or ornamental vegetation as a burnable fuel type and therefore the model may under predict actual fire activity.

Table 1.Flame length outputs (%) for the City of La Verne

FlamMap Modeled Flame Length – City of La Verne				
Flame Length (feet)				
Unburnable	1 - 4	5-8	8-11	11+
64.25%	22.29%	2.75%	3.73%	6.98%

For more information on being prepared and preventing wildfires, go to https://www.readyforwildfire.org/.