4.5 FIRE PROTECTION

This section in the DEIR ~~is~~was based in part on a third party review by the EIR consultant of a report entitled *Santa Barbara Botanic Garden Fire Protection Plan*, prepared for the applicant by G&M Ventures, April 13, 2006 (see **Appendix E** of the DEIR). This report included a *Fire/Vegetation Management Plan and Fire Risk Analysis* prepared by Scott Franklin Consulting, December 12, 2001. The DEIR identified a mitigation measure that would be required in order to reduce the project's significant fire protection impacts. The measure entailed the expansion and amendment of the Fire Protection Plan (FPP) for County Fire Department review and specified numerous elements to be addressed in the expansion/revision of the plan.

During public review of the DEIR, a number of commenters requested that the revisions to the FPP occur during the EIR process and that the revised FPP be circulated for public review. In response to these comments, the applicant has revised the FPP in light of the DEIR mitigation measure along with the revised project description. The revised FPP (*Santa Barbara Botanic Garden Vital Mission Plan Conceptual Fire Protection Plan*, Dudek, Draft November 2008) was reviewed by the Santa Barbara County Fire Department (SBCFD) as well as County of Santa Barbara Planning and Development staff. The revised FPP document is provided in **Appendix E**. The revised FPP identifies the fire risk associated with the project and sets forth site-specific requirements for water supply, fuel modification, access, building ignition and fire resistance, fire protection systems, defensible space, staff, visitor and collection safety, among other pertinent criteria essential for fire protection. The purpose of the revised FPP is to generate and memorialize the fire safety requirements of the SBCFD, which is the Fire Authority Having Jurisdiction (FAHJ).

This section has been updated to incorporate the revised FPP into the EIR analysis. Hereafter the revised FPP is referred to simply as the FPP.

4.5.1 Existing Conditions

The Santa Barbara Botanic Garden property in Mission Canyon includes 78 acres situated in a wildland-urban interface area ~~subject to high fire hazards~~that has been designated by the California Department of Forestry as having a very high fire hazard potential. A wildland-urban interface is a location where highly flammable vegetation within a wildland (naturally vegetated area) is present adjacent to urban development. The very high fire hazard at this location is due to a combination of conditions including climate, topography, and vegetation, and is evidenced by the history of fires in this and other similar areas. Human activity in a wildland-urban interface area may also contribute to the frequency of wildland fires.

It is recognized by California Fire Agencies that the fire season in southern California is a 12-month event. The history of wildland fires occurring throughout the year is a product of inconsistent precipitation, drought stressed fuel beds, and evolving environmental conditions. With the recognition of a year round threat of wildfire, Southern California Fire Agencies have transitioned from using the "in and out of fire season" approach and instead now refer to levels of preparedness based on the potential of an incident occurring. High or Low Level of Preparedness are levels of response based on current and predicted environmental conditions. Levels of response that are adaptable to the current and predicted weather and fuel bed conditions provide the most responsible approach to meeting the threat of wildfire in the wildland-urban interface on a year round basis. The discussion and analyses that follow reflect this new understanding. This

new approach was formulated subsequent to preparation of the revised Fire Protection Plan. Thus, it is assumed that references to the "declared fire season" within the FPP are now understood to refer to High Fire Season Level of Preparedness periods, as they are functionally equivalent. The Final FPP will be revised accordingly.

Conditions Contributing to Existing Wildland Fire Hazards

Climate and Local Weather Patterns

The climate of southern California is classified as a Mediterranean type in which hot summer droughts are followed by winter season rainfall. The hot, dry summers subject vegetation to prolonged periods of moisture stress at times when wildfire is most likely. In addition, the project site is in an area subject to "sundowner" type winds with speeds up to 50 MPH or more. These hot dry winds can blow for several days, from the mountains to the ocean. The hot dry winds remove moisture from vegetation and result in a high fire hazard condition. Relative humidity of less than 10% is possible during levels of High Fire Season Preparedness.

In addition, climate change (a significant change in measures of climate such as temperature, precipitation, or wind lasting for an extended period) has the potential to substantially increase the risk and intensity of large wildfires in the region. Higher temperatures may result in increased precipitation during the winter. This would increase the growth of vegetation that becomes fuel during wildfires. Hotter temperatures and drier conditions during the summer would also exacerbate fire risks.

Vegetation

Plant growth is most rapid in spring, followed by a drought-induced dormancy during the summers. Drought causes plants to accumulate dead plant material annually during their dormant stages, which contributes to a build-up, or fuel-loading, of volatile plant material. This vegetative response produces conditions that may exacerbate the intensity of potential fires, and thereby the degree of the fire hazard over time.

Vegetation in areas outside of the Garden, particularly further up the canyon towards the Los Padres National Forest, is characterized by dense stands of chaparral and oak woodland/riparian woodland communities, including those associated with Mission Creek. Due to the lack of any recent fires in this area, large expanses of dead and decadent vegetation exist in these areas, providing significant fuel loads in a wildland fire event. In recent years, the Mission Canyon Association has been working closely with the County Fire Department to ensure canyon residents employ proper vegetation management strategies to reduce the build-up of dead and decadent vegetation on their properties. These efforts are on-going. This has helped to reduce fuel loads within the residential neighborhoods of Mission Canyon, though significant natural vegetation and sources of fuel still remain.

Natural vegetation at the Garden consists of extensive riparian forest and woodland, and upland woodland, chaparral, and introduced grassland communities associated with the perennial stream courses of Mission Creek and Las Canoas Creek and adjoining upland slopes and minor tributaries. Vegetation at the Garden also consists of several areas of manicured and maintained exhibits of California native plants and shrubs, all of which are irrigated, thereby minimizing the build-up of fuel loads. See Section 4.3 for further description of on-site vegetation.

~~The BehavePlus fire modeling system is based on a collection of models that describe fire behavior, fire effects, and the fire environment. It provides probable flame lengths resulting from a predicted fire event. Based on this modeling software, the surrounding area is predominantly Fuel Model 4 (Chaparral, six (6) feet high). The Garden's *Fire Protection Plan* includes a fire behavior model suggesting flame lengths of up to 124 feet for this fuel model.~~

Variations in vegetative cover type and species composition have a direct effect on fire behavior. Some plant communities and their associated plant species have increased flammability due to plant chemistry (resin content), biological function (flowering, retention of dead plant material), physical structure (leaf size, branching patterns), and overall fuel loading. For example, the native shrub species that compose the coastal scrub plant communities on site are considered to exhibit higher potential hazard than grassland or oak woodland, based on such criteria.

Vegetation distribution throughout the site varies by location and topography. Riparian woodlands are concentrated in canyon bottoms while upland areas typically support oak woodland, grass or scrub cover. The importance of vegetative cover type on fire suppression efforts is related to its role in affecting fire behavior. For example, while fires burning in grasslands may exhibit lower flame lengths than those burning in coastal scrub, fire spread rates in grasslands are often much more rapid than those in other vegetation types due to the fine fuels which readily ignite and spread fire. On-site vegetation conditions are a key component of the fire behavior modeling conducted as part of the FPP. This modeling is described below.

Topography

Topography conditions such as the length of slopes, slope steepness, directional exposure (slope aspect), and/or the overall ruggedness of terrain each influence the potential intensity of and/or rates at which wildfire may spread. Terrain surface configuration also affects wind speed and direction. Most importantly, slope steepness influences the speed at which fire spreads. Up-slope fires move significantly faster than down-slope fires because of an up-slope "wind effect" which accelerates the spread of fire. Slope steepness or the ruggedness of terrain also affects fire-fighting accessibility and response times.

The general topography of the Garden site is characterized by a fairly gentle landscape of moderately wide to wide ridges bordered by shallow to moderately steep slopes descending into U-shaped and flat-bottomed primary drainages. Relief between the ridge areas proposed for development and each adjacent valley is roughly 60 feet or less decreasing to the south. The intervening slopes have maximum gradients ranging mostly from 20 to 27 degrees (45 to 60 percent). Slopes along the ridge line and down the valleys are approximately 11 percent and 7 percent, respectively.

The north-south alignment of Mission Canyon exacerbates the wind effect by channeling air currents through a narrow passage, which accelerates wind velocity, particularly for down-slope winds with fires coming from the north. However, when the down canyon drift ceases, an up-canyon problem exists due to topography. As mentioned above, up-slope wind effects accelerate the spread of fire.

Fire History

Fire history information can provide an understanding of fire frequency, fire type, most vulnerable project areas, and significant ignition sources, amongst others. There have been numerous fires recorded by fire agencies in the vicinity of the project area's foothill location. During preparation of the FPP, fire history data was obtained via the California Department of Forestry and Fire Protection (CDF/CalFire) Fire and Resource Assessment Program (FRAP) database (FRAP 2007). Significant fires include:

- 1932 – Matilija Fire – 220,000 acres
- 1955 – Refugio Fire – 85,000 acres
- 1964 – Coyote Fire – 64,000 acres
- 1966 – Wellman Fire – 94,000 acres
- 1977 Sycamore Fire – 805 acres
- 1985 – Wheeler Fire – 118,000 acres
- 1990 – Painted Cave Fire – 4,900 acres
- 2007 – Zaca Fire – 225,000 acres
- 2008 – Gap Fire – 9,443 acres
- 2008 – Tea Fire – 1,940 acres

Since the FPP was prepared (early November 2008), the Tea Fire burned approximately 1,940 acres, beginning in Montecito and extending westward to approximately one-quarter mile east of the eastern boundary of the Cavalli site.

The fire frequency in the Santa Ynez Mountain foothills is approximately every 16 years, although Mission Canyon appears to have not been subject to wildfire for approximately 80 years or more. During this period, the canyon has been subject to landscape level changes with structures and ornamental landscaping replacing much of the original native plant communities. ~~Fire history of this area (Santa Barbara front – Carpenteria to Goleta) includes a major fire on an average of once every 16 years.~~ The lack of a recent fire in the Mission Canyon area has resulted in a build-up of decadent vegetation and heavy fuel loads, especially within the Los Padres National Forest boundaries to the north of the Garden. Current conditions in the project area (volume and age class of native vegetation, typical fuel moistures, typical weather influences, etc.,) are similar to conditions preceding the 1964 Coyote Fire~~, which burned adjacent property in 1964,~~ and the 1977 Sycamore Fire ~~during 1977~~. However, there are currently more buildings and people present in the area. As discussed below, the additional population in the canyon exacerbates evacuation of the area in the event of a fire. While development typically brings with it more fuel management, buildings themselves serve as fuel and can also be sources of a fire in their own right (e.g. gas leaks, electrical shorts, etc.). Lastly, additional development in the area places more people at risk in a fire than would otherwise occur in a less populated fire-prone area.

Sources of Ignition

Human Activity and Area Development

The potential for wildland fires increases with increased human activity in high fire hazard areas. Wildland fires can be ignited by an arsonist, vehicle, structure fire, children playing with matches, careless smokers, gas powered mowers, trimmers or other equipment, etc. To reduce potential

on-site risks, the SBBG currently educates visitors on fire awareness and potential hazards, implements a No Smoking policy in all areas of the Garden, discourages roadside parking along Garden street frontages, and, as much as is physically possible, monitors visitation and protects the Garden grounds from potential risks associated with unauthorized and unattended visitors.

Development in Mission Canyon is characterized by low- to medium-density residential neighborhoods. The areas to the north and east of the Garden along Mission Canyon Road and Las Canoas Road are predominantly large-lot single-family residences, while areas to the west and southwest along Tunnel Road and in the Mission Heights area (Cheltenham Road/Montrose Place) are more urbanized with smaller residential lots. The Mission Canyon Plan area includes a total of approximately 1,012 residential units located throughout the approximately 1,178-acre planning area, 231 of which are located south of Foothill Road and 254 are located in the Upper Mission Canyon area. According to the 2000 U.S. Census, Mission Canyon had a population of 2,610 people. These figures include the portion of Mission Canyon below Foothill Road. These ~~S~~single-family residential neighborhoods and the Garden area are the primary sources of human activity in the Mission Canyon area, as well as visitors (hikers, walkers, etc.) to the extensive trail network in the National Forest area at the head of the canyon.

In addition to the sources of ignition discussed above associated with human activities, power lines serve as a considerable ignition source, especially during sundowners and Santa Ana wind conditions when the lines can be blown down and the sparks ignite a fire. Power lines run throughout Mission Canyon, including along Mission Canyon Road above and below the Garden and along the entirety of Tunnel Road and Las Canoas Road. In addition, power lines run west to east within Los Padres National Forest at the head of Mission Canyon. These lines represent an existing fire risk within Mission Canyon and the rest of the South Coast foothills.

Fire Behavior Modeling

Fire behavior modeling was conducted to document the type and intensity of fire that would be expected on this site given characteristic site features such as topography, vegetation, and weather. This modeling is described in detail in the FPP provided in Appendix E and summarized below.

Fire behavior modeling includes a high level of analysis and information detail to arrive at reasonably accurate representations of how wildfire would move through available fuels on a given site. Fire behavior calculations are based on site-specific fuel characteristics supported by fire science research that analyzes heat transfer related to specific fire behavior. To objectively predict flame lengths, intensities, and spread rates, the BehavePlus 3.0.2 fire behavior fuel modeling system was applied using predominant fuel characteristics, slope percentages, and five representative fuel models observed on site.

Predicting wildland fire behavior is not an exact science. As such, the movement of a fire will likely never be fully predictable, especially considering the variations in weather and the limits of weather forecasting. Nevertheless, practiced and experienced judgment, coupled with a validated fire behavior modeling system, results in useful and accurate fire prevention planning information.

Fire behavior is affected by seven principal fuel characteristics: fuel loading, size and shape, compactness, horizontal continuity, vertical arrangement, moisture content, and chemical

properties. The seven fuel characteristics help define 13 standard fire behavior fuel models and more recent custom fuel models developed for Southern California.

To support the fire behavior modeling efforts conducted for this FPP, the different vegetation types observed on site as delineated in Section 4.3 were classified into the appropriate fuel models. Weather data for the fire behavior modeling is associated with the extreme weather conditions experienced in the area during the 1990 Painted Cave Fire, which burned approximately 4,900 acres and destroyed nearly 500 homes. This includes 100° temperatures and wind speeds of 60 mph.

The results from the BehavePlus fire behavior model are presented in **Table 4.5-1**. As presented, wildfire behavior for areas with coastal scrub vegetation presents the most hazardous condition on the SBBG site, although this vegetation community covers only 6.3 acres of the site (8%) and is generally remote from existing and proposed structures. Fire spread rate in coastal scrub vegetation where located onsite with slopes measuring 9% reach 1 mph with flame lengths exceeding 25 feet.[1] Fires burning in grassland vegetation on site experience lower flame lengths (8.7 to 9.4 feet), although spread rates exceed 3.5 mph, depending on slope conditions. Spotting is projected to occur up to nearly two miles during extreme weather conditions with sustained 60 mph wind speeds.

It should be noted the BehavePlus fire behavior computer modeling system was not intended for determining sufficient fuel modification zone widths. However, it does provide the average length of the flames, which is a key element for determining "defensible space" distances for minimizing structure ignition. -In addition, it should be noted that the results presented in Table 4.5-1 depict values based on inputs to the BehavePlus software. Changes in slope, weather, or pockets of different fuel types, are not accounted for site-wide in this analysis. Model results are used as a basis for planning only, as actual fire behavior for a given location will be affected by many factors, including unique weather patterns, small-scale topographic variations, or changing vegetation patterns.

Table 4.5-1
BehavePlus Fire Behavior Modeling Results

Fuel Model (On-site Vegetation)	Surface Rate of Spread (mph)*	Fireline Intensity (Btu/ft/sec)*	Flame Length (feet)	Spotting Distance (miles)
1 (Cultivated Areas, Grasslands)	3.1 - 3.7	624 – 725	8.7 – 9.4	0.9
8 (Oak Woodlands)	0.06 - 0.07	21 – 27	1.8 – 2.0	0.1
9 (Riparian Habitats)	0.3	242	5.6	0.3
SCAL18 (Coastal	1.0	6,591	25.7	1.9

[1] The coastal scrub occurring within approximately 300 feet of proposed structures (the area that has the largest impact on fuel modification zone areas), occurs on relatively flat terrain, and with 60 mph winds, is predicted to produce 25-foot tall flame lengths. There are other remote areas on site with coastal scrub, and if these areas were modeled, slope would play a significant factor on resulting flame lengths. One SCAL18 inclusive area on a steep slope in the eastern portion of the project is anticipated to produce flame lengths in the 52 feet range. However, it is remote from proposed structures and therefore is not considered in this study except for its ability to produce fire brands (embers). The FPP addresses embers through structural construction requirements, fire protection systems, fuel modification zones, and maintenance.

Scrub)				

*Ranges result from variations in slope values calculated for the site.
Source: Santa Barbara Garden Vital Mission Plan Conceptual Fire Protection Plan, Dudek, November 2008.

Defensibility From Wildfire Hazard

Defensibility from wildfire hazards depends on a variety of factors, including structural design features, vegetation management, the ability of residents to evacuate and/or shelter-in-place as necessary, water supply and availability for use by Garden staff and/or visitors, as well as emergency responder access to the site. The following describes each of these factors as they relate to the existing Botanic Garden site and the surrounding Mission Canyon area.

Fire Department Facilities, Equipment, and Response Time

The Project is located within the SBCFD jurisdiction. The SBCFD provides structural fire protection and rescue services to the Santa Barbara County Fire Protection District, which encompasses approximately 1,236 square miles (791,040 acres). The Santa Barbara County Fire Department is also one of six contract counties, which has executed a contract with the State of California to provide wildland fire protection on state responsibility areas (SRA). As such, the SBCFD and its mutual aid partners maintain a comprehensive assortment of fire apparatus from wildland and structural fire engines to fixed wing and rotary aircraft along with personnel to operate them.

Initial response is from SBCFD's Station No. 15, located at 2491 Foothill Road, approximately ¾ of a mile south of the SBBG's primary entrance. This facility staffs a minimum of three firefighters at all times (nine total staffing three shifts) and has a Type I Engine as well as a Type III wildland engine. This apparatus is suitable to the existing (as well as proposed) structures as building heights do not exceed those that would require a ladder truck for adequate response.

Secondary response would be provided from other Santa Barbara County and City of Santa Barbara Fire Stations, as well as by USFS for wildland fires in the Red Zone that may affect Los Padres National Forest, as needed and according to automatic and mutual aid agreements with neighboring agencies, including air support, as necessary and available.

~~Santa Barbara County Station No. 15 is located at 2941 Foothill Road, approximately 3/4 of a mile south of the Garden.~~ Given the proximity of ~~this f~~Fire ~~s~~Station No. 15 and the automatic aid and mutual aid responses of Santa Barbara City Fire Department equipment and personnel, fire department response time is adequate for a typical fire. However, the wildland-urban interface fire typically results in a response by the fire department to the general area rather than a specific address, as many homes are usually threatened. It is not unusual to have a ratio of only one fire engine per 25 or more simultaneously threatened homes in this type of fire and/or no direct aid to houses for up to several hours due to overwhelmed emergency crews. In addition, as described further below, the single access/egress route to the Garden along Mission Canyon Road, and associated potential traffic flow conflicts between fire responders and evacuees, may affect fire response times. The potential amount of delay is highly dependent on the particulars of a given wildfire event (e.g. location, extent, whether smoke or flames block access, etc.) and cannot be accurately quantified.

Water Supply and Pressure

Existing water supply and pressure at the Garden (at the time of the Notice of Preparation) is limited for the purposes of fire protection. The Garden is currently served by a 2-inch water line extending across the canyon from the main 12-inch gravity fed line on Tunnel Road. There are inadequate water flows and pressure to fight a fire for any extended period of time as County Fire Department standards would not be met. The nearest standard fire hydrant is north of the main parking lot on Mission Canyon Road. An additional hydrant is located at the intersection of Mission Canyon Road and Las Canoas Road, which serve some of the southern Garden facilities. Recent flow tests indicate flows (gallons per minute, gpm) and pressure from ~~that~~ those hydrants do not meet current County Fire Department standards for commercial development (i.e. 1,250 gallons per minute at 20 psi for two hours) but do meet County Fire Department standards for residential development (i.e. 750 gallons per minute at 20 psi for two hours). No standard fire hydrants with 4-inch connections currently exist within the Garden, though there are several smaller proprietary standpipes that could be used for fire-fighting purposes.

The Garden recently ~~is currently working with the City of Santa Barbara, who provides water service to Mission Canyon, to~~ upgraded its existing fire protection capacity by extending an 8-inch line up Mission Canyon Road from its intersection with Las Canoas Road. This ~~would~~ project, which is separate and distinct from the proposed Vital Mission Plan, was completed in 2007 (after the Notice of Preparation) and facilitated the addition of ~~five or~~ six standard residential-grade hydrants to serve existing facilities, thus significantly improving water supply and pressure for fire-fighting purposes. However, because this installation occurred after the Notice of Preparation, this ~~discussion~~ EIR analysis assumes no such upgrades have occurred as part of existing baseline conditions. Additionally, the City recently installed a residential grade fire hydrant immediately north of the entrance to the Garden's main parking lot, which is served by the Upper Mission Canyon Pressure Zone by a hydro-pneumatic pump. Together, these hydrants have significantly improved the fire-fighting capabilities in and around the Garden. However, water supply for fire-fighting purposes still does not meet the standard for commercial uses. Analysis of these recent projects is addressed in the cumulative impact discussion.

The City of Santa Barbara operates the water distribution system that serves the Mission Canyon Area. The water distribution system is divided into different pressure zones. Canyon residents above the Botanic Garden on Mission Canyon Road are on the Upper Tunnel Pressure Zone, while the Botanic Garden, residents along Tunnel Road, and south and west of the Botanic Garden are on the El Cielito/Tunnel Pressure Zone.

The Cater Water Treatment Plant provides domestic water supplies to Tunnel Reservoir, which has a one-million gallon capacity. Tunnel Reservoir serves the Upper Tunnel Pressure Zone via a hydro-pneumatic pressure tank that is equipped with an emergency generator and 60-hour fuel tank. The El Cielito/Tunnel Pressure Zone is dually served by gravity flows from El Cielito and Tunnel Reservoirs. El Cielito Reservoir has a one-million gallon capacity, and receives flows from the two 6.5 million gallon Sheffield Reservoirs via the El Cielito Pump Station, which is equipped with an emergency generator. Flows into the Sheffield Reservoirs come from the Cater Water Treatment Plant, via the Sheffield Pump Station, which also can be supported by an emergency generator.

The Upper Tunnel Pressure Zone would not see the affects of water flowing in the El Cielito/Tunnel Zone, and vice versa, since the two are separate and distinct pressure zones.

Reservoir operating levels are pre-determined by distribution staff, and are controlled by a sophisticated electronic control system known as SCADA. SCADA allows for the water system to automatically respond to changing water demands throughout the entire water distribution system. This ensures that there is ample water flow and pressure for domestic and fire fighting purposes throughout the distribution system, in accordance with American Water Works Association (AWWA) recommendations and United States Environmental Protection Agency (USEPA) regulations.

Existing Building Fire and Ignition Resistance

The 30 structures currently existing at the Garden exhibit varying degrees of ignition resistance. Newer structures include more features that help structures resist ignition, however none of the structures meet the latest ignition resistant codes. Many of the existing structures include wood siding, unboxed eaves, and other potentially vulnerable features in a wildland-urban interface setting. None of the existing structures include interior fire sprinklers.

Vegetation Management ~~and Structures~~

Vegetation management is accomplished in zones, referred to as Fuel Management Zones (FMZ), and expressed in feet of impacted area adjacent to buildings, exit pathways, combustible fuels and sources of ignition. These zones can substantially reduce the direct flame impingement, radiant heat exposure, and ember volume that account for building loss in wildland-urban interface fires. Currently the Garden utilizes chipped biomass to preclude the invasion of flashy fuels, such as grass, leaves, pine needles, ferns, tree moss, and some types of slash. Flashy fuels ignite readily and are consumed rapidly when dry. These fuels are also called fine fuels.

~~Use of the vegetation management zones predicated on flame lengths of predicted fire behavior using the Behave model will exceed the State standards found in Public Resources Code 4291 and County of Santa Barbara Fire Department Defensible Space Regulations which require minimum FMZs of 30 feet to 100 feet from structures in High Fire Hazard Zones (minimizing flammable vegetation and other combustible growth within 30 feet of each building or structure, and disrupting the vertical and/or horizontal continuity of flammable and combustible vegetation within 30 to 100 feet from each building or structure). Methods of accomplishing this depend on site-specific conditions such as slope and existing vegetation. Guidance for implementing these regulations is provided in General Guidelines for Creating Defensible Space, State Board of Forestry and Fire Protection, February 8, 2006. The Garden currently maintains the existing configuration of vegetation around buildings, which to some extent aids in fire protection.~~

SBBG currently maintains a defensible space program which is implemented at least annually on portions of the site. The defensible space program at the SBBG site consists of the following features:

- Primary-access-road shoulder is mowed to the extent possible (east of Mission Canyon Road).
- Areas around structures are maintained with canopy lifting and mowing beneath large shrubs and trees.
- Plant exhibits throughout the public viewing areas and around structures are irrigated and routinely maintained.

- Fuel modification occurs at various areas around the Garden structures with chipped biomass scattered to minimize establishment and growth of weeds.

Based on recent site visits to the Garden by SBCFD, the Garden's current defensible space program is generally adequate though additional thinning and removal of certain flammable vegetation in proximity to existing structures is recommended to break horizontal and vertical fuel ladders and provide greater defensible space.

Site Access and Emergency Evacuation

Access to the Garden is provided via Mission Canyon Road. This road has pavement width of 20 to 22 feet from Foothill Road to the Santa Barbara Botanic Garden site. The road does not meet County requirements for road width, which are based on the number of parcels served. In this location a road width of 32 to 40 feet would be necessary, depending on whether or not parking would be allowed, in order to meet County requirements. In addition, with only a single access road serving the Garden and residences north of the Garden (see description of the area's development pattern above), emergency access and egress in the project area is a significant problem in terms of defensibility from wildland fires. Fire and other emergency first responders must use the same primary path to gain access to the fire that the residents and visitors use to relocate or evacuate during a fire event. For these reasons, there is currently a considerable risk associated with evacuating the canyon population in the event of a wildfire.

There are two fire stations located within the study area: a County of Santa Barbara Fire Station (Fire Station #15) located at 2491 Foothill Road, south of Mission Canyon Road, and a City of Santa Barbara Fire Station located at 2411 Stanwood Drive, approximately 2 miles south east of the Garden during a wildland fire in Mission Canyon Area #6 (i.e., Botanic Garden, Mission Canyon Road, Alamar Avenue). As identified in the *Santa Barbara I-Zone Major Incident Preplan* document, fire response units will use Foothill Road to access Mission Canyon Road to respond to the fire incident. As part of controlling access to and from an evacuation area for a wildland fire in Mission Canyon Area #6, nearby roadways will be closed by law enforcement agencies to inbound traffic with the exception for public safety vehicles. The closed roads or traffic closure points are identified in the *Santa Barbara I-Zone Major Incident Preplan*. For eastbound traffic, the traffic closure points would be at the following locations:

- Foothill Road at Alamar Road (approximately 0.8 miles west of the Foothill Road/Mission Canyon Road (East) intersection).
- Foothill Road at 2600 Mission Canyon Road (just east of Foothill Road (West)).

For westbound traffic, the traffic closure points would be at the following locations:

- Foothill Road at Mountain Drive (approximately 0.7 miles east of the Foothill Road/Mission Canyon Road (East) intersection).
- Foothill Road at Mission Canyon Road (East) (at Fire Station #15).

Evacuation routes for Garden visitors and residents identified in the *Santa Barbara I-Zone Major Incident Preplan* are as follows:

- For westbound traffic, the probable evacuation route is Foothill Road to Alamar Road to State Street.
- For eastbound traffic, the probable evacuation route is Foothill Road to Mountain Drive to Mission Ridge.

The Garden currently maintains an Emergency Response Plan that is part of staff training.

~~See the *Traffic Impact Study* provided in **Appendix F** for further discussion of emergency evacuation.~~

~~Estimated Number of Potential Residential Units in the Mission Canyon Area~~

~~The volume of traffic on Mission Canyon Road during evacuation may impede evacuation times. The County of Santa Barbara Planning and Development staff has prepared a study documenting the existing residential units and potential residential units for the Mission Canyon area that would likely use Mission Canyon Road, as well as Tunnel Road to Mission Canyon Road and Las Canoas Road to Mission Canyon Road to evacuate. The estimates for potential residential units were based on the number of vacant lots and underdeveloped lots (i.e. lots that could be split based on their parcel size and current zone district minimum parcel sizes). Consideration was not given to the development of these vacant and underdeveloped lots based on slopes, vegetation, septic requirements, etc. The estimates are therefore considered conservative. The existing and future residential units were separated by street segments and are presented in **Table 4.5-1**. The number of existing and potential units north of the Botanic Garden is projected to be a total of 41 units. There are a total of 89 existing and potential units projected on Las Canoas Road east of Mission Canyon Road. Mission Canyon Road between Las Canoas Road and Tunnel Road is projected to have a total of 8 existing and potential units. Tunnel Road, northwest of Mission Canyon Road, is projected to have a total of 268 existing and potential units, which is the largest amount of housing in the Mission Canyon area. A total of 18 existing and potential units are projected on Mission Canyon Road between Tunnel Road and Foothill Road. Overall, the potential number of residential units in the Mission Canyon area that would likely utilize Mission Canyon Road for evacuation is 424 units.~~

~~Table 4.5-1~~
~~Potential Buildout of Single-Family Dwelling Units~~
~~in the Botanic Garden Vicinity – Evacuation Route Scenario [1]~~

~~Location~~	~~Existing Units~~	~~Potential Units Vacant Lots [2]~~	~~Potential Units Under Developed Lots [3]~~	~~Total Units~~
~~Mission Canyon north of Botanic Garden~~	~~26~~	~~15~~	~~0~~	~~41~~
~~Las Canoas Road east of Mission Canyon Road~~	~~65~~	~~11~~	~~13~~	~~89~~
~~Mission Canyon between Las Canoas Road and Tunnel Road~~	~~6~~	~~1~~	~~1~~	~~8~~
~~Tunnel Road northwest of~~	~~219~~	~~36~~	~~13~~	~~268~~

~~Mission Canyon Road~~				
~~Mission Canyon between Tunnel Road and Foothill Road~~	~~13~~	~~5~~	~~0~~	~~18~~
~~Total~~	~~329~~	~~68~~	~~27~~	~~424~~

~~[1] Source: County of Santa Barbara, November 22, 2006.~~

~~[2] Estimate of single-family residences that could be developed on vacant lots based on maximum densities permitted under the lots' zoning.~~

~~[3] Estimate of additional single-family residences that could be constructed on lots that are not currently developed to the maximum levels permitted under the lots' zoning.~~

Summary of Existing Fire Hazards at the Project Site

The SBBG is vulnerable to wildfire starting in, burning onto, or spotting onto the site given the climatic, vegetation, wildland-urban interface location, and topographical characteristics of the area, along with the fire history and behavior modeling results discussed above. Under certain weather conditions, lower intensity fire can move rapidly through the non-indigenous grass and grass understory areas approaching the developed portions of the SBBG site. Under extreme conditions, catastrophic wildfire could result as grass fires burn into ladder fuels or heavier fuels, driven by high winds, in the absence of properly implemented and maintained fuel modification zones. The existing fire hazard is exacerbated by limited access, including a lack of a secondary access road to the area west of Mission Canyon. In addition, the single access serving the site also serves the residential areas of Mission Canyon, which are also subject to severe fire hazard conditions similar to those described for the SBBG site.

4.5.3 Thresholds of Significance

The County's *Environmental Thresholds and Guidelines Manual* does not include significance thresholds pertaining to fire hazards. The following significance threshold is based on CEQA Guidelines Appendix G. A significant adverse impact would occur as a result of the project if:

- The project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

The following impact analysis focuses on the changes in fire hazard conditions as compared to existing conditions.

4.5.4 Project Impacts

The proposed project would implement a series of changes to the Garden's facilities and would accommodate and expand future activity levels at the Garden. The project includes the demolition of some existing structures; renovation, relocation, and modification of other existing structures; construction of new structures and ancillary facilities; and improvements to the facility's circulation system, parking, fencing, and lighting. As described in Section 4.11 Traffic, it is anticipated that the number of visitors to the Garden would increase over time, partially due to ~~growth in the area~~general visitor growth and partially due to the improvements and specific increased uses proposed by the project. For purposes of this analysis, the total projected growth

in visitors to the Garden is included as part of the project. The proposed project would also increase the numbers of residents and employees at the site, as described in Section 2.0 Project Description.

The FPP provided in Appendix E is also considered part of the proposed project. This plan is summarized below, followed by an assessment of impacts associated with the proposed project including the FPP.

~~The project includes a number of elements intended to improve fire safety conditions, as well as a *Fire Protection Plan*, which includes requirements and recommendations for building construction, road design, water systems, and evacuation (provided in **Appendix E**). Project elements related to fire safety include the following:~~

- ~~Internal fire sprinklers would be provided within all new and remodeled structures. These systems would be designed and installed to NFPA 13 and County Fire Department requirements.~~
- ~~A new vehicle turnaround would be created at the south exit driveway to Mission Canyon Road, which would provide emergency vehicles an alternative means of turning around on Mission Canyon Road.~~
- ~~The entire access road through the East of Mission and Hansen sites (extending from Mission Canyon Road to Las Canoas Road, also referred to as the Gane House Road) is proposed to be paved, partially re-routed, and improved in order to meet current Fire Department standards. A turnaround would be constructed at the end of the roadway serving the easternmost staff residences.~~
- ~~New water mains and hydrants would be installed.~~

Summary of Fire Protection Plan

The FPP sets forth requirements related to fuel modification, site access, structures and improvements, and provides an emergency response plan. The following summarizes each of the components of the FPP; detailed descriptions are provided in the FPP (see Appendix E).

Fuel Modification

Fuel modification areas are designed to gradually reduce fire intensity and flame lengths from advancing fire by strategically placing thinning zones, restricted vegetation zones, and irrigated zones adjacent to each other on the perimeter of the wildland-urban interface exposed structures, as well as around all structures, including low and high occupancy, from residences to the library/office and herbarium facilities.

The fuel modification area is an important part of the fire protection system designed for this site. For this project, the fuel modification areas are at minimum four times the predicted flame lengths and up to seventeen times as wide as predicted adjacent flame lengths when irrigated and maintained exhibit areas are included in the fuel modification area. The fuel modification area works in tandem with the other components of the fire protection system, including ignition-resistive construction, interior sprinklers, infrastructure upgrades, and enhanced water supply/fire flow, amongst others.

Figure 2-9 (see Section 2.0 Project Description) illustrates the proposed fuel modification zones. The width of these zones was determined based on the terrain, the positioning of the structures relative to fuels, and other site-specific characteristics. Three zones around structures are identified - Zone 1, Zone 2, and an extended Zone 2, as described below. In addition, fuel modification requirements are proposed along roads and pathways and around central exhibit spaces and construction areas. Each zone would include permanent field markers to delineate the zones, aiding ongoing maintenance activities.

In addition to the fuel modification requirements listed below, a Prohibited Plant List for fuel modification areas is provided in the FPP. These plants are considered to be undesirable in the landscape due to characteristics, which may be physical or chemical, that make them highly flammable.

Zone 1 – Non-Flammable, Irrigated Zone (structure to 30 feet in all directions)

Zone 1 is measured from the structure outward in all directions. It includes the following key components:

- Low-density, low flammability plantings.
- Irrigated wet zone (drip irrigation that maintains plant moisture).
- High-leaf-moisture plants as ground cover, less than 4 inches high.
- No trees permitted within Zone 1; except native Oaks (Quercus) and specimen trees may be permitted on a case-by-case basis as determined by the County Fire Department.
- Tree spacing of a minimum 20 feet between canopies of individual trees and up to three times the combined diameter of canopies between tree groups, unless a shorter distance is permitted by the County Fire Department on a case-by-case basis.
- No tree limb encroachment within 10 feet of a structure or chimney.
- Tree maintenance includes limbing-up (canopy raising) 6 feet or one-third the height of the tree.
- Shrubs less than 2 feet tall, on 5-foot centers.
- Vegetation Management Plan prepared and submitted to SBCFD in compliance with this FPP and SBCFD requirements that are sensitive to the SBBG's irrigated exhibit spaces.

In light of potential water scarcity and the need for conservation, landscape irrigation within fuel modification zones (Zone 1) would continue to receive efficient drip, overhead, or computerized irrigation resulting in higher plant moisture which may reduce ignition potential.

Zone 2 – Non-Flammable, Reduced-Fuel Zone (31 to 100 feet from structure)

Zone 2 is measured from the end of Zone 1 outward in all directions. It includes the following key components:

- 50 % fuel reduction zone.
- Ground cover less than 6 inches high.
- Minimum 20 feet between tree or tree grouping canopies, unless a shorter distance is permitted by the County Fire Department on a case-by-case basis.
- Tree groupings not to exceed canopy diameter of 50 feet.

- Shrubs less than 3 feet high, 20 feet on center.
- Single-specimen or specimen groupings of native shrubs, exclusive of chamise, sage, and other prohibited plants may be retained 20 feet on center if canopy lifted and ground cover cleared.

Extended Zone 2 (100 to 175 feet from the Horticultural Unit)

An extended Zone 2 will be provided for areas adjacent to the horticultural unit on the east side of Mission Canyon Road (P6/7/8 and P9). Around these structures, Zone 2 fuel modification will be extended to 175 feet. This structure is designed as a protected site for wildfire emergency. The structure was selected based on the landscape features that will augment the fuel modification areas. The horticultural unit will be situated adjacent to a proposed 20 foot paved access drive to the south and east, ignition resistant structures and improved areas to the north and south, and parking areas, paved access drive and fuel modification to the west. The fuel modification zones will integrate existing roadways as fire breaks within the fuel modification areas to further enhance their fire intensity-reducing function. The horticultural unit would also receive additional features resulting in further reduction of wildfire vulnerability, as described further below.

Roadside Fuel Modification Zones (20 feet on both sides of roadways)

- All roads, including the new Hansen Site driveway, within the SBBG will be subject to flammable vegetation clearance for 20 feet on each side, from edge of pavement. Trees and large shrubs meeting requirements in this FPP may remain in this zone with required maintenance.
- Flammable vegetation, including flammable shrubs and trees, shall be removed.
- Vertical and horizontal separation between allowable trees and shrubs will be provided.
- Canopies shall be interrupted to provide discontinuous fuels.
- Grass and tree understory shall be mowed to 4 inches stubble height.
- Single specimens of trees, ignition-resistive shrubs, or cultivated ground cover, such as green grass, succulents, or similar plants used as ground covers, may be used, provided they do not form a means of readily transmitting fire.

Trees may be placed within the Roadside Vegetation Management Zones. The following criteria must be followed:

- Tree spacing to be 20 feet between mature canopies (30 feet if adjacent to a slope steeper than 41%), unless a shorter distance is permitted by the County Fire Department on a case-by-case basis.
- Trees must be limbed up 1/3 the height of the mature tree or 6 feet, whichever is greater and dependent on understory plant heights.
- No tree canopies lower than 15 feet over roadways.
- No tree trunks intruding into roadway width.
- No trees or other plants that are listed on the Prohibited Plant List (Appendix E) shall be planted or remain alongside roadways.
- No flammable understory is permitted beneath trees.
- Vegetation beneath tree canopies to be ignition resistive and kept to 2 feet in height or lower, and no more than 1/3 the height of the lowest limb/branch on the tree.

Pathway Vegetation Management (10 feet on both sides of pathways)

- A 10-foot vegetation modification zone is required on both sides of pedestrian paths on the perimeter of and within the property. Pathway vegetation does not require clearance of all vegetation, but application of the principles described in the FPP including thinning, maintenance, and horizontal and vertical spacing. Most of these pathways will be maintained in a manner similar to current maintenance practices.
- Native vegetation that exhibits lower flammability to be utilized.
- Grasses must be kept mowed to 4 inches or lower.
- Certain trees may be planted if they are not prohibited in this FPP.
- Trees within vegetation management zones must be properly spaced and maintained with no flammable understory or dead wood accumulation. The highest priority will be given to removal of ladder fuels in order to prevent movement of ground fire into tree canopies.

Central Exhibit Spaces

Fire-safe vegetation management is recommended within public viewing areas, exhibit spaces, and open space areas that are within fuel modification zones in compliance with the guidelines in this plan.

- Flammable vegetation must be removed.
- Grasses must be maintained/mowed to 4 inches stubble height.
- Types and spacing of trees, plants, and shrubs to comply with the criteria in the FPP.
- Plant materials included in the Prohibited Plant List are prohibited in this area.
- Areas shall be maintained free of downed and dead vegetation.
- Flammable vegetation and flammable trees shall be removed and prohibited.
- Trees to be properly limbed and spaced.

Pre-Construction Temporary Fuel Modification Area

- A temporary fuel modification area will need to be in place prior to initiating site improvements.
- Prior to issuance of a permit for grading, trenching, or other site installations, the outermost 30 feet of each structure location (perimeter of pad) is to be maintained as a temporary fuel modification zone.
    - Dead plants, ladder fuels (fuel which can spread fire from ground to trees), and other flammable plants shall be removed, thinned, or mowed, as appropriate and trees/shrubs shall be properly limbed, pruned, and spaced per the FPP, for the temporary fuel modification area.
- The remainder of the temporary fuel modification zone required for the particular project area shall be installed and maintained prior to combustible materials being brought onto any project area under construction.

Fuel Modification Area Vegetation Maintenance

All fuel modification area vegetation management shall be completed in compliance with Santa Barbara County's Development Standard No. 6 (Vegetation Management) and the following requirements. Vegetation management shall be completed annually by May 15 of each year and

more often as needed for fire safety, as determined by SBCFD. The Fuel Modification Zones shall be provided maintenance by May 15 of each year and again by the end of October of each year, as necessary.

SBBG shall be responsible for all vegetation management throughout the project site, in compliance with the requirements detailed herein and with SBCFD requirements. SBBG shall be responsible for ensuring long-term funding and ongoing compliance with all provisions of this FPP, including vegetation planting, fuel modification, vegetation management, and maintenance requirements throughout the garden property.

SBBG shall obtain a defensible space inspection each year certifying that vegetation management activities throughout the project site have been performed pursuant to this plan. A report of the fuel modification areas shall be provided to the SBCFD in June of each year by SBBG personnel, or their representative to ensure that proper maintenance has been conducted. Required maintenance observed during the inspections will be provided to SBBG upon which SBBG will have 30 days in which to correct any non-compliance.

Construction Phase Vegetation Management

Vegetation management requirements shall be implemented prior to commencement and throughout the construction phase. Vegetation management shall be performed pursuant to the SBCFD on all building locations prior to the start of work and prior to any import of combustible construction materials. Adequate fuel breaks shall be created around all grading, site work, and other construction activities in areas where there is flammable vegetation.

In addition to the requirements outlined above, the project will comply with the following important risk-reducing vegetation management guidelines:

- Caution must be used to avoid predisposing areas to erosion, soil creep or other ground (including slope) instability or excessive, concentrated water runoff due to vegetation removal, vegetation management, maintenance, landscaping, or irrigation. Removed plants shall be cut with roots left in tact to provide soil support.
- All new power lines shall be underground for fire safety during high wind conditions or during fires on a right-of-way that can expose aboveground power lines.
- Vegetation management zones cannot extend beyond the SBBG ownership without written, legal permission of off-site landowners, and shall not extend into biological open space or other sensitive biological areas that have not been analyzed and mitigated according to CEQA, or other areas controlled by the County and/or resource agencies, without first having written formal permission from all applicable agencies.

Access

Roads

Road Widths and Circulation

- All roads will be constructed to a minimum 20-foot road width, unobstructed by parking and shall be improved with asphalt paving materials meeting County Code.
- There is one primary point of access for the west-side and two points of access for the east-side. All interior roads will be designed to accommodate apparatus expected to respond, including water tenders (capable of supporting up to 60,000 pounds).
- Sensitive resources along the driveway access through the Hansen Site cause the improved driveway access to be approximately 16 feet, which narrows slightly in one location, as approved by the SBCFD.
- Parking will be restricted along interior circulation streets. All parking will be in designated parking areas. Parking will be restricted by posting of signs stating "No Parking; Fire Lane" to preserve the 20-foot unobstructed width for emergency response.

Secondary Access/Egress

- There is no secondary access to the west-side SBBG project.
- The primary site access road to the east side of the SBBG project is Gane House Road, which enters the east side of the project from Mission Canyon Road and dead-ends just north of the propagation facility. In addition, the project will improve the existing Hansen Site driveway to 16-feet wide (20-feet where possible, sensitive environmental resources require slight reduction in width of this drive in one location) through the site from Mission Canyon Road to its intersection with Las Canoas Road. The Hansen Site driveway will provide an improved potential secondary egress route from the Garden parking lot to Las Canoas Road as well as provide access connectivity where it previously didn't exist for firefighters. This new access/egress drive will enhance firefighter's ability to access the eastern property area. This drive shall be designed and engineered to handle two-axle, 45 passenger buses as well as fire apparatus. This new access drive shall require a minimum of 20-feet of brush clearance along both sides of the road.

With implementation of the FPP, the project will meet or exceed all applicable Code requirements *except* designated secondary access at a location that is remote from the primary access to the west property. However, this non-conformance is provided *same practical effect* with the provision of the following measures:

- Enhanced fire resistive construction to 2007 California Building and Fire Code standards, including:
  - Life safety interior sprinklers
  - Exterior fire rated walls
  - Glazing, dual pane, tempered windows
  - Vent design, size, and placement
  - Appendage restrictions
  - Attic protection (sprinklered or design features)
  - Others per County Code
- Road circulatory system improvements with new roads and improved, widened and

paved existing roads.
- Improved water availability, fire flow and volume.
- Fire Department approved fuel modification zones around all structures.
- Annual inspections and maintenance of fuel modification zones.
- Emergency Preparedness Plan.
- Registration of all telephone numbers in Mission Canyon with Reverse 911
- Planned and rehearsed evacuation, reduced reliance on Mission Canyon Road in wildfire emergency.
- Training and annual emergency drills.
- Restrictions on general public visitation during red flag days as declared by the County Fire Chief. Limited participation and mandated shuttle bus transportation associated with events during High Fire Season Preparedness Levels.
- Remote Area Weather Station establishment in Mission Canyon.

Interior Circulation Roads

- Any dead-end roads serving new buildings that are longer than 150 feet shall have approved provisions for fire apparatus turnaround.
    - As part of the proposed Vital Mission Plan, one fire engine turnaround is provided at the southern end of the existing public parking lot adjacent to Mission Canyon Road, one adjacent to the education center on the west side, two turnarounds at the Hansen site, and an additional turnaround at parking area at the north end of Gane House Road, adjacent to the propagation facility. This turnaround will be large enough to serve as an emergency helispot, if necessary.
- Fire apparatus turnarounds to include turning radius of a minimum 24 feet, measured to inside edge of improved width.
- The longest dead-end road (cul-de-sac) shall not exceed 800 feet, per the California Fire Code (CFC) and State Title 19.
- All dead-end access roads shall terminate with either a 40 ft (without parking) or 48 ft (with parking radius bulb turnaround or as approved by the Fire Chief. (CFC Appendix III-D, Section 5.1).
- Roadways and/or driveways shall provide fire department access to within 150 feet of all portions of the exterior walls of the first floor of the structures (all structures are sprinklered).
- Roadside design features (e.g., speed bumps, humps, speed control dips, planters, fountains) that could interfere with emergency apparatus response speeds and required unobstructed access road widths shall not be installed or allowed to remain on roadways.
- Vertical clearance of vegetation along roadways is required to be 13 feet, six inches (CFC 902.2.2.1). Proper maintenance is required to ensure that vegetation and trees on roadsides do not grow over or into the roadway and impede emergency apparatus access.
    - Native oak and other trees along roads will be trimmed as necessary according to industry standards by a certified arborist and conducted outside of the migratory bird treaty act and breeding seasons, except where hazardous conditions exist and warrant immediate attention.
- Angle of approach/departure shall not exceed 12 degrees.
- Road grades will not exceed 12%, unless mitigated to approval by the Fire Chief.

- A response map update in a format compatible with current department mapping shall be provided to the SBCFD.

Gates and Driveways

The FPP includes specifications for gates and driveways to ensure that gates do not impede Fire Department access and that driveways permit adequate access to structures for fire fighters. See the FPP provided in Appendix E for a list of these specifications.

Structures

The FPP outlines ignition-resistant construction specifications (for all new and remodeled structures) that will meet the requirements of the County Fire Code and Chapter 7-A of the California Building Code. These specifications address building materials, eaves, roofs, venting, etc. See Appendix E for a full list of these requirements. While these standards will provide a high level of protection to structures in this development, and should reduce or eliminate the need to order evacuations in some situations, there is no guarantee of assurance that compliance with these standards will prevent damage or destruction of structures by fire under all scenarios.

The FPP also includes infrastructure recommendations related to water supply, fire hydrants, fire sprinklers, and alarm systems as described below.

Water Supply and Fire Hydrants

Water supply and hydrant requirements include (County Fire Code, Development Standard 2 and CFC):

- Hydrant type and locations shall be subject to SBCFD approval and shall be located on the normal Fire Apparatus response side of the road.
- Hydrants shall be located within 150 feet of all exterior walls by way of access.
- Hydrants shall have one 4-inch outlet and two 2.5-inch outlets.
- Water supply and pressure currently do not strictly conform to SBCFD standards, which require 1,250 gpm at 20 psi for 2 hours. (Note - projected fire flow will meet County requirements with implementation of Mitigation Measure PF 2-1.)
- The project will include three new hydrants in addition to the six hydrants recently installed (October 2007) at 750 gpm for residential facilities and 1,250 gpm for all other Garden facilities.
- A portable pumpkin tank will be provided near the emergency helispot on the east of Mission Canyon Road parcel (in the upper parking lot north of E18 and E19). The pumpkin tank will be available as a portable water reservoir for fire departments and forest fire control agencies, for wildland fire or the urban interface. The as-needed fire fighting water provided by the pumpkin tank would shorten the round trip for helicopters that may be fighting a fire up canyon or in nearby canyons or foothill locations. In addition, the pumpkin tank could be fitted with a drafting pump or outlet for on the ground fire fighting purposes.
- The supplying water system is public and metered by the Santa Barbara Water District. The water will be delivered to the SBBG site via a 12-inch main (private).
- Fire flow in the mains for residential occupancies shall be at least 750 gpm in fire mains with a 20 psi residual at periods of maximum peak domestic demand. Fire flow for the

higher occupancies shall be a minimum of 1,250 gpm in fire mains. Duration of flow shall be 2 hours or more. In addition, fire protection water systems should comply with AWWA Standard M-31, "Distribution Requirements for Fire Protection."

- Prior to the issuance of building permits, the applicant shall submit to the County of Santa Barbara, plans approved by the Santa Barbara County Public Works Department, or other engineer, for a water system capable of handling the fire flow requirements – existing and proposed buildings.
- Prior to issuance of building permits, the appropriate number of fire hydrants and their specific locations, approved by the SBCFD, will be identified and they will be constructed accordingly.
- Fire service laterals, valves, and meters will be installed on site as required by the SBCFD Fire Marshal.
- Reflective blue dot hydrant markers shall be installed in the street to indicate location of the hydrant.
- Crash posts will be provided where needed in on site areas where vehicles could strike fire hydrants, fire department connections, etc.

Fire Sprinklers

- All structures, other than shade structures or kiosks, are required to have internal fire sprinklers. All single and multiple residences and attached garages or carports (less than 10 feet separation), and all other structures, shall have NFPA 13 internal fire sprinklers. One-family residences may have NFPA 13-D systems. Residential structures 7,000 square feet and larger may be required to have a four-head calculation. Sprinkler systems will be in compliance with SBCFD Development Standard No. 4.
- Other occupancies, such as the library/educational structure as well as other structures intended for 20 or more people, shall have a sprinkler system in compliance with UBC standard 9-1 or NFPA 13.
- Actual system design is subject to final building design and the occupancy types in the structure. All other occupancies in this development shall have fire sprinklers in compliance with NFPA 13.
- All systems for structures larger than 7,000 square feet or accommodating 20 or more visitors to be remotely supervised by an approved 24/7 alarm company.
- A pressure of more than the minimum 20 psi will most likely be needed to supply fire sprinklers in certain of the larger structures, and in the higher occupancy building. This must be determined in the water system design phase and approved by SBCFD.
- Portable fire extinguishers will be placed in all buildings per County Fire Code.

Fire Alarm Systems

- All residential units shall have electric-powered, hard-wired smoke detectors in compliance with County Fire Code.

Facility-Wide Alarm System

- There shall be a suitable, manually-activated, facility-wide emergency alarm system which is audible throughout the SBBG, such as a public address system. The system shall have emergency power supply, will function as an alert system to be heard by all occupants and

visitors, notifying them of an emergency situation such as a structural fire or wildfire, and will be a component of the regular fire emergency training and drills.

See the FPP provided in Appendix E for additional requirements and recommendations related to higher-occupancy buildings.

Emergency Planning

The FPP provided in Appendix E describes in detail emergency planning measures and procedures. Key aspects of this emergency planning are described below.

- SBBG shall continue participation in Santa Barbara County Red Flag Fire Alert Program and improve overall effectiveness by:
    - Closing the SBBG to general public visitation and special events during RFFA periods as declared by the County Fire Chief
    - Establishing a Remote Area Weather Station (RAWS) directly connected to local fire agencies to assist Red Flag Fire Alert declarations
    - Maintaining the manually-activated, facility-wide emergency notification system
    - Establishing Mission Canyon residents and all SBBG telephone numbers with Santa Barbara County Sheriff's Department so that use of the Reverse 911 Emergency Notification System works efficiently during a wildfire emergency
    - Take a lead role in researching, organizing and funding a Low Power Radio Emergency Alert System. These FCC compatible, local radio stations are available for specific geographies and provide local residents information about wildfire (and other events) within a highly specific area.
- The SBBG shall conduct at least annual relocation drill/fire drill exercises to ensure proper safety measures have been implemented.
- Staff shall receive annual training to coincide with the fire relocation drill.

SBBG Emergency Response Procedures

Wildfire emergency response procedures will vary depending on the type of wildfire and the available time in which decision makers from SBCFD and SBBG can assess the situation and determine the correct relocation/evacuation alternative.

The following sections discuss emergency response decision making and the relocation/evacuation alternatives available for SBBG staff and visitors.

Relocation/Evacuation

In case of wildfire, the preferred plan is relocation when that option would not expose people to dangerous conditions.

The SBBG site and its structures will be designed and constructed to withstand significant wildfire. Nevertheless, early notification of the SBBG administrators and subsequently of SBBG staff and visitors is critical to the timely and safe relocation to the designated evacuation areas. As indicated in the 2007 San Diego County wildfires and the 2008 Gap Fire in Santa Barbara County, early notification and evacuation of residents is an effective means of limiting loss of life. On an annual basis, SBBG will conduct a fire relocation/fire drill to train staff on what to do during a wildfire and where to assemble.

If a relocation of SBBG staff and visitors is required, the following procedures would be followed. (NOTE: Relocation of the SBBG staff and visitors, at maximum usage during Low Fire Season Preparedness Levels, may require in excess of one hour.) If adequate time is not possible, the decision to temporarily relocate to less exposed/protected areas of SBBG will be made with the assistance of fire and law enforcement personnel, and relocations will temporarily follow that alternative until it is safe to leave the canyon.

Relocation/evacuation of SBBG staff and visitors would typically occur during large, distant wildfire events that, due to weather patterns and difficulty in gaining control, could threaten Mission Canyon and SBBG. Under this scenario, law enforcement and SBBG administrators would evaluate the wildfire event and determine at which point relocation would occur, utilizing a conservative threshold for evacuation. Allowance for adequate relocation time will be a key factor in determining the relocation timeframe so that the roads do not become congested, hindering relocation of other Mission Canyon residents.

Relocation/evacuation would occur in scenarios that include ample time to relocate staff and visitors from the site without impacting the up canyon residents' evacuation, such as non-extreme weather days where a wildfire has the potential for spotting into or otherwise threatening Mission Canyon. With regard to staff, volunteers, and interns, relocations could be completed relatively quickly, whereas canyon residents may require longer timeframe to gather personal property and pets. Evacuation of all staff at SBBG under this scenario would typically occur before resident evacuation by virtue of the pre-planned relocation process and lack of additional personal property requiring relocation.

Relocation/evacuation of SBBG visitors would occur quickly as well. As mentioned, on red flag days as declared by the County Fire Chief, when wildfire potential is high and fire behavior is unpredictable, the SBBG will be closed to general public visitation and special event uses. On non-red flag days within High Fire Season Preparedness periods, typical visitation will be allowed except that all special events will be limited to no more than 180 participants onsite at any one time, and any event involving more than 80 participants will be required to transport participants to and from the Garden via shuttle/busses, which shall remain onsite for the duration of the event. On non-red flag days during Low Fire Season Preparedness periods, when wildfire potential is lower and wildfire behavior is more predictable and controllable, typical visitation will be allowed. On a non-red flag day, should a wildfire occur that allowed time to relocate/evacuate, visitors would be quickly relocated with the assistance of SBBG's internal pre-

plan which includes notification systems and procedures, gathering, and disbursement with local law enforcement assistance.

In the event of a notification of wildfire and relocation by local law enforcement, fire agencies, and SBBG staff:

- Staff and visitors will be directed to their vehicles and will be required by SBBG staff and/or Fire personnel to carpool for evacuation.
- Vehicles will exit the site via the primary site access off Mission Canyon Road.
- The vehicles will drive south on Mission Canyon Road and depending on direction from law enforcement, will continue westbound on Foothill Road to Alamar Road to State Street; or they will continue eastbound on Foothill Road to Mountain Drive to Mission Ridge and on to safe areas of the City.
- Assuming an average of 100 people on site at any one time and on a given day (except during red-flag days as declared by the County Fire Chief when the Garden would be closed to general public visitation), it is estimated that it could take as long as one hour or more to locate all visitors, get them to their vehicles, and relocate them from Mission Canyon south to the City area.
    - SBBG holds regular evacuation drills with timed facility sweeps for visitor "round up". The sweeps take a maximum 25 minutes and include all facilities and paths. Continued property sweep training will be included in the overall SBBG fire safety training program.

As stated above, during red flag conditions as declared by the County Fire Chief, general public visitation and special events will not be allowed at SBBG and, as such, evacuation of people on the SBBG site would be prompt. During High Fire Season Preparedness periods (on non-red flag days) SBBG events will be limited to a maximum of 180 participants and special events involving 80 participants or more shall transport participants in from south of Foothill Road via shuttle buses. The busses will wait on site such that all event attendees could be relocated/evacuated at one time. With mandated use of shuttle busses for event transportation of 80 participants or more, attendees would be expeditiously evacuated from the site with few vehicles and the traffic impact from this scenario is minimal. Relocations would be directed by local law enforcement and would follow the County's OES emergency evacuation plans. In no case shall events exceeding 180 guests occur on days during High Fire Season Preparedness periods. No commercial buses greater than two axles and 45 passengers are sanctioned during High Fire Season Preparedness periods.

Should a wildfire threaten during a non-red flag day Special Event, the following procedures would be followed:

- Special events involving 80 visitors or more occurring during High Fire Season Preparedness periods shall transport all attendees in from south of Foothill Road via shuttle buses, which shall remain onsite for the duration of the event. These buses would be mobilized and loaded with SBBG visitors and staff.
- The vehicles will exit the site via the primary site access off Mission Canyon Road.

- The vehicles would convoy south on Mission Canyon Road back to the designated parking site for visitor vehicles south of Foothill Road, as directed by law enforcement or according to the SBBG FPP if law enforcement is not available.
- If the maximum allowed 180 person event occurred on site during High Fire Season Preparedness periods and were to require relocation in conjunction with the assumed average of 100 people on site at any one time and on a given day, it is estimated that the shuttle buses and limited personal vehicles could relocate 180 persons via on-site busses in one trip out of the canyon. The 100 other visitors would utilize their vehicles to relocate from the site. It is estimated that relocation of the 280 persons can be accomplished within approximately one hour (including time for loading and unloading) with open roads. Therefore, relocation to the ignition resistant structures will likely be an option that is not used in all but the most severe scenarios and will be a last resort only if evacuation from the canyon is not possible.

On-Site Relocation

Wildfire scenarios that would not allow enough time to safely evacuate Mission Canyon residents and SBBG, such as fires igniting within the canyon north or south of SBBG and driven by wind and rapid spread rates, may require an alternative to off site evacuation. There is a high probability that wildfire in Mission Canyon will be spotted and reported by SBBG first, based on the fact that its staff members are in Mission Canyon, on the SBBG grounds every day and some are currently and more will be residing on the site as part of the proposed Vital Mission Plan. SBBG staff and personnel consistently monitor emergency broadcasts (an emergency frequency radio is provided and monitored onsite) as well as an existing onsite weather station. In addition, a new Remote Automated Weather Station is included in the Vital Mission Plan. Once a fire is reported and SBBG is notified, the pre-planned emergency response would be initiated. Evacuation procedures will be implemented immediately. However, should fire and law enforcement personnel determine that a higher risk to people exists during off site evacuation/relocation options than if people were to temporarily seek protection in SBBG's ignition resistant and maintained structure, the on-site relocation plan will be initiated by SBBG administration in communication with local fire authorities (when possible). Visitors cannot be mandated to follow on-site relocation directions, but visitor education and training information will be provided to raise awareness of the potential danger and potential options during a wildfire emergency.

As detailed in the FPP, the combined system, including site-specific fuel modification zones, enhanced, ignition-resistive construction, interior sprinklers, and exterior sprinklers (on designated structures), and infrastructural improvements only possible with the implementation of the proposed site plans, is designed to provide protected area during a wildfire.

The proposed horticulture unit has been identified as an on-site protected area. The building offers interior space and additional amenities to maintain communication and situation awareness for those utilizing the on-site protected area, which include:

- Large-panel television monitors on multiple walls for tracking newscasts during a wildfire event.
- Large computer monitors for tracking fire incident status.
- Several computer terminals available for communicating via e-mail.

- Back-up power – battery banks that are "float" maintained and/or supported by solar panels.
- Second utility source such as back-up batteries or U.L.-rated diesel generator with fuel stored in an above ground ConVault tank or a below ground storage tank.
- Emergency preparedness kits to make brief shelter in place stay as comfortable as possible and including medical related equipment (i.e., supplemental oxygen, pain relievers, inhalers, etc.).

If a wildfire occurs within the canyon during a red flag day declared by the County Fire Chief and there is no option for safely evacuating the canyon, the relocation of SBBG personnel to the on-site protected area would occur by moving all people into the designated structure. Staff would presumably be located throughout the 78-acre site and therefore would be notified by 1) site wide intercom/warning system, 2) handheld radios, 3) structural intercom systems and 4) cell phone/text message. All SBBG staff would be current on appropriate emergency response procedures during a wildfire event. Staff would be tallied once in the structure(s) to ensure that all on-duty staff members were accounted for. Staff would stay in communication with law enforcement and fire agencies for authorization to relocate from the SBBG site, after the fire threat has been controlled or the fire has passed.

Should a wildfire threaten Mission Canyon on a non-red flag day, when visitors may be on the SBBG site and there is no option for safely evacuating the canyon, willing persons and all SBBG personnel on the site would be guided to the protected structures via communication systems mentioned above and supplemented by well-trained staff who are proficient at sweeping the facilities and site. Staff and the number of visitors in the garden would be tallied so that all are accounted for. Staff would stay in communication with law enforcement and fire agencies for authorization to relocate from the SBBG site, after the fire threat has been controlled or the fire has passed. Should a vegetation fire ignite on the SBBG site or very nearby and spread rapidly making safe evacuation impossible, staff and visitors may be instructed to stay within any of the structures on site for temporary refuge from advancing flames. As noted by the office of the state Fire Marshal, a building will be exposed to the main flame front of a wildfire for a relatively short period of time, 5 to 10 minutes at the most (Cal Fire 2007). This exposure time will be shorter and less intense if proper fuel modification zones are in place. Buildings are subject to pre- and post-fire for a longer period of time, which may include wind, flying embers and spot fires. Temporary refuge in any of the newly constructed buildings will be preferable to remaining outdoors, and exposed to the wildfire should offsite evacuation/relocation be infeasible. Buildings will be "linked" via intercom, radios or other communication systems such that staff can contact each other from any building to stay appraised of the situation. The SBBG site, following implementation of the requirements in this FPP, will provide its staff and visitors with last resort protected areas during a wildfire.

The FPP does not provide a guarantee that all SBBG staff and visitors or community members will be safe at all times because of the advanced fire protection features it requires for the SBBG expansion. There are many variables that may influence overall safety. The FPP provides requirements and recommendations for implementation of the latest fire protection features that have proven to result in reduced wildfire related risk and hazard. The system of fire protection features must be properly maintained for it to function as designed. Even then, fire can compromise the fire protection features through various, unpredictable ways. The goal is to reduce the likelihood that the system is compromised through implementation of the requirements

in the FPP.

See the FPP provided in Appendix E for description of procedures to be followed during a typical scenario as well as a decision matrix to be followed in case of a wildfire emergency.

Impacts of the Proposed Project

This EIR assesses the potential for impacts associated with wildland fires ~~assuming implementation of the measures identified~~considering ~~in~~ changes to the built environment and activity levels resulting from the proposed project ~~and~~as well as implementation of the measures identified in the FPP ~~*Fire Protection Plan*~~. The assessment of whether or not the project would expose people or structures to a significant risk of loss, injury or death involving wildland fires, centers around three issues: (1) would the project's occupants, visitors, and/or property be adequately protected from wildland fire (defensibility), (2) would the increase in use of the Garden expose area residents to greater risk by inhibiting the evacuation of the Mission Canyon area in the event of a wildland fire, and (3) would the project substantially increase the potential for wildland fires to occur.

Defensibility from Wildland Fire (Impact Fire 1)

The original DEIR identified a significant impact related to defensibility from wildland fires because the fire protection plan upon which the DEIR was based did not adequately describe an effective evacuation and/or shelter-in-place plan, adequate structural design measures, or vegetation management requirements. The original DEIR identified a mitigation measure that required strengthening of the plan to ensure an adequate level of defensibility. The FPP provided in Appendix E and summarized above accomplishes this by setting forth a comprehensive and detailed plan including provisions for fuel modification, structural specifications for proposed development, infrastructure improvements (water supply, hydrants, fire alarm systems), and emergency planning procedures, including evacuation and on-site relocation as well as restrictions in activity at the Garden during red flag alert days as declared by the County Fire Chief.

The proposed project exacerbates on-site fire hazard issues to the extent that it introduces additional structures, facility staff, residents and visitors that would be exposed to the high fire risk that exists in Mission Canyon. However, the proposed project also includes many fire safety measures to improve conditions on the site as compared to existing conditions. A number of the FPP requirements would benefit both existing and proposed development and protect visitors, staff, and residents. These include expanded fuel modification requirements around all structures, improved water supply/fire flow facilities and capacity throughout the site, improved internal circulation for existing and new development, restrictions on activity during High Fire Season Preparedness periods, closure to the public on red flag alert days declared by the County Fire Chief, and an emergency response plan that includes provisions for temporary on-site relocation if necessary.

The FPP summarized above and provided in full in Appendix E was reviewed by SBCFD and was found to provide an adequate level of defensibility for the Garden and improve the resources available to emergency personnel for responding to fires in the Mission Canyon area. It was also found that implementation of the FPP in conjunction with the proposed project would result in a reduced fire hazard situation than currently exists in this area of Mission Canyon. However, prior to imposition of a mitigation measure to assure that the FPP will be fully implemented during

project construction and throughout the life of the project, the proposed project would result in the potential for a **significant impact** related to defensibility from wildland fire risks (**Impact Fire 1**).

~~Key factors in defensibility from wildland fires are related to the adequacy of:~~

- ~~A protective action plan (evacuation and/or shelter-in-place) and structural design measures and/or vegetation management to support that plan;~~
- ~~Access for emergency vehicles; and~~
- ~~Fire flow or water pressure.~~

~~Protective Action Plan (Evacuation and/or Shelter-in-Place, Structural Design, and Vegetation Management, Impact FIRE 1)~~

~~As mentioned above, a wildland/urban interface fire typically results in a response to the general area rather than a specific address by the fire department, as many homes are usually threatened. It is not unusual to have a ratio of only one fire engine per 25 or more simultaneously threatened homes. As with other area-wide emergencies, individuals and groups are advised to be prepared to function without active firefighting intervention for several hours or more. In addition, in order to assure adequate fire safety for visitors and residents at the Garden, given potential evacuation limitations or constraints associated with a single access, a shelter-in-place facility is required, along with adequate vegetation management zones around this and other facilities and access routes, and ignition resistant and fire resistant building construction for the shelter-in-place structure(s).~~

~~In order to provide a shelter-in-place option, the Garden must include a building or buildings that have been constructed and maintained such that it would survive the potential fire event. The *Fire Protection Plan* does not currently include specific requirements for an adequate shelter-in-place facility.~~

~~The *Fire Protection Plan* does not clearly set forth a plan for determining when to evacuate the facility and when to use the shelter-in-place option, nor for implementing each of these options. The plan also does not adequately describe design features sufficient to establish defensible structures and does not provide adequate detail to establish effective vegetation management zones for a shelter-in-place facility or other structures.~~

~~Therefore, the *Fire Protection Plan* does not adequately describe an effective evacuation and/or shelter-in-place plan, structural design measures, or vegetation management requirements as described above. As such, prior to strengthening this plan, Garden visitors, residents and property would not be adequately protected in the event of a wildland fire. Although there is an existing risk, the project would increase the number of visitors, staff, and residents and thereby would expose more people to the risk. This is a **significant impact** (**Impact FIRE 1**).~~

Emergency Access in the Mission Canyon Area (Impact FIRE 2)

As described above, access and egress to and from the Garden and residents north of the Garden along Mission Canyon Road is provided via a single access along Mission Canyon Road. Fire and other emergency first responders must use the same path to gain access to the fire that the residents and visitors use to relocate or evacuate during a fire event. The relatively narrow

Mission Canyon Road with poor sight distances exacerbates this deficiency. During a fire this road may be congested or blocked, for example by an abandoned vehicle or vehicle traveling in the wrong direction, or the road may become impassable due to smoke obscuring vision or from direct flame impingement across the road. Without at least a secondary access for use by emergency responders, response times could increase and emergency vehicle access would not be sufficient to adequately protect the Garden and its occupants and surrounding residents against a wildland fire. There are secondary routes (Las Canoas Road, Tunnel Road, etc.), but these are far less direct and would potentially be unusable depending on the type and location of the wildfire event. In addition, access or egress using these roads would still require use of Mission Canyon Road to a limited degree. This access issue presently exists, however the proposed project would increase the number of visitors, facility staff, and residents at the Garden, thereby potentially increasing the number of vehicles using Mission Canyon Road to evacuate. See Section 4.11 Traffic for a discussion of traffic impacts associated with the proposed project.

An attempt was made as part of the original DEIR impact analysis to quantify the impact of the proposed project on emergency evacuation of residents out of the canyon. An estimate of the canyon population likely relying on Mission Canyon Road to evacuate was identified and estimated clearing times were calculated based on various assumptions (e.g. number of vehicles per residence, traffic management at potential choke points, response times, etc.). The impacts of the project in terms of adding additional vehicles to the road in an evacuation scenario were then calculated based on the delay that the additional vehicles would cause. This model was included in Appendix F of the original DEIR. The evacuation model was ultimately discarded due to the reliance on assumptions that may or may not be borne out given the unpredictability of a wildfire event and the speculative nature of attempting to quantify such an unpredictable scenario. Rather, the existing risks and hazards associated with evacuation of the canyon were recognized and the contribution of the Vital Mission Plan in terms of increasing the use at the Garden was identified, though not quantified.

Thus, the existing risk to canyon residents in terms of emergency evacuation would be exacerbated by the increase in canyon population (both temporary and permanent). The improvement of the road through the East of Mission and Hansen sites and providing internal access sufficient to support fire engines help to mitigate this problem. In addition, as described above, the project's FPP includes measures that would reduce on-site population during levels of High Fire Season Preparedness. It requires the closure of the Garden to public visitors, including special events, during red flag alert days as declared by the County Fire Chief. This would not only avoid proposed increases in population at the site during high fire hazard days, but would also reduce existing population at the site during these days since similar restrictions are not currently in place. Similarly, the FPP places a limit on the number of attendees at special events and requires the use of shuttles/small buses for events over 80 guests during High Fire Season Preparedness periods; these events are currently not subject to such limits and controls. As described above, the FPP would provide improved fuel modification requirements surrounding all on-site structures and improvements in on-site circulation. In addition, the FPP calls for the implementation of a number of fire safety measures that would benefit the Mission Canyon area (not just the Garden property). These include the provision of an emergency helispot to be used by fire crews during wildfire events, establishing a Remote Area Weather Station with connection to local fire agencies to assist Red Flag Fire Alert declarations, provision of a portable pumpkin tank for helicopter buckets or siphoning, and establishing Mission Canyon residents and all SBBG telephone numbers with Santa Barbara County Sheriff's Department so that use of the Reverse 911 Emergency Notification System works efficiently during a wildfire emergency.

Given the above, it is expected that the proposed project and associated increases in use and activities, including the FPP, would not substantially exacerbate existing evacuation issues and the seasonal restrictions in Garden activity would ameliorate these issues. Construction activities associated with development of the Vital Mission Plan could exacerbate emergency evacuation by adding vehicles, including potentially large construction vehicles and equipment, to the roadways in the event of a wildfire forcing evacuation, thereby inhibiting the ability for staff, visitors, and surrounding residents to evacuate in a timely manner. Prior to imposition of a mitigation measure to assure that the FPP, including all restrictions on use, will be fully implemented during project construction and throughout the life of the project, and absent restrictions on construction activities during declared red flag days, the proposed project would result in the potential for a **significant impact** related to evacuation of the area (**Impact Fire 2**).

~~The improvement of the road through the East of Mission and Hansen sites and providing internal access sufficient to support fire engines help to mitigate this problem. Despite the project's proposed internal improvements to emergency access, the increase in the number of people at the Garden is considered a **significant impact** on emergency access **(Impact FIRE 2).** This would affect visitors, staff, and residents of the Garden as well as residents in the area who would also use Mission Canyon Road to evacuate in the event of a wildland fire.~~

Fire Flow and Water Pressure (Impact FIRE 3)

Existing water supply and pressure at the Garden is substandard for serving the project site. Water supply for fire protection purposes to serve the proposed project, including the addition of several fire hydrants as dictated by the County Fire Department, would improve fire flows and water pressure for fire suppression activities. However, based on an analysis of the existing water supply system surrounding the Garden and flow tests of hydrants served by the existing water supply system, fire hydrants served by the proposed water system improvements would not meet County Fire Department standards for commercial flows and pressure as currently proposed (i.e. 1,250 gpm at 20 psi residual pressure for 2 hours), though they would meet residential standards (750 gpm). While this would be an improvement over its existing system, because it would not meet County Fire Department requirements for commercial facilities, impacts related to fire flow and water pressure would still be considered **significant (Impact FIRE 3)**. As a side note, ~~A~~as discussed above under existing conditions, the Garden ~~is currently planning~~ recently upgraded its water supply for fire-fighting purposes~~ to provide a source of water supply~~ by providing a connection with the existing 8-inch water line at the intersection of Las Canoas and Mission Canyon Roads. This connection ~~would~~ involves an 8-inch main north to the Garden from that intersection. Fire hydrants served by this line ~~would~~ do not meet County Fire Department commercial standards for water flow and pressure serving the ~~main garden area~~Garden (i.e. 1,250 gpm at 20 psi for 2 hours). ~~While this would be an improvement over its existing system, because it still would not meet County Fire Department requirements, impacts related to fire flow and water pressure would still be considered **significant (Impact FIRE 3)**.~~

Increased Potential for Wildland Fires (Impact FIRE 4)

The proposed project would increase human activity at the Garden and in the area. It would increase the number of residential units at the site (~~8~~3 additional units), employment levels and daily visitors ~~(an approximate increase of 40 percent over the next 20 years is expected due to general growth as well as the proposed improvements),~~ and the number and size of classes and special events as described in Section 2.0 Project Description (an approximate increase of 45 percent over the next 20 years is expected). In addition, construction activities associated with

buildout of the project have the potential to start a fire through spark-generating activities such as welding, grading, and cutting or heating of construction materials. The proposed project would have no impact on one of the greatest risks to wildfires, which is present above the Garden within Los Padres National Forest, associated with power lines within the upper canyon and unmonitored human activity within the miles of trails and remote backcountry. However, ~~A~~an increase in activity in the project area would incrementally increase the potential for wildfires caused by human activities in this area. ~~This is considered a **significant impact (Impact FIRE 4)**.~~ As described above, the project's FPP includes measures that would reduce on-site population during declared red flag days and High Fire Season Preparedness periods. In addition, the FPP calls for the continued education of visitors regarding fire hazards and implementation of the no-smoking policy. These measures would help to limit any significant increase in the potential for human-caused wildfires. Nonetheless, prior to imposition of a mitigation measure to assure that the FPP will be fully implemented during project construction and throughout the life of the project, and absent restrictions on construction activities during declared red flag days, the proposed project would result in the potential for a **significant impact** related to an increased potential for wildland fires (**Impact Fire 4**).

4.5.5 Cumulative Impacts

The Mission Canyon community, including the Garden and surrounding residential neighborhoods, is presently subject to a significant risk from a wildland fire, as described above under existing conditions. Currently planned development projects in the area north of Foothill Road include seventeen new single-family residences, several other smaller residential additions and rebuilds, and minor projects at the Garden itself (See Section 3.0, Related Projects). In addition, buildout analysis under the proposed Mission Canyon Community Plan indicates that up to 178 additional residential units could be developed in the future based on vacant and underdeveloped parcels. Of these, 91 are within the Upper Mission Canyon area that would potentially share similar evacuation routes as visitors to the Garden. The Mission Canyon area is not currently easily defensible from a wildland fire given the limited access to existing homes, the lack of adequate vegetation management around these homes and along access roads, and ~~substandard~~ limited water flows and pressure at various locations throughout the canyon. The water system in Mission Canyon, like most other systems throughout the state and country, is designed to address structure fires, not wildfires which require a completely different strategy that is dictated on a case-by-case basis and cannot be pinpointed. The limited ingress and egress options in an evacuation event, with Mission Canyon Road serving as the only primary evacuation route (secondary evacuation routes exist, including Las Canoas Road and the roads through the Mission Canyon Heights neighborhood, though these are far less direct), makes safe and timely evacuation of the canyon population difficult.

Additional development in the area, including both residential development as well as the proposed Garden project (including the facility improvements, staff and visitor increases, and three new staff residences), would exacerbate the exposure of people and property to wildland fire hazards, ~~and~~ increase the potential for wildland fires caused by human activity, and increase the population requiring evacuation in a wildfire event. This is considered a **significant cumulative impact**. With the exception of possible future buildout of the Mission Canyon Community Plan, ~~A~~as identified in Figure 3-1, ~~however,~~ all but two of the other planned and pending projects are located in a separate area of the canyon that would in all likelihood utilize a different evacuation route in the event of an emergency. Thus, the ~~related~~ planned and pending projects are not expected to exacerbate the problematic evacuation situation present along

Mission Canyon Road. Additionally, the majority of new planned and pending residential units included in the list of Related Projects occur outside or on the edge of the high fire hazard area and thus their impacts with respect to fire protection and wildfire hazards are very small. However, while full residential buildout of the community plan area is unlikely given existing development patterns and site constraints, the cumulative analysis considers the potential effects of these additional units. Their greatest effect would likely be on emergency evacuation of canyon residents. There is the possibility that many of these residents would potentially use roads through Mission Canyon Heights or Las Canoas Road for evacuation purposes, depending on the particular wildfire scenario, which would help to reduce the burden on Tunnel Road and Mission Canyon Road. Nonetheless, the addition of nearly 100 vehicles resulting from Community Plan buildout, other planned and pending projects, and new Garden residences (based on one vehicle per residence) in an evacuation scenario would likely delay the evacuation times of canyon residents, further exacerbating an existing hazard.

According to the County Fire Department, emergency service to a project is considered adequate if emergency response times are under five minutes and the ratio of the population to be served relative to the number of County Fire Department personnel is less than 4,000 to 1 (2,000 to 1 or less is ideal). The Garden and the Mission Canyon neighborhoods are located less than one mile from Station #15 at the intersection of Foothill Road and Mission Canyon Road, thus the Garden and Mission Canyon as a whole are within the acceptable response time. There are three emergency personnel regularly staffing Station #15, which is responsible for providing fire protection services to County land extending north to Los Padres National Forest, south and east to the City of Santa Barbara boundaries, and to the west up to Debra Drive north of Foothill Road and Alamar Avenue south of Foothill Road. According to 2000 Census data, the population within the Mission Canyon response area was 2,871 for a ratio of approximately 1,000 residents to 1 firefighter, well within the ideal firefighter-to-population ratio. On a typical day, the Garden would add up to approximately 442 staff and visitors, plus an additional 10 new residents associated with new staff housing. Related projects, including theoretical buildout of the Community Plan area, would still result in a population served by Fire Station #15 well below its acceptable threshold. Thus, it can be clearly demonstrated that the proposed project in conjunction with other related projects could be adequately served without taking away emergency services available to other residents in the community.

Past Garden projects are not considered to impact or increase fire hazards within the Garden as they only involve minor changes to the landscape within the Garden and short sections of fencing along Mission Canyon Road and Tunnel Road. The recent installation of six residential fire hydrants provides greater fire protection to existing facilities at the Garden. These hydrants, along with the additional hydrants that were recently installed by the City of Santa Barbara just north of the Garden along Mission Canyon Road greatly improves firefighting capability for the Fire Department in the Canyon area. With respect to the Botanic Garden, the ~~project proposals~~FPP measures to increase fire protection and emergency access within the project site (e.g. fire sprinklers, increased water flows and pressure, new fire hydrants, roadway improvements, vegetation management, an emergency helispot, and a real-time weather reporting system) would greatly improve the fire fighting and emergency access abilities of local emergency personnel in this area of the canyon. Restrictions on activities at the Garden during High Fire Season Preparedness periods, including closure to the public on red flag days declared by the County Fire Chief, would help to ensure that the Garden's contribution to cumulative fire hazards and the difficulties of evacuating the canyon population is minimized. ~~Nonetheless~~Prior to assurance of full and continued implementation of the FPP, the proposed increase in use of the

Botanic Garden would exacerbate the exposure of people and property to wildland fire hazards, including evacuation, and increase the potential for wildland fires caused by human activity. Thus, cumulative fire impacts are considered significant and **the project's contribution to cumulative fire impacts is ~~considered~~ cumulatively considerable**.

4.5.6 Mitigation Measures

Defensibility from Wildland Fire, Emergency Access in the Mission Canyon Area, and Increased Potential for Wildland Fires (Impacts FIRE 1, FIRE 2, and Fire 4)

Impacts Fire 1, Fire 2, and Fire 4, related to defensibility, area evacuation, and increased wildfire occurrence, respectively would be mitigated with implementation of the following mitigation measures.

FIRE 1-1 The FPP is documented in the report entitled *Santa Barbara Botanic Garden Vital Mission Plan Conceptual Fire Protection Plan*, Dudek, Draft November 2008 (contained in Appendix E). SBBG shall be required to implement all requirements set forth in this FPP, which has been approved by the SBCFD and P&D, or subsequent updated versions of the plan as approved by the SBCFD and P&D.

Plan Requirements and Timing: The FPP shall be included in the project's deed encumbrances. In addition, a requirement for annual inspection of all active and passive fire protection mitigation measures, including vegetation management, shall also be included in the project's deed encumbrances. SBBG shall submit an annual report to P&D in February of each year documenting the number, size, and dates of special events and activities held during periods of High Fire Season Preparedness Levels during the previous year and measures taken to ensure compliance with the above requirements.

Monitoring: Prior to Zoning Clearance, P&D shall assure that the above measure is included in deed encumbrances. An annual report of inspection shall be filed with the SBCFD. Where deficiencies are found, the required maintenance or repair shall be accomplished forthwith. In the event of a failure to perform, the SBCFD is authorized to contract such work by a third party. The cost of such inspection and/or maintenance shall, if not paid, be made a lien on the property, executable by the fire authority. P&D shall conduct periodic site inspections during construction and operation to ensure compliance.

Impacts Fire 2 and Fire 4 would also be mitigated by the following measure:

FIRE 1-2 All construction shall be prohibited on red flag days as declared by the County Fire Chief.

Plan Requirements and Timing: This condition shall be included on all building and grading plans.

Monitoring: -Permit compliance shall respond to complaints and spot check in the field to ensure compliance with this condition.

~~Defensibility from Wildland Fire – Protective Action Plan and Emergency Access (Impacts FIRE 1 and FIRE 2)~~

~~**FIRE 1-1** The applicant shall expand and amend its *Fire Protection Plan* to provide a comprehensive Fire Protection Plan for Fire Department approval, as required by the County Fire Code. The Plan shall provide specific measures for shelter-in-place features, evacuation procedures, enhanced fire department access (Gane House Road and internal access), ignition resistant construction, a fire sensor and notice system, and an enforceable maintenance program. Key elements of the Plan shall include the following:~~

- ~~The Fire Protection Plan shall include a requirement for a shelter-in-place building or buildings (among those proposed for development) that have been constructed and maintained to survive a potential fire event. Characteristics of the building(s) would be construction materials and configuration consistent with the standards found in the California Building Code, Chapter 7(a), 2008 revised, as well as ignition resistant window shutters, vents, skylights and other openings designed to be manually and/or remotely closed so that no embers or flame is permitted to enter, interior fire sprinkler systems, protected air handling and communication conduits and uninterruptible power supply (UPS) for electricity for the building, including the required fire systems, radio, telephone, television and computer systems. (It is possible to achieve this level of protection by modifying existing structures, but more practical to implement during original design and construction.)~~
- ~~An evacuation plan that distinguishes between conditions requiring evacuation and conditions requiring shelter-in-place and a clear implementation plan. When made aware of the potential for a fire event impacting the Garden, the relative value of relocation, evacuation or shelter options must be determined and appropriate action instituted. Sufficient resources must be allocated in order to allow each of these options to be successfully implemented. Where sufficient time is available, for example when conditions are such that a fire event is a strong possibility (e.g., during a Red Flag alert), or if there is an actual fire in the general area but not constituting a direct and immediate threat to Mission Canyon, staff and visitors should relocate to another location. This action is distinguished from an evacuation by the lack of immediate threat. Where an immediate threat exists, the choice is between evacuation and shelter. Both options must be available. The evacuation option must be supported by adequate roadways with sufficient width and with adequate roadside vegetation clearances to allow safe egress. The evacuation option is only available where the fire event does not involve the planned exit pathway. The shelter-in-place option is employed where an analysis of the circumstance suggests greater risk exposure to life occurs on~~

~~the roadway than in the provided shelters. This analysis is heavily influenced by the time factor, as it must include the simultaneous actions of other Mission Canyon inhabitants and the ingress response of the fire service.~~

- ~~Where the evacuation option is chosen, the plan must be clearly articulated to all visitors in a timely fashion and have sufficient resources for effective execution. The plan should be designed for typical days as well as days with higher activity levels and special event days. During days with higher activity levels, as identified in the plan, the Garden should provide a shuttle system that would utilize a pick up point(s) outside of the interface fire (in any suitable location below Foothill Road) area during days with high visitor levels. Visitors should be provided with information describing risk associated with evacuation in an interface fire circumstance and sign a waiver form that included a commitment to stay in a shelter-in-place building if directed to do so.~~
- ~~A decision matrix shall be prepared that involves communication with applicable public safety agencies (i.e. County Fire Department, City of Santa Barbara Fire Department, City of Santa Barbara Police Department, County Sheriff's Office) when evaluating whether to evacuate or shelter-in-place in the event of an emergency. The decision matrix shall be included in the Fire Protection Plan for review and approval by Planning and Development and the County Fire Department in consultation with applicable public safety agencies.~~
- ~~The Fire Protection Plan shall include a comprehensive, detailed project vegetation management plan, which will identify vegetation management and landscaping pertaining to shelter-in-place facilities as well as other Garden structures. The vegetation management plan shall be tailored to site-specific conditions. The guidance for vegetation management should be a fire behavior model using the BehavePlus computer program, and a description of plant types and physical configuration, including empirical data sufficient for third party annual maintenance determinations, to be mutually determined by a plant biologist representing the Botanic Garden and a representative of County Fire. The vegetation management zones surrounding the designated shelter-in-place building(s) would generally be the greater of 100 feet (Santa Barbara County Guide) or twice the computed flame length (BehavePlus). The surrounding area is predominantly Fuel Model 4 (Chaparral, 6 feet high). The applicant's *Fire Protection Plan* includes a fire behavior model suggesting 124-foot flame lengths for this fuel model. It is noted however that the original area modeling was accomplished using an average slope of 20%. The building(s) designated as shelter-in-place should be modeled specifically in order to determine appropriate vegetation management zone dimensions. The fuel modification area for the shelter-in-place facility needs to be designed taking into account site-specific conditions (e.g., location of the facility relative to slopes and wind effects) and structural design measures included in the facility. It is expected that with these considerations the fuel modification requirement for the shelter-in-place facility, and other on-site structures, would be within 100 feet.~~

- ~~A visible flame and smoke, early warning, fire sensor and notification system shall be located in the canyon, with direct communication with the Botanic Garden and the Santa Barbara County Fire Department.~~
- ~~Utilities shall be undergrounded throughout the property.~~
- ~~All buildings greater than 200 square feet shall be protected with fire sprinklers.~~
- ~~All new and renovated buildings associated with the Vital Mission Plan will be constructed or reconstructed to high fire hazard building standards.~~
- ~~On red flag days as called by the County Fire Chiefs, the Garden shall be closed to paid and general membership visitation as well as all pre-arranged Garden activities (events, classes, lectures, etc.). In addition, all volunteers will vacate the Garden.~~
- ~~Construction trucking, use of heavy construction machinery such as bulldozers, end-loaders, dump trucks and equipment powered by internal combustion engines, and construction activities involving outdoor welding, cutting or heating of materials associated with the Vital Mission Plan project, or any construction activity occurring within a public road right-of-way, shall be halted on all red flag days as called by the County Fire Chiefs.~~
- ~~Special events (e.g. weddings, private parties, fundraisers, etc.) with more than 80 guests present on-site at one time in a single group shall not be permitted unless shuttle busses/trolleys are utilized to transport guests to/from the Garden and shuttle busses/trolleys are to remain on-site at all times during the event to facilitate early evacuation. In no case shall an event exceed 300 guests during the declared fire season. At no time shall commercial buses greater than two axles and/or 45 passengers be sanctioned for carrying visitors to and from the Botanic Garden during the declared fire season.~~
- ~~The Garden shall post signs and distribute handouts to all visitors informing them of what to do in the event of a fire, including procedures for shelter-in-place and evacuation routes.~~

~~**Plan Requirements and Timing**: Prior to approval of any Land Use Permit for structural development, the Fire Department and P&D shall review the Fire Protection Plan to ensure that it provides for adequate defensibility of the Garden. Upon approval, the Fire Protection Plan shall be included in the project's deed encumbrances. In addition, a requirement for annual inspection of all active and passive fire protection mitigation measures, including vegetation management, shall also be included in the project's deed encumbrances. The Botanic Garden shall submit an annual report at the end of declared fire season documenting the number, size, and dates of special events and activities held during the fire season and measures taken to ensure compliance with the above requirements.~~

~~**Monitoring**: Prior to approval of a Land Use Permit, P&D shall assure that the Fire Protection Plan has been reviewed and approved and that the above measures are included in deed encumbrances. An annual report of inspection shall be filed with the Santa Barbara County Fire Department. Where deficiencies are found, the required maintenance or repair shall be accomplished forthwith. In the event of a failure to perform, the Santa Barbara County Fire~~

~~Department is authorized to contract such work by a third party. The cost of such inspection and/or maintenance shall, if not paid, be made a lien on the property, executable by the fire authority. Planning and Development shall conduct period site inspections during construction and operation to ensure compliance~~

Defensibility from Wildland Fire – Fire Flow and Water Pressure (Impact FIRE 3)

Water supply and pressure shall be enhanced to meet County Fire Department standards as set forth in Mitigation PF 2-1.

~~Increased Potential for Wildland Fires (Impact FIRE 4)~~

~~The mitigation measures identified above are expected to reduce potential hazards associated with increased human activity at the project site to less than significant.~~

4.5.7 Residual Impacts

Implementation of the mitigation measures identified above, in conjunction with project proposals to enhance fire protection capabilities and upgrade internal roadways to enhance emergency access within and around the Garden, would result in an overall improvement in the defensibility of the Garden and the surrounding area. By restricting activities during ~~the fire season~~High Fire Season Preparedness periods such as large events and construction activities, and implementing an~~both a shelter-in-place program and~~ evacuation plan, the probability of the project exacerbating evacuation of canyon residents during an emergency or increasing the potential for wildfires to occur by increased human activity is significantly reduced. Upgrades to the water system through Mitigation PF 2-1, which includes construction of a 12-inch main line connecting the main lines on Tunnel Road and Las Canoas Road would enhance water flows and pressure to the Garden and the entire El Cielito/Tunnel Pressure Zone~~this area of the canyon as a whole, without creating deficiencies elsewhere in the water system.~~ , ensuring that all domestic users within this zone would receive adequate water pressure and flow. Implementation of these mitigation measures in conjunction with project improvements would reduce the project-specific residual impacts to less than significant levels (**Class II**). Implementation of these mitigation measures in conjunction with project improvements would similarly result in the project's contribution to cumulative fire impacts no longer being considered cumulatively considerable (**Class II**) ~~and cumulative fire impacts would be reduced to a less than significant level. Therefore the residual cumulative impacts are **Class II**, significant but mitigable~~.