KENSINGTON EVACUATION RESEARCH PROJECT

FINAL REPORT

Stephen Wong

Ian Martin

Jeremy Halpern

University of California, Berkeley

January 8, 2020

SUMMARY

The community of Kensington, California in Contra Costa County faces multiple risks from natural hazards due to its unique geography, especially from wildfires and earthquakes. Consequently, the Kensington Fire Board and community members requested a research project to begin building a community evacuation plan. This final report details all aspects of the research project and creates a series of recommendations for the community of Kensington to consider when building a wildfire evacuation plan and a transportation response strategy. This report:

- Defines the evacuation problem statement for Kensington;
- Summarizes requests for obtaining official right-of-way maps;
- Reviews local emergency and evacuation preparedness guides and plans;
- Reviews academic literature on wildfire evacuations;
- Documents a data protocol for a field survey of Kensington street conditions;
- Analyzes street condition data from the field survey of Kensington streets;
- Provides methodology and results for a network analysis of Kensington;
- Identifies critical intersections, road links, and gathering points for evacuations;
- Provides recommendations for developing a Kensington evacuation plan.

These tasks provide the starting point for the community of Kensington to develop an actionable evacuation plan in the event of a major disaster.

Contents

1) Problem Statement

Kensington, California is a small unincorporated community in Contra Costa County with a population of approximately 5,600 people. The hillside community, bordering Berkeley, El Cerrito, and Tilden Regional Park, is largely developed with single family detached homes. Small commercial districts are located along Arlington Avenue, a major arterial running through the community and linking it with Berkeley and El Cerrito. The community is also connected with surrounding cities through Colusa Avenue and the Colusa Circle along the western edge.

The Kensington Fire District Board is interested in developing an evacuation plan for wildfires and other emergencies. An evacuation plan would complement work being done by Kensington in cooperation with the East Bay Regional Parks District, the El Cerrito Fire Department, and other neighboring jurisdictions.

One critical issue for the community is the development of evacuation routes, which would differ depending on the direction and type of the hazard. This is especially important for Kensington because many local streets are cul-de-sacs or have limited connections to roads leading out of the community. While walking is often a recommended evacuation strategy in hilly topologies, this evacuation strategy may not be feasible in many cases for Kensington. Sidewalks are lacking in many parts of the community and pedestrian pathways cutting down the hills are not always maintained. In addition, the steepness of the hills leads to critical accessibility barriers for some residents, including small children, older adults over 65 years of age, and individuals with disabilities. In Kensington, children under the age of five account for 4% of residents, older adults over 65 years of age account for 26% of residents, and individuals with disabilities account for 9% of residents (American Community Survey 2017 5-year estimate). In addition, many of the streets in the area are narrow and parking along the street creates constrictions in some locations, potentially hampering vehicular evacuations as well as movement of emergency vehicles.

2) Summary of Work

This final report covers all activities associated with the research project initiated by the Kensington Fire Board. Preliminary information in this report includes: 1) a request for right-of-way maps for Kensington, 2) a brief review of local evacuation plans (including

new information on the recently completed Berkeley evacuation map), 3) a literature review of wildfire evacuation research, and 4) methodology for data collection and network analysis. With this given context, we present results through:

a) An analysis of the street network in Kensington including an identification of key intersections that could experience significant congestion;
b) Development of maps that show critical intersections, road links, and potential gathering points; and
c) An analysis of Kensington street data from a field study of street condition.

We conclude the report with a series of evacuation recommendations that will help Kensington develop an empirically driven evacuation plan for wildfires. Elements of a preliminary report, delivered in August 2019, are also included in this final report.

3) Right-of-Way Information Request

In June and July 2019, we requested official right-of-way (ROW) maps and information from Contra Costa County. The goal of the request was to produce official maps which could be compared to a field survey of Kensington streets. One primary concern for the Kensington Fire Board was that the official ROW and the effective ROW (i.e., the actual street width) may be different. This difference could lead to evacuation challenges as streets with a smaller effective ROW may be reduced to single-lane traffic.

We sent an information request to the Contra Costa County GIS Department and received information from two individuals with Contra Costa County: Mr. Chris Howard with the Department of Conservation and Development and Mr. Wiley Osborn with the Department of Public Works. According to the Department of Public Works, Contra Costa County does not have a GIS (geographical information system) layer for the official ROW. The official ROW can only be determined from various subdivision maps, deeds, dedications, and vacation documents for specific streets and parcels. This process would require a significant amount of resources and staff time to research and assemble. Consequently, the Department of Public Works noted that the consulting team could infer the official ROW from parcel GIS data, but that this may lead to inaccurate results. The department also noted that some of the ROW may be unusable. For example, an official 50 feet ROW may only have a paved road that is 22 feet wide due to inaccessible hillsides

and drop-offs. The department also explained that structures and other improvements may be encroaching on the ROW.

Given this information request and the lack of official ROW maps, we determined that our street survey of Kensington would provide accurate information on effective ROW, which is the determining factor in an evacuation. Consequently, we are unable to provide a direct comparison of official ROW and effective ROW, unless official maps become available through significant Contra Costa County staff work.

4) Review of Local Evacuation Plans

We conducted a brief review of local evacuation plans beyond the current El Cerrito – Kensington Wildfire Action Plan. The goal of this review was to highlight key evacuation elements of local plans and identity if these elements could be included in a future plan for Kensington (and El Cerrito). Given the knowledge and experience of the Kensington Fire Board and El Cerrito Fire Department with their own evacuation and emergency response plans, we suggest that officials compare the elements of their plans with other elements identified in Table 1. We also recommend that given the passage of AB 2311 (Emergency Services: Access and Functional Needs in Emergencies Act of 2016), Kensington should integrate strategies for evacuating access and functional needs populations into emergency plans upon next update.

In our brief review, we found that the no neighboring jurisdiction has a publicly available evacuation plan for community members. The Lamorinda (Lafayette-Moraga-Orinda) area had the most publicly available evacuation information with multiple documents providing evacuation zones, recommendations for residents, and tips for evacuating. This information was found through multiple sources including the local Lamorinda Community Emergency Response Team (CERT). Moraga also had a publicly available Emergency Operations Plan (EOP). Berkeley provided a map and evacuation tips, but details were significantly less than Lamorinda. Berkeley is also currently building a full-scale evacuation and response plan. In September 2019, Berkeley released an evacuation zone map. The map contains detailed information about the location of more than 100 evacuation zones along with the location of fire hydrants, temporary evacuation sites, schools, libraries, senior centers, recreation centers, fire stations, and hospitals. For more information on the specifics of the future Berkeley plan, the fire board should contact Keith May at the Berkeley Fire Department (kmay@cityofberkeley.info). Albany,

Richmond, Oakland, and the East Bay Regional Parks District had little evacuation information, focusing rather on emergency preparedness. We note that these entities may have private emergency response and evacuation plans that are not available to the public. We recommend that Kensington reach out to these specific jurisdictions for these documents as researchers may not be able to access or view the plans. Based on this review, we also recommend that any future evacuation plans should be widely disseminated to the public to increase preparedness and encourage evacuation compliance. We also did not find any indication that other jurisdictions will route evacuees through Kensington. All references and links to pages are provided in Table 1 and are not located in the reference section.

Table 1: Review of Local Evacuation Plans

Jurisdiction	Sources	Key Evacuation Elements
Berkeley	Website with evacuation information Evacuation checklist Fire suppression activity guide Evacuation Zone Map *Future full-scale evacuation plan will be released within the next year	Information on when to evacuate, how messages will be relayed, and how to evacuate (with links to AC Alert and numbers for radio stations) Additional links for Berkeley paths and how to evacuate on foot Evacuation checklist with information on go-bag contents, checking on others, preparing homes, receiving alerts, and grabbing additional items The "5 P's" (people and pets, prescriptions, papers, personal needs, priceless items) Information on how to protect homes if time allows and what to do if evacuees become trapped in their vehicle, on foot, or at home New map on evacuation zones in Berkeley Map of evacuation routes along with fire stations, hospitals, schools, senior centers, the city recreation center, and the high-risk Berkeley hills zone Language focused on taking personal initiative and making decisions, even without official support or information https://www.cityofberkeley.info/WildfireEvacuation/ http://www.cityofberkeley.info/uploadedFiles/Fire/Level_3_-_General/Fire-Safety-Suppression-Activity-Guide-Final.pdf https://www.cityofberkeley.info/uploadedFiles/Fire/Level_3_-_General/CityWide%20Evac%20Map%2009-19.pdf

El Cerrito	Website with emergency preparedness information El Cerrito – Kensington Wildfire Action Plan	Tips for storing water, making an emergency plan, and building an evacuation kit Information on joining local CERT teams and news on local threats, including PG&E public safety power shutoff events Updates on hazard mitigation in the community along with a list of educational outreach programs Appendix to the Contra Costa Countywide Community Wildfire Protection Plan that encourages developing evacuation plans, exercising evacuations through drills, identifying evacuation routes and shelters, and collaborating with CERT and Red Cross to develop neighborhood evacuation plans (combined with Kensington) https://www.el-cerrito.org/572/Get-Ready---Emergency-Preparedness https://www.el-cerrito.org/1357/Fire-Hazard-Mitigation-Updates http://www.diablofiresafe.org/pdf/El%20Cerrito%20Kensington%20Wildfire%20Action%20Plan%202017.pdf
Albany	Website with emergency preparedness information Local Hazard Mitigation Plan	Link for signing up for AC Alert and list of items for a basic disaster supply kit Information on maintaining disaster supply kit and where to place kits Hazard analysis, risk assessment, and mitigation strategies and action plans Additional information about CERT programs, block captain programs, and other disaster preparedness websites https://www.albanyca.org/departments/fire-department/disaster-preparedness https://www.albanyca.org/home/showdocument?id=38867
East Bay Regional Park District	Website with emergency preparedness information Guide and postcard on preparedness	Wildfire protection postcard and guide with information on maintaining defensible space, current park district firefighting actions and programs, equipment descriptions, and map of park zones Additional emergency response information including information on the Hills Emergency Forum Web page with current fire warnings, fire safety tips, and weather https://www.ebparks.org/civicax/filebank/blobdload.aspx?blobid=32397 https://www.ebparks.org/civicax/filebank/blobdload.aspx?blobid=32396 https://www.ebparks.org/about/fire/be_prepared_wildfire_season_in_the_east_bay.htm https://www.ebparks.org/parks/fire_warning.htm

Richmond	Community Guide to Emergency Preparedness Website with emergency preparedness information	Preparedness tips for earthquakes along with list of supplies for disaster kit Additional tips for families, seniors, and individuals with access and functional needs Details on the community warning system, including sirens for chemical hazards Links to other useful preparedness sites and business emergency planning guidelines. https://www.ci.richmond.ca.us/DocumentCenter/View/7172/RFD-Community-Guide-July2019?bidId= https://www.ci.richmond.ca.us/206/Office-of-Emergency-Services
Lafayette – Moraga – Orinda (Lamorinda)	Moraga Emergency Operations Plan Moraga – Orinda Fire District website Lamorinda Resident Guide to Wildfire Preparedness and Evacuation Lamorinda CERT website	Registration and database information for seniors and individuals with special needs who may require additional assistance while evacuating (Orinda) Information on reducing wildfire fire risk on properties including the Firewise Program with educational outreach and action plans for wildfire reduction (Moraga and Orinda) Maps for very high fire hazard severity zones (Moraga and Orinda) Evacuation zone maps with descriptions, special concerns, critical sites, evacuation routes, critical traffic control posts, and collection areas for each zone (Moraga) Evacuation planning document with checklist of emergency supplies, guidance on helping neighbors and animals evacuate, and how to evacuate (Moraga) Full emergency operations plan (Moraga) In-depth guide for wildfire evacuations including evacuation tips on assisting neighbors, preparing animals for evacuations, and responding to a wildfire (Lamorinda) In-depth website from CERT providing information on preparedness and training (Lamorinda) Evacuation maps for all three cities (Lamorinda) Map of trails for pedestrian evacuations (Lafayette) Note: Recent evacuation drills have been conducted in the area to prepare for wildfires http://www.mofd.org/services/emergency-preparedness https://cityoforinda.org/DocumentCenter/View/1878/Evactuation-Planning-Doc?bidId= https://police.moraga.ca.us/documents/Wildfire.pdf https://police.moraga.ca.us/documents/Evacuation%20Plan%20Zones.pdf https://lamorindacert.org/resource/evacuate/ http://cityoforinda.org/DocumentCenter/View/1690/FinalDraft_Orinda_20170807

Oakland	Website with emergency preparedness information	Preparedness tips for multiple potential hazards Information on training for business emergency preparedness, testing of outdoor sirens, and signing up for alert systems Additional information on Communities of Oakland Respond to Emergencies (CORE) and the Disaster Preparedness Council (OESDPC) http://www2.oaklandnet.com/government/o/OFD/s/EmergencyPreparedness/index.htm https://www.oaklandca.gov/topics/emergency-preparedness http://www2.oaklandnet.com/oakca1/groups/fire/documents/report/oak031846.pdf

5) Academic Review of Wildfire Evacuations

We briefly review relevant wildfire evacuation literature for Kensington on wildfire evacuation behavior (both quantitative and qualitative), policy, and traffic modeling.

5.1) Quantitative Wildfire Evacuation Behavior Research

Despite significant academic work on hurricane evacuations, wildfire evacuation research remains limited, especially behavioral research. Early work on wildfire evacuation behavior has focused largely on the decision to evacuate or stay. Fisher III et al. (1995) presented descriptive statistics on the Ephrata Fire in Pennsylvania, finding that those who evacuated typically received mandatory evacuation orders, were contacted frequently, thought past orders were accurate, and had children in the household. Benight et al. (2004) also focused on descriptive statistics using revealed preference data, finding evacuees used a variety of sources for information. Respondents also stated that false alarms had little impact on their decision-making and that in future events, they needed more accurate, detailed, and updated maps to make their evacuation decision. Recent work has found that a sizable number of people were willing to stay and protect their home in a future wildfire throughout the fire while a high number of people were likely to do as much as possible to defend their home and then evacuate (McCaffrey and Winters, 2011). The research indicated that homeowners may be spending more time on mitigation measures than disaster planning. Indeed, wildfires lead to significant "defending" behavior, where residents stay to fight the fire. This is a popular technique in Australia, especially given strong policies that encourage the "stay and defend or leave early" (SDLE) approach (McCaffrey and Rhodes, 2008). McCaffrey and Rhodes (2008) provides an additional

review of the subject, including the feasibility of this approach for the United States. The research determined that while the context of most United States wildfires would render the SDLE approach inappropriate, some situations may require the approach in certain localities. We note this, especially in the case of Kensington, where home values may increase willingness to stay and defend. Table 2 presents results from discrete choice analysis studies (statistical models that identify factors that influence choices) of wildfire behavior, all on the decision to evacuate, stay, or defend.

Table 2: Review of Discrete Choice Studies on Wildfire Behavior

Authors (Year)	Wildfire(s)	Key Location(s)	N	Increases Likelihood to Evacuate	Decreases Likelihood to Evacuate
Mozumder et al. (2008)	Hypothetical	East Mountain, Albuquerque, New Mexico	1018	Concern of wildfire impacting home Females Democrats Expecting to stay at a hotel/motel Expecting to stay with friends	Owning stock animals High number of amenities in the area (e.g., access to water)
Paveglio et al. (2014)	Hypothetical	Flathead County, Idaho	734	Females Part-time residents Household income above $100,000	Created a water supply for firefighting
McLennan et al. (2014)	Hypothetical	Southeastern Australia	584	Self-efficacy (i.e., ability to leave) Response Efficacy (i.e., leaving would be the safest option) Attitude (i.e., leaving would increase my chances to survive) Subjective norms (i.e., close peers would prefer me to evacuate) Perceived behavioral control (i.e., option to leave is under my control) Self-determination (i.e., opinion to defend wouldn't impact me)	Self-efficacy (i.e., ability to defend) Susceptibility to threat (i.e., lower chance of serious injury while defending) Attitude (i.e., defending would increase my chances to survive) Self-determination (i.e., the opinion of others to leave would have little influence on my decision)

Strahan (2017)	Perth Hills Bushfire (2014); Adelaide Hills Bushfire (2015)	Perth Hills, Australia; Adelaide Hills, Australia	429	Received warnings from authorities Home would be damaged or destroyed Evacuating is the best way to protect myself Little to no cost of evacuating Media has a responsibility for protecting me and property	Defending is the best way to protect my property Knowledge is needed to evacuate Belief that neighbors have responsibility for protecting me and property Media has knowledge, is informed, and provides helpful fire information
McCaffrey et al. (2018)	Sample of respondents threatened by fire in past three years	Horry County, South Carolina; Chelan County, Washington; Montgomery County, Texas	759	Evacuation efficacy (i.e., evacuating will decrease odds of being harmed and losing home) Received a voluntary evacuation order Receive a mandatory evacuation order Unwritten disaster plan Official cues (i.e., learning about evacuation orders and having authorities tell me to leave) High financial risk attitude High property risk perception	Defense efficacy (i.e., defending will decrease odds of being harmed and losing home) High preparedness knowledge High physical cues (i.e., visual fire threat) General risk attitude High risk perception for family's safety Higher household income
Toledo et al. (2018)	Haifa Wildfire (2016)	Haifa, Israel	516	Younger age (under 35) Older age (55 and over) Young children in the household Larger households Fire risk	Pets in the household Low and very low income Very high income

Wong et al. (2020)	December Southern California Wildfires (2017); Carr Wildfire (2018)	Ventura, Santa Barbara, Los Angeles counties, California; Shasta County, California	226; 284	Received a mandatory evacuation order Extreme worry of fire speed Utility loss likelihood Injury/death likelihood Children present in household Female Younger age (under 35) Older age (65 and over) Higher level education degree	Worry about cost of housing Work requirements (somewhat mixed) First responder availability likelihood Pets in the household Homeowner Very low income Long-time resident (more than 10 years) Previous evacuee Frequent experience with wildfires

Descriptive statistics have also been used to indicate how evacuees versus non-evacuees respond to evacuation messaging and information (McCaffrey et al., 2013). Evacuees more often sought information compared to non-evacuees but were less satisfied with evacuation and road closure information. In addition, several papers offer literature reviews on the community impacts of wildfires on communities along the Wildland-Urban Interface (WUI) (Kumagai et al., 2004), the feasibility of a stay and defend strategy in the United States (McCaffrey and Rhodes, 2008), the social context for the stay and defend strategy in Australia (McNeill et al., 2015), and wildfire evacuations including the behavioral factors that impact decision-making (McLennan et al., 2018). McLennan et al. (2018) is currently the most in-depth and systematic review of literature in the wildfire evacuation field.

5.2) Qualitative Wildfire Evacuation Behavior Research

Some research in the wildfire evacuation field has collected qualitative data on evacuation behavior through interviews and focus groups (see Johnson et al., 2012 for a short overview). These studies are summarized in Table 3 with relevant conclusions for Kensington. A number of these studies also contain policy-relevant recommendations and conclusions. We also provide conclusions from additional research that did not collect

quantitative or qualitative data, focusing rather on developing frameworks and policy for wildfires. The research is summarized in Table 4.

Table 3: Review of Qualitative Studies on Wildfire Behavior

Authors (Year)	Topic	Key Location(s)	Key Conclusions
McGee and Russell (2003)	Preparedness	Rural Australia (North Central Victoria)	Long-time residents were generally more prepared due to social networks, previous experience, and involvement in local fire brigades. Agency involvement and directives encouraged community preparedness, which led to year-round preparation, especially for those who wanted to stay and defend. Demographics within communities should be monitored as groups respond differently to community adaption programs and communication.
Taylor et al. (2005)	Information and Communication	Bridge Fire (2003) in the San Bernardino Mountains, California	Individuals relied on multiple local sources (including social contacts) for severity, size, and direction of the fire. Generalized information was of little value to at-risk individuals. News media was often viewed as inaccurate for evacuation purposes. The Incident Management Team should distribute information as broadly as possible in real-time. Local-information networks should be established and encouraged to communicate directly with fire crews.

Cohn et al. (2006)	Information and Communication	Hayman Fire (2002) in Teller County, Colorado; Rodeo-Chediski Fire (2002) in Northern Arizona; Bucksnort/Cave Gulch Fire (2000) in Helena, Montana	Officials and evacuees emphasized the need for clear communication and evacuation time estimates for residents. Electronic communication should be reinforced with verbal, written, and door-to-door notices. Specific information on evacuation status and the level of impact gives residents time to confirm evacuation orders. Real-time information on the evacuation and post-fire impact was useful for evacuees. Escorted trips into impacted areas reduced unauthorized entries and reassured property owners. Evacuees should be prepared to be away from homes upwards of two weeks after the fire.
Goodman and Proudley (2008)	Social Context	Wangary Fire (2005) in South Australia	Preparedness should not only focus on actions but on the roles taken by members of the household in defending and/or evacuating. Individuals with prior fire experience more readily recognized visual fire cues, sought information from informal networks, and had home defense for fires.
Paveglio et al. (2010)	Alternative Strategies	Wilderness Ranch, Idaho	Alternative evacuation strategies (e.g., staying and defending) are highly place-based and their success is dependent on structural/physical and social characteristics of the community. Alternatives can differ vastly between jurisdictions and the development of the strategies must involve significant interaction between the community, emergency managers, and fire officials to determine all available options and promote informational exchange on preparedness and training. Self-reliant communities and those with a diverse mix of skills and abilities are better positioned to take over some firefighting responsibilities and develop alternative strategies.

Stidham et al. (2011)	Information and Communication	Black Crater Fire (2006) in Oregon; Blue Springs Fire (2005) in Utah	Long-term relationships between homeowner associations and authorities (including federal authorities) produced effective communication channels for evacuation orders. Up-to-date and detailed information on fire progression provided reassurance to evacuees. Uncertainty was one of the primary stressors for evacuees. Without communication and transparency, fire management was blamed for some damages and persistent rumors led to distrust and resentment towards local officials.
McLennan et al. (2012)	Behavior	Murrindindi Wildfire (2009) in Victoria, Australia	People were more likely to stay and defend if they had a prior commitment to a defending plan and believed that it was too late to evacuate. A significant number of people who attempted to stay and defend still had to flee, indicating that defenders need alternate plans. People were more likely to leave due to a trigger event that significantly increased fire threat, when they had knowledge of others leaving, or received information about the location of the fire from trusted sources.
Cote and McGee (2014)	Social Context	Mt. Lorne, Yukon, Canada	A significant number of individuals intended to stay and defend in a wildfire, despite lacking knowledge of how to defend property. Agencies should more proactively work with residents to help them understand wildfire risks and prepare to stay or evacuate. Livestock loss was a major concern for rural residents, encouraging staying rather than evacuating.
McCaffrey et al. (2015)	Social Context	Painted Rocks, Montana; Ventura County, California; Santa Barbara, California; Santa Fe, New Mexico	The primary concerns about evacuations were the potential for a late evacuation and the logistical costs of an evacuation. Alternative evacuation strategies (i.e., staying and defending) were seen to reduce logistical costs, increase homeowner control, and augment firefighting capabilities. Staying and defending approaches were viewed as full of unknown risks by officials. Residents (unlike officials) believed community members could understand the nuances of staying and defending.

Table 4: Review of Wildfire Policy and Framework Literature

Authors (Year)	Topic	Key Location(s)	Key Conclusions
Keeley et al. (2004)	Lessons Learned	Southern California	Massive wildfires have occurred previously in many fire-prone areas and future planning should focus on the cyclical nature of fires. Traditional fuel breaks or fuel reductions will not stop large fires in extreme weather events and fuel manipulation should focus on creating safe and defensible space for firefighters. Future development should recognize that wildfires in California are natural events and fire management is severely limited in preventing, slowing, and stopping wildfires.
MacGregor et al. (2007)	Risk Perception Framework	Western United States	Agencies seeking to change self-protective behavior should focus on the unique socio-cultural characteristics of their local jurisdictions. Risk-related interventions (i.e., media events, programs, brochures) increased public awareness of risks. Interventions to change attitudes and behavior should be both long-term and targeted to specific populations.
de Araujo et al. (2011)	Traffic Control Framework	Colorado Springs, Colorado	Contraflow operations are only necessary for the most constrained neighborhoods with severe bottlenecks. Baseline strategies such as egress route restriction to evacuation traffic and entry restriction of non-emergency responders into areas was enough for most neighborhoods. Evacuation zones should be developed along fire lines with distinctive geographical differences.
Mutch et al. (2011)	Communication Framework	Painted Rocks, New Mexico; Rancho Santa Fe, California	Most policy in the United States has focused on evacuations, not on alternative strategies such as staying and defending. Several U.S. areas have implemented the "Prepare, Go Early, or Stay and Defend" strategy that is popular in Australia.

			Recent devastating wildfires in Australia require further examination of the feasibility and life-saving ability of strategy for the U.S. context.
Paveglio et al. (2012)	Alternative Evacuation Strategies	Australia and United States	Populations in high-risk areas do not implement personal mitigation measures, even though they know about possible actions. Both evacuation and alternative strategies require clear and targeted messages for different populations. Translating nationally consistent preparedness campaigns (such as "Ready, Set, Go" and "Prepare, Act, Survive") tend to leave out unique local characteristics. Disinvestment in alternative strategies may reduce fire mitigation behaviors, while wildfire approach and terminology changes may decrease trust of fire management.
Woo et al. (2017)	Lessons Learned	Fort McMurray, Alberta, Canada	Traffic analysis indicated that wildfire evacuations followed an S-curve and that evacuations occurred quickly within twelve hours. Contraflow operations increased capacity, but additional route management could have reduced congestion. Contraflow operations need to be preplanned to reduce unsafe traffic situations and ensure emergency vehicle access. The success of air transportation (upwards of 23,000 evacuated by air convoys) suggests that a multi-modal approach could be highly beneficial for sparse geographical areas.

5.3) Wildfire Mapping and Traffic Modeling

Finally, a significant amount of research on wildfire evacuations has also focused on simulations that incorporate GIS mapping techniques, traffic simulations, and fire spread models. Since wildfires are heavily localized, early work focused on neighborhood-based simulations that mapped potential response and routing scenarios (Cova and Johnson, 2002). Other work identified evacuation trigger points – points at which an evacuation should be ordered – based on the characteristics of the wildfire (Cova et al., 2005). Much

of this work has been expanded to consider buffer zones around these trigger points (Dennison et al., 2006; Larsen et al., 2011; Li et al., 2015), assessing clearance times from neighborhoods (Wolshon and Marchive, 2007), adding dynamics between fire spread and warnings into simulation methods (Beloglazvov et al., 2016), and leveraging machine learning in an experimental setting to simulate evacuee decision-making (Nguyen et al., 2018). From the perspective of the incident commander, work has been conducted on identifying which households should evacuate, shelter-in-place, or shelter-in-refuge (Cova et al., 2009; Cova et al., 2011). Fundamental research has also been conducted on identifying high-risk neighborhoods across the United States with high ratios of households-to-exits (Cova et al., 2013). For Kensington and Zonehaven (a local consulting firm), some of this literature may be beneficial in developing a simulation for evacuations. Specifically, identifying trigger points for issuing mandatory evacuation orders and areas with a high ratio of households-to-exits will be instrumental for a future evacuation plan.

6) Methodology

Using the literature review, we developed a methodology to conduct a field survey of Kensington street conditions and analyze the Kensington street network.

6.1) Kensington Field Survey Methodology

In Fall 2019, we conducted a field survey of Kensington street conditions to capture a "worst-case" scenario for a wildfire evacuation. We determined that a "worst-case" scenario would occur at night when most of the population would be home and parking occupancy along streets would be highest. Populations would also be higher during the weekday (as opposed to a weekend) due to weekend travel and vacations. Consequently, we collected data on weekdays (Monday through Thursday) between the hours of 5:00 and 8:00AM or between the hours of 8:00 and 11:00PM. A final day of collection occurred during the daytime to qualitatively assess paths and stairs and gather additional visual evidence of key bottlenecks.

Using the OSMnx Python package, OpenStreetMap data was extracted for the Kensington area. As Kensington is unincorporated and therefore cannot be queried conventionally in OpenStreetMap, a polygon was generated corresponding to Kensington's approximate area by subtracting the Richmond and El Cerrito municipal areas from the Contra Costa

County urbanized area polygon. Comparison with Google's representation of Kensington reveals a good match, minus some territory within the Tilden Nature Area.

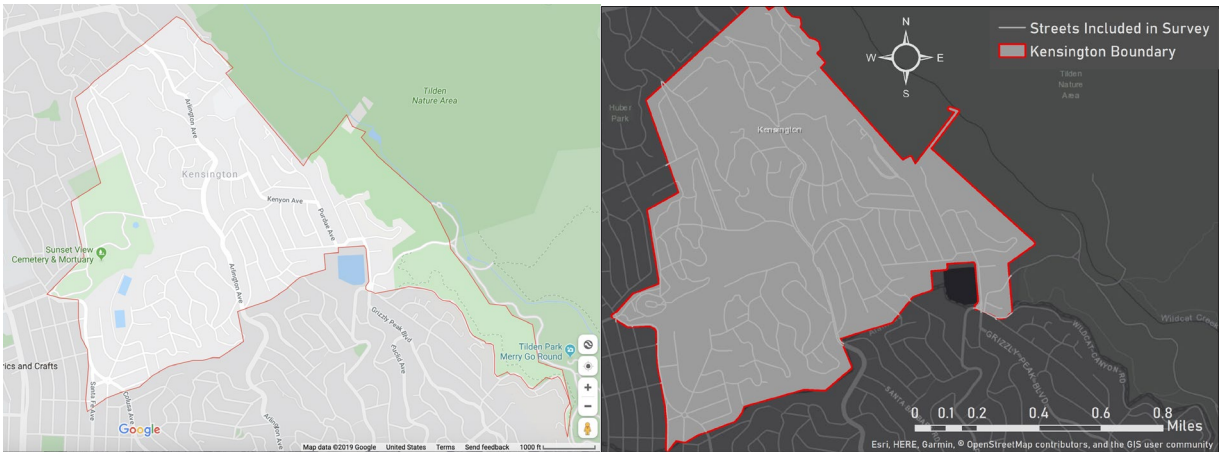


Figure 1: Comparison of Google (left) and Python-generated (right) representations of Kensington. The only significant difference is the removal of an unpopulated section of the Tilden Nature Area, which is outside the Contra Costa County Urban Limit Line.

The Kensington polygon was subsequently used to extract a street network from OpenStreetMap, initially corresponding to only drivable public roads. This resulted in some inconsistency in the incorporation of smaller and/or private roads in the study, as many of these were not initially captured in the network extract. Some were added on through the process of data collection while others were left off. In general, explicitly marked private roads were excluded from the study. While this presents some data gaps, these roads are almost universally dead-ends and are less relevant to the study's primary goal of identifying evacuation routes and key bottlenecks. Additional challenges were encountered near borders due to edge-effects of the network download. In some cases, the network was cleanly ended at the Kensington border; in others, the network had to be modified in order to extend to the nearest intersection. For the case of Colusa Avenue, a ~20ft segment of each cross street to the west of Colusa was included, even though these streets are most likely within El Cerrito city limits. As part of our data collection process we divided Kensington into four quadrants, excluding the cemetery (Figure 2). References regarding these quadrants (Northeast, Northwest, Southeast, and Southwest) will be made throughout the following sections for orientation. These quadrants do not necessarily demarcate neighborhoods, but they do serve as potential examples for a zone-based evacuation plan that allows for zones to leave at different times.

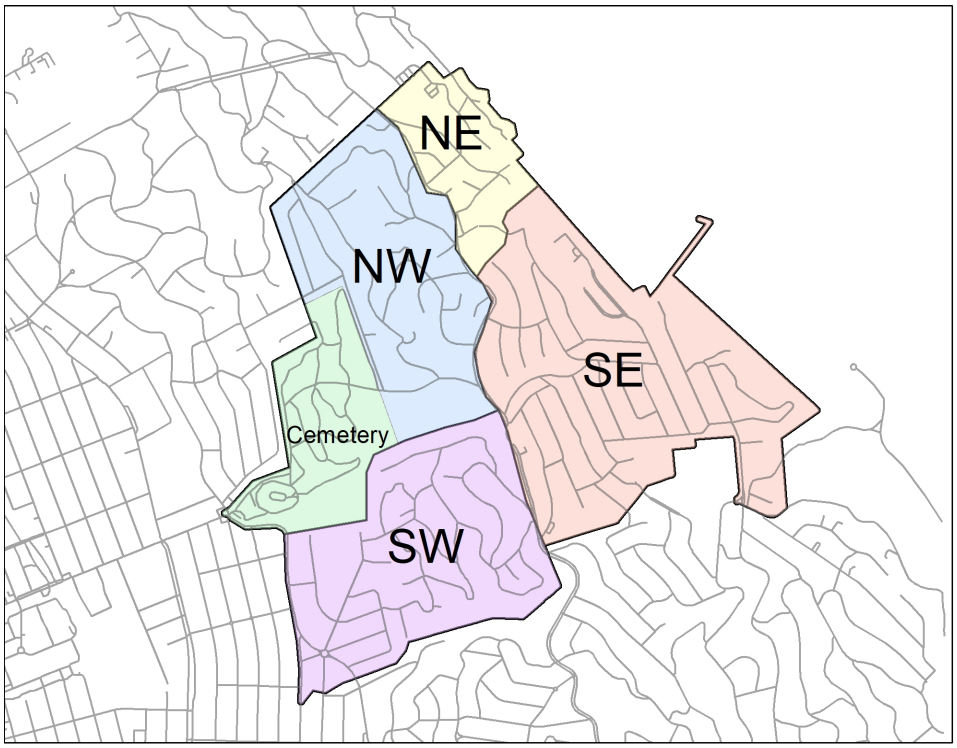


Figure 2: Kensington quadrants for data collection.

6.2) Data Types

The downloaded street network was then used to create data tables of all links (street segments) and nodes (intersections, including dead ends) in the network. For each link in the network (i.e., road between two nodes or points), we captured field conditions to that would likely impact evacuation planning and transportation response. The consulting team also contacted Zonehaven to request any additional data needs. However, the company did not require any additional data to perform their analysis of Kensington.

Table 5: Data Types for Kensington Field Survey

Link Data	
Variable	**Justification**
End street names	Block identification
Number of parked vehicles on each side	Parking occupancy and potential bottlenecks
Minimum street width (ft)	Potential bottlenecks

Maximum street width (ft)	Streets for contraflow or emergency responder access
Number of locations with street width under 20 feet (lane width under 10 feet for one-way segments)	"Pinch points" - road capacity and potential restrictions
Number of lanes	General road capacity
Single lane roads	Flag for single lane roads and direction of traffic flow
Centerline markings	Potential evacuation routes and clearly marked roads
Presence or absence of sidewalks on each side	Pedestrian routes and sidewalk usage for vehicles
Steep gradients	Potential evacuation routes and challenging locations for first responders
Speed limits	Potential evacuation routes and travel time for traffic simulations
Vegetation fuel levels (tree cover and underbrush)	Unsafe evacuation routes
Intersection Data	
Variable	**Justification**
Cross-street pair	Intersection identification
Traffic control measures	Traffic operation needs during evacuation

Figure 3: Data collection activities for the Kensington Field Survey.

Data collection (pictured in Figure 3) was undertaken in teams of 2-3 individuals on weekday mornings (5-8AM) or late evenings (8-11PM) when parking levels on residential streets were likely to be highest. When possible, efforts were made to collect data closer to the middle of the week to further avoid reduced parking counts. While collecting data during off hours does undercount parking usage in commercial districts, the vast majority of streets in the study are residential in nature and thus determining the "worst case" residential parking count was prioritized. For each segment, the team measured the available right-of-way at the qualitatively determined narrowest point, occasionally repeating the measurement if a narrower point was subsequently identified. A similar process was used for identifying the maximum segment width. Much of the survey was done on foot to avoid missing important details; however, some segments were assessed from a vehicle with quick stops to measure segment widths.

6.3) Network Analysis Methodology

As part of this study, we are assessing not only current conditions but also likely routes for evacuation. A closest facility model was used with the Network Analyst tool in ArcGIS. The model spatially assigns "incidents" to the closest "facilities" via the shortest route. In this scenario, the incidents are the nodes simulating Kensington's population and the facilities are the designated exit routes. Most lots across Kensington are similar in size and contain mostly single-family houses, so we assume equal distribution of population for the network analysis. Nodes, including intersections and dead ends, were used as origin

points. A total of 158 nodes were used as shown in Figure 4. Nodes were removed in Sunset View Cemetery and at complex intersections that contained multiple nodes, such as Colusa Circle and along Arlington Avenue where divided segments frequently doubled the number of nodes present. As of 2017, the population of Kensington is 5,575 with 2,801 households based on the American Community Survey 2017 5-year estimate (U.S. Census Bureau, 2019). Each node therefore represents roughly 35 people or 18 households. Kensington households on average have 2.12 vehicles. The number of cars each household takes in the event of an evacuation will change the traffic load on Kensington roads. For robustness, we considered 1.5, 2.0, and 2.5 vehicles per household.

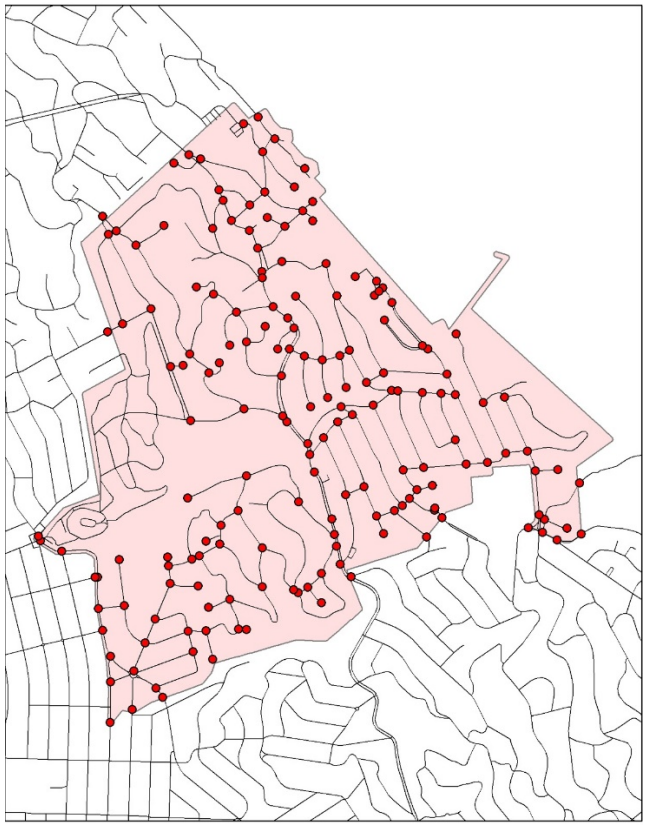


Figure 4: Origin points representing the Kensington population

There are two alternative approaches to analyzing the most heavily trafficked evacuation routes. The first is a local analysis that narrows the area of interest to Kensington. Every exit from Kensington is weighted equally. The second is a regional analysis: the underlying theory is that in the event of an emergency evacuation, evacuees will travel major regional routes to leave the area. We assume a typical route will be downhill and west and from there toward San Pablo Ave or I-80. We selected "egress points" along east-west streets (Potrero Ave, Moeser Ln, Fairmount Ave, Solano Ave, and Marin Ave) as destinations.

Potrero Ave did not appear as a destination in any of the analyses and is thus excluded from images. Local and regional egresses are shown in Figure 5.

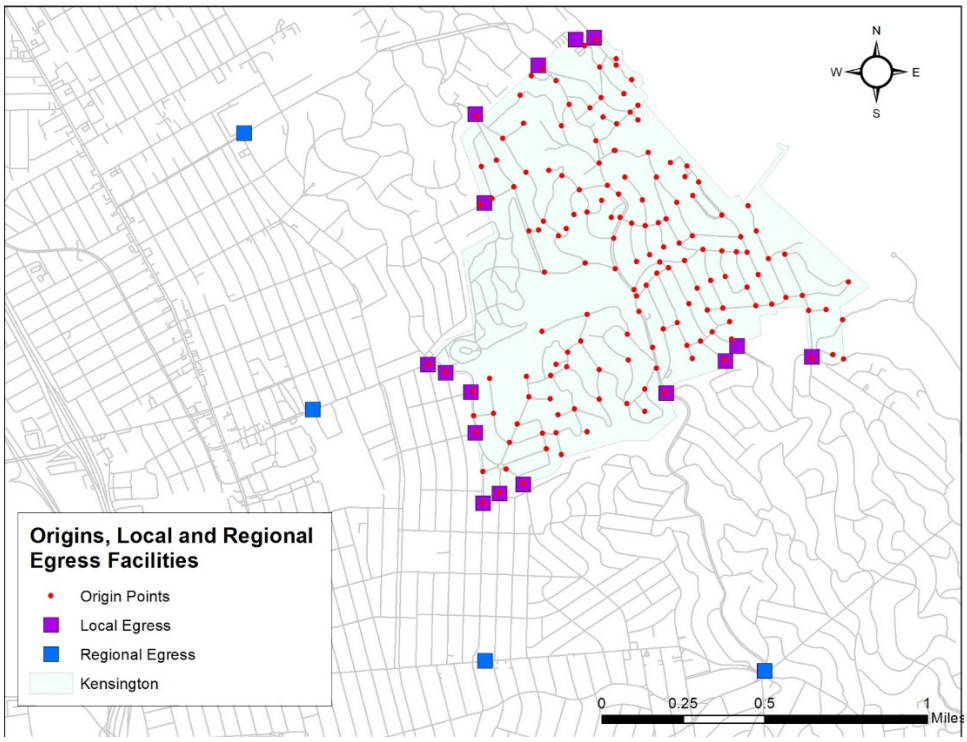


Figure 5: Origin points and egress routes

Every origin node is matched with the shortest route to the closest destination node. We calculate the number of agents (i.e., vehicles) passing along each link and through each intersection. Links with the most agents are classified as critical evacuation routes. We then analyze these routes in the context of the field survey to determine the most appropriate evacuation routes that should be designated by Kensington officials. Most importantly, we identify key streets and intersections that may require transportation response, traffic control, personnel placement, improved infrastructure (e.g., improved gutters or stop control), and/or regulations (e.g., restricted parking) to improve evacuation outcomes.

Because the nodes are not population-weighted (neighborhoods with more nodes produce more evacuees under the current model assumptions), the network analysis does not perfectly predict traffic loads on each link and intersection. Nonetheless, the analysis provides: 1) information on the shortest path from each node to the nearest egress point, and 2) directional information on which routes are likely to see more traffic, as node density is not entirely uncorrelated from population density.

There is currently no vehicular access through Sunset View Cemetery from Kensington (see section 7.1.8 for details). As access to the cemetery was thought to have a potentially significant impact on evacuation route choice, scenarios were tested with and without vehicular access to the cemetery from Kensington. The above network analyses also assume that all exits in Kensington are available to evacuees. However, in the event of a wildfire that originates north of the community and a fire that originates southeast of the community (or spreads from Berkeley), some exits are likely to be blocked. Consequently, we also conducted a Northern Wildfire scenario and a Southeastern Wildfire scenario. These two scenarios will help Kensington officials better understand how the origin of a wildfire might impact the network and associated transportation response.

7) Results

7.1) Field Survey Analysis

The field survey covered approximately 250 street segments and 200 intersections, comprising most of the public road network in Kensington. As mentioned previously, some private thoroughfares were omitted, and some additional segments were included to better understand potential exit paths. The following sections provide an overview of the findings. Appendices C.1 and C.2 contain the full data for each segment and intersection, respectively. To preface the results, centerline markings as identified by the survey are displayed in Figure 6. Centerline markings were found to be a good proxy for "major routes" that are likely to see the heaviest use during an evacuation, except for Garden Drive, whose median is more attributable to geography than network importance. In contrast to the streets lacking centerline markings, the marked streets were generally wider and had fewer obstructions to travel, though significant exceptions could be found.

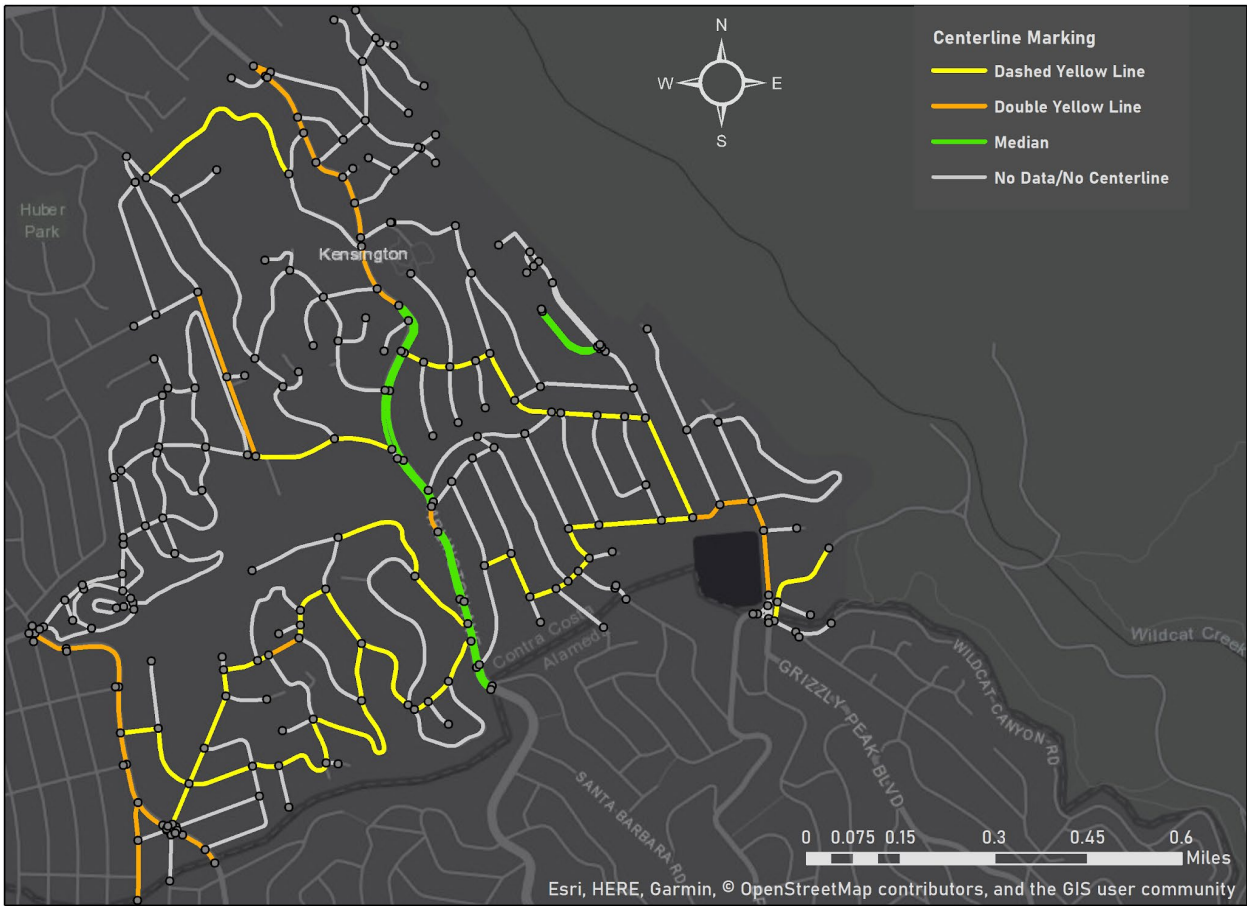


Figure 6: Centerline markings on study segments.

Nonetheless, this map allows for identification of several major routes that will be discussed later in the analysis. In terms of north-south routes, Colusa Avenue in the west, Arlington Avenue in the center, and Grizzly Peak Boulevard in the east form the primary connections to and from Berkeley to the south and (in the case of Colusa and Arlington) El Cerrito to the north and west. East-west routes between Arlington Avenue and the El Cerrito border include Coventry Road, Stratford Road, Sunset Drive/Franciscan Way (continuing to Eureka Ave), and Kerr Avenue/Edwin Drive. East-west routes between Wildcat Canyon and Arlington Avenue include a southern route consisting of Beloit, Yale, and Princeton Avenues as well as a central route consisting of Purdue, Kenyon, and Westminster Avenues.

7.1.1) Street Widths

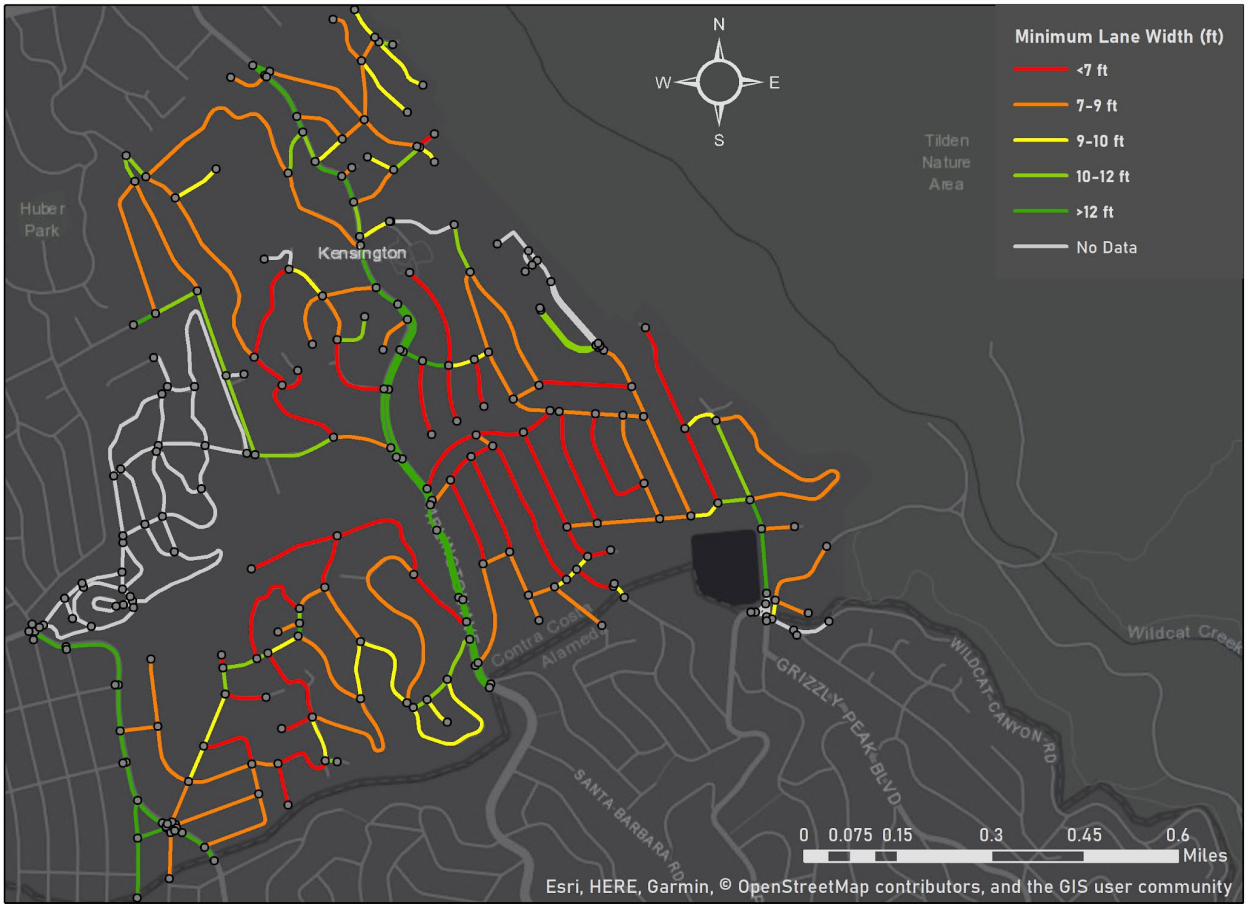


Figure 7: Minimum lane width for each segment surveyed in the study.

Lane width, illustrated by Figure 7 above, was used in order to represent both one-way and two-way streets. As the divided segments of Arlington Avenue are represented as one-way pairs (neither of which exceed 20' in width individually), using the 20' width standard derived for two-way roads would provide an exceedingly pessimistic assessment of Arlington Ave's potential as an evacuation route. Other than the divided segments of Arlington Avenue, the only other one-way segments surveyed were Edgecroft Road and Garden Drive. The former is a "true" one-way street and the latter is divided.

The purpose of gathering minimum street width (typically measured at the narrowed pinch point) is to examine the possibility of passing lanes for two-way traffic and/or emergency vehicles, as well as general difficult conditions for continuous flow of vehicles during an evacuation. However, the application of the 10' lane standard to narrow two-way roads results in "lane widths" of less than seven feet, which would not even

accommodate a passenger car. These areas can be practically interpreted as "two lane" roads that are effectively one lane due to pinch points.

A particular challenge in measuring street widths was the treatment of concrete gutters, which are common on Kensington streets given the area's hilly topography (see Figure 8). Qualitative judgement of whether gutters were "navigable" and therefore able to contribute to street width was typically made based on the ground clearance of a typical vehicle. Gutters thought to be navigable only by 4-wheel drive or high ground clearance vehicles were considered non-navigable; however, those considered "navigable" may still present challenges for very low-clearance vehicles such as sports cars. Whenever possible, an alternate criterion was employed concerning whether the *crossings* of the gutter could be traversed by a typical passenger car. Most gutters are intersected by private driveways, with several distinct typologies of crossings emerging over the course of the survey. Many driveways have "hard cutoff" crossings, which present a 6-12" vertical barrier to any vehicle driving in the gutter. Others had sloped crossings, which could allow a vehicle to travel up and over the driveway in an emergency. Additionally, some driveways contained metal grating to allow water to drain while preserving a level surface from the roadway to the curb. In general, for any segment which presented hard barriers to driving in the gutter, the gutter was considered non-navigable and was not included in the street width measurement.

Figure 8: Three variations of driveway gutter crossings: Hard edge (left), smooth edge (center), and metal grate (right).

The area with the most streets of narrow effective width was the southeast quadrant. With street widths generally between 14ft and 18ft (7 - 9ft per lane), there would be potential on major evacuation routes for both traffic back-up and an inability of emergency responders to access uphill areas. This is driven by a combination of factors (see Figure 9)

including non-navigable gutters and extensive on-street parking along already-narrow rights-of-way.

Figure 9: Cambridge Avenue, looking north from Beloit Avenue, showing a ~20′ right-of-way narrowed to a maximum width of 18′ by deep gutters (note non-navigable driveway crossings) and further narrowed to a minimum of 11′ by parked vehicles.

While Grizzly Peak Boulevard (and extending into Berkeley, Spruce Street) provides a wide, unimpeded exit route for the extreme southeastern quadrant, other routes are less easily traversed. For example, the primary east-west route (determined by lane markings) of Beloit-Cambridge-Yale- Princeton-Amherst frequently narrows to pinch points where parked vehicles block two-way traffic (see Figure 10). Other routes to the south (Vassar and Rugby Avenues) empty into narrow, winding roads in Berkeley that may also be congested with evacuees. Additionally, the presence of multiple tall trees along Rugby Ave at the county line presents the risk of this route being blocked in an emergency.

Figure 10: Beloit Avenue, looking east between Trinity and Colgate Avenues, showing extensive on-street parking, narrowing to a minimum of 16 feet and forcing multiple segments of one-way traffic. Several parking spots are already time-restricted (see right) to allow AC Transit buses to make a left turn off of Trinity Avenue during service hours.

7.1.2) Pinch Points

Closely related to the minimum street width is the existence of "pinch points" of less than 20' of effective width on two-way segments (less than 10' on one-way segments). In order to account for the different lengths of segments, a metric of "percent obstructed" was developed, in which the number of pinch points was normalized by the street width, assuming that each pinch point was the average length of one passenger car (15' was used as a representative value)[1]. The application of this metric, shown below in Figure 11, reveals a similar result to the mapping of minimum street widths.

[1] See https://www.dimensions.guide/element/honda-civic

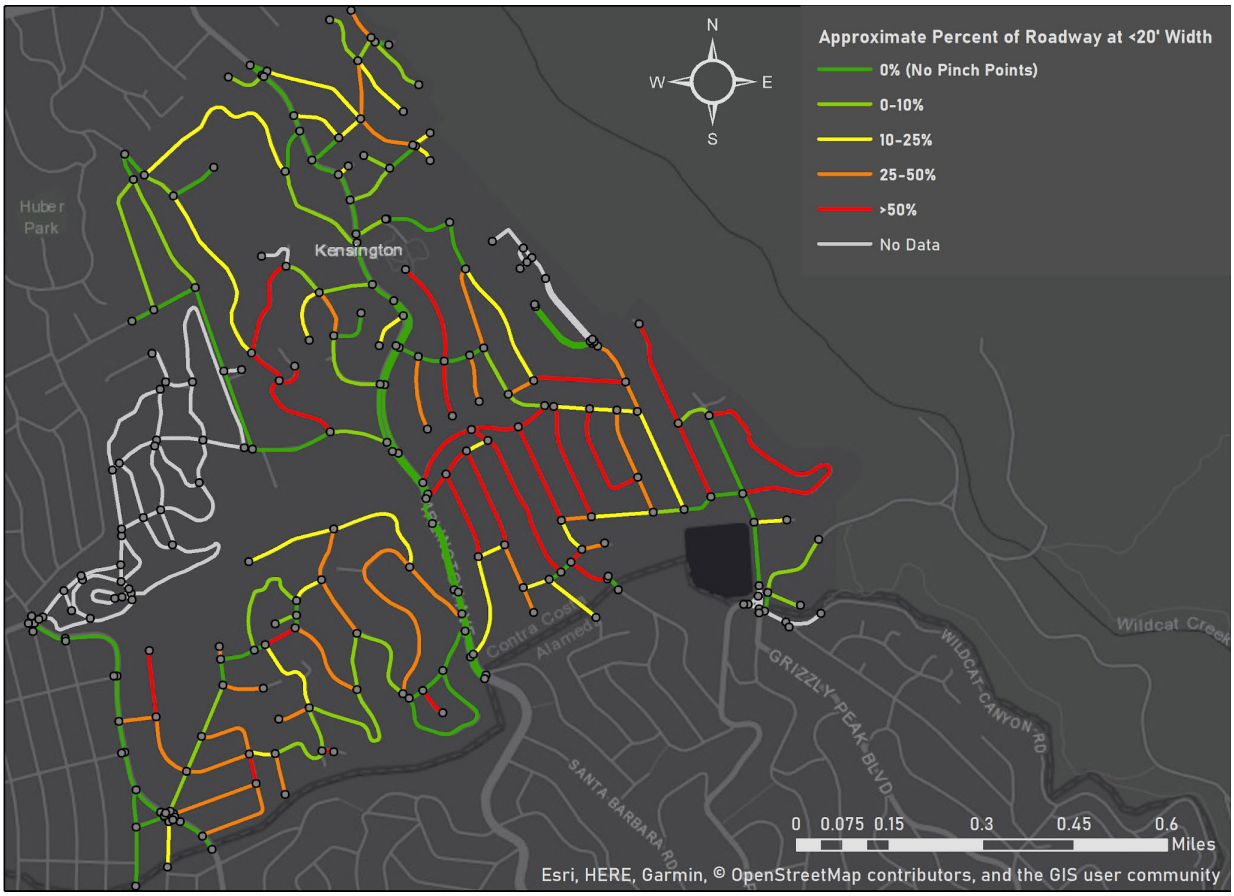


Figure 11: Percent of segment length under 20′ (10′ for one-way segments), assuming an average pinch point length of 15′ (a typical passenger car).

While the southeastern quadrant once again fares poorly, some changes can be seen between the two maps. While the northern east-west route of Kenyon Ave-Westminster Ave fares poorly on minimum street widths, it fares better in the "percent obstructed" metric, indicating that while some obstructions exist (mostly on the Kenyon portion), there is ample space for two-way traffic along the majority of this segment. Westminster Avenue fares well on both maps as a "trunk" through which the northern portion of the southeast quadrant can access Arlington Avenue.

In addition to the high-level illustration presented in the map, several specific pinch points were qualitatively noted in the study. These included Lenox Road between Beverly Road and Kingston Road (near the intersection of Public Path #5, see Figure 12), Los Altos Drive near its eastern end (see Figure 13), and Norwood Avenue near the intersection of Norwood Court and Norwood Place (see Figure 14).

Figure 12: Lenox Road between Beverly Road and Kingston Road, looking east near the intersection of Public Path #5. The minimum width of this segment was measured to be just 11 feet, which is particularly notable given that this is a through street that could serve as an egress path for many residents of Kingston Road.

Figure 13: Los Altos Drive, looking east toward the sharp bend in which it becomes Beloit Avenue, taken from Google StreetView. This area along the retaining wall is only 17' curb to curb, despite the lack of any parked vehicles.

Figure 14: Norwood Avenue, looking north at Norwood Court (left) and looking west near Norwood Place (right), taken from Google StreetView. Both of these areas are less than 20' wide curb to curb without parked vehicles present - the power pole at right imposes a 13.5' minimum width.

In addition to the pinch points identified above, several wide spots in the road network were identified that could provide useful contingency for traffic direction, staging, or turning of large vehicles during an emergency. Many of these were intersections and will be discussed in section 7.1.6, but there were several spots that occurred in the middle of street segments. At the point where Kerr Avenue becomes Edwin Drive, the roadway widens from a typical width of 23' curb to curb to a maximum of 31' (see Figure 15). Similarly, immediately north of the Alameda County line, there is a cul de sac-like feature on Vassar Avenue that could provide a staging area in the event of an emergency (see Figure 16).

Figure 15: Edwin Drive, looking west from the point at which it becomes Kerr Avenue, taken from Google StreetView. The roadway widens significantly from its 23' typical width in this area. The location is also located midway up a steep hill and adjacent to a large stand of trees surrounding the Carmelite Monastery.

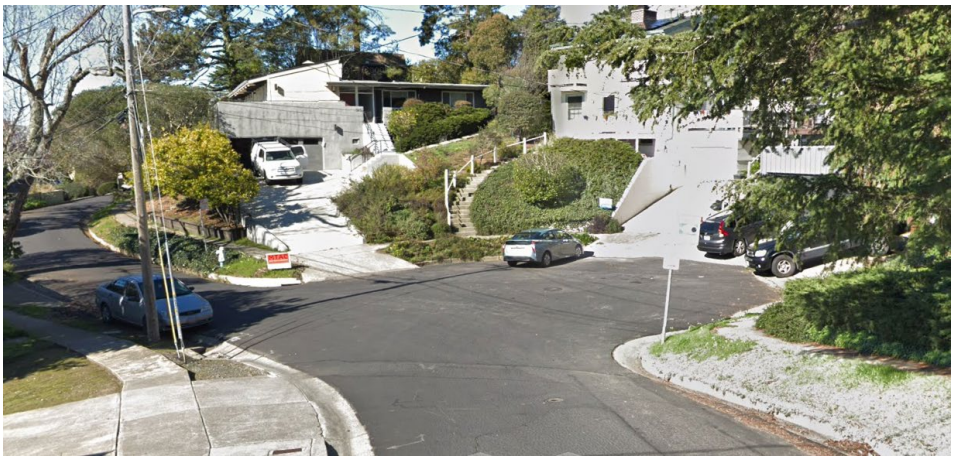


Figure 16: Vassar Avenue, looking north from the Alameda County line, taken from Google StreetView. This extra roadway could be particularly useful for passing/staging given the otherwise narrow (14-20') width of this segment.

7.1.3) Parking

Also related to both minimum widths and pinch points is the degree of on-street parking. Data was collected by counting vehicles based on whether they touched the primary road surface - vehicles could be parallel parked off the pavement and would not be counted. Motorcycles, boats, and trailers were counted as vehicles if parked within the street right-of-way. In order to normalize vehicle counts against segment lengths, a "percent parked"

measure similar to the pinch point measure was employed. As with the pinch point measure, the number of vehicles (a pessimistic sum of those parked on both sides of the street) was multiplied by a typical length of 15′ and divided by the segment length to calculate the percentage of the segment occupied by parked vehicles (Figure 17).

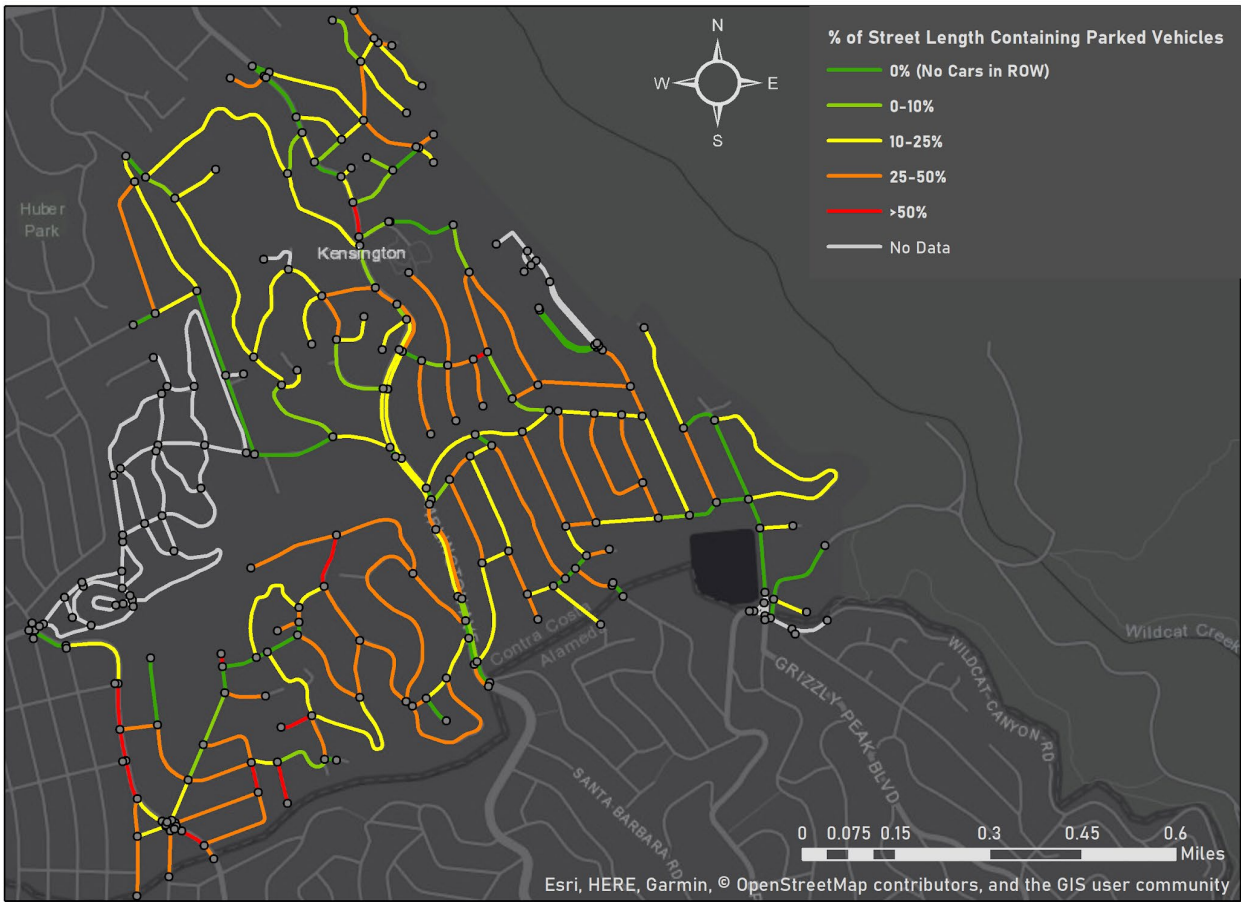


Figure 17: Percent of segment length occupied by parked vehicles, summing parking counts from both sides of a segment and assuming an average vehicle length of 15′.

Measures rarely exceeded 50%, even for densely parked streets, due to the large number of driveways that occupy much of the curb space on residential streets. The percent parked diverges from the percent under 20′ in several ways. First, on narrow streets that are almost entirely under 20′, parking may only be allowed on one side, whereas wider streets may allow parking on both sides but lack any locations under 20′. For example, the narrow streets of the southeastern quadrant fare "better" under this metric due to the lack of double-sided parking, while wide roads such as Colusa Avenue show high parking percentages but are unaffected by street width constraints. Nonetheless, the "percent parked" provides a good indicator of where parked vehicles may be found, which could

provide an indirect measure of parking demand as well as marking potential hazards in an evacuation. Even on a wide street such as Westminster Avenue or Colusa Avenue, parked cars could present obstacles under poor visibility conditions, which are likely to occur during a fire.

7.1.4) Vegetation

Another hazard to consider in evaluating evacuation routes is the presence of large amounts of vegetation that could block the egress path or contribute to the spread of a fire. In the course of the survey, vegetation was analyzed along two axes - tree cover and underbrush. Each was ranked on a low/moderate/high scale (though some segments in the southwest quadrant initially employed a yes/no scale for underbrush; these were later converted to low/high values). Ratings were subjective and potentially influenced by the sample being surveyed in a given outing and visibility (several surveying trips were done on foggy nights). Nonetheless, as a general guide, low tree cover ratings corresponded to few/no overhanging branches or large trees that could block a roadway, while high tree cover ratings typically corresponded to large numbers of overhanging branches and/or large trees in close proximity to the roadway. Moderate tree cover ratings typically corresponded to a large number of medium-sized trees near the roadway and/or a small number of large trees at one location along a segment that was otherwise clear of overhanging vegetation. Underbrush ratings were influenced by both the size and quantity of underbrush as well as whether it was located beneath trees, where it would be more likely to contribute to the spread of a fire. Examples of vegetation ratings are shown below in Figure 18.

Figure 18: Three examples of vegetation ratings, left-right: Low tree cover/low underbrush (Grizzly Peak Blvd between Beloit Ave and Kenyon Ave), moderate tree cover/moderate underbrush (Kenyon Ave between Trinity Ave and Columbia Ave), high tree cover/high underbrush (Yale Ave between Cambridge Ave and Vassar Ave, taken from Google StreetView).

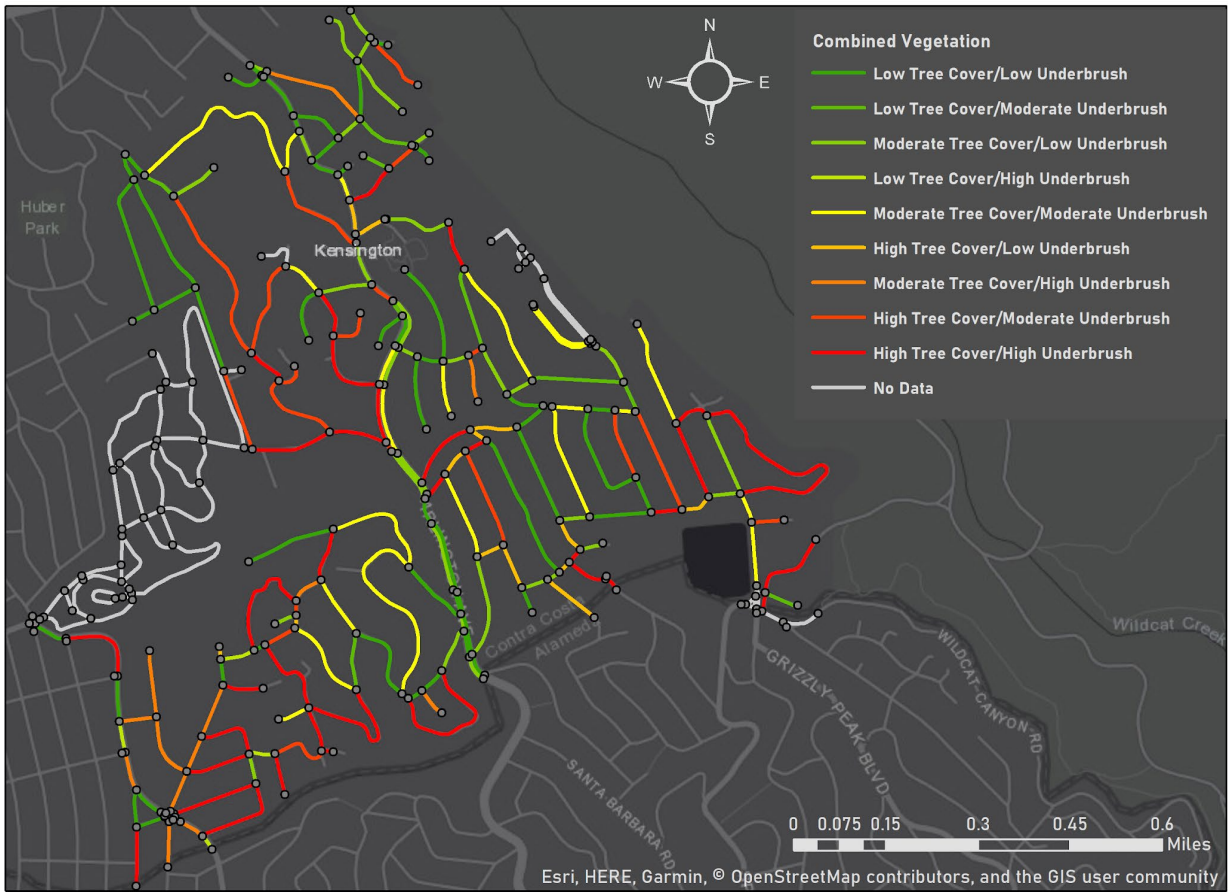


Figure 19: Vegetation ratings for the Kensington network, consisting of a nine-point combined scale incorporating tree cover and underbrush.

The two vegetation scores were combined into a nine-category scale, which was subsequently applied to the network as shown in Figure 19. In general, many streets in Kensington have significant tree cover, which poses risks to the viability of these segments during a fire. Many of the major roads (such as Arlington Ave., Colusa Ave., Grizzly Peak Blvd.) have more moderate quantities of vegetation present, but the potential for failure points remains. For example, there are large stands of trees surrounding Arlington Ave. near the Community Center and north of Sunset Drive. There are also short segments of high vegetation at the east end of Westminster Avenue and along Colusa Avenue between Curry and San Carlos Avenues. Other streets, such as Sunset Drive and Rugby Avenue, have significant vegetation along almost their entire length, which especially in the case of Sunset Drive could pose challenges to an evacuation.

7.1.5) Inclines

In addition to vegetation, inclines may also present an impediment to navigation during an emergency. Street inclines were qualitatively assessed during the survey process via a low/moderate/high scale and are presented in Figure 20 below.

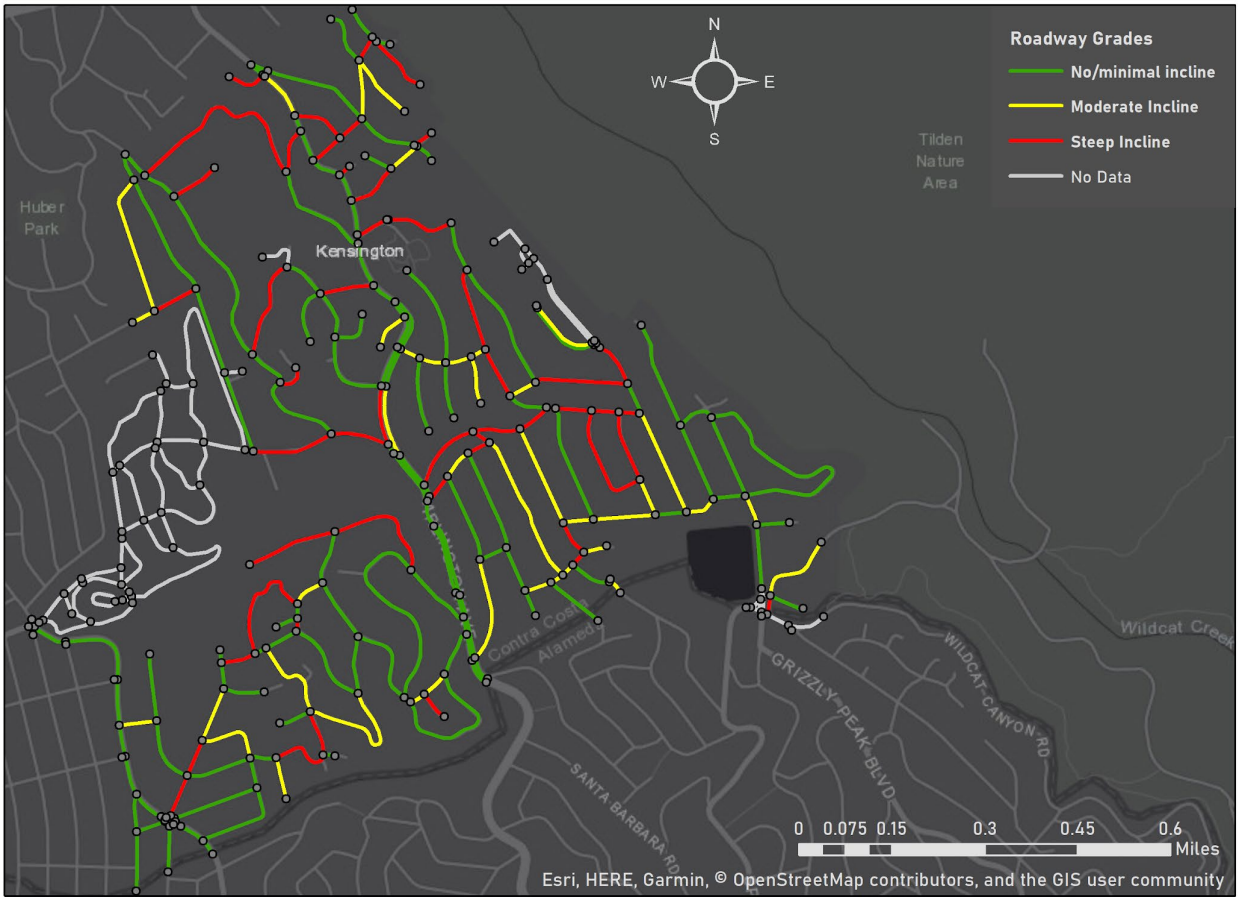


Figure 20: Road incline ratings for the Kensington network, consisting of a low/moderate/steep scale.

Unlike the case of vegetation, where one tall tree at one end of an otherwise clear segment may be cause for a 'moderate' rather than a 'high' tree cover rating, segments were generally classified as "steep" if *any* portion of the segment could be considered steep. For example, Arlington Court between Arlington Avenue and Norwood Avenue is mostly flat, but has a steep incline as it approaches Arlington Avenue (see Figure 21 and is therefore classified as "steep."

Figure 21: Arlington Court looking east toward Arlington Avenue (Google StreetView photo), showing the steep incline at the east end of an otherwise-flat segment.

7.1.6) Intersections

In addition to road segments, intersections were also assessed during the field survey. The sole variable of interest in this case was the presence of traffic control devices. For each intersection approach, the presence of a traffic control device (stop sign, yield sign, or signal) was noted and the intersection was subsequently classified based on the aggregate value for all approaches. For a full description of each intersection, refer to Appendix C.2. The intersection-level classification is mapped below in Figure 22. There were only two traffic signals in the study area - a typical signal at the intersection of Colusa Avenue and Fairmount Avenue in El Cerrito and a pedestrian beacon at the intersection of Arlington Avenue and Berkeley Park Road. All-way stops were present at several locations along key routes, most notably at the intersection of Arlington and Amherst Avenues. Partial stops (where only some approaches are stop-controlled) were more common. In general, it can be assumed that partial stops control a minor street while leaving the primary approaches uncontrolled (e.g. a partial stop on Colusa Avenue or Arlington Avenue is unlikely to affect traffic on Colusa or Arlington). Yields were present at select locations, with a mix of signage and/or pavement markings. However, the plurality of intersections (about 40%) in the study area are completely uncontrolled, with no signage or pavement markings present. While certain traffic control types such as all-

way stops could slow traffic during an evacuation, the ambiguity posed by uncontrolled intersections could present a hazard with a large number of evacuating vehicles.

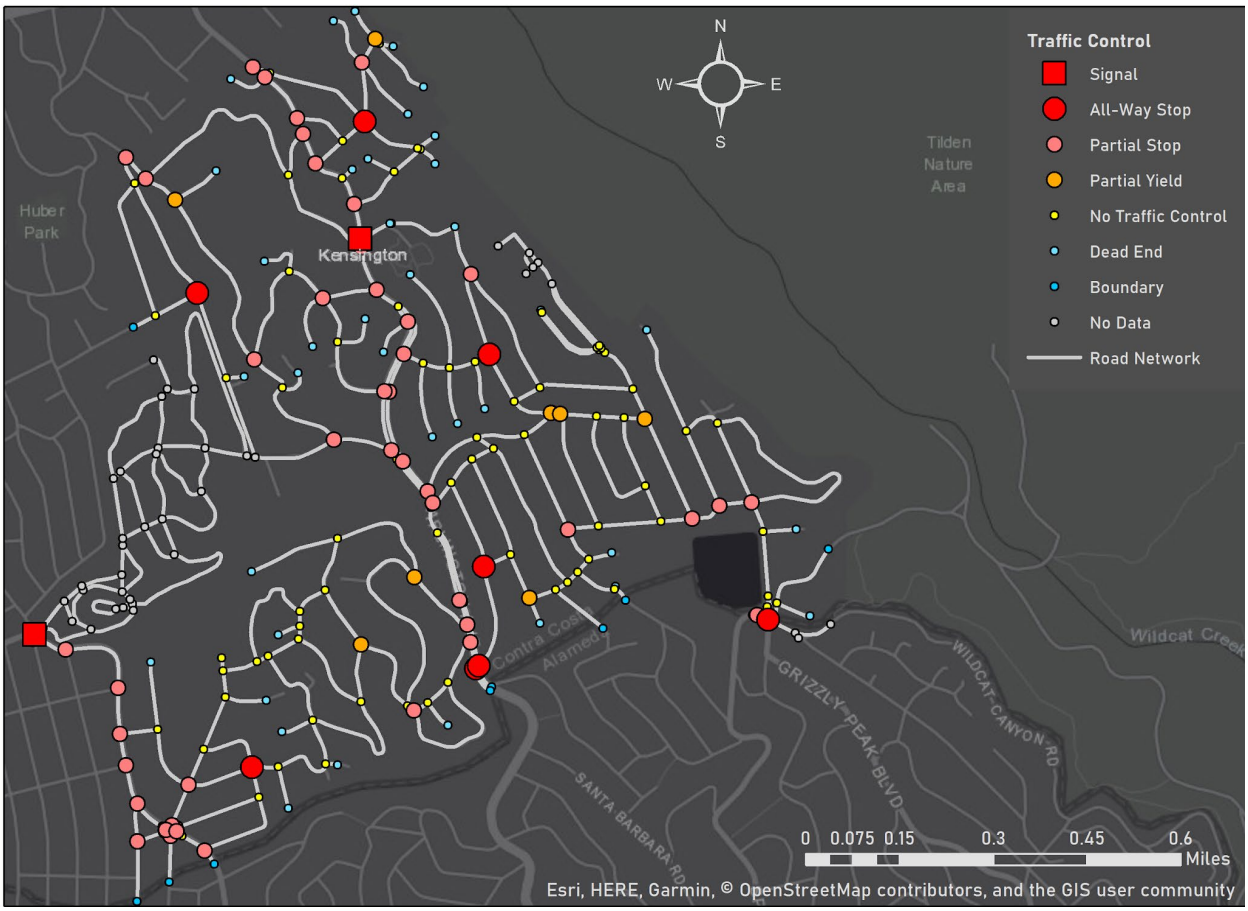


Figure 22: Map of traffic control at intersections within the study area.

Several intersections contain unconventional geometry and/or traffic control and are identified below in Figures 23-24. The intersection of Grizzly Peak Boulevard, Spruce Street, Wildcat Canyon Road, and Canon Drive at the southeastern edge of Kensington is likely to be a key node for evacuations in this area. While the intersection is large and generally has good visibility (the exception being vehicles exiting the steep ascent from Canon Drive), it's five-way geometry is unconventional. This may be a location that requires monitoring in the event of an emergency.

Figure 23: Grizzly Peak Boulevard, Spruce Street, Wildcat Canyon Road, and Canon Drive meet at this intersection that also straddles the Alameda County Line (shown here looking north along Grizzly Peak toward Kensington).

Figure 24: The intersection of Grizzly Peak Boulevard and Beloit Avenue is another key node in southeastern Kensington (seen here looking east along Beloit). This intersection is notable for a somewhat unconventional traffic control arrangement.

Further north of Grizzly Peak Boulevard, the intersection with Beloit Avenue presents some unconventional traffic control in that the stop-controlled approaches are adjacent to each other rather than across from each other. This is reasonable given that the primary route through this area turns from Grizzly Peak to the south onto Beloit to the west at this location, but the traffic control is nonetheless unconventional.

Figure 25: Another unconventional intersection is that of Arlington Avenue and Sunset Drive (shown here in Google StreetView). In this case, vehicles traveling from northbound Arlington Avenue to Sunset Drive must negotiate the turn lane here and then drive up a short segment of the southbound half of Arlington Avenue to then make another left on Sunset Drive (which branches to the left behind the car seen in the photo). Vehicles have also been observed using the median gap to exit Sunset Drive and make an immediate U-turn to proceed north on Arlington Avenue.

A particularly unconventional intersection is that of Arlington Avenue and Sunset Drive (Figure 25). Sunset Drive intersects the western half of Arlington Avenue along one of its divided segments. A median break immediately to the south allows vehicles to turn left onto Arlington from Sunset and allows vehicles to turn left onto Sunset from Arlington northbound. The unconventional aspect is that, because of the offset median break, vehicles turning left onto Sunset must travel "against traffic" on a short stretch of southbound Arlington before completing their turn onto Sunset. While this short stretch of Arlington is technically two-way, it is still striped as a one-way street. Though this arrangement seemed to operate effectively during the time that the team was in the area, it could pose challenges during an emergency. Especially in the circumstance that the

Sunset View Cemetery can be used as an egress route, significant traffic will be flowing onto Sunset Drive in order to descend away from the WUI. High volumes of turning vehicles, combined with high volumes of traffic on Arlington due to its use as an egress route to the south, could present significant potential for conflicts and/or collisions at this location.

As noted previously, some larger intersections may be suitable for use as staging locations during an emergency, or at the very least could facilitate easy turnarounds of emergency vehicles. These include Kingston Road & Lenox Road, Arlington Avenue & Amherst Avenue, Grizzly Peak Boulevard & Spruce Street, Purdue Avenue & Garden Drive, and Cowper Avenue & Kensington Road. Not all these intersections are suitable as gathering points, but they may be of use to first responders. The intersection of Kingston & Lenox has a cul de sac-like footprint that could allow easy turnaround of emergency vehicles or could provide limited staging capabilities. Arlington & Amherst and Grizzly Peak & Spruce both have large footprints and could function as gathering points under certain circumstances (see Section 7.2 for details). Purdue & Garden has a large enough footprint to allow for limited staging, which could be valuable given the narrow width of the adjacent segments. Lastly, the intersection of Cowper Avenue and Kensington Road blends together with that of Kensington Road and Kensington Court, providing a sizable staging area immediately adjacent to the WUI.

7.1.7) Walking Paths

In addition to the street network, the survey team also conducted a qualitative assessment of the walking paths within Kensington. Through a combination of online resources[2], the team was able to identify 19 pathway segments within Kensington, including the Ye Olde School trail abutting Wildcat Canyon. While this section will present a selected overview of pathway conditions, a full table listing the condition of each segment can be found in Appendix B. Of the paths surveyed, two were completely blocked (Public Path #10 between Columbia Ave and Trinity Ave and the Princeton Path between Amherst Ave and Arlington Ave). This confirmed pre-survey information gathering from the website of the Kensington Pathkeepers, a local group devoted to ensuring public access to paths in Kensington.

[2] Google Maps, Kensington Pathkeepers

The remaining paths varied in condition, ranging from dirt trails (see Figure 26) to sidewalks approaching roadway width (see Figure 27). Several of the paths (mostly in the southwest quadrant) have the potential to be ADA accessible, but the vast majority contain stairs for all or part of their length. Many are not clearly signed or identified and could be easily confused with a residential entryway. Many of the paths in the northeastern quadrant have significant encroachment from vegetation, which could prove problematic when considering the paths as a fire evacuation route. In general, paths in the southwest quadrant were more likely to be paved and more sidewalk-like in nature, except for Public Path #1 between Marchant Court and Coventry Road (see Figure 28). Meanwhile, the paths in the southeast quadrant were more rustic in nature, rarely being paved and frequently containing segments of dirt trail. Both closed/blocked paths were in the southeast quadrant.

Figure 26: A range of path conditions in the northeastern quadrant, ranging from concrete surface to narrow, wooden stairs to an unmarked dirt trail. From left to right are Public Path #6 east of Arlington Avenue, the same path east of York Avenue with low overhanging foliage, and the Westminster path between Kenyon Ave. and Highland Blvd. All photographs were taken looking east.

Figure 27: The Ardmore path immediately west of Arlington Avenue features wide stairs and a double sidewalk.

Figure 28: Most paths in the southwest quadrant are paved with concrete, such as the Ardmore Path (left, shown intersecting Coventry Road) which is entirely step-free in its western half. However, Public Path #1 (seen at right approaching Coventry Road from Marchant Court) is much less developed and only consists of a steep, unmarked walking track. An abutting homeowner claimed that part of this path traverses private property.

The Ye Olde School Trail (running from the end of Grizzly Peak Blvd. to the elementary school with branches to Lake Drive and Kensington Court) is more of a hiking trail than an egress path and may have limited utility over the street network as a means of egress for residents. Its condition is at some points akin to a dirt road that could be traversed by an all-terrain vehicle, while at other points it devolves to a single-track hiking trail with significant inclines.

7.1.8) Other Connections

In addition to the public paths, several other non-vehicular cut-throughs were noted in the course of the survey. The four most notable connections were the Sunset View Cemetery roads, a closed section of Kensington Park Road connecting the school to the Community Center, a pedestrian connection from the north end of Windsor Avenue to the community center, and an East Bay Municipal Utility District (EBMUD) access road along the west side of the Summit Reservoir.

The first connection through the cemetery is very significant in that it provides a fourth western exit route (Figure 29). Currently, egress to the west can be achieved via Coventry Road or Stratford Road in the southwest quadrant or via Eureka Avenue in the northwest quadrant. Other options require travel to the north into El Cerrito (to reach Moeser Lane) or to the south into Berkeley. The cemetery roads provide a fourth, direct path from the center of Kensington to Colusa Avenue and the flatland portion of El Cerrito.

Figure 29: The gate separating the cemetery roads from Sunset Drive (measured at 20' wide), as viewed from the east/outside of the cemetery (left) and the west/inside (right).

Kensington Park Road currently ends in a parking lot at the Kensington Community Center (Figure 30). However, a paved roadway extends further up the hill to Kensington Hilltop Elementary School parking lot, which is in turn connected to Highland Boulevard and Kenyon Avenue. This road segment is currently closed to vehicular traffic by bollards at both ends. While it was not formally measured, it appeared to be in the range of 20' wide and lacks any pinch points or obstructions. There is a steep segment at the west end where it connects to the open portion of Kensington Park Rd.

Figure 30: The east (left) and west (right) ends of the closed segment of Kensington Park Road.

In the same vicinity, several pedestrian paths (paved and step-free, potentially navigable by emergency vehicles) extend from the north end of Windsor Avenue to connect with Kensington Park Road and the Community Center (Figure 31). Given that Windsor Avenue is a long, narrow dead end, these paths could provide additional (non-car) egress options for residents living at the north end of this street segment.

Lastly, an EBMUD access road extends around the west side of the Summit Reservoir in the southeast corner of Kensington, providing an additional connection between Beloit Avenue and Spruce Street in Berkeley (Figure 32). The access road is narrow and winding (it was not measured, but it is no more than a lane wide) and is likely unsuitable for evacuations unless Grizzly Peak Boulevard becomes blocked. However, it could provide an alternate access route for first responders, in turn enabling Grizzly Peak Boulevard to be dedicated to evacuating vehicles.

Figure 31: The connection between Windsor Avenue (darker pavement at left) and the Kensington Community Center.

Figure 32: The northern gate of the EBMUD access road along Beloit Avenue.

7.2) Potential Gathering Points

Several potential gathering points were identified and are illustrated in Figure 33 below. It is important to note that great care should be taken in recommending gathering points within Kensington during any large-scale emergency, as many of these locations may not be sufficiently distant from the hazard and residents should instead attempt to reach gathering points in El Cerrito and Berkeley whenever possible.

Figure 33: Map of Identified gathering points.

Gathering points were generally identified based on a reduced amount of vegetation/fuel load, distance from the WUI, and accessibility by larger vehicles such as buses. Consideration was given to the ability of a larger vehicle (such as a transit bus) to turn around at intersections and return downhill after collecting evacuees. Traveling from west to east, they are the Summit Reservoir, the Kensington Elementary School, Kensington Recreation Center, the commercial district on Arlington Avenue, Colusa Circle, and the

intersection of Colusa Avenue and Fairmount Avenue (including the lower portion of Sunset View Cemetery).

The Summit Reservoir, and the adjacent intersection of Grizzly Peak Boulevard and Spruce Street, is a large area with relatively little vegetation. Spruce Street currently has bus service and therefore can likely support high-capacity vehicle access, though consideration should be given to the fact that Spruce Street will also be heavily trafficked with evacuees in personal vehicles. The intersection of Grizzly Peak Boulevard and Spruce Street has a sufficiently large footprint that a bus could likely be turned around without requiring a backing move. Additional and significant consideration should be given to the fact that this location is very close to the WUI and therefore may not be an appropriate gathering point for all emergencies.

The Kensington Elementary School (and nearby Recreation Center) both present lower vegetation levels than the surroundings. The Recreation Center is close to Arlington Avenue, which is a major through route which can accommodate access by larger vehicles (though similar caveats apply regarding Arlington's status as an evacuation route). Both locations are still very close to the WUI as the eastern edge of the school *is* the WUI and overlooks Wildcat Canyon. Consequently, consideration should be given as to when these locations can be used as gathering points.

The commercial district on Arlington Avenue presents similar advantages of lower vegetation load and high-capacity vehicle access (via Arlington Avenue). The intersection of Arlington Avenue and Amherst Avenue is sufficiently large that a bus could likely be turned around without difficulty, and a median break north of the commercial district presents an alternate option for turning vehicles. Additional advantages of this area include the potential presence of some non-wood frame structures. However, this area is also likely to be a choke point for evacuees in vehicles traveling along Arlington Avenue, so traffic management is likely to be necessary.

Colusa Circle, much like the Arlington Avenue commercial district, presents advantages of lower vegetation, potential for masonry structures, and existing transit service indicating ease of access by high-capacity vehicles. While much further from the WUI and therefore preferable to other gathering points, the potential for Colusa Circle to be a bottleneck is high, having six entrances all controlled by stop signs.

Lastly, the intersection of Colusa Avenue and Fairmount Avenue (and, by extension, the lower portion of Sunset View Cemetery) is the westernmost point that is adjacent to Kensington and therefore is furthest from the WUI. This location has low vegetation levels, existing access by high-capacity vehicles, and is directly connected to safer locations such as the El Cerrito Plaza BART station. A large field of undetermined ownership immediately south of the intersection could be used as a staging area, pending coordination with the property owners.

As a note, we do not recommend that evacuees gather at the building that houses the Kensington Fire District or Kensington Police Department. While resources may be available, evacuees may hamper emergency operations and strain personnel.

7.3) Network Analysis

As noted in section 6.3, the network analysis was conducted at two geographic levels in order to assess the strengths and weaknesses of each methodology (i.e., local and regional). The local approach consisted of placing an "egress point" at every border crossing into El Cerrito, Richmond, or Berkeley. One key advantage of this approach is that it is neutral to presumptions about major and minor routes by allocating traffic to major and minor roads based only on proximity. However, by allocating routes based on the shortest distance to a border crossing, this method presumes that the end goal is to leave Kensington, whereas evacuees actually seek safe destinations beyond the borders of the community. By only looking at border crossings, the local analysis presumes that all crossings have equal value in accessing safety, which is unlikely to be the case.

In contrast, the regional approach made use of the broader network outside of Kensington to navigate evacuees to likely gathering points and/or major roads. Attempts were made to place these egress points at similar distances from the Kensington border in order to avoid biasing the analysis. This has the benefit of reflecting potential regional destinations of evacuees but is limited by only using a handful of such locations. The act of choosing the points incorporates assumptions about likely egress routes and target destinations of evacuees. As a result, this analysis is less likely to show use of all egress routes that would be used. Nonetheless, if the points are well-chosen, the resulting network loads should demonstrate route choices based on the "shortest path to safety" versus the "shortest path out of Kensington."

We also tested (as mentioned in the methodology) several regional scenarios where the cemetery would be an option for evacuation. We also tested this transportation response at the local analysis level but found no meaningful difference. We also tested two wildfire cases where we assume fire is either spreading from the Northeast or from the Southeast, leading some exits in Kensington to be blocked. For the Northern Wildfire, we eliminated exits from Kensington Rd, Lawson Rd and Arlington Ave while for the Southeastern Wildfire, we eliminated exits from Grizzly Peak Blvd, Vassar Ave and Rugby Ave. For the southeastern fire regional analysis, we removed The Circle egress point. We tested both north and southeast fire scenarios using the local and regional analysis along with the possibility of using the cemetery in the regional analysis.

It should be noted that predicting route choice during an emergency evacuation is an imperfect exercise and is necessarily predicated on assumptions. It is typically assumed in models that evacuees will choose their shortest path to safety; however, this presumes that evacuees have: 1) knowledge of the nearest point of safety, and 2) knowledge of the shortest path by which this point can be reached. In some cases, individuals may be unaware of their nearest place of safety and/or their shortest path. Even in the case where individuals possess both pieces of information, they may choose more familiar routes and destinations or may be forced to alter behavior based on traffic or a blocked route. Indeed, recent research has found that distance of the route, potential fire danger, and the pavement conditions were the most significant variables that impacted route choice (Wong et al., 2020). We also note that this model does not consider congestion; people will likely deviate to other routes or have to wait in a queue as the shortest paths become congested. If congestion and queuing behavior is of interest to Kensington, we recommend that the community consider conducting a full traffic analysis using microscopic and mesoscopic simulations. Regardless, this analysis provides a quantitative validation of the major routes identified in section 7.1 based on the level of road markings present. This analysis also shows how availability to evacuate through the cemetery could improve evacuations. The scenarios used for the network analysis are provided in Table 6.

Table 6: Summary of Different Network Analysis Simulations

Scenario Number	Approach	Kensington Route Availability	Location of Egress Points	Cemetery Gate Open
1	Local	All	All Exits at Kensington Border	Yes/No
2	Regional	All	Four Chosen Egress Points in El Cerrito and Berkeley	No
3	Regional	All	Four Chosen egress points in El Cerrito and Berkeley	Yes
4	Local	No Northern Exits	All Exits at Kensington Border	Yes/No
5	Regional	No Northern Exits	Four Chosen egress points in El Cerrito and Berkeley	No
6	Regional	No Northern Exits	Four Chosen egress points in El Cerrito and Berkeley	Yes
7	Local	No Southern Exits	All Exits at Kensington Border	Yes/No
8	Regional	No Southern Exits	Chosen egress points in El Cerrito and Berkeley	No
9	Regional	No Southern Exits	Chosen egress points in El Cerrito and Berkeley	Yes

7.3.1) Local-Level Analysis

Sixteen egress points were defined for the local-level analysis, representing every road crossing of the Kensington boundary. Clockwise from the southeast, these are: Grizzly Peak Boulevard at Spruce Street, Vassar Avenue, Rugby Avenue, Arlington Avenue south, Colusa Avenue south, Berkeley Park Boulevard, Santa Fe Avenue, Colusa Avenue at Lynn Avenue, Colusa Avenue at Curry Avenue, Colusa Avenue at San Carlos Avenue, Colusa Avenue at Fairmount Avenue, Eureka Avenue, Highgate Road at Franciscan Way and Contra Costa Drive, Arlington Avenue north, Lawson Road north (via the Unitarian Universalist Church of Berkeley parking lot), and Kensington Road north. The egress assignments and resulting egress assignments are illustrated in Figure 34 and Figure 35 below.

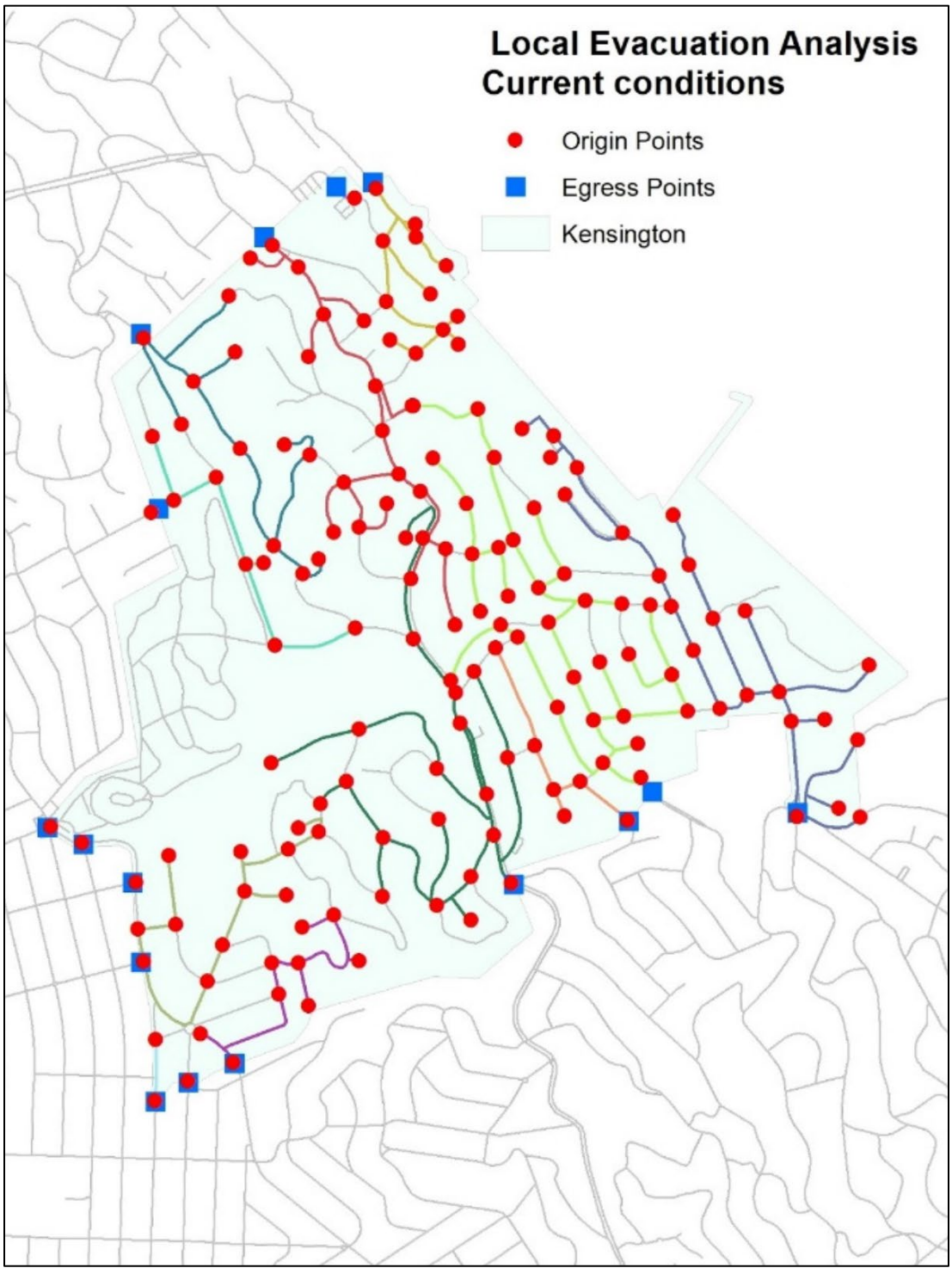


Figure 34: Egress assignment across Kensington for local-level analysis

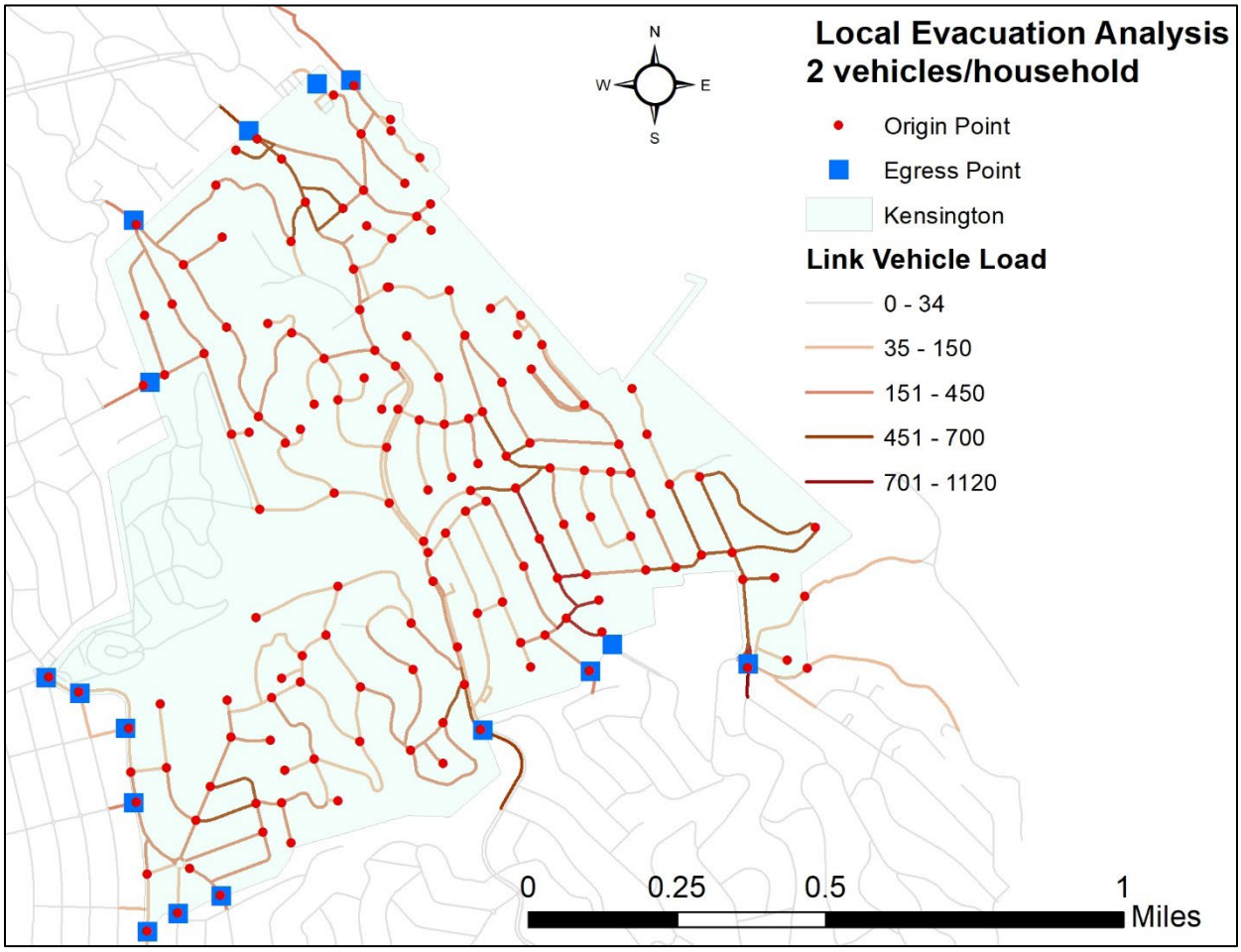


Figure 35: Network loads resulting from the local-level network analysis

Several insights can be gleaned from the egress assignment. Multiple egress routes receive no traffic (Berkeley Park Boulevard, Curry Avenue, San Carlos Avenue, Fairmount Avenue, and Lawson Road) except for vehicles generated immediately adjacent to those exits. Santa Fe Avenue is only used by traffic generated *on* Santa Fe Avenue, while other evacuees in the southwest quadrant make use of Lynn Avenue to the west or Colusa Avenue to the south. A large portion of the southwest quadrant evacuates *uphill* to Arlington Avenue, which may be technically efficient but is unlikely to be feasible in an emergency. The proximity of the Rugby and Vassar Avenue egresses causes most of the southeastern quadrant to evacuate via these roads rather than taking longer paths to reach Arlington Avenue or Grizzly Peak Boulevard. Streets to the east of Purdue Avenue *do* evacuate via Grizzly Peak, which was expected.

All vehicles originating on Arlington Avenue evacuate on Arlington Avenue to the north or south, with the split occurring between Norwood Avenue and Arlington Lane. Most of the northeast quadrant evacuates via Kensington Road, despite this requiring an uphill drive. In the southwest quadrant, vehicles originating on Highgate Road and adjacent streets along with the western portion of Norwood Avenue exit via Highgate Road/Contra Costa Drive. Lastly, traffic originating on Sunset Drive, southern portions of Franciscan Way, and Anson Way exits via Eureka Avenue. The cemetery route to the Fairmount Avenue egress point was unused even without a barrier at the gate entrance. Because the border with El Cerrito is further east at the point where Eureka Avenue crosses, the Eureka egress point is still closer than Fairmount Avenue to all the origin nodes even with the cemetery roads available for use. This highlights the issue with using the Kensington border as the "measure of success" in the network analysis, as vehicles traveling via either route are also likely headed toward Fairmount Avenue, but can cross into El Cerrito sooner if they use the Eureka egress point.

These assignments have several implications for evacuation planning. First, many of these routes require evacuees to travel uphill to reach an egress point (consider the cases of Kensington Road or the southwestern quadrant and Arlington Avenue). This is counterintuitive in the case where the hazard is to the east and may not be a realistic assumption of evacuee behavior. However, while it is likely that *most* evacuees will choose to travel downhill instead, some may opt to travel east to reach a high-capacity egress route such as Arlington Avenue or Grizzly Peak Boulevard. This raises the possibility of significant traffic conflicts in these regions as large volumes of *two-way* traffic are introduced to narrow, parking-constrained streets.

Second, the opposite case occurs in the case of Vassar Avenue and Rugby Avenue significant traffic volumes travel via these narrow, low capacity roads rather than taking a longer path to high-capacity links such as Arlington Avenue or Grizzly Peak Boulevard. This results in Vassar Avenue seeing some of the highest traffic volumes on the network (as noted in Table 7 despite having little capacity to support such a volume of traffic as shown in Figure 16). Other intersections seeing high volumes include Grizzly Peak Blvd & Spruce St and Arlington Ave & Amherst Ave, which is more in keeping with the expected results. Given the limited capacity of Vassar Avenue, it could also be expected that many of the evacuees assigned to Vassar by this analysis may use Arlington or Grizzly Peak instead, further increasing the load on these intersections. As both intersections are all-

way stops, they may also be bottlenecks in the case of a rapid evacuation and may be good candidates for traffic supervision and transportation responses.

Table 7: Intersections with Highest Traffic Loads Under Local Egress Scenario

Intersection Name	Traffic Count (1.5 veh/HH)	Traffic Count (2.0 veh/HH)	Traffic Count (2.5 veh/HH)	Traffic Control
Vassar Avenue & Circle North of County Line	864	1120	1408	None
Vassar Avenue & Yale Avenue	837	1085	1364	None
Cambridge Ave & Yale Ave	675	875	1100	None
Cambridge Ave & Beloit Ave	648	840	1056	Partial Stop
Grizzly Peak Blvd & Spruce St	594	770	968	All-Way Stop
Arlington Ave & Amherst Ave	513	665	836	All-Way Stop
Plateau Dr & Grizzly Peak Blvd	513	665	836	None
Arlington Ave & Highland Blvd	486	630	792	Partial Stop
Arlington Ave & Lam Ct	459	595	748	Partial Stop
Coventry Rd & Arlington Ave	459	595	748	Partial Stop
Grizzly Peak Blvd & Beloit Ave	459	595	748	Partial Stop
Arlington Ave & Lam-Highland Cut-Through	432	560	704	None
Cambridge Ave & Wellesley Ave	432	560	704	None
Kenilworth Dr & Arlington Ave	405	525	660	Partial Stop
Kenyon Ave & Wellesley Ave	405	525	660	Partial Yield
Arlington Ave & Rincon Road (N)	378	490	616	Partial Stop
Lake Dr & Beloit Ave	378	490	616	Partial Stop
Willamette Ave & Kenyon Ave	351	455	572	None
Lynn Ave & Colusa Ave	324	420	528	Partial Stop
Cowper Ave & Arlington Ave	324	420	528	Partial Stop
Estates Rd & Arlington Ave	324	420	528	None
Arlmont Dr & Arlington Ave	324	420	528	Partial Stop
Franciscan Way & Contra Costa Dr	297	385	484	Partial Stop
Cowper Ave & Kensington Rd	297	385	484	Partial Yield

7.3.2) Regional-level analysis

Residents will likely evacuate to a destination beyond the Kensington border. A regional method takes this behavior into account and uncovers impacts in El Cerrito and Berkeley. One limitation is that made key assumptions about the location of the egress points, which we determined prior to conducting our analysis. We consequently limit the potential destinations and routes of evacuees and allocate heavier traffic along the primary route rather than distributing to any nearby comparable routes.

For the "regional scale" analysis covering greater Kensington, five potential egress points were placed outside of Kensington along major corridors leading away from the WUI and toward high-capacity corridors such as San Pablo Ave and Interstate 80. From south to north, the egress points were located at The Circle (the south end of Arlington Avenue) in Berkeley and along Solano Avenue in Albany, Fairmount Avenue in El Cerrito, Moeser Lane in El Cerrito, and Potrero Avenue in El Cerrito. The Potrero Ave egress point did not appear in any of the results of this analysis, likely because the Moeser Lane egress point was consistently closer. That said, if there were congestion on Moeser Lane, it is possible evacuees would continue up Arlington Ave to Potrero Ave where they could continue onto Interstate 80, San Pablo Ave, or Carlson Blvd towards Richmond.

7.3.2.1) Current Conditions Without Cemetery Access

The current conditions without cemetery access show relatively even distribution of traffic among Moeser Ln and The Circle with Fairmount also collecting 20% of the traffic. The egress assignments and traffic levels are shown in Figure 36 and Figure 37.

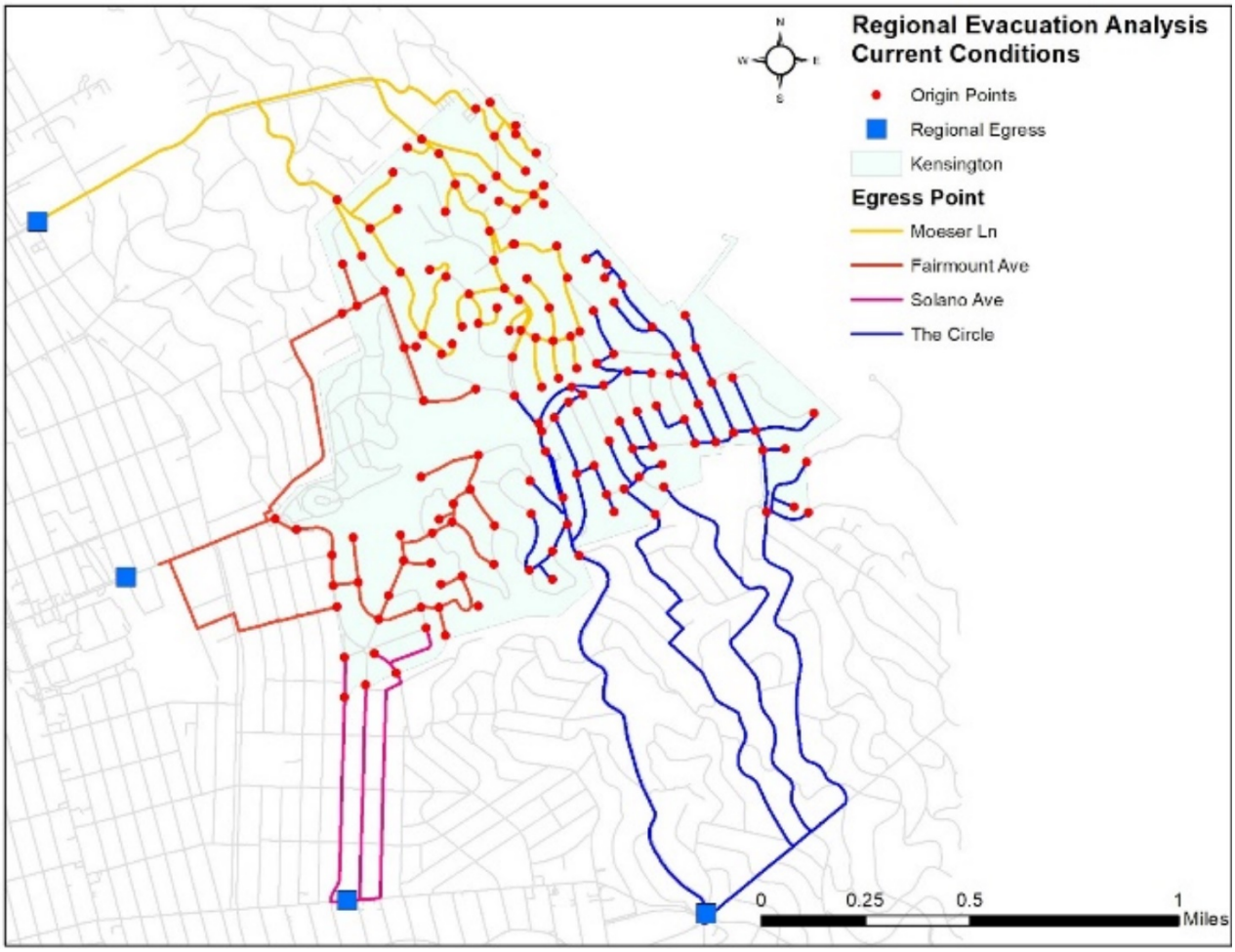


Figure 36: Egress allocation of regional analysis (no cemetery access)

With the cemetery closed, Eureka Ave receives significant traffic as vehicles take a more circuitous path to Fairmount Ave. Most cars traveling to Fairmount originate from the southwest quadrant, particularly from Coventry Road and Colusa Ave. Vehicles traveling to The Circle primarily travel down Arlington, though a significant number also route down Marin Avenue after taking Grizzly Peak Blvd to Spruce Street in Berkeley. All of northeast quadrant and part of northwest quadrant evacuate via Moeser Lane. We find more heavily used nodes as multiple egress paths combine to go towards the limited number of destinations. Thus, roads and intersections with the highest number of Kensington vehicles lie outside its borders (top five examples are shown in Table 8). While Kensington may not have control over the areas surrounding these major evacuation routes, the results highlight the need to engage with neighboring municipalities such as Berkeley and El Cerrito to prepare a coordinated evacuation strategy.

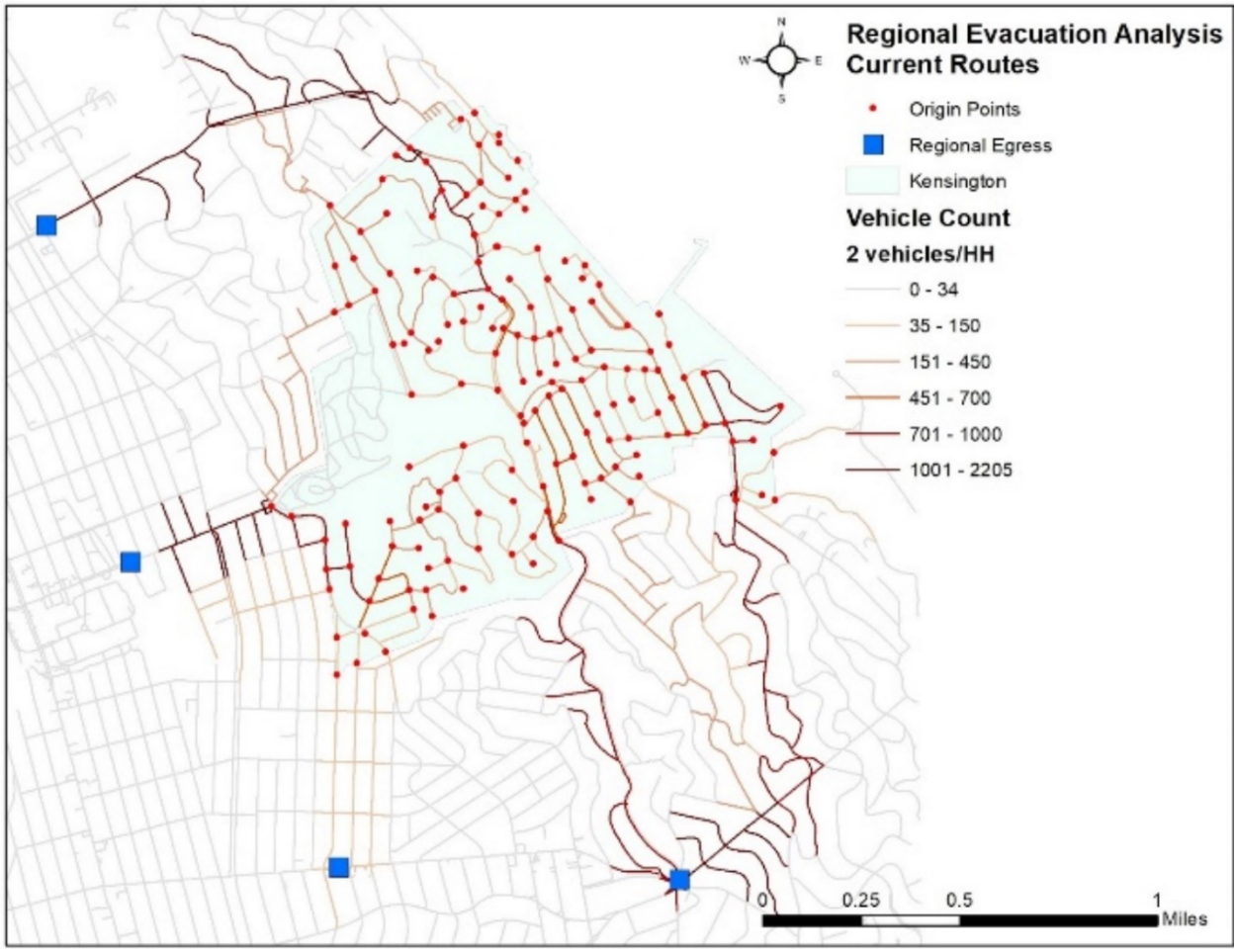


Figure 37: Traffic loading (2 vehicles/HH) for regional analysis (no cemetery access)

Table 8: Five Highest Volume Intersections from Regional Analysis (No Cemetery Access)

Intersection Name	Traffic Count (1.5 veh/HH)	Traffic Count (2.0 veh/HH)	Traffic Count (2.5 veh/HH)	Traffic Control
The Circle & Arlington Ave, Berkeley	1,701	2,205	2,772	Yield
Moeser Ln & Seaview Dr, El Cerrito	1458	1890	2376	Partial Stop
Marin Ave & Oxford St, Berkeley	999	1295	1628	Partial Stop
Arlington Blvd & Moeser Ln, El Cerrito	972	1260	1584	Partial Stop
Fairmount Ave & Ashbury Ave, El Cerrito	918	1190	1496	Traffic Light

The intersections with the highest traffic loads within the borders of Kensington are along the northern half of Arlington Ave, along Colusa Ave between Fairmount Ave and Valley Road, and along Beloit Ave and Grizzly Peak Blvd (Table 9). Arlington Ave is generally wide enough for consistent flow, with centerline markings or a median and only one traffic signal and one all-way stop along its length within Kensington. Colusa Ave along the portion described is well marked and is among the wider streets in the study area. Use of Valley Road and Coventry Road to access Colusa is subject to narrower widths.

Despite this in-depth analysis, we note that we found somewhat weak robustness of results. The location of the final destination points along the major roads significantly varied traffic loading along links and intersections. For example, shifting the egress point on Moeser Ln two blocks east or west changed the number of nodes that would choose that destination by 10%.

Table 9: Intersections with Highest Traffic Loads Under Regional Egress Scenario (No Cemetery Access)

Intersection Name	Traffic Count (1.5 veh/HH)	Traffic Count (2.0 veh/HH)	Traffic Count (2.5 veh/HH)	Traffic Control
Arlington Ave & Highland Blvd	972	1260	1584	Partial Stop
Arlington Ave & Lam Court	783	1015	1276	Partial Stop
Kenilworth Dr & Arlington Ave	729	945	1188	Partial Stop
Colusa Ave & Fairmount Ave	702	910	1144	Signal
Arlington Ave & Rincon Rd (N)	702	910	1144	Partial Stop
Grizzly Peak Blvd & Spruce St	702	910	1144	All-Way Stop
Arlington Ave & Amherst Ave	675	875	1100	All-Way Stop
San Carlos Ave & Colusa Ave	675	875	1100	Partial Stop
Colusa Ave & Curry Ave	648	840	1056	Partial Stop
Cowper Ave & Arlington Ave	648	840	1056	Partial Stop
Estates Rd & Arlington Ave	648	840	1056	None
Arlmont Dr & Arlington Ave	648	840	1056	Partial Stop

Valley Rd & Colusa Ave	621	805	1012	Partial Stop
Plateau Dr & Grizzly Peak Blvd	621	805	1012	None
Valley Rd & Coventry Rd	594	770	968	None
Rincon Rd & Arlington Ave	594	770	968	Partial Stop
Arlington Ave & Kensington Park Rd	594	770	968	Signal
Grizzly Peak Blvd & Beloit Ave	567	735	924	Partial Stop
Arlington Ave & Arlington Ct	567	735	924	Partial Stop
Berkeley Park Blvd & Coventry Rd	540	700	880	Partial Stop
Lake Dr & Beloit Ave	486	630	792	Partial Stop
Amherst Ave & Princeton Ave	432	560	704	All-Way Stop
Arlington Ave & Westminster Ave (E)	405	525	660	Partial Stop
Beloit Ave & Purdue Ave	378	490	616	Partial Stop
Ocean View Ave & Berkeley Park Blvd	351	455	572	None

7.3.2.2) Open Cemetery Path

We also ran models for both the local and regional analyses where the cemetery would be accessible for evacuees. We found minimal impact in the local analysis, so we focus our attention on the regional implications of a cemetery route. Overall, there is a significant shift in evacuation route choice, particularly for the center of Kensington, when the cemetery becomes available. Egress allocation and traffic loading are shown in Figure 38 and Figure 39. We also present the change in egress percentage (between an open and a closed cemetery route) in Table 10. Potrero Ave is excluded because no traffic is shown traveling that far north in this analysis. The table uses an assumption of 2 vehicles per household, in line with the average number of vehicles owned in Kensington.

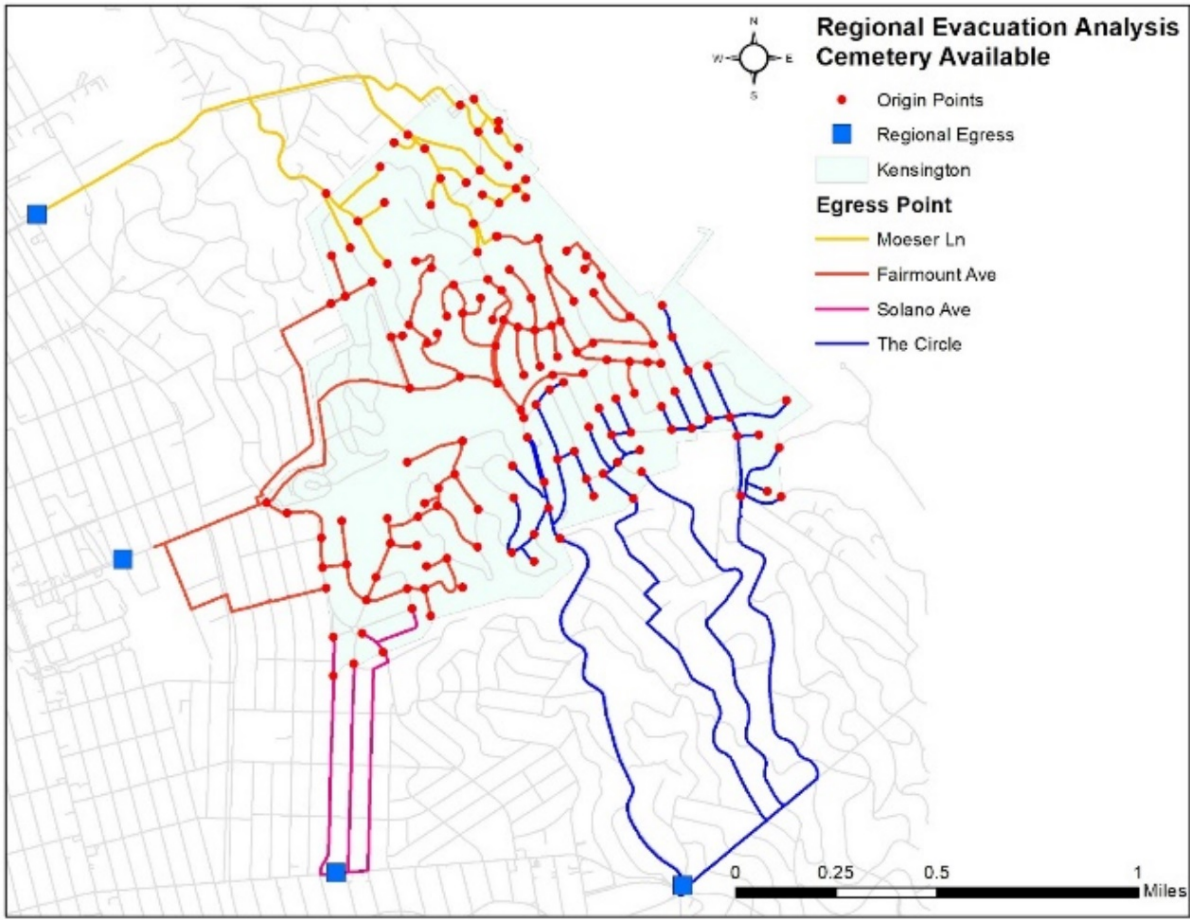


Figure 38: Egress allocation of regional analysis (no cemetery access)

We first find that the cemetery route alone carries over 30% of all vehicles evacuating Kensington in the model. It is significantly faster for a large part of Kensington's population, particularly for residents located east of Arlington Ave near Westminster Ave. The intersections with the highest traffic loads are along the cemetery route followed by those along Westminster Ave. After these, other significant intersections include Colusa Ave from Valley Rd to Fairmount and along Grizzly Peak Blvd. The ends of Arlington Ave remain significant, though not to the same extent. These results strongly support developing an agreement to access the cemetery in the case of an evacuation. In the "no cemetery" conditions, Wellesley Ave and adjacent roads travel to Grizzly Peak Blvd and south (once again resulting in some counter-intuitive uphill travel). In contrast, when the cemetery is available, some traffic from the southeast quadrant travels via Oberlin and Wellesley to Arlington in order to reach the cemetery. Wellesley and Oberlin both have very narrow widths, which is compounded by parked vehicles and high vegetation,

making these less recommended for 2-way traffic flow. In a fire situation, one or both streets could be best designated as "downhill only."

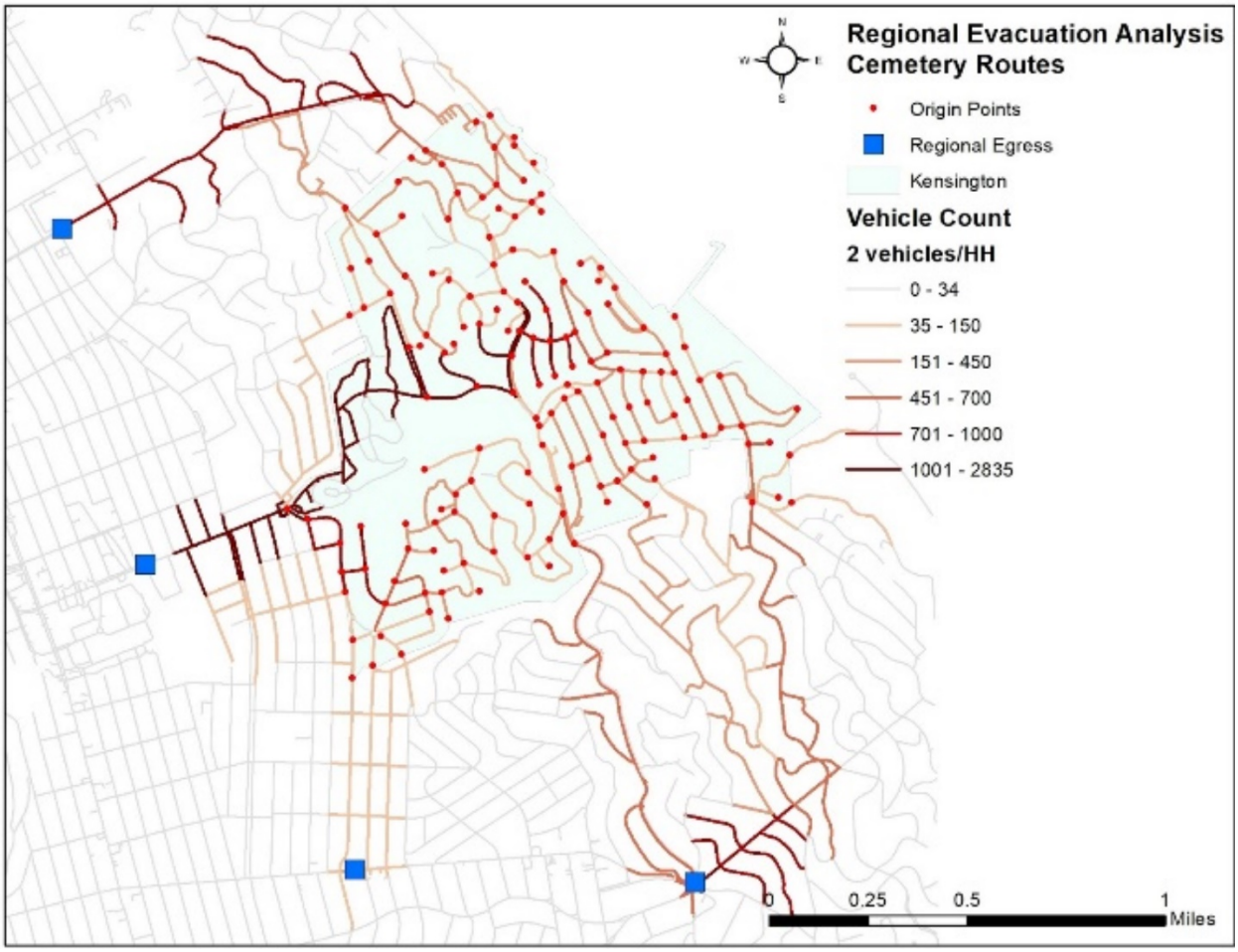


Figure 39: Egress allocation and most used routes with cemetery

Table 10: Shift in Egress Point by Cemetery Condition

Egress point (Destination)	Current (No cemetery)		Cemetery Route	
	Traffic load (vehicles), 2 veh/HH	Percentage of total vehicles	Traffic load (vehicles), 2 veh/HH	Percentage of total vehicles
Moeser Ln	1,890	34%	980	18%
Fairmount Ave	1,225	22%	2,835	51%
Solano Ave	280	4%	210	4%

The Circle	2,205	40%	1,505	27%
Total	5,530	100%	5,530	100%

While Grizzly Peak Blvd receives lower traffic than in the "no cemetery" scenario, the road remains a significant evacuation link for the southeast quadrant. Grizzly Peak Blvd itself is wide and relatively free of obstructions, but consideration should be given to downstream curves and all-way stop signs along Spruce Street in Berkeley.

If Kensington plans to move forward with designating access to the cemetery route, there are several potential hazards that should be addressed. As discussed further in section 7.1.6, the intersection of Sunset Drive and Arlington Avenue has unconventional geometry. This could lead to conflicts between traffic on southbound Arlington Ave with left-turning northbound traffic from Arlington onto Sunset. The majority of vehicles evacuating via the cemetery route from east of Arlington Ave enter Arlington from Wellesley and Westminster Avenues. Wellesley has a straightforward northbound turn onto Arlington Ave, but reaching Sunset requires turning left through the aforementioned intersection. Traffic entering via Westminster may face difficulties turning left onto Arlington Ave, particularly if there is heavy northbound traffic on Arlington. Additionally, Sunset Drive has very high vegetation levels along its entire length and is at risk of becoming blocked during an emergency.

Arlington Court and Norwood Avenue are not recommended as alternative paths to the cemetery. As discussed in the survey results, Norwood Avenue and Highgate Road together have significant issues related to pinch points, high fuels (vegetation) and a steep incline on Norwood. Sunset Drive will then be under significant load and should be treated as a major evacuation route. Traffic supervision and direction may be necessary to ensure that any possible queuing of vehicles on Sunset Dr does not block travel along Arlington Ave and vice versa.

7.3.3) Fire Simulation

While most of the network analysis considered all egress points as being available for use, conditions during an emergency would likely block certain routes or render them inadvisable for use. Two scenarios of fires traveling along the ridge are examined: one in which the fire is to the north and one in which it is to the south or southeast. These are

evaluated using both the local and regional perspectives. For the local analysis, the three egresses furthest to the northeast or southeast were eliminated. For the regional analysis barriers were drawn in a line along the northeast and south/southeast respectively.

7.3.3.1) Wildfire from the North

We first conducted a local-level analysis assuming a wildfire from the north (Figure 40 and Figure 41). One major difference from the original local analysis is significant traffic on Edwin Dr and Kerr Ave on the way to the Highgate Road egress point, which now handles most of the evacuees originating in northern Kensington. Results from our field survey indicate that the Edwin/Kerr segment is narrowed by parked vehicles and that this route requires making a sharp turn from Rincon Road onto Kerr Avenue. There are also large trees around the Carmelite Monastery which could be a hazard. Since the Highgate Road egress still moves traffic to the north, emergency responders should be prepared to channel all this traffic toward Eureka and/or encourage the northeast quadrant to evacuate via Arlington Ave. If an advancing fire from the north cuts off Kerr Avenue, it should be noted that the only other east-west route north of Sunset Drive (Norwood Avenue) is even more compromised by narrow widths and high vegetation levels.

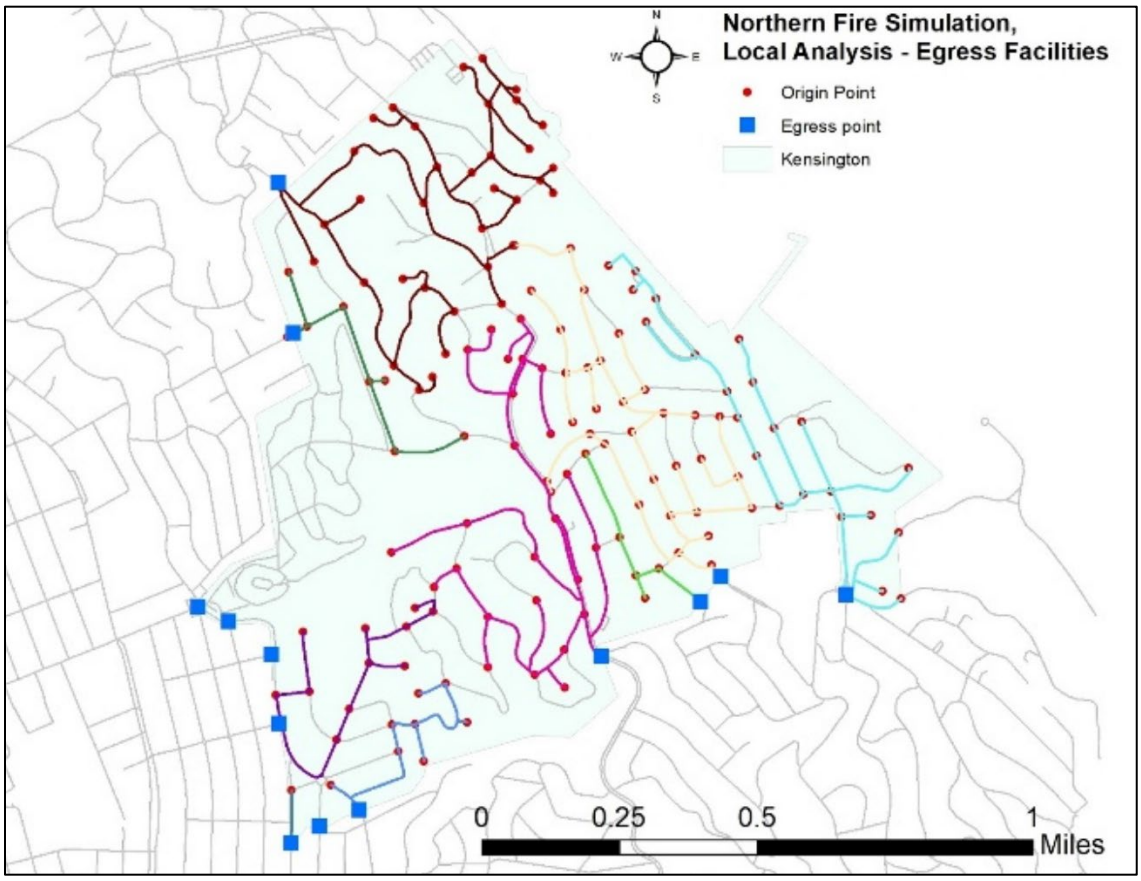


Figure 40: Available egress facilities and allocation for a wildfire from the north.

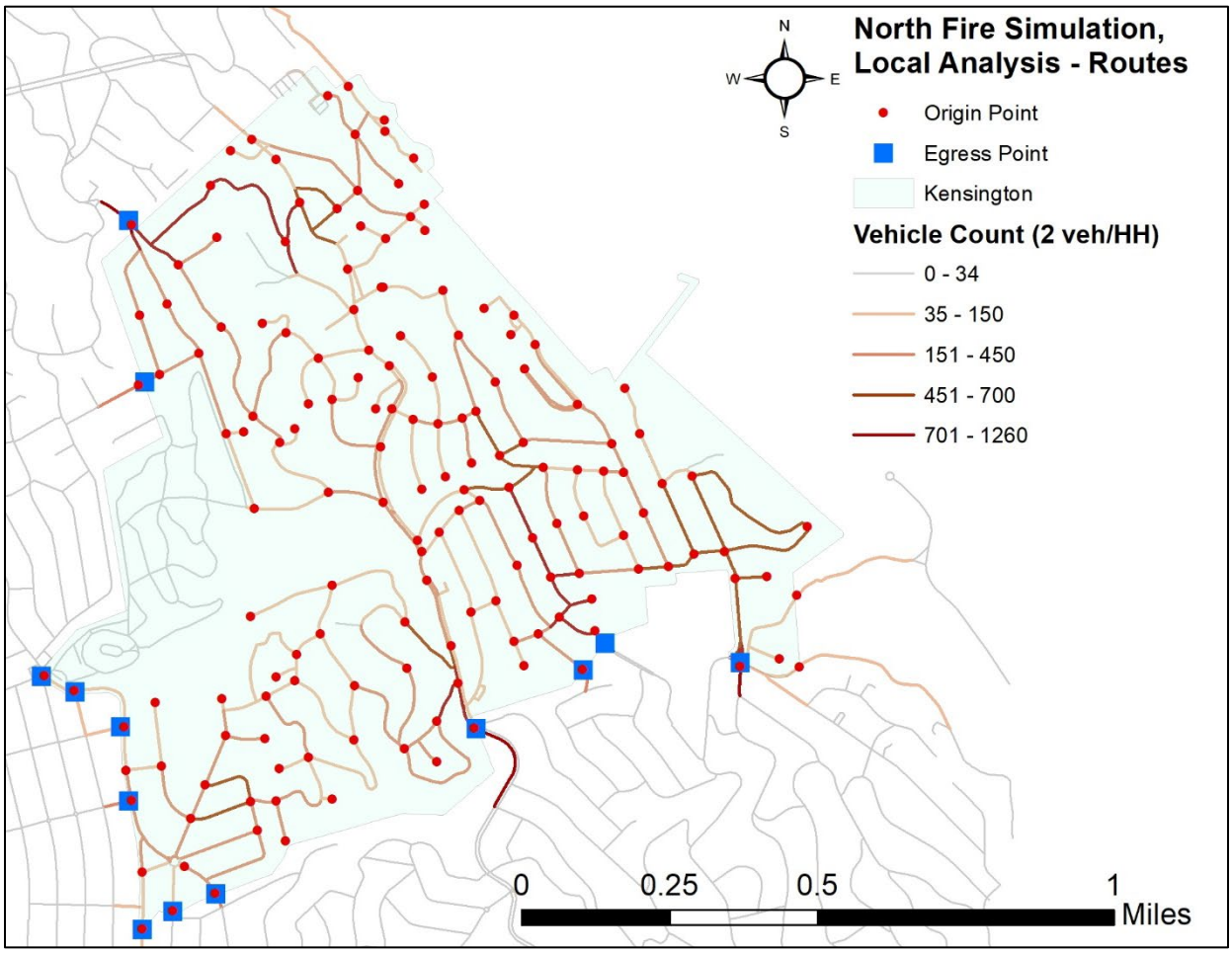


Figure 41: Traffic loading for a wildfire from the north.

We next conducted a regional analysis where we assumed that the cemetery would not be open. The regional analysis for a northern fire simulation assumes a closure of the Arlington Ave., Lawson Rd., and Kensington Rd. egress points (see Figure 42). Highgate Road was left open as was the Moeser Lane egress point, though this may not be feasible in all situations. Though fire may come from the northeast, evacuation may still be faster using a route such as Highgate. The percentage of traffic traveling to Moeser lane is roughly 10% less than the baseline regional analysis of 25% for all traffic; however, almost all this traffic now travels via Edwin and Kerr. Most of the traffic shift is from Moeser Ln to The Circle in Berkeley as seen in Figure 43.

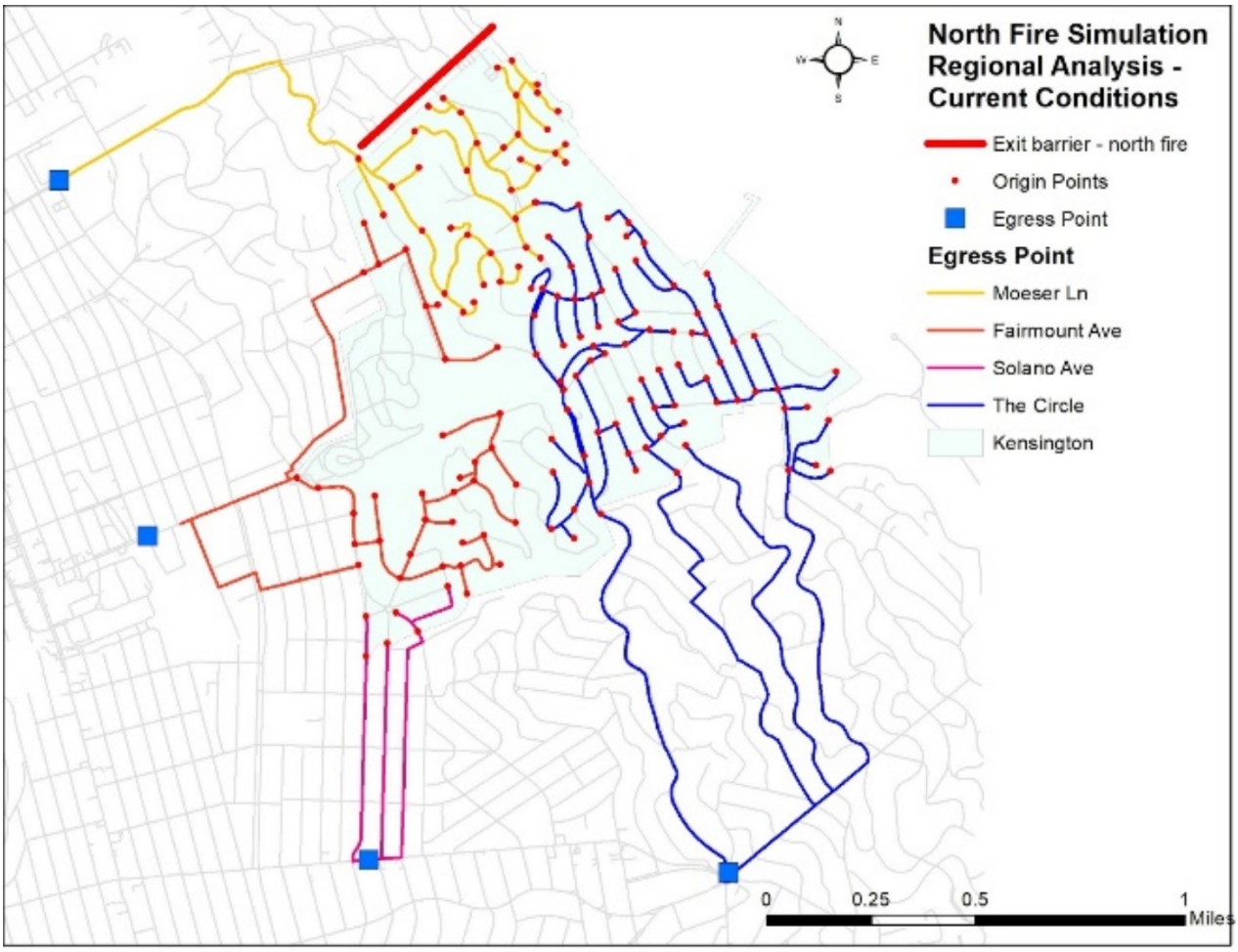


Figure 42: Exit barrier due to a northern fire and allocation of egress points (no cemetery access)

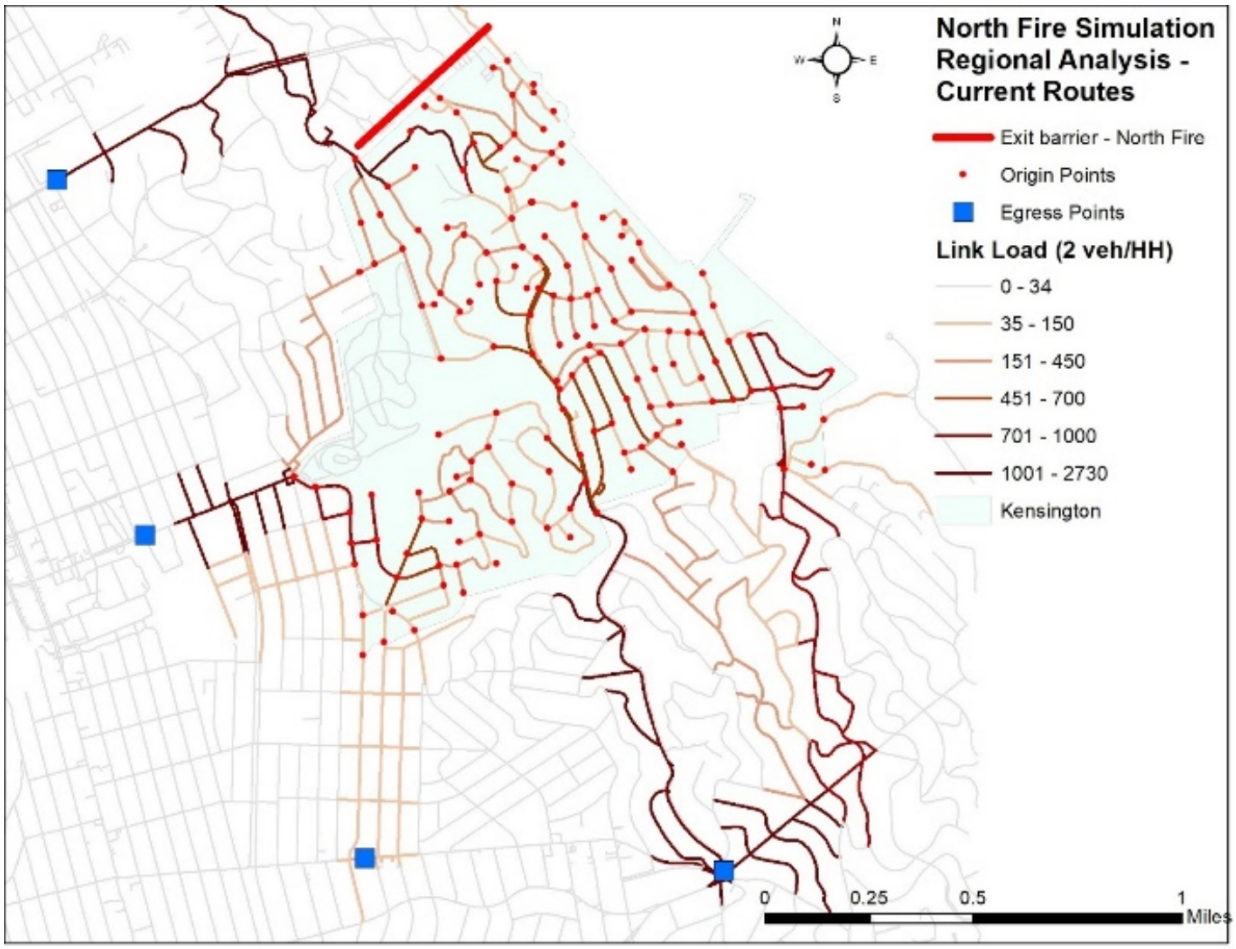


Figure 43: Traffic loading on the network for a northern fire (no cemetery access)

We also conducted a regional analysis where we assumed that the cemetery would be available to evacuees (Figure 45 and Figure 45). We find that evacuees shift again away from the Moeser Ln egress point, from 18% in the base case to 13%. However, unlike the current conditions, the rerouted trips travel to Fairmount Ave via the cemetery rather than south to The Circle. Similar to the base case through the cemetery, Arlington Ave between Sunset Dr and Arlington Ct, including the junction with Westminster Ave, faces the heaviest traffic loading. It should also be noted that this case results in significant traffic convergence at the intersection of Fairmount and Colusa, coming from the north, south, and east. While some traffic may travel via other east-west routes in El Cerrito, this intersection could easily become a bottleneck in such a scenario.

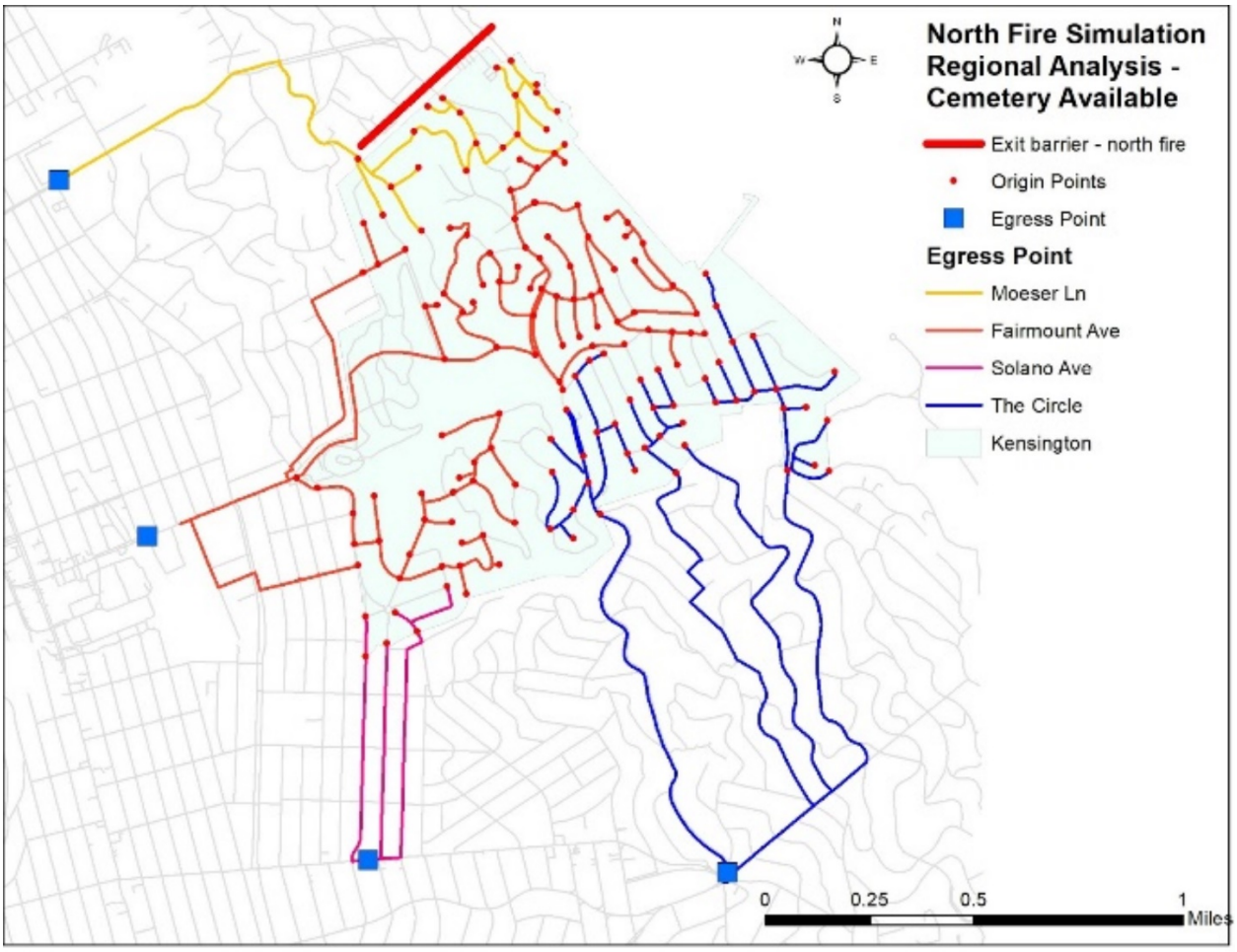


Figure 44: Exit barrier due to a northern fire and allocation of egress points (with cemetery access)

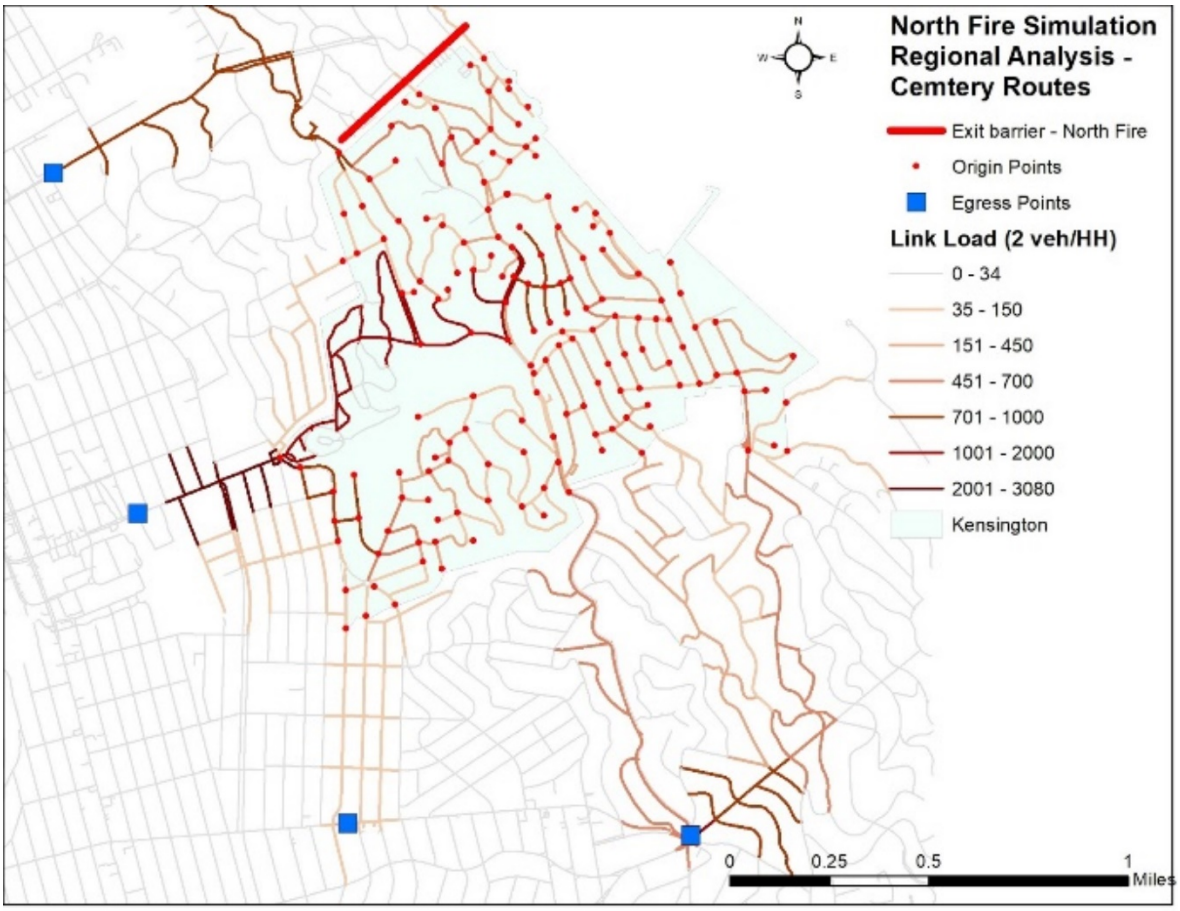


Figure 45: Traffic loading on the network for a northern fire (no cemetery access)

7.3.3.1) Wildfire from the South

We next conducted a local analysis of a southern/southeastern wildfire (Figure 46). Closing Grizzly Peak Blvd and trips to the southeast leads to heavy loading around southern Arlington Ave (Figure 47). One potential hazard here is that many of the roads in the southeast quadrant lack traffic control. Heavy traffic exists not just along southern Arlington Ave but narrow roads with parked vehicles such as Amherst and Yale. This would further encourage the designation of "downhill only" roads like Wellesley or Oberlin. Unfortunately, the fastest route from the local analysis is shown to be south on Arlington. However, there will likely be challenges with a large number of vehicles turning left onto Arlington Ave. Vehicles from Berkeley will also likely be evacuating northwards and Wellesley Avenue can only turn right (northbound) on Arlington. Additionally, similar to the case of Highgate Road in the northern scenarios, Arlington itself may become compromised, forcing all traffic to travel via comparably smaller east-west routes such as Coventry Road and Sunset Drive.

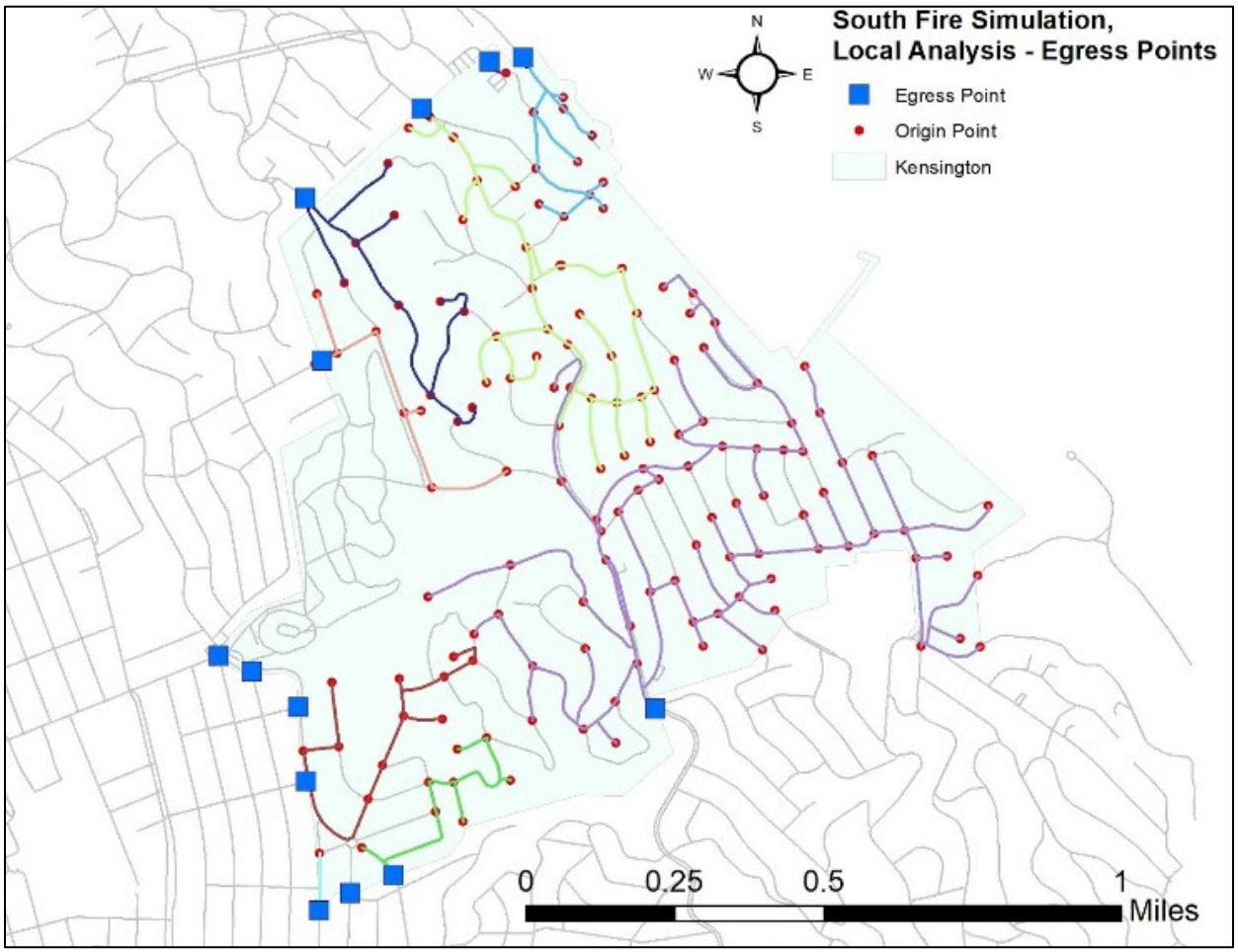


Figure 46: Available egress facilities and allocation for a wildfire from the south.

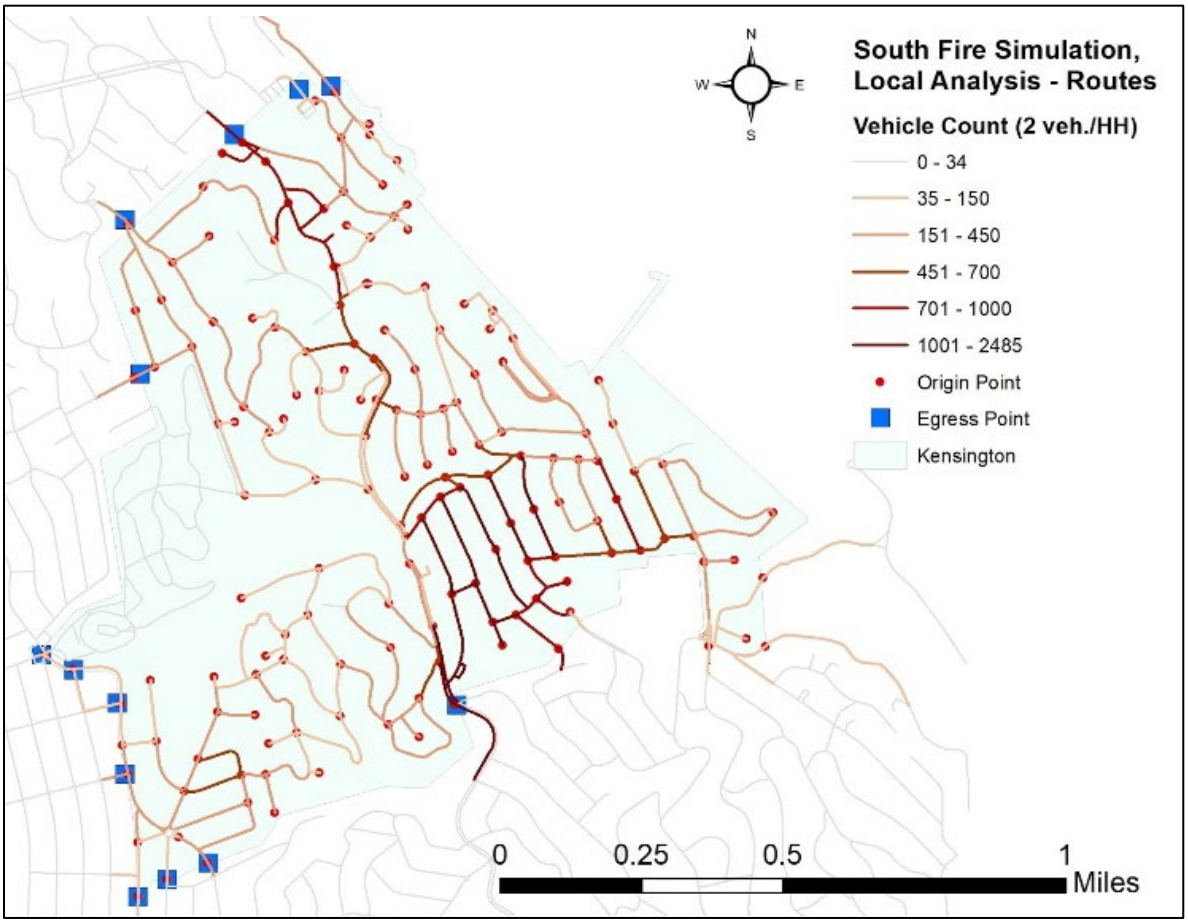


Figure 47: Traffic loading for a wildfire from the south.

At the regional level, 1,200 of The Circle's 2,200 base vehicles were redistributed to Solano Ave, primarily via a route along Arlington Ave to San Fernando Ave to Yosemite Rd to Contra Costa Ave to Capistrano Ave (Figure 48 and Figure 49). While most of those roads are narrow with street parking on both sides of the street, San Fernando Ave is of greatest concern with likely under 14' of clearance on both sides. This increases the risk of a bottleneck. Additionally, 600 trips shifted from The Circle to the Moeser Ln egress point via northern Arlington Ave. These were primarily trips from streets north of Beloit Ave including Colgate, Columbia, Trinity and Kenyon. Some of the through-streets are narrow but Kenyon is relatively well-marked. Given the large group moving downhill to Arlington rather than through Grizzly Peak, Kensington officials should consider a traffic coordinator at Westminster and Arlington. Additionally, as a fire to the south will likely result in Berkeley residents evacuating into Kensington, officials should be prepared for significant northbound traffic on Grizzly Peak Blvd, Vassar Avenue, Rugby Avenue, and Arlington Avenue.

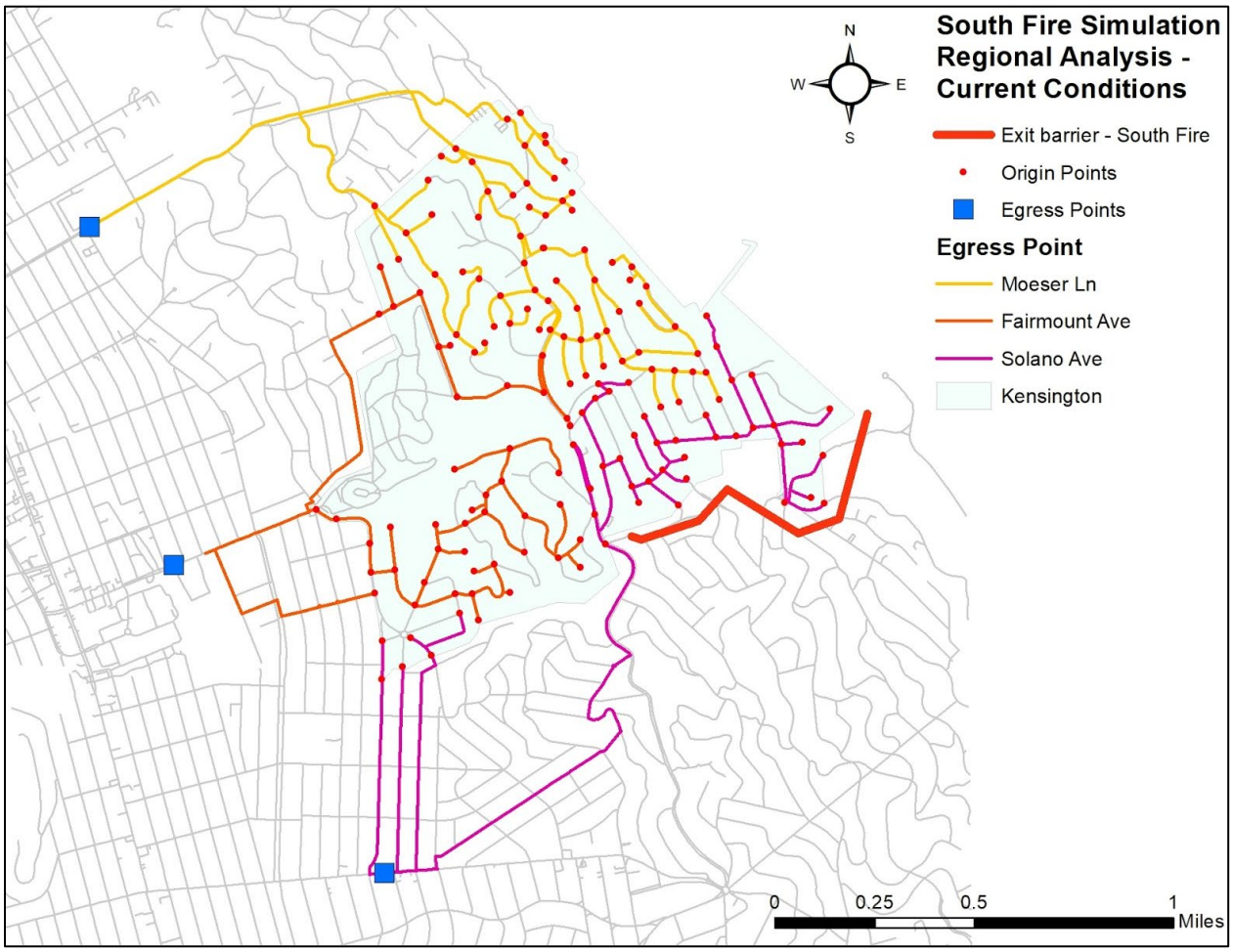


Figure 48: Exit barrier due to a southern fire and allocation of egress points (no cemetery access)

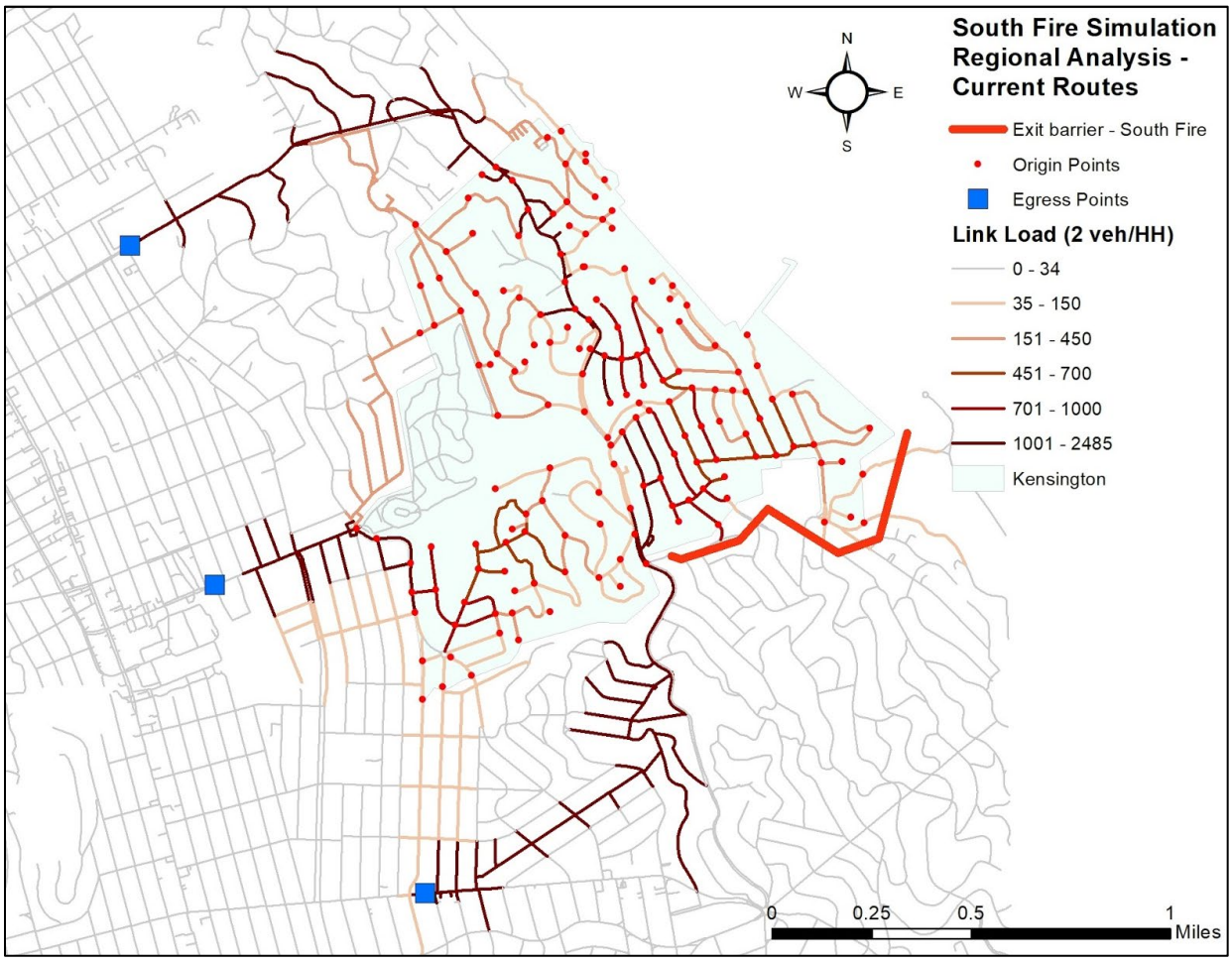


Figure 49: Traffic loading on the network for a southern fire (no cemetery access)

For the regional analysis when the cemetery is available and The Circle is not viable as an egress point, 80% all vehicles travel through the cemetery towards Fairmount Ave (Figure 50 and Figure 51). Considering congestion, this is unlikely a feasible solution. However, this result further highlights the centrality of the cemetery and its potential to improve evacuation times. Similar limitations to accessing the roads from Highgate Rd and Norwood Ave remain. In an emergency situation, traffic coordinators could be placed at major intersections along Arlington Ave to direct traffic away from the south towards the north. Communication between coordinators would also be critical. For example, if there was a delay northbound on Arlington Ave, traffic coordinators at Westminster could redirect southward towards either Sunset Dr or further south towards Solano Ave or Berkeley Park Blvd, depending on the location of the fire.

Similar to the other southern fire simulations, east-west streets uphill from Arlington Ave such as Westminster, Kenyon, Trinity and Columbia face heavier traffic when they cannot exit via Grizzly Peak Blvd towards The Circle.

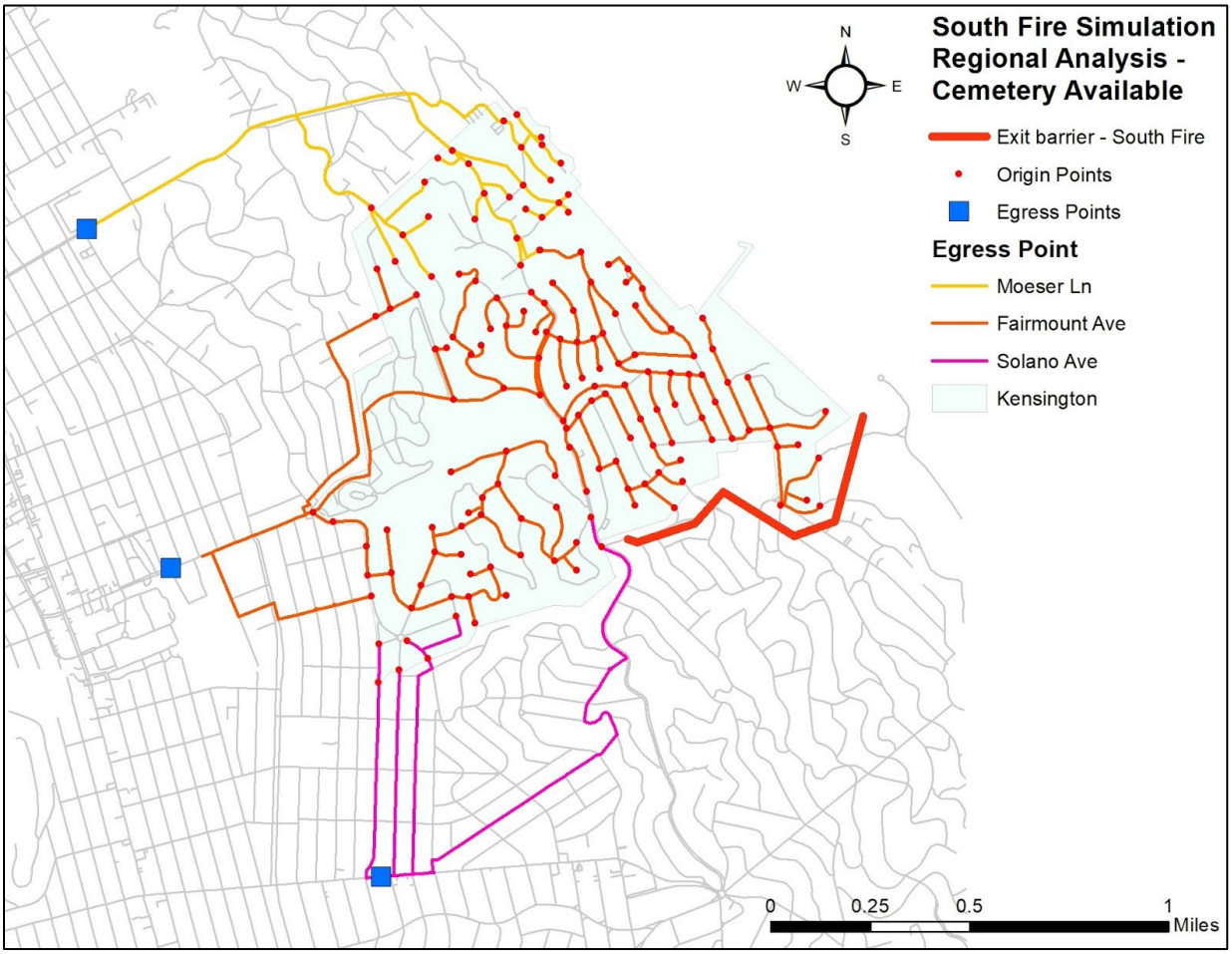


Figure 50: Exit barrier due to a southern fire and allocation of egress points (with cemetery access)

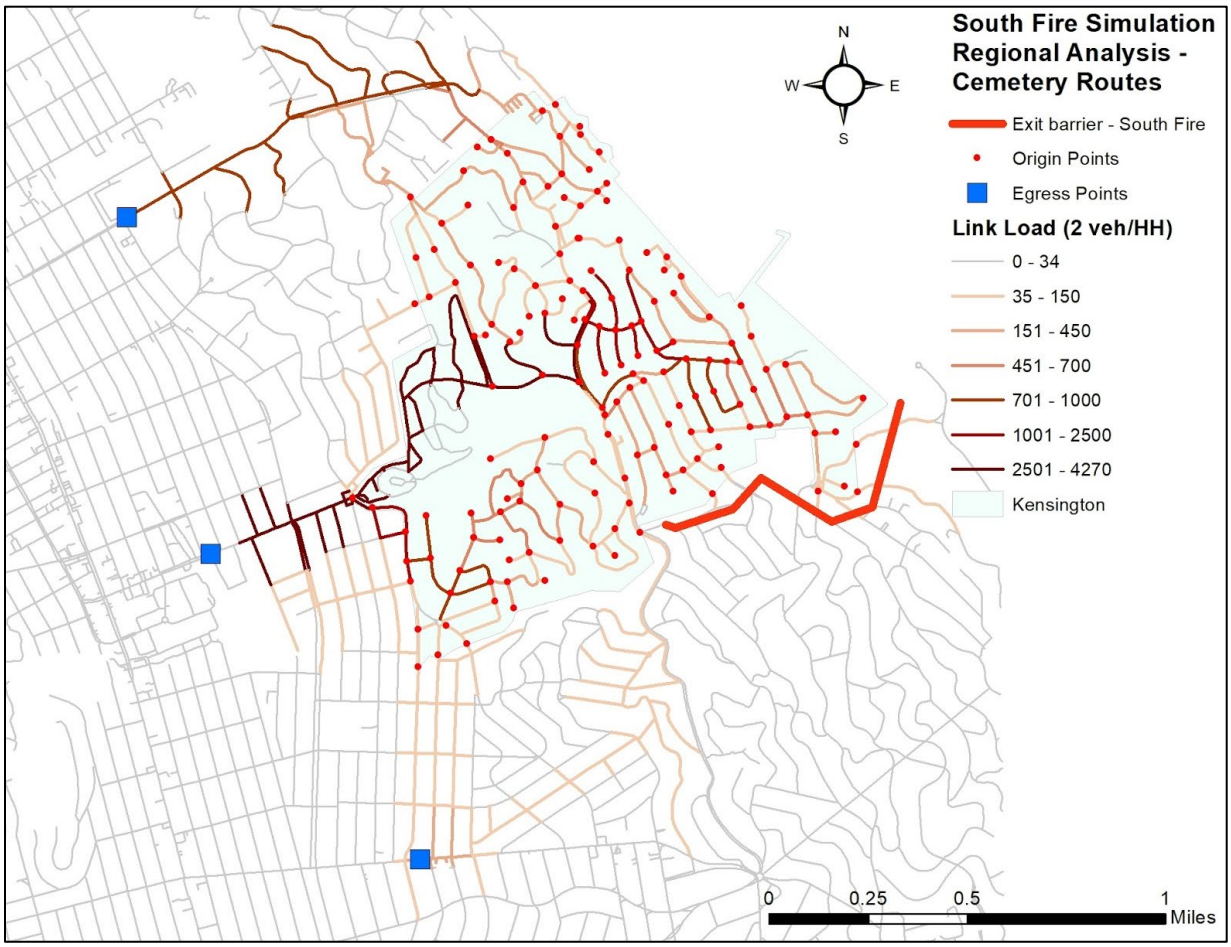


Figure 51: Traffic loading on the network for a southern fire (no cemetery access)

7.3.4) Network Analysis Summary

Each model in our network analysis has its strengths and weaknesses. The local-level analysis is unbiased to major and designated evacuation routes, weighting the importance of all exits along the border of Kensington equally. The regional-level analysis better recognizes that the goal of evacuation is to not just leave Kensington, but to reach a place of safety. Together, they highlight important findings. Consistent across both models are the importance of Arlington Ave, Grizzly Peak Blvd and parts of Colusa Ave.

The local analysis reflects how households may counterintuitively travel uphill in order to reach a more major road. Both regional and local analyses highlight how some central roads may see two-way traffic even though the current roadway geometry likely cannot accommodate this. This includes Wellesley Ave for the regional analysis and Vassar Ave for the local analysis. It may be more likely that users of Vassar Avenue may take a more

major road such as Arlington or Grizzly Peak Blvd. The regional analysis highlights the significance of the cemetery route to improving evacuation time.

The fire simulations show the need for additional sensitivity based on the direction of risk. The cemetery consistently sees higher use when exits are constrained by fire from either the north or south. The simulations also highlight how some smaller roads with lower capacity may take on more traffic when their nearest egress points are eliminated.

One shortcoming in both models is the sensitivity to egress point location. Shifting egress points by small amounts can significantly influence route choice. While the cemetery does not appear significant in the local analysis, this is largely due to a border peculiarity that favors the use of Eureka Avenue; in the regional analysis, the introduction of the cemetery route has a very significant effect on evacuation route choice. It should be noted that while the analysis is very sensitive to egress point location, this likely diverges from the decision-making of evacuees, who as noted earlier may not have any knowledge of where to evacuate to and/or the shortest path to reach such a location. Some individuals may be more likely to follow their intuition and personal habits unless given specific information on where to go and how to get there. Indeed, more evacuees than expected may attempt to evacuate on Arlington Avenue since it is the major thoroughfare for the community. Consequently, we note that simulations (or network analyses) with even the most informed assumptions and parameters will likely be different than actual events due to human behavior. However, we believe that this network analysis is a good indicator for Kensington on areas that could present major challenges moving forward with an evacuation plan and that a full-scale simulation is not necessary to make informative recommendations.

8) RECOMMENDATIONS

In this section, we provide recommendations for Kensington officials to prepare for, respond to, and recover from natural hazards, with an emphasis on wildfires and evacuations. We note that due to the unpredictable nature of wildfires and human behavior, these recommendations constitute just a toolkit for improving evacuation outcomes, not a guaranteed way to save all lives and protect all property. Moreover, some recommendations may not be currently implementable. We encourage Kensington officials to continue to reference these recommendations moving forward, as circumstances and additional resources may alter feasibility. We also note that our

network analysis is an idealized simulation. Indeed, a single evacuee moving in the wrong direction could significantly hamper overall evacuation outcomes. Through our research, we found the road network in Kensington is highly fragile to human behavior, particularly through the low tolerance of much of the road network to large volumes of two-way traffic. Consequently, recommendations may not produce the exact desirable values or results. Finally, we note that any developed evacuation plan will not be 100% implementable in a major disaster; emergencies are by nature chaotic and disruptive. However, the process of constructing the plan, setting communication protocols and flows, determining responsibilities, and notifying residents will be highly useful in a disaster.

8.1) Recommendations from Literature and Evacuation Plan Review

R1: Kensington should ensure that emergency response plans, evacuation plans, reentry plans, preparedness guides, and fire suppression activity guides are free and easily accessible to the public online and in print.

- Evidence: Most jurisdictions in the surrounding area do not provide resources or materials related to wildfires, making it difficult for residents to know what to do before, during, and after a wildfire. This lack of information may lead to dangerous behavior (such as attempting to defend residences from the fire) and hinders the goals of emergency managers.

R2: Kensington should produce relevant maps that split the community into specific zones to improve evacuation outcomes and institute a phased evacuation (releasing zones at different times), if possible. Officials should limit zones to under ten to avoid confusion and bound areas using key landmarks, distinct geographies, and clearly defined roads. Officials need to clearly communicate these zones to residents (e.g., "Know Your Zone Campaign").

- Evidence: Both Berkeley and Lamorinda developed evacuation maps that help identify zones and provide information on possible shelters. If the fire is moving slower (or given enough lead time), zones could be released at different times, beginning first with zones closest to the WUI, to reduce congestion. However, zones cannot be too small as the proliferation of zones makes it harder for residents to know their zone (e.g., over 130 zones for Berkeley). Moreover, zones

must be communicated widely to residents to ensure that any phased evacuation is performed correctly.

R3: Officials should consider adding information about how to help others in evacuations and integrating with local Community Emergency Response Teams (CERTs).

- Evidence: Given that many residents in Kensington lack transit access, officials should encourage a community-based approach that helps carless individuals and those who are unable to drive. Developing a neighborhood network that identifies neighbors that may need assistance evacuating or being notified of an evacuation would improve equitable outcomes and reduce risks. Moreover, the network should match vulnerable residents with several other residents who will be able to assist in an evacuation. Vulnerable residents include older adults, people with disabilities and individuals without car access. Moreover, CERTs could play this intermediary role since members often receive training for emergencies (see Wong and Shaheen, 2019 for more recommendations on a shared resource strategy).

R4: Officials should develop and promote a Firewise program (like that for Moraga and Orinda) to reduce wildfire fire risk on properties and encourage preparedness.

- Evidence: The Kensington Fire Board does not have enough resources to institute a broad fuel reduction program. Consequently, educational outreach through a Firewise program would be the most effective tool in improving community resilience. While a large and rapidly spreading wildfire would likely still impact Kensington, fuel reduction could be instrumental in slowing smaller wildfires and stopping the outbreak of large fires.

R5: All types of emergency and evacuation plans and guides should also consider other hazards that would be relevant to Kensington including but not limited to: earthquakes, landslides/mudslides, hazardous material and chemical spills, power outages (including public safety power outages), and floods.

- Evidence: While other hazards may be less likely or not require evacuations, Kensington should be prepared to handle such events, as evidenced by the inclusion of these hazards in other area emergency plans. Moreover, officials should include a section of cascading failures (e.g., an earthquake leading to an outbreak of a wildfire). This becomes especially important in the event of public

safety power shutoff (PSPS) events as communication with residents becomes very difficult. Low-tech strategies will be necessary to communicate wildfire risks and evacuation orders.

R6: Officials should consider developing joint evacuation and emergency plans with neighboring communities, specifically El Cerrito and Berkeley. Plans need to state how evacuees from Kensington may impact those jurisdictions.

- Evidence: The Lamorinda (Lafayette, Moraga, Orinda) area has developed joint materials and plans that factor in the regionality of wildfires and evacuations. Since most Kensington evacuees will have to travel through either El Cerrito or Berkeley, developing a joint plan could alleviate congestion through both communities. Moreover, joint planning could highlight potential opportunities and challenges in an emergency.

R7: Kensington should develop a campaign that encourages residents to sign up for emergency alerts for both Contra Costa and Alameda counties. This campaign should attempt to reach a critical mass of registered users to ensure that information is widely distributed.

- Evidence: Other community plans and preparedness material continuously encourage residents to sign up for alerts. However, a dedicated campaign may be necessary to increase sign-ups. Moreover, residents should sign up for alerts from both Contra Costa and Alameda counties given that a wildfire could originate in either county.

R8: Officials should be prepared to conduct door-to-door mandatory order notifications in neighborhoods where residents believe they are able to defend against a fire.

- Evidence: Research has found that those with strong self-efficacy in the ability to defend are more likely to stay behind. Moreover, residents with a water supply for firefighting are more likely to stay. Mandatory evacuation orders via personnel may be more effective in encouraging compliance.

R9: Kensington officials should be proactive in issuing evacuation orders to ensure that evacuees have time to leave.

- Evidence: Mandatory evacuation orders have been found to be one of the strongest influencers on the decision to evacuate. To avoid situations where some residents do not receive orders in time, officials need to push out orders early and widely. While this may encourage evacuations from people not immediately at risk, officials should prioritize any mechanism that notifies at-risk populations.

R10: Evacuation plans and mandatory orders should include information on available housing, including free public shelters in nearby cities.

- Evidence: Research has found that the cost of an evacuation can decrease willingness to evacuate. Moreover, individuals without resources are more vulnerable in an emergency event. Evacuation plans (preparedness stage) and mandatory orders (response stage) should both include information on available shelters to encourage people to leave.

R11: Officials may need to conduct additional outreach (preparedness stage) and door-to-door notifications (response stage) to encourage pet owners to evacuate.

- Evidence: Pet owners have been found to be less likely to evacuate, which substantially increases their fire risk. Officials should encourage pet owners to develop a go bag for both themselves and their pet(s). These owners should also have knowledge of local shelters that accept pets in an emergency.

R12: Mandatory evacuation orders and wildfire information should be dispersed consistently across multiple platforms to increase knowledge and reduce confusions and rumors.

- Evidence: Research has found that individuals relied on multiple local sources (including social contacts) for information about evacuations and wildfires. This information should be as detailed as possible as generalized information was found to be of little value to at-risk individuals. While Kensington does not have a large police force to conduct extensive door-to-door notices, this method has been found to improve evacuation likelihood. Alternative communication methods, including mobile or stationary sirens and drones, should be considered.

R13: Officials should keep information up-to-date for residents, including after the wildfire for the planned reentry process.

- Evidence: Research found that real-time information was critical for evacuees to make evacuation plans and conduct safe evacuations. Even if information does not change drastically, real-time information offers knowledge to evacuees, reassures residents, and decreases overall worry and concern. Uncertainty has been found to a primary stressor for evacuees. Moreover, following wildfires, poor communication led to substantial decreases in trust of fire personnel and local officials and led residents to blame fire officials for damages.

R14: Kensington should consider supplementing official orders with information to CERTs and neighborhood-based groups to encourage evacuations.

- Evidence: People have been found to be more likely to evacuate if they had knowledge that other people were leaving. Residents also leverage their social networks for information. CERTs and neighbors could be a meaningful mechanism to encourage others to evacuate, provided that the information is dispersed accurately.

R15: Officials should consider some contraflow measures, traffic signal prioritization, and intersection flow mechanisms to increase capacity.

- Evidence: Research has found that traffic interventions, even limited ones, were helpful in decreasing evacuation times and congestion. Routes also need to be developed for emergency vehicles to access hazard areas. While Kensington has limited personnel, pre-planned and targeted responses could be highly effective. To the extent possible, these responses should be communicated to residents. Additional evidence is provided in the following sections.

R16: Officials should focus on building evacuation plans and should refrain from encouraging or supporting defending behavior.

- Evidence: Residents tend to be more confident that they can defend their property from a wildfire than officials. Moreover, a significant number of individuals have been found to intend to defend their home, despite lacking knowledge of how to defend. Defending behavior has proven deadly in several instances, such as the Black Saturday Fire in Australia in 2009 when 173 people were killed. While some defending behavior has saved lives and property in certain instances, Kensington's geography and fire risk would be severely detrimental to defenders. Moreover,

limited and narrow evacuation routes throughout the community would cause challenges for individuals who defend and later evacuate.

R17: Kensington should remain up-to-date on innovative mobility options that could help (or harm) evacuation outcomes.

Evidence: Emerging mobility (e.g., electric and hydrogen vehicles, autonomous and connected vehicles, micromobility, app-based shared mobility, and urban air mobility and drones) could be helpful in increasing the amount of resources available to evacuees. Some options, such as drones, could serve to detect and monitor fires, identify congestion in real-time, or even alert residents through mounted speakers. Other options such as electric vehicles could become unusable in an evacuation, as the event may be preceded by a power shutoff.

8.2) Recommendations from Field Survey

R18: Kensington should establish improved coordination with adjacent municipalities when identifying preferred evacuation routes.

- Evidence: While this study exclusively surveyed Kensington Streets, downstream bottlenecks should be considered when recommending evacuation routes. Streets that could appear to be good conduits for evacuees within Kensington may encounter bottlenecks in adjacent jurisdictions. These could include traffic signals in El Cerrito, the traffic circle at the Berkeley end of Arlington Avenue, and stop signs along Moeser Lane in El Cerrito and Spruce Street in Berkeley.

R19: First responders should identify uphill routes for emergency vehicles that minimize conflicts with downhill traffic.

- Evidence: Many streets in Kensington would present significant challenges to emergency personnel attempting to travel uphill. The implementation of dedicated access routes or the removal of parking should be considered area-wide where applicable to either facilitate two-way traffic or provide alternate access.

R20: Kensington should consider reducing vegetation where possible along major evacuation routes.

Evidence: Many evacuation routes (as identified in sections 7.1 and 7.3) have the potential to be impacted by fallen trees or burning vegetation due to high fuel loads in proximity to the roadway. Specific cases include segments of Coventry Road between Eldridge Court and Stratford Road, the entirety of Sunset Drive, and Arlington Avenue in the vicinity of Sunset Drive. While major roadways are less likely to be impacted than secondary streets (see Section 7.1.4), potential bottlenecks remain. Kensington officials should work with the county and property owners to find site-specific solutions that could mitigate these risks.

R21: Officials should consider reducing obstructions on the Beloit/Yale/Princeton route and treating Wellesley and Oberlin as "downhill only" during an evacuation (e.g. route uphill emergency vehicles via a different route to minimize conflicts).

- Evidence: The Beloit route is a key east-west evacuation route in the southeast quadrant but is compromised by narrow widths (in part due to parked vehicles) and multiple turns. Alternate options, such as Wellesley and Oberlin Avenues, are even narrower and are further compromised by parked vehicles and vegetation.

R22: In the southwest quadrant, consider prioritizing Lenox Road/Stratford Road/Berkeley Park Boulevard over Coventry Road as an exit route and/or reducing obstructions and potential hazards along Coventry Road west of its junction with Stratford Road.

- Evidence: Between the junction of Coventry Road and Lenox Road and the Colusa Circle area, Coventry Road is more impacted by parked vehicles, pinch points, minimum lane widths, and vegetation than the Stratford Road route. Additionally, where the two routes re-converge at the intersection Berkeley Park Boulevard and Coventry Road, Berkeley Park Boulevard currently has the preferred right-of-way while traffic on Coventry faces a stop sign. Coventry Road also traverses a two hairpin turns over this distance. However, while Stratford is currently a better route based on the metrics assessed in the field survey, Coventry should be maintained and improved as an evacuation route for purposes of resilience, redundancy, and additional capacity.

R23: If appropriate given the situation, residents of Arlington Court, Norwood Court, and the eastern sections of Norwood Avenue should be encouraged to evacuate toward Arlington Avenue rather than toward Highgate Road.

- Evidence: The segment of Norwood Avenue between Norwood Place and Highgate Avenue is steep and narrow with high fuel levels, making it potentially hazardous to navigate in an emergency. The section of Highgate Road south of Norwood Avenue also has significant pinch points and high fuel levels.

R24: Kensington should examine the potential for emergency personnel to be able to remove bollards by Kensington Elementary School.

- Evidence: This response would provide a pathway for first responders to access the eastern portion of Kensington that bypasses roadways such as Westminster Avenue and Kenyon Avenue that are likely to be used by residents evacuating in the opposite direction. This also provides dedicated (though steep) access for emergency and/or high-capacity vehicles to the Kensington Elementary School if it is used as a staging area or gathering point of last resort.

R25: Kensington fire and police personnel should consider encouraging residents of the southeastern quadrant of Kensington to evacuate via Grizzly Peak Boulevard and Spruce Street rather than Beloit Avenue to Arlington Avenue.

- Evidence: The Beloit/Yale/Princeton east-west route is currently compromised by narrow streets and multiple turns, whereas Grizzly Peak Boulevard is wider and more direct. Nonetheless, consideration should be given to the fact that the intersection of Grizzly Peak Boulevard and Spruce Street is complex and likely requires supervision during an emergency, as well as the fact that Spruce Street will also have to handle evacuees from Berkeley. Moreover, both routes are closer to WUI and would only be recommended if the fire is not in the vicinity.

R26: Emergency personnel should consider using the EBMUD access road at Summit Reservoir as an alternate route for emergency vehicles. In extreme circumstances, the EBMUD access road could be used to evacuate vehicles.

- Evidence: If Grizzly Peak Boulevard is used as a preferred evacuation route, the EBMUD access road could offer emergency vehicles a section of designated right-of-way in which they could bypass evacuating traffic and the five-way intersection at Grizzly Peak Boulevard and Spruce Street. The Summit Reservoir area also has little tree cover and vegetation and therefore could be valuable as a staging area or gathering point.

R27: Officials should work with Contra Costa county to further establish "clear zones" at intersections to reduce congestion and improve turning ability.

- Evidence: Currently, many intersections are unlikely to be negotiable by large vehicles that may need to navigate them in an emergency. Targeted no-parking zones could help accommodate the larger turning radii of these vehicles. An example is already in place at the intersection of Beloit Ave and Trinity Ave, where several parking spots are removed during the hours that AC Transit line 67 operates to this part of Kensington in order for buses to be able to turn left out of Trinity onto Beloit. Such an effort could provide additional co-benefits in the form of improved visibility and safety for pedestrians crossing at intersections.

R28: Officials should investigate alternate gutter designs that could enable greater right of way width, particularly for installation in the southeastern quadrant along segments of Beloit, Cambridge, Columbia, Trinity, and Willamette Avenues.

- Evidence: Several segments were significantly width-constrained by deep gutters, as these both narrowed the drivable area and occasionally resulted in vehicles being parked farther from the curb. Potential solutions could include covering deep gutters with metal grating over their full length or incentivizing homeowners to adopt driveway crossings that could be navigable by vehicles driving in the gutter.

R29: Kensington and/or neighborhood groups should add clearly visible signage at both ends of each segment of the pathway network and vegetation along the paths should be managed to allow safe passage during an emergency.

- Evidence: Given the limitations of the road network to handle a sudden influx of vehicle traffic, greater consideration needs to be given to the potential for people to evacuate on foot. The use of the pathway network in conjunction with high-capacity vehicles is likely to be the best option based on current conditions. However, many elements of the pathway network may not be viable as evacuation routes. Two walking paths are not currently navigable due to barriers imposed by neighboring homeowners. Many more are narrow and surrounded by vegetation but navigable, though the Westminster Path is notably steep with dirt grounding that may be difficult to navigate when traveling downhill. The Ardmore Path (and

generally those west of Arlington) was more navigable with wide, paved pathways and gentler slopes.

R30: Officials should work to establish designated gathering points within Kensington, particularly for evacuees traveling on foot, where emergency services will be available and high-capacity vehicles can move people further from the hazard. Officials must ensure that anyone arriving to these gathering points is able to evacuate.

- Evidence: Residents are unlikely to be able to sufficiently remove themselves from the hazard area on foot and therefore will require pickup by vehicles, which will be easier to coordinate at a designated set of locations. Potential gathering points are detailed in section 7.2 and could include the Kensington Elementary School, the Summit Reservoir, the commercial district along Arlington Avenue, and Colusa Circle. Care should be taken in ensuring that high-capacity vehicles can access these locations, particularly if they are required to travel against evacuating traffic to do so. Currently, Colusa Avenue, Arlington Avenue, and Grizzly Peak Boulevard accommodate public transit buses, and the elementary school is presumably accessible to school buses. However, great care should be taken in recommending gathering points within Kensington during any large-scale emergency, as many of these locations may not be sufficiently distant from the hazard and residents should instead attempt to reach gathering points in El Cerrito and Berkeley whenever possible. Residents can also access resources in Albany, Richmond, Oakland, and further away in San Francisco.

R31: Officials should identify and communicate key gathering points in Berkeley. This includes schools (e.g., Thousand Oaks Elementary School, Jefferson Elementary School, Rosa Parks Elementary School, Berkeley High School, and the University of California, Berkeley), libraries (e.g., North Branch Library and Central Public Library), parks (e.g. Thousand Oaks Park, King School Park, Ohlone Park, and Ohlone Greenway), and transit centers (e.g., North Berkeley BART, Downtown Berkeley BART).

- Evidence: Most Kensington gathering points are highly vulnerable in a large wildfire or emergency. Residents should know about potential shelters and gathering points identified in the Berkeley Evacuation Map.

R32: Officials should identify and communicate key gathering points in El Cerrito. This includes schools (e.g., Harding Elementary School, Fairmont Elementary School, Fred T. Korematsu Middle School, and El Cerrito High School), the El Cerrito Library, the El Cerrito Community Center, the El Cerrito Senior Center, parks (e.g., Cerrito Vista Park, Harding Park, and Ohlone Greenway), and transit centers (e.g., El Cerrito Plaza BART and El Cerrito del Norte BART).

- Evidence: Most Kensington gathering points are highly vulnerable in a large wildfire or emergency. Residents should know about potential shelters and gathering points in El Cerrito that are away from the WUI and could have resources.

R33: Kensington should improve wayfinding regarding evacuation routes and gathering points.

Evidence: While it is valuable to inform residents of evacuation routes and gathering points, this knowledge may not be able to be relied upon in an emergency. Good wayfinding, including signs, will help guide evacuees toward safe locations, especially in cases of poor visibility or for visitors to the area.

8.3) Recommendations from Network Analysis

R34: Kensington should consider designating the following road combinations as primary evacuation routes for wildfires:

- Arlington Ave, Sunset Dr, Sunset Dr (through cemetery), Fairmount Ave;
- Arlington Ave, Moeser Ln;
- Beloit Ave & Grizzly Peak Blvd, with coordination with Berkeley as to the best downhill routes from the intersection of Grizzly Peak Blvd & Spruce Street;
    - Note that this route is close to the WUI and therefore not recommended for all situations;
- Stratford Rd, Berkeley Park Blvd, Colusa Ave, Fairmount Ave;
    - To reach Stratford Rd, Beverly Rd, Lenox Rd, Kingston and/or Coventry Rd need be improved.

- Evidence: Based on the network analysis and identifying key links that would likely see significant traffic based on shortest-path, specific routes could be designated as evacuation routes.

R35: Fire, police, and/or community officials should have access to the Sunset View Cemetery gate. Cemetery roads could be used to increase evacuation speed and/or send emergency personnel and resources into the hazard zone. Officials need to create an arrangement with cemetery personnel to ensure that the gate can be opened at any time.

- Evidence: By utilizing the cemetery roads, congestion could be significantly reduced along Arlington Avenue and northern Kensington including Highgate Rd and Franciscan Way. Rather than overloading Moeser Ln (which is also located close to the WUI), vehicles can more directly reach Fairmount Ave via the cemetery. Moreover, the inclusion of a two-way road could improve evacuation clearance times.

R36: Kensington should consider improving Sunset Dr and the nearby area, especially if Kensington intends to use the cemetery for evacuation. These include ensuring adequate width along Sunset Dr, parking restrictions along at least one side of the road and managing underbrush and trees to minimize fuel risk.

- Evidence: Currently, Arlington Ct and Norwood Ave are not suitable alternatives to Sunset Dr for reaching the cemetery. The intersection at Sunset Dr and Arlington Ave is unconventional with high potential for conflict between southbound traffic on Arlington Ave and vehicles trying to turn onto Sunset Dr. Vehicles will face difficulty turning left from Westminster onto Arlington Ave due to northbound traffic without a traffic coordinator. A traffic coordinator at Sunset Dr and Arlington Ave would make sure that the queue does not block Arlington Ave and redirect vehicles otherwise.

R37: Kensington should consider deploying traffic coordinators at key intersections to facilitate more efficient traffic flow. They should have a system to communicate with each other and central command. Specifically, they should focus on intersections where residents may travel uphill towards the WUI.

- Arlington Ave & Amherst Ave;
- Arlington Ave & Oberlin Ave;

- Arlington Ave & Sunset Dr;
- Arlington Ave & Westminster Ave;
- Arlington Ave & Cowper Ave;
- Arlington Ave & Highland Blvd;
- Grizzly Peak Blvd & Spruce St;
- Sunset Dr & cemetery entrance;
- Highgate Rd & Franciscan Way;
- Eureka Ave & Franciscan Way;
- Colusa Ave & Valley St; and
- Fairmount Ave & Colusa Ave.
- Vassar Ave and Yale Ave;
- Cambridge Ave and Yale Ave;
- Cambridge Ave and Beloit Ave;
- Grizzly Peak Blvd and Beloit Ave; and
- Kenyon Ave & Wellesley Ave.

- Evidence: The field survey shows unconventional intersections at Sunset Dr and Arlington Ave. All regional analyses with the cemetery available showed traffic from Westminster traveling down Sunset Dr through the cemetery. However, left turns onto Arlington Ave could be complex and unsafe, particularly if traffic is primarily evacuating north. Local analysis for the fire simulations showed heavy traffic on smaller local roads: Edwin and Kerr for northern fires and Amherst Ave and Oberlin Ave for southern fires. The edges of Kensington such as Grizzly Peak Blvd, Highgate Rd, Franciscan Way, Fairmount Rd, Eureka Ave, Valley St, & Colusa Ave are heavy evacuation points in either or both local and regional analyses.

  Several other key intersections were identified in the local network analysis as having substantially higher vehicle movement. These intersections are concentrated in the southeast quadrant, are geometrically small, and sometimes fail to have any stop control. Officials could also consider placing additional yield signs to ensure that intersections are better marked. The intersection of Vassar Ave. and Yale Ave. is particularly problematic since the analysis shows it may take upwards of one hour to move the intended demand of vehicles through that intersections, especially if each household in Kensington takes an average of 2.5 vehicles.

R38: Kensington officials should consider instituting one-way directions (either all the time or only red flag warning days) along roads particularly in the southeast quadrant. Parking restrictions at some pinch points may also be necessary, particularly for roads that could be bidirectional.

- Evidence: Multiple roads in the southeast quadrant would be highly impacted by evacuees based on the local analysis. Given that many of these roads are narrow and the possibility of two-way traffic, officials should consider making roads single direction.

R39: The Kensington Fire Department should engage with the cities of El Cerrito and Berkeley to coordinate evacuation plans.

- Evidence: Kensington residents will generally evacuate towards major arteries in Berkeley and El Cerrito (Moeser Ln, Fairmount Ave, Solano Ave along with The Circle). These destinations will be subjected to heavy traffic loads based on the network analysis, particularly Moeser Ln and The Circle without cemetery access and Fairmont Ave with cemetery access. It is also likely that residents from both Kensington and these cities will be traveling on the same routes. For a northern fire, Fairmount Ave will be severely impacted (especially if the cemetery is available). For a southern fire, Solano Ave will be severely impacted (regardless if the cemetery is available).

R40: Kensington officials should consider encouraging evacuees to travel south on Arlington Avenue (rather than smaller side streets) in the event of a northern fire. Officials should also consider improving Edwin Dr and Kerr Ave by restricting parking on red flag days to ensure adequate traffic flow. Officials may also have to direct traffic from Highgate Rd toward Eureka Ave, depending on the direction of the fire.

- Evidence: The network analysis for a northern fire (both local and regional) indicates that a significant number of vehicles from the northeast quadrant will be routed down Edwin and Kerr Ave.

R41: In the case of a wildfire (regardless on directionality), Kensington should establish strong coordination with El Cerrito regarding traffic supervision and direction at the intersection of Fairmount Ave and Colusa Ave, or work with El Cerrito to define alternate east-west routes.

- Evidence: In both directional fire scenarios, particularly when the cemetery is available as an egress path, almost all of Kensington's evacuees converge on the intersection of Fairmount Ave and Colusa Ave from multiple approaches. This is likely to cause significant traffic congestion that will impact multiple evacuation routes.

R42: If there is a wildfire from the southeast, traffic coordination will need to be established by El Cerrito along Fairmount Ave (if the cemetery is opened) and along Solano Ave (if the cemetery is not opened).

- Evidence: The cemetery-available simulation results indicate that the cemetery is the shortest path for 80% of Kensington households.

R43: Overall, Kensington should consider the following transportation changes to improve evacuation outcomes, reduce congestion, and improve flow through the community:

    - Removing some on-street parking and/or restricting parking during red flag days, particularly on suggested evacuation routes and roads with enough width for two lanes;
    - Designating some very narrow roads as one-way traffic permanently or for red flag days, particularly on highly impacted links;
    - Improving intersection signage with yield signs as appropriate to improve flow through the intersection and set precedent to evacuation routes;
    - Removing several spaces of parking near tight, unconventional, and/or critical intersections to improve turning radii and set staging areas for first responders;
    - Considering some two-way streets as single direction downhill in an evacuation (e.g., Berkeley Park Blvd, Coventry Rd, Moeser Ln, Sunset Dr, all roads within the cemetery);
    - Encouraging residents to park vehicles in driveways or as far off the street as possible during evacuation.
- Evidence: Network analysis results from all tested scenarios indicate that a substantial number of links and intersections in Kensington will be heavily impacted in a wildfire. Kensington should prepare a suite of community-wide, road-specific, and intersection-specific strategies that could be debated and

communicated to the public. In addition, some of these strategies have co-benefits, particularly related to overall daily safety of the network and pedestrians.

9) Conclusion

Through a review of local plans and academic literature, a field survey of Kensington, and analysis of the road network, we found that Kensington could make a number of key changes that would help improve evacuation outcomes. Most importantly, this research project serves as a primer for the development of an evacuation plan (and reentry plan), refinement of the emergency operation plan, and creation of necessary guides for residents. Any future work on these fronts should maintain strong transparency and be communicated widely to the public. Moreover, residents should be incorporated into the evacuation and preparedness planning process. With this investigative project, Kensington will be more prepared to respond to and recovery from natural hazards (especially wildfires), improving evacuation outcomes, life safety, and quality of life for community residents.

10) References

Beloglazov, A., Almashor, M., Abebe, E., Richter, J., & Steer, K. C. B. (2016). Simulation of wildfire evacuation with dynamic factors and model composition. *Simulation Modelling Practice and Theory*, *60*, 144–159. https://doi.org/10.1016/j.simpat.2015.10.002

Benight, C., Gruntfest, E., & Sparks, K. (2004). *Colorado Wildfires 2002*. Retrieved from University of Colorado website: https://hazards.colorado.edu/uploads/basicpage/qr167_mod.pdf

Cohn, P. J., Carroll, M. S., & Kumagai, Y. (2006). Evacuation Behavior during Wildfires: Results of Three Case Studies. *Western Journal of Applied Forestry*, *21*(1), 39–48. https://doi.org/10.1093/wjaf/21.1.39

Cote, D. W., & McGee, T. K. (2014). An exploration of residents' intended wildfire evacuation responses in Mt. Lorne, Yukon, Canada. *The Forestry Chronicle*, *90*(04), 498–502. https://doi.org/10.5558/tfc2014-100

Cova, T. J., Dennison, P. E., Drews, F. A., Cova, T. J., Dennison, P. E., & Drews, F. A. (2011). Modeling Evacuate versus Shelter-in-Place Decisions in Wildfires. *Sustainability*, *3*(10), 1662–1687. https://doi.org/10.3390/su3101662

Cova, T. J., Dennison, P. E., Kim, T. H., & Moritz, M. A. (2005). Setting Wildfire Evacuation Trigger Points Using Fire Spread Modeling and GIS. *Transactions in GIS*, *9*(4), 603–617. https://doi.org/10.1111/j.1467-9671.2005.00237.x

Cova, T. J., & Johnson, J. P. (2002). Microsimulation of Neighborhood Evacuations in the Urban–Wildland Interface. *Environment and Planning A: Economy and Space*, *34*(12), 2211–2229. https://doi.org/10.1068/a34251

Cova, T. J., Theobald, D. M., Norman, J. B., & Siebeneck, L. K. (2013). Mapping wildfire evacuation vulnerability in the western US: The limits of infrastructure. *GeoJournal*, *78*(2), 273–285. https://doi.org/10.1007/s10708-011-9419-5

Cova, T. J., Drews, F. A., Siebenck, L. K., & Musters, A. (2009). Protective Actions in Wildfires: Evacuate or Shelter-in-Place? *Natural Hazards Review*, *10*(4), 151–162. https://doi.org/10.1061/(ASCE)1527-6988(2009)10:4(151)

de Araujo, M. P., Lupa, M. R., Casper, C. T., & Waters, B. (2014). Wildfire Evacuation Scenario in Colorado: Comparison of Adapted Four-Step Metropolitan Planning Organization Modeling Results and Planning Process Findings with Actual Experience. *Transportation Research Record*, *2430*(1), 133–144. https://doi.org/10.3141/2430-14

Dennison, P. E., Cova, T. J., & Mortiz, M. A. (2007). WUIVAC: A wildland-urban interface evacuation trigger model applied in strategic wildfire scenarios. *Natural Hazards*, *41*(1), 181–199. https://doi.org/10.1007/s11069-006-9032-y

Fischer III, H. W., Stine, G. F., Stocker, B. L., Trowbridge, M. L., & Drain, E. M. (1995). Evacuation behaviour: Why do some evacuate, while others do not? A case study of the Ephrata, Pennsylvania (USA) evacuation. *Disaster Prevention and Management: An International Journal*, *4*(4), 30–36. https://doi.org/10.1108/09653569510093414

Goodman, H., & Proudley, M. (2008). *Social contexts of responses to bushfire threat: A case study of the Wangary fire*. Retrieved from https://researchbank.rmit.edu.au/view/rmit:10682

Johnson, P. F., Johnson, C. E., & Sutherland, C. (2012). Stay or Go? Human Behavior and Decision Making in Bushfires and Other Emergencies. *Fire Technology*, *48*(1), 137–153. https://doi.org/10.1007/s10694-011-0213-1

Keeley, J. E., Fotheringham, C. J., & Moritz, M. A. (2004). Lessons from the October 2003. Wildfires in Southern California. *Journal of Forestry*, *102*(7), 26–31. https://doi.org/10.1093/jof/102.7.26

Kumagai, Y., Carroll, M. S., & Cohn, P. (2004). Coping with Interface Wildfire as a Human Event: Lessons from the Disaster/Hazards Literature. *Journal of Forestry*, *102*(6), 28–32. https://doi.org/10.1093/jof/102.6.28

Larsen, J. C., Dennison, P. E., Cova, T. J., & Jones, C. (2011). Evaluating dynamic wildfire evacuation trigger buffers using the 2003 Cedar Fire. *Applied Geography*, *31*(1), 12–19. https://doi.org/10.1016/j.apgeog.2010.05.003

Li, D., Cova, T. J., & Dennison, P. E. (2015). A household-level approach to staging wildfire evacuation warnings using trigger modeling. *Computers, Environment and Urban Systems*, *54*, 56–67. https://doi.org/10.1016/j.compenvurbsys.2015.05.008

MacGregor, D. G., Finucane, M., & González-Cabán, A. (2007). *Risk Perception, Adaptation and Behavior Change: Self-protection in the Wildland-Urban Interface*. 15.

McCaffrey, S. M., & Rhodes, A. (2009). Public Response to Wildfire: Is the Australian "Stay and Defend or Leave Early" Approach an Option for Wildfire Management in the United States? *Journal of Forestry*, *107*(1), 9–15. https://doi.org/10.1093/jof/107.1.9

McCaffrey, S. M., Velez, A.-L. K., & Briefel, J. A. (2013). *Difference in information needs for wildfire evacuees and non-evacuees*. Retrieved from https://www.nrs.fs.fed.us/pubs/44256

McCaffrey, S. M., & Winter, G. (2011). *Understanding homeowner preparation and intended actions when threatened by a wildfire*. Retrieved from https://www.nrs.fs.fed.us/pubs/38521

McCaffrey, S. M., Rhodes, A., & Stidham, M. (2015). Wildfire evacuation and its alternatives: Perspectives from four United States' communities. *International Journal of Wildland Fire*, *24*(2), 170–178. https://doi.org/10.1071/WF13050

McCaffrey, S. M., Wilson, R., & Konar, A. (2018). Should I Stay or Should I Go Now? Or Should I Wait and See? Influences on Wildfire Evacuation Decisions. *Risk Analysis*, *38*(7), 1390–1404. https://doi.org/10.1111/risa.12944

McGee, T. K., & Russell, S. (2003). "It's just a natural way of life…" an investigation of wildfire preparedness in rural Australia. *Global Environmental Change Part B: Environmental Hazards*, *5*(1), 1–12. https://doi.org/10.1016/j.hazards.2003.04.001

McLennan, J., Cowlishaw, S., Paton, D., Beatson, R., & Elliott, G. (2014). Predictors of south-eastern Australian householders' strengths of intentions to self-evacuate if a wildfire threatens: Two theoretical models. *International Journal of Wildland Fire*, *23*(8), 1176–1188. https://doi.org/10.1071/WF13219

McLennan, J., Elliott, G., & Omodei, M. (2012). Householder decision-making under imminent wildfire threat: Stay and defend or leave? *International Journal of Wildland Fire*, *21*(7), 915–925. https://doi.org/10.1071/WF11061

McLennan, J., Ryan, B., Bearman, C., & Toh, K. (2018). Should We Leave Now? Behavioral Factors in Evacuation Under Wildfire Threat. *Fire Technology*. https://doi.org/10.1007/s10694-018-0753-8

McNeill, I. M., Dunlop, P. D., Skinner, T. C., & Morrison, D. L. (2015). Predicting delay in residents' decisions on defending v. Evacuating through antecedents of decision avoidance. *International Journal of Wildland Fire*, *24*(2), 153–161. https://doi.org/10.1071/WF12213

Mozumder, P., Raheem, N., Talberth, J., & Berrens, R. P. (2008). Investigating intended evacuation from wildfires in the wildland–urban interface: Application of a bivariate probit model. *Forest Policy and Economics*, *10*(6), 415–423. https://doi.org/10.1016/j.forpol.2008.02.002

Mutch, R. W., Rogers, M. J., Stephens, S. L., & Gill, A. M. (2011). Protecting Lives and Property in the Wildland–Urban Interface: Communities in Montana and Southern California Adopt Australian Paradigm. *Fire Technology*, *47*(2), 357–377. https://doi.org/10.1007/s10694-010-0171-z

Nguyen, C., Schlesinger, K. J., Han, F., Gür, I., & Carlson, J. M. (2018). Modeling Individual and Group Evacuation Decisions During Wildfires. *Fire Technology*. https://doi.org/10.1007/s10694-018-0770-7

Paveglio, T. B., Prato, T., Dalenberg, D., & Venn, T. (2014). Understanding evacuation preferences and wildfire mitigations among Northwest Montana residents. *International Journal of Wildland Fire*, *23*(3), 435–444. https://doi.org/10.1071/WF13057

Paveglio, T. B., Boyd, A. D., & Carroll, M. S. (2012). Wildfire evacuation and its alternatives in a post-Black Saturday landscape: Catchy slogans and cautionary tales. *Environmental Hazards*, *11*(1), 52–70. https://doi.org/10.1080/17477891.2011.635185

Paveglio, T. B., Carroll, M. S., & Jakes, P. J. (2010). Alternatives to evacuation during wildland fire: Exploring adaptive capacity in one Idaho community. *Environmental Hazards*, *9*(4), 379–394. https://doi.org/10.3763/ehaz.2010.0060

Stidham, M., Toman, E., McCaffrey, S. M., & Schinder, B. (2011). Improving an inherently stressful situation: The role of communication during wildfire evacuations. *In: McCaffrey, Sarah M.; Fisher, Cherie LeBlanc, Eds. 2011. Proceedings of the Second Conference on the Human Dimensions of*

Wildland Fire. Gen. Tech. Rep. NRS-P-84. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station: 96-103., *84*, 96–103.

Strahan, K. (2017). *Factors influencing householder self-evacuation in two Australian bushfires*. Retrieved from http://researchbank.rmit.edu.au/view/rmit:162093

Strahan, Ken, Whittaker, J., & Handmer, J. (2018). Self-evacuation archetypes in Australian bushfire. *International Journal of Disaster Risk Reduction*, *27*, 307–316. https://doi.org/10.1016/j.ijdrr.2017.10.016

Taylor, J. G., Gillette, S. C., & Downing, J. L. (2005). *Communicating With Wildland Interface Communities During Wildfire*. 32.

Toledo, T., Marom, I., Grimberg, E., & Bekhor, S. (2018). Analysis of evacuation behavior in a wildfire event. *International Journal of Disaster Risk Reduction*, *31*, 1366–1373. https://doi.org/10.1016/j.ijdrr.2018.03.033

U.S. Census Bureau. American Community Survey (ACS) 2017 5-year Estimates. Retrieved October 19, 2018, from https://www.census.gov/programs-surveys/acs

Wolshon, B., & Marchive, E. (2007). Emergency Planning in the Urban-Wildland Interface: Subdivision-Level Analysis of Wildfire Evacuations. *Journal of Urban Planning and Development*, *133*(1), 73–81. https://doi.org/10.1061/(ASCE)0733-9488(2007)133:1(73)

Wong, S., & Shaheen, S. (2019). Current State of the Sharing Economy and Evacuations: Lessons from California. Retrieved from https://escholarship.org/uc/item/16s8d37x

Wong, S., Broader, J., Walker, J., & Shaheen, S. (2020). Modeling Wildfire Evacuation Behavior: An Assessment of California Wildfires and Comparison with Hurricane Evacuation Behavior. *In Journal Preparation*.

Woo, M., Hui, K. T. Y., Ren, K., Gan, K. E., & Kim, A. (2017). Reconstructing an Emergency Evacuation by Ground and Air. *Transportation Research Record: Journal of the Transportation Research Board*, *2604*, 63–70. https://doi.org/10.3141/2604-08

11) Appendices

Appendix A: Variable definitions expanded

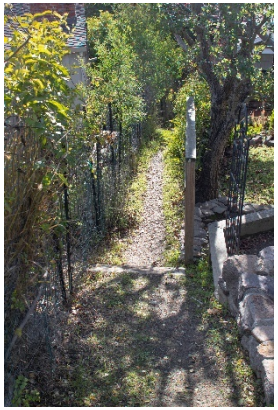
Link Data	
Variable	**Definition**
End street names	Block name
Number of parked vehicles on each side	Vehicles in driveways were not included. Vehicles that were parallel parked but not touching the road were not included. Paved vs. unpaved areas and different pavement types were used to determine if a vehicle was counted. Vehicles may have still been within the county ROW but were not counted unless they touched the primary roadway surface.
Minimum street width (ft)	The effective width of the road at the narrowest point. This could be edge to edge, edge to vehicle or vehicle to vehicle depending on the configuration. The edge would be the curb unless the curb had a steep gradient such that traveling over it with a low-floor vehicle would be difficult. Examples are shown in Figure 8. In that case, the edge was defined as the edge of the drainage ditch.
Maximum street width (ft)	The effective width of the road at the widest point, with some effort to exclude intersection areas that were atypical of the street's cross-section.
Number of locations with street width under 20 feet	The number of locations at which a two-way road narrowed to less than 20' or a one-way road narrowed to less than 10'. This number was typically a total or partial count of parked cars, though two cars parked across from one another could also be counted as a single "pinch point." Other examples of pinch points included power poles, non-navigable drainage ditches, and generally narrow roads (such as Los Altos Drive or Norwood Ave east of Highgate Road).
Number of lanes	All two-way roads were generally regarded as having two lanes, though parking conditions typically render these to be one-lane thoroughfares. Arlington Avenue was counted as having one lane on

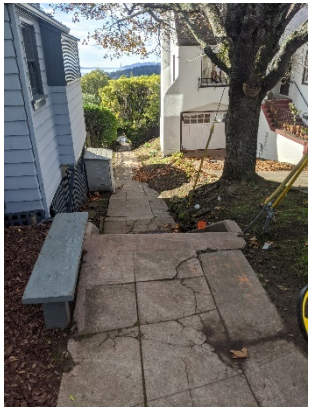
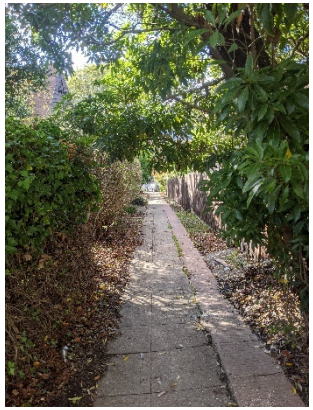
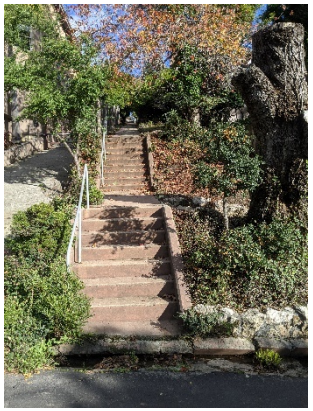
	its one-way segments (the parking shoulder was not counted) except for immediately north of Amherst where two lanes are explicitly marked.
Single lane roads	Flag for single lane roads and direction of traffic flow.
Centerline markings	Observed variations were none, dashed yellow lines, double yellow lines, and medians.
Presence or absence of sidewalks on each side	Many streets had sidewalks on one or both sides, but most sidewalks had obstacles to navigation, ranging from being incomplete to being blocked by vehicles to having accessibility barriers (e.g. stairs).
Steep gradients	Street segments were classified as flat/gradual, moderately steep, and steep. Grading was subjective and likely subject to perception error based on the sample of streets surveyed on a given night.
Speed limits	Speed limits were identified where posted, though almost all were 25mph and effective speeds during an evacuation should be assumed to be much lower.
Vegetation fuel levels	Tree cover and underbrush were separately identified as being low, moderate, or high (though some streets in the southwest quadrant used a yes/no rating for underbrush; these were later converted to low/high). Ratings were subjective and were likely skewed by the survey sample and visibility during late-evening data collection.
Intersection Data	
Variable	**Definition**
Cross-street pair	Streets that meet at the intersection. Directions given are from a reference of the center of the intersection. For example, Colusa St NW would indicate the link that is immediately northwest of the intersection
Traffic control measures	Any signage or ground marking around the intersection. Options were: None; Yield; All-way stop; Partial stop; Traffic light

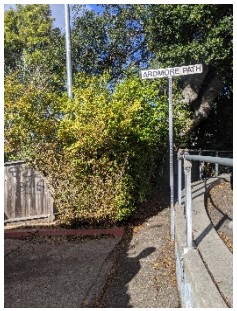
Appendix B: Path Conditions

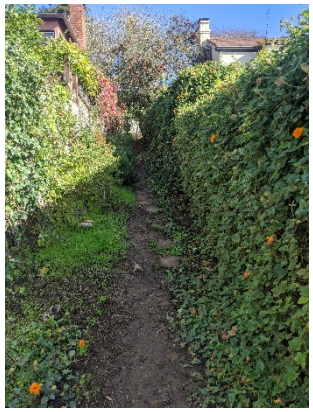
Path Segment	Comments	Photo	Suitability for Evacuation	Recommendations
Ye Olde School Trail, Grizzly Peak Blvd to Lake Drive Spur	Clean, well-kept trail about four paces across at its narrowest. Low underbrush, but also low-hanging tree canopy that would preclude navigation by emergency vehicles. Begins as a dirt road on the south end but narrows in spots - generally squeezed between fences and the edge of Wildcat Canyon.	 	Minimal for vehicles, moderate for pedestrians	Reduce tree canopy to allow emergency vehicles to pass through
Ye Olde School Trail, Lake Drive Spur	Dirt road that could likely handle an off-road vehicle. No tree obstructions, downhill sloping from the end of Lake Drive to the junction with the Ye Olde School Trail.		Moderate for vehicles (only off-road), moderate for pedestrians	Designate as a potential fire road

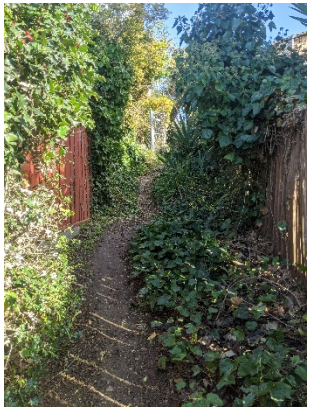
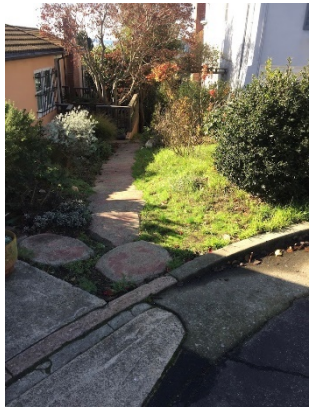
Ye Olde School Trail, Lake Drive Spur to school	Alternates between road-like trail that could be suitable for a 4x4 and a hiking trail - a significant dip at the south end would likely preclude vehicle travel. Downward-sloping to the north, slope is gradual over most of the trail.	 	Minimal for vehicles, moderate for pedestrians	Designate as a route of last resort to reach the school
Ye Olde School Trail, School to Kensington Court	Steep, winding, narrow trail along ridge crest, with significant dip at the north end. Could provide limited access for able-bodied individuals between school and Kensington Court area.	 	Minimal for vehicles, moderate for pedestrians (only for able-bodied individuals)	Designate as a route of last resort to connect between the school and Kensington Court

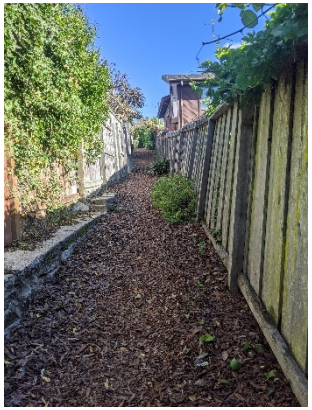
Public Path #1 (Coventry Rd to Marchant Court)	2' at north end, opens to 4-4.5' in middle, down to 3.5' at south end. Steep dirt trail (max. 2' wide) for entire length. One wooden stair at north end (~2' wide). Bend in the middle. Homeowner at north end mentioned that path is on private land at the south end. Extensive underbrush, moderate canopy (plenty of headroom). No signage.	 	Not suitable for vehicles, low for pedestrians (only for able-bodied individuals)	Check if any part of the path is on private land; create signs at both ends of the path; clear extensive underbrush to reduce fire risk
Public Path #2 (Stratford Rd to Coventry Rd)	5' wide end-to-end; concrete sidewalk (uneven) at the east end, 9 stairs at west end. Fences on both sides; minimal overhanging brush. Minimal slope. Signage at east end only.	 	Not suitable for vehicles, high for pedestrians (only for able-bodied individuals)	Install signage at the west end; designate as a possible evacuation path for pedestrians

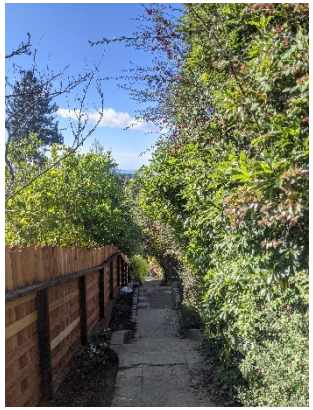
Public Path #3 (Coventry Rd to Coventry Rd)	Stairs and intermediate (steep) concrete sidewalk all 5' wide. 7 concrete stairs at east end, 16 concrete stairs with metal railing on north side at west end; larger risers. West end is a drainage ditch (no sidewalks on either side of Coventry here, though can cross over to an adjacent driveway). Signage at east end only. Moderate overhanging brush; some additional width beyond path.	  	Not suitable for vehicles, moderate for pedestrians (only for able-bodied individuals)	Install signage at the west end; install sidewalk landings; clear some overhanging brush to reduce fire risk

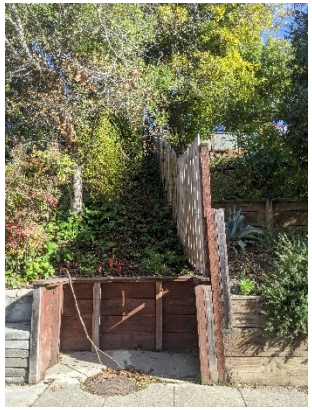
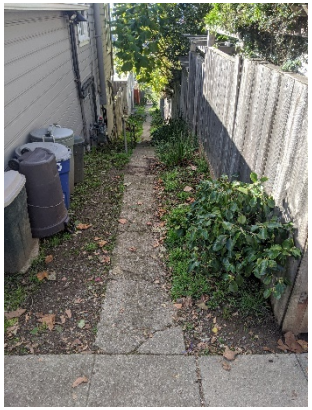
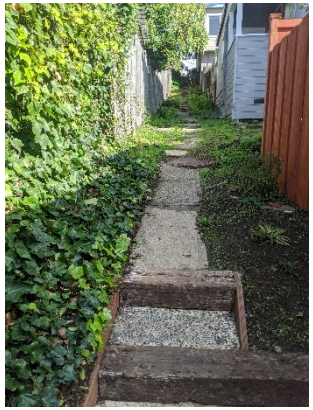
Public Path #5 (Beverly Ct to Lenox Rd)	8 concrete stairs (4.5' wide) with ramp bypass (2.5' wide) at west end; concrete sidewalk (4.5' wide) for full length. Fences on both sides; limited brush (partial overhang). May not be ADA slope compliant. Signed at west end only.	 	Not suitable for vehicles, high for pedestrians (for able-bodied individuals and mobile individuals)	Check if slope is ADA compliant; reduce overhanging brush to reduce fire risk; install sign at the east end; designate as a possible evacuation route for pedestrians
Ardmore Path (Coventry Rd to Ardmore Rd)	5.5' concrete (uneven in parts) sidewalk for full length, one bend in the middle. Fences on both sides with some extra ROW. Some overhanging trees but plenty of headroom. Likely ADA compliant (minimal slope). Signed at east end only.	 	Not suitable for vehicles, high for pedestrians (for all mobility levels)	Designate as an evacuation route for pedestrians; install sign at the west end; flatten concrete sidewalk to reduce unevenness
Ardmore Path (Ardmore Rd to Arlington Ave)	28 concrete stairs (8' at top, 10' at bottom) with metal railing in middle at east end, followed by 15' open space, double sidewalk (4.5' each) at west end (minimal slope outside of stairs). Some overhanging vegetation/low branches at west end, but	 	Not suitable for vehicles, high for pedestrians (for able-bodied individuals and mobile individuals)	Remove some brush to reduce fire risk; install additional railings; designate as a potential evacuation route for pedestrians

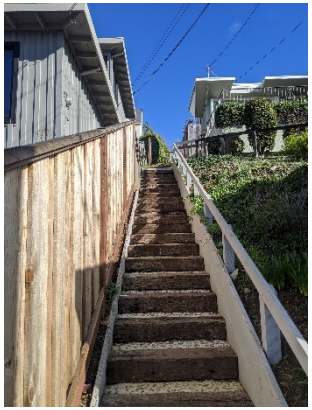
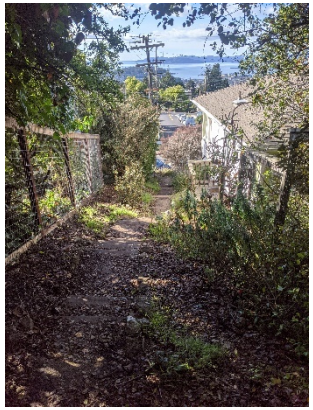
	overall very passable. Signed at both ends.			
Public Path #6 (Kenyon-St Albans)	3-6' of ROW, single track dirt trail with stones at east end; gradual slope, significant vegetation, fences on both sides in parts. Signed at the east end.	  	Not suitable for vehicles, low for pedestrians (only for able-bodied individuals)	Install sign at the west end; clear significant vegetation to reduce fire risk

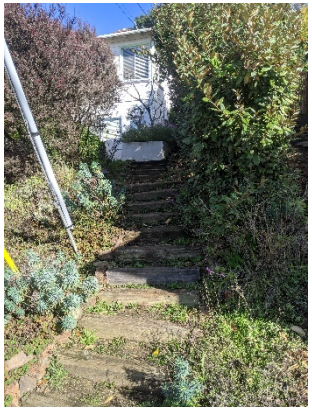
Public Path #6 (St Albans-Windsor)	27 small stone/brick stairs at east end; otherwise single-track dirt trail (~18" wide) with gradual slope. ~4' of ROW in middle but generally overgrown. Part of a yard at the west end; fences on both sides at times, some enclosing vegetation but generally 6'+ of headroom. No signage.	   	Not suitable for vehicles, low for pedestrians (only for able-bodied individuals)	Install signs at both ends; clear significant vegetation to reduce fire risk

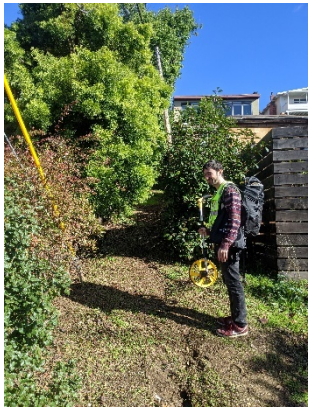
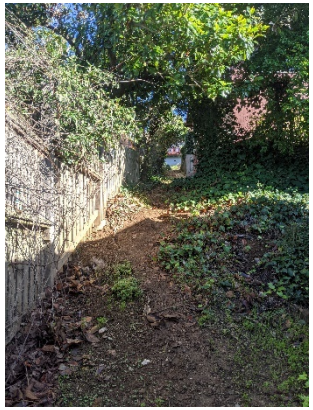
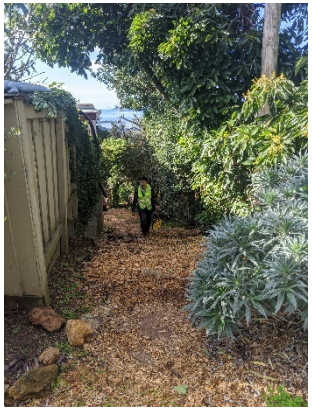
Public Path #6 (Windsor-York)	31 wooden steps, 2' at west end widening to 4' in middle; woodchip path (~4' wide, gradual slope) at east end. Significant enclosing vegetation at west end, fences on both sides at east end. No signage.	   	Not suitable for vehicles, moderate for pedestrians (only for able-bodied individuals)	Install signs at both ends; clear significant vegetation to reduce fire risk

Public Path #6 (York-Arlington)	4' concrete path with stairs (86 steps). Some enclosing vegetation (but generally 6'+ of headroom) and fences on both sides at times. Steep path (bumpy concrete with root heaves) between stair segments. No signage.	  	Not suitable for vehicles, moderate for pedestrians (only for able-bodied individuals)	Install signs at both ends; clear significant vegetation to reduce fire risk; level concrete to reduce impact of roots

Princeton Path (Amherst-Arlington)	Identified as closed by Pathkeepers; some evidence at the east end but ends abruptly; no evidence at the west end.	 	Not suitable for vehicles or pedestrians	Remove from any evacuation maps (and inform Google Maps if possible)
Public Path #9 (Cambridge-Stanford)	83 steps; 2' concrete at top, 3' wood/cement steps at bottom; moderate riser height. Gravel/stone path in middle. Brush on one side, fencing on both. Metal railing on south side at east end; wooden railing on south side at west end. Not marked at either end, but clearly identifiable from sidewalk.	 	Not suitable for vehicles, moderate for pedestrians (only for able-bodied individuals)	Install signs at both ends; install continuous railings; designate as a possible evacuation route for pedestrians

				
Public Path #9 (Stanford-Yale)	160 wooden steps (3' wide), moderate riser height. 9' of ROW in middle (one bench about 1/3 of the way from east end). Dirt/woodchips on landings (more steps toward ends). Vegetation canopy but plenty of headroom. No handrails. Not much underbrush. Signed at west end only.	 	Not suitable for vehicles, moderate for pedestrians (only for able-bodied individuals)	Install sign at east end; designate as a possible evacuation route for pedestrians

				
Public Path #10 (Columbia-Trinity)	Identified as closed by pathkeepers. East end is unmarked and in a yard; fenced ROW begins but ends at a blocking fence. No trace of path at the west end.	 	Not suitable for vehicles or pedestrians	Remove from any evacuation maps (and inform Google Maps if possible)

Westminster Path (Highland-Kenyon)	Steep dirt trail (3-6' of ROW), very steep in the middle; some visible sewer infrastructure. Enclosing vegetation but plenty of headroom. Likely difficult to descend due to steep dirt slope. No signage; very hard to identify at the ends.	  	Not suitable for vehicles, low for pedestrians (only for able-bodied individuals)	Install signs at both ends; clear some vegetation to reduce fire risk

Appendix C.1: Link Data

Map ID	Street Name	From Node	To Node	From Intersection Name	To Intersection Name	Reference Direction	Number of Cars Parked (left)	Number of Cars Parked (right)	Minimum width (ft)	Maximum width (ft)	Number of Locations under 20' (10' for one-ways)	Number of Lanes	Minimum lane width (ft)	Segment length (ft)	Parking Fraction	Approximate Percent Under 20' (10' for one-ways)	One Way Y/N	Centerline	Sidewalk (Left)	Sidewalk (Right)	Steep?	Posted Speed Limit	Tree Cover High/Med/Low	Underbrush High/Med/Low	Combined Vegetation	Notes
[57846732-99333186]	Amherst Avenue	57846732	99333186	Arlington Avenue (W) & Amherst Avenue	Arlington Avenue (E) & Amherst Avenue	INTERSECTION																				
[57846724-99333186]	Amherst Avenue	57846724	99333186	Amherst Avenue & Princeton Avenue	Arlington Avenue (E) & Amherst Avenue	S-N	14	0	16	24	14	2	8	889.38	0.24	0.24	N	NONE	Y	Y	MED	N/A	MED	LOW	MED-LOW	
[57846724-57846719]	Amherst Avenue	57846724	57846719	Amherst Avenue & Princeton Avenue	Oberlin Avenue & Amherst Avenue	S-N	19	0	13	19	CONT	2	6.5	767.30	0.37	1.00	N	NONE	Y	Y	N	N/A	MED	MED	MED-MED	
[57921193-57854477]	Anson Way	57921193	57854477	Anson Way & Eureka Avenue	Anson Way & Franciscan Way	S-N	15	16	17	26	7	2	8.5	1210.90	0.38	0.09	N	NONE	N	N	MED	N/A	LOW	LOW	LOW-LOW	Steep at north end; large tree at south end
[57919465-57832760]	Ardmore Road	57919465	57832760	Ardmore Road & Kingston Road	Coventry Road & Ardmore Road	S-N	0	48	15	24	47	2	7.5	1829.55	0.39	0.39	N	NONE	Y	Y	N	N/A	MED	MED	MED-MED	
[2244374982-57919465]	Ardmore Road	2244374982	57919465	Ardmore Road & Arlington Avenue (W)	Ardmore Road & Kingston Road	W-E	5	12	12	22	15	2	6	615.91	0.41	0.37	N	DASHYELL	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57878531-57878529]	Arlington Avenue	57878531	57878529	Estates Road & Arlington Avenue	Cowper Avenue & Arlington Avenue	S-N	0	0	29	29	0	2	14.5	264.71	0.00	0.00	N	DBLYELL	Y	N	N	20	LOW	LOW	LOW-LOW	
[57878526-57878529]	Arlington Avenue	57878526	57878529	Rincon Road & Arlington Avenue	Cowper Avenue & Arlington Avenue	S-N	2	0	24	29	0	2	12	269.27	0.11	0.00	N	DBLYELL	Y	PARTIAL	N	25	MED	LOW	MED-LOW	
[57878533-57878531]	Arlington Avenue	57878533	57878531	Arlmont Drive & Arlington Avenue	Estates Road & Arlington Avenue	S-N	2	0	28	35	0	2	14	243.88	0.12	0.00	N	DBLYELL	Y	N	N	20	MED	MED	MED-MED	Moderate tree cover close to road
[57797132-57878533]	Arlington Avenue	57797132	57878533	Arlington Avenue & Kensington Park Road	Arlmont Drive & Arlington Avenue	S-N	9	8	24	39	0	2	12	296.76	0.86	0.00	N	DBLYELL	Y	N	N	25	HIGH	LOW	HIGH-LOW	Large trees on east side
[263579538-57878536]	Arlington Avenue	263579538	57878536	Arlington Avenue & Rincon Road	Arlington Avenue & Arlington Court	S-N	2	0	30	37	0	2	15	387.54	0.08	0.00	N	DBLYELL	DIRT	Y	N	N/A	MED	LOW	MED-LOW	
[260540954-57878536]	Arlington Avenue	260540954	57878536	Arlington Avenue & End of Median North of Arlington Lane	Arlington Avenue & Arlington Court	S-N	5	0	32	37	0	2	16	229.69	0.33	0.00	N	DBLYELL	DIRT	Y	N	N/A	HIGH	MED	HIGH-MED	
[263579538-57797132]	Arlington Avenue	263579538	57797132	Arlington Avenue & Rincon Road	Arlington Avenue & Kensington Park Road	S-N	0	0	39	39	0	2	19.5	74.29	0.00	0.00	N	INTERSECTION	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57837387-57841519]	Arlington Avenue	57837387	57841519	Arlington Avenue & Wellesley Avenue	Arlington Avenue & Sunset Drive	S-N	0	3	13.5	19	0	1	13.5	327.45	0.14	0.00	Y	MEDIAN	N	Y	N	N/A	MED	LOW	MED-LOW	
[99323375-3180480692]	Arlington Avenue	99323375	3180480692	Arlington Avenue & North End of Median by Police Dept	Arlington Avenue & End of Median South of Oberlin	S-N	5	0	51	56	0	2	25.5	230.93	0.32	0.00	N	DBLYELL	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57878526-57878525]	Arlington Avenue	57878526	57878525	Rincon Road & Arlington Avenue	Kenilworth Drive & Arlington Avenue	S-N	0	0	28.5	28.5	0	2	14.25	142.27	0.00	0.00	N	DBLYELL	Y	N	N	N/A	LOW	LOW	LOW-LOW	
[57878525-506825551]	Arlington Avenue	57878525	506825551	Kenilworth Drive & Arlington Avenue	Arlington Avenue & Lam-Highland Cut-Through	S-N	0	0	29	29	0	2	14.5	432.35	0.00	0.00	N	DBLYELL	Y	N	MED	25	LOW	LOW	LOW-LOW	
[57878524-506825551]	Arlington Avenue	57878524	506825551	Arlington Avenue & Lam Court	Arlington Avenue & Lam-Highland Cut-Through	INTERSECTION																				
[57878524-57878523]	Arlington Avenue	57878524	57878523	Arlington Avenue & Lam Court	Arlington Avenue & Highland Boulevard	S-N	0	0	29	29	0	2	14.5	131.30	0.00	0.00	N	DBLYELL	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57878542-260540954]	Arlington Avenue (E)	57878542	260540954	Arlington Avenue (E) & Westminster Avenue	Arlington Avenue & End of Median North of Arlington Lane	S-N	0	9	15	19	0	1	15	485.11	0.28	0.00	Y	MEDIAN	N	Y	N	N/A	MED	LOW	MED-LOW	
[57878543-57878542]	Arlington Avenue (E)	57878543	57878542	Norwood Avenue & Arlington Avenue (E)	Arlington Avenue (E) & Westminster Avenue	S-N	0	3	14	18	0	1	14	347.05	0.13	0.00	Y	MEDIAN	N	Y	N	N/A	MED	LOW	MED-LOW	
[57841519-57878543]	Arlington Avenue (E)	57841519	57878543	Arlington Avenue & Sunset Drive	Norwood Avenue & Arlington Avenue (E)	S-N	0	8	14	19	0	1	14	614.50	0.20	0.00	Y	MEDIAN	N	Y	MED	N/A	MED	MED	MED-MED	
[99333186-99333196]	Arlington Avenue (E)	99333186	99333196	Arlington Avenue (E) & Amherst Avenue	Arlington Avenue (E) & Median Break North of Ardmore	S-N	0	3	18.5	37	0	1	18.5	552.45	0.08	0.00	Y	MEDIAN	N	Y	N	N/A	LOW	LOW	LOW-LOW	Two lanes at north end, angled parking at south end
[266908923-99333186]	Arlington Avenue (E)	266908923	99333186	Arlington Avenue (E) & Alameda County Line	Arlington Avenue (E) & Amherst Avenue	S-N	0	0	17	17	0	1	17	217.82	0.00	0.00	Y	MEDIAN	N	Y	N	N/A	LOW	LOW	LOW-LOW	
[99333196-99323375]	Arlington Avenue (E)	99333196	99323375	Arlington Avenue (E) & Median Break North of Ardmore	Arlington Avenue & North End of Median by Police Dept	S-N	0	11	15.5	19	0	1	15.5	642.51	0.26	0.00	Y	MEDIAN	N	Y	N	N/A	LOW	LOW	LOW-LOW	
[3180480692-266909007]	Arlington Avenue (E)	3180480692	266909007	Arlington Avenue & End of Median South of Oberlin	Oberlin Avenue & Arlington Avenue	INTERSECTION																				
[266909007-57837387]	Arlington Avenue (E)	266909007	57837387	Oberlin Avenue & Arlington Avenue	Arlington Avenue & Wellesley Avenue	S-N	0	0	20	20	0	1	20	107.37	0.00	0.00	Y	MEDIAN	N	Y	N	N/A	MED	LOW	MED-LOW	
[266909009-266909051]	Arlington Avenue (W)	266909009	266909051	Arlington Avenue (W) & Sunset Drive Crosswalk	Sunset Drive & Arlington Avenue	S-N	0	0	27	27	0	2	13.5	90.06	0.00	0.00	N	NONE	Y	N	N	N/A	HIGH	MED	HIGH-MED	Short informal two-way stretch of westbound Arlington to allow left-turning vehicles to access Sunset
[266909009-3180480692]	Arlington Avenue (W)	266909009	3180480692	Arlington Avenue (W) & Sunset Drive Crosswalk	Arlington Avenue & End of Median South of Oberlin	S-N	6	0	15	21	0	1	15	499.83	0.18	0.00	Y	MEDIAN	Y	N	N	N/A	MED	LOW	MED-LOW	
[260540954-266909033]	Arlington Avenue (W)	260540954	266909033	Arlington Avenue & End of Median North of Arlington Lane	Arlington Lane & Arlington Avenue	S-N	1	0	13.5	18	0	1	13.5	151.49	0.10	0.00	Y	MEDIAN	Y	N	N	N/A	LOW	MED	LOW-MED	
[266909033-266909039]	Arlington Avenue (W)	266909033	266909039	Arlington Lane & Arlington Avenue	Arlington Avenue (W) & Westminster Avenue	S-N	2	0	14	18	0	1	14	288.92	0.10	0.00	Y	MEDIAN	Y	N	N	N/A	LOW	LOW	LOW-LOW	
[266909046-266909051]	Arlington Avenue (W)	266909046	266909051	Norwood Avenue & Arlington Avenue (W)	Sunset Drive & Arlington Avenue	S-N	6	0	15	20	0	1	15	511.23	0.18	0.00	Y	MEDIAN	Y	N	Y	25	HIGH	HIGH	HIGH-HIGH	
[266909039-266909046]	Arlington Avenue (W)	266909039	266909046	Arlington Avenue (W) & Westminster Avenue	Norwood Avenue & Arlington Avenue (W)	S-N	5	0	14	18	0	1	14	359.01	0.21	0.00	Y	MEDIAN	Y	N	N	N/A	MED	MED	MED-MED	
[57846732-677315471]	Arlington Avenue (W)	57846732	677315471	Arlington Avenue (W) & Amherst Avenue	Arlington Avenue (W) & Alameda County Line	S-N	7	0	16	26	0	1	16	233.23	0.45	0.00	Y	MEDIAN	Y	N	N	25	MED	LOW	MED-LOW	
[99323375-99323365]	Arlington Avenue (W)	99323375	99323365	Arlington Avenue & North End of Median by Police Dept	Arlington Avenue (W) & Median Break North of Ardmore	S-N	9	0	15.5	19	0	1	15.5	599.70	0.23	0.00	Y	MEDIAN	Y	N	N	N/A	MED	LOW	MED-LOW	
[2244374968-57846732]	Arlington Avenue (W)	2244374968	57846732	Coventry Road & Arlington Avenue (W)	Arlington Avenue (W) & Amherst Avenue	S-N	0	0	24.5	24.5	0	2	12.25	226.53	0.00	0.00	Y	MEDIAN	Y	N	N	N/A	LOW	LOW	LOW-LOW	
[2244374982-2244374968]	Arlington Avenue (W)	2244374982	2244374968	Ardmore Road & Arlington Avenue (W)	Coventry Road & Arlington Avenue (W)	S-N	0	0	20	20	0	1	20	150.46	0.00	0.00	Y	MEDIAN	N	N	N	N/A	MED	LOW	MED-LOW	
[99323365-2244374982]	Arlington Avenue (W)	99323365	2244374982	Arlington Avenue (W) & Median Break North of Ardmore	Ardmore Road & Arlington Avenue (W)	S-N	1	0	26	26	0	1	26	217.44	0.07	0.00	Y	MEDIAN	Y	N	N	N/A	LOW	LOW	LOW-LOW	
[99333196-99323365]	Arlington Avenue Median Break North of Ardmore	99333196	99323365	Arlington Avenue (E) & Median Break North of Ardmore	Arlington Avenue (W) & Median Break North of Ardmore	W-E	0	0	33	33	0	2	16.5	44.56	0.00	0.00	N	TURNAROUND	CROSSWALK	N	N	N/A	LOW	LOW	LOW-LOW	
[57947646-57878536]	Arlington Court	57947646	57878536	Arlington Court & Norwood Avenue	Arlington Avenue & Arlington Court	W-E	4	6	15.5	29	3	2	7.75	460.29	0.33	0.10	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	Steep at east end w/ 19' curb-curb width - ROW widens to 29' in middle
[260540925-57947646]	Arlington Court	260540925	57947646	Arlington Court & Dead End	Arlington Court & Norwood Avenue	W-E	7	1	15.5	28	4	2	7.75	498.99	0.24	0.12	N	NONE	N	N	N	N/A	LOW	LOW	LOW-LOW	23' curb-curb at east end; wide in middle
[266909033-57882138]	Arlington Lane	266909033	57882138	Arlington Lane & Arlington Avenue	Arlington Lane & Dead End	W-E	3	2	17	22	5	2	8.5	344.73	0.22	0.22	N	NONE	N	N	MED	N/A	LOW	LOW	LOW-LOW	
[6604893822-6604893821]	Arlmont	6604893822	6604893821	Arlmont & East Dead End	Highland Boulevard & Arlmont	W-E	2	1	12	24	2	2	6	179.14	0.25	0.17	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[57817312-57878533]	Arlmont Drive	57817312	57878533	Arlmont Drive & Marguerita Road	Arlmont Drive & Arlington Avenue	W-E	2	0	18	24	2	2	9	453.64	0.07	0.07	N	NONE	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57934129-57817312]	Arlmont Drive	57934129	57817312	Highland Boulevard & Arlmont Drive	Arlmont Drive & Marguerita Road	W-E	0	0	24	24	0	2	12	294.61	0.00	0.00	N	NONE	N	N	MED	N/A	HIGH	MED	HIGH-MED	
[57921722-260540544]	Avon Road	57921722	260540544	Beverly Road & Avon Road	Avon Road & Stratford Road	SW-NE	8	2	12	26	5	2	6	1025.17	0.15	0.07	N	NONE	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57817950-57837111]	Beloit Avenue	57817950	57837111	Grizzly Peak Boulevard & Los Altos Drive & Beloit Avenue	Lake Drive & Beloit Avenue	W-E	0	0	23	25	0	2	11.5	274.35	0.00	0.00	N	DBLYELL	N	N	N	N/A	MED	LOW	MED-LOW	
[57809783-57837111]	Beloit Avenue	57809783	57837111	Beloit Avenue & Purdue Avenue	Lake Drive & Beloit Avenue	W-E	0	0	20	24	0	2	10	273.29	0.00	0.00	N	DBLYELL	N	N	MED	N/A	HIGH	LOW	HIGH-LOW	
[57846446-57846445]	Beloit Avenue	57846446	57846445	Trinity Avenue & Beloit Avenue	Cambridge Avenue & Beloit Avenue	W-E	0	7	16	20	7	2	8	259.48	0.40	0.40	N	DASHYELL	Y	BLOCKED	MED	N/A	MED	LOW	MED-LOW	
[57846447-57846446]	Beloit Avenue	57846447	57846446	Colgate Avenue & Beloit Avenue	Trinity Avenue & Beloit Avenue	W-E	0	6	16	21	6	2	8	530.82	0.17	0.17	N	DASHYELL	CONSTRAINED	CONSTRAINED	MED	25	LOW	LOW	LOW-LOW	Left-hand (north) sidewalk has stairs at Trinity end
[57809783-57846447]	Beloit Avenue	57809783	57846447	Beloit Avenue & Purdue Avenue	Colgate Avenue & Beloit Avenue	W-E	0	1	17	21	1	2	8.5	264.42	0.06	0.06	N	DASHYELL	Y	BLOCKED	N	N/A	HIGH	HIGH	HIGH-HIGH	Deep gutters
[57839081-57883886]	Berkeley Park Boulevard	57839081	57883886	Ocean View Avenue & Berkeley Park Boulevard	Berkeley Park Boulevard & Lexington Road	SW-NE	0	2	19	22	2	2	9.5	476.53	0.06	0.06	N	DASHYELL	Y	Y	MED	N/A	MED	HIGH	MED-HIGH	
[57839081-57832735]	Berkeley Park Boulevard	57839081	57832735	Ocean View Avenue & Berkeley Park Boulevard	Berkeley Park Boulevard & Coventry Road	SW-NE	0	2	20	29	2	2	10	325.52	0.09	0.09	N	DASHYELL	Y	Y	Y	N/A	MED	HIGH	MED-HIGH	
[258780730-5043351846]	Berkeley Park Boulevard	258780730	5043351846	Colusa Avenue & Berkeley Park Boulevard	Berkeley Park Boulevard & Alameda County Line	S-N	6	1	14.5	24	6	2	7.25	391.77	0.27	0.23	N	NONE	Y	Y	N	N/A	MED	HIGH	MED-HIGH	
[266908987-57883885]	Berkeley Park Boulevard	266908987	57883885	Berkeley Park Boulevard & North Dead End	Stratford Road & Berkeley Park Boulevard	S-N	3	1	14	22.5	3	2	7	108.27	0.55	0.42	N	NONE	Y	Y	N	N/A	HIGH	LOW	HIGH-LOW	

[57883886-57883885]	Berkeley Park Boulevard	57883886	57883885	Berkeley Park Boulevard & Lexington Road	Stratford Road & Berkeley Park Boulevard	S-N	0	0	22.5	22.5	0	2	11.25	223.91	0.00	0.00	N	DASHYELL	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57832735-258780720]	Berkeley Park Boulevard	57832735	258780720	Berkeley Park Boulevard & Coventry Road	Colusa Avenue & Berkeley Park Boulevard	SW-NE	2	1	16	28	1	2	8	372.10	0.12	0.04	N	DASHYELL	Y	Y	Y	N/A	MED	HIGH	MED-HIGH	
[57921722-57880650]	Beverly Road	57921722	57880650	Beverly Road & Avon Road	Beverly Road & Lenox Road	S-N	0	4	16.5	23.5	3	2	8.25	290.29	0.21	0.16	N	DASHYELL	PARTIAL	N	MED	N/A	MED	HIGH	MED-HIGH	
[57915704-57921722]	Beverly Road	57915704	57921722	Camelot Court & Beverly Road	Beverly Road & Avon Road	S-N	0	3	20.5	25	0	2	10.25	122.87	0.37	0.00	N	DASHYELL	Y	N	N	N/A	HIGH	MED	HIGH-MED	
[57915704-57921725]	Beverly Road	57915704	57921725	Camelot Court & Beverly Road	Beverly Road & Stratford Road	S-N	0	0	25	25	0	2	12.5	111.80	0.00	0.00	N	DASHYELL	Y	N	Y	N/A	HIGH	LOW	HIGH-LOW	
[57921488-57846445]	Cambridge Avenue	57921488	57846445	Cambridge Avenue & Yale Avenue	Cambridge Avenue & Beloit Avenue	S-N	4	0	14	20	4	2	7	307.59	0.20	0.20	N	DASHYELL	Y	Y	Y	N/A	HIGH	LOW	HIGH-LOW	One large tree, otherwise moderate
[57837395-57846445]	Cambridge Avenue	57837395	57846445	Cambridge Avenue & Wellesley Avenue	Cambridge Avenue & Beloit Avenue	S-N	25	0	11	18	CONT	2	5.5	884.61	0.42	1.00	N	NONE	Y	BLOCKED	MED	N/A	LOW	LOW	LOW-LOW	
[57915704-260540545]	Camelot Court	57915704	260540545	Camelot Court & Beverly Road	Camelot Court & Dead End	W-E	1	3	14.5	26	1	2	7.25	198.14	0.30	0.08	N	NONE	N	N	N	N/A	MED	LOW	MED-LOW	
[57939694-98461061]	Canon Drive	57939694	98461061	Canon Drive & Parkside Court	Canon Drive & Grizzly Peak Boulevard	S-N	0	0	20	20	0	2	10	162.93	0.00	0.00	N	DASHYELL	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57939694-984957182]	Canon Drive	57939694	984957182	Canon Drive & Parkside Court	Canon Drive & Tilden Park Gate	S-N	0	0	18	21	1	2	9	690.64	0.00	0.02	N	DASHYELL	N	N	MED	15	HIGH	HIGH	HIGH-HIGH	
[57829666-5482922766]	Carmel Avenue	57829666	5482922766	Colusa Ave & Fairmount Ave	Carmel Avenue & El Cerrito City Line	S-N	0	1	25	34	0	2	12.5	72.64	0.21	0.00	N	NONE	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57829666-5482922771]	Cemetery West Entrance	57829666	5482922771	Colusa Ave & Fairmount Ave	Parking Lot Entrance	W-E	0	0	34	34	0	2	17	54.66	0.00	0.00	N	NONE	N	N	N	15	LOW	HIGH	LOW-HIGH	
[5482922771-237134926]	Cemetery West Entrance	5482922771	237134926	Colusa Ave & Fairmount Ave	Parking Lot Entrance	W-E	0	0	34	34	0	2	17	39.48	0.00	0.00	N	NONE	N	N	N	15	LOW	HIGH	LOW-HIGH	
[57884195-57884194]	Colgate Avenue	57884195	57884194	Columbia Avenue & Colgate Avenue	Colgate Avenue & Kenyon Avenue	S-N	14	0	17	23	14	2	8.5	612.26	0.34	0.34	N	NONE	Y	Y	Y	N/A	HIGH	MED	HIGH-MED	
[57846447-57884195]	Colgate Avenue	57846447	57884195	Colgate Avenue & Beloit Avenue	Columbia Avenue & Colgate Avenue	S-N	8	1	15.5	23	8	2	7.75	328.96	0.41	0.36	N	NONE	BLOCKED	Y	MED	N/A	LOW	LOW	LOW-LOW	
[57953646-57884195]	Columbia Avenue	57953646	57884195	Kenyon Avenue & Columbia Avenue	Columbia Avenue & Colgate Avenue	S-N	26	0	13	20	CONT	2	6.5	972.17	0.40	1.00	N	NONE	BLOCKED	Y	Y	N/A	LOW	LOW	LOW-LOW	18' ROW with gutters
[258780770-258780713]	Colusa Avenue	258780770	258780713	Colusa Circle	Colusa Circle	INTERSECTION																				
[53058779-258780713]	Colusa Avenue	53058779	258780713	Colusa Avenue & Ocean View Avenue	Colusa Circle	S-N	4	7	27	39.5	0	2	13.5	227.87	0.72	0.00	N	DBLYELL	Y	Y	N	25	MED	HIGH	MED-HIGH	
[258780713-258780767]	Colusa Avenue	258780713	258780767	Colusa Circle	Colusa Circle	INTERSECTION																				
[258780716-258780720]	Colusa Avenue	258780716	258780720	Oak View Avenue & Colusa Avenue	Colusa Avenue & Berkeley Park Boulevard	INTERSECTION																				
[258780767-258780716]	Colusa Avenue	258780767	258780716	Colusa Circle	Oak View Avenue & Colusa Avenue	INTERSECTION																				
[57846904-258780724]	Colusa Avenue	57846904	258780724	Santa Fe Avenue & Colusa Avenue	Colusa Circle	S-N	2	1	28	40	0	2	14	286.28	0.16	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[258780724-258780763]	Colusa Avenue	258780724	258780763	Colusa Circle	Colusa Circle	INTERSECTION																				
[258780773-258780724]	Colusa Avenue	258780773	258780724	Colusa Circle	Colusa Circle	INTERSECTION																				
[258780730-258780770]	Colusa Avenue	258780730	258780770	Colusa Avenue & Berkeley Park Boulevard	Colusa Circle	INTERSECTION																				
[258780727-258780730]	Colusa Avenue	258780727	258780730	Oak View Avenue & Colusa Avenue	Colusa Avenue & Berkeley Park Boulevard	INTERSECTION																				
[53058779-266910806]	Colusa Avenue	53058779	266910806	Colusa Avenue & Ocean View Avenue	Colusa Avenue & Alameda County Line	S-N	1	3	25	40	0	2	12.5	142.28	0.42	0.00	N	DBLYELL	y	y	N	25	LOW	HIGH	LOW-HIGH	
[258780773-258780763]	Colusa Avenue	258780773	258780763	Colusa Circle	Colusa Circle	INTERSECTION																				
[258780763-258780727]	Colusa Avenue	258780763	258780727	Colusa Circle	Oak View Avenue & Colusa Avenue	INTERSECTION																				
[57829666-57846876]	Colusa Avenue	57829666	57846876	Colusa Avenue & Fairmount Avenue	San Carlos Avenue & Colusa Avenue	S-N	0	0	37.5	40.5	0	2	18.75	305.71	0.00	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[57846909-57846876]	Colusa Avenue	57846909	57846876	Colusa Avenue & Curry Avenue	San Carlos Avenue & Colusa Avenue	S-N	0	7	32.5	39.5	0	2	16.25	717.39	0.15	0.00	N	DBLYELL	Y	Y	N	25	HIGH	HIGH	HIGH-HIGH	
[258780770-258780767]	Colusa Avenue	258780770	258780767	Colusa Circle	Colusa Circle	INTERSECTION																				
[258780720-258780773]	Colusa Avenue	258780720	258780773	Colusa Avenue & Berkeley Park Boulevard	Colusa Circle	INTERSECTION																				
[57846904-57846905]	Colusa Avenue	57846904	57846905	Santa Fe Avenue & Colusa Avenue	Lynn Avenue & Colusa Avenue	S-N	6	10	27.5	51	0	2	13.75	341.13	0.70	0.00	N	DBLYELL	Y	Y	N	25	MED	HIGH	MED-HIGH	
[57846905-57846908]	Colusa Avenue	57846905	57846908	Lynn Avenue & Colusa Avenue	Valley Road & Colusa Avenue	S-N	8	5	27	40	0	2	13.5	272.69	0.72	0.00	N	DBLYELL	Y	Y	N	25	LOW	HIGH	LOW-HIGH	
[57846909-57846908]	Colusa Avenue	57846909	57846908	Colusa Avenue & Curry Avenue	Valley Road & Colusa Avenue	S-N	8	9	26.5	40	0	2	13.25	388.19	0.66	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[57829666-5482922765]	Colusa Avenue	57829666	5482922765	Colusa Avenue & Fairmount Avenue	Colusa Avenue & El Cerrito City Line	S-N	0	0	39	39	0	2	19.5	64.71	0.00	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[57832760-57803490]	Coventry Road	57832760	57803490	Coventry Road & Ardmore Road	Coventry Road & Edgecroft Road West	W-E	1	2	33.5	45.5	0	2	16.75	69.46	0.65	0.00	N	DASHYELL	GRAVEL	Y	N	N/A	LOW	LOW	LOW-LOW	
[57832760-57832750]	Coventry Road	57832760	57832750	Coventry Road & Ardmore Road	Lenox Road & Coventry Road	W-E	0	20	18.5	23.5	5	2	9.25	754.68	0.40	0.10	N	DASHYELL	BLOCKED	BLOCKED	N	N/A	LOW	LOW	LOW-LOW	
[57830120-268003100]	Coventry Road	57830120	268003100	Eldridge Court & Coventry Road	Kenilworth Court & Coventry Road	W-E	3	0	14	35.5	3	2	7	514.13	0.09	0.09	N	DASHYELL	N	N	Y	N/A	HIGH	MED	HIGH-MED	
[268003100-57832743]	Coventry Road	268003100	57832743	Kenilworth Court & Coventry Road	Coventry Road & Richardson Road & Willow Lane	S-N	7	0	19.5	23	1	2	9.75	391.65	0.27	0.04	N	DASHYELL	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57832748-57832743]	Coventry Road	57832748	57832743	Coventry Road & Stratford Road	Coventry Road & Richardson Road & Willow Lane	W-E	15	0	17	24	2	2	8.5	1169.91	0.19	0.03	N	DASHYELL	N	N	MED	N/A	HIGH	HIGH	HIGH-HIGH	
[57832750-57832748]	Coventry Road	57832750	57832748	Lenox Road & Coventry Road	Coventry Road & Stratford Road	W-E	13	0	19.5	27	1	2	9.75	492.37	0.40	0.03	N	DASHYELL	BLOCKED	N	N	N/A	LOW	MED	LOW-MED	
[2244374968-57803482]	Coventry Road	2244374968	57803482	Coventry Road & Arlington Avenue (W)	Coventry Road & Edgecroft Road East	W-E	5	0	20.5	26	0	2	10.25	401.34	0.19	0.00	N	DASHYELL	Y	BLOCKED	N	N/A	MED	LOW	MED-LOW	
[57803490-57832712]	Coventry Road	57803490	57832712	Coventry Road & Edgecroft Road (West)	Eagle Hill & Coventry Road	W-E	3	0	20.5	24.5	0	2	10.25	135.95	0.33	0.00	N	DASHYELL	GRAVEL	Y	MED	N/A	LOW	LOW	LOW-LOW	
[57832712-57803482]	Coventry Road	57832712	57803482	Eagle Hill & Coventry Road	Coventry Road & Edgecroft Road (East)	W-E	4	0	20.5	24	0	2	10.25	242.73	0.25	0.00	N	DASHYELL	Y	Y	MED	N/A	LOW	LOW	LOW-LOW	
[57832731-57832729]	Coventry Road	57832731	57832729	Valley Road & Coventry Road	Coventry Road & North Dead End	S-N	0	0	15	24	CONT*	2	7.5	573.56	0.00	1.00	N	NONE	Y	N	N	N/A	MED	HIGH	MED-HIGH	EBMUD project has one lane closed (temporary)
[57832735-57832731]	Coventry Road	57832735	57832731	Berkeley Park Boulevard & Coventry Road	Valley Road & Coventry Road	S-N	13	0	17	24	13	2	8.5	581.41	0.34	0.34	N	DASHYELL	Y	BLOCKED BY EBMUD	N	N/A	MED	HIGH	MED-HIGH	
[57832736-57832735]	Coventry Road	57832736	57832735	Coventry Road & Ocean View Avenue	Berkeley Park Boulevard & Coventry Road	W-E	14	0	16.5	24	14	2	8.25	560.94	0.37	0.37	N	DASHYELL	Y	Y	N	25	HIGH	HIGH	HIGH-HIGH	
[57830120-57832736]	Coventry Road	57830120	57832736	Eldridge Court & Coventry Road	Coventry Road & Ocean View Avenue	W-E	3	0	17	24.5	3	2	8.5	229.05	0.20	0.20	N	DASHYELL	STAIRS	BLOCKED	N	N/A	LOW	HIGH	LOW-HIGH	
[57890595-57878529]	Cowper Avenue	57890595	57878529	Cowper Avenue & Kenilworth Drive	Cowper Avenue & Arlington Avenue	W-E	0	1	19	24	0	2	9.5	300.82	0.05	0.00	N	NONE	N	N	Y	N/A	LOW	LOW	LOW-LOW	
[57868718-57826883]	Cowper Avenue	57868718	57826883	Cowper Avenue & Kensington Road	Lawson Road & Cowper Avenue	W-E	1	1	16	29	1	2	8	227.28	0.13	0.07	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[57826883-57934391]	Cowper Avenue	57826883	57934391	Lawson Road & Cowper Avenue	Highland Boulevard & Cowper Avenue	W-E	0	9	17	23	9	2	8.5	503.47	0.27	0.27	N	NONE	N	PARTIAL	MED	N/A	LOW	LOW	LOW-LOW	
[57890595-57934391]	Cowper Avenue	57890595	57934391	Cowper Avenue & Kenilworth Drive	Highland Boulevard & Cowper Avenue	W-E	0	4	17.5	23.5	4	2	8.75	244.48	0.25	0.25	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[261736262-57846909]	Curry Avenue	261736262	57846909	Curry Avenue & El Cerrito City Line	Colusa Avenue & Curry Avenue	W-E	1	0	33.5	43.5	0	2	16.75	29.97	0.50	0.00	N	NONE	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57895824-57809771]	Dewey Road	57895824	57809771	Dewey Road & Dead End	Purdue Avenue & Dewey Road	PRIVATE																				

[260540808-57832712]	Eagle Hill	260540808	57832712	Eagle Hill & Dead End	Eagle Hill & Coventry Road	S-N	0	0	10	10	CONT	1	10	258.44	0.00	1.00	N	NONE	N	N	Y	N/A	MED	HIGH	MED-HIGH	Cul de sac at end (not measured)
[57803490-57803482]	Edgecroft Road	57803490	57803482	Edgecroft Road & Coventry Road (West)	Edgecroft Road & Coventry Road (East)	W-E	0	37	10	20	0	1	10	378.68	0.42	0.00	Y	NONE	N	PARTIAL	N	N/A	HIGH	HIGH	HIGH-HIGH	Vegetation data added post-survey; changed to have zero pinch points in keeping with 10' lane-width alternate criteria
[57830120-57830122]	Eldridge Court	57830120	57830122	Eldridge Court & Coventry Road	Eldridge Court & Dead End	S-N	8	5	13	19	8	2	6.5	361.87	0.54	0.33	N	NONE	N	N	MED	N/A	HIGH	HIGH	HIGH-HIGH	
[57942368-57878531]	Estates Road	57942368	57878531	Estates Road & Dead End	Estates Road & Arlington Avenue	W-E	1	0	18	22	1	2	9	111.99	0.13	0.13	N	NONE	N	N	Y	N/A	LOW	LOW	LOW-LOW	
[57921193-57854484]	Eureka Avenue	57921193	57854484	Anson Way & Eureka Avenue	Eureka Avenue & Franciscan Way	W-E	0	4	22	30	0	2	11	399.00	0.15	0.00	N	NONE	N	N	Y	N/A	LOW	LOW	LOW-LOW	
[57921193-57921192]	Eureka Avenue	57921193	57921192	Anson Way & Eureka Avenue	Eureka Avenue & El Cerrito City Line	W-E	0	0	28	28	0	2	14	213.23	0.00	0.00	N	NONE	N	N	MED	N/A	LOW	LOW	LOW-LOW	
[262125791-57829666]	Fairmount Avenue	262125791	57829666	Fairmount Avenue & El Cerrito City Line	Colusa Avenue & Fairmount Avenue	W-E	0	0	40	40	0	2	20	48.06	0.00	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[57854484-57854477]	Franciscan Way	57854484	57854477	Eureka Avenue & Franciscan Way	Anson Way & Eureka Avenue & Franciscan Way	S-N	9	12	16	25	2	2	8	1609.90	0.20	0.02	N	NONE	N	N	N	N/A	LOW	LOW	LOW-LOW	Tall tree at south end; most cars clear of 20'
[2869002030-57854477]	Franciscan Way	2869002030	57854477	Contra Costa Drive & Franciscan Way	Anson Way & Eureka Avenue & Franciscan Way	S-N	2	0	21	24.5	0	2	10.5	244.43	0.12	0.00	N	NONE	N	N	N	N/A	LOW	LOW	LOW-LOW	Measured to Highgate
[57802552-57854484]	Franciscan Way	57802552	57854484	Franciscan Way & Sunset Drive & Reed Place	Eureka Avenue & Franciscan Way	S-N	0	0	23.5	27	0	2	11.75	759.19	0.00	0.00	N	DBLYELL	N	N	N	25	LOW	LOW	LOW-LOW	
[57841511-57802552]	Franciscan Way	57841511	57802552	Franciscan Way & Sunset Drive & Cemetery Entrance	Franciscan Way & Reed Place	S-N	0	0	23.5	23.5	0	2	11.75	712.12	0.00	0.00	N	DBLYELL	N	N	N	N/A	HIGH	MED	HIGH-MED	
[266909108-266909107]	Garden Drive	266909108	266909107	Garden Drive & Actual Dead End	Garden Drive & North End of Median	S-N	0	0						21.40	0.00											Cul de sac
[266909120-266909122]	Garden Drive	266909120	266909122	Purdue Avenue & Garden Drive	Purdue Avenue & Garden Drive	INTERSECTION																				
[2478049238-2478049237]	Garden Drive	2478049238	2478049237	Purdue Avenue & Garden Drive	Purdue Avenue & Garden Drive	INTERSECTION																				
[2478049237-266909107]	Garden Drive East	2478049237	266909107	Purdue Avenue & Garden Drive	Garden Drive & North End of Median	S-N	0	0	11	12	0	1	11	607.69	0.00	0.00	Y	MEDIAN	N	N	MED	15	MED	MED	MED-MED	East side; Changed to zero pinch points in keeping with 10' lane-width alternate criteria
[266909107-266909120]	Garden Drive West	266909107	266909120	Garden Drive & North End of Median	Purdue Avenue & Garden Drive	S-N	0	0	11	12	0	1	11	652.85	0.00	0.00	Y	MEDIAN	N	N	N	N/A	MED	MED	MED-MED	West side Changed to zero pinch points in keeping with 10' lane-width alternate criteria
[6520693393-98461097]	Grizzly Peak Boulevard	6520693393	98461097	Grizzly Peak Boulevard & Alameda County Line	Grizzly Peak Boulevard ("divided" section near County Line)	INTERSECTION																				
[258769157-6520693394]	Grizzly Peak Boulevard	258769157	6520693394	Grizzly Peak Boulevard & Slip Lane to Spruce WB	Grizzly Peak Boulevard & Alameda County Line	INTERSECTION																				
[98461097-57812199]	Grizzly Peak Boulevard	98461097	57812199	Grizzly Peak Boulevard ("divided" section near County Line)	Plateau Drive & Grizzly Peak Boulevard	S-N	0	0	31	31	0	2	15.5	548.93	0.00	0.00	N	DBLYELL	Y	N	N	25	MED	MED	MED-MED	
[57817950-57812199]	Grizzly Peak Boulevard	57817950	57812199	Grizzly Peak Boulevard & Los Altos Drive & Beloit Avenue	Plateau Drive & Grizzly Peak Boulevard	S-N	0	0	27.5	30	0	2	13.75	266.64	0.00	0.00	N	DBLYELL	Y	N	MED	25	MED	MED	MED-MED	
[98461097-258769157]	Grizzly Peak Boulevard	98461097	258769157	Grizzly Peak Boulevard ("divided" section near County Line)	Grizzly Peak Boulevard & Slip Lane to Spruce WB	INTERSECTION																				
[258769157-98461043]	Grizzly Peak Boulevard	258769157	98461043	Grizzly Peak Boulevard & Slip Lane to Spruce WB	Grizzly Peak Boulevard & Spruce Street	INTERSECTION																				
[57817950-57817949]	Grizzly Peak Boulevard	57817950	57817949	Grizzly Peak Boulevard & Los Altos Drive & Beloit Avenue	Grizzly Peak Boulevard & Los Altos Drive	S-N	0	0	23	24	0	2	11.5	730.18	0.00	0.00	N	NONE	N	N	N	N/A	MED	LOW	MED-LOW	
[57817949-57837109]	Grizzly Peak Boulevard & Kenyon Avenue	57817949	57837109	Grizzly Peak Boulevard & Los Altos Drive	Kenyon Avenue & Lake Drive	W-E	0	0	18.5	22	1	2	9.25	330.89	0.00	0.05	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57883862-57883858]	Highgate Court	57883862	57883858	Highgate Court & Dead End	Highgate Road & Highgate Court	W-E	1	1	11.5	18	CONT	2	5.75	251.90	0.12	1.00	N	NONE	N	N	Y	N/A	HIGH	MED	HIGH-MED	
[57841518-57883858]	Highgate Road	57841518	57883858	Sunset Drive & Highgate Road	Highgate Road & Highgate Court	S-N	4	0	12	21	1-CONT	2	6	766.09	0.08	1.00	N	NONE/DBLYELL	N	N	N	N/A	HIGH	MED	HIGH-MED	27' wide spot (on blind corner) south of Highgate Ct, 17' curb-curb north of Sunset
[57960336-57807649]	Highgate Road	57960336	57807649	Norwood Avenue & Highgate Road	Jessen Court & Highgate Road	S-N	14	2	15	24	12	2	7.5	1589.01	0.15	0.11	N	NONE	N	N	N	N/A	HIGH	MED	HIGH-MED	Wide area (up to 31') for passing; 17' curb-curb pinch point south of Norwood
[57874410-57807649]	Highgate Road	57874410	57807649	Kerr Avenue & Edwin Drive & Highgate Road	Jessen Court & Highgate Road	S-N	2	0	18	26	1	2	9	307.59	0.10	0.05	N	NONE	N	N	N	N/A	LOW	MED	LOW-MED	
[57960336-57883858]	Highgate Road	57960336	57883858	Norwood Avenue & Highgate Road	Highgate Road & Highgate Court	S-N	4	0	12	19	CONT	2	6	351.81	0.17	1.00	N	NONE/DBLYELL	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57874410-2869002030]	Highgate Road	57874410	2869002030	Kerr Avenue & Edwin Drive & Highgate Road	Contra Costa Drive & Franciscan Way	S-N	0	0	23	23	0	2	11.5	245.27	0.00	0.00	N	NONE	N	PARTIAL	N	25	LOW	LOW	LOW-LOW	Measured to Franciscan
[57878523-506825381]	Highland Boulevard	57878523	506825381	Arlington Avenue & Highland Boulevard	Highland Boulevard & Lam-Highland Cut-Through	S-N	0	0	26	26	0	2	13	152.66	0.00	0.00	N	DBLYELL	N	N	N	N/A	MED	LOW	MED-LOW	
[57953642-57949752]	Highland Boulevard	57953642	57949752	Highland Boulevard & Kenyon Avenue	Highland Boulevard & Willamette Avenue	S-N	0	32	17	25	14	2	8.5	1134.42	0.42	0.19	N	NONE	PARTIAL	N	N	20	MED	MED	MED-MED	Low vegetation near south end; tall trees on hill at north end
[57934129-6604893821]	Highland Boulevard	57934129	6604893821	Highland Boulevard & Arlmont Drive	Highland Boulevard & Arlmont	INTERSECTION																				
[6604893821-57934391]	Highland Boulevard	6604893821	57934391	Highland Boulevard & Arlmont	Highland Boulevard & Cowper Avenue	S-N	10	0	17	22	10	2	8.5	524.68	0.29	0.29	N	NONE	N	N	N	20	LOW	MED	LOW-MED	
[506825381-57934391]	Highland Boulevard	506825381	57934391	Highland Boulevard & Lam-Highland Cut-Through	Highland Boulevard & Cowper Avenue	S-N	3	9	15.5	23	11	2	7.75	933.27	0.19	0.18	N	NONE	PARTIAL	N	N	N/A	MED	HIGH	MED-HIGH	
[263579546-57934129]	Highland Boulevard	263579546	57934129	Highland Boulevard & South Dead End	Highland Boulevard & Arlmont Drive	S-N	2	0	19.5	26	2	2	9.75	178.17	0.17	0.17	N	NONE	N	N	N	N/A	LOW	LOW	LOW-LOW	
[57953642-57797121]	Highland Boulevard	57953642	57797121	Highland Boulevard & Kenyon Avenue	School Parking Lot Entrance	S-N	2	0	21	25	0	2	10.5	428.34	0.07	0.00	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57807649-260605063]	Jessen Court	57807649	260605063	Jessen Court & Highgate Road	Jessen Court & Dead End	W-E	1	2	20	26	0	2	10	423.47	0.11	0.00	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[268003100-1588168793]	KENILWORTH CT	268003100	1588168793	Kenilworth Court & Coventry Road	Kenilworth Court & Dead End	S-N	0	0	10.5	24	CONT	1	10.5	100.78	0.00	1.00	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57878525-57890595]	Kenilworth Drive	57878525	57890595	Kenilworth Drive & Arlington Avenue	Cowper Avenue & Kenilworth Drive	S-N	7	0	18	23	7	2	9	457.62	0.23	0.23	N	NONE	N	N	Y	N/A	LOW	LOW	LOW-LOW	
[262120923-57868716]	Kensington Court	262120923	57868716	Dead End	Kensington Court & Kensington Road	S-N	5	1	19	27	3	2	9.5	538.51	0.17	0.08	N	NONE	N	N	Y	N/A	HIGH	MED	HIGH-MED	
[5733416164-57797132]	Kensington Park Road	5733416164	57797132	Kensington Park Road & Dead End	Arlington Avenue & Kensington Park Road	W-E	0	1	18.5	31	1	2	9.25	284.41	0.05	0.05	N	NONE	N	N	Y	N/A	HIGH	LOW	HIGH-LOW	Wide at west end, narrows to steep road with bollards
[266909128-57797121]	Kensington Park Road	266909128	57797121	Kensington Park Road West Bollards	School Parking Lot	W-E	0	0			0	2		575.52	0.00	0.00	N	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[262120917-57868718]	Kensington Road	262120917	57868718	Kensington Road & El Cerrito Border	Cowper Avenue & Kensington Road	S-N	0	6	18.5	25	6	2	9.25	292.44	0.31	0.31	N	NONE	N	N	N	N/A	MED	LOW	MED-LOW	
[57868716-57868714]	Kensington Road	57868716	57868714	Kensington Court & Kensington Road	Dead end	S-N	0	2	21	28	0	2	10.5	119.48	0.25	0.00	N	NONE	N	Y	N	N/A	LOW	LOW	LOW-LOW	
[57868718-57868716]	Kensington Road	57868718	57868716	Cowper Avenue & Kensington Road	Kensington Court & Kensington Road	INTERSECTION																				
[57809780-57884194]	Kenyon Avenue	57809780	57884194	Kenyon Avenue & Purdue Avenue	Colgate Avenue & Kenyon Avenue	W-E	0	2	18	23	2	2	9	174.65	0.17	0.17	N	DASHYELL	Y	Y	Y	N/A	MED	MED	MED-MED	
[57953646-57884194]	Kenyon Avenue	57953646	57884194	Kenyon Avenue & Columbia Avenue	Colgate Avenue & Kenyon Avenue	W-E	0	3	17	23	3	2	8.5	235.08	0.19	0.19	N	DASHYELL	Y	Y	Y	N/A	LOW	LOW	LOW-LOW	
[57949751-57924237]	Kenyon Avenue	57949751	57924237	Willamette Avenue & Kenyon Avenue	Westminster Avenue & Kenyon Avenue	S-N	3	0	17	22	2	2	8.5	450.70	0.10	0.07	N	DASHYELL	Y	Y	Y	N/A	MED	LOW	MED-LOW	Some large trees
[57837397-57949751]	Kenyon Avenue	57837397	57949751	Kenyon Avenue & Wellesley Avenue	Willamette Avenue & Kenyon Avenue	S-N	2	0	17	22	2	2	8.5	342.04	0.09	0.09	N	DASHYELL	CONSTRAINED	Y	N	N/A	LOW	LOW	LOW-LOW	One large tree at north end
[57953642-57924237]	Kenyon Avenue	57953642	57924237	Highland Boulevard & Kenyon Avenue	Westminster Avenue & Kenyon Avenue	S-N	17	0	16	22	17	2	8	718.18	0.36	0.36	N	NONE	CONSTRAINED	BLOCKED	Y	20	LOW	MED	LOW-MED	One tall tree
[57895320-57837397]	Kenyon Avenue	57895320	57837397	Trinity Avenue & Kenyon Avenue	Kenyon Avenue & Wellesley Avenue	W-E	0	0	32	32	0	2	16	79.35	0.00	0.00	N	DASHYELL	Y	Y	Y	N/A	LOW	MED	LOW-MED	
[57895320-57953646]	Kenyon Avenue	57895320	57953646	Trinity Avenue & Kenyon Avenue	Kenyon Avenue & Columbia Avenue	W-E	0	5	15	23	5	2	7.5	304.94	0.25	0.25	N	DASHYELL	Y	Y	Y	N/A	MED	MED	MED-MED	
[57874410-57821862]	Kerr Avenue & Edwin Drive	57874410	57821862	Kerr Avenue & Edwin Drive & Highgate Road	Kerr Avenue & Edwin Drive & Rincon Road	S-N	7	12	17	31	18	2	8.5	1794.76	0.16	0.15	N	DASHYELL	N	N	Y	N/A	MED	MED	MED-MED	Large stands of trees, otherwise low vegetation; road widens at one point where Edwin/Kerr meet, otherwise 23' typical width
[57919465-57880646]	Kingston Road	57919465	57880646	Ardmore Road & Kingston Road	Lenox Road & Kingston Road	W-E	7	15	13	25.5	16	2	6.5	1009.19	0.33	0.24	N	DASHYELL	PARTIAL	PARTIAL	Y	N/A	MED	MED	MED-MED	Incline data added post-survey
[266908967-57880646]	Kingston Road	266908967	57880646	Kingston Road & Dead End	Lenox Road & Kingston Road	W-E	11	9	13	25.5	9	2	6.5	782.97	0.38	0.17	N	NONE	Y	Y	Y	N/A	LOW	LOW	LOW-LOW	

[258769170-57837109]	Lake Drive	258769170	57837109	Lake Drive & Dead End	Grizzly Peak Boulevard & Kenyon Avenue & Lake Drive	S-N	8	7	12	18	CONT	2	6	924.09	0.24	1.00	N	NONE	N	N	N	N/A	MED	MED	MED-MED	
[57837111-57837109]	Lake Drive	57837111	57837109	Lake Drive & Beloit Avenue	Grizzly Peak Boulevard & Kenyon Avenue & Lake Drive	S-N	10	2	14	18	CONT	2	7	693.05	0.26	1.00	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57878524-262120961]	Lam Court	57878524	262120961	Arlington Avenue & Highland Boulevard & Arlington Avenue	Lam Court & Dead End	W-E	4	5	18	31	2	2	9	335.60	0.40	0.09	N	NONE	Y	Y	Y	N/A	LOW	LOW	LOW-LOW	
[506825551-506825381]	Lam-Highland Cut-Through	506825551	506825381	Arlington Avenue & Lam-Highland Cut-Through	Highland Boulevard & Lam-Highland Cut-Through	W-E	0	0	28.5	28	0	1	28.5	56.56	0.00	0.00	Y	NONE	N	N	Y	N/A	MED	LOW	MED-LOW	
[57826883-262120957]	Lawson Road	57826883	262120957	Lawson Road & Cowper Avenue	Lawson Road & South Dead End	S-N	0	5	18.5	24	4	2	9.25	591.51	0.13	0.10	N	NONE	N	PARTIAL	MED	N/A	MED	LOW	MED-LOW	
[57826894-57826883]	Lawson Road	57826894	57826883	Lawson Road & North Dead End	Lawson Road & Cowper Avenue	S-N	2	1	17	27	3	2	8.5	468.75	0.10	0.10	N	NONE	N	N	N	N/A	MED	LOW	MED-LOW	
[57880650-57880646]	Lenox Road	57880650	57880646	Beverly Road & Lenox Road	Lenox Road & Kingston Road	S-N	11	5	11	23.5	9	2	5.5	458.64	0.52	0.29	N	NONE	N	N	N	25	HIGH	HIGH	HIGH-HIGH	
[57832750-57880650]	Lenox Road	57832750	57880650	Lenox Road & Coventry Road	Beverly Road & Lenox Road	S-N	0	14	17	27	12	2	8.5	552.73	0.38	0.33	N	DASHYELL	PARTIAL	Y	N	25	MED	MED	MED-MED	
[57883886-266908984]	Lexington Road	57883886	266908984	Berkeley Park Boulevard & Lexington Road	Lexington Road & Dead End	W-E	0	8	12.5	23.5	8	2	6.25	350.47	0.34	0.34	N	NONE	Y	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57817949-57817950]	Los Altos Drive & Beloit Avenue	57817949	57817950	Grizzly Peak Boulevard & Los Altos Drive	Grizzly Peak Boulevard & Beloit Avenue	S-N	3	17	15	22	CONT OR 20	2	7.5	730.18	0.14	1.00	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	Sustained stretch of 17' ROW
[4058051722-57846905]	Lynn Avenue	4058051722	57846905	Lynn Avenue & El Cerrito City Line	Lynn Avenue & Colusa Avenue	W-E	1	0	29	40	0	2	14.5	26.08	0.58	0.00	N	NONE	Y	Y	N	N/A	MED	LOW	MED-LOW	
[57848787-57832743]	Marchant Court	57848787	57832743	Marchant Count & Dead End	Coventry Road & Richardson Road & Willow Lane	W-E	6	6	13	24	6	2	6.5	283.36	0.64	0.32	N	NONE	N	N	N	N/A	MED	MED	MED-MED	
[57817312-57817311]	Marguerita Road	57817312	57817311	Arlmont Drive & Marguerita Road	Marguerita Road & Dead End	S-N	0	1	19	24	1	2	9.5	244.65	0.06	0.06	N	NONE	N	N	N	N/A	LOW	MED	LOW-MED	
[266909046-57878543]	Norwood Avenue	266909046	57878543	Norwood Avenue & Arlington Avenue (W)	Norwood Avenue & Arlington Avenue (E)	W-E	0	0	38	38	0	2	19	36.87	0.00	0.00	N	TURNAROUND	N	N	N	N/A	LOW	LOW	LOW-LOW	
[57960336-57847890]	Norwood Avenue	57960336	57847890	Norwood Avenue & Highgate Road	Norwood Place & Norwood Avenue	W-E	2	4	13	21	CONT	2	6.5	850.85	0.11	1.00	N	NONE	N	N	Y	N/A	HIGH	MED	HIGH-MED	13.5' pinch point at telephone pole; only 19-21' of ROW at widest
[57947646-57847890]	Norwood Avenue	57947646	57847890	Arlington Court & Norwood Avenue	Norwood Place & Norwood Avenue	W-E	3	2	19	27	1	2	9.5	375.94	0.20	0.04	N	NONE	N	N	N	N/A	MED	MED	MED-MED	
[57947646-57918103]	Norwood Avenue	57947646	57918103	Arlington Court & Norwood Avenue	Norwood Court & Norwood Avenue	S-N	7	4	17	23	7	2	8.5	412.99	0.40	0.25	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	
[266909046-57918103]	Norwood Avenue	266909046	57918103	Norwood Avenue & Arlington Avenue (W)	Norwood Court & Norwood Avenue	S-N	4	0	13.5	23	4	2	6.75	721.82	0.08	0.08	N	NONE	N	N	N	N/A	HIGH	HIGH	HIGH-HIGH	17.5' curb-curb at north & south ends
[57918103-260540946]	Norwood Court	57918103	260540946	Norwood Court & Norwood Avenue	Norwood Court & Dead End	W-E	3	3	21	28	0	2	10.5	380.13	0.24	0.00	N	NONE	PARTIAL	PARTIAL	N	N/A	HIGH	MED	HIGH-MED	
[266909029-57847890]	Norwood Place	266909029	57847890	Norwood Place & Dead End	Norwood Place & Norwood Avenue	PRIVATE																				
[57839093-258780716]	Oak View Avenue	57839093	258780716	Oak View Avenue & Ocean View Avenue	Oak View Avenue & Colusa Avenue	W-E	21	0	16	24	21	2	8	748.28	0.42	0.42	N	NONE	Y	Y	N	N/A	HIGH	HIGH	HIGH-HIGH	
[258780727-57891376]	Oak View Avenue	258780727	57891376	Oak View Avenue & Colusa Avenue	Santa Fe Avenue & Oak View Avenue	W-E	0	2	33	40	0	2	16.5	254.89	0.12	0.00	N	NONE	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57846719-57905313]	Oberlin Avenue	57846719	57905313	Oberlin Avenue & Amherst Avenue	Oberlin Avenue & Yale Avenue	W-E	7	0	11	18	CONT	2	5.5	267.82	0.39	1.00	N	NONE	N	Y	MED	N/A	HIGH	LOW	HIGH-LOW	
[57846719-266909007]	Oberlin Avenue	57846719	266909007	Oberlin Avenue & Amherst Avenue	Oberlin Avenue & Arlington Avenue	W-E	1	0	15	20	CONT	2	7.5	240.80	0.06	1.00	N	NONE	Y	Y	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57905315-57905313]	Oberlin Avenue	57905315	57905313	Oberlin Avenue & Stanford Avenue	Oberlin Avenue & Yale Avenue	W-E	3	0	12	20	3	2	6	203.14	0.22	0.22	N	NONE	Y	Y	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57839081-57832736]	Ocean View Avenue	57839081	57832736	Ocean View Avenue & Berkeley Park Boulevard	Coventry Road & Ocean View Avenue	S-N	13	0	13	22	13	2	6.5	582.51	0.33	0.33	N	NONE	Y	Y	MED	N/A	HIGH	HIGH	HIGH-HIGH	
[57839093-53058779]	Ocean View Avenue	57839093	53058779	Oak View Avenue & Ocean View Avenue	Colusa Avenue & Ocean View Avenue	W-E	18	0	15	23.5	18	2	7.5	799.35	0.34	0.34	N	NONE	Y	BLOCKED	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57839093-57832736]	Ocean View Avenue	57839093	57832736	Oak View Avenue & Ocean View Avenue	Coventry Road & Ocean View Avenue	S-N	11	0	15	22	11	2	7.5	263.34	0.63	0.63	N	NONE	Y	Y	N	N/A	MED	LOW	MED-LOW	
[57939694-288990531]	Parkside Court	57939694	288990531	Canon Drive & Parkside Court	Parkside Court & Dead End	W-E	1	3	17.5	27	1	2	8.75	301.78	0.20	0.05	N	NONE	N	N	N	N/A	LOW	MED	LOW-MED	
[57812200-57812199]	Plateau Drive	57812200	57812199	Plateau Drive & Dead End	Plateau Drive & Grizzly Peak Boulevard	W-E	0	3	15	20	3	2	7.5	278.88	0.16	0.16	N	NONE	N	N	N	N/A	HIGH	MED	HIGH-MED	
[57846724-57906743]	Princeton Avenue	57846724	57906743	Amherst Avenue & Princeton Avenue	Yale Avenue & Princeton Avenue	W-E	3	0	18	23	3	2	9	244.93	0.18	0.18	N	DASHYELL	Y	Y	N	N/A	HIGH	LOW	HIGH-LOW	
[57809771-57809767]	Purdue Avenue	57809771	57809767	Purdue Avenue & Dewey Road	Dead end	PRIVATE																				
[57809771-266909119]	Purdue Avenue	57809771	266909119	Purdue Avenue & Dewey Road	Purdue Avenue & North End of Median	PRIVATE																				
[57809776-57809775]	Purdue Avenue	57809776	57809775	Willamette Avenue & Purdue Avenue	Purdue Avenue & End of Divided Section (South of Garden)	S-N	10	0	17	23	10	2	8.5	403.45	0.37	0.37	N	NONE	Y	Y	Y	N/A	MED	LOW	MED-LOW	
[266909120-57809775]	Purdue Avenue	266909120	57809775	Purdue Avenue & Garden Drive	Purdue Avenue & End of Divided Section (South of Garden)	S-N	2	0																		
[57809775-266909122]	Purdue Avenue	57809775	266909122	Purdue Avenue & End of Divided Section (South of Garden)	Purdue Avenue & Garden Drive	INTERSECTION																				
[57809780-57809776]	Purdue Avenue	57809780	57809776	Kenyon Avenue & Purdue Avenue	Willamette Avenue & Purdue Avenue	S-N	6	0	17	24	6	2	8.5	275.95	0.33	0.33	N	NONE	Y	Y	N	N/A	LOW	MED	LOW-MED	
[57809783-57809780]	Purdue Avenue	57809783	57809780	Beloit Avenue & Purdue Avenue	Kenyon Avenue & Purdue Avenue	S-N	14	0	17	23	14	2	8.5	937.21	0.22	0.22	N	DASHYELL	Y	Y	MED	25	HIGH	MED	HIGH-MED	
[266909119-2478049237]	Purdue Avenue	266909119	2478049237	Purdue Avenue & North End of Median	Purdue Avenue & Garden Drive	PRIVATE																				
[2478049238-266909119]	Purdue Avenue	2478049238	266909119	Purdue Avenue & Garden Drive	Purdue Avenue & North End of Median	PRIVATE																				
[2478049237-266909120]	Purdue Avenue	2478049237	266909120	Purdue Avenue & Garden Drive	Purdue Avenue & Garden Drive	INTERSECTION																				
[266909122-2478049238]	Purdue Avenue	266909122	2478049238	Purdue Avenue & Garden Drive	Purdue Avenue & Garden Drive	INTERSECTION																				
[57802553-57802552]	Reed Place	57802553	57802552	Reed Place & Dead End	Franciscan Way & Sunset Drive & Reed Place	PRIVATE																				
[57885421-57832743]	Richardson Road & Willow Lane	57885421	57832743	Richardson Road & Willow Lane & Stratford Road	Coventry Road & Richardson Road & Willow Lane	S-N	7	5	10	24	11	2	5	745.17	0.24	0.22	N	NONE	N	N	MED	N/A	HIGH	HIGH	HIGH-HIGH	
[263579538-57821862]	Rincon Road	263579538	57821862	Arlington Avenue & Rincon Road (South)	Kerr Avenue & Edwin Drive & Rincon Road	S-N	0	7	15.5	28	3	2	7.75	930.32	0.11	0.05	N	NONE	N	N	N	N/A	HIGH	MED	HIGH-MED	Large trees at south end; north end width ~23'
[57878526-57821862]	Rincon Road	57878526	57821862	Rincon Road & Arlington Avenue (North)	Kerr Avenue & Edwin Drive & Rincon Road	S-N	0	2	23	23	0	2	11.5	390.69	0.08	0.00	N	NONE	N	N	Y	N/A	MED	MED	MED-MED	
[57831212-53043946]	Rugby Avenue	57831212	53043946	Yale Avenue & Rugby Avenue	Rugby Avenue & Alameda County Line	S-N	7	0	15.5	21	6	2	7.75	519.00	0.20	0.17	N	NONE	Y	Y	N	N/A	HIGH	LOW	HIGH-LOW	Large tree near county line
[57924232-260541022]	Saint Alban's Road	57924232	260541022	Saint Alban's Road & Westminster Avenue	Saint Alban's Road & Dead End	S-N	10	0	13	20	10	2	6.5	409.47	0.37	0.37	N	NONE	Y	PARTIAL	MED	N/A	MED	HIGH	MED-HIGH	More foliage at north end
[4058051737-57846876]	San Carlos Avenue	4058051737	57846876	San Carlos Avenue & El Cerrito City Line	San Carlos Avenue & Colusa Avenue	S-N	1	0	25	32.5	0	2	12.5	23.27	0.64	0.00	N	NONE	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[57891376-53116462]	Santa Fe Avenue	57891376	53116462	Santa Fe Avenue & Oak View Avenue	Santa Fe Avenue & Alameda County Line	S-N	7	7	27	40	0	2	13.5	507.40	0.41	0.00	N	DBLYELL	Y	Y	N	N/A	HIGH	HIGH	HIGH-HIGH	
[57846904-57891376]	Santa Fe Avenue	57846904	57891376	Santa Fe Avenue & Colusa Avenue	Santa Fe Avenue & Oak View Avenue	S-N	7	3	27.5	40	0	2	13.75	321.23	0.47	0.00	N	DBLYELL	Y	Y	N	25	LOW	LOW	LOW-LOW	
[258769162-98461043]	Spruce Street	258769162	98461043	Spruce Street (Alameda County Line)	Grizzly Peak Boulevard & Spruce Street	INTERSECTION																				
[57905315-57921072]	Stanford Avenue	57905315	57921072	Oberlin Avenue & Stanford Avenue	Stanford Avenue & Yale Avenue	S-N	34	0	12	17.5	CONT	2	6	1306.93	0.39	1.00	N	NONE	BLOCKED	BLOCKED	MED	N/A	LOW	LOW	LOW-LOW	
[57837391-57905315]	Stanford Avenue	57837391	57905315	Stanford Avenue & Wellesley Avenue	Oberlin Avenue & Stanford Avenue	S-N	0	0	17	19.5	CONT	2	8.5	169.76	0.00	1.00	N	NONE	Y	Y	Y	N/A	HIGH	LOW	HIGH-LOW	Variable gutter depth
[57885421-260540544]	Stratford Road	57885421	260540544	Richardson Road & Willow Lane & Stratford Road	Avon Road & Stratford Road	W-E	0	0	23.5	23.5	0	2	11.75	102.51	0.00	0.00	N	DASHYELL	N	N	N	N/A	LOW	LOW	LOW-LOW	
[57883885-260540544]	Stratford Road	57883885	260540544	Stratford Road & Berkeley Park Boulevard	Avon Road & Stratford Road	W-E	0	0	22.5	25.5	0	2	11.25	303.22	0.00	0.00	N	DASHYELL	N	BARRIER	Y	N/A	LOW	HIGH	LOW-HIGH	

[57832748-57921725]	Stratford Road	57832748	57921725	Coventry Road & Stratford Road	Beverly Road & Stratford Road	W-E	0	16	16.5	24	15	2	8.25	786.16	0.31	0.29	N	NONE	N	PARTIAL	N	N/A	MED	MED	MED-MED	
[57885421-57921725]	Stratford Road	57885421	57921725	Richardson Road & Willow Lane & Stratford Road	Beverly Road & Stratford Road	W-E	0	0	19	22	CONT	2	9.5	293.27	0.00	1.00	N	DBLYELL	ENDS	N	N	N/A	HIGH	MED	HIGH-MED	
[57841518-57841511]	Sunset Drive	57841518	57841511	Sunset Drive & Highgate Road	Franciscan Way & Sunset Drive & Cemetery Entrance	W-E	0	0	22.5	22.5	0	2	11.25	700.32	0.00	0.00	N	DASHYELL	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57841519-266909009]	Sunset Drive	57841519	266909009	Arlington Avenue & Sunset Drive	Arlington Avenue (W) & Sunset Drive Crosswalk	W-E	0	0	24	24	0	N/A		53.31	0.00	0.00	N	TURNAROUND	CROSSWALK	N	N	N/A	LOW	LOW	LOW-LOW	Measured end of double yellow to north median
[266909051-57841518]	Sunset Drive	266909051	57841518	Sunset Drive & Arlington Avenue	Franciscan Way & Sunset Drive & Highgate Road	W-E	0	4	15	21	3	2	7.5	498.69	0.12	0.09	N	DASHYELL	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57895320-57846446]	Trinity Avenue	57895320	57846446	Trinity Avenue & Kenyon Avenue	Trinity Avenue & Beloit Avenue	S-N	27	0	13	18	CONT	2	6.5	1016.31	0.40	1.00	N	NONE	BLOCKED	Y	N	N/A	MED	MED	MED-MED	18' ROW with gutters
[57832731-57846908]	Valley Road	57832731	57846908	Valley Road & Coventry Road	Valley Road & Colusa Avenue	W-E	0	8	16.5	24	8	2	8.25	319.72	0.38	0.38	N	DASHYELL	Y	Y	MED	N/A	MED	HIGH	MED-HIGH	
[99295292-99295289]	Vassar Avenue	99295292	99295289	Vassar Avenue & Circle North of County Line	Vassar Avenue & Alameda County Line	S-N	0	0	20	20	0	2	10	135.80	0.00	0.00	N	NONE	BLOCKED	Y	MED	N/A	HIGH	HIGH	HIGH-HIGH	
[57858944-99295292]	Vassar Avenue	57858944	99295292	Vassar Avenue & Yale Avenue	Vassar Avenue & Circle North of County Line	S-N	6	0	14	19.5	CONT	2	7	356.79	0.25	1.00	N	NONE	Y	Y	N	N/A	HIGH	HIGH	HIGH-HIGH	
[266909078-99295292]	Vassar Avenue Circle North of County Line	266909078	99295292	Vassar Avenue Circle North of County Line & End of Circle	Vassar Avenue & Circle North of County Line	INTERSECTION																				
[57837397-57837395]	Wellesley Avenue	57837397	57837395	Kenyon Avenue & Wellesley Avenue	Cambridge Avenue & Wellesley Avenue	W-E	3	0	13.5	18.5	CONT	2	6.75	291.30	0.15	1.00	N	NONE	Y	BLOCKED	Y	N/A	LOW	LOW	LOW-LOW	
[57837391-57837395]	Wellesley Avenue	57837391	57837395	Stanford Avenue & Wellesley Avenue	Cambridge Avenue & Wellesley Avenue	W-E	3	0	12	17	CONT	2	6	406.91	0.11	1.00	N	NONE	Y	Y	Y	25	HIGH	LOW	HIGH-LOW	20' with gutters
[57837387-57837391]	Wellesley Avenue	57837387	57837391	Arlington Avenue & Wellesley Avenue	Stanford Avenue & Wellesley Avenue	W-E	5	0	13	21	CONT	2	6.5	649.76	0.12	1.00	N	NONE	N	N	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57924228-57878542]	Westminster Avenue	57924228	57878542	Westminster Avenue & York Avenue	Arlington Avenue (E) & Westminster Avenue	W-E	0	0	31	32	0	2	15.5	178.81	0.00	0.00	N	DASHYELL	Y	Y	MED	N/A	MED	LOW	MED-LOW	
[266909039-57878542]	Westminster Avenue	266909039	57878542	Arlington Avenue (W) & Westminster Avenue	Arlington Avenue (E) & Westminster Avenue	W-E	0	0	58	58	0	2	29	30.91	0.00	0.00	N	TURNAROUND	CROSSWALK	N	N	N/A	LOW	LOW	LOW-LOW	
[57924232-57868920]	Westminster Avenue	57924232	57868920	Saint Alban's Road & Westminster Avenue	Windsor Avenue & Westminster Avenue	W-E	3	1	20	31	0	2	10	222.61	0.27	0.00	N	DASHYELL	Y	Y	MED	N/A	MED	LOW	MED-LOW	20' with two cars across
[57924228-57868920]	Westminster Avenue	57924228	57868920	Westminster Avenue & York Avenue	Windsor Avenue & Westminster Avenue	W-E	0	1	29	31	0	2	14.5	228.25	0.07	0.00	N	DASHYELL	Y	Y	MED	N/A	LOW	LOW	LOW-LOW	
[57924237-57924232]	Westminster Avenue	57924237	57924232	Westminster Avenue & Kenyon Avenue	Saint Alban's Road & Westminster Avenue	W-E	3	2	20	31	0	2	10	136.91	0.55	0.00	N	DASHYELL	Y	Y	MED	N/A	HIGH	MED	HIGH-MED	20' with two cars across
[57809776-57949752]	Willamette Avenue	57809776	57949752	Willamette Avenue & Purdue Avenue	Highland Boulevard & Willamette Avenue	W-E	0	17	10.5	25	CONT	2	5.25	792.04	0.32	1.00	N	NONE	PARTIAL	Y	Y	N/A	LOW	MED	LOW-MED	17.5-19' with gutters
[57949751-57949752]	Willamette Avenue	57949751	57949752	Willamette Avenue & Kenyon Avenue	Highland Boulevard & Willamette Avenue	W-E	5	0	16	22	5	2	8	243.59	0.31	0.31	N	NONE	BLOCKED	Y	MED	N/A	MED	LOW	MED-LOW	
[57868920-57868917]	Windsor Avenue	57868920	57868917	Windsor Avenue & Westminster Avenue	Windsor Avenue & North Dead End	S-N	20	0	11	18	CONT	2	5.5	895.70	0.33	1.00	N	NONE	BLOCKED	Y	N	N/A	LOW	LOW	LOW-LOW	
[57868924-57868920]	Windsor Avenue	57868924	57868920	Windsor Avenue & South Dead End	Windsor Avenue & Westminster Avenue	S-N	10	0	13	19.5	CONT	2	6.5	481.07	0.31	1.00	N	NONE	Y	Y	N	N/A	MED	MED	MED-MED	Large tree at north end
[57906743-57905313]	Yale Avenue	57906743	57905313	Yale Avenue & Princeton Avenue	Oberlin Avenue & Yale Avenue	S-N	0	14	13	18	CONT	2	6.5	874.47	0.24	1.00	N	NONE	CONSTRAINED	Y	N	N/A	HIGH	MED	HIGH-MED	Cars parked between road and left-hand (west) sidewalk
[57859955-57831212]	Yale Avenue	57859955	57831212	Yale Avenue & Yale Circle	Yale Avenue & Rugby Avenue	W-E	2	0	18	24	2	2	9	231.89	0.13	0.13	N	DASHYELL	Y	Y	MED	N/A	MED	LOW	MED-LOW	
[57859955-57906743]	Yale Avenue	57859955	57906743	Yale Avenue & Yale Circle	Yale Avenue & Princeton Avenue	S-N	0	8	17	21	8	2	8.5	400.32	0.30	0.30	N	DASHYELL	Y	Y	N	N/A	HIGH	LOW	HIGH-LOW	
[57921488-677315541]	Yale Avenue	57921488	677315541	Cambridge Avenue & Yale Avenue	Dead end	W-E	4	0	14	20	4	2	7	202.60	0.30	0.30	N	NONE	Y	BLOCKED	MED	N/A	MED	LOW	MED-LOW	
[57831212-57921072]	Yale Avenue	57831212	57921072	Yale Avenue & Rugby Avenue	Stanford Avenue & Yale Avenue	W-E	0	0	20	20	0	2	10	119.27	0.00	0.00	N	DASHYELL	Y	Y	MED	N/A	MED	LOW	MED-LOW	
[57858944-57921072]	Yale Avenue	57858944	57921072	Vassar Avenue & Yale Avenue	Stanford Avenue & Yale Avenue	W-E	0	0	20	20	0	2	10	123.06	0.00	0.00	N	DASHYELL	Y	Y	MED	N/A	HIGH	LOW	HIGH-LOW	
[57921488-57858944]	Yale Avenue	57921488	57858944	Cambridge Avenue & Yale Avenue	Vassar Avenue & Yale Avenue	W-E	0	0	19.5	19.5	CONT	2	9.75	141.23	0.00	1.00	N	DASHYELL	Y	Y	Y	N/A	HIGH	HIGH	HIGH-HIGH	
[57859957-57859955]	Yale Circle	57859957	57859955	Yale Circle & Dead End	Yale Avenue & Yale Circle	S-N	0	5	17	23	5	2	8.5	231.68	0.32	0.32	N	NONE	Y	Y	N	N/A	LOW	LOW	LOW-LOW	
[260540903-57924228]	York Avenue	260540903	57924228	York Avenue & Dead End	Westminster Avenue & York Avenue	S-N	18	0	12	20	18	2	6	640.86	0.42	0.42	N	NONE	BLOCKED	Y	N	N/A	LOW	LOW	LOW-LOW	
	Cemetery Roadway					W-E	0	0	20	20	0	2	10				N	NONE	N	N					-	Measured at Sunset Gate

Appendix C.2: Intersection Data

Map ID	Name	Approach 1	Approach 2	Approach 3	Approach 4	Approach 5	Approach 1 Traffic Control	Approach 2 Traffic Control	Approach 3 Traffic Control	Approach 4 Traffic Control	Approach 5 Traffic Control	Dead End?	Boundary?	Aggregate Traffic Control	Notes
57846724	Amherst Avenue & Princeton Avenue	Amherst Avenue N	Amherst Avenue S	Princeton Avenue E			Stop	Stop	Stop					All-Stop	
57921193	Anson Way & Eureka Avenue	Eureka Avenue W	Eureka Avenue E	Anson Way N			None	None	None					None	
57854477	Anson Way & Franciscan Way	Anson Way SW	Franciscan Way N	Franciscan Way S			None	None	None					None	
2244374982	Ardmore Road & Arlington Avenue (W)	Ardmore Road	Arlington Avenue (W)	Arlington Avenue (W)			Stop/no left	one way	one way					Stop	
57919465	Ardmore Road & Kingston Road	Ardmore Road NW	Ardmore Road SE	Kingston Road N			None	None	Yield					Yield	
57878536	Arlington Avenue & Arlington Court	Arlington Court W	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
260540954	Arlington Avenue & End of Median North of Arlington Lane	Arlington Avenue	End of Median North of Arlington Lane				None	None						None	
3180480692	Arlington Avenue & End of Median South of Oberlin	Arlington Avenue	End of Median South of Oberlin				None	None						None	
57878523	Arlington Avenue & Highland Boulevard	Arlington Avenue NE	Highland Boulevard E	Arlington Avenue SE			None	Stop	None					Stop	
57797132	Arlington Avenue & Kensington Park Road	Arlington Avenue N	Arlington Avenue S	Kensington Park Road E			Pedestrian S	Pedestrian S	Stop					Signal	
57878524	Arlington Avenue & Lam Court	Arlington Avenue NE	Lam Court W	Arlington Avenue SE			None	Stop	None					Stop	
506825551	Arlington Avenue & Lam-Highland Cut-Through	Arlington Avenue N	Arlington Avenue S	Lam-Highland Cut-Through E			None	None	None					None	
99323375	Arlington Avenue & North End of Median by Police Dept													None	
263579538	Arlington Avenue & Rincon Road	Arlington Avenue	Arlington Avenue	Rincon Road			None	None	Stop					Stop	
57841519	Arlington Avenue & Sunset Drive	Arlington Avenue N	Arlington Avenue S	Sunset Drive W			None	None	Stop					Stop	
57837387	Arlington Avenue (E) & Wellesley Avenue	Arlington Avenue (E) N	Wellesley Avenue NE				None	Stop						Stop	
99333173	Arlington Avenue (E) & Alameda County Line	Arlington Avenue (E)	Alameda County Line				None	None					Yes	Boundary	adjusted nodeid
99333186	Arlington Avenue (E) & Amherst Avenue	Amherst Avenue	Arlington Avenue (E) South				Stop	Stop						All-Stop	
99333196	Arlington Avenue (E) & Median Break North of Ardmore	Arlington Avenue (E)	Turnaround				None	None						None	
57878542	Arlington Avenue (E) & Westminster Avenue	Arlington Avenue (E)	Westminster Avenue				None	Stop						Stop	
677315471	Arlington Avenue (W) & Alameda County Line	Arlington Avenue (W)	Alameda County Line				None	None					Yes	Boundary	
57846732	Arlington Avenue (W) & Amherst Avenue	Amherst Avenue	Arlington Avenue (W) North				Stop	Stop						All-Stop	
99323365	Arlington Avenue (W) & Median Break North of Ardmore	Arlington Avenue (W)	Turnaround				None	Stop						Stop	
266909009	Arlington Avenue (W) & Sunset Drive Crosswalk	Arlington Avenue (W)	Sunset Drive Crosswalk				None	None						None	
266909039	Arlington Avenue (W) & Westminster Avenue	Arlington Avenue (W)	Arlington Avenue (W)	Westminster Avenue			None	None	None					None	
260540925	Arlington Court & Dead End	Arlington Court	Dead End				None	None				Yes		Dead End	
57947646	Arlington Court & Norwood Avenue	Arlington Court E	Arlington Court W	Norwood Avenue NW	Norwood Avenue SE		None	Stop	None	None				Stop	
266909033	Arlington Lane & Arlington Avenue	Arlington Lane SW	Arlington Avenue (W) N				Stop	None						Stop	
57882138	Arlington Lane & Dead End	Arlington Lane	Dead End				None	None				Yes		Dead End	
6604893822	Arlmont & East Dead End	Arlmont	East Dead End				None	None				Yes		Dead End	
57878533	Arlmont Drive & Arlington Avenue	Arlmont Drive E	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
57817312	Arlmont Drive & Marguerita Road	Arlmont Drive NE	Arlmont Drive SW	Marguerita Road W			None	None	None					None	
260540544	Avon Road & Stratford Road	Stratford Road W	Stratford Road E	Avon Road N			None	None	None					None	
57809783	Beloit Avenue & Purdue Avenue	Beloit Avenue N	Beloit Avenue S	Purdue Avenue W			None	None	Stop					Stop	
5043351846	Berkeley Park Boulevard & Alameda County Line	Berkeley Park Boulevard	Alameda County Line				None	None					Yes	Boundary	
57832735	Berkeley Park Boulevard & Coventry Road	Berkeley Park Boulevard	Berkeley Park Boulevard S	Coventry Road E	Coventry Road W		None	None	Stop	Stop				Stop	
57883886	Berkeley Park Boulevard & Lexington Road	Berkeley Park Blvd N	Berkeley Park Blvd S	Lexington Road E			None	None	None					None	
266908987	Berkeley Park Boulevard & North Dead End	Berkeley Park Boulevard	North Dead End				None	None						None	
57921722	Beverly Road & Avon Road	Beverly Road S	Beverly Road NE	Avon Road NW			None	None	None					None	
57880650	Beverly Road & Lenox Road	Lenox Road N	Lenox Road S	Beverly Road W			None	None	None					None	
57921725	Beverly Road & Stratford Road	Stratford Road W	Stratford Road E	Beverly Road N			None	None	None					None	
57846445	Cambridge Avenue & Beloit Avenue	Cambridge Avenue N	Cambridge Avenue S	Beloit Avenue E			None	None	Stop					Stop	
57837395	Cambridge Avenue & Wellesley Avenue	Cambridge Avenue S	Wellesley Avenue E	Wellesley Avenue W			None	None	None					None	
57921488	Cambridge Avenue & Yale Avenue	Cambridge Avenue NW	Yale Avenue SW	Yale Avenue NE			None	None	None					None	
57915704	Camelot Court & Beverly Road	Beverly Road	Beverly Road	Camelot Court			None	None	None					None	
260540545	Camelot Court & Dead End	Camelot Court	Dead End				None	None				Yes		Dead End	
57939694	Canon Drive & Parkside Court	Canon Drive N	Canon Drive S	Parkside Court E			None	None	None					None	
984957182	Canon Drive & Tilden Park Boundary	Canon Drive	Tilden Park Boundary				None	None					Yes	Boundary	
5482922766	Carmel Avenue & El Cerrito City Line	Carmel Avenue	El Cerrito City Line				None	None					Yes	Boundary	
57846447	Colgate Avenue & Beloit Avenue	Colgate Avenue N	Beloit Avenue E	Beloit Avenue W			None	None	None					None	
57884194	Colgate Avenue & Kenyon Avenue	Colgate Avenue S	Kenyon Avenue W	Kenyon Avenue E			None	None	None					None	
57884195	Columbia Avenue & Colgate Avenue	Columbia Avenue W	Colgate Avenue N	Colgate Avenue S			None	None	None					None	
266910806	Colusa Avenue & Alameda County Line	Colusa Avenue	Alameda County Line				None	None					Yes	Boundary	
258780720	Colusa Avenue & Berkeley Park Boulevard	Colusa Circle	Berkeley Park Boulevard N				None	Stop						Stop	
258780730	Colusa Avenue & Berkeley Park Boulevard	Colusa Circle	Berkeley Park Boulevard S				None	Stop						Stop	
57846909	Colusa Avenue & Curry Avenue	Colusa Avenue N	Colusa Avenue S	Curry Avenue E			None	None	Stop					Stop	
5482922765	Colusa Avenue & El Cerrito City Line	Colusa Avenue	El Cerrito City Line				None	None					Yes	Boundary	
57829666	Colusa Avenue & Fairmount Avenue & Carmel Ave	Colusa Ave SE	Colusa Ave N	Carmel Ave S	Fairmuont Ave W	cemetary entrance n	Traffic Light	Traffic Light	Traffic Light	Traffic Ligh	Traffic Light			Signal	
53058779	Colusa Avenue & Ocean View Avenue	Colusa Ave N	Colusa Ave S	Ocean View Ave E			None	None	Stop					Stop	
258780713	Colusa Circle	Colusa Avenue SE Approach					None							None	
258780724	Colusa Circle	Colusa Avenue NW Approach					None							None	
258780763	Colusa Circle	Colusa Circle	Colusa Avenue NW				Stop							Stop	
258780767	Colusa Circle	Colusa Circle	Colusa Avenue SE				Stop							Stop	
258780770	Colusa Circle	Colusa Circle	Colusa Avenue SE exit				None							None	
258780773	Colusa Circle	Colusa Circle	Colusa Avenue NW exit				None							None	
57832760	Coventry Road & Ardmore Road	Coventry Road NW	Coventry Road SE	Ardmore Road N			None	None	None					None	
2244374968	Coventry Road & Arlington Avenue (W)	Coventry Road	Arlington Avenue (W)	Arlington Avenue (W)			Stop/no left	one way	one way					Stop	
57832712	Coventry Road & Eagle Hill	Coventry Road	Coventry Road	Eagle Hill			None	None	None					None	
57803482	Coventry Road & Edgecroft Road East	Coventry Road NE	Coventry Road SW	Edgecroft Road SE			None	None	one way away from int					None	
57803490	Coventry Road & Edgecroft Road West	Coventry Road NE	Coventry Road SW	Edgecroft Road SW			None	None	Stop/One way					Stop	
57832729	Coventry Road & North Dead End	Coventry Road	North Dead End				None	None				Yes		Dead End	
57832736	Coventry Road & Ocean View Avenue	Coventry Road W	Coventry Road E	Ocean View Avenue N	Ocean View Avenue S		Stop	Stop	Stop	Stop				All-Stop	
57832743	Coventry Road & Richardson Road & Willow Lane	Coventry Road S	Coventry Road E	Marchant Ct W	Willow Lane N		None	None	None	None				None	
57832748	Coventry Road & Stratford Road	Coventry Road SE	Coventry Road N	Stratford Road W			None	None	None					None	

57878529	Cowper Avenue & Arlington Avenue	Cowper Avenue E	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
57890595	Cowper Avenue & Kenilworth Drive	Cowper Avenue SW	Cowper Avenue NE	Kenilworth Drive NW			None	None	None					None	
57868718	Cowper Avenue & Kensington Road	Cowper Avenue SW	Kensington Road SE	Kensington Road NW			Yield	None	None					Yield	
261736262	Curry Avenue & El Cerrito City Line	Curry Avenue	El Cerrito City Line				None	None					Yes	Boundary	
57895824	Dewey Road & Dead End	Dewey Road	Dead End				None	None				Yes			
260540808	Eagle Hill & Dead End	Eagle Hill	Dead End				None	None				Yes		Dead End	
57830120	Eldridge Court & Coventry Road	Coventry W	Coventry W	Eldridge Ct S			None	None	None					None	
57830122	Eldridge Court & Dead End	Eldridge Court N	Dead End S				None	None				Yes		Dead End	
57878531	Estates Road & Arlington Avenue	Arlington Avenue N	Arlington Avenue S	Estates Road E			None	None	None					None	
57942368	Estates Road & Dead End	Estates Road	Dead End				None	None				Yes		Dead End	
57921192	Eureka Avenue & El Cerrito City Line	Eureka Avenue	El Cerrito City Line				None	None					Yes	Boundary	
57854484	Eureka Avenue & Franciscan Way	Franciscan Way N	Franciscan Way S	Eureka Avenue W			Stop	Stop	Stop					All-Stop	
262125791	Fairmount Avenue & El Cerrito City Line	Fairmount Avenue	El Cerrito City Line				None	None					Yes	Boundary	
2869002030	Franciscan Way & Contra Costa Drive	Highgate Road	Contra Costa Drive	Franciscan Way			None	None	Stop					Stop	
260604925	Franciscan Way & El Cerrito City Line	Franciscan Way	El Cerrito City Line				None	None					Yes	Boundary	
57841518	Franciscan Way & Sunset Drive & Highgate Road	Sunset Drive W	Sunset Drive E	Highgate Road N			None	None	Stop					Stop	
57802552	Franciscan Way & Sunset Drive & Reed Place	Franciscan Way N	Sunset Drive S	Reed Place E			None	None	None					None	
266909108	Garden Drive & Actual Dead End	Garden Drive	Actual Dead End				None	None				Yes		Dead End	
266909107	Garden Drive & North End of Median	Garden Drive	North End of Median				None	None						None	
6520693392	Grizzly Peak Boulevard & Alameda County Line	Grizzly Peak Boulevard	Alameda County Line				None	None					Yes	Boundary	adjusted nodeid
6520693394	Grizzly Peak Boulevard & Alameda County Line	Grizzly Peak Boulevard	Alameda County Line				None	None					Yes	Boundary	
57837109	Grizzly Peak Boulevard & Kenyon Avenue & Lake Drive	Lake Drive N	Lake Drive S	Kenyon Avenue E			None	None	None					None	
57817949	Grizzly Peak Boulevard & Los Altos Drive	Grizzly Peak Boulevard	Grizzly Peak Boulevard SE	Los Altos Drive NE			None	None	None					None	
57817950	Grizzly Peak Boulevard & Los Altos Drive & Beloit Avenue	Grizzly Peak Boulevard	Grizzly Peak Boulevard S	Beloit Avenue W	Los Altos Drive E		Stop	None	Stop	None				Stop	
258769157	Grizzly Peak Boulevard & Slip Lane to Spruce WB	Grizzly Peak Boulevard	Slip Lane to Spruce WB				None	None						None	
53030619	Grizzly Peak Boulevard & Spruce Street	Grizzly Peak Boulevard	Grizzly Peak Boulevard S	Spruce Street W	Wildcat Canyon Road E	Canon Drive N	Stop	Stop	Stop	Stop	Stop			All-Stop	adjusted nodeid
98461097	Grizzly Peak Boulevard ("divided" section near County Line	Grizzly Peak Boulevard	Grizzly Peak Boulevard ("divided" section near County Line)				None	None						None	
98461043	Grizzly Peak Boulevard Slip Lane & Spruce Street	Spruce Street W	Spruce Street E	Slip Lane N			None	None	Stop					Stop	
57883862	Highgate Court & Dead End	Highgate Court	Dead End				None	None				Yes		Dead End	
2869002028	Highgate Road & El Cerrito City Line	Highgate Road	El Cerrito City Line				None	None					Yes	Boundary	
57883858	Highgate Road & Highgate Court	Highgate Road N	Highgate Road S	Highgate Court E			None	None	None					None	
6604893821	Highland Boulevard & Arlmont	Highland Boulevard W	Highland Boulevard E	Arlmont SW	Arlmont NE		None	None	None	None				None	
57934129	Highland Boulevard & Arlmont Drive	Highland Boulevard NW	Highland Boulevard SE	Arlmont Drive NE	Arlmont Drive SW		None	None	None	None				None	
57934391	Highland Boulevard & Cowper Avenue	Highland Boulevard NW	Highland Boulevard SE	Cowper Avenue NE	Cowper Avenue SW		Stop	Stop	Stop	Stop				All-Stop	
57953642	Highland Boulevard & Kenyon Avenue	Highland Boulevard	Highland Boulevard	Kenyon Avenue			None	None	Stop					Stop	
506825381	Highland Boulevard & Lam-Highland Cut-Through	Highland Boulevard	Highland Boulevard	Lam-Highland Cut-Through			None	None	Do not enter					None	
263579546	Highland Boulevard & South Dead End	Highland Boulevard	South Dead End				None	None				Yes		Dead End	
57949752	Highland Boulevard & Willamette Avenue	Willamette Avenue W	Willamette Avenue E	Highland Boulevard N			None	None	None					None	
260605063	Jessen Court & Dead End	Jessen Court	Dead End				None	None				Yes		Dead End	
57807649	Jessen Court & Highgate Road	Highgate Rd NW	Highgate Rd SE	Jessen Ct NE			None	None	Yield					Yield	
268003100	Kenilworth Ct & Coventry Road	Coventry Road	Coventry Road	Kenilworth Court			None	None	None					None	
1588168793	Kenilworth Ct & Dead End	Kenilworth Court	Dead End				None	None						Dead End	
57878525	Kenilworth Drive & Arlington Avenue	Kenilworth Drive E	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
262120923	Kensington Court & Dead End	Kensington Court	Dead End				None	None				Yes		Dead End	
57868716	Kensington Court & Kensington Road	Kensington Court SE	Kensington Road E	Kensington Road NW			None	None	None					None	
5733416164	Kensington Park Road & Dead End	Kensington Park Road E	Dead End				None	None				Yes		Dead End	
266909128	Kensington Park Road (closed segment) & Bollards	Kensington Park Road V	Dead End				None	None				Yes		Dead End	
57797121	Kensington Park Road (closed segment) & Highland Boulev	Kensington Park Road	Highland Boulevard				None	None				Yes		Dead End	school parking lot
262120917	Kensington Road & North Dead End	Kensington Road	North Dead End				None	None				Yes		Dead End	
57868714	Kensington Road & South Dead End	Kensington Road	South Dead End				None	None				Yes		Dead End	
57953646	Kenyon Avenue & Columbia Avenue	Kenyon Avenue W	Kenyon Avenue E	Columbia Avenue S			None	None	None					None	
57809780	Kenyon Avenue & Purdue Avenue	Purdue Avenue W	Purdue Avenue E	Kenyon Avenue S			Yield	None	None					Yield	
57837397	Kenyon Avenue & Wellesley Avenue	Kenyon Avenue W	Kenyon Avenue E	Wellesley Avenue SW			None	None	Yield					Yield	
57874410	Kerr Avenue & Edwin Drive & Highgate Road	Edwin Drive NE	Highgate Road N	Highgate Road S			Stop	None	None					Stop	
57821862	Kerr Avenue & Edwin Drive & Rincon Road	Kerr Avenue NW	Kerr Drive SE	Rincon Road N			None	None	None					None	
266908967	Kingston Road & Dead End	Kingston Road	Dead End				None	None				Yes		Dead End	
57837111	Lake Drive & Beloit Avenue	Lake Drive N	Beloit Avenue W	Beloit Avenue E			Stop	None	None					Stop	
258769170	Lake Drive & Dead End	Lake Drive	Dead End				None	None				Yes		Dead End	
262120961	Lam Court & Dead End	Lam Court	Dead End				None	None				Yes		Dead End	
57826883	Lawson Road & Cowper Avenue	Lawson Road NW	Lawson Road SE	Cowper Avenue NE	Cowper Avenue SW		Stop	None	None	None				Stop	
57826894	Lawson Road & North Dead End	Lawson Road SE	North Dead End				None	None				Yes		Dead End	
262120957	Lawson Road & South Dead End	Lawson Road	South Dead End				None	None				Yes		Dead End	
57832750	Lenox Road & Coventry Road	Coventry Road S	Coventry Road E	Lenox Road W			None	None	Yield					Yield	
57880646	Lenox Road & Kingston Road	Kingston Road NE	Kingston Road SW	Lenox Road S			None	None	None					None	
266908984	Lexington Road & Dead End	Lexington Road	Dead End				None	None				Yes		Dead End	
57846905	Lynn Avenue & Colusa Avenue	Colusa Avenue N	Colusa Avenue S	Lynn Avenue			None	None	Stop					Stop	
4058051722	Lynn Avenue & El Cerrito City Line	Lynn Avenue	El Cerrito City Line				None	None						Boundary	
57848787	Marchant Count & Dead End	Marchant Count	Dead End				None	None				Yes		Dead End	
57817311	Marguerita Road & Dead End	Marguerita Road E	Dead End W				None	None				Yes		Dead End	
57878543	Norwood Avenue & Arlington Avenue (E)	Norwood Avenue	Arlington Avenue (E)				Stop	None						Stop	
266909046	Norwood Avenue & Arlington Avenue (W)	Norwood Avenue	Arlington Avenue (W)	Arlington Avenue (W)			Stop	None	None					Stop	
57960336	Norwood Avenue & Highgate Road	Highgate Road	Highgate Road	Norwood Avenue			None	None	Stop					Stop	
260540946	Norwood Court & Dead End	Norwood Court	Dead End				None	None				Yes		Dead End	
57918103	Norwood Court & Norwood Avenue	Norwood Court E	Norwood Avenue N	Norwood Avenue S			None	None	None					None	
266909029	Norwood Place & Dead End	Norwood Place	Dead End				None	None				Yes		Dead End	
57847890	Norwood Place & Norwood Avenue	Norwood Place N	Norwood Avenue E	Norwood Avenue W			None	None	None					None	
258780716	Oak View Avenue & Colusa Avenue	Colusa Circle	Oak View Avenue E				None	Stop						Stop	

258780727	Oak View Avenue & Colusa Avenue	Colusa Circle	Oak View Avenue W				None	Stop						Stop	
57839093	Oak View Avenue & Ocean View Avenue	Oak View Avenue W	Ocean View Avenue N	Ocean View Avenue S			None	None	None					None	
57846719	Oberlin Avenue & Amherst Avenue	Oberlin Avenue NE	Oberlin Avenue SW	Amherst Avenue SE			None	None	None					None	
266909007	Oberlin Avenue & Arlington Avenue	Oberlin Avenue NE	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
57905315	Oberlin Avenue & Stanford Avenue	Stanford Avenue	Stanford Avenue	Oberlin Avenue			None	None	None					None	
57905313	Oberlin Avenue & Yale Avenue	Oberlin Avenue	Oberlin Avenue	Yale Avenue			None	None	None					None	
57839081	Ocean View Avenue & Berkeley Park Boulevard	Ocean View Avenue N	Ocean View Avenue S	Berkeley Park Boulevard E	Berkeley Park Boulevard W		None	None	None	None				None	
288990531	Parkside Court & Dead End	Parkside Court	Dead End				None	None				Yes		Dead End	
57812200	Plateau Drive & Dead End	Plateau Drive S	Dead End N				None	None				Yes		Dead End	
57812199	Plateau Drive & Grizzly Peak Boulevard	Plateau Drive N	Grizzly Peak Boulevard E	Grizzly Peak Boulevard W			None	None	None					None	
57809771	Purdue Avenue & Dewey Road	Purdue Avenue	Purdue Avenue												
57809775	Purdue Avenue & End of Divided Section (South of Garden)	Purdue Avenue												None	
266909120	Purdue Avenue & Garden Drive	Purdue Avenue	Purdue Avenue	Garden Drive (N)			None	None	None					None	
266909122	Purdue Avenue & Garden Drive	Purdue Avenue	Purdue Avenue	Garden Drive (S)			None	None	None					None	
2478049237	Purdue Avenue & Garden Drive													None	
2478049238	Purdue Avenue & Garden Drive													None	
57809767	Purdue Avenue & North Dead End	Purdue Avenue													
266909119	Purdue Avenue & North End of Median	Purdue Avenue	North End of Median				None	None							
57802553	Reed Place & Dead End	Reed Place W	Dead End E				None	None				Yes		Dead End	
57885421	Richardson Road & Stratford Road	Richardson Road S	Stratford Road W	Stratford Road E			None	None	None					None	
57878526	Rincon Road & Arlington Avenue	Rincon Road W	Arlington Avenue N	Arlington Avenue S			Stop	None	None					Stop	
53043946	Rugby Avenue & Alameda County Line	Rugby Avenue	Alameda County Line				None	None					Yes	Boundary	adjusted nodeid
260541022	Saint Alban's Road & Dead End	Saint Alban's Road	Dead End				None	None				Yes		Dead End	
57924232	Saint Alban's Road & Westminster Avenue	Saint Alban's Road	Westminster Avenue E	Westminster Avenue W			None	None	None					None	
57846876	San Carlos Avenue & Colusa Avenue	Colusa Avenue W	Colusa Avenue E	San Carlos Avenue S			None	None	Stop					Stop	
4058051737	San Carlos Avenue & El Cerrito City Line	San Carlos Avenue	El Cerrito City Line				None	None					Yes	Boundary	
53116462	Santa Fe Avenue & Alameda County Line	Santa Fe Avenue N	Alameda County Line S				None	None					Yes	Boundary	
57846904	Santa Fe Avenue & Colusa Avenue	Colusa Avenue N	Colusa Avenue SE	Santa Fe Ave S			None	None	Stop					Stop	
57891376	Santa Fe Avenue & Oak View Avenue	Santa Fe Avenue N	Santa Fe Avenue S	Oak View Avenue E			None	None	Stop					Stop	
258769162	Spruce Street (Alameda County Line)														
57837391	Stanford Avenue & Wellesley Avenue	Stanford Avenue S	Wellesley Avenue E	Wellesley Avenue W			None	None	None					None	
57921072	Stanford Avenue & Yale Avenue	Yale Avenue SW	Yale Avenue NE	Stanford Avenue NW			None	None	None					None	
57883885	Stratford Road & Berkeley Park Boulevard	Berkeley Park Blvd N	Berkeley Park Blvd S	Stratford Road E			None	None	None					None	
266909051	Sunset Drive & Arlington Avenue	Sunset Drive W	Arlington Avenue N	Arlington Avenue S			Stop	None/One-v	None					Stop	
57846446	Trinity Avenue & Beloit Avenue	Trinity Avenue N	Beloit Avenue E	Beloit Avenue W			None	None	None					None	
57895320	Trinity Avenue & Kenyon Avenue	Trinity Avenue S	Kenyon Avenue W	Kenyon Avenue E			Yield	None	None					Yield	
57846908	Valley Road & Colusa Avenue	Colusa Avenue N	Colusa Avenue S	Valley Road E			None	None	Stop					Stop	
57832731	Valley Road & Coventry Road	Coventry Road	Coventry Road	Valley Rd Z			None	None	None					None	
677315536	Vassar Avenue & Alameda County Line	Vassar Avenue	Alameda County Line				None	None					Yes	Boundary	adjusted nodeid
99295292	Vassar Avenue & Circle North of County Line	Vassar Avenue	Circle North of County Line				None	None						None	
57858944	Vassar Avenue & Yale Avenue	Vassar Avenue SE	Yale Avenue SW	Yale Avenue NE			None	None	None					None	
266909078	Vassar Avenue Circle North of County Line & End of Circle	Vassar Avenue Circle No	End of Circle				None	None				Yes		Dead End	
57924237	Westminster Avenue & Kenyon Avenue	Kenyon Avenue S	Kenyon Avenue N	Westminster Avenue W			Stop	Stop	Stop					All-Stop	
57924228	Westminster Avenue & York Avenue	Westminster Avenue E	Westminster Avenue W	York Avenue S			None	None	None					None	
57949751	Willamette Avenue & Kenyon Avenue	Willamette Avenue NE	Kenyon Avenue N	Kenyon Avenue E			None	None	None					None	
57809776	Willamette Avenue & Purdue Avenue	Willamette Avenue S	Purdue Avenue W	Purdue Avenue E			None	None	None					None	
57868917	Windsor Avenue & North Dead End	Windsor Avenue	North Dead End				None	None				Yes		Dead End	
57868924	Windsor Avenue & South Dead End	Windsor Avenue	South Dead End				None	None				Yes		Dead End	
57868920	Windsor Avenue & Westminster Avenue	Westminster Avenue W	Westminster Avenue E	Windsor Avenue N	Windsor Avenue S		None	None	None	None				None	
677315541	Yale Avenue & Dead End	Yale Avenue	Dead End				None	None				Yes		Dead End	
57906743	Yale Avenue & Princeton Avenue	Yale Avenue	Yale Avenue	Princeton Avenue			None	None	None					None	
57831212	Yale Avenue & Rugby Avenue	Yale Avenue NE	Yale Avenue SW	Rugby Avenue SE			None	None	None					None	
57859955	Yale Avenue & Yale Circle	Yale Avenue N	Yale Avenue E	Yale Circle S			None	None	Yield					Yield	
57859957	Yale Circle & Dead End	Yale Circle	Dead End				None	None				Yes		Dead End	
260540903	York Avenue & Dead End	York Avenue	Dead End				None	None				Yes		Dead End	