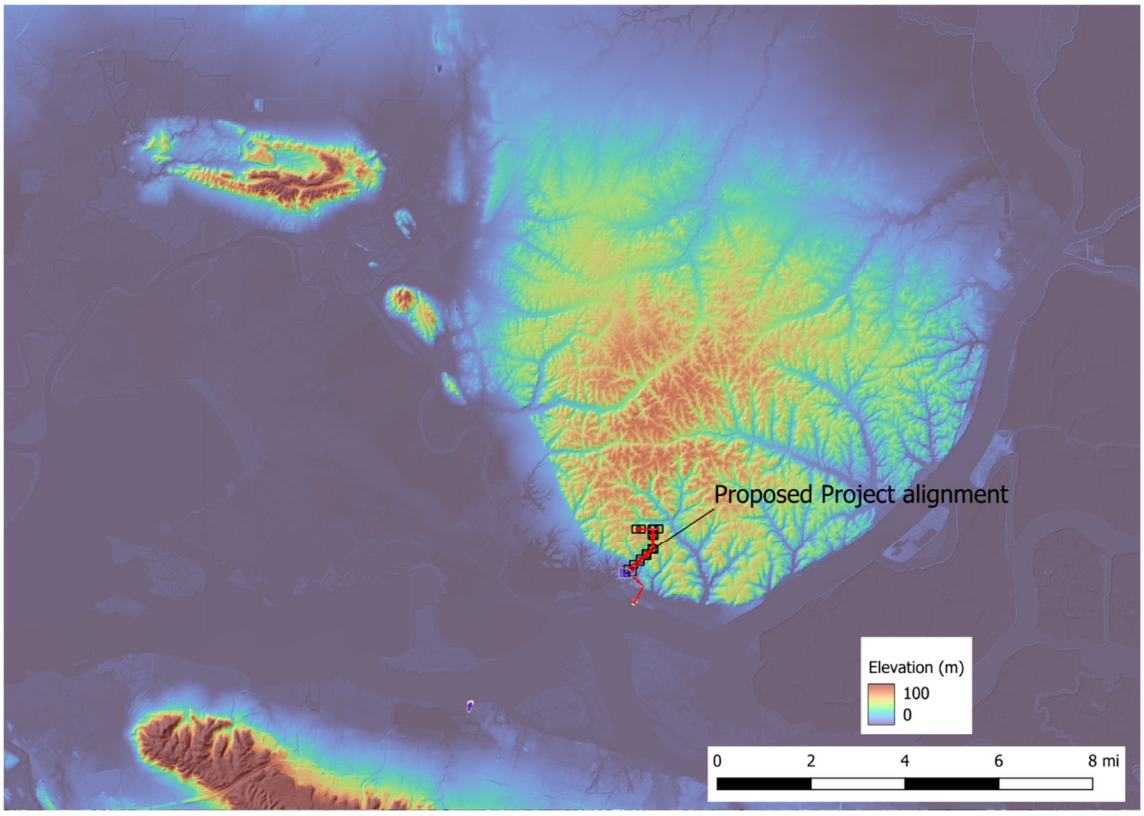
ATTACHMENT 5.20-A: WILDFIRE TECHNICAL REPORT

Collinsville 500/230 kV Substation Project - Wildfire Analyses



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1.0 INTRODUCTION

CloudFire Inc. (CloudFire) has been retained by Insignia Environmental (Insignia) to provide a wildfire risk analysis of the proposed Collinsville 500/230 kilovolt (kV) Substation Project (Proposed Project). This analysis addresses components outlined in Section 5.20.1 of the California Public Utilities Commission (CPUC) "Guidelines for Energy Project Application Requiring CEQA Compliance"[1], hereafter "CPUC guidelines". This report presents the findings of this analysis.

[1] https://www.cpuc.ca.gov/-/media/cpuc-website/files/legacyfiles/c/6442463239-ceqa-pre-filing-guidelines-pea-checklist-nov-2019.pdf

2.0 HIGH FIRE RISK AREAS AND STATE RESPONSIBILITY AREAS

CPUC guidelines Section 5.20.1.1 requires identification of Wildland Urban Interface (WUI) areas and high fire risk areas within the Proposed Project area. To meet this requirement, CloudFire analyzed the following maps developed by the Federal Government and State of California:

1. 1990-2020 wildland-urban interface of the coterminous United States[2] - see Figure 1.
2. CPUC High Fire Threat District map[3] - see Figure 2.
3. Currently adopted Fire Hazard Severity Zone maps[4] - see Figure 3.
4. Fire Resource Assessment Program (FRAP) Fire Threat map[5] - see Figure 4.

The entirety of the Proposed Project is located in areas designated as Local Responsibility Area (LRA), meaning none of the Proposed Project is in areas designated as State Responsibility Area (SRA) or Federal Responsibility Area (FRA). Figure 1 shows that the predominant WUI classifications north of the Sacramento River in the vicinity of the Proposed Project alignment North are "very low density". Higher density WUI classifications are present around Rio Vista, approximately 8 miles northeast of the Proposed Project.

As shown collectively in Figure 2 – Figure 4, the Proposed Project is sited in a generally low fire risk area. North of the Sacramento River, there are no CPUC high fire threat districts or Very High Fire Hazard Severity Zones near the Proposed Project alignment (Figure 2 - Figure 3). Finally, the FRAP Fire Threat Map (Figure 4) shows that fire threat for most areas near the alignment is not rated, meaning it is less than the minimum fire threat category (low). There is a mosaic of low/moderate/high fire threat immediately East of the Proposed Project alignment, most likely caused by somewhat elevated topographical slope values in that area.

[2] https://www.fs.usda.gov/rds/archive/catalog/RDS-2015-0012-4
[3] https://www.cpuc.ca.gov/industries-and-topics/wildfires/fire-threat-maps-and-fire-safety-rulemaking
[4] https://osfm.fire.ca.gov/divisions/community-wildfire-preparedness-and-mitigation/wildfire-preparedness/fire-hazard-severity-zones/fire-hazard-severity-zone-maps/
[5]https://34c031f8-c9fd-4018-8c5a-4159cdff6b0d-cdn-endpoint.azureedge.net/-/media/calfire-website/what-we-do/fire-resource-assessment-program---frap/gis-data/fire-threat-v14_2.zip?rev=6e6841d8777b429397875c25b9bb696c&hash=A2667077F81E905061931642470112CF

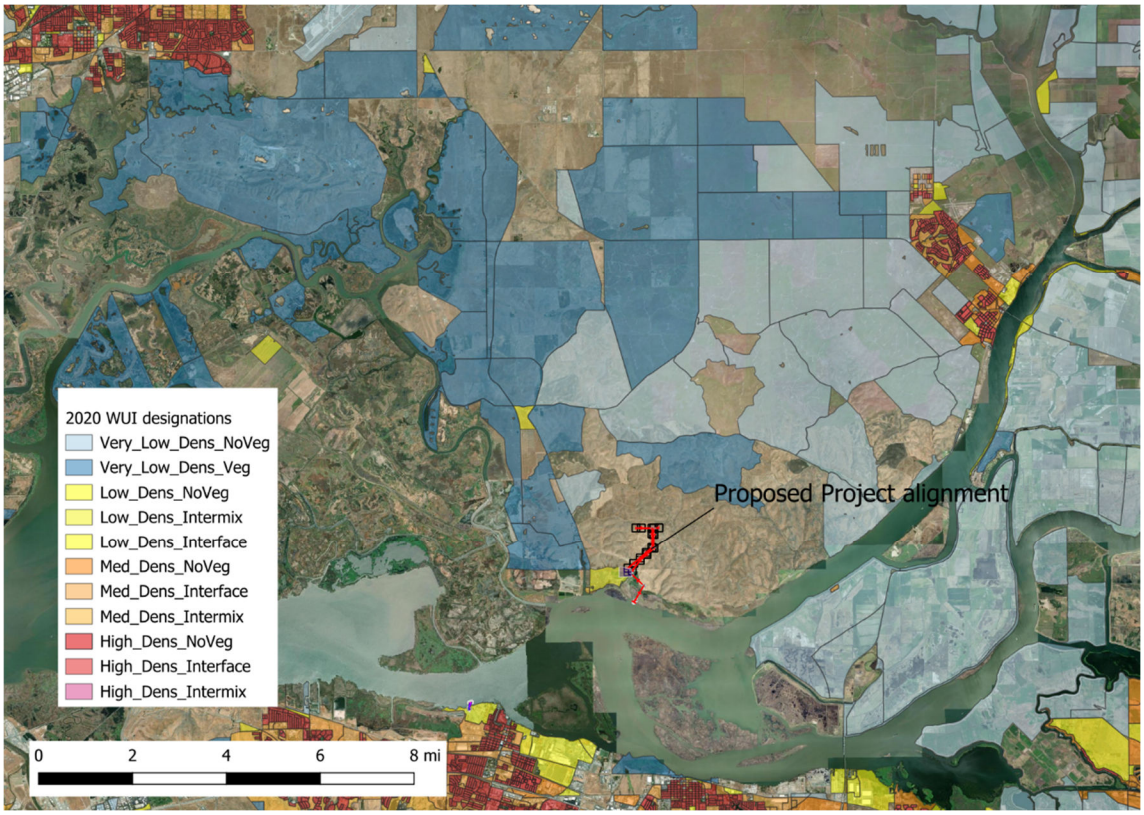

Figure 1. Wildland urban interface areas relative to Proposed Project area.

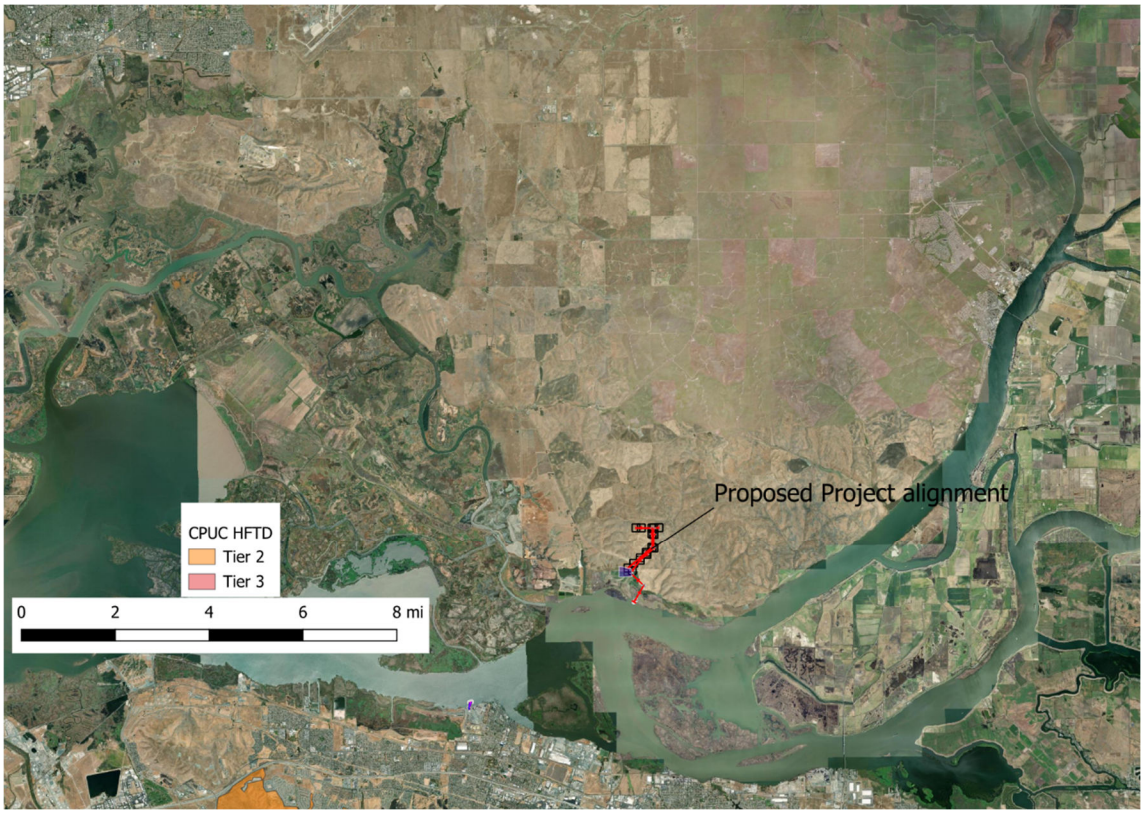

Figure 2. CPUC High Fire Threat District map relative to Proposed Project area.

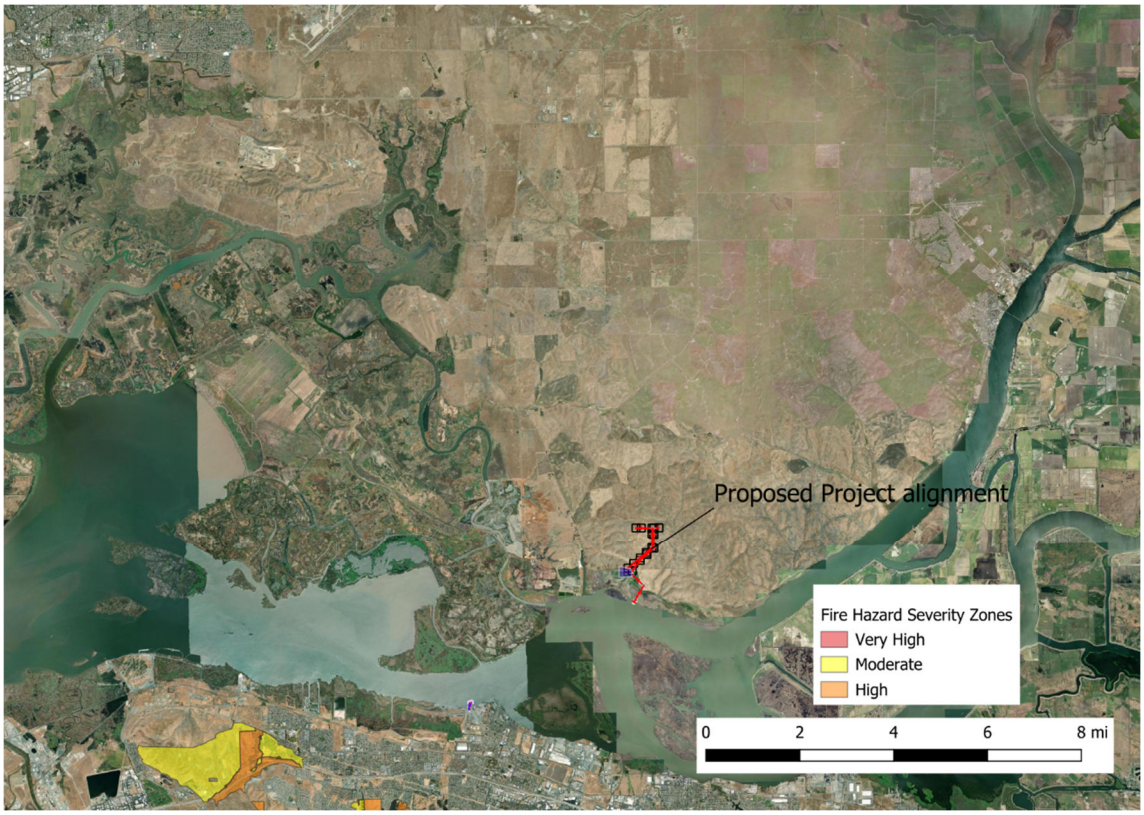

Figure 3. Fire Hazard Severity Zone map relative to Proposed Project area.

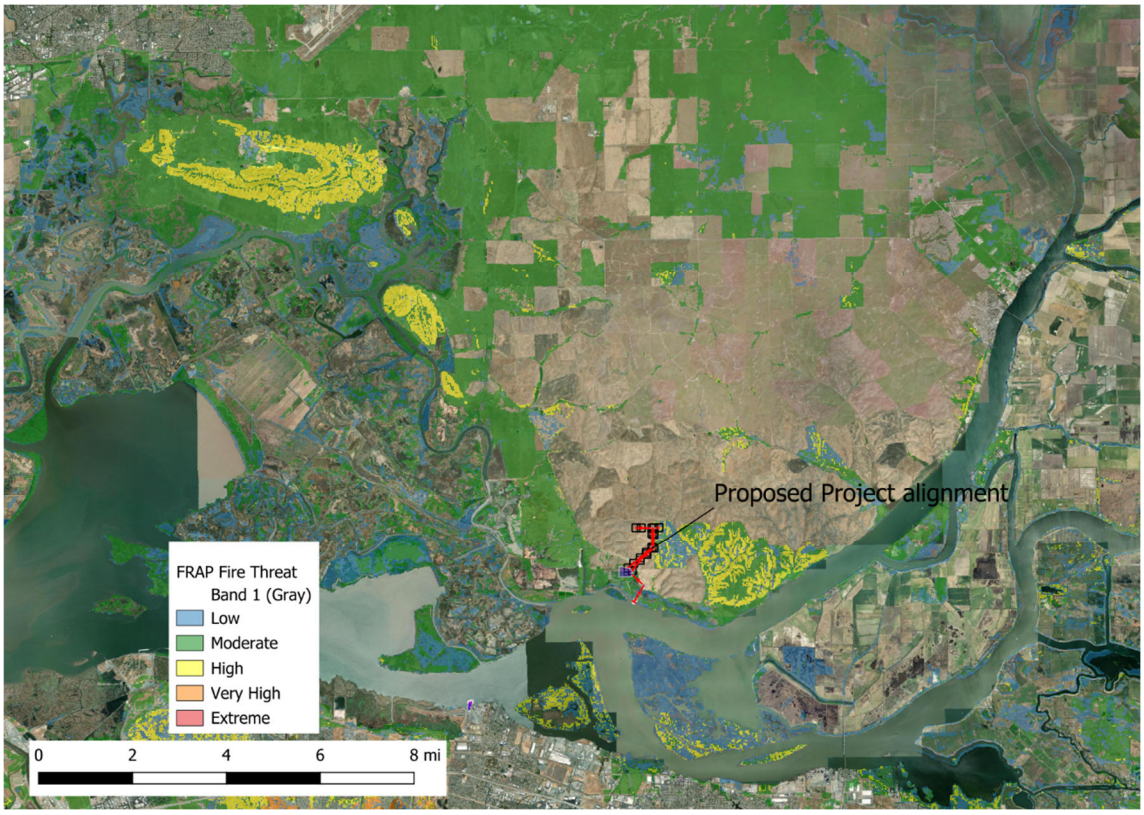

Figure 4. Fire Threat Map relative to Proposed Project area.

3.0 HISTORICAL FIRE OCCURRENCE

CPUC guidelines Section 5.20.1.2 require identification of recent (within the last 10 years) large fires that have occurred within the Proposed Project vicinity. Figure 5 shows 10 years of fire history per CAL FIRE's fire perimeter database[6]. There are no large fires North of the Sacramento River in the Proposed Project area. South of the Sacramento River, as shown in the Southwest corner of Figure 5, the Port Fire burned 57 acres in 2021 and the Willow Fire burned 29 acres in 2022. Additionally, approximately 2 miles South of Figure 5's map extent near Kirker Pass are the 2013 Kirker Fire (478 acres), the 2021 Kirker Fire (84 acres), and the 2022 Kirker Fire (85 acres). Since the immediate vicinity of the southern terminus of the Proposed Project is devoid of wildland fuels and fire ignition there is improbable, fires South of the Sacramento River are less relevant than fires North of the Sacramento River.

Figure 5. Historical fire occurrence (2013-2022) relative to Proposed Project area.

[6] https://gis.data.ca.gov/datasets/CALFIRE-Forestry::california-fire-perimeters-all-1/explore

4.0 Baseline Fire Risk

4.1 Surface fuels

CPUC guidelines section 5.20.1.3(a) requires "… fuel modeling using Scott Burgan fuel models…" For that reason, surface fuel models in the Scott & Burgan system from LANDFIRE 2022 are shown in Figure 6 near the Proposed Project. The predominant surface fuel models in the project area are low load dry climate grass and non-burnable agricultural. North of the Proposed Project, fuels transition from grass to grass/shrub.

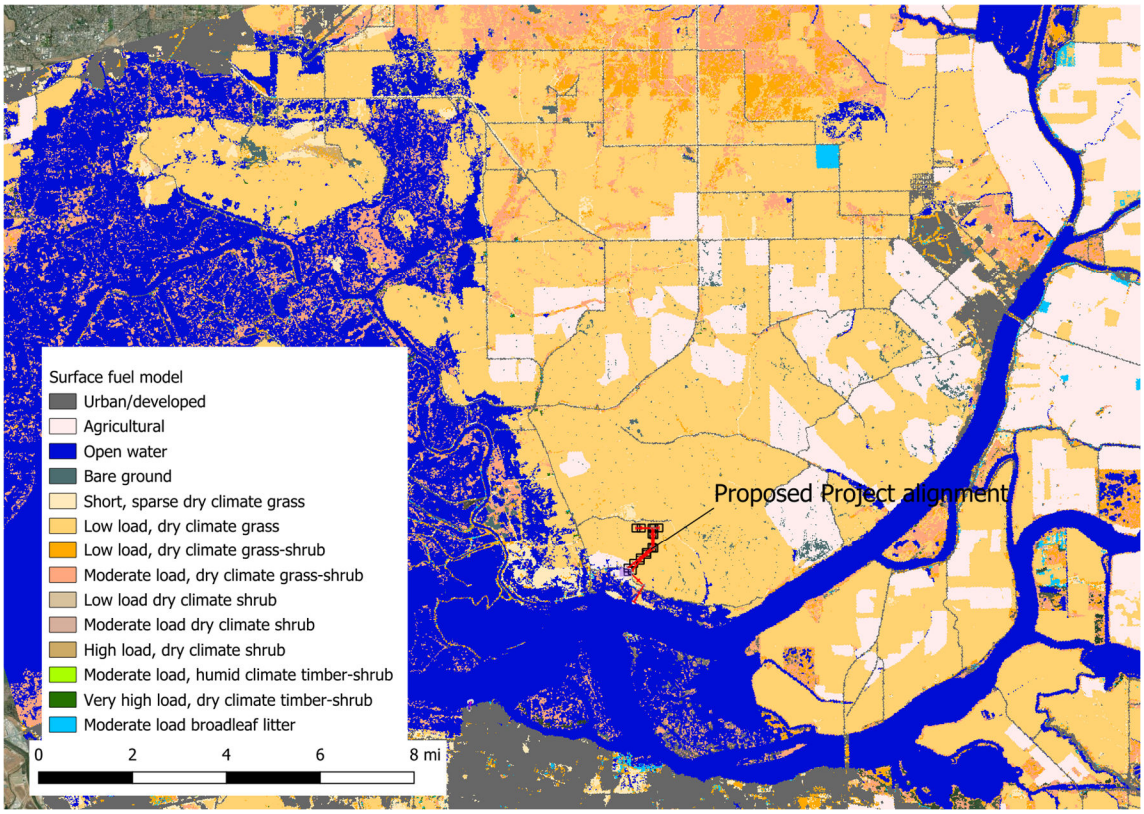

Figure 6. LANDFIRE 2022 Scott & Burgan surface fuel models near Proposed Project area.

4.2 Fire weather

CPUC guidelines section 5.20.1.3(b) requires "…values of wind direction and speed, relative humidity, and temperature for representative weather stations along the alignment for the previous 10 years, gathered hourly." Fire weather climatology is typically conducted using data from Remote Automated Weather Stations (RAWS). The closest RAWS station, Black Diamond RAWS, is located approximately 10 miles SSW of the Proposed Project. Figure 7 shows a wind rose for Black Diamond RAWS calculated from 10 years (2013-2022) of hourly observations with

no seasonal or diurnal filtering. The predominant wind direction is out of the West, with wind azimuths between 225 and 315 degrees accounting for the majority of observations.

Yearly variations in daily maximum temperature, daily minimum relative humidity, and wind gust speed are shown in Figure 8 through Figure 10. These data show that peak winds occur "off season", meaning during the wetter months. Temperatures of over 100 °F are reached during the summer months, with minimum relative humidity typically below 20%. Between May 1 and October 1, peak wind gusts approach 40 mph with occasional excursions above 40 mph.

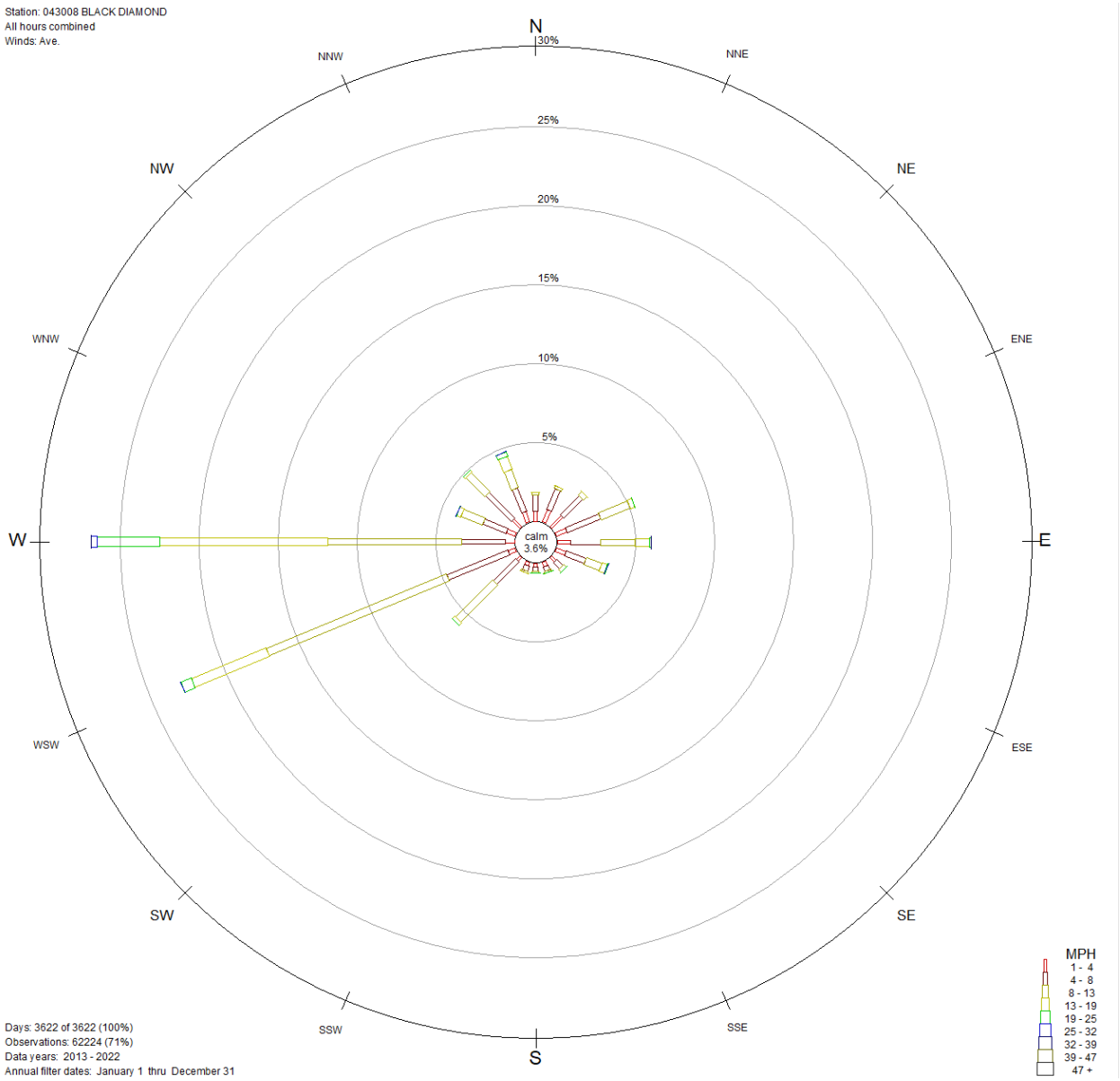

Figure 7. Black Diamond RAWS wind rose.

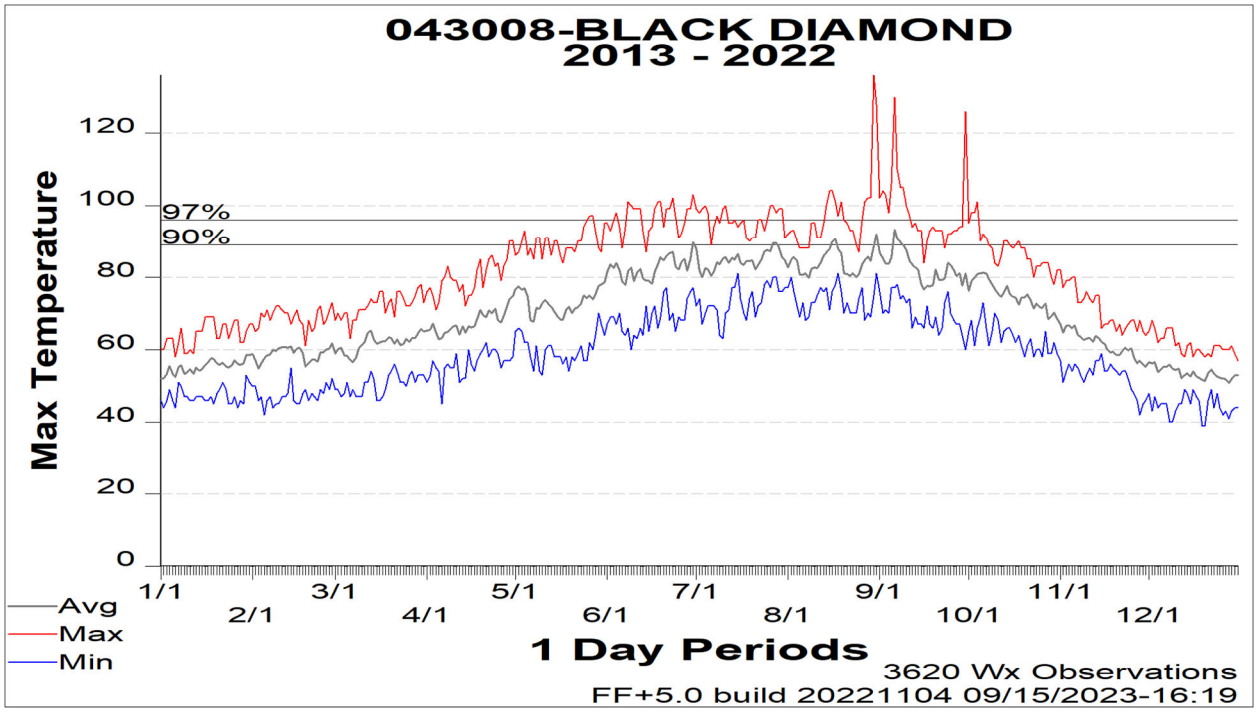

Figure 8. Black Diamond RAWS daily maximum temperature.

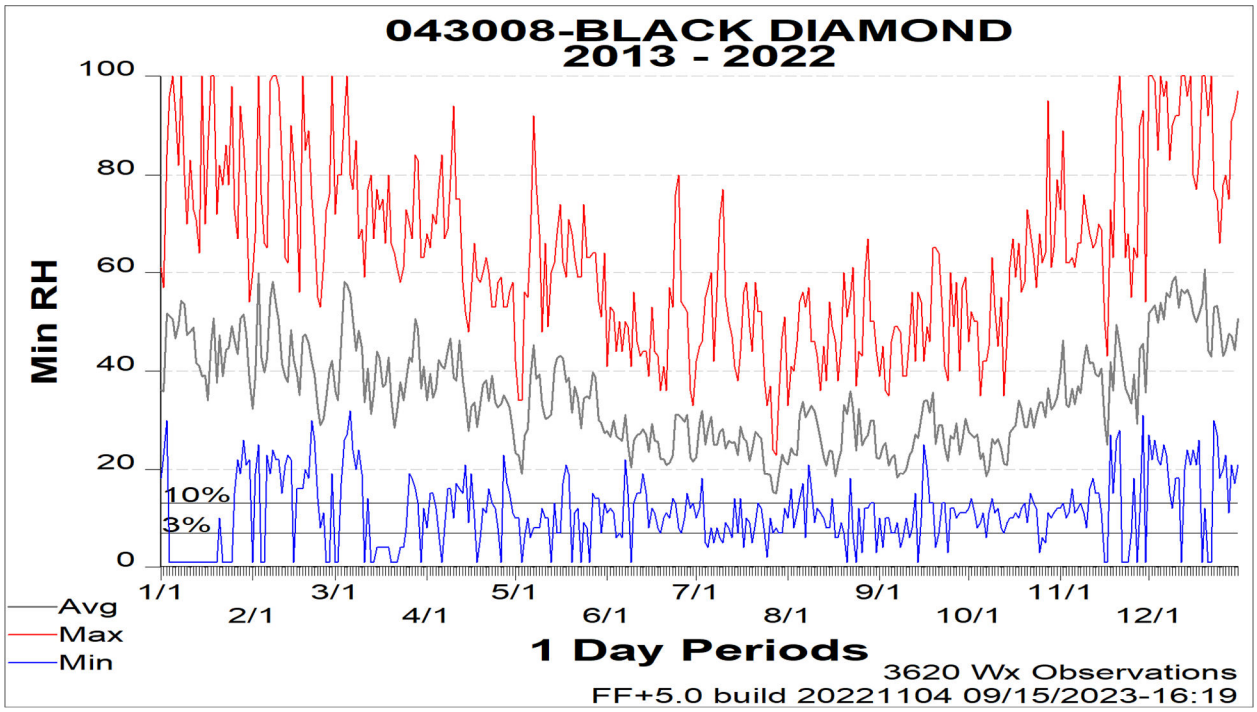

Figure 9. Black Diamond RAWS daily minimum relative humidity.

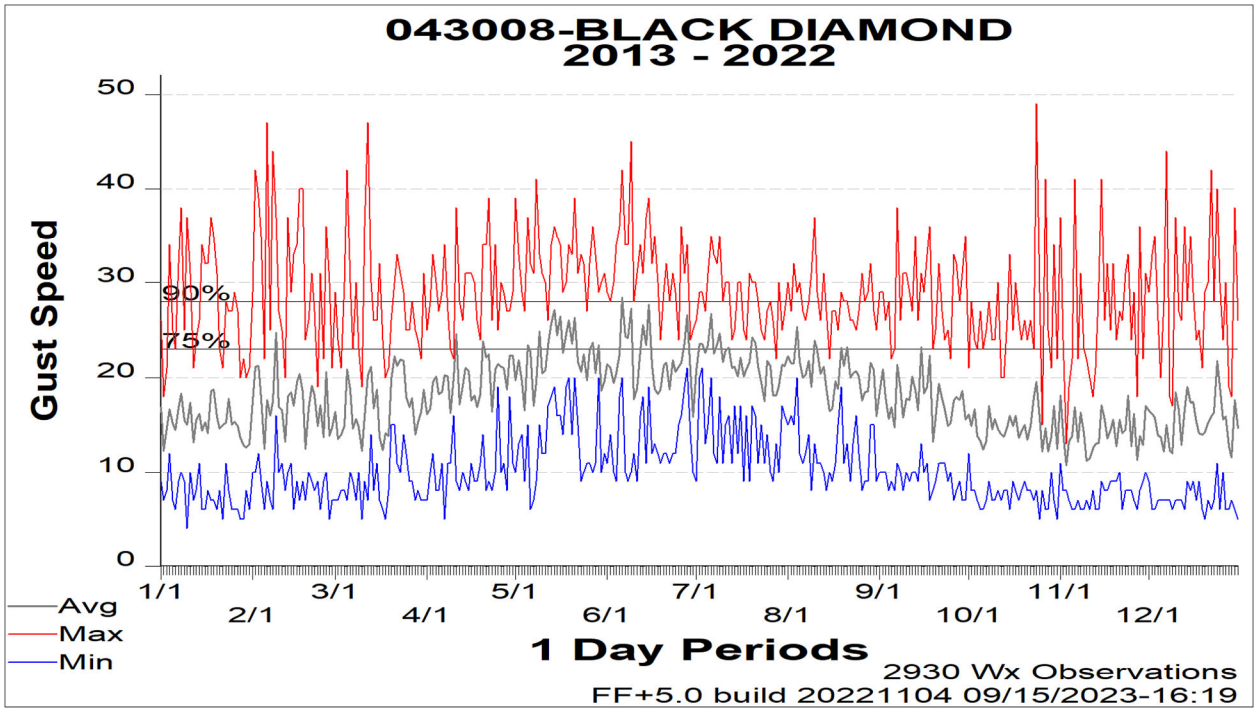

Figure 10. Black Diamond RAWS wind gust.

4.3 Topography analysis

CPUC guidelines section 5.20.1.3(c) requires "Digital elevation models for the topography in the project region…" To meet this requirement, Figure 11 shows a hybrid hillshade/digital elevation model near the Proposed Project. Topography near the Proposed Project alignment consists of rolling hills with elevations ranging from close to sea level to approximately 300 feet.

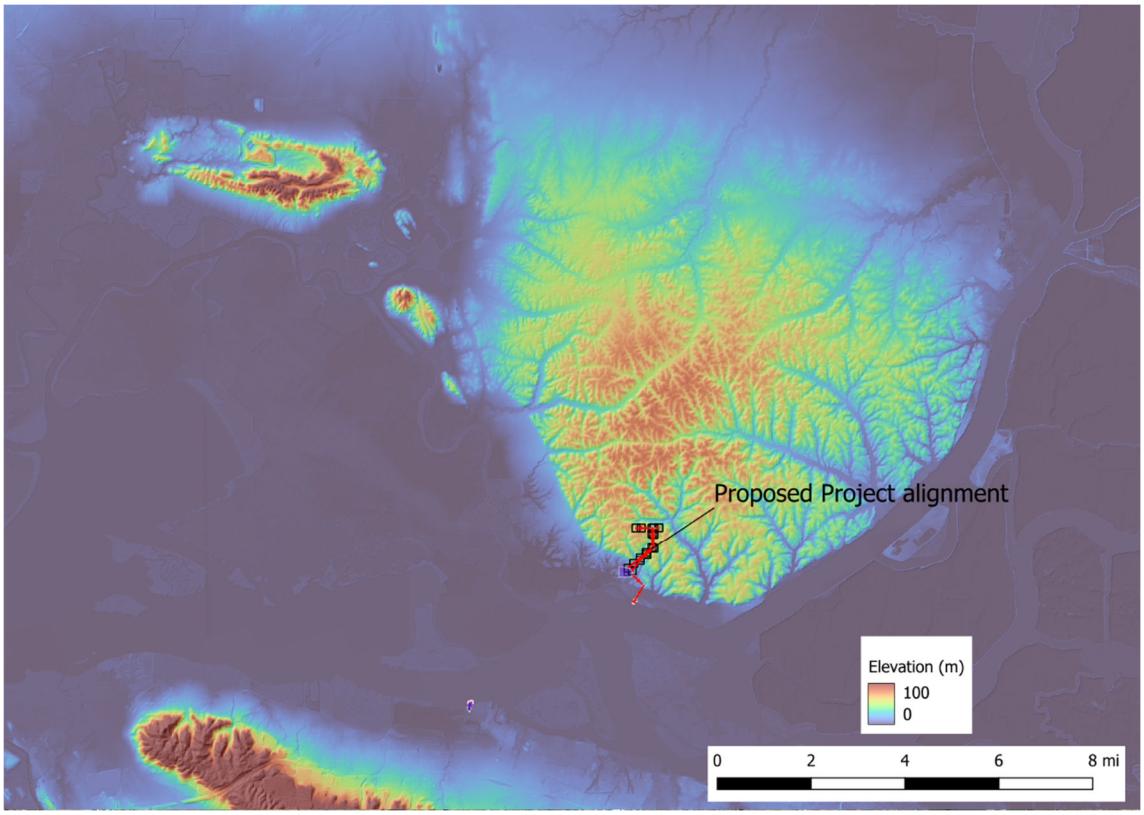

Figure 11. Hybrid hillshade/digital elevation model near Proposed Project area.

4.4 Vegetation description

CPUC guidelines section 5.20.1.3(d) requires a description of "vegetation fuels within the project vicinity". This is redundant with surface fuel models and the reader is referred to Section 4.1.

5.0 VALUES AT RISK

CPUC guidelines Section 5.20.1.4 requires identification of values at risk. To meet this requirement, CloudFire has mapped the following values at risk:

1. Structures[7] – See Figure 12.
2. Transmission lines[8] – See Figure 13.
3. Roads[9] – See Figure 14.
4. Crops[10] - See Figure 15.
5. Habitat[11] - See Figure 16.

In general, areas North of the Sacramento River near the Proposed Project are sparsely populated with few structures. The primary value at risk is agricultural areas/crops. Several transmission lines are in the Proposed Project area. There is no significant sensitive habitat near the Proposed Project except for Delta smelt, a small fish endemic to the Sacramento River.

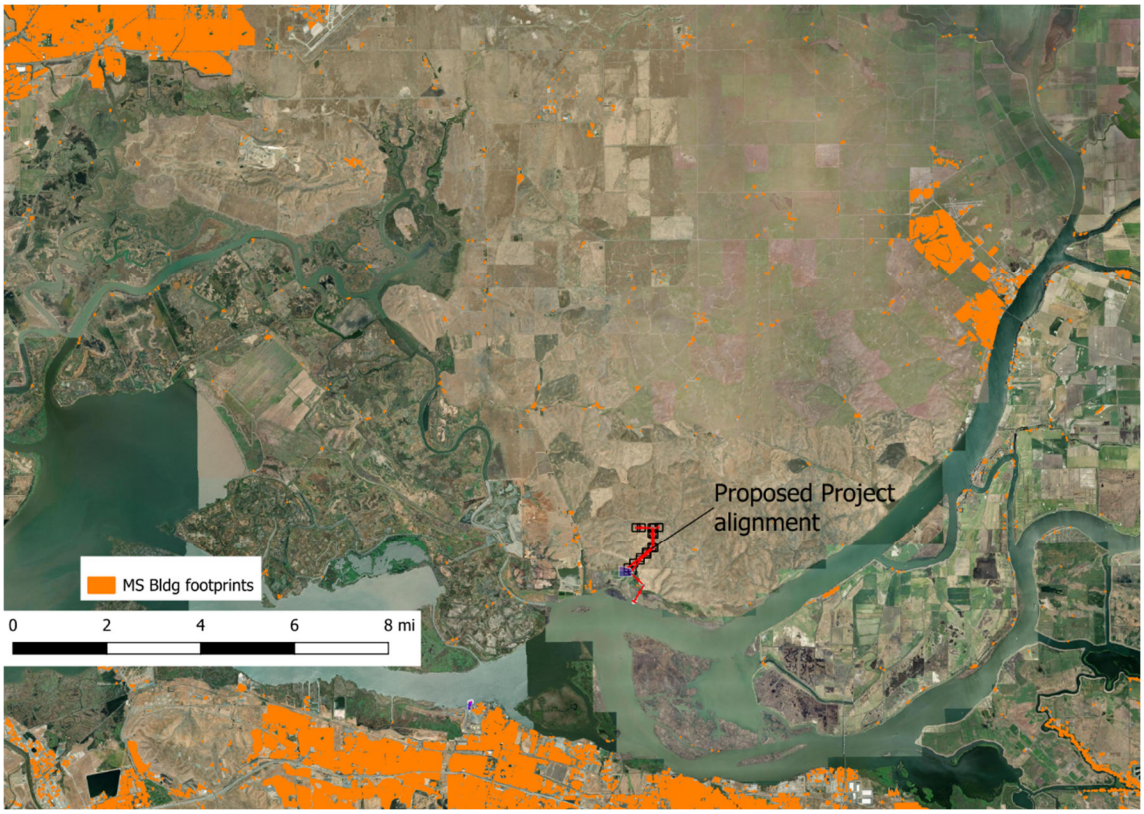

Figure 12. Structures near Proposed Project area.

[7] https://github.com/Microsoft/USBuildingFootprints
[8] https://data.ca.gov/dataset/california-electric-transmission-lines
[9] https://download.geofabrik.de/north-america/us/california.html
[10] https://data.cnra.ca.gov/dataset/statewide-crop-mapping
[11] https://ecos.fws.gov/ecp/report/table/critical-habitat.html

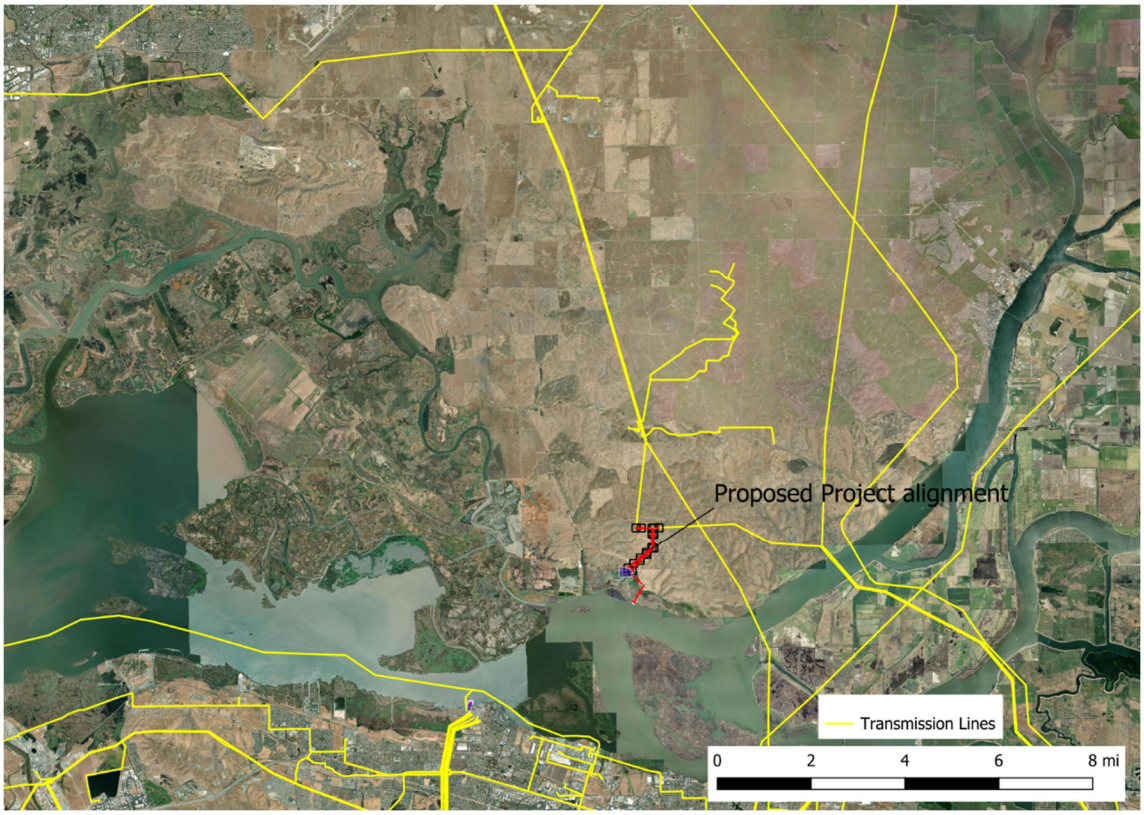

Figure 13. Transmission lines near Proposed Project area.

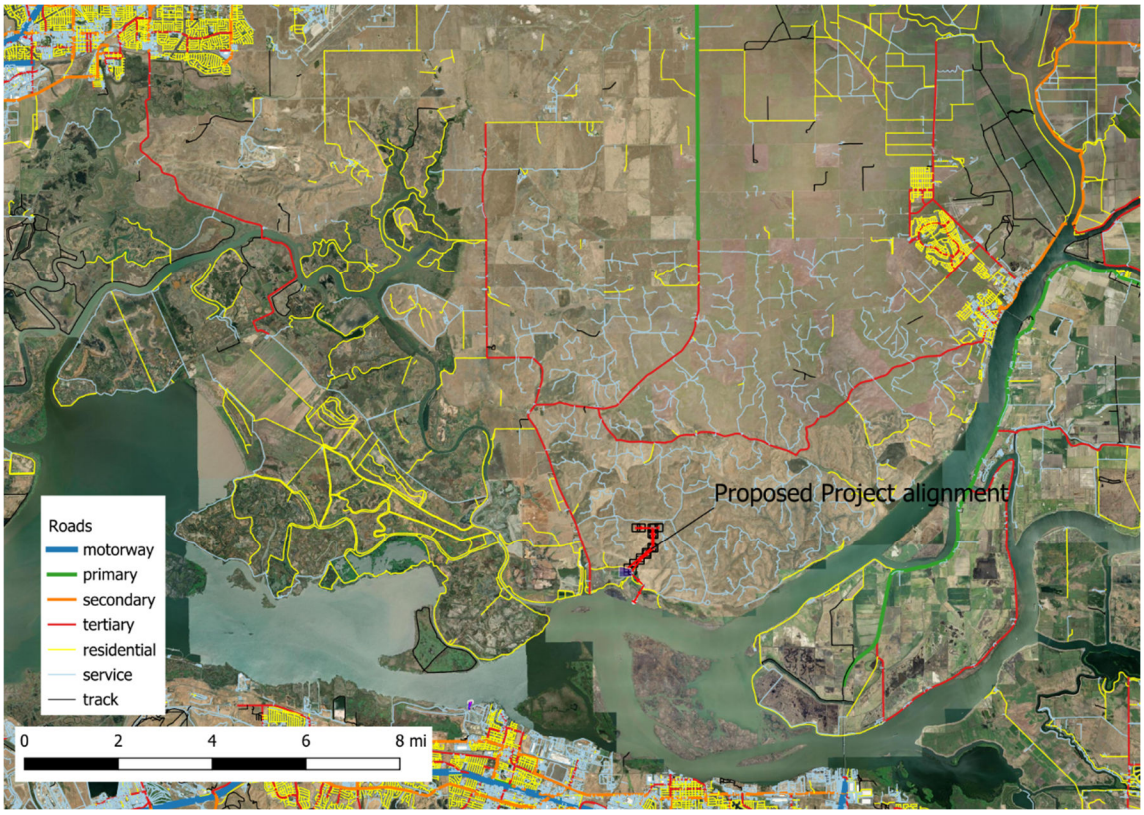

Figure 14. Roads near Proposed Project area.

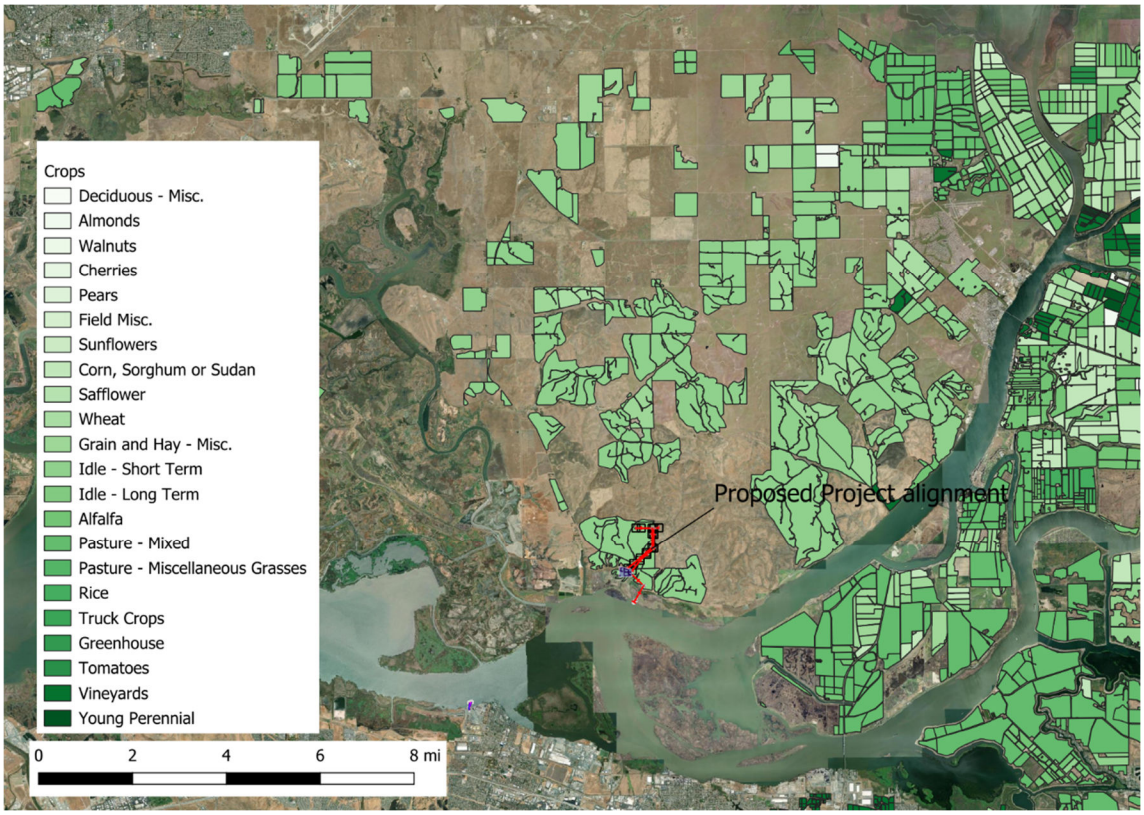

Figure 15. Crops near Proposed Project area.

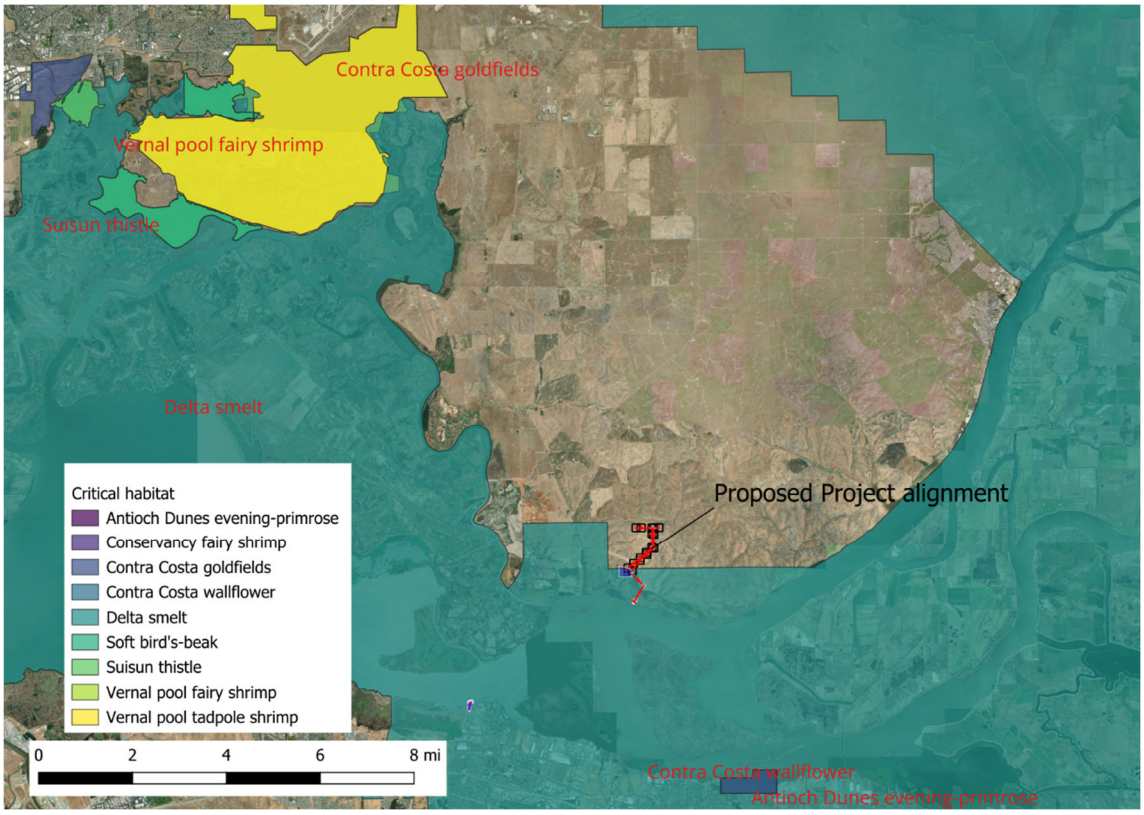

Figure 16. Habitat near Proposed Project area.

6.0 EVACUATION ROUTES

CPUC guidelines section 5.20.1.5 requires identification of evacuation routes and areas that lack a secondary point of egress. As shown in Figure 14, there are few major roads in the Proposed Project area. CloudFire did not identify any areas that lack a secondary means of egress.

7.0 IMPACT ANALYSES

CPUC guidelines Section 5.20.4.2 requires fire behavior modeling to support the analysis of wildfire risk. To meet this requirement, CloudFire conducted fire potential modeling using the ELMFIRE open-source operational fire spread model[12,13,14]. Based on the climatological analysis presented earlier, head fire spread rate and flame length were modeled across the Proposed Project area under near-worst case conditions as follows:

- 1-hour fuel moisture: 2%
- 10-hour fuel moisture: 3%
- 100-hour fuel moisture: 4%
- Live herbaceous fuel moisture: 30%
- Live woody fuel moisture: 60%
- 20-ft sustained wind speed: 20 mph

Outputs from this modeling are shown in Figure 17 (spread rate) and Figure 18 (flame length). These results indicate that along the Proposed Project alignment, spread rate and flame length are expected to be low-moderate. Given the preponderance of low-load grass fuels in and along the Proposed Project, such fires are uniquely suppressible as supported by the lack of large fire history in the area. Additionally, these near-worst case spread rates and flame lengths are unlikely to cause significant damage to the few assets at risk located near the Proposed Project.

[12] https://doi.org/10.1016/j.firesaf.2013.08.014
[13] https://elmfire.io
[14] https://github.com/lautenberger/elmfire

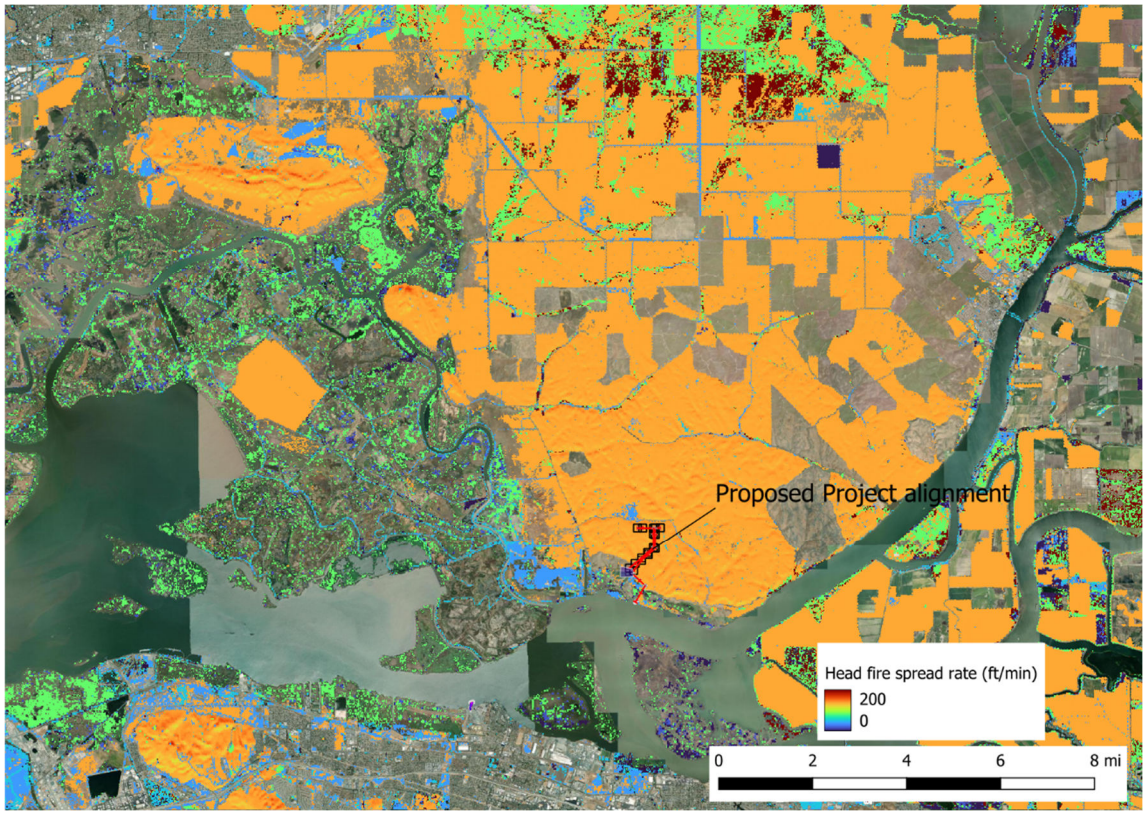

Figure 17. Modeled head fire spread rate near Proposed Project area.

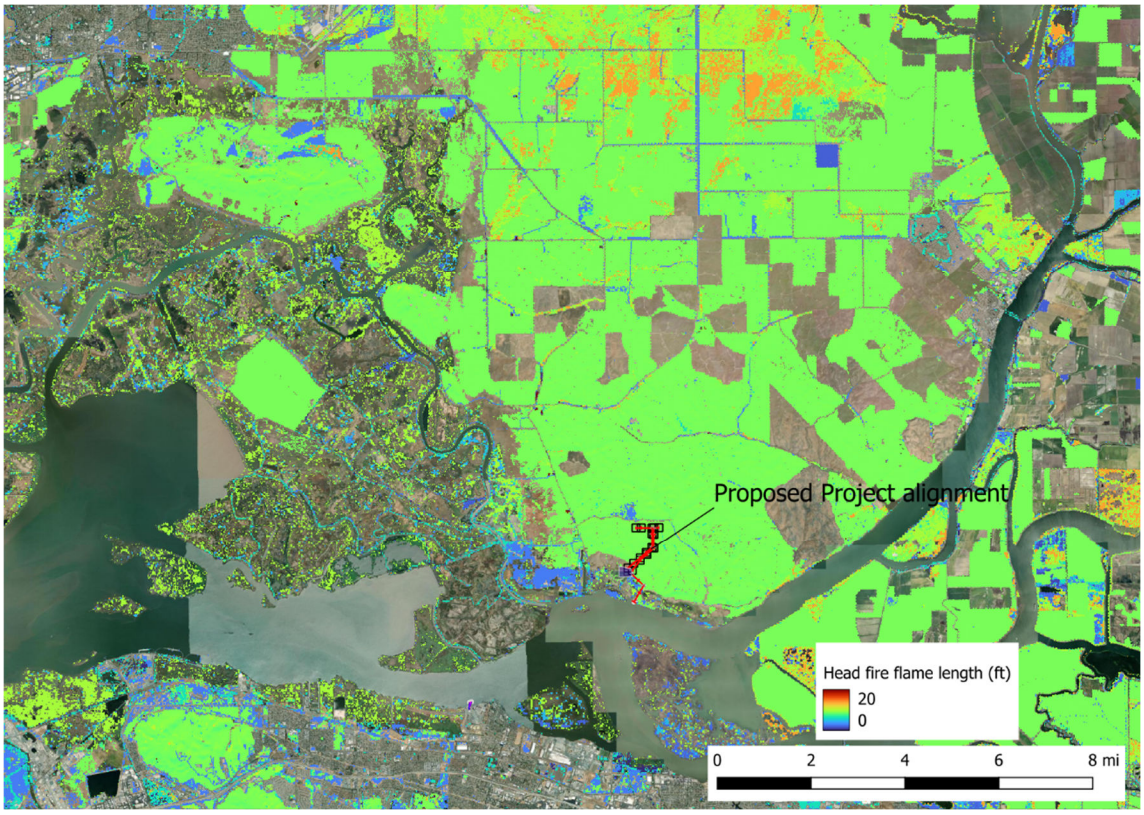

Figure 18. Modeled head fire flame length near Proposed Project area.

8.0 CONCLUSIONS

The analyses presented above show that the Collinsville 500/230 kV Substation Project presents a very low fire risk. Most of the Proposed Project alignment is North of the Sacramento River where fuels are primarily low load grass and there is no recent history of large fires, indicating that fires have been extinguished in their incipient stages. Based on existing risk maps, these areas are generally classified as low risk. Additionally, there are very little assets at risk in the area. Fire behavior modeling conducted using near worst case conditions suggests that the consequence of fires in this is expected to be low.