



STAFF REPORT

DATE: October 22, 2019

TO: Bryan Montgomery, City Manager *Approved and Forwarded to the City Council*

FROM: Joshua McMurray, Community Development Director

SUBJECT: **Oakley General Plan Update Work Session – Environmental Justice and Climate Adaptation**

Background and Recommendation

This work session on the General Plan Update will be focused on providing the City Council information related Environmental Justice and Climate Adaptation. The City’s consultant, De Novo Planning Group, has prepared two white papers to assist in the discussion. The focus of the City Council Work Session is to: 1) present the City Council with the information contained in the two white paper’s, 2) identify elements of the General Plan that we anticipate revising to address Environmental Justice and Climate Adaptation, and 3) ask the City Council for their input.

Included with this Staff Report are the Environmental Justice and Climate Adaptation White Paper’s that discusses the two topics in detail.

Recommendation

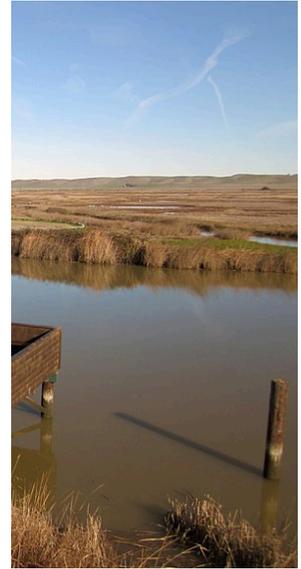
Staff recommends the City Council review the information provided, through the Staff Report and Power Point presentation, and provide Staff and De Novo Planning Group with comments and direction.

Attachments

1. White Paper – Environmental Justice
2. White Paper – Climate Adaptation

OAKLEY

General Plan Update



October 2019

ENVIRONMENTAL JUSTICE WHITE PAPER

City of Oakley Focused General Plan Update

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1. BACKGROUND & REGULATORY FRAMEWORK

BACKGROUND

The negative effects of environmental degradation and pollution are well-documented and include severe impacts to human health and longevity, depending on the level of exposure. Within the United States, certain communities have historically been disproportionately affected by environmental threats and the negative health impacts of environmental degradation. These communities include, but are not limited to, low-income communities, communities of color, communities comprising members of tribal nations, and immigrant communities. Increased exposure to environmental pollutants, unsafe drinking water, and contaminated facilities/structures have contributed to poorer health outcomes for these communities. Structural inequalities that disadvantage certain individuals and groups, local and regional policies, zoning, code enforcement deficiencies, and lack of community engagement and advocacy are related to disproportionate environmental and social effects. The field of environmental justice is focused on addressing these disproportionate impacts and improving the wellness of all communities by bolstering community planning efforts, considering exposure to adverse environmental effects, increasing access to amenities and services, and promoting the fair treatment of all people regardless of their race, ethnicity, national origin, or income.

REGULATORY FRAMEWORK

STATE

SENATE BILL 1000

In 2016, the Senate passed Senate Bill 1000 (SB 1000), also known as The Planning for Healthy Communities Act, to amend Section 65302 of the Government Code. SB 1000 requires local California jurisdictions to prepare and maintain an Environmental Justice element or environmental justice-related goals, policies, and implementation programs in their General Plan's other elements. SB 1000 outlines the approach to identifying disadvantaged communities (DACs), strategies to promote the protection of sensitive land uses within the state and simultaneously mandates that local jurisdictions address the needs of DACs. Through this bill, environmental justice is a mandated consideration in all local jurisdictions' land-use planning policies, regulations, and activities.

The California Environmental Justice Alliance created a strategic toolkit to identify legislative requirements and provide tools, best practices, and resources to support stakeholders in addressing environmental justice. Each General Plan must address the following topics:

- Pollution Exposure and Air Quality
- Public Facilities
- Food Access
- Safe and Sanitary Homes
- Physical Activity
- "Civil" or Community Engagement
- Improvements and Programs that address the needs of Disadvantaged Communities

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SENATE BILL 535

In 2012, the Legislature passed SB 535, adding Sections 39711, 39713, 39715, 39721, and 39723 to the Health and Safety Code. SB 535 directs 25% of the proceeds from the Greenhouse Gas Reduction Fund (established by the California Global Warming Solutions Act of 2006 AB 52's cap and trade program) to projects that provide a benefit to DACs.

ASSEMBLY BILL 1550

In 2016, the Legislature passed AB 1550, to amend Section 39713 of the Health and Safety Code. AB 1550 amended SB 535 to require all GGRF investments that benefit DACs to also be located within those communities. The law also requires that an additional 10% of the fund be dedicated to low-income households and communities, of which 5% is reserved for low-income households and communities living within a half-mile of a designated DAC.

SENATE BILL 673

In 2015, the Senate passed SB 673, to add Sections 25200.21 and 25200.23 to the Health and Safety Code. SB 673 directs the Department of Toxic Substances Control (DTSC) to include criteria such as cumulative impact and neighborhood vulnerability when issuing or renewing hazardous waste facility permits. The law provides the DTSC with an opportunity to use tools such as CalEnviroScreen (CES), an Internet-based mapping tool described below that helps jurisdictions identify DACs, when making decisions on hazardous waste permitting.

ASSEMBLY BILL 523

In 2017, the Legislature passed AB 523, to amend Section 25711.5 of, and to add and repeal Section 25711.6 of, the Public Resources Code. AB 523 allocates at least 25% of the Electric Program Investment Charge (EPIC) funds administered by the California Energy Commission (CEC) to support technology demonstration and deployment projects located in and benefiting "disadvantaged communities," and dedicates at least 10% of the fund to activities located in and benefiting "low-income" communities as defined by AB 1550.

SENATE BILL 43

In 2013, the Senate passed SB 43, to add and repeal Chapter 7.6 (commencing with Section 2831) of Part 2 of Division 1 of the Public Utilities Code. SB 43 establishes the Green Tariff Shared Renewables program, administered by the California Public Utilities Commission (CPUC), which enables utility customers to meet their energy generation needs through offsite generation of renewable energy projects. The program requires 100 MW of renewable energy projects to be sited in the top 20% of CES scores based on each investor-owned utility (IOU) service territory.

ASSEMBLY BILL 2722

In 2016, legislature passed AB 2722, to add Part 4 (commencing with Section 75240) to Division 44 of the Public Resources Code. AB 2722 requires the California Strategic Growth Council to award competitive grants to specified eligible entities for the development and implementation of neighborhood-level transformative climate community plans that include greenhouse gas emissions reduction projects that provide local economic, environmental, and health benefits to DACs. AB 2722 created the Transformative Climate Communities (TCC) program administered through the California Strategic Growth Council (SGC). The TCC is a GGRF-funded program that supports innovative, comprehensive, and community-led plans that reduce pollution and achieve multiple co-benefits at the neighborhood level.

CALIFORNIA DEPARTMENT OF TRANSPORTATION'S ACTIVE TRANSPORTATION PROGRAM (ATP)

The California Department of Transportation (CalTrans) Active Transportation Program (ATP) aims to enhance public health and advance California's climate goals by increasing safety and mobility for non-motorized active transportation such as

biking and walking. ATP projects in “disadvantaged communities” (defined as census tracts within the top 25% of CES scores along with several other options) are allocated 25% of program funds, while an additional 2% is set aside to fund active transportation planning in DACs.

The City of Oakley is currently receiving ATP funding to help develop the City’s active transportation plan, known as “Oakley Moves.”

LOCAL

CITY OF OAKLEY GENERAL PLAN

A variety of policies contained in the existing City of Oakley General Plan support DACs and environmental justice issues through city-wide improvements that provide equitable access to facilities and services, transportation network improvements, parks and recreation opportunities, and promoting air and water quality.

Specific goals included within the General Plan that are most related to the topics of environmental justice and DACs include:

LAND USE ELEMENT

GOAL 2.1: Guide development in a manner that creates a balanced and desirable community, maintains and enhances the character and best qualities of the community, and ensures that Oakley remains an economically viable City.

GOAL 2.8: Encourage projects exhibiting excellent design and sensitivity to the community, while preserving the community character of the City of Oakley.

CIRCULATION ELEMENT

GOAL 3.1: Provide an efficient and balanced transportation system.

GOAL 3.3: Provide adequate, convenient, and affordable public transportation.

GROWTH MANAGEMENT ELEMENT

GOAL 4.1: Provide for the levels of growth and development depicted in the Land Use Element, while preserving and extending the quality of life through the provision of public facilities and ensuring traffic levels of service necessary to protect the public health, safety, and welfare.

GOAL 4.3: Assure that high quality civic and community facilities are provided to meet the broad range of needs of Oakley residents.

GOAL 4.7: Promote and seek to assure the provision of safe, efficient, and cost-effective removal of waste from residences, businesses, and industry.

OPEN SPACE AND CONSERVATION ELEMENT

GOAL 6.2: Maintain or improve air quality in the City of Oakley.

GOAL 6.6: Encourage preservation and enhancement of existing open space resources in and around Oakley and balance open space and urban areas to meet the social, environmental and economic needs of the City now and for the future.

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PARKS AND RECREATION ELEMENT

GOAL 7.2: Provide a vital system of community parks, playfields, and recreation facilities to serve the residents of Oakley.

HEALTH AND SAFETY ELEMENT

GOAL 8.3: Provide protection from hazards associated with the use, transport, treatment, and disposal of hazardous substances.

HOUSING ELEMENT

GOAL 1: Production of New Housing. Provide adequate sites to accommodate the City's share of regional housing needs, including housing for special needs groups, through appropriate zoning and development standards; and where appropriate, removal of identified governmental constraints to the development of housing.

GOAL 2: Rehabilitation of Existing Housing Stock. Conserve and improve the condition of existing housing stock for all income levels.

GOAL 3: Preservation and Conservation of Existing Housing Resources. Preserve existing affordable housing and maintain community character.

GOAL 4: Increase Access to Housing Opportunities. Promote housing opportunities for all persons, regardless of race, religion, sex, marital status, ancestry, national origin, color, familial status or disability.

2. DISADVANTAGED COMMUNITIES

The term 'disadvantaged community' is a broad designation that includes any community disproportionately affected by environmental, health, and other burdens or low income areas disproportionately affected by environmental pollution and other hazards. In relation to environmental justice, DACs are typically those communities that disproportionately face the burdens of environmental hazards. Government Code Section 65302, as amended by SB 1000, defines a DAC as follows:

"...an area identified by the California Environmental Protection Agency (CalEPA) pursuant to Section 39711 of the Health and Safety Code or an area that is a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation."

The CES 3.0 tool identifies communities that are disproportionately affected by environmental hazards. The CES 3.0 map is a science-based tool developed by the Office of Environmental Health Hazards Assessment on behalf of CalEPA that uses existing environmental, health, and socioeconomic data to rank all census tracts in California with a CES score. CalEPA designates the tracts with a CES score in the top 25 percentile as DACs. Figure 1 identifies the CES score for each census tract in and around the Planning Area, which includes the City, Sphere of Influence, and Urban Limit Line, and indicates that tract 3020.05 is a DAC based on CES score in the top 25 percentile.

Low income communities disproportionately affected by environmental concerns can be identified using the California Air Resources Board (CARB) Priority Populations Mapping Tool, which identifies low-income communities located within ½ mile of a CalEPA-identified disadvantaged community. Figure 1 identifies census tract 3060.02 as a DAC based on

income and proximity to a CalEPA-identified DAC income. It is noted that DAC tract 3060.02 is largely within Antioch and only a portion of this census tract is within Oakley.

3. HEALTH & SOCIOECONOMIC CHARACTERISTICS

To understand the existing health and socioeconomic conditions of each DAC, Table 1 lists the percentiles for sensitive population and socioeconomic factor indicators in the Planning Area by census tract. The two DAC census tracts are highlighted with bold boxes. The sensitive population indicators reflect the communities' health and the socioeconomic factor indicators describe educational attainment, income level, employment, and housing conditions and burden. In combination with the environmental/pollution data included in Table 2: Pollution Burden by Pollution Indicator, the data forms the basis of the CES scores. For each indicator, scores of 75% or higher represent a high burden on the population. Based upon the indicators, all of the tracts are burdened one or more indicator, but the socioeconomic indicators are typically less than the sensitive population indicators. In particular, five of the tracts, 3010, 3020.05, 3020.07, 3020.08, and 3060.02, have medium or high burdens in seven or more of the eight indicators. DAC tract 3020.05 has high burdens in three of the indicators (asthma, cardiovascular disease, and housing) and medium burdens in five of the indicators. DAC tract 3060.02 has high burdens in three of the indicators (asthma, cardiovascular disease, and unemployment) medium burdens in three of the indicators, and a low burden in one of the indicators.

TABLE 1: POPULATION CHARACTERISTICS BY SENSITIVE POPULATION AND SOCIOECONOMIC FACTOR INDICATORS

INDICATOR (%)	CENSUS TRACTS							
	3010	3020.05	3020.06	3020.07	3020.08	3020.10	3031.02	3060.02
SENSITIVE POPULATION INDICATORS								
Asthma	90	90	90	88	88	89	68	99
Low Birth Weight	78	63	68	45	38	35	38	57
Cardiovascular Disease	94	94	94	91	90	93	85	92
SOCIOECONOMIC FACTOR INDICATORS								
Education	42	49	61	60	57	35	47	46
Linguistic Isolation	2	24	5	49	28	6	12	22
Poverty	42	64	15	43	46	9	37	53
Unemployment	46	69	61	77	68	17	15	75
Housing Burden	46	80	7	40	30	36	34	51
Total Population Characteristics Score	67	80	60	72	63	45	45	74

	High Burden: 75.0 - 100.0%		Medium Burden: 25.0 - 74.9%		Low Burden: 0.0 - 24.9%
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NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT, CALENVIROSCREEN 3.0, 2019.

4. ENVIRONMENTAL JUSTICE ISSUES

Based Government Code Section 65302, as amended by SB 1000, the General Plan’s Environmental Justice Element or integrated environmental justice policies must seek to reduce the unique or compounded health risks in the City’s DAC by addressing the following topics, at a minimum: pollution exposure, including air quality, public facilities, food access, safe and sanitary homes, and physical activity, and by providing a policy framework to encourage civil engagement. The existing conditions for these topics within the City of Oakley and larger Planning Area is summarized below.

POLLUTION EXPOSURE AND AIR QUALITY

The various forms and sources of air and water pollution and hazardous waste often disproportionately affect DACs. This is typically due to the existence and relative concentration of pollution-emitting sources within close proximity to the communities. Disproportionate exposure to pollutants is linked to variety of negative health impacts, including but not limited to, asthma, cardiovascular diseases, cancer, and other potentially fatal conditions. Based on CES data, Table 2 lists the percentile of pollution burden for the twelve CES pollution indicators by census tract.

TABLE 2: POLLUTION BURDEN BY POLLUTION INDICATORS

INDICATOR (%)	CENSUS TRACTS							
	3010	3020.05	3020.06	3020.07	3020.08	3020.10	3031.02	3060.02
Air Quality: Ozone	40	32	40	40	40	32	40	32
Air Quality: PM2.5	18	18	18	18	18	18	18	18
Air Quality: Diesel PM	4	65	53	52	53	76	59	55
Pesticide Use	56	70	61	63	61	58	48	64
Toxic Releases from Facilities	28	34	34	32	34	34	33	38
Traffic Density	N/A	39	25	42	25	14	27	18
Drinking Water Contaminants	90	14	14	17	14	14	38	10
Cleanup Sites	0	33	65	48	65	28	86	87
Groundwater Hazards	14	79	92	61	92	22	33	96
Hazardous Waste	0	94	97	43	97	16	0	98
Impaired Water Bodies	93	76	93	93	93	76	86	76
Solid Waste Sites	74	0	0	0	0	0	20	0
Total Pollution Burden Score	41	58	63	49	63	27	45	62
	High Burden: 75.0 - 100.0%		Medium Burden: 25.0 - 74.9%				Low Burden: 0.0 - 24.9%	

NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: CALIFORNIA OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT, CALENVIROSCREEN 3.0, 2019.

Scores of 75% or higher represent a high pollution burden. The census tracts with the highest pollution burden scores are 3020.06 and 3020.08. DAC tract 3020.05 has a high burden score for three indicators (groundwater hazards, hazardous waste, and impaired water bodies) and an overall score of 58. DAC tract 3060.02 has a high burden score for four indicators (cleanup sites, groundwater hazards, hazardous waste, and impaired water bodies) and an overall score of 62. Impaired water bodies, groundwater hazards, and hazardous waste are the most common indicators affecting the Planning Area.

HAZARDOUS MATERIALS AND TOXICS

The Planning Area includes 31 hazardous waste sites that are currently under evaluation or in the midst of cleanup. The sites are generally clustered within the city's northcentral area, predominately occupying locations within DAC tract 3020.05 (13 sites) and tract 3020.08 (8 sites) and affecting residents living in these and the adjoining tracts. DAC tract 3060.02 does not contain any hazardous waste sites.

TABLE 3: HAZARDOUS MATERIALS AND TOXICS SITES

NAME	PROJECT TYPE/ACTIVITY	ADDRESS	CENSUS TRACT
ENVIROSTOR SITES¹			
Baldocchi Property	Voluntary Cleanup	6390 Sellers Avenue	3020.08
Carpenter Road School	School Investigation	1629 and 1541 Carpenter Road	3020.10
Chemours Company FC LLC	Corrective Action	6000 Bridgehead Road	3020.05
Contra Costa Auto Salvage	Voluntary Cleanup	1731 Main Street	3020.05
Cook Battery (Oakley Battery)	State Response	139 Hill Avenue	3020.08
Cypress Road New Elementary School	School Investigation	Cypress Road/Highway 4	3020.08
Cypress Road School	School Cleanup	4901 Frank Hengel Way	3020.08
Dal Porto Elementary School Site	School Investigation	East Cypress Road/Jersey Island Road	3010
Dupont De Nemours & Co., Inc.	Corrective Action	6000 Bridgehead Road	3020.05
New Oakley Road ES	School Investigation	Live Oake Avenue/Oakley Road	3020.05
O'Hara Park Middle School	School Cleanup	1100 O'Hara Avenue	3020.07
Oakley Union Elementary School District - Future Middle School	Evaluation	Sandmound, Bethel Island Boulevard, E. Cypress Road	3010
Summer Lake Elementary School Site	School Investigation	Cypress Road/Bethel Island Road	3010
The Chemours Company FC LLC	Post Closure	6000 Bridgehead Road	3020.05
Zocchi Elementary School	School Investigation	Brownstone Road/Anderson Lane	3031.02
CORTESE LIST SITE²			
Cook Battery (Oakley Battery)	State Response	139 Hill Avenue	3020.08
GEOTRACKER SITES³			
Cook Battery Reclamation Site	Cleanup Program Site	139 Hill Avenue	3020.08
Custom Cleaners	Cleanup Program Site	2575 Main Street	3020.05
Cypress Square Shopping Center	Cleanup Program Site	2025 Main Street	3020.05
Pacific Gas & Electric	Cleanup Program Site	5400 Neroly Road	3020.05
PG&E Antioch Natural Gas Terminal	Cleanup Program Site	5900 Bridgehead Road	3020.06
PG&E Dutch Slough Dehydrator Station	Cleanup Program Site	1126 Fetzer Lane	3020.06
LUST CLEANUP SITES⁴			
A & A Market (Former)	LUST Cleanup Site	407 Main Street	3020.05
Big Break Marina	LUST Cleanup Site	100 Big Break Road	3020.06
Blue Star Gas	LUST Cleanup Site	1541 Cypress Road, E	3020.08
Bridgehead Inc.	LUST Cleanup Site	5540 Bridgehead Road	3020.05
Chevron #9-3801	LUST Cleanup Site	5433 Neroly Road	3020.05
Food & Liquor #86	LUST Cleanup Site	Highway 4/Cypress	3020.08
Lauritzen Yacht Harbor LLC	LUST Cleanup Site	115 Lauritzen Lane	3020.06
Oakley Builders Supply	LUST Cleanup Site	800 Main Street	3020.05
Rain for Rent	LUST Cleanup Site	5301 Live Oak Avenue	3020.05

1: SOURCE: CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL, ENVIROSTOR DATABASE, 2019.

2: SOURCE: CALEPA.CA.GOV/SITCLEANUP/CORTESELIST/, 2019.

3: SOURCE: CALIFORNIA WATER RESOURCES CONTROL BOARD GEOTRACKER DATABASE, 2019.

4: SOURCE: CALIFORNIA WATER RESOURCES CONTROL BOARD GEOTRACKER DATABASE, 2019.

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PUBLIC FACILITIES

Access and availability of public facilities is an aspect of the built-environment that may disproportionately limit the opportunities of DACs. If DACs have unequal access to public facilities, or if a City does not provide adequate facilities for public use, DACs may be limited in their ability to access necessary key resources. Limited access to resources as a result of inadequate public facilities can lead to reduced lifespan, poorer health outcomes, and diminished mental well-being. The adequate planning of parks and transportation infrastructure can ensure that all communities within a City have equal access to resources.

This section summarizes the adequacy of public facilities as they pertain to the DAC.

PUBLIC FACILITY LOCATIONS

Figures 2 and 3 show the locations of the public facilities within the Planning Area and with relationship to the DACs. The content portrayed on each map is as follows:

- Figure 2: Public Services Map – shows the location of transit stations and routes, hospitals, and emergency services and public safety facilities.
- Figure 3: Community Facilities Map – shows the location of city and county government buildings; parks; daycare centers; and libraries, museums, and cultural facilities.

DISTRIBUTION AND ACCESS

PUBLIC SERVICES

The Planning Area includes one fire station, one police station, one sheriff's office, and a medical clinic. Two of the Planning Area's four public services sites (the medical clinic and police station) are located in the same DAC tract: 3020.05. The other two sites (the sheriff's office and fire station) are within 400 feet of DAC tract 3020.05. The police, sheriff, and fire sites are centrally located and provide services Citywide, while the medical clinic is located in the northwestern quadrant.

COMMUNITY FACILITIES

Five of the Planning Area's 43 community facilities, including four parks and City Hall, are located within DAC tract 3020.05. None of the community facilities are within DAC tract 3060.02. Two day care centers are located within 0.1 mile of the DAC. The library is located along the City's southern boundary, while the other community facilities are generally centrally located. The parks are generally concentrated in the southern and central portions of the City near residential developments.

FOOD ACCESS

Food access encompasses the following three interrelated topics:

- Nutritionally adequate, culturally appropriate, and affordable food;
- Income sufficient to purchase healthy food; and
- Proximity and ability to travel to a food source that offers affordable, nutritionally adequate, and culturally appropriate food.

Ensuring adequate food access is challenging in many communities. Many communities, and especially low-income areas, lack retailers with a sufficient selection of healthy foods. Consequently, many residents lack access to nutritional

foods, known as “food insecurity”, resulting in public health challenges and poor health outcomes. Affected populations cope with food insecurity by consuming nutrient-poor, but calorie-rich foods. This may result in malnutrition; obesity; cognitive, behavioral, and mental health problems in children; and physical and mental health problems and birth complications among pregnant women. Children and communities of color are often disproportionately affected by food insecurity.

FOOD INSECURITY AND COST

No existing conditions data for food insecurity and cost exists at the City level. As the best possible alternative, these topics were evaluated on the County level, using the United States Department of Agriculture (USDA) 2017 American Community Survey, Feeding America.

- 113,940 people, or 10.1% of the population in Contra Costa County experienced food insecurity in 2017. This is below the statewide rate of 11.0% and countrywide rate 12.5%, and marks a 1.0% decline from the previous year. Of Contra Costa County’s affected population, 39,250 were children, marking a child food insecurity rate of 15.0%. This rate is below the statewide rate of 18.1% and the countrywide rate of 17.0%.
- The average cost of a home-cooked meal in Contra Costa County is \$3.61. This is higher than the statewide average of \$3.20 and the countrywide average of \$3.02.
- Of the food insecure population within Contra Costa County, 63% of individuals and 54% of children were from households with incomes below the Federal poverty threshold for nutrition assistance programs, potentially qualifying those individuals for food assistance from the federal government¹. In part, this can help defray the relatively high cost of purchasing food in Contra Costa County. Individuals who qualify for federal nutrition assistance programs can utilize assistance at any store that accepts Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and Supplemental Nutrition Assistance Program (SNAP) purchases.

ACCESS TO FOOD RETAILERS

Figure 4 illustrates the Planning Area’s supermarket and grocery store locations and census tracts that qualify as food deserts. The map categorizes supermarkets as larger food retailers that serve the community, grocery stores as the range of smaller food retailers that serve individual neighborhoods or cater to specific groups, and food deserts as low-income tracts where a substantial number or share of residents has low access to a supermarket that sells affordable and nutritious food.

Three supermarkets and three grocery stores exist within the Planning Area. All three supermarkets are located in DAC tract 3020.05, and two grocery stores lie on the border of this DAC census tract. No supermarkets or grocery stores are located in DAC tract 3060.02.

The lack of proximate grocery stores has the greatest affect in locations where residences do not own vehicles or have sufficient access to transit. Table 4 lists the number of and percent of households without vehicles within the city and the census tracts. With the exception of Keller’s Mini-Mart, the Planning Area’s grocery stores and supermarkets are located along major streets and transit routes, helping to ensure access to the stores by all residents, including those in DAC tract

¹ Gundersen, C., et al. (2017). Map the Meal Gap 2016: Food insecurity and child food insecurity estimates at the county level. Feeding America. Accessable at: http://www.feedingamerica.org/research/map-the-meal-gap/2016/overall/CA_AllCounties_CDs_MMG_2016.pdf

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3020.05. All of the households in DAC tract 3020.05 have one or more vehicles available. Therefore, due to the nearby locations of the food retailers and the 100% vehicle access, access to food for DAC tract 3020.05 is not viewed as an issue. Within DAC tract 3060.02, 3.0 percent of households do not have a vehicle. As noted above, this DAC tract also does not have any supermarkets or grocery stores. Therefore, access to food for DAC tract 3060.02 is viewed as an issue; however, there appear to be a limited number of lower income households in Oakley within this tract based on a review of the housing within this DAC.

In addition to the proximity of grocery and food sources within an area, the types of food sources available are important for determining adequacy of food access. The USDA Food Research Atlas data shows that there were approximately 196 grocery stores in Contra Costa County as of 2014, and approximately 491 SNAP-authorized food retailers. In addition, the same data set shows that the County had 644 fast food restaurants as of 2014.

TABLE 4: CAR OWNERSHIP

CITY/CENSUS TRACT	# OF HOUSEHOLDS	# OF HOUSEHOLDS WITHOUT VEHICLES	% OF HOUSEHOLDS WITHOUT VEHICLES
CITYWIDE			
City of Oakley	10,727	545	5.1%
CENSUS TRACT			
3010	1,804	25	1.4%
3020.05	2,317	0	0.0%
3020.06	1,237	30	2.4%
3020.07	2,091	19	0.9%
3020.08	2,172	59	2.7%
3020.10	3,244	81	2.5%
3031.02	2,593	8	0.3%
3060.02	1,040	31	3.0%

NOTE: CENSUS TRACT 3020.05 IS A DAC.

SOURCE: UNITED STATES CENSUS BUREAU, AMERICAN FACT FINDER, 2017 ESTIMATES.

HOUSING CONDITIONS

The condition of the housing stock in a DAC may have negative impacts on the well-being of its residents. These health impacts stem from issues such as poor indoor air quality, toxic building materials, exposure to climate variation such as excess heat or cold, improper ventilation, and structural insecurity. Unsafe housing conditions can be a result of the age of the dwelling structure, which increases the likelihood of incorporation of dangerous materials like lead and asbestos that have significant negative health impacts.² DACs often have a larger amount of older units within their housing stock and therefore, residents of these communities are more likely to be exposed to the harmful health impacts that are associated with older housing. Other factors that can contribute to unsafe housing conditions include; improper regulation and overcrowding. Ensuring the safety and sanitation of housing stock within a community ensures that there are proper living conditions for all residents, including those living in DACs.

² SB 1000 Toolkit

This section summarizes the existing housing conditions and cost of housing throughout the city. While the conditions apply on a citywide level, they can reasonably be extrapolated to understand housing conditions in the DACs.

HOUSING STOCK CONDITIONS

Housing conditions are considered substandard when conditions are found to be below the minimum standard of living conditions defined in the California Health and Safety Code. Households living in substandard conditions are considered to be in need of housing assistance, even if they are not seeking alternative housing arrangements, due to the threat to health and safety.

In addition to structural deficiencies and standards, the lack of infrastructure and utilities often serves as an indicator for substandard conditions. According to the 2017 American Community Survey, all of the 11,671 occupied housing units in Oakley have complete plumbing and kitchen facilities. Only 225 of the housing units had no telephone service available.

OVERCROWDING

Overcrowding within a housing unit is a primary cause of unsafe housing conditions. The World Health Organization notes that overcrowding is a potential health risk as it contributes to the transmission of disease by creating unsanitary conditions.³ A housing unit is considered overcrowded if there is more than one person per room and severely overcrowded if there are more than 1.5 persons per room. Table 5, based upon data obtained from the U.S. Census 2017 American Community Survey, depicts the city's overcrowding conditions.

TABLE 5: OVERCROWDING BY TENURE

CITY/ CENSUS TRACT	PERSONS PER ROOM						TOTAL UNITS	OVERCROWDING CONDITION	
	1.00 OR LESS		1.01 TO 1.50		1.51 OR MORE			#	%
	#	%	#	%	#	%			
CITYWIDE									
City of Oakley	11,181	95.8%	247	2.1%	243	2.1%	11,671	490	4.2%
CENSUS TRACT									
3010	1,759	97.5%	45	2.5%	0	0.0%	1,804	45	2.5%
3020.05	2,122	91.6%	60	2.6%	135	5.8%	2,317	195	8.4%
3020.06	1,207	97.6%	30	2.4%	0	0.0%	1,237	30	2.4%
3020.07	1,978	94.6%	22	1.1%	91	4.4%	2,091	113	5.4%
3020.08	2,099	96.6%	73	3.4%	0	0.0%	2,172	73	3.4%
3020.10	3,192	98.4%	52	1.6%	0	0.0%	3,244	52	1.6%
3031.02	2,479	95.6%	109	4.2%	5	0.2%	2,593	114	4.4%
3060.02	1,002	96.3%	10	1.0%	28	2.7%	1,040	38	3.7%

NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: UNITED STATES CENSUS BUREAU, AMERICAN FACT FINDER, 2017 ESTIMATES.

³ World Health Organization (WHO). Accessed on September 5, 2018. Water Sanitation and Hygiene. What are the health risks related to overcrowding?. Available at: http://www.who.int/water_sanitation_health/emergencies/qa/emergencies_qa9/en/

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According to the American Community Survey's overcrowding data, five of the census tracts experienced overcrowding at a higher rate than at the citywide rate of 4.2%. DAC tract 3060.02 experiences overcrowding at a lower rate than the citywide rate, with 96% of rooms containing one or fewer persons. DAC tract 3020.05 has the highest rate of overcrowding in the City at 8.4 percent (at the census tract level).

HOUSING AFFORDABILITY

As what is typically the most expensive component of a household's budget, housing cost (rent or mortgage, utilities, homeowner or renter insurance, and property taxes for homeowners only) is a preeminent factor in determining if the household is "cost burdened" or negatively impacted by its expenses. This consideration takes on even greater importance in California, a place where housing costs far exceed the national average, and the San Francisco Bay Area, one of the most expensive regions for housing in the state.

Traditionally, housing affordability has been assessed by the "maximum rent standard." According to the standard, households that spend more than 30% of income on housing costs may be cost burdened. Taken from the most recent U.S. Department of Housing and Urban Development (HUD) Comprehensive Housing Affordability Strategy (CHAS) data which is an aggregation of ACS data, Table 6 describes the cost burden for the city's low- to moderate-income residents.

TABLE 6: HOUSING AFFORDABILITY

INCOME LEVEL	OWNER-OCCUPIED		RENTER-OCCUPIED		TOTAL OCCUPIED HOUSING UNITS	
	UNITS	%	UNITS	%	UNITS	%
Extremely Low (30% or less AMI)	630	7.4%	925	31.3%	1,555	13.6%
Very Low (30-50% AMI)	850	10.0%	620	20.9%	1,470	12.8%
Low (50-80% AMI)	1,210	14.2%	465	15.7%	1,675	14.6%
Moderate (80-100% AMI)	985	11.6%	300	10.1%	1,285	11.2%
High (100% or more AMI)	4,825	56.7%	650	22.0%	5,475	47.8%
Total	8,505	100%	2,960	100%	11,465	100%

SOURCE: HUD CHAS DATA, 2012-2016

"Housing problems" are considered a household that has one or more of the following conditions: lacks complete plumbing, lacks complete kitchen facilities, more than one person per room, and cost burden greater than 30 percent. The 2012-2016 HUD CHAS data indicates that 4,585 of 11,465 households have at least one housing problem. The majority of housing problems in the City occur in households earning extremely low income (28%) and in very low income households (25%).

PHYSICAL ACTIVITY

Residents of DACs are often more likely to experience negative health outcomes. Increased physical activity levels are associated with a decreased risk for numerous health conditions and chronic illnesses. The built environment in DACs can often be limited by land use planning and lack of investment, leaving less opportunities for formal and informal physical activity. Increasing the opportunity for physical activity within a community can work to positively impact the physical health of residents living in DACs.

This section summarizes the use of active transportation modes and the state and distribution of pedestrian and bicycle facilities and facilities conducive to physical activity in the DACs.

ACTIVE TRANSPORTATION USE

Active transportation is any form of transportation that is non-motorized. The use of active transportation during a daily commute increases physical activity levels, yielding a number of positive health benefits, including mortality risk reduction, disease prevention, cardiorespiratory fitness, and metabolic health. DACs often have disproportionately poorer health outcomes. Increasing opportunities for active transportation within a City can improve the overall health outcomes of DACs.

Data from the 2019 California Department of Finance (DOF) Population and Housing Estimate Report and 2013-2017 American Community Survey (ACS) were utilized to illustrate journey to work (JTW) statistics for the city. Table 7 provides an overview of Oakley's JTW mode split data compared to county and statewide statistics.

TABLE 7: COMMUTING TRANSPORTATION MODES

POPULATION	CITY OF OAKLEY		CONTRA COSTA COUNTY		STATE OF CALIFORNIA	
Total ¹	41,759		1,155,879		39,927,315	
Employed ²	18,071		520,162		17,589,758	
MODE SPLIT	NUMBER	%	NUMBER	%	NUMBER	%
ACTIVE TRANSPORTATION MODES						
Walked	126	0.7%	8,800	1.7%	470,101	2.7%
Bicycled	72	0.4%	2,577	0.5%	186,321	1.1%
Total - Active Transportation Modes	198	1.1%	11,377	2.2%	656,422	3.7%
POWERED TRANSPORTATION MODES						
Drove Alone	13,734	76.0%	353,988	68.1%	12,950,487	73.6%
Carpooled	2,422	13.4%	61,025	11.7%	1,830,958	10.4%
Public Transit	506	2.8%	53,698	10.3%	909,679	5.2%
Taxicab, Motorcycle, or Other Means	361	2.0%	7,483	1.4%	264,165	1.5%
Total - Powered Transportation Modes	17,023	94.2%	476,194	91.5%	15,955,289	90.7%
Worked at Home	867	4.8%	32,591	6.3%	978,047	5.6%

¹POPULATION DATA OBTAINED FROM 2019 CALIFORNIA DEPARTMENT OF FINANCE POPULATION AND HOUSING ESTIMATE REPORT.

²EMPLOYMENT AND MODAL CHOICE DATA OBTAINED FROM 2013-2017 AMERICAN COMMUNITY SURVEY 5-YEAR ESTIMATES.

The ACS reports that the majority of workers living in Oakley, 76%, drove to work alone, whereas other powered transportation modes accounted for approximately 18.2.0% of commute trips. This data also indicates that most commuters in Oakley do not use active transportation as a means of getting to work; only 0.7% of commuters reported walking to work and 0.4% rode a bike to work. By comparison, 89.4% of all trips made by the city's employed residents involve the use of an automobile by either driving alone or carpooling. Utilizing active transportation is an effective way of engaging in physical exercise and can be a factor in improving community health outcomes in DACs.

FACILITIES CONDUCIVE TO PHYSICAL ACTIVITY

The Planning Area is home to 34 parks facilities. Table 8 lists the parks and their amenities, including facilities for physical activity, and indicates whether the parks are in a DAC. The parks' locations and buffer distances of 0.25 and 0.5 miles, illustrating the reasonable walking distance to the facilities, are illustrated on Figure 5.

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TABLE 8: PLANNING AREA PARK FACILITIES

PARK	ADDRESS	AMENITIES	DAC?
Big Break Regional Shoreline	69 Big Break Rd.	Grass Areas, Picnic Areas, Benches, Kayak Launch, Visitor Center	No
Briarwood Park	100 Michaelangelo Dr. / Dalia Court	Grass Area, Playground, ½ Court Basketball, BBQs, Picnic Tables, Water Fountain (people and dogs), Bicycle Rack	No
Civic Center Park	Main St. / Morcross Ln.	Amphitheater, Walking Path, Picnic Tables	Yes
Claremont Bay Park	4676 Bayside Way	Climbing Rock, Picnic Tables	No
Creekside Park	3900 Creekside Way	Large Grass Area, Playground, Picnic Tables, BBQs, BMX Park (Closed), Waterplay Feature (2PM-7PM), Walking Path, Group, Picnic Area, Basketball Court, Sports Fields, Bocce Ball Courts	No
World of Discovery at Crockett Park	Richard Way	Large Grass Area, All- Abilities play structure, Picnic Tables, BBQs, BMX Park (Closed), Benches, Tennis Court, Basketball Court	No
Cypress Grove Park	4001 Frank Hengel Way	Large Grass Area, Playground, Tables, BBQs, Drinking Fountain (people and dog)	No
Cypress Grove Pond	38 Crane Ct.	Picnic Tables, Walking Paths, Benches	No
Daffodil Park	590 Daffodil Dr.	Grass Area, Playground, Picnic Tables, ½ Court Basketball	No
Dewey Park	100 Acme St.	Grass Area, Benches	No
Emerson Ranch Park	Hansford Way / Shearwater Way	Lake Area, Grass Area, Benches, Playground	No
Freedom Basin Park	O'Hara Ave. / Neroly Rd.	Large Grass Area, Trail, Picnic Tables, Forebay and wetland area with an overview deck to watch wildlife	No
Harvest Park	Harvest Cr.	Grass Area, BBQ, Picnic Tables	No
Heartwood Park	240 Heartwood Dr,	Grass Area, Playground Picnic Tables	No
Heather Park	Canterbury Ln. / Claremont Ln.	Grass Area, BBQ, Picnic Tables, Bench, Drinking Fountain	Yes
Holly Creek Park	4758 Hagar Ct.	Large Grass Area, BBQ, Picnic Tables, Playground, Shade Area, Bicycle and Walking Trail	No
Lakewood Park	1882 Lakewood Dr.	Small Grass Area, BBQ, Picnic Tables, Playground, Benches, Bicycle Rack	No
Lakeside Park	E. Summer Lake Dr.	Grass Area, Benches, Playground, Picnic Tables	N
Laurel Ball Fields Park	850 Laurel Rd.	Benches, Sports Fields, Picnic Tables, Basketball Court, Skate Feature, Restrooms, Parking Lot, Walking Trail, Playground	No
Laurel Park	Nutmeg Dr.	Grass Area	No
Live Oak Ranch Park	19 Solitude Ct.	Grass Area, Benches	No
Main Street Park	Main St. / Gardenia Ave.	Grass Area, Benches	Yes
Magnolia Park	Daffodil Dr. / Everlasting Way	Large Grass Area, Playground, Picnic tables, Benches, Sports Fields, Skate Feature, Trail	No
Manresa Park	1088 Clear Lake Dr.	Tables, Benches	No
Marsh Creek Glenn Park	430 Hill Ave.	Large Grass Area, Playground, Picnic tables, Benches, Sports Fields, Skate Feature, Trail	No
Novarina Park	100 Brown St.	Large Grass Area, Playground with dinosaur dig feature, Picnic Tables	No
Nunn-Wilson Family Park	100 Oxford Dr.	Playground, Adult Fitness Area, Water Feature (limited hours open Wed-Sun 11-7pm beginning), Grass Area, Picnic Tables, BBQ, ½ Basketball Court	No
Nutmeg Park	1068 Nutmeg Dr.	Grass Area, Playground, Picnic Tables, Benches, Basketball, BBQ, Skate Area, Walking Path	No
Oak Grove Park	403 White Oak Ct.	Grass Area, Playground, Tables, Benches, BBQ	No

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PARK	ADDRESS	AMENITIES	DAC?
Riata Park	607 Saddlebrook Way	Grass Area, Play Areas, Tables, Benches	No
Shady Oak Community Park	Cedar Glenn Dr. / Shady Oak Dr.	Grass Area, Playground, Table with checkers and chess board, Water Feature (Closed due to drought), Bocce Court, Sports Field, Basketball Court, Drinking Fountain	No
Simoni Ranch Open Space	Simoni Ranch Rd.	Grass Area, Picnic Tables	No
Summer Lake Park	4020 Summer Lake Dr.	Grass Area, Picnic Tables, Benches, Trail Access, Sports Field, Playground, Tennis Court, Restroom	No
Sycamore Park	1799 Park Pl.	Grass Area, Picnic Tables, Benches	No

SOURCE: [HTTPS:// WWW.CI.OAKLEY.CA.US/PARKS-AND-TRAILS/CITY-PARKS/](https://www.ci.oakley.ca.us/parks-and-trails/city-parks/).

Four of the of the City's 34 park facilities are located in one of the City's DACs (3020.05) and the other DAC (3060.02) has no park facilities. There are four parks within census tract 3020.05 and households within this DAC are also within the ¼- and ½-mile buffer areas of multiple parks located in the vicinity of this DAC as shown in Figure 5. There are no park facilities located within or within a ¼- or ½-mile buffer distance of census tract 3060.02. This appears to affect households located north of Oakley Road as homes located south of Oakley Road are on generally on one-acre lots with large yards that include a variety of opportunities for at-home active recreation, including swimming pools, tennis courts, lawns, and play areas.

CIVIC ENGAGEMENT

An important aspect of planning for environmental justice is the development of effective policies and programs that enable all residents to participate in local decision making. DACs can often be excluded from decision-making when officials and policies do not focus on involving these communities in a strategic manner. SB 1000 emphasizes that community engagement must be promoted in a local jurisdiction through the development of objectives and policies that seek to specifically involve residents of DACs. By engaging DACs in decision-making processes, policy-makers can effectively meet the needs of these community members. DACs often have culturally-specific needs, distinct from those of the general population, that must be made a priority within local policy to ensure community success. The US EPA Environmental Justice Policy requires the "... meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." The establishment of appropriate opportunities for those who are low-income, minorities, and linguistically isolated to engage in local decision making will help ensure that environmental justice issues are identified and resolved. In addition, community programs that address the needs of DACs are critical to ensuring environmental justice is achieved for these communities within a city.

This section summarizes the levels of civic engagement, based upon voter registration and turnout, and demographics that may influence civic engagement in Oakley's DAC.

LEVELS OF CIVIC ENGAGEMENT

The primary means of measuring a community's level of civic engagement is the assessment of voter participation. This includes the percentage of voting age residents registered to vote and the percentage of registered voters who cast ballots. A summary of both metrics for Oakley and Contra Costa County is as follows:

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VOTER REGISTRATION

During the 15 days prior to the 2018 general election, there were 621,309 registered voters in Contra Costa County, including 20,898 registered voters residing in Oakley. According to the ACS 2013-2017 five-year estimate, the most recent range for which data is available, 743,847 people of voting age resided in the county, including 28,846 people of voting age in the city. This equates to voter registration rates of approximately 72.4% in Oakley and 71% across the county.

VOTER PARTICIPATION

According to the Contra Costa County Recorder’s Office, for the 2018 general election there were 619,963 registered voters in Contra Costa County, including 20,898 registered voters residing in Oakley. Additionally, 423,348 votes were cast across the county, including 12,052 votes in the city’s precincts. This equates to voter turnout rates of 57.7% in Oakley and 68.3% across Contra Costa County. By comparison, for the 2016 general election, the most recent presidential election, the voter turnout rate for the city was 79.1% and for the county was 77.9%. This is consistent with increased voter turnout during presidential election years.

Based upon the most recent voting metrics, the city’s residents are similarly engaged as county residents as a whole. Given the relatively lower levels of civic engagement in DACs, it is reasonable to extrapolate that that the Planning Area’s DAC experienced similar, if not lower, voter involvement than the citywide rates.

DEMOGRAPHICS THAT MAY INFLUENCE CIVIC ENGAGEMENT

Certain demographic categories can help predict a community’s likely level of civic engagement. This section assesses three demographic categories: resident age, language spoken at home, and educational attainment. The assessments are based upon tables that compare the demographic categories at the county, city, and DAC tract levels.

RESIDENT AGE

Age distribution can help predict the likelihood of a community participating in civic activities and identify constraints associated with engaging different members of the community. A disproportionately high percentage of residents under the age of 18 suggests the significant presence of families. Parents of minors are generally busy raising their children, making them less likely to participate in civic activities. Encouraging the use of virtual outreach tools, such as social media and online surveying, and outreach approaches at other community events, such as farmers markets, fairs, and sporting events, can help increase participation among this group. Conversely, a disproportionately high percentage of seniors, a group that generally has fewer commitments and less time constraints, suggests that the community may participate in conventional civic activities, at a higher rate. Because seniors are less familiar with technology than their younger counterparts, the group is less likely to utilize virtual outreach tools.

As reflected by Table 9, Oakley’s residents are somewhat younger than the county as a whole. In the instance of the City’s DAC tracts, tract 3020.05 is younger than the county as a whole, while tract 3060.02 is older than the county as a whole. The city’s tracts that do not qualify as a DAC tract reveal varied ages compared to the County.

TABLE 9: RESIDENT AGE

LOCATION	TOTAL POPULATION	AGE					
		UNDER 18 YEARS		18 TO 64 YEAR		65 YEARS AND OVER	
		NUMBER	%	NUMBER	%	NUMBER	%
Contra Costa County	1,123,678	261,503	23.3%	698,404	62.1%	163,771	14.6%
City of Oakley	39,950	11,104	27.8%	25,009	62.6%	3,477	8.7%

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LOCATION	TOTAL POPULATION	AGE					
		UNDER 18 YEARS		18 TO 64 YEAR		65 YEARS AND OVER	
		NUMBER	%	NUMBER	%	NUMBER	%
CENSUS TRACTS							
3010	4,784	910	19.0%	3,090	64.6%	784	16.4%
3020.05	7,131	2,043	28.6%	4,187	58.8%	901	12.6%
3020.06	3,873	985	25.4%	2,653	68.5%	235	6.1%
3020.07	7,050	1,910	27.1%	4,643	65.9%	497	7.0%
3020.08	8,126	2,370	29.2%	5,104	92.8%	652	8.0%
3020.10	11,648	3,234	27.8%	7,421	63.7%	993	8.5%
3031.02	8,930	2,676	30.0%	5,511	61.7%	743	8.3%
3060.02	3,344	688	20.6%	2,105	62.9%	551	16.5%

NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: UNITED STATES CENSUS BUREAU, AMERICAN FACT FINDER, 2017 ESTIMATES.

LANGUAGE ACCESS

Language is a critical signifier of a population's likely participation in civic activities. Non-native English speakers, and especially those individuals with limited English fluency, are less likely to participate in civic activities. Translation services are critical to reaching and actively communicating with these individuals. In addition, the metric of households who speak languages other than English can help identify the cultural diversity of a community. Civic activities, and the venues where they take place, can be tailored to accommodate the cultural preferences of individual racial, ethnic, and religious groups.

As identified by Table 10, Oakley and most of the census tracts, including both DACs, are home to a more than 30 percent of households where the residents speak languages other than English and/or have limited fluency in English. Of the other household languages spoken, Spanish and various Asian and Pacific Islander languages are most common in Oakley.

TABLE 10: LANGUAGES SPOKEN AT HOME

LOCATION	POPULATION 5 YEARS AND OVER	ENGLISH ONLY HOUSEHOLD	OTHER LANGUAGE SPOKEN AT HOME	LANGUAGES SPOKEN OTHER THAN ENGLISH			
				SPANISH	OTHER INDO-EUROPEAN	ASIAN AND PACIFIC ISLANDER	OTHER
				NUMBER	NUMBER	NUMBER	NUMBER
				NUMBER	NUMBER	NUMBER	NUMBER
		%	%	%	%	%	%
Contra Costa Co.	1,058,105	690,049	368,056	190,059	62,119	103,823	12,055
		65.2%	34.8%	18.0%	5.9%	9.8%	1.1%
City of Oakley	37,135	25,309	11,826	8,710	798	1,868	450
		68.2%	31.8%	23.5%	2.1%	5.0%	1.2%
CENSUS TRACTS							
3010	4,477	3,857	620	350	89	110	71
		86.2%	13.8%	7.8%	2.0%	2.5%	1.6%
3020.05	6,639	4,502	2,137	1,912	13	198	14
		67.8%	32.2%	28.8%	0.2%	3.1%	0.2%
3020.06	3,614	2,564	1,050	869	58	101	22
		70.9%	29.1%	24.0%	1.6%	2.8%	0.6%
3020.07	6,593	4,209	2,384	1,790	208	251	135
		63.8%	36.2%	27.2%	3.2%	3.8%	2.0%

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LOCATION	POPULATION 5 YEARS AND OVER	ENGLISH ONLY HOUSEHOLD	OTHER LANGUAGE SPOKEN AT HOME	LANGUAGES SPOKEN OTHER THAN ENGLISH			
				SPANISH	OTHER INDO-EUROPEAN	ASIAN AND PACIFIC ISLANDER	OTHER
		NUMBER	NUMBER	NUMBER	NUMBER	NUMBER	NUMBER
		%	%	%	%	%	%
3020.08	7,502	4,901	2,601	1,989	333	279	0
		65.3%	34.7%	26.5%	4.4%	3.7%	0.0%
3020.10	10,911	7,991	2,920	1,833	96	783	208
		73.2%	26.8%	16.8%	0.9%	7.2%	1.9%
3031.02	8,450	5,893	2,557	1,230	636	593	98
		69.7%	30.3%	14.6%	7.5%	7.0%	1.2%
3060.02	3,181	2,106	1,075	846	76	153	0
		66.2%	33.8%	26.6%	2.4%	4.8%	0.0%

NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: UNITED STATES CENSUS BUREAU, AMERICAN FACT FINDER, 2017 ESTIMATES.

EDUCATIONAL ATTAINMENT

Educational attainment is a strong signifier of a population’s likely participation in civic activities. Higher educational attainment generally correlates with increased civic participation. This is reflective of individuals with less educational attainment experiencing underemployment circumstances, such as working for less than a living wage and/or on a part-time basis. This may require individuals to seek out additional employment, reducing the time that they can commit to civic activities. In addition, individuals with lower educational attainment generally make less money. Those individuals who cannot afford to own or otherwise have limited access to an automobile, may be unable to attend civic events. This may also be reflective of individuals with less educational attainment lacking the sufficient literacy level and/or a formal education in civics and government to feel comfortable participating in civic matters.

Based upon Table 11, Oakley’s residents and the census tracts’ populations educational attainment levels are lower than on the countywide level. On average, a significantly higher percentage of residents completed high school or graduated from high school or attained some post-secondary education, but did not complete college. Of the DAC residents, those that did not complete high school or only obtain a high school degree are of greatest concern. DAC tract 3020.05 residents have lower educational attainment levels compared to the county and city. Specifically, 55.4 percent of DAC tract 3020.05 residents have some college, an associate’s degree, bachelor’s degree, or higher, compared to 72.0 percent in the county and 58.8 percent in the city. DAC tract 3060.02 residents also have slightly lower educational attainment levels, with 52.2 percent with some college, an associate’s degree, bachelor’s degree, or higher.

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TABLE 11: EDUCATIONAL ATTAINMENT

LOCATION	TOTAL POPULATION (25+ YEARS)	LESS THAN A HIGH SCHOOL GRADUATE		HIGH SCHOOL GRADUATE (OR EQUIVALENT)		SOME COLLEGE OR ASSOCIATE'S DEGREE		BACHELOR'S DEGREE OR HIGHER	
		NUMBER	#	NUMBER	#	NUMBER	#	NUMBER	#
Contra Costa Co.	603,361	65,348	10.8%	105,071	17.4%	184,913	30.6%	248,029	41.1%
City of Oakley	24,506	3,131	12.7%	6,929	28.3%	9,795	39.9%	4,651	18.9%
CENSUS TRACTS									
3010	3,342	390	11.7%	1,016	30.4%	1,240	37.1%	696	20.8%
3020.05	4,516	632	13.5%	1,406	31.1%	2,074	46.0%	424	9.4%
3020.06	2,531	489	19.3%	543	21.5%	1,162	45.9%	337	13.3%
3020.07	4,250	824	19.4%	1,154	27.2%	1,614	38.0%	658	15.5%
3020.08	4,915	621	12.6%	1,456	29.6%	1,510	30.7%	1,327	27.0%
3020.10	6,969	532	7.7%	1,935	27.8%	2,930	42.0%	1,572	22.5%
3031.02	5,470	567	10.4%	774	14.1%	2,226	40.7%	1,903	3.8%
3060.02	2,469	330	13.4%	850	34.4%	882	35.7%	407	16.5%

NOTE: DACs INCLUDE CENSUS TRACT 3020.05 AND A PORTION OF 3060.02.

SOURCE: UNITED STATES CENSUS BUREAU, AMERICAN FACT FINDER, 2017 ESTIMATES.

5. COMMUNITY INPUT

As discussed in the Visioning White Paper, the City hosted two General Plan Update Visioning Workshops in June 2019. The initial Visioning Workshop was the community kick off for the General Plan Update project. The first activity during Visioning Workshop #1 was a Post-It activity. Meeting attendees were provided stacks of blank Post-it notes and asked to write down what they think are Oakley's primary assets and challenges, along with their vision for the future of the City. The second activity during Visioning Workshop #1 was a mapping activity. Community members formed two groups of two people and each group was provided one large map of the City of Oakley, an instruction sheet with nine various icon stickers, and worksheets in order to complete this activity. The large map included predesignated focus areas (1 through 6). The community members were asked to identify the top concerns and top needs for each focus area. Focus Area 1 included DAC tract 3020.05 and the portion of 3020.06 most affected by environmental justice factors.

Workshop #1 - Focus Area 1 Input:

- Top concerns for this area:
 - Need of aesthetic improvements
 - Lack of safe and affordable housing
 - Disparity between one area of Empire and the other
- Top needs for this area:
 - Public facilities
 - Parks and recreation
 - Safe and affordable housing
 - Maintenance and renovation

The second Visioning Workshop provided an overview of the General Plan process and focused on identifying the transportation and mobility issues and concerns in Oakley. The first activity during Visioning Workshop #2 was a mapping activity to identify mobility barriers in the Planning Area. The second activity during Visioning Workshop #2 was a Transportation and Mobility Vision activity which aimed to identify transportation and mobility related priorities. The third activity was a prioritization activity aimed at prioritizing which of the following issues are the top priority: Automobile Improvements, Bicycle Improvements, Pedestrian Improvements, Transit Improvements, and Safety Improvements.

Workshop #2 – Concerns related to Environmental Justice:

- Mobility Barriers:
 - Congestion downtown
 - Safety updates needed
 - Improved bus and transit service needed, particularly near schools and downtown
 - Unsafe and/or limited walkways, particularly for students near schools
- Transportation Vision:
 - Improved access for all

During the Visioning process, an on-line survey was distributed via the City's website, with links also advertised via an email blast, Twitter, and Facebook pages, to encourage additional community input. Full survey results are provided in the Visioning White Paper. The survey included questions related to needs in Focus Area 1, which included the DAC tracts as previously described. The top comments related to Focus Area 1 included:

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- Issues of Most Concern - Focus Area 1: Lack of community services (51%), noise (35%), access to affordable and nutritious food (26%)
- Solutions and Amenities Needed - Focus Area 1: Public safety (65%), maintenance and renovation (61%), and parks and recreation (47%)

6. POLICY APPROACHES

The following policies may be used to address environmental justice concerns in Oakley:

- Require future planning decisions, development, and infrastructure and public projects to consider the effects of planning decisions on the overall health and well-being of the community and its residents, with specific consideration provided regarding disadvantaged populations and communities to ensure equitable distribution of amenities, needed infrastructure, and community services and to avoid concentrations of adverse uses in DACs.
- As part of land use decisions, ensure that environmental justice issues related to potential adverse health impacts associated with land use decisions, including methods to reduce exposure to hazardous materials, industrial activity, vehicle exhaust, other sources of pollution, and excessive noise on residents regardless of age, culture, gender, race, socioeconomic status, or geographic location, are considered and addressed.
- When planning for parks, recreational facilities, community gardens, civic facilities, and other uses that improve the quality of life, ensure that environmental justice issues related to the equitable provision of desirable public amenities are considered and addressed.
- Promote broad and balanced participation to ensure that affected residents have the opportunity to participate in the decision-making process, including in decisions that affect their health and well-being such as planning, roadway, parks, infrastructure, and utility projects.
- Support existing health care services and encourage the location of new health care facilities and medical services, particularly in disadvantaged areas, areas with a high rate of special needs populations, and in underserved residential areas. Encourage new facilities to be located in areas that are readily accessible by pedestrians and bicyclists and served by transit.
- Support existing health care services and encourage the location of new health care facilities and medical services, particularly in disadvantaged areas, areas with a high rate of special needs populations, and in underserved residential areas. Encourage new facilities to be located in areas that are readily accessible by pedestrians and bicyclists and served by transit.
- Encourage smoke free workplaces, multifamily housing, parks, and other outdoor gathering places to reduce exposure to secondhand smoke.
- Encourage convenience stores, supermarkets, liquor stores, and neighborhood markets to stock nutritional food choices, including local produce, local meats and dairy, 100% juices, and whole-grain products.
- Encourage sustainable local food systems including farmer's markets, community gardens, edible school yards, community supported agriculture, neighborhood garden exchanges, federal food assistance programs, and healthy food retailers.
- Support schools and other organizations' efforts to encourage students and their families to make healthy food choices through providing fresh, nutritious lunches and providing students and their families access to fresh fruits and vegetables through "edible school yards", holiday meal programs, and sustainable gardening programs.
- As new transportation technologies and mobility services, including autonomous vehicles, electric vehicles, electric bicycles and scooters, and transportation network companies (e.g., Uber and Lyft) are implemented in Oakley and used by the public, the City shall review and update its policies and plans to maximize the benefit to the public of such technologies and services without adversely affecting the City's transportation network.

Oakley Focused General Plan Update

Updates to the City's policies and plans may cover topics such as electric vehicle charging stations, curb space management, changes in parking supply requirements, policies regarding electric scooter use and docking, etc.

- Consider implementing vehicle weight limit restrictions on roadways near sensitive uses like schools and residential neighborhoods to discourage cut-through truck traffic.
- Locate site entries, parking areas, storage bays, and service areas of buildings to minimize conflicts with adjacent properties, especially residential neighborhoods.

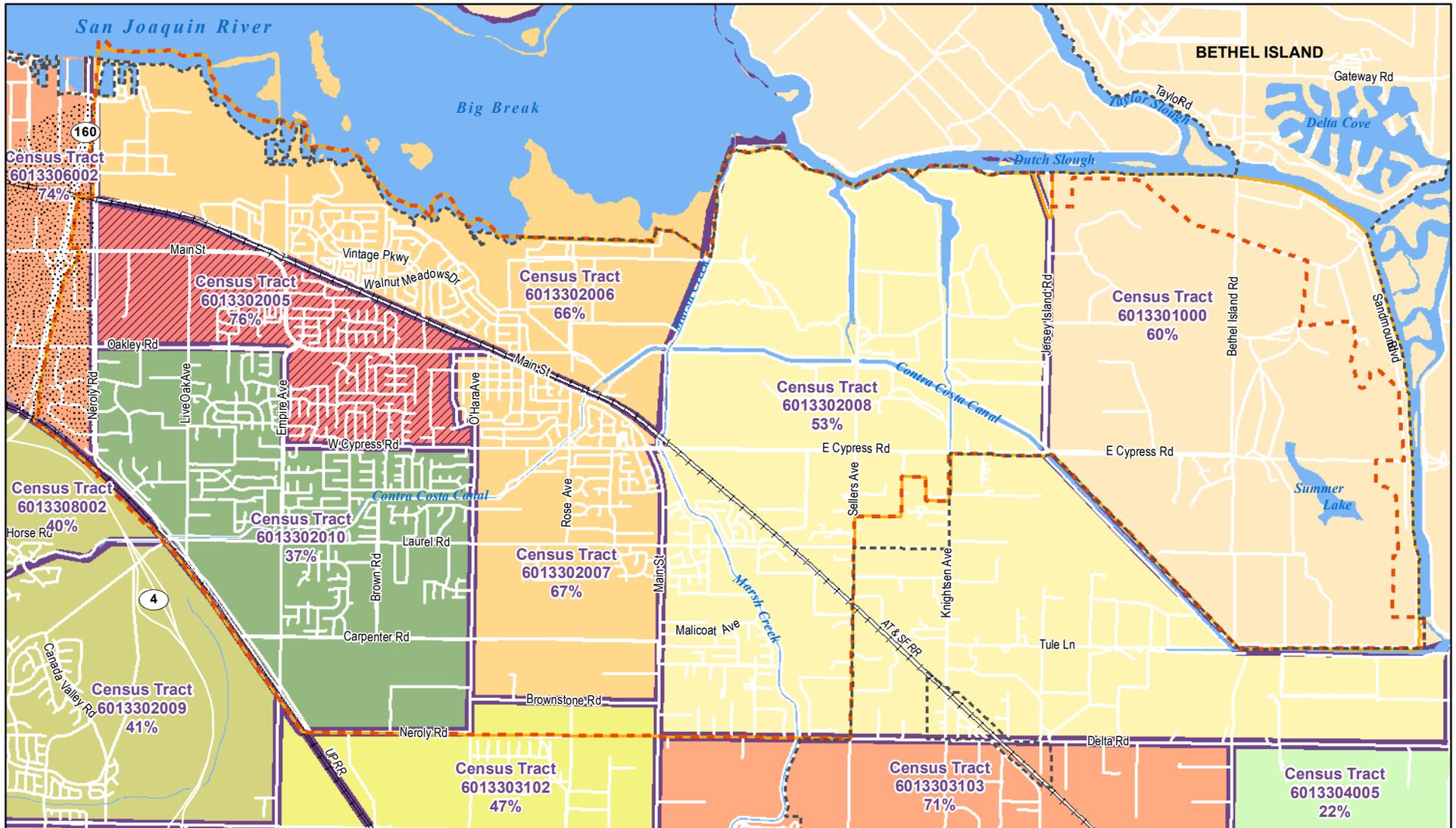
The following actions may be used to address environmental justice concerns in Oakley:

- Review all development proposals, planning projects, and infrastructure projects to ensure that potential adverse impacts to disadvantaged communities, such as exposure to pollutants, including toxic air contaminants, and unacceptable levels of noise and vibration are reduced to the extent feasible and that measures to improve quality of life, such as connections to bicycle and pedestrian paths, community services, schools, and recreation facilities, access to healthy foods, and improvement of air quality are included in the project. The review shall address both the construction and operation phases of the project.
- Review the City's community outreach programs and public notice requirements to encourage broad-based and meaningful community participation in decisions. The review should address providing measures to promote capacity-building, encourage participation from populations that may have language, health, or other barriers that may reduce their involvement in the decision-making process, and maximize use of technology broaden opportunities for participation.
- Encourage and support local transit service providers to increase and expand services for people who are transit-dependent, including seniors, persons with mobility disabilities, and persons without regular access to automobiles, by improving connections to regional medical facilities, senior centers, and other support systems that serve residents and businesses.
- Encourage the County to promote physical activity, access to healthy food, and address health indicators in local DACs through the Healthy Communities Program.
- Encourage community gardens near high-density housing and encourage the incorporation of community gardens into new and existing high-density housing projects.
- Encourage schools that serve the City to develop school gardens and to develop protocols to facilitate the streamlined development of school gardens from year to year.
- Support local government and non-profit efforts and programs aimed at teen drug, alcohol, and tobacco use prevention.
- Review updates to transportation planning documents and any automated vehicle plans to ensure the benefits of automated mobility are equitably distributed across all segments of the community and that the negative impacts of automated mobility are not disproportionately borne on traditionally marginalized neighborhoods.
- As part of the development of or participation in any ridesharing program, including for shared automated vehicle fleets, ensure that the program considers the safety needs of vulnerable populations and loading needs of seniors, families with children, and individuals with mobility impairments.
- Review and update the City's standard plans to ensure that the plans reflect the City's goals and policies for the circulation system, including cross-sections that provide for landscape-separated sidewalks along arterials and non-residential streets, best practices for traffic safety, and accommodate all users.

Oakley Focused General Plan Update

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LEGEND

Disadvantaged

CalEnviroScreen 3.0 percentile in top 25%

Low-income area proximate to area burdened by pollution and other factors

Boundaries

Oakley City Limit

CalEnviroScreen 3.0 Percentile Range

1-5%	20-25%	40-45%	60-65%	80-85%
5-10%	25-30%	45-50%	65-70%	85-90%
10-15%	30-35%	50-55%	70-75%	90-95%
15-20%	35-40%	55-60%	75-80%	95-100%

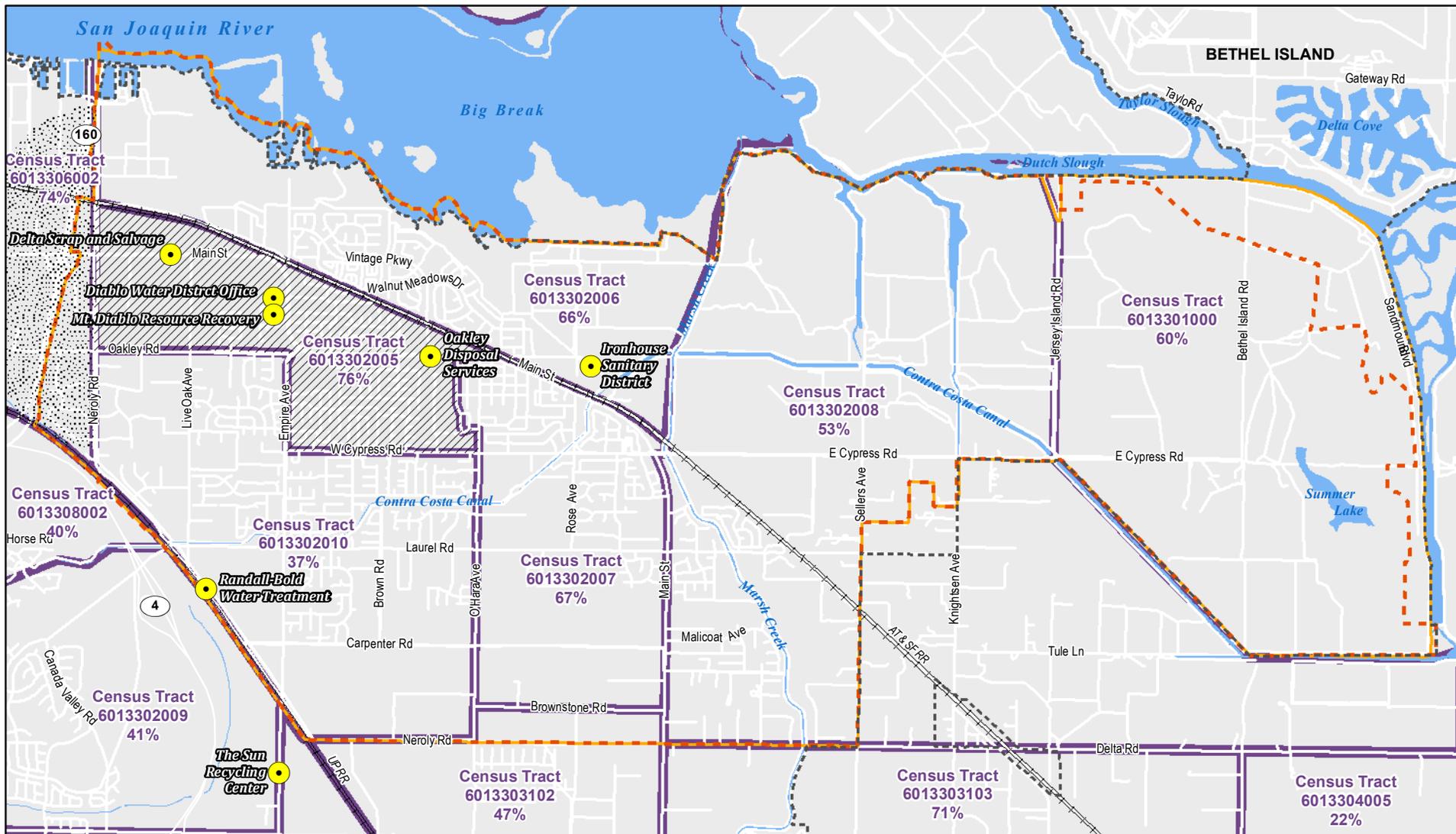
Oakley Sphere of Influence

Urban Limit Line

Census Tract

Figure 1.
Disadvantaged Communities



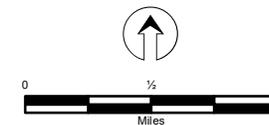


LEGEND

- Public Improvement
- Disadvantaged Communities**
- CalEnviroScreen 3.0 percentile in top 25%
- Low-income area proximate to area burdened by pollution and other factors
- Boundaries**
- Oakley City Limit
- Oakley Sphere of Influence
- Urban Limit Line
- Census

Figure 2.

Public Improvements



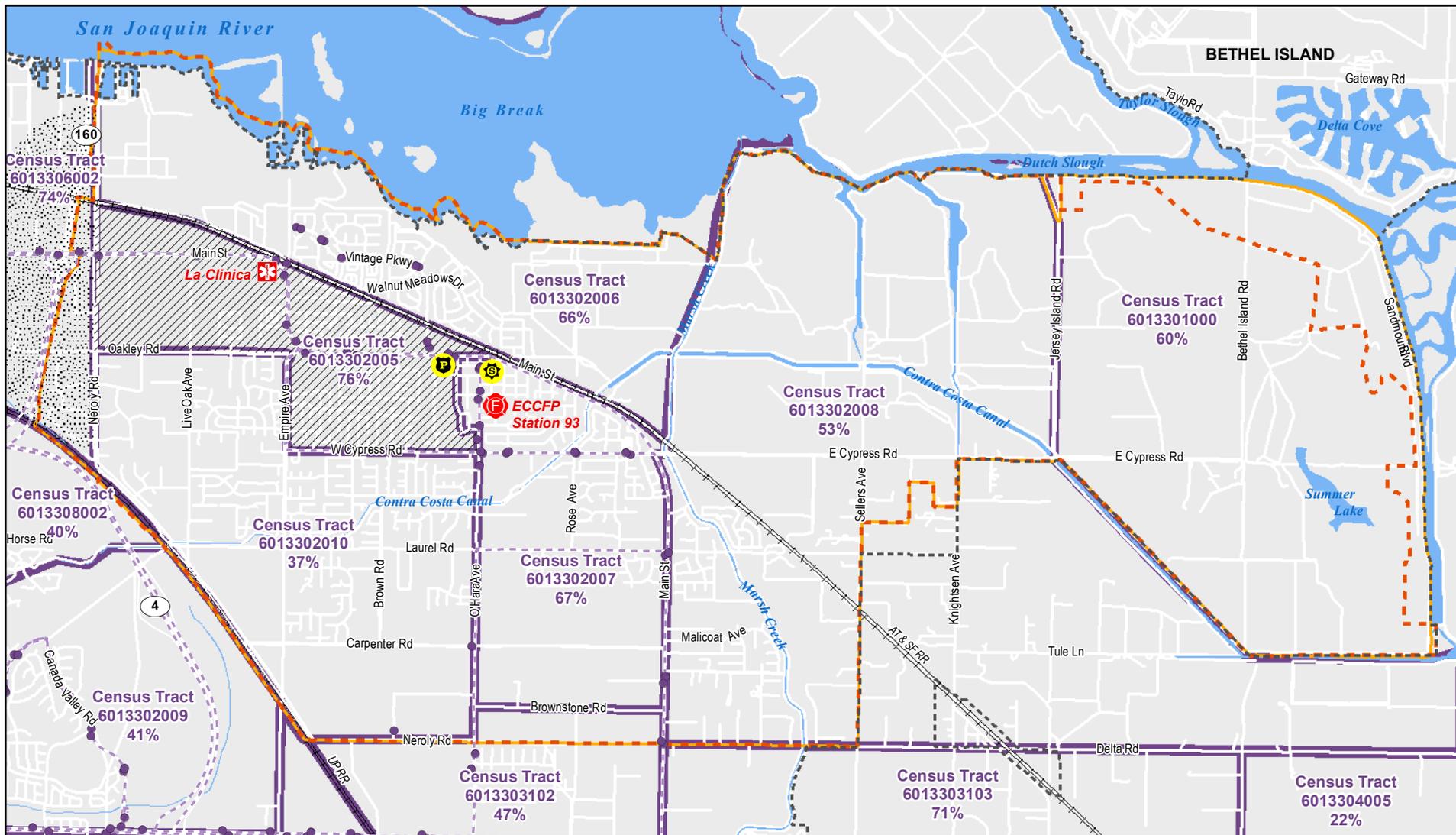


Figure 3.

Public Services



LEGEND

Public Services

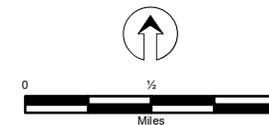
- Fire Station
- Medical Facility
- Police Department
- Sheriff's Office

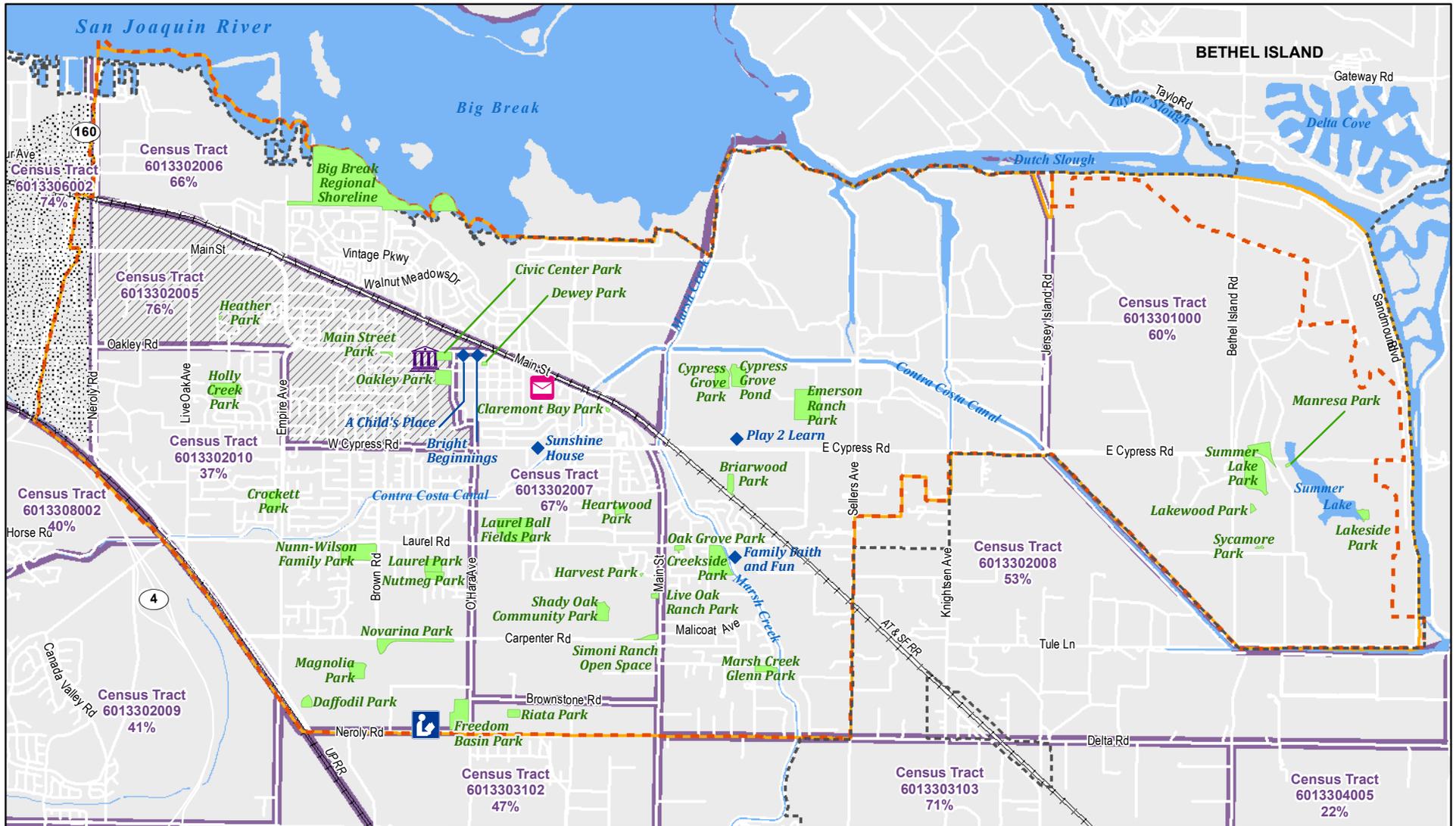
Disadvantaged

- CalEnviroScreen 3.0 percentile in top 25%
- Low-income area proximate to area burdened by pollution and other factors

Boundaries

- Oakley City Limit
- Oakley Sphere of Influence
- Urban Limit Line
- Census Tract





LEGEND

Community Facilities

- Daycare Center
- Oakley City Hall
- Oakley Library
- United States Post Office
- Park

Disadvantaged Communities

- CalEnviroScreen 3.0 percentile in top 25%
- Low-income area proximate to area burdened by pollution and other factors

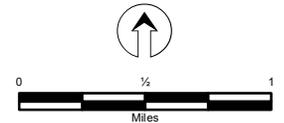
Boundaries

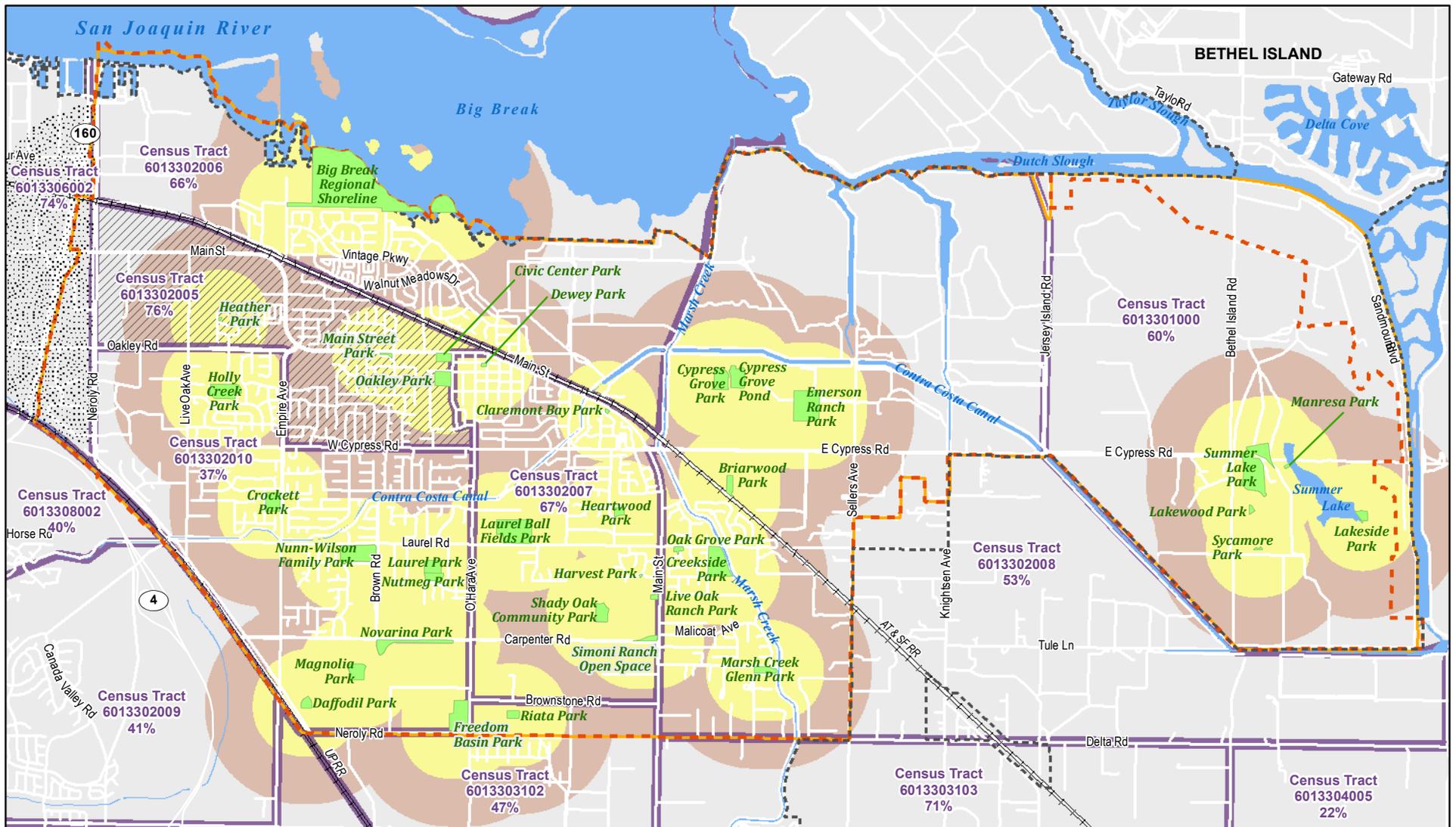
- Oakley City Limit
- Oakley Sphere of Influence
- Urban Limit Line
- Census Tract



Community Facilities

Figure 4.





LEGEND

Parks Facilities

- Park
- Quarter-Mile Buffer of Parks
- Half-Mile Buffer of Parks

Disadvantaged Communities

- CalEnviroScreen 3.0 percentile in top 25%
- Low-income area proximate to area burdened by pollution and other factors

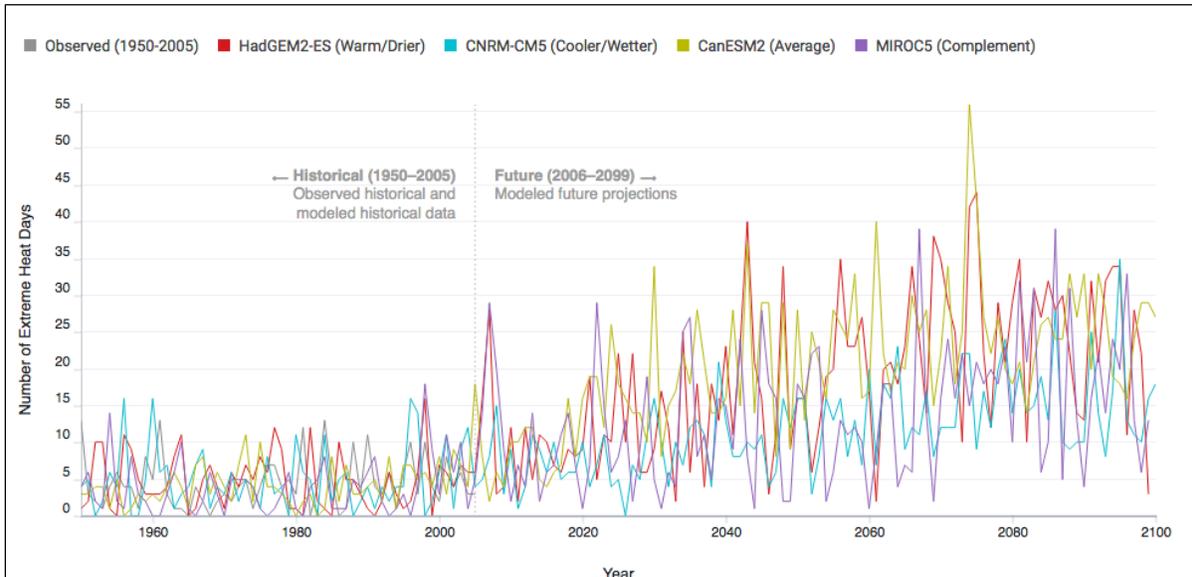
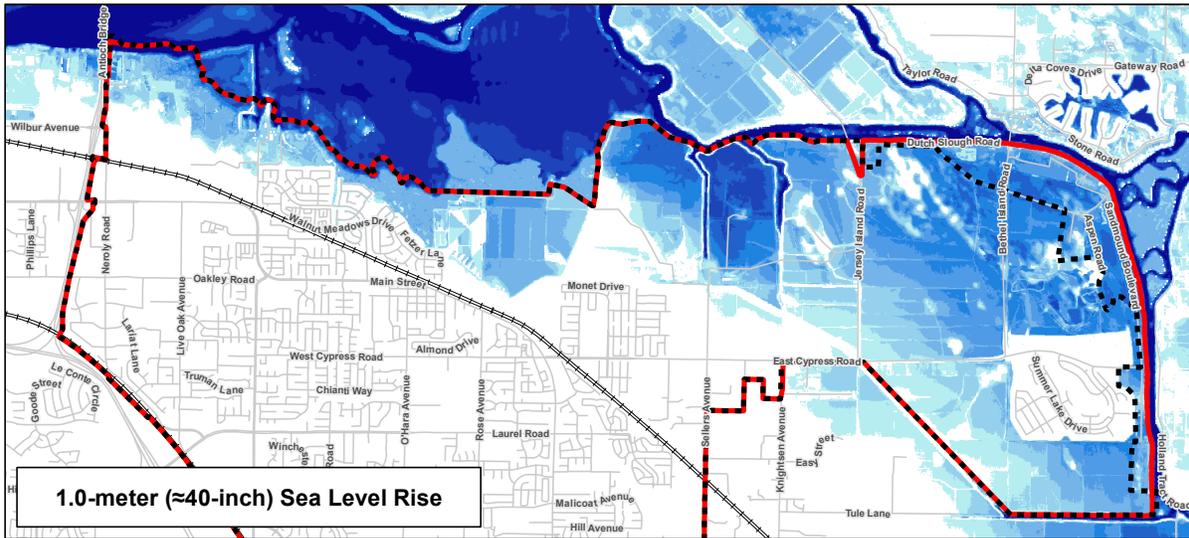
Boundaries

- Oakley City Limit
- Oakley Sphere of Influence
- Urban Limit Line
- Census Tract



Figure 6.
Parks and Recreation Facilities





October 2019

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1. BACKGROUND AND REGULATORY FRAMEWORK

BACKGROUND

Climate change contributes to ongoing, escalating impacts on people, the economy, and the environment on both the local and global level. Addressing and preparing for these impacts requires collaboration and transformative action among economic, governmental, social, environmental, and other elements. In recent years, California has been at the forefront of developing approaches to promote resiliency to the effects of climate change and reduce greenhouse gas (GHG) emissions while continuing to foster economic growth, social equity, and environmental protection. This White Paper addresses the federal, state, and regulatory framework related to climate change and greenhouse gas emissions, the status of local climate action efforts, conditions related to climate change, including primary GHG emissions sources, and potential impacts associated with climate change, including sea-level rise, extreme heat, changes in precipitation and drought, increased risk of wildfire and flooding, and other impacts.

This white paper provides an overview of the existing and future impacts of climate change on people and the built environment. This includes descriptions of the regulatory framework relating to climate change. An overview of the regulatory framework is presented first, followed by an assessment climate change impacts on the community, and a discussion of how to address the community's priorities and concerns on climate change, including through mitigation and adaptation.

This section identifies terminology associated with climate change and GHG issues and the associated regulatory framework at the federal, state, regional, and local levels.

KEY TERMS

Acre-foot (AF). A unit of volume equal to the volume of a sheet of water one acre in area and one foot in depth; equivalent to 43,560 cubic feet.

Bay Area Regional Reliability (BARR). A partnership made up of several large water suppliers serving six counties in the San Francisco Bay Area. Partners include Alameda County Water District, Bay Area Water Supply and Conservation Agency, Contra Costa Water District, East Bay Municipal Utility District, Marin Municipal Water District, San Francisco Public Utilities Commission, Santa Clara Valley Water District, and Zone 7 Water Agency.

CALGreen. The State of California mandatory green building code.

Carbon Dioxide-equivalent (CO₂e). A standard unit for measuring carbon footprints, expressed in terms of the amount of carbon dioxide that would create the same amount of global warming.

Cap-and-Trade Program. A Cap-and-Trade Program is a common term for a government regulatory program designed to limit, or cap, the total level of emissions of carbon dioxide as a result of industrial activity. The California Cap-and-Trade Program sets a statewide limit on sources responsible for 85 percent of California's greenhouse gas emissions, and establishes a price signal designed to drive long-term investment in cleaner fuels and more efficient use of energy.

Contra Costa Water District (CCWD). An urban water supplies that owns and operates a public water system, as defined in the California Water Code. CCWD is both a retail and wholesale water supplier. CCWD supplies wholesale untreated water to several municipalities in Contra Costa County and Diablo Water District.

Coastal Storm Monitoring System (CoSMoS). A tool developed by the United States Geologic Survey that can simulate sea-level rise in combination with storm events and other coastal dynamics.

Central Valley Project (CVP). A federal water management project providing irrigation and municipal water to a large portion of California's Central Valley.

Diablo Water District (DWD). The water district that supplies potable water to the City of Oakley.

East Contra Costa Integrated Regional Water Management (ECCC IRWM). A collaborate effort to manage all aspects of water resources in the East Contra Costa region. The East Contra Costa Region is a distinct geographic region, covering 50 square miles, which is isolated from its neighboring regions by the ridge lines of Mt Diablo to the south and west, and the Sacramento-San Joaquin Delta waterways to the north and east.

Federal Clean Air Act (FCAA). A federal law designed to control air pollution on the nation level.

Greenhouse Gas (GHG). A gas that contributes to the global greenhouse effect by absorbing infrared radiation, which include carbon dioxide and chlorofluorocarbons.

Intergovernmental Panel on Climate Change (IPCC). The United Nations body for assessing the science related to climate change.

Ironhouse Sanitary District (ISD) Wastewater Treatment Facility. The ISD wastewater treatment facility is located in the City of Oakley. ISD provides sewage collection, treatment and disposal for the City of Oakley, Bethel Island, and areas outside of the Oakley city limits.

Oakley Regional Board Waste Treatment Plant (RBWTP). The RBWTP in Oakley is jointly owned by CCWD and DWD. The DWD portion of the facility delivers treated water to the City of Oakley.

State Water Project (SWP). The state water management project providing drinking water to more than 23 million people in California.

United States Environmental Protection Agency (EPA). An independent agency of the United States federal government for environmental protection.

Urban Water Management Plan (UWMP). Urban Water Management Plans are prepared by urban water suppliers every 5 year to support long-term resource planning and water supply sustainability.

Vector-borne Disease (VBD). Illnesses caused by parasites, viruses and bacteria that are transmitted by mosquitoes, sandflies, triatomine bugs, blackflies, ticks, tsetse flies, mites, snails, and lice.

REGULATORY FRAMEWORK

FEDERAL

Clean Air Act

The Federal Clean Air Act (FCAA) was first signed into law in 1970. In 1977, and again in 1990, the law was substantially amended. The FCAA is the foundation for a national air pollution control effort, and it is composed of the following basic elements: NAAQS for criteria air pollutants, hazardous air pollutant standards, state attainment plans, motor National Ambient

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Air Quality Standards (NAAQS) vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

The EPA is responsible for administering the FCAA. As discussed in Section 5.2, the FCAA requires the EPA to set NAAQS for several problem air pollutants based on human health and welfare criteria and recognizes the importance for each state to locally carry out the requirements of the FCAA, as consideration of local industries, geography, housing patterns, etc. are needed to address pollution control at the local level.

Energy Policy and Conservation Act

The Energy Policy and Conservation Act of 1975 required that all vehicles sold in the United States meet certain fuel economy goals. Through this Act, Congress established the first fuel economy standards for on-road motor vehicles in the U.S. Pursuant to the Act, the National Highway Traffic and Safety Administration, which is part of the U.S. Department of Transportation (USDOT), is responsible for establishing additional vehicle standards and for revising existing standards.

Since 1990, the fuel economy standard for new passenger cars has been 27.5 mpg. Since 1996, the fuel economy standard for new light trucks (gross vehicle weight of 8,500 pounds or less) has been 20.7 mpg. Heavy-duty vehicles (i.e., vehicles and trucks over 8,500 pounds gross vehicle weight) are not currently subject to fuel economy standards. Compliance with federal fuel economy standards is determined on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the U.S. The Corporate Average Fuel Economy (CAFE) program, which is administered by the EPA, was created to determine vehicle manufacturers' compliance with the fuel economy standards. The EPA calculates a CAFE value for each manufacturer based on city and highway fuel economy test results and vehicle sales. Based on the information generated under the CAFE program, the USDOT is authorized to assess penalties for noncompliance.

Energy Policy Act of 1992 (EPAct)

The Energy Policy Act of 1992 (EPAct) was passed to reduce the country's dependence on foreign petroleum and improve air quality. EPAct includes several parts intended to build an inventory of alternative fuel vehicles (AFVs) in large, centrally fueled fleets in metropolitan areas. EPAct requires certain federal, state, and local government and private fleets to purchase a percentage of light duty AFVs capable of running on alternative fuels each year. In addition, financial incentives are included in EPAct. Federal tax deductions are allowed for businesses and individuals to cover the incremental cost of AFVs. States are also required by the act to consider a variety of incentive programs to help promote AFVs.

Energy Policy Act of 2005

The Energy Policy Act of 2005 was signed into law on August 8, 2005. Generally, the act provides for renewed and expanded tax credits for electricity generated by qualified energy sources, such as landfill gas; provides bond financing, tax incentives, grants, and loan guarantees for a clean renewable energy and rural community electrification; and establishes a federal purchase requirement for renewable energy.

Intermodal Surface Transportation Efficiency Act

The Intermodal Surface Transportation Efficiency Act (ISTEA) promoted the development of intermodal transportation systems to maximize mobility as well as address national and local interests in air quality and energy. ISTEA contained factors that metropolitan planning organizations (MPOs), such as the Metropolitan Transportation Commission (MTC), were to address in developing transportation plans and programs, including some energy-related factors. To meet the ISTEA requirements, MPOs adopted explicit policies defining the social, economic, energy, and environmental values that were to guide transportation decisions in that metropolitan area. The planning process was then to address these policies. Another

requirement was to consider the consistency of transportation planning with federal, state, and local energy goals. Through this requirement, energy consumption was expected to become a criterion, along with cost and other values that determine the best transportation solution.

Moving Ahead for Progress in the 21st Century

MAP-21, the Moving Ahead for Progress in the 21st Century Act (P.L. 112-141), was signed into law on July 6, 2012. MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.

Federal Climate Change Policy

According to the EPA, “the United States government has established a comprehensive policy to address climate change” that includes slowing the growth of emissions; strengthening science, technology, and institutions; and enhancing international cooperation. To implement this policy, “the Federal government is using voluntary and incentive-based programs to reduce emissions and has established programs to promote climate technology and science.” The federal government’s goal is to reduce the greenhouse gas (GHG) intensity (a measurement of GHG emissions per unit of economic activity) of the American economy by 18 percent over the 10-year period from 2002 to 2012. In addition, the EPA administers multiple programs that encourage voluntary GHG reductions, including “ENERGY STAR”, “Climate Leaders”, and Methane Voluntary Programs. However, as of this writing, there are no adopted federal plans, policies, regulations, or laws directly regulating GHG emissions.

Mandatory Greenhouse Gas Reporting Rule

On September 22, 2009, the EPA issued a final rule for mandatory reporting of GHGs from large GHG emissions sources in the United States. In general, this national reporting requirement will provide the EPA with accurate and timely GHG emissions data from facilities that emit 25,000 metric tons or more of CO₂ per year. This publicly available data will allow the reporters to track their own emissions, compare them to similar facilities, and aid in identifying cost effective opportunities to reduce emissions in the future. Reporting is at the facility level, except that certain suppliers of fossil fuels and industrial greenhouse gases along with vehicle and engine manufacturers will report at the corporate level. An estimated 85% of the total U.S. GHG emissions, from approximately 10,000 facilities, are covered by this final rule.

STATE

Assembly Bill 1493

In response to Assembly Bill (AB) 1493, the CARB approved amendments to the California Code of Regulations (CCR) adding GHG emission standards to California’s existing motor vehicle emission standards. Amendments to CCR Title 13 Sections 1900 (CCR 13 1900) and 1961 (CCR 13 1961), and adoption of Section 1961.1 (CCR 13 1961.1) require automobile manufacturers to meet fleet average GHG emission limits for all passenger cars, light-duty trucks within various weight criteria, and medium-duty passenger vehicle weight classes beginning with the 2009 model year. For passenger cars and light-duty trucks 3,750 pounds or less loaded vehicle weight (LVW), the 2016 GHG emission limits are approximately 37 percent lower than during the first year of the regulations in 2009. For medium-duty passenger vehicles and light-duty trucks 3,751 LVW to 8,500 pounds gross vehicle weight (GVW), GHG emissions are reduced approximately 24 percent between 2009 and 2016.

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The CARB requested a waiver of federal preemption of California's Greenhouse Gas Emissions Standards. The intent of the waiver is to allow California to enact emissions standards to reduce carbon dioxide and other greenhouse gas emissions from automobiles in accordance with the regulation amendments to the CCRs that fulfill the requirements of AB 1493. The EPA granted a waiver to California to implement its greenhouse gas emissions standards for cars.

Assembly Bill 1007

AB 1007 (Pavley, Chapter 371, Statutes of 2005) directed the CEC to prepare a plan to increase the use of alternative fuels in California. As a result, the CEC prepared the State Alternative Fuels Plan in consultation with the state, federal, and local agencies. The plan presents strategies and actions California must take to increase the use of alternative non-petroleum fuels in a manner that minimizes costs to California and maximizes the economic benefits of in-state production. The Plan assessed various alternative fuels and developed fuel portfolios to meet California's goals to reduce petroleum consumption, increase alternative fuels use, reduce greenhouse gas emissions, and increase in-state production of biofuels without causing a significant degradation of public health and environmental quality.

Bioenergy Action Plan – Executive Order #S-06-06

Executive Order #S-06-06 establishes targets for the use and production of biofuels and biopower and directs state agencies to work together to advance biomass programs in California while providing environmental protection and mitigation. The executive order establishes the following target to increase the production and use of bioenergy, including ethanol and biodiesel fuels made from renewable resources: produce a minimum of 20 percent of its biofuels within California by 2010, 40 percent by 2020, and 75 percent by 2050. The executive order also calls for the state to meet a target for use of biomass electricity.

California Executive Orders S-3-05, S-20-06, and B-30-15, Assembly Bill 32, and Senate Bill 32

On June 1, 2005, then Governor Arnold Schwarzenegger signed Executive Order S-3-05. The goal of this Executive Order is to reduce California's GHG emissions to: 1) 2000 levels by 2010, 2) 1990 levels by the 2020 and 3) 80% below the 1990 levels by the year 2050.

In 2006, this goal was further reinforced with the passage of Assembly Bill 32 (AB 32), the Global Warming Solutions Act of 2006. AB 32 sets the same overall GHG emissions reduction goals while further mandating that the CARB create a plan, which includes market mechanisms, and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." Executive Order S-20-06 further directs state agencies to begin implementing AB 32, including the recommendations made by the state's Climate Action Team.

In April 2015, Governor Jerry Brown signed Executive Order B-30-15, which requires that there be a reduction in GHG emissions to 40% below 1990 levels by 2030. This intermediate target was codified into law by Senate Bill 32 (SB 32), which was signed into law on September 8, 2016.

Climate Change Scoping Plan

On December 11, 2008, the CARB adopted its *Climate Change Scoping Plan* (Scoping Plan), which functions as a roadmap of the CARB's plans to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. The CARB updated the Scoping Plan in 2013 (*First Update to the Climate Change Scoping Plan*) (2013 Update) and again in 2017 (the *Final 2017 Scoping Plan Update*) (2017 Update). The 2013 Update built upon the initial Scoping Plan with new strategies and recommendations, and also set the groundwork to reach the long-term goals set forth by the state. The 2017 Update

expanded the scope of the plan further by focusing on the strategy for achieving the state's 2030 GHG target of 40 percent emissions reductions below 1990 levels (to achieve the target codified into law by SB 32), and substantially advances toward the state's 2050 climate goal to reduce GHG emissions by 80 percent below 1990 levels. The 2017 Update is helping the State of California to:

- Lower GHG emissions on a trajectory to avoid the worst impacts of climate change;
- Support a clean energy economy which provides more opportunities for all Californians;
- Provide a more equitable future with good jobs and less pollution for all communities; and
- Improve the health of all Californians by reducing air and water pollution and making it easier to bike and walk.

The California 2030 GHG reduction target of 40 percent emissions reductions below 1990 levels guides the 2017 Update. The 2017 Update includes a suite of specific actions to meet the State's 2030 GHG reduction target, including additional measures developed or required by legislation since the 2015 Update, such as extending the LCFS to an 18 percent reduction in carbon intensity beyond 2020, and the requirements of SB 350 to increase renewables to 50 percent and to double energy efficiency savings. The 2017 Update also included the Mobile Source Strategy targets for more zero emission vehicles and much cleaner trucks and transit, the Sustainable Freight Action Plan to improve freight efficiency and transition to zero emission freight handling technologies, and the requirements under SB 1383 to reduce anthropogenic black carbon by 50 percent and hydrofluorocarbon and methane emissions by 40 percent below 2013 levels by 2030. The adoption of AB 398 into State law on July 25, 2017, clarifies the role of the Cap-and-Trade Program through December 31, 2030.

Senate Bill 743

SB 743, passed into law in 2013, changes the way that public agencies evaluate the transportation impacts of projects under CEQA through balancing the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of GHGs. The 2017 Update to the Scoping Plan identified that slower VMT growth from more efficient land use development patterns would promote achievement of the state's climate goals.

As detailed in SB 743, the Governor's Office of Planning and Research (OPR) was tasked with developing potential metrics to measure transportation impacts and replace the use of vehicle delay and level of service (LOS). More detail about SB 743 is provided in the Chapter 2 (Circulation).

In December 2018, OPR released its final changes to the CEQA Guidelines, including the addition of Section 15064.3 that implements SB 743. In support of these changes, OPR published its Technical Advisory on Evaluating Transportation Impacts in CEQA, which recommends that the transportation impact of a project be based on whether it would generate a level of VMT per capita (or VMT per employee) that is 15 percent lower than existing development in the region. OPR's technical advisory explains that this criterion is consistent with Section 21099 of the California Public Resources Code, which states that the criteria for determining significance must "promote the reduction in greenhouse gas emissions". It is also consistent with the statewide per capita VMT reduction target developed by Caltrans in its Strategic Management Plan, which calls for a 15 percent reduction in per capita VMT, compared to 2010 levels, by 2020. Additionally, the California Air Pollution Control Officers Association (CAPCOA) determined that a 15 percent reduction in VMT is typically achievable for projects. CARB's First Update to the Climate Change Scoping Plan also called for local governments to set communitywide GHG reduction targets of 15 percent below then-current levels by 2020. Although not required, a lead agency may elect to be governed by the provisions of Section 15064.3 immediately. However, the provisions of Section 15064.3 do not apply statewide until July 1, 2020.

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Executive Order B-48-18: Zero-Emission Vehicles

In January 2018, EO B-48-18 was signed into law and requires all State entities to work with the private sector to have at least 5 million zero-emission vehicles (ZEVs) on the road by 2030, as well as install 200 hydrogen fueling stations and 250,000 electric vehicle charging stations (EVCSs) by 2025. It specifies that 10,000 of the EVCSs should be direct current fast chargers. This Executive Order also requires all State entities to continue to partner with local and regional governments to streamline the installation of ZEV infrastructure. The Governor's Office of Business and Economic Development is required to publish a Plug-in Charging Station Design Guidebook and update the 2015 Hydrogen Station Permitting Guidebook to aid in these efforts. All State entities are required to participate in updating the 2016 Zero-Emissions Vehicle Action Plan (Governor's Interagency Working Group on Zero-Emission Vehicles 2016) to help expand private investment in ZEV infrastructure with a focus on serving low-income and disadvantaged communities. Additionally, all State entities are to support and recommend policies and actions to expand ZEV infrastructure at residential uses through the Low Carbon Fuel Standard Program, and recommend how to ensure affordability and accessibility for all drivers.

California Strategy to Reduce Petroleum Dependence (AB 2076)

In response to the requirements of AB 2076, the CEC and the CARB developed a strategy to reduce petroleum dependence in California. The strategy, *Reducing California's Petroleum Dependence*, was adopted by the CEC and CARB in 2003. The strategy recommends that California reduce on-road gasoline and diesel fuel demand to 15 percent below 2003 demand levels by 2020 and maintain that level for the foreseeable future. At the time of this writing, the Governor and Legislature are working to establish national fuel economy standards that double the fuel efficiency of new cars, light trucks, and sport utility vehicles (SUVs) and increase the use of non-petroleum fuels to 20 percent of on-road fuel consumption by 2020 and 30 percent by 2030.

Assembly Bill 2188: Solar Permitting Efficiency Act

Assembly Bill (AB) 2188, enacted in California in 2015, required local governments to adopt a solar ordinance by September 30, 2015 that creates a streamlined permitting process that conforms to the best practices for expeditious and efficient permitting of small residential rooftop solar systems. The act is designed to lower the cost of solar installations in California and further expand the accessibility of solar to more California homeowners. The bulk of the time and cost savings associated with a streamlined permitting process comes from the use of a standardized eligibility checklist and a simplified plan. This bill also shortens the number of days for those seeking Homeowner's Association (HOA) approval for a written denial of a proposed solar installation.

Governor's Low Carbon Fuel Standard (Executive Order #S-01-07)

Executive Order #S-01-07 establishes a statewide goal to reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 through establishment of a Low Carbon Fuel Standard. The Low Carbon Fuel Standard is incorporated into the State Alternative Fuels Plan and is one of the proposed discrete early action GHG reduction measures identified by the CARB pursuant to AB 32.

Senate Bill 375

Senate Bill (SB) 375 (SB 375) was built on AB 32 (California's 2006 climate change law). SB 375's core provision is a requirement for regional transportation agencies to develop a Sustainable Communities Strategy (SCS) in order to reduce GHG emissions from passenger vehicles. The SCS is one component of the existing Regional Transportation Plan (RTP). The SCS outlines the region's plan for combining transportation resources, such as roads and mass transit, with a realistic land use pattern, in order to meet a state target for reducing GHG emissions. The strategy must take into account the region's

housing needs, transportation demands, and protection of resource and farmlands. The current RTP/SCS for the San Francisco Bay Area is Plan Bay Area 2040. Plan Bay Area 2040 is the San Francisco Bay Area's roadmap for forecasting transportation needs through the year 2040, preserving the character of diverse communities, and adapting to the challenges of future population growth.

Additionally, SB 375 modified the state's Housing Element Law to achieve consistency between the land use pattern outlined in the SCS and the Regional Housing Needs Assessment allocation. The legislation also substantially improved cities' and counties' accountability for carrying out their housing element plans. Finally, SB 375 amended the California Environmental Quality Act (Pub. Resources Code, § 21000 et seq.) to ease the environmental review of developments that help reduce the growth of GHG emissions.

Climate Action Program at Caltrans

The California Department of Transportation, Business, Transportation, and Housing Agency, prepared a Climate Action Program in response to new regulatory directives. The goal of the Climate Action Program is to promote clean and energy efficient transportation, and provide guidance for mainstreaming energy and climate change issues into business operations. The overall approach to lower fuel consumption and CO₂ from transportation is twofold: (1) reduce congestion and improve efficiency of transportation systems through mixed-use, higher-density, and transit-oriented development, operational improvements, and Intelligent Transportation Systems; and (2) institutionalize energy efficiency and GHG emission reduction measures and technology into planning, project development, operations, and maintenance of transportation facilities, fleets, buildings, and equipment.

The reasoning underlying the Climate Action Program is the conclusion that "the most effective approach to addressing GHG reduction, in the short-to-medium term, is strong technology policy and market mechanisms to encourage innovations. Rapid development and availability of alternative fuels and vehicles, increased efficiency in new cars and trucks (light and heavy duty), and super clean fuels are the most direct approach to reducing GHG emissions from motor vehicles (emission performance standards and fuel or carbon performance standards)."

Advanced Clean Cars Program

In January 2012, the CARB approved the Advanced Clean Cars program which combines the control of GHG emissions and criteria air pollutants, as well as requirements for greater numbers of zero-emission vehicles, into a single package of standards for vehicle model years 2017 through 2025. The new rules strengthen the GHG standard for 2017 models and beyond. This will be achieved through existing technologies, the use of stronger and lighter materials, and more efficient drivetrains and engines. The program's zero-emission vehicle regulation requires battery, fuel cell, and/or plug-in hybrid electric vehicles to account for up to 15 percent of California's new vehicle sales by 2025. The program also includes a clean fuels outlet regulation designed to support the commercialization of zero-emission hydrogen fuel cell vehicles by 2015 by requiring increased numbers of hydrogen fueling stations throughout the state. The program will have significant energy demand implications as battery, fuel cell, and/or plug-in hybrid electric vehicle sales increase overtime, creating new demand for electricity services both in residential and commercial buildings (e.g. charging stations) as well as demand for new EV and hydrogen fuel cell charging stations. The number of stations will grow as vehicle manufacturers sell more fuel cell vehicles. According to the CARB, by 2025, when the rules will be fully implemented, the statewide fleet of new cars and light trucks will emit 34 percent fewer global warming gases and 75 percent fewer smog-forming emissions than the statewide fleet in 2016.

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California Building Energy Efficiency Standards

Title 24, Part 6 of the California Code of Regulations, known as the Building Energy Efficiency Standards, was established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. On January 1, 2010, the California Building Standards Commission adopted CALGreen and became the first state in the United States to adopt a statewide green building standards code. CALGreen requires new buildings to reduce water consumption by 20 percent, divert 50 percent of construction waste from landfills, and install low pollutant-emitting materials. The California Building Energy Efficiency Standards are updated periodically. The most recent standards are effective as of January 1, 2017.

The next update to the standards (the 2019 California Energy Standards) are planned to take effect on January 1, 2020. Included as part of the 2019 California Energy Standards are rooftop solar power requirements. These requirements mandate that all new homes under three stories high install solar panels (starting January 1, 2020), and that solar systems must be sized to net out the annual kilowatt-hour energy usage of the dwelling. The updated Standards also incentivize "demand-responsive technologies," including battery storage and heat pump water heaters.

CEQA Guidelines

In late 2018, amendments to the CEQA Guidelines were finalized, including changes to CEQA Guidelines Section 15064.4, which addresses the analysis of greenhouse gas emissions. The amendments were approved by the Office of Administrative Law and filed with the Secretary of State. The amendments became effective on December 28, 2018.

The revision of CEQA Guidelines Section 15064.4 clarified several points, including the following:

- Lead agencies must analyze the greenhouse gas emissions of proposed projects.
- The focus of the lead agency's analysis should be on the project's effect on climate change, rather than simply focusing on the quantity of emissions and how that quantity of emissions compares to statewide or global emissions.
- The impacts analysis of greenhouse gas emissions is global in nature and thus should be considered in a broader context. A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions.
- Lead agencies should consider a timeframe for the analysis that is appropriate for the project.
- A lead agency's analysis must reasonably reflect evolving scientific knowledge and state regulatory schemes.
- Lead agencies may rely on plans prepared pursuant to Section 15183.5 (Plans for the Reduction of Greenhouse Gases) in evaluating a project's greenhouse gas emissions.
- In determining the significance of a project's impacts, the lead agency may consider a project's consistency with the State's long-term climate goals or strategies, provided that substantial evidence supports the agency's analysis of how those goals or strategies address the project's incremental contribution to climate change and its conclusion that the project's incremental contribution is consistent with those plans, goals, or strategies.
- The lead agency has discretion to select the model or methodology it considers most appropriate to enable decision makers to intelligently take into account the project's incremental contribution to climate change.

In addition, in order to assure that energy implications are considered in project decisions, CEQA requires that EIRs include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful and unnecessary consumption of energy. The goal of conserving energy implies the wise and efficient use of energy.

LOCAL

Bay Area Air Quality Management District 2017 Clean Air Plan

The Bay Area Air Quality Management District (BAAQMD) 2017 Clean Air Plan is a roadmap for regional efforts to reduce air pollution and protect public health and the global climate. The 2017 Plan identifies potential rules, programs, and strategies to reduce GHG emissions and other harmful air pollutants in the Bay Area. The 2017 Plan complements and supports other important regional and state planning efforts, including Plan Bay Area and the State of California's 2030 Scoping Plan.

This Plan lays out 85 distinct control measures to decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs and other pollutants. Numerous measures reduce multiple pollutants simultaneously, while others focus on a single type of pollutant - for example, "super-GHGs" like methane and black carbon.

San Francisco Bay Conservation and Development Commission

The San Francisco Bay Conservation and Development Commission (BCDC) was created in 1965 to address a shrinking San Francisco Bay due to haphazard filling and to increase shoreline public access. Since the San Francisco Bay is getting larger due to sea level rise, some flood protection strategies are expected to require larger amounts of fill than BCDC has ever previously permitted. In that vein, the BCDC has developed programs and tools to help prepare for and adapt to rising sea levels in the San Francisco Bay Area. It should be noted that while BCDC's jurisdiction does not extend to Oakley, their work is relevant to the entire San Francisco Bay Area.

The Policies for a Rising Bay project is part of the San Francisco Bay Conservation and Development Commission's climate change program, which involves building the region's capacity to plan for sea level rise and ensuring that the Commission's laws and policies support and encourage appropriate resilience and adaptation. Separately, the BCDC unanimously approved an amendment to the San Francisco Bay Plan to address climate change, which is included in the current version of the San Francisco Bay Plan. The BCDC also developed the Adapting to Rising Tides program, which provides guidance, tools, and information to address the specific challenges of climate change on the San Francisco Bay. The Adapting to Rising Tides program includes a Bay Shoreline Flood Explorer tool, which provides interactive mapping that illustrates sea level rise at the local level along the San Francisco Bay.

Oakley 2005 and 2010 Community-wide and Municipal Operations GHG Inventories

In 2011, the City of Oakley (in collaboration with ICLEI – Local Governments for Sustainability) developed baseline year 2005 and 2010 greenhouse gas inventories for the community and for government operations. These GHG inventories provide a "snapshot" of pre-existing GHG emissions within the community and the local government, and includes details to guide decision making. They also serve as a benchmark against which future GHG reductions can be measured.

Oakley Strategic Energy Plan

In the Fall of 2015, the City of Oakley Energy Leadership Team published their Strategic Energy Plan (SEP). The primary purpose of the plan was to help Oakley become a more energy-efficient economy and to move toward a more sustainable future. To meet these challenges, the City of Oakley agreed to participate as a "Pilot City" in the East Bay Energy Watch (EBEW) Strategic Energy Planning Program. EBEW is the Pacific Gas and Electric (PG&E) Local Government Partnership in Alameda and Contra Costa Counties, providing cities in both counties with energy efficiency program and technical assistance services, as well as incentives and rebates for implementing energy savings projects. The SEP outlines a comprehensive and actionable approach for the City to meet its "Energy Vision" and energy-use reduction goals while reflecting the City's unique culture, values, and constraints.

2. CLIMATE CHANGE LINKAGES AND EFFECTS

GREENHOUSE GASES AND CLIMATE CHANGE LINKAGES

Various gases in the Earth's atmosphere, classified as atmospheric GHGs, play a critical role in determining the Earth's surface temperature. Solar radiation enters Earth's atmosphere from space, and a portion of the radiation is absorbed by the Earth's surface. The Earth emits this radiation back toward space, but the properties of the radiation change from high-frequency solar radiation to lower-frequency infrared radiation.

Naturally occurring greenhouse gases include water vapor (H₂O), carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and ozone (O₃). Several classes of halogenated substances that contain fluorine, chlorine, or bromine are also greenhouse gases, but they are, for the most part, solely a product of industrial activities. Although the direct greenhouse gases CO₂, CH₄, and N₂O occur naturally in the atmosphere, human activities have changed their atmospheric concentrations. From the pre-industrial era (i.e., ending about 1750) to 2011, concentrations of these three greenhouse gases have increased globally by 40, 150, and 20 percent, respectively (IPCC, 2013).

Greenhouse gases, which are transparent to solar radiation, are effective in absorbing infrared radiation. As a result, this radiation that otherwise would have escaped back into space is now retained, resulting in a warming of the atmosphere. This phenomenon is known as the greenhouse effect. Among the prominent GHGs contributing to the greenhouse effect are carbon dioxide (CO₂), methane (CH₄), ozone (O₃), water vapor, nitrous oxide (N₂O), and chlorofluorocarbons (CFCs).

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. In California, the transportation sector is the largest emitter of GHGs, followed by the industrial sector (California Energy Commission, 2018).

As the name implies, global climate change is a global problem. GHGs are global pollutants, unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, respectively. California produced approximately 429 million gross metric tons of carbon dioxide equivalents (MMTCO₂e) in 2016 (California Energy Commission, 2018). By 2020, California would need to produce below 431 MMTCO₂e by 2020 (California Air Resources Board, 2017).

Carbon dioxide equivalents are a measurement used to account for the fact that different GHGs have different potential to retain infrared radiation in the atmosphere and contribute to the greenhouse effect. This potential, known as the global warming potential of a GHG, is also dependent on the lifetime, or persistence, of the gas molecule in the atmosphere. Expressing GHG emissions in carbon dioxide equivalents takes the contribution of all GHG emissions to the greenhouse effect and converts them to a single unit equivalent to the effect that would occur if only CO₂ were being emitted.

Consumption of fossil fuels in the transportation sector was the single largest source of California's GHG emissions in 2016, accounting for 41% of total GHG emissions in the state. This category was followed by the industrial sector (23%), the electricity generation sector (including both in-state and out-of-state sources) (16%), the agriculture sector (8%), the residential energy consumption sector (7%), and the commercial energy consumption sector (5%) (California Energy Commission, 2018).

EFFECTS OF GLOBAL CLIMATE CHANGE

The effects of increasing global temperature are far-reaching and extremely difficult to quantify. The scientific community continues to study the effects of global climate change. In general, increases in the ambient global temperature as a result of increased GHGs are anticipated to result in rising sea levels, which could threaten coastal areas through accelerated coastal erosion, threats to levees and inland water systems and disruption to coastal wetlands and habitat.

The impacts of climate change are already being felt in the San Francisco Bay Area and Northern California. Besides containing secular changes over several decades, the annual temperature record at San Francisco and surrounding San Francisco Bay locations (such as Oakley) also exhibit shorter period variability from time scales of a few years to a few decades. From the observed and from the model historical simulations, it is seen that the model simulations begin to warm more substantially in the 1970s; this is likely a response to effects of GHG increases which began to increase significantly during this time period (California Energy Commission, 2012).

Over the next century, increasing atmospheric GHG concentrations are expected to cause a variety of changes to global climate conditions, including sea level rise and storm surge in coastal areas, increased riverine flooding, and higher temperatures more frequently (leading to extreme heat events and wildfires), particularly in inland areas. Local impacts stemming from climate related conditions range from impacts to extreme temperatures, flooding, public health, wildfires and infrastructure.

For example, if the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. The snowpack portion of the supply could potentially decline by 50% to 75% by the end of the 21st century (National Resources Defense Council, 2014). This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population. Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would likely increasingly come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system.

According to the most recent California Climate Change Assessment (*California's Fourth Climate Change Assessment*) (2018), and the Contra Costa Health Services *Climate Change Vulnerability in Contra Costa County: A Focus on Heat* report (2015), the impacts of global warming in California are anticipated to include, but are not limited to, the following:

- Ocean Warming
- Extreme Heat
- Precipitation
- Wildfires
- Flooding & Sea Level Rise
- Water Resources
- Public Health
- Biological Resources
- Agriculture
- Energy Consumption
- Infrastructure

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Because local governments largely determine the shape of development through land-use plans, regulations, and implementing decisions, local governments play an important role in developing climate change strategies including resiliency planning and adaptation. Inasmuch as local governments play an important role in adaptation strategies through local land use plans and policies, many climate adaptation strategies will need to be coordinated as part of a larger regional, or statewide strategy requiring cooperation by many local governments, and decision making and regulatory bodies.

This section addresses future conditions anticipated to result from climate change as well as resiliency planning and adaptation strategies at the statewide, regional, and local levels, where applicable. Information in this section is primarily derived from the Adapting to Rising Tides: Contra Costa County Assessment and Adaptation Project, the Bay Area Sea Level Rise Analysis and Mapping Project, and the California Energy Commission's Cal-Adapt tool.

OCEAN WARMING

California has recently experienced unprecedented events along its coasts including a historic marine heat wave, record harmful algal blooms, fisheries closures, and a significant loss of northern kelp forests. These events increase concern that coastal and marine ecosystems are being transformed, degraded, or lost due to climate change impacts, particularly sea-level rise, ocean acidification, and warming. From 1900 to 2016, California's coastal oceans warmed by 1.26 °F.

"The Blob," a very warm patch of ocean water off the coast of California from 2013-2016, demonstrated that anomalously warm ocean temperatures can produce unprecedented events, including the mass abandonment of sea lion pups and California's record-setting drought. Rising bay water and groundwater levels will also increase salinity intrusion and subsurface flooding. If this groundwater intrudes into sewer systems, treatment processes will become more expensive and wastewater recycling capabilities will be reduced. Additionally, climate change will require improved stormwater management in the Bay Area as extreme storm events increase in size and frequency (State of California, 2018).

EXTREME HEAT

Temperature is a climate variable, and is directly affected by changes in global atmospheric and oceanic temperatures. While trends in average annual temperature are an important indicator of climate change, extreme temperature events have greater impacts on society due to their episodic nature. Therefore, vulnerability and risk assessment tends to specifically focus on extreme heat events and not on average temperature changes.

The United Nations' Intergovernmental Panel on Climate Change (IPCC) defines extreme heat events as a period of abnormally hot weather. While extreme heat events can have various durations, Cal-Adapt defines an extreme heat event as a period of five or more consecutive extreme heat days. Cal-Adapt defines an extreme heat day in a given region as a day in April through October where the maximum temperature exceeds the 98th historical percentile of maximum temperatures for that region based on daily temperature data from 1961 to 1990. The 98th historical percentile of maximum temperatures varies by locality and inland areas tend to be at a greater risk of extreme heat events when compared to areas near the coast.

There was a major heat wave in California from mid- to late July 2006, with 10 days of record-breaking temperatures. Across the state, at least 140 extreme heat-related deaths were reported, and researchers estimate that the heat wave resulted in over 16,166 more emergency department visits than average and 1,182 more hospitalizations than average (Contra Costa Health Services, 2015).

Increasing numbers of extreme heat days are projected in the coming decades. The California's Changing Climate 2018 report points out that increasing high heat days from climate change have a number of impacts on communities, including direct

heat-related mortalities and worsening of chronic health conditions. The Cal-Adapt tool identifies that average annual temperature in Contra Costa County would increase from approximately 71.4 °F during the period for 1961 to 1990, to 76.5 °F for the period from 2070 to 2099 (California Energy Commission, 2019). The Cal-Adapt tool also identifies that, for Oakley, while there were an average of four days per year of extreme heat days during the historical period from years 1961 to 1990, it is projected that there will be an average of 21 days of extreme heat days per year during the model projections for the period from years 2070 to 2099 (California Energy Commission, 2019).

PRECIPITATION

Precipitation change is a climate variable that is directly affected by changes in global atmospheric and oceanic temperatures. Projected changes in precipitation include annual trend changes as well as extreme precipitation events. An extreme weather event is an occurrence that is significantly different from typical weather at a specific location and time of year. Extreme precipitation events can lead to flooding, mudslides and other damaging events. In a changing climate the frequency and intensity of such events will likely change across California.

The Cal-Adapt tool identifies the estimated intensity and frequency of extreme precipitation events in Oakley. During the historical period from October 1961 through September 1990, the average level of precipitation during an extreme precipitation event (i.e. those precipitation events that are on average exceeded once every 20 years) was approximately 3.1 inches, whereas during the forecasted period from October 2070 through September 2099, precipitation levels during extreme precipitation events are expected to range from approximately 2.8 inches to 4.1 inches (dependent on the model selected).¹ Separately, the Cal-Adapt tool provides that the number of extreme precipitation events in a given year (defined as those events with 2-day rainfall totals above an extreme threshold of 1 inch) in Oakley would increase from approximately 7 per year during the historical period from 1961 to 1990, to 11 per year during the forecasted period from 2070 through 2099 (California Energy Commission, 2019).

WILDFIRES

Wildfire occurs as a result of conditions affected by complex interactions between primary variables (including precipitation, and temperature) and other factors (including changes in cover type). Wildfires are unplanned, natural occurring fires and may be caused by lightning, accidental human ignitions, arson, or escaped prescribed fires. Weather is one of the most significant factors in determining the severity of wildfires; natural fire patterns are driven by conditions such as drought, temperature, precipitation, and wind, and also by changes to vegetation structure and fuel (i.e., biomass) availability. Wildfires pose a great threat to life and property, particularly when they move from forest or rangeland into developed areas.

Climate change will make forests more susceptible to extreme wildfires. By 2100, if greenhouse gas emissions continue to rise, one study found that the frequency of extreme wildfires burning over approximately 25,000 acres would increase by nearly 50 percent, and that average area burned statewide would increase by 77 percent by the end of the century. In the areas that have the highest fire risk, wildfire insurance is estimated to see costs rise by 18 percent by 2055 and the fraction of property insured would decrease.

In recent years, the area burned by wildfires has increased in parallel with increasing air temperatures. Wildfires have also been occurring at higher elevations in the Sierra Nevada mountains, a trend which is expected to continue under future

¹ Four models were selected by California's Climate Action Team Research Working Group as priority models for research contributing to California's Fourth Climate Change Assessment: a warm/dry simulation; a cooler/wetter simulation; an average simulation; and the model simulation that is most unlike the first three for the best coverage of different possibilities.

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climate change. Climate change will likely modify the vegetation in California, affecting the characteristics of fires on the land. Land use and development patterns also play an important role in future fire activity. Because of these complexities, projecting future wildfires is complicated, and results depend on the time period for the projection and what interacting factors are included in the analysis. Because wildfires are affected by multiple and sometimes complex drivers, projections of wildfire in future decades in California range from modest changes from historical conditions to relatively large increases in wildfire regimes.

Moreover, continued global warming will alter natural ecosystems and biological diversity within the state. For example, alpine and sub-alpine ecosystems are expected to decline by as much as 60% to 80% by the end of the century as a result of increasing temperatures. The productivity of the state's forests is also expected to decrease as a result of global warming.

The Cal-Adapt tool identifies that, based on increased precipitation forecasted for the City of Oakley due to climate change, dependent on the climate change scenario selected, the annual mean area burned is forecasted to be reduced from approximately a range of 42.6 to 43.7 hectares per year during the 1961-1990 period to between 23.4 and 26.1 hectares per year for the 2070-2099 period, respectively (California Energy Commission, 2019).

FLOODING & SEA LEVEL RISE

Riverine and local flooding is influenced by precipitation and local conditions, such as ground cover and soil conditions. Riverine flooding occurs when heavy rainfall causes rivers or creeks to overtop their banks and inundate surrounding areas during extreme weather events. Urban flooding commonly occurs when local stormwater infrastructure is overwhelmed during extreme precipitation events.

Global models indicate that California will see substantial sea level rise during this century, with the exact magnitude depending on such factors as, global emissions, rate at which oceans absorb heat, melting rates and movement of land-based ice sheets, and local coastal land subsidence or uplift. Sea level rise is virtually certain to increase beyond the 6 inches that much of California experienced in the past century, but there are important questions involving how fast and how extreme the rates of sea-level rise will be. The National Oceanic and Atmospheric Administration models predict that sea level rise will increase by 0.3 to 2.5 meters (12 to 98 inches) by 2100, depending on the future GHG emissions levels (National Oceanic and Atmospheric Administration, 2017). Resultant effects could include increased coastal flooding, saltwater intrusion, and disruption of wetlands. As the existing climate throughout California changes over time, mass migration of species, or failure of species to migrate in time to adapt to the perturbations in climate, could also result.

Statewide damages from rising sea levels could reach nearly \$17.9 billion from inundation of residential and commercial buildings under 50 centimeters (~20 inches) of sea-level rise, which is close to the 95th percentile of potential sea-level rise by the middle of this century. A 100-year coastal flood, on top of this level of sea-level rise, would almost double the costs. Rising sea levels, more intense coastal storms, and warmer water temperatures will increasingly threaten the state's coastal regions. Rising sea levels would inundate coastal areas with saltwater, accelerate coastal erosion, threaten vital levees and inland water systems, and disrupt wetlands and natural habitats.

Building resilience to sea level rise in California requires approaches tailored to communities' needs, climate impacts, and many other factors. Options to protect communities and ecosystems include combinations of armoring, natural infrastructure, and hybrid approaches. Decision-makers need tools to evaluate the economic and environmental costs and benefits of alternative strategies with more complete information. The *California's Fourth Climate Change Assessment* (Fourth

Assessment) contributed to this need by supporting the expansion of CoSMoS, which is a tool that can simulate sea-level rise in combination with storm events and other coastal dynamics.

Coastal protection strategies can include the restoration of tidal marshes, judiciously-placed coastal armoring, and beach renourishment for highly accessed urban locations (e.g., adding large volumes of sand, an expensive solution lasting only 1-2 years). However, by 2050, with increasing sea-level rise and coastal storms, localities may need to begin considering shoreline retreat strategies.

A large-scale tidal restoration project currently underway within Oakley is the Dutch Slough Tidal Restoration Project, implemented by Department of Water Resources (DWR). The Dutch Slough Project is located on the west Delta, within Oakley, and contains three parcels located on the western edge of the Delta. The project is expected to transform 1,187 acres of land into tidal marsh to provide habitat for salmon and other native fish and wildlife. Additionally, 55 acres of the south-central portion of Dutch Slough will be developed by the City of Oakley into a community park. The Dutch Slough project will be the Delta's largest restored fresh water tidal marsh. Construction on two of the parcels started in May 2018 and is expected to be completed in 2019, followed by revegetation planting. Restoration of the third parcel, Burroughs, would begin in 2020.

The restoration of marine plants and seaweeds in coastal environments is a tactic that could increase dissolved oxygen levels, at least for local areas. Ocean and coastal vegetation including marshes also sequester carbon, and quantifying the locations and contributions that marine plants can make to reducing carbon dioxide in local waters is needed. Other actions include reducing nutrient runoff from sewage disposal and excess agricultural fertilizer.

The Cal-Adapt tool identifies forecasted inundation of the San Francisco Bay Area, Sacramento – San Joaquin Delta (Delta), and the California Coast. The Cal-Adapt tool provides the ability to see the areas within Oakley that would be affected by flooding (due to a 100-year storm event), assuming current levels of infrastructure, under the following sea level rise scenarios: 0.5 meters, 1.0 meters, and 1.41 meters of sea level rise. Figure 1.1 illustrates the effects of each the 100-year storm event under each of these three sea level rise scenarios. As shown in Figure 1.1, under the 0.5-meter sea level rise scenario, parts of the northern and eastern portions of Oakley (i.e. in primarily agricultural and residential areas) would be flooded during a 100-year flood event. Under the 1.0-meter and 1.41-meter sea level rise scenarios, flooding would occur over a larger portion of this area. There are two marinas located within Oakley – Driftwood Marina, located in the northwest corner of Oakley, and Big Break Marina, located in the north-central portion of Oakley. As shown in Figure 1.1, each of these marinas would face a significant flooding, even during the 100-year flood event under the 0.5-meter sea level rise scenario (i.e. under the 0.5-meter sea level rise scenario, portions of the marinas could flood up to approximately 3 meters). Moreover, as shown in Figure 1.1, the tidal marshes and low-lying reclaimed land located within and near Oakley would be affected by increased flooding and sea level rise that is forecasted to occur due to climate change (San Francisco Estuary Institute & Aquatic Science Center, 2018). For example, various trails located along the shoreline, such as the Marsh Creek Regional Trail, would be subject to flooding during the 100-year flood under varying sea level rise scenarios. Areas within Oakley located further inland would not be affected by the 100-year flood event under these varying sea level rise scenarios, including all portions of Oakley south of Main Street and the BNSF railroad line.

Additionally, a large low-lying area (the far northeastern portion of Oakley) has been designated as part of the East Cypress Corridor Specific Plan (ECSP). The ECSP outlines the development of a comprehensive levee system for the area for flood control purposes. The levee system is planned to extend completely around the boundaries of ECSP's proposed new development, with interim levees added as full buildout of the ECSP occurs. Although most of the ECSP has not yet been built

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out, the Summerlake residential community (located in the east portion of the ECSP) has already been developed, and is completely surrounded by a combination of permanent and interim earthen levees. Due to these levees, the Summerlake community is currently protected from flooding, including during the 100-year flood event under the 1.41-meter sea level rise scenario, as shown in Figure 1.1.² Relatedly, although the Cal-Adapt Tool identifies that the currently undeveloped areas of the ECSP would face significant flooding under the various sea level rise scenarios, the risk of flooding within these areas would be minimized for new development in this area due to the implementation of additional flood control measures as further development occurs. Therefore, the level of flooding in the ECSP area would be greatly reduced, compared with the level of flooding provided in Figure 1.1, as the ECSP area is further developed.

Separately, the *Bay Area Sea Level Rise Analysis and Mapping Project* mapped sea level rise scenarios for the area along the northern boundary of the mainland portion of the City limits, using the BCDC's *Adapting to Rising Tides* tool. Figures 1.2 and 1.3 illustrate the level and location of sea level rise inundation over four sea level rise scenarios, ranging from 12 inches to 83 inches of sea level rise, under two separate datasets (i.e. Figure 1-2 shows sea level rise scenarios under a 100-year flood event, while Figure 1.3 shows sea level rise with no flood event but under average high tide. The scenarios provided by the BCDC tool provide a range of sea level rise nearly consistent with the predictions for sea level rise by the National Oceanic and Atmospheric Administration, which predicts that that sea level rise will increase by 0.3 to 2.5 meters (12 to 98 inches) by 2100, depending on the future GHG emissions levels.³ Similar to what is provided in Figure 1.1 from the Cal-Adapt tool, the BCDC tool predicts that large portions of the northern and eastern portions of Oakley would be inundated to varying degrees under these scenarios, with the most extreme flooding occurring under the most extreme sea level rise and storm surge scenarios. As shown in Figure 1.2, under the 100-year storm event, although the Summerlake residential community avoids inundation under the 12-inch, 24-inch, and 36-inch sea level rise scenarios, inundation of this community would occur under the most extreme (i.e. 83-inch) sea level rise scenario with the current infrastructure. The remaining portions of the ECSP area under current infrastructure would not flood under the 12-inch sea rise scenario, but would begin to flood under the 24-inch sea level rise scenario. However, the remainder of the ECSP area is expected to be well protected from flooding as buildout occurs in the ECSP area, due to the implementation of new levees and related flood protection measures. Flooding is anticipated at the two marinas in Oakley even under the 12-inch sea level rise scenario. Additionally, although the Ironhouse Sanitary District (ISD) wastewater treatment facility located in the northern portion of the City of Oakley would not be subject to flooding under the 12-inch, 24-inch, or 36-inch sea level rise scenarios, it would be subject to flooding under the most extreme (i.e. 83-inch) sea level rise scenario (as provided by Figure 1.2), if no further is taken to prevent flooding at this facility. Separately, Figure 1-3 shows that under average high tide, flooding under the 12-inch and 24-inch sea level rise scenarios would only occur along small portions of the northern portion of Oakley. However, Figure 1-3 identifies that under average high tide, flooding under the 83-inch scenario would be similar to but slightly reduced compared to the 83-inch scenario under the 100-year year flood event (as shown in Figure 1-2) (e.g. the ISD wastewater treatment facility is not projected to be flooded under average high tide, in comparison to the flooding at this site BCDC projects under the 100-year flood event).

WATER RESOURCES

A vast network of man-made reservoirs and aqueducts capture and transport water throughout the state from northern California rivers and the Colorado River. The current distribution system relies on Sierra Nevada snowpack to supply water

² The Summerlake community encompasses the area immediately surrounding Summer Lake Drive, in the far northeastern portion of Oakley.

³ Data for sea level rise above 84 inches is not currently available from the BCDC for the City of Oakley.

during the dry spring and summer months. Rising temperatures, potentially compounded by decreases in precipitation, could severely reduce spring snowpack, increasing the risk of summer water shortages.

The state's water supplies are also at risk from rising sea levels. An influx of saltwater would degrade California's estuaries, wetlands, and groundwater aquifers. Saltwater intrusion caused by rising sea levels is a major threat to the quality and reliability of water within the southern edge of the Delta, a major state fresh water supply.

Current management practices for water supply and flood management in California may need to be revised for a changing climate. This is in part because such practices were designed for historical climatic conditions, which are changing and will continue to change during the rest of this century and beyond. As one example, the reduction in the Sierra Nevada snowpack, which provides natural water storage, will have implications throughout California's water management system. Even under the wetter climate projections, the loss of snowpack would pose challenges to water managers, hamper hydropower generation, and nearly eliminate all skiing and other snow-related recreational activities.

The San Francisco Bay Area's water agencies rely on a diverse portfolio of local and imported sources. The reliability of these sources will vary dramatically in both the short and long term as the climate changes. Climate impacts – such as earlier melting of snowpack, increasing seawater intrusion into groundwater, increased rates of evapotranspiration, and levee failures or subsidence that contaminate Delta supplies – will affect both the quantity of water available and the quality of supplies (State of California, 2019).

Reliability concerns can be mitigated with more diverse water supply portfolios, additional water storage infrastructure above and belowground, and innovative groundwater management. Strategies for increasing supply reliability are being pursued by individual agencies and as part of a regional effort called the Bay Area Regional Reliability (BARR) partnership made up of several large water suppliers serving six counties. Alternatives under consideration by BARR and other Bay Area agencies include: expanding storage and conveyance infrastructure; increasing non-potable water recycling; implementing potable reuse and/or seawater desalination; promoting groundwater augmentation, banking, and conjunctive use; constructing interties between systems to enable additional water transfers; and harvesting stormwater. Reducing water demand can also increase reliability (State of California, 2019).

The Diablo Water District (DWD) supplies potable water to the City of Oakley. DWD is located in the northeastern corner of Contra Costa County, east of the City of Antioch and north of the City of Brentwood. DWD's service area includes the City of Oakley, the Town of Knightsen, and some of Bethel Island. According to the DWD's UWMP, projected water deliveries is expected to increase from approximately 2,263 million gallons (MG) in 2020 to 5,349 MG in 2040 (CDM Smith, 2016). This represents an increase of nearly 100% over the twenty-year period. Water demand in the City, in particular for industrial purposes, will increase as a result of more frequent, longer, and more extreme heat waves; increased air temperatures; increased atmospheric carbon dioxide levels; changes in precipitation, winds, humidity, atmospheric aerosol and ozone levels; and population growth. DWD does not provide water for agricultural uses, does not sell water to other agencies, and does not participate in exchanges or non-recurring agreements, saline barriers, groundwater banking, or groundwater recharge and conjunctive use programs.

Open space and Delta recreation areas are not irrigated with DWD water. In addition, DWD's policy is to require that large new turf landscape areas use private groundwater wells or non-potable water for irrigation. Landscape irrigation is assumed to increase over existing levels to accommodate small or isolated areas where it is not feasible to provide another source of

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irrigation water. The DWD UWMP assumes that parks and landscape areas in new development areas, such as the East Cypress Corridor, will irrigate large landscape areas with groundwater, not with DWD water.

Generally speaking, any water supplies that are dependent on natural hydrology are vulnerable to climate change, especially if the water source originates from mountain snow pack. In addition to water supply impacts, changes in local temperature and precipitation are expected to alter water demand patterns. The generalized impacts of climate change on water supply would likely include increased water demands for irrigation and cooling purposes, and decreased total local surface runoff. Other impacts might include increased fire events that could impact water quality and sedimentation, as well as decreased groundwater recharge due to lower soil moisture (CDM Smith, 2016).

Most studies on climate change impacts to California's water supply have been conducted for the Northern California region, which supplies both the CVP and the SWP. The 2008 Reclamation Central Valley Operations Criteria and Plan evaluated the sensitivity of CVP and SWP deliveries to potential climate change and related sea level rise. Reclamation presented results from the CalSim II model, which simulates key water resources infrastructure in the Central Valley and Bay Delta region, for four different climate change scenarios and one sea level rise assumption. The climate change forecasts range from less warming to more warming, and drier to wetter. The baseline average delivery for these municipal and industrial water contractors is 201,000 AF per year, and with a one-foot sea level rise this baseline delivery is projected to decrease to 196,000 AF due to salinity restrictions and reverse flows in the Delta. The drier with more warming scenario further decreases deliveries to 181,000 AF, and the wetter, less warming scenario has the largest average deliveries at 207,000 AF per year (CDM Smith, 2016).

Water agencies can reduce the impacts of climate change on water resources through adaptation and/or mitigation. For water resources planning, a climate change adaptation strategy involves taking steps to effectively manage the impacts of climate change by making water demands more efficient and relying on supply sources that are less vulnerable to climate change. A mitigation strategy involves proactive measures that reduce greenhouse gas emissions (CDM Smith, 2016).

PUBLIC HEALTH

Heat waves, the natural disaster responsible for the most deaths in California over the last 30 years, are an example of the current and future risk climate change poses to people. The 2006 heat wave killed over 600 people, resulted in 16,000 emergency department visits, and led to nearly \$5.4 billion in damages. The human cost of these events is already immense, but research suggests that mortality risk for those 65 or older could increase ten-fold by the 2090s because of climate change. Studies show that while air conditioning can reduce mortality and illness from heat, increased electrical demand for cooling due to hotter conditions could also drive up emissions. However, the state is rapidly moving to cleaner electricity generation. Greenhouse gas emissions from electricity generation in 2016 were about 37% lower than emissions in 1990 (State of California, 2018).

Nineteen heat-related events occurred in California from 1999 to 2009 that had significant impacts on human health, resulting in about 11,000 excess hospitalizations. However, the National Weather Service issued Heat Advisories for only six of the events. Heat-Health Events (HHEs), which better predict risk to populations vulnerable to heat, will worsen drastically throughout the state.

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. Climate change poses direct and indirect risks to public health, as people will experience earlier death and

worsening illnesses. Air quality could be further compromised by increases in wildfires, which emit fine particulate matter that can travel long distances depending on wind conditions.

In addition, under the higher warming scenario, there would be a substantial increase in the number of high heat days per year by 2100. For example, in Sacramento, there could be up to 100 more days per year with temperatures above 95°F in Sacramento by 2100. This is a large increase over historical patterns and approximately twice the increase projected if temperatures remain within or below the lower warming range. Rising temperatures will increase the risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

In addition to the health impacts related to air and water quality, warmer temperatures and drought conditions can contribute to the spread of diseases by aiding development and spread of the vectors that transmit them. A vector-borne disease (VBD) is one caused by a virus, bacteria, or protozoan that spends part of its life cycle in a host species (e.g. mosquitoes, ticks, fleas, rodents), which subsequently spreads the disease to other animals and people.

Regional research assessments have previously concluded that climate change and variability are highly likely to influence current VBD spread, including both short-term outbreaks and shifts in long-term disease trends. For example, as temperatures rise, mosquito reproductive cycles are shortened, allowing more breeding cycles each season, and viral transmission rates to rise sharply. Mosquitoes are an increasing vector of concern, particularly those species that have been introduced from other countries because changes in temperature and precipitation conditions can allow exotic species to become established in places where they could not previously survive year-round. Contra Costa Health Services identifies several infectious diseases that may increase due to increase temperatures, including West Nile Virus, Coccidioides, and Vibrio (Contra Costa Health Services, 2015).

Climate change will affect California's diverse people and communities differently, depending on their location and existing vulnerabilities. While research shows that all Californians will likely endure more illness and be at greater risk of early death because of climate change, vulnerable populations that already experience the greatest adverse health impacts will be disproportionately affected.

BIOLOGICAL RESOURCES

The Sacramento-San Joaquin Delta is listed as one of the top 10 habitats to save for endangered species in a warming world. The Delta provides habitat for hundreds of species of fish, birds, and other wildlife and enables the migration of Pacific salmon from spawning grounds in the upper reaches of cold-water rivers to the saline oceans and back again. Regional climate-sensitive populations include salmonid species, migratory bird species, and wetland species.

Projected climate changes are likely to result in a number of interrelated and cascading ecosystem impacts. At present, most projected impacts are primarily associated with increases in air and water temperatures and include increased stress on fisheries that are sensitive to a warming aquatic habitat. Warmer temperatures can compromise the health and resilience of aquatic and terrestrial species and make it more challenging for them to compete with nonnative species for survival. Competition for habitat and food will intensify with climate change. Further, changes in seasonal runoff patterns may place additional stress on native species by affecting, for example, adult and juvenile migrations.

Rising temperatures are likely to increase challenges for providing suitable habitat conditions for salmonid populations. Of specific concern within the Region are Chinook salmon and steelhead, which prefer temperatures of less than 64.4 to 68 degrees Fahrenheit (°F) in mountain streams, although these anadromous fish may tolerate higher temperatures for short

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periods. Increased water temperatures could reduce the habitat suitability of California rivers for these species. Additionally, warmer air and water temperatures could potentially improve habitat for invasive species that outcompete natives. Invasive species, including various nonnative fish and plant species, are an ongoing issue within the Region. Some invasive species, such as quagga mussels, may additionally impact maintenance of hydraulic structures. Further, climate change could decrease the effectiveness of measures currently used to control invasive species.

Warmer water temperatures also could spur the growth of algae, which could result in eutrophic conditions in lakes and reservoirs, declines in water quality and changes in species composition. Other warming-related impacts include northward shifts in the geographic range of various species, impacts on the arrival and departure of migratory species, amphibian population declines, and effects on pests and pathogens in ecosystems. Impacts on terrestrial ecosystems have also been observed, including changes in the timing and length of growing seasons, timing of species life cycles, primary production, and species distributions and diversity.

AGRICULTURE

Increased GHG emissions are expected to cause widespread changes to the agriculture industry reducing the quantity and quality of agricultural products statewide. Although higher carbon dioxide levels can stimulate plant production and increase plant water-use efficiency, California's farmers will face greater water demand for crops and a less reliable water supply as temperatures rise.

Plant growth tends to be slow at low temperatures, increasing with rising temperatures up to a threshold. However, faster growth can result in less-than-optimal development for many crops, so rising temperatures are likely to worsen the quantity and quality of yield for a number of California's agricultural products. Products likely to be most affected include wine grapes, fruits and nuts, and milk.

Crop growth and development will be affected, as will the intensity and frequency of pest and disease outbreaks. Rising temperatures will likely aggravate ozone pollution, which makes plants more susceptible to disease and pests and interferes with plant growth.

In addition, continued climate change will likely shift the ranges of existing invasive plants and weeds and alter competition patterns with native plants. Range expansion is expected in many species while range contractions are less likely in rapidly evolving species with significant populations already established. Should range contractions occur, it is likely that new or different weed species will fill the emerging gaps. Continued global warming is also likely to alter the abundance and types of many pests, lengthen pests' breeding season, and increase pathogen growth rates.

ENERGY CONSUMPTION

Energy in California is consumed from a wide variety of sources. Fossil fuels (including gasoline and diesel fuel, natural gas, and energy used to generate electricity) are most widely used form of energy in the State. However, renewable source of energy (such as solar and wind) are growing in proportion to California's overall energy mix. A large driver of renewable sources of energy in California is the State's current Renewable Portfolio Standard (RPS), which requires the State to derive at least 33 percent of electricity generated from renewable resources by 2020 and 50 percent by 2030.

Overall, in 2015, California's per capita energy usage was ranked 49th in the nation (U.S. EIA, 2019), lower than any other state except Hawaii. Additionally, California's per capita rate of energy usage has remained relatively constant since the

1970's. Many State regulations since the 1970's, including new building energy efficiency standards, vehicle fleet efficiency measures, as well as growing public awareness, have helped to keep per capita energy usage in the State in check.

The consumption of nonrenewable energy (primarily gasoline and diesel fuel) associated with the operation of passenger, public transit, and commercial vehicles results in GHG emissions that ultimately result in global climate change. Other fuels such as natural gas, ethanol, and electricity (unless derived from solar, wind, nuclear, or other energy sources that do not produce carbon emissions) also result in GHG emissions and contribute to global climate change.

Electricity Consumption

California relies on a regional power system composed of a diverse mix of natural gas, renewable, hydroelectric, and nuclear generation resources. Approximately 71 percent of the electrical power needed to meet California's demand is produced in the state. Approximately 29 percent of its electricity demand is imported from the Pacific Northwest and the Southwest (California Energy Commission, 2019). In 2010, California's in-state generated electricity was derived from natural gas (53.4 percent), large hydroelectric resources (14.6 percent), coal (1.7 percent), nuclear sources (15.7 percent), and renewable resources that include geothermal, biomass, small hydroelectric resources, wind, and solar (14.6 percent) (California Energy Commission, 2019). The percentage of renewable resources as a proportion of California's overall energy portfolio is increasing over time, as directed the State's Renewable Portfolio Standard (RPS).

According to the California Energy Commission (CEC), total statewide electricity consumption increased from 166,979 gigawatt-hours (GWh) in 1980 to 274,985 GWh in 2010. Contra Costa County consumed approximately 9,778 GWh of electricity in 2017, the year for which the latest data is available (California Energy Commission, 2016).

Higher temperatures will increase annual electricity demand for homes, driven mainly by increased use of air conditioning. High demand is projected in inland regions, and more moderate increases are projected in cooler coastal areas. However, in California, the increased annual residential energy demand for electricity is expected to be offset by reduced use of natural gas for space heating. Increases in peak hourly demand during the hot months of the year could be more pronounced than changes in annual demand. This is a critical finding for California's electric system, because generating capacity must match peak electricity demand.

Oil

The primary energy source for the United States is oil, which is refined to produce fuels like gasoline, diesel, and jet fuel. Oil is a finite, nonrenewable energy source. World consumption of petroleum products has grown steadily in the last several decades. As of 2009, world consumption of oil had reached 96 million barrels per day. The United States, with approximately five percent of the world's population, accounts for approximately 19 percent of world oil consumption, or approximately 18.6 million barrels per day (Central Intelligence Agency, 2009). The transportation sector relies heavily on oil. In California, petroleum-based fuels currently provide approximately 96 percent of the state's transportation energy needs (California Energy Commission, 2018).

Natural Gas/Propane

Natural gas supplies are derived from underground sources and brought to the surface at gas wells. Once it is extracted, gas is purified and the odorant that allows gas leaks to be detected is added to the normally odorless gas. Natural gas suppliers, such as PG&E, then send the gas into transmission pipelines, which are usually buried underground. Compressors propel the gas through the pipeline system, which delivers it to homes and businesses.

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The state produces approximately 12 percent of its natural gas, while obtaining 22 percent from Canada and 65 percent from the Rockies and the Southwest (California Energy Commission, 2019). Total natural gas demand in California in 2012 was 2,313, billion cubic feet of natural gas (California Energy Commission, 2019). In 2017, Contra Costa County consumed approximately 1,118 million therms of natural gas (California Energy Commission, 2016).

INFRASTRUCTURE

California's Fourth Climate Change Assessment provides in-depth analyses that support proactive steps to protect California's energy, transportation, and water infrastructure systems and the communities they serve. These systems face increasing risks from climate change as temperatures warm, sea levels rise, and other climate impacts worsen. These systems are interconnected, and disruption in one part can impact other connected parts with both direct and indirect economic effects.

Energy resources can be considered from both supply and demand perspectives. Fourth Assessment studies found infrastructure that supplies energy along the coast – particularly docks, terminals, and refineries – will increasingly be exposed to coastal flooding. Meanwhile, electrical power lines, rails, and roads are primarily at risk from increasing wildfire. Costs and impacts of wildfire to electricity transmission and distribution systems are expected to grow as climate change impacts increase.

California's roads, railroads, pipelines, waterways, ports, and airports are critical for the movement of people and goods. They will be significantly affected by climate change. A growing threat to California's transportation system is wildfire, which can also have cascading effects like landslides and mudslides that occur after rain falls on newly burned areas.

Rising temperatures are also expected to increase road construction costs between 3 and 9%. Adapting roadway materials to withstand higher temperatures is needed to avoid potential costs of over \$1 billion by 2070. One-hundred fifteen miles of railroad could be at risk of coastal flooding by 2040, with an additional 285 miles at risk by 2100. Infrastructure located along low-lying areas within Oakley are at the greatest risk of coastal flooding within the City's Planning Area. As shown in Figures 6.2-1 and 6.2-2, due to sea level rise over time, low-lying roadways, especially those near the current water level, are at particular risk during flooding events.

Refineries, pipelines, electrical power distribution (substations) and generation facilities are energy sector assets are also vulnerable to sea level rise. Energy infrastructure provides electricity and natural gas to homes and businesses, as well as fuel for multiple modes of transportation, both within the City's Planning Area, and beyond to other parts of the region, state, and nation. Energy sector assets are considered together because these systems share similar vulnerabilities, and their damage or disruption can have wide ranging consequences on day-to-day community function as well as emergency response capacity (Contra Costa County, 2017).

There is a total of 276 miles of pipeline in Contra Costa County. A total of 55 miles is within the current 100-year floodplain, 12 miles that carry natural gas and 43 miles that carry hazardous liquids. A total of 51 miles of pipeline is within the area potentially exposed to six feet of sea level rise. The majority of these exposed pipelines carry hazardous liquids. Given the shoreline location of many pipelines, many that are exposed to sea level rise are likely within the existing floodplain (Contra Costa County, 2017).

CCWD has water supply infrastructure that could be impacted by flooding and the effects of sea level rise. In Contra Costa County, CCWD has major assets in the existing 100-year flood zone, which could be exposed to more frequent or longer duration flooding due to sea level rise. For example, flooding may impact the Mallard Reservoir and the Shortcut Pipeline,

both of which could be impacted by sea level rise. However, it is challenging to evaluate exposure of the water supply infrastructure below ground (e.g. water mains), since little is known about how sea level rise will impact groundwater levels at a particular location along the shoreline. Additional studies at the site-level and refined site or asset-specific scale analyses will be needed in order to understand risks that water supply assets face from flooding (Contra Costa County, 2017).

EXISTING GREENHOUSE GAS EMISSIONS IN OAKLEY

COMMUNITY AND MUNICIPAL OPERATIONS GHG EMISSIONS INVENTORIES

The City of Oakley, in collaboration with ICLEI – Local Governments for Sustainability, has developed community and municipal operations greenhouse gas inventories for baseline years 2005 and 2010.

2005 Oakley Community GHG Emissions

The community greenhouse gas inventory for 2005 included the following GHG emissions sectors:

- Residential Energy;
- Commercial/Industrial Energy;
- Transportation; and
- Waste Generation

Including all scopes and sectors, the community of Oakley emitted approximately 120,360 metric tons (MT) of CO₂e in the year 2005, as shown in Table 1.1. The Transportation sector (transportation-related gasoline and diesel usage) was by far the largest source of community emissions. Emissions from the Residential sector (due to electricity and natural gas usage) accounted for 32 percent of total community emissions, and electricity and natural gas consumption within the Commercial/Industrial sector generated 7 percent of the community's overall emissions. The remaining 8 percent of emissions came from waste generated by Oakley's residents and business.

TABLE 1.1: CITY OF OAKLEY COMMUNITY GHG EMISSIONS - 2005

SECTOR	EMISSIONS (MT CO ₂ E/YEAR)	PERCENT OF TOTAL EMISSIONS
Residential Energy	37,995	31.6%
Commercial/Industrial Energy	8,736	7.3%
Transportation	63,637	52.9%
Waste	9,991	8.3%
Total	120,360	100%

MT CO₂E/YEAR = METRIC TONS OF CARBON DIOXIDE EQUIVALENTS PER YEAR

SOURCE: CITY OF OAKLEY 2005 COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS INVENTORY, 2011.

2010 Oakley Community GHG Emissions

The community greenhouse gas inventory for 2010 included the following GHG emissions sectors:

- Residential Energy;
- Commercial/Industrial Energy;
- Transportation;
- Waste Generation; and
- Wastewater Treatment

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Including all scopes and sectors, the community of Oakley emitted approximately 132,494 metric tons (MT) of CO₂e in the year 2010, as shown in Table 1.2. The Transportation sector (transportation-related gasoline and diesel usage) was by far the largest source of community emissions. Emissions from the Residential sector (due to electricity and natural gas usage) accounted for 32 percent of total community emissions, and electricity and natural gas consumption within the Commercial/Industrial sector generated 7 percent of the community's overall emissions. An additional 8 percent of emissions came from waste generated by Oakley's residents and business. A new sector for this inventory year, wastewater treatment, accounted for less than 1% of total emissions.

TABLE 1.2: CITY OF OAKLEY COMMUNITY GHG EMISSIONS – 2010

SECTOR	EMISSIONS (MT CO ₂ E/YEAR)	PERCENT OF TOTAL EMISSIONS
Residential Energy	42,707	32.2%
Commercial/Industrial Energy	11,061	8.3%
Transportation	75,377	56.9%
Waste	3,197	2.4%
Wastewater Treatment	151	0.1%
Total	132,494	100%

MT CO₂E/YEAR = METRIC TONS OF CARBON DIOXIDE EQUIVALENTS PER YEAR

NOTE: NUMBERS MAY NOT ADD UP DUE TO ROUNDING.

SOURCE: CITY OF OAKLEY 2005 COMMUNITY-WIDE GREENHOUSE GAS EMISSIONS INVENTORY, 2011.

2005 Oakley Municipal Operations GHG Emissions

The municipal operations greenhouse gas inventory, which attempts to account for the GHG emissions generated by the local government operations, included the following sectors within the 2005 GHG inventory:

- Vehicle Fleet;
- Employee Commute;
- Buildings and Facilities (energy usage);
- Government-generated solid waste;
- Business Travel;
- Public Lighting;
- Water Transport

Table 1.3, below, provides the results of the 2005 Oakley Municipal Operations GHG Inventory.

TABLE 1.3: CITY OF OAKLEY MUNICIPAL OPERATIONS GHG EMISSIONS – 2005

SECTOR	EMISSIONS (MT CO ₂ E/YEAR)	PERCENT OF TOTAL EMISSIONS
Vehicle Fleet	403	52.7%
Employee Commute	241	31.5%
Buildings and Facilities (energy usage)	52	6.8%
Government-generated Solid Waste	37	4.8%
Business Travel	24	3.1%
Public Lighting	4	0.5%
Water Transport	1	0.2%
Total	764	100%

MT CO₂E/YEAR = METRIC TONS OF CARBON DIOXIDE EQUIVALENTS PER YEAR

NOTE: NUMBERS MAY NOT ADD UP DUE TO ROUNDING.

SOURCE: CITY OF OAKLEY 2005 GOVERNMENT OPERATIONS GREENHOUSE GAS EMISSIONS INVENTORY, 2011.

2010 Oakley Municipal Operations GHG Emissions

The municipal operations greenhouse gas inventory, which attempts to account for the GHG emissions generated by the local government operations, included the following sectors within the 2010 GHG inventory:

- Vehicle Fleet;
- Employee Commute;
- Buildings and Facilities (energy usage);
- Government-generated solid waste;
- Business Travel;
- Public Lighting;
- Water Transport

Table 1.4, below, provides the results of the 2010 Oakley Municipal Operations GHG Inventory. As shown, there was a significant decrease in municipal operations GHG emissions between 2005 and 2010.

TABLE 1.3: CITY OF OAKLEY MUNICIPAL OPERATIONS GHG EMISSIONS – 2010

SECTOR	EMISSIONS (MT CO ₂ E/YEAR)	PERCENT OF TOTAL EMISSIONS
Vehicle Fleet	201	52.7%
Employee Commute	266	31.5%
Buildings and Facilities (energy usage)	100	6.8%
Government-generated Solid Waste	7	4.8%
Business Travel	13	3.1%
Public Lighting	143	0.5%
Water Transport	21	0.2%
Total	752	100%

MT CO₂E/YEAR = METRIC TONS OF CARBON DIOXIDE EQUIVALENTS PER YEAR

NOTE: NUMBERS MAY NOT ADD UP DUE TO ROUNDING. THERE WERE DIFFERENCES IN THE SUBSECTORS INCLUDED BETWEEN THE 2005 BASELINE INVENTORY AND THE 2010 INVENTORY, WHICH IMPACTS THE FINAL EMISSIONS FIGURE. FOR MORE DETAIL, SEE PAGES 19 AND 20 OF THE 2010 COMMUNITY-WIDE & LOCAL GOVERNMENT OPERATIONS GREENHOUSE GAS EMISSIONS INVENTORY UPDATE.

SOURCE: CITY OF OAKLEY 2010 COMMUNITY-WIDE & LOCAL GOVERNMENT OPERATIONS GREENHOUSE GAS EMISSIONS INVENTORY UPDATE

It should be noted that there were differences in the subsectors between the 2005 baseline and 2010 Municipal Operations GHG inventories, which impact the final emissions figures. An adjusted version of the 2005 Municipal Operations Inventory is provided in the City of Oakley 2010 Community-Wide & Local Government Operations Greenhouse Gas Emissions Inventory Update. With adjustments made to the 2005 Inventory, the reduction between the 2005 and 2010 Municipal Operations GHG inventories is further pronounced. In both cases, GHG emissions stemming from Oakley's municipal operations decreased significantly between 2005 and 2010.

3. ISSUES AND PRIORITIES

The Focused General Plan Update will provide a comprehensive approach to addressing climate change, including addressing greenhouse gas emissions and providing proactive measures to address potential effects of climate change, including the effects of sea level rise and increased extreme temperature days.

Recognizing that vehicle emissions are a significant part of greenhouse gas emissions, the Mobility White Paper will address goals, policies, and actions to promote pedestrian and bicycle travel and use of transit and electric vehicles and will provide strategies to address and reduce vehicle miles travelled (VMT).

Potential policies to address greenhouse gas emissions reductions include:

- Require development, infrastructure, and long-range planning projects to support State and local climate goals by demonstrating consistency State greenhouse gas reduction targets and Bay Area Air Quality Management District thresholds for greenhouse gas emissions.
- Promote a sustainable economy that encourages businesses to operate in an environmentally sound and community-friendly manner and that attracts and retains business sectors that support clean and sustainable technologies, including fuels, vehicles, equipment, goods, and services.
- Participate, when appropriate, in efforts of local and regional governments to identify programs that may assist Oakley and the region in reducing GHG emissions and in developing mitigation approaches. Examples of programs may include the Bay Area Regional Energy Network (BayREN) and Energy Upgrade California.
- Encourage and support for infill, mixed use, and higher density development, where appropriate, in order to reduce GHG emissions associated with vehicle travel.

Potential actions to address greenhouse gas emissions reductions include:

- Consider opportunities to enhance existing water efficiency and conservation measures, as feasible, and continue to support programs that encourage recycled water use and water efficiency in order to reduce energy and GHGs associated with water use.
- Provide education and outreach highlighting the benefits of energy conservation to the community and encourage residents and businesses to utilize available PG&E, BAAQMD, and other programs to retrofit structures and upgrade appliances and equipment to reduce emissions.
- Explore methods to increase alternative energy production and consider establishing City-wide measurable goals for alternative energy.
- Where appropriate, remove regulatory or procedural barriers to producing renewable energy in the City's Municipal Code.
- Consider opportunities to reduce urban heat islands through vegetation management and cool/higher-albedo surfaces.
- Continue to review development and infrastructure projects to ensure that the projects address consistency with BAAQMD GHG emissions thresholds and implement feasible best management practices and, when needed, mitigation measures to reduce GHG emissions.

Potential policies to address adaptation to the effects of climate change include:

- Prepare for and adapt to anticipated sea level rise and fluctuations and changes in weather conditions, including addressing impacts on existing and future neighborhoods, infrastructure and facilities, the shoreline, and natural resources.
- Encourage restoration and capacity-building projects that recognize the role of the shoreline, wetlands, and marshlands in adapting to sea level rise.
- Develop flood control and prevention measures to protect the City from rising waters due to climate change.
- To the extent feasible, locate critical facilities and vital infrastructure outside of areas anticipated to be significantly affected by sea level rise.
- Where critical facilities and vital infrastructure are located in areas anticipated to be significantly affected by sea level rise, develop measures to ensure that facilities remain accessible and undamaged during flood events.
- Prioritize improvements and actions that would protect vulnerable populations (e.g., elderly communities, low-income areas), critical facilities, and vital infrastructure, from damage or lack of access due to flooding from sea level rise.

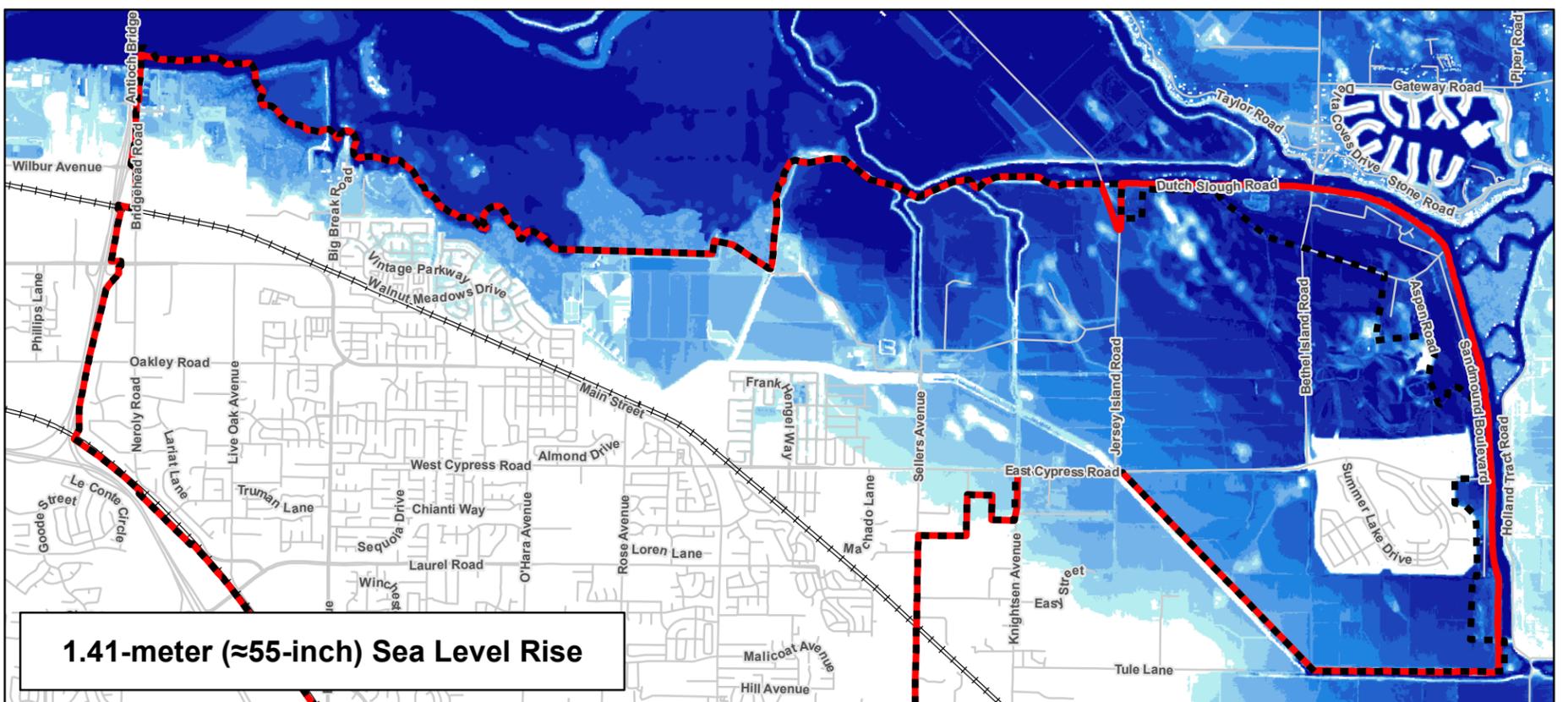
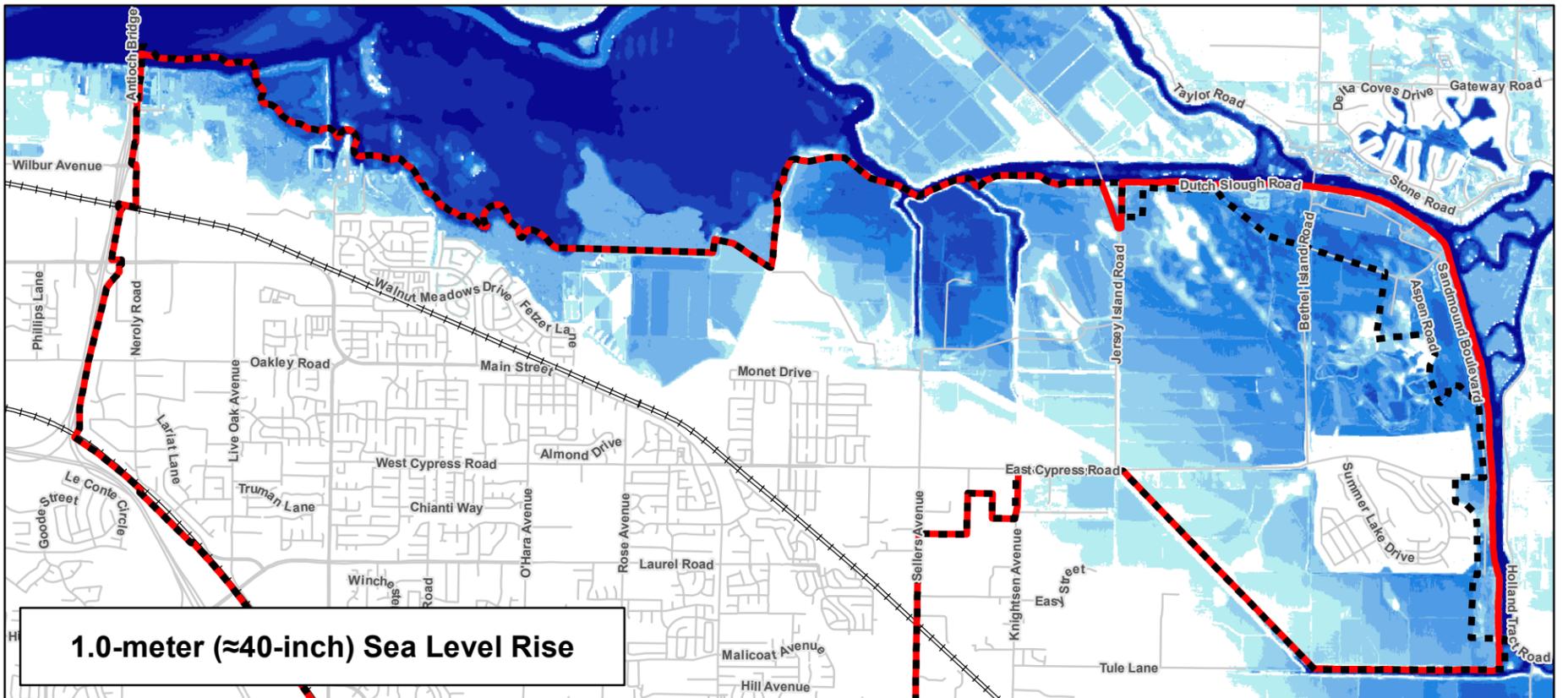
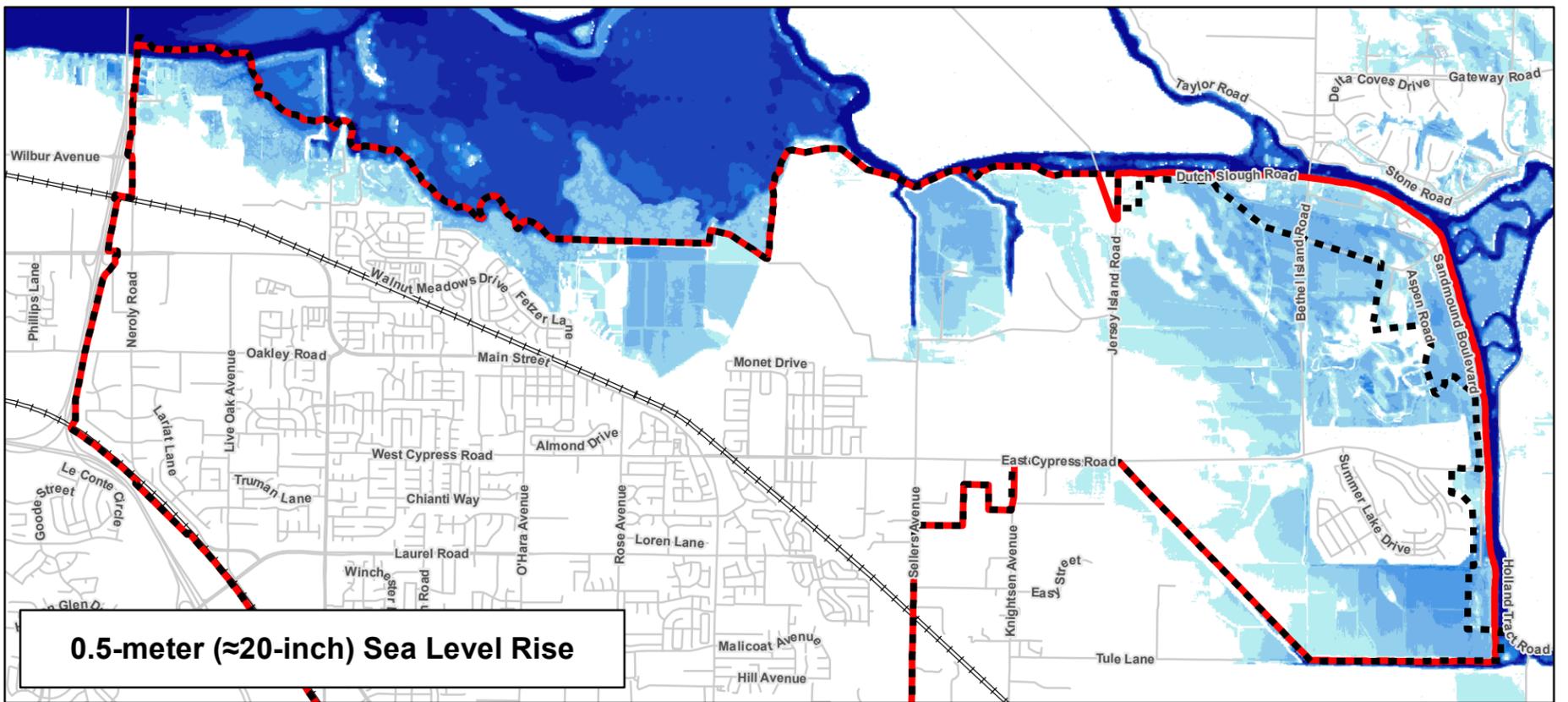
Potential actions to address adaptation to the effects of climate change include:

- Regularly update the City's Emergency Operations Plan, as required by state and federal laws, and ensure that the plan addresses emergency situations, such as flooding, wildfires, and extreme temperature days, that may result from the changing climate.
- Ensure that updates to the Local Hazard Mitigation Plan address anticipated and modeled effects of climate change, including sea level rise, potential changes to areas affected by the 100-year storm event under sea level rise scenarios, extreme weather events, increased wildfire potential, and drought conditions.
- Provide developers with links to the CalAdapt and BCDC model data identifying sea level rise anticipated under potential climate change scenarios to ensure that all scenarios are considered in the design of future projects.
- Require new development projects located along the shoreline or in areas projected to be inundated under sea level rise scenarios to identify projected sea level rise levels in relation to proposed residences, buildings, and important infrastructure.
- Where new development or redevelopment projects are in areas projected to be substantially affected by increased sea levels or expanded 100-year flood areas, identify potential mitigation and adaptation measures prior to approval of development projects to address exposure to substantial flooding hazards during the useful life of structures.
- Monitor BCDC and other regional efforts to adapt to climate change and identify opportunities for participation in strategies and projects, including levees, seawalls, and other shoreline protection measures, to protect critical developed areas along the shoreline from flooding and by identifying opportunities to enhance natural resources, including preserving existing habitat, creek corridors, riparian areas, and the shoreline, reducing shoreline erosion, restoring habitat, and identifying areas where tidal wetlands can migrate landward.
- Maintain improvements and facilities designed to protect against flooding and sea level rise.

Oakley Focused General Plan Update

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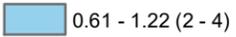
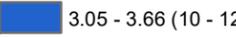
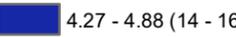
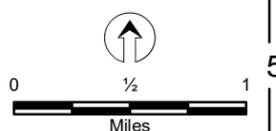
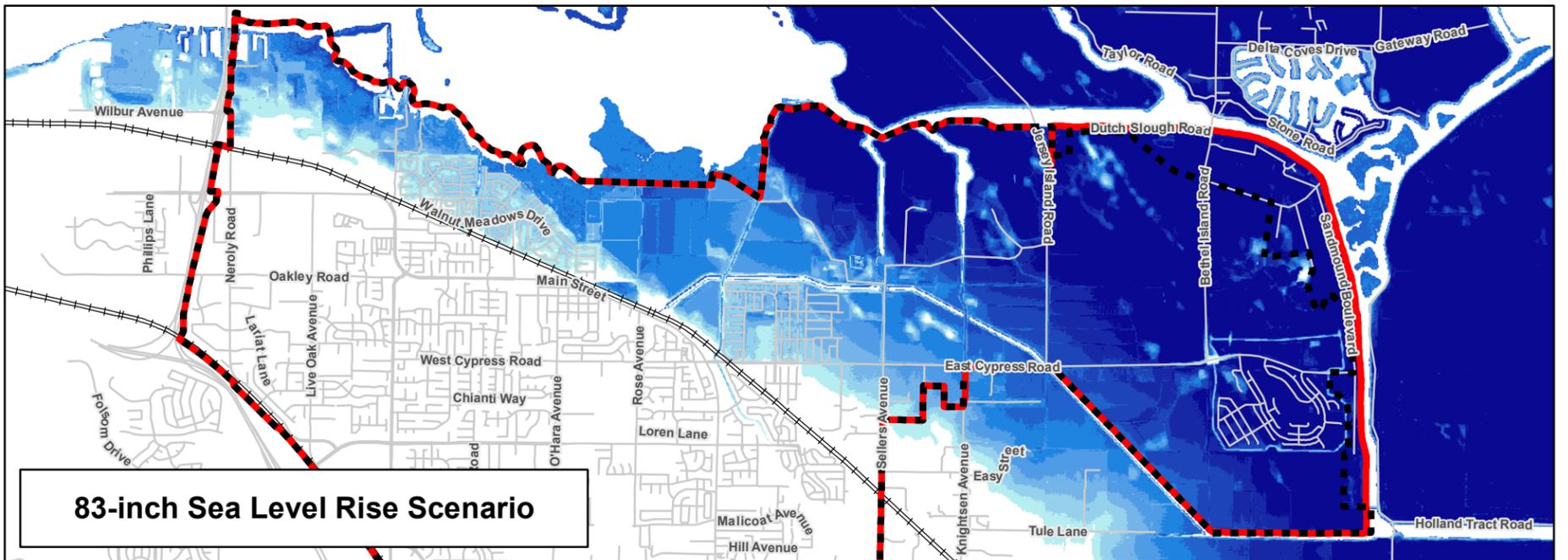
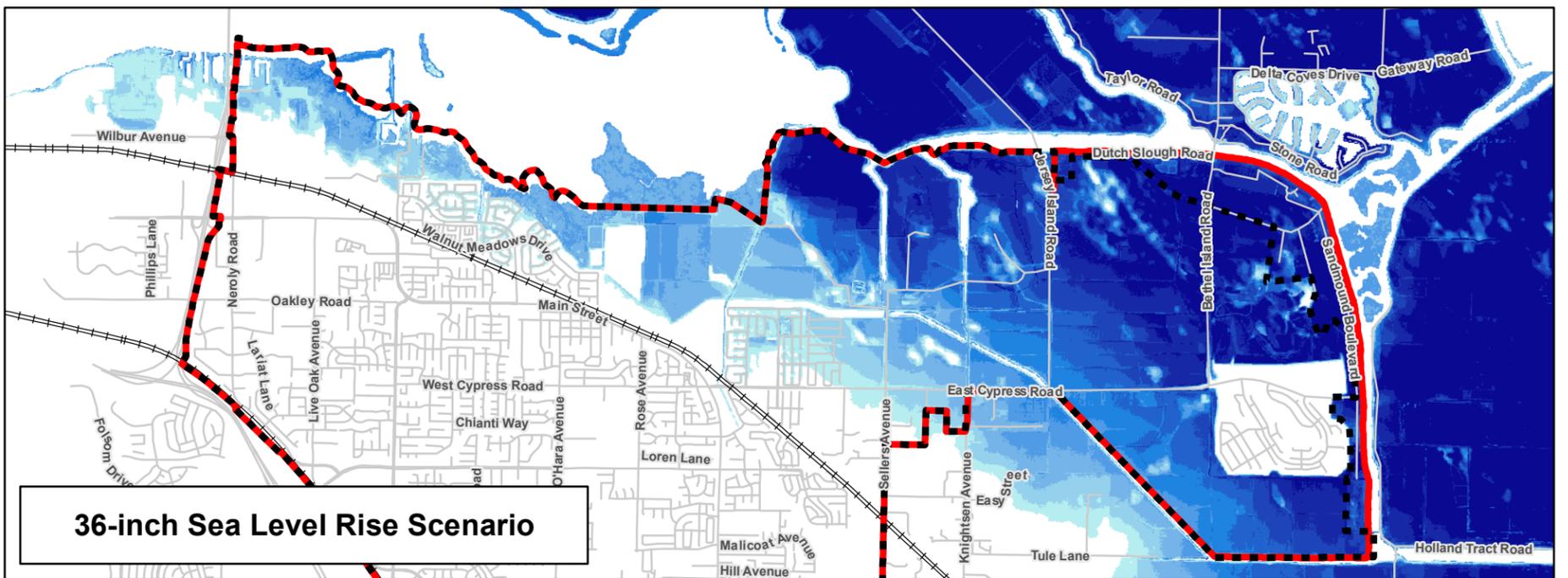
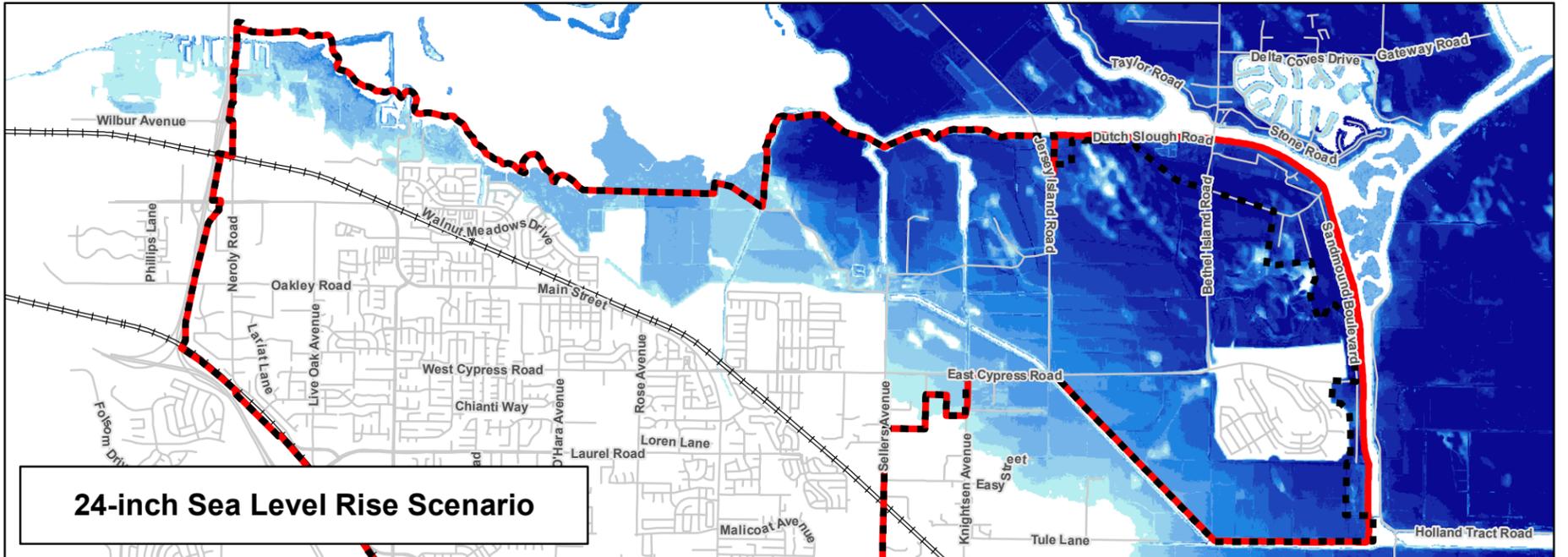
	Oakley City Limit		Oakley Sphere of Influence
Depth of Flooding in Meters (≈ Feet)			
<i>Maximum inundation depth during a likely 100-yr storm under varying sea level rise scenarios</i>			
	0 - 0.61 (0 - 2)		1.83 - 2.44 (6 - 8)
	0.61 - 1.22 (2 - 4)		2.44 - 3.05 (8 - 10)
	1.22 - 1.83 (4 - 6)		3.05 - 3.66 (10 - 12)
			3.66 - 4.27 (12 - 14)
			4.27 - 4.88 (14 - 16)
			>4.88 (>16)

Figure 1.1.
Sea Level Rise Scenarios
(100-year Storm Event)

Cal-Adapt - University of California, Berkeley



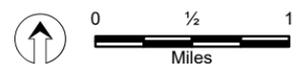


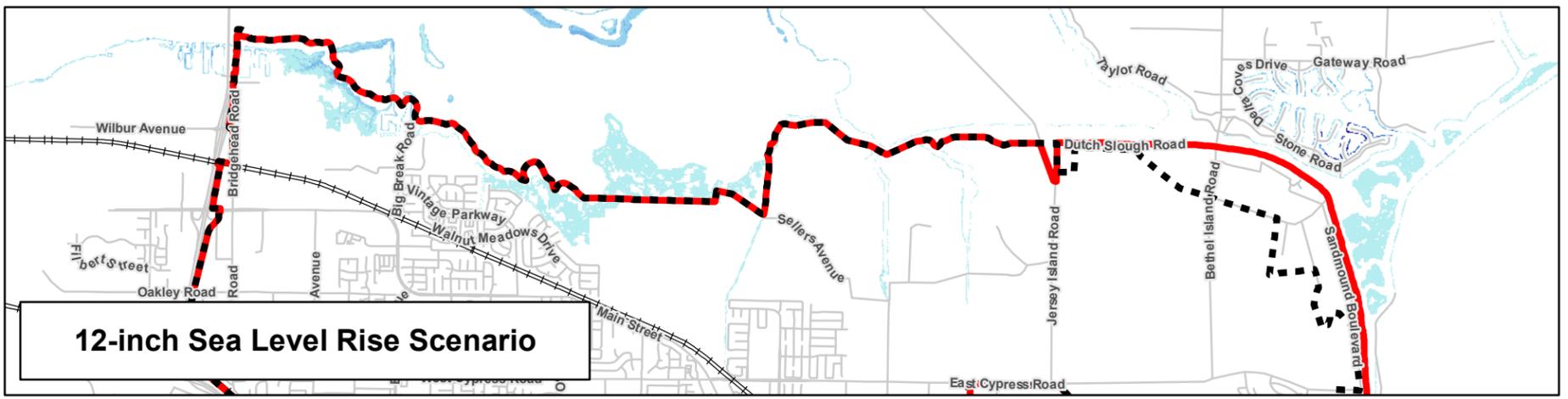
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	Oakley City Limit		Oakley Sphere of Influence
Depth of Flooding in Feet (Maximum inundation depth during a likely 100-yr storm under varying sea level rise scenarios)			
	0 - 2		6 - 8
	2 - 4		8 - 10
	4 - 6		10 - 12
			12 - 14
			14 - 16
			>16

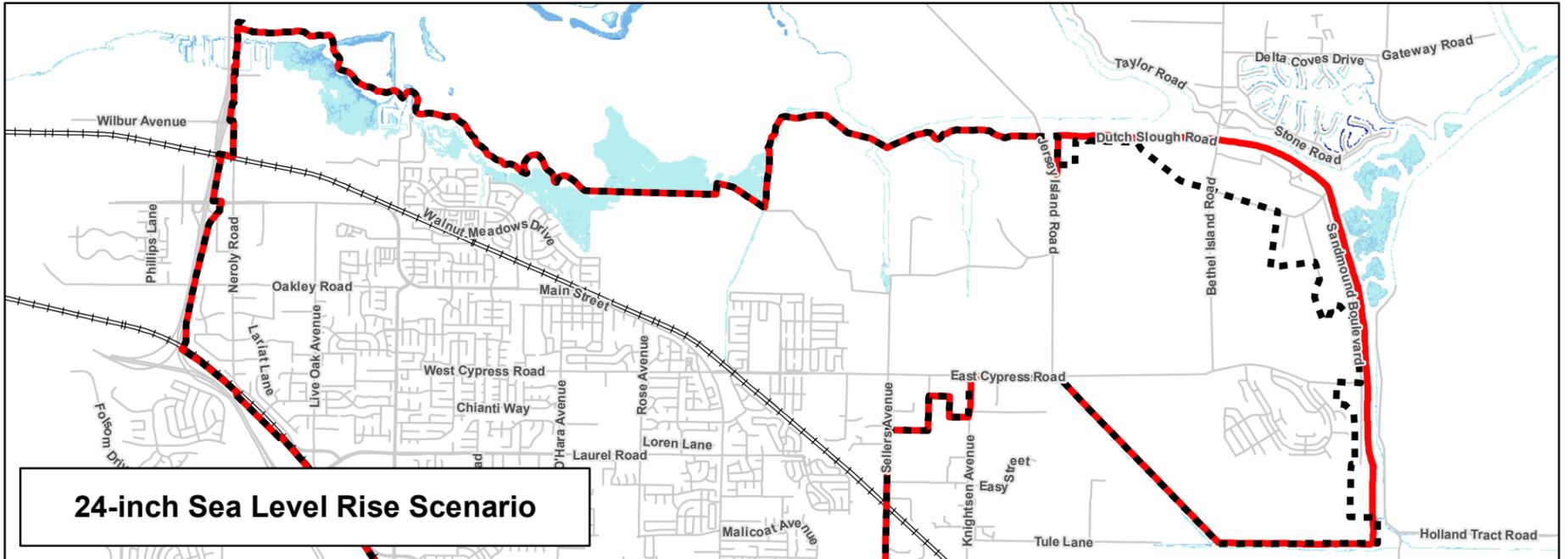
Figure 1.2.
Sea Level Rise Scenarios
(100-year Storm Event)

Adapting to Rising Tides - BCDC

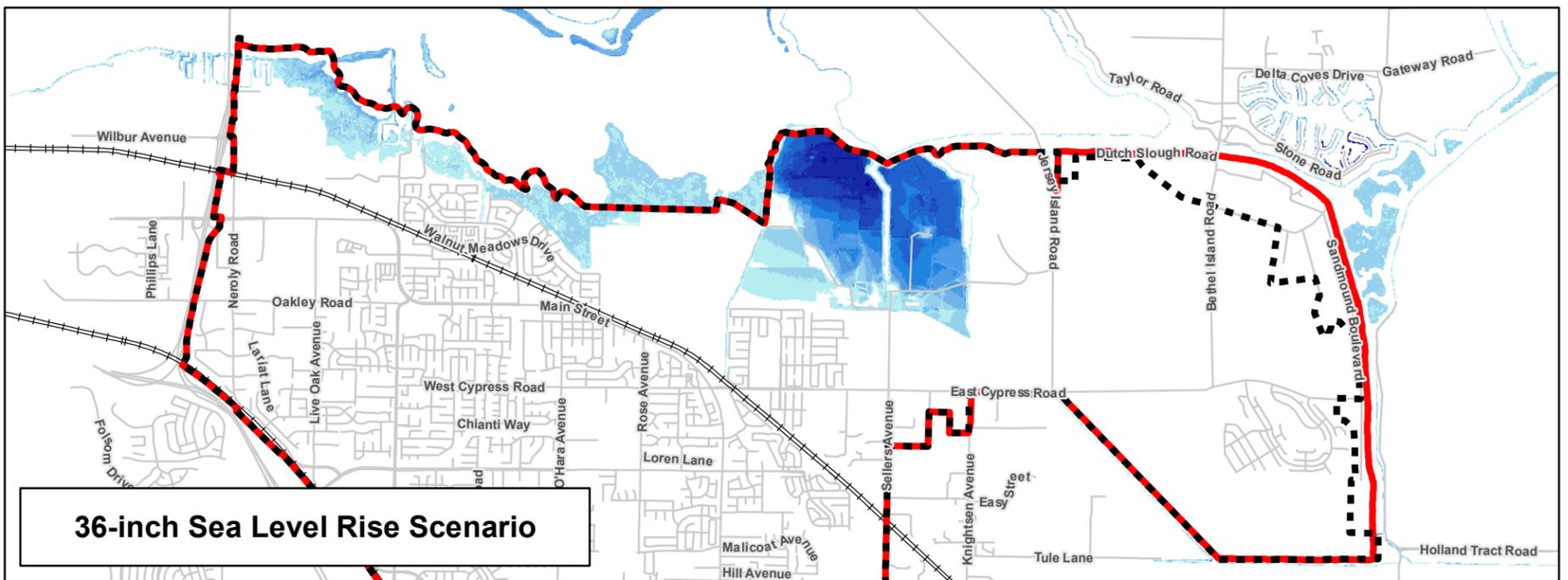




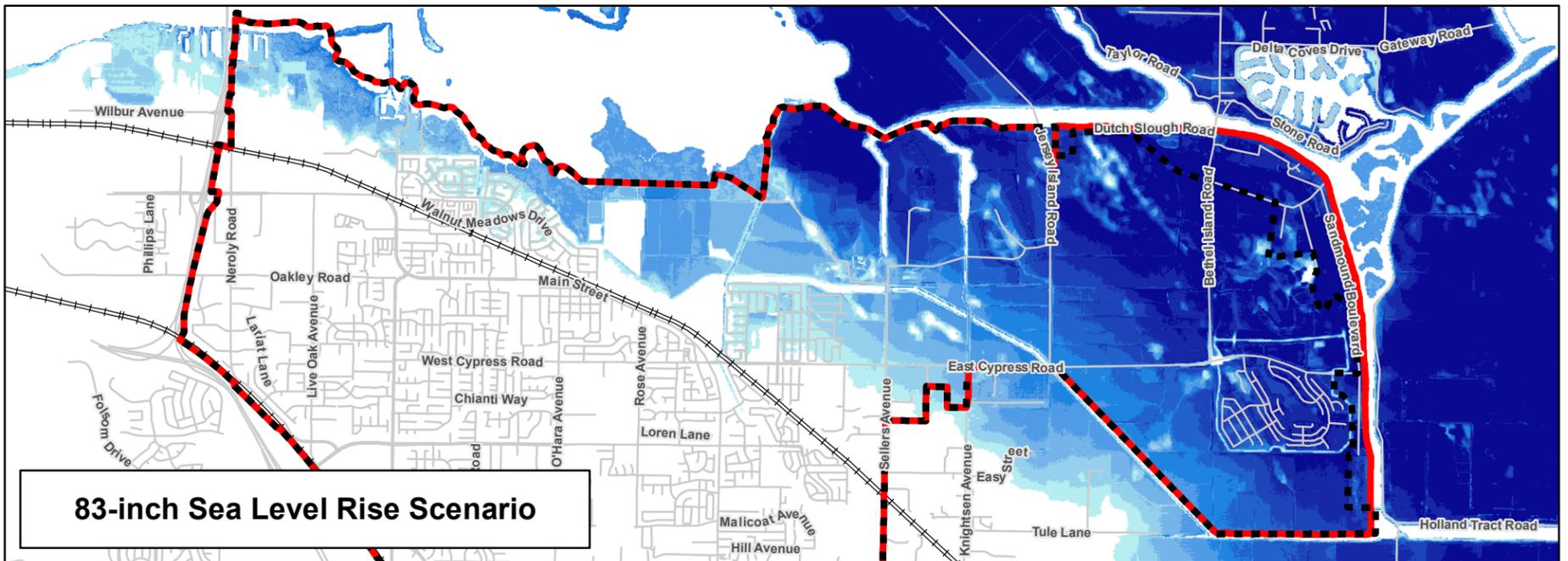
12-inch Sea Level Rise Scenario



24-inch Sea Level Rise Scenario



36-inch Sea Level Rise Scenario



83-inch Sea Level Rise Scenario

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- Oakley City Limit
- Oakley Sphere of Influence
- Depth of Flooding in Feet**
(Maximum inundation depth during average high tide under varying sea level rise scenarios)
- 0 - 2
- 2 - 4
- 4 - 6
- 6 - 8
- 8 - 10
- 10 - 12
- 12 - 14
- 14 - 16
- >16

Figure 1.3.
Sea Level Rise Scenarios
(Average High Tide)

Adapting to Rising Tides - BCDC

