

# RICHMOND RESILIENCE ROADMAP



The work upon which this publication is based was funded in part through a  
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# RICHMOND RESILIENCE ROADMAP

## Final Report

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### **1. Introduction**

The City of Richmond developed the Richmond Resilience Roadmap in collaboration with a consultant team of The Trust for Public Land and PlaceWorks with input from diverse stakeholders such as residents and business owners within the Project Area. The roadmap connects and expands recent efforts, including the City's Climate Action Plan, the Climate-Smart Cities™ Initiative, and the Richmond Wellness Trail, with the goal of creating a roadmap of planned projects that support community resilience. The projects, which are intended to be built in the next five to ten years, require additional implementation funding support, from state grants, public-private partnerships, and other sources, to be built.

This Richmond Resilience Roadmap is a deliverable of the TCC Planning Grant, which was awarded to the City of Richmond (Lead Applicant), The Trust for Public Land (co-applicant), and the Richmond Community Foundation (co-applicant) in August 2018. The Roadmap, which is the result of a larger community outreach and engagement process, explores nine potential projects that can advance the Strategic Growth Council's sustainable communities objectives, such as improving air quality, improving water quality, reducing GHG emissions, improving transportation, and strengthening community resiliency to the impacts of climate change. In addition to producing the Resilience Road Map, the TCC Planning Grant also funded the applicants to complete a portion of the existing conditions studies and schematic design for the Richmond Wellness Trail, which is one of the projects identified in the Road Map.

#### **1.1 The Project Area**

The Project Area consists of three neighborhoods within the City of Richmond: Iron Triangle, Santa Fe, and Coronado. As shown in Figure 1, these neighborhoods are generally bounded by the Burlington Northern Santa Fe Railroad to the north and west, Interstate 580 (I-580) to the south, and Bay Area Rapid Transit (BART) and Southern Pacific Railroad to the east. The Project Area has an ethnically diverse population with a high percentage of non-English speaking households that are primarily low-income and burdened by housing and transportation costs. This area has been identified as a priority area in the Association of Bay Area Governments (ABAG's) 2015 Stronger Housing, Safer Communities study, which looks at vulnerability and resilience of Bay Area communities to flooding and seismic hazards. The Iron Triangle neighborhood, specifically, was also recognized in the 2015 Health in All Policies Report (HiAP Report) as an example of community engagement to build healthy places, such as parks, within the Project Area.<sup>1</sup>

#### **1.2 Summary of the Richmond Resilience Roadmap**

The Richmond Resilience Roadmap is comprised of nine projects that cover the Coronado, Santa Fe, and Iron Triangle neighborhoods. The projects include a range of project types that provide direct benefits of increasing community services and providing job training and education through resilience hubs, increasing mobility and reducing pollution through expansion of active transportation routes and complete streets, reducing long-term energy costs and increasing energy independence through rooftop solar and energy storage installations, and increasing housing security through affordable housing projects. These projects also provide co-benefits, which are indirect positive impacts of projects, such as reducing GHG emissions, improving public health, creating environmental benefits, and generating economic opportunity. Overall, implementation of the Richmond Resilience Roadmap will help improve

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public health and environmental health within the Project Area, which can help close the “climate gap” created by historical disproportionate health and economic impacts in the Project Area.

### **Reduction in GHG Emissions**

The nine projects included in the Richmond Resilience Roadmap each contribute to an overall reduction in GHG emissions. Nearly all of the projects include landscaping, streetscaping, or tree planting that would help sequester carbon and store it in the soil, trunks, and stems, reducing the GHG emissions in the Project Area. The increase in vegetation and tree canopy cover would provide shade and reduce the urban heat island effect, which would curb the need to use energy for air conditioning. The corridor projects connect the Iron Triangle, Santa Fe, and Coronado neighborhoods internally and to regional transportation hubs through pedestrian and bicycle improvements, which encourage residents to walk and bike to destinations in the Project Area, which reduces GHG emissions generated from vehicles. The Income-Based Solar and Home Weatherization Project would provide solar PV systems to households in the Project Area, which would provide a source of renewable energy and reduce the need to rely on the larger electrical grid.

### **Public Health and Environmental Benefits**

Implementation of the Richmond Resilience Roadmap will create both public health and environmental benefits in the Project Area. The green infrastructure elements will reduce flooding in the Project Area by collecting and conveying stormwater away from streets and built infrastructure. This also reduces the risk of human health hazards created by mosquitos, rodents, and ticks that tend to live near pooled water. Additionally, green infrastructure can help clean toxins from the water before it goes into the storm drain system. The vegetation and tree plantings clean the air and provide shade cover that reduces the urban heat island effect. This can reduce heat related illnesses, especially for children, seniors, and others who may be highly susceptible to very high temperatures. The corridor projects will encourage physical activity by creating safer and healthier active transportation routes, creating positive health outcomes in the community. The resilience hub projects will also improve health outcomes by providing residents with refuge centers to use during extreme heat weather, severe air pollution, or other natural disasters.

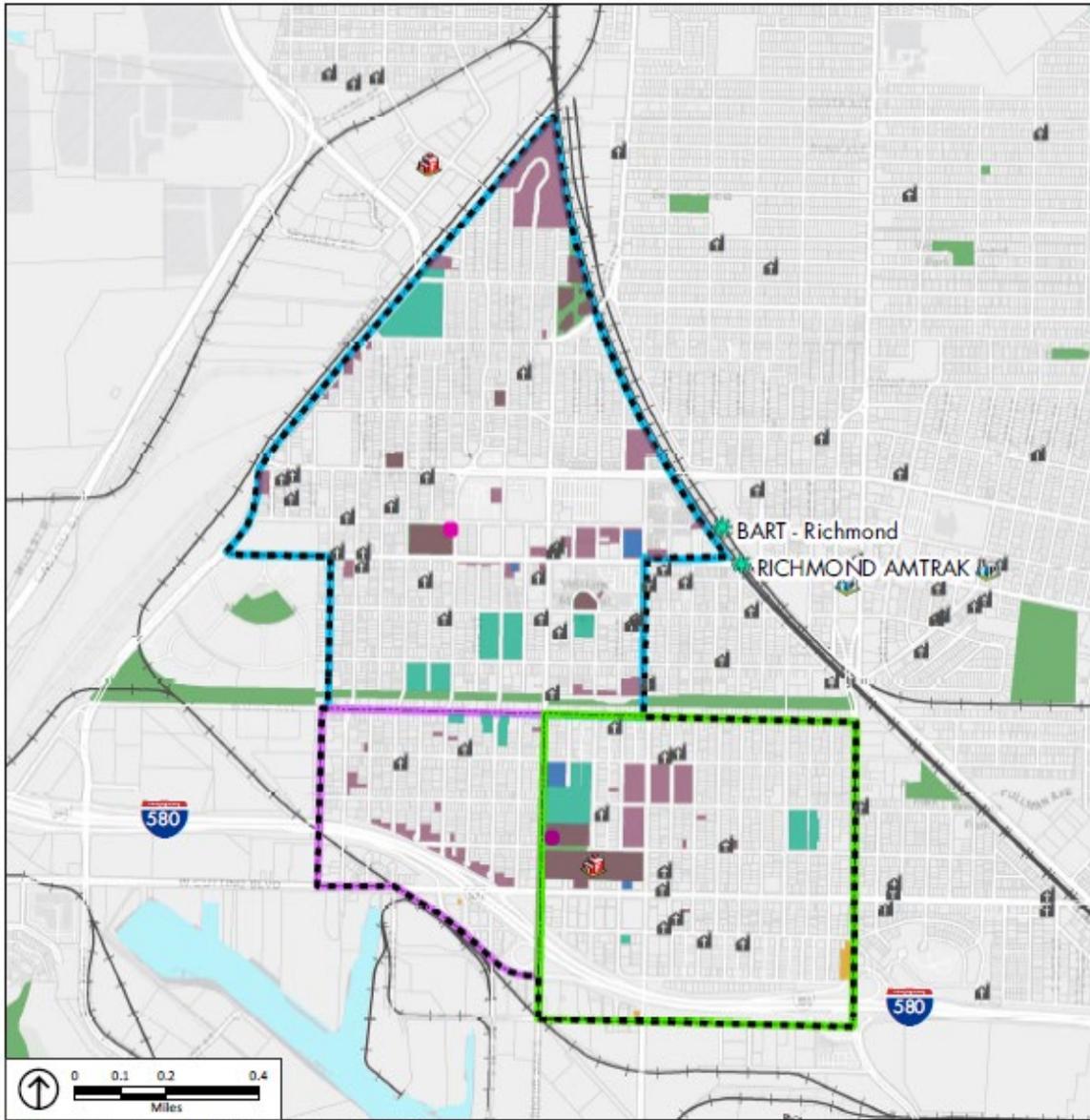
### **Economic Opportunity**

Construction of the projects on the roadmap will generate economic opportunities within the Project Area. Construction activities will create temporary construction and maintenance positions. The resilience hub projects will also create job training and other educational programs that the entire community could benefit from long term. Development of these projects will include community engagement and partnering with community-based organizations that can help the community be involved throughout all phases of implementation.

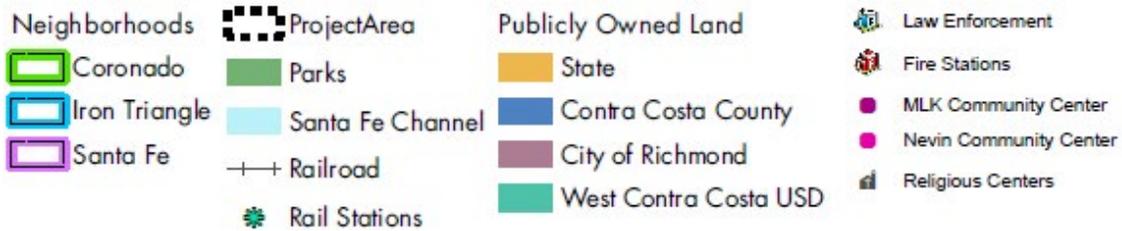
The following sections describe the planning process for the Richmond Resilience Roadmap, from defining terms, selecting project criteria, assessing climate vulnerability, evaluating projects, and engaging stakeholders.

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Figure 1 Resilience Roadmap Project Area



Source: Contra Costa County, 2019; PlaceWorks, 2019.



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### 1.3 Defining Resilience in the Project Area

Within the City of Richmond, resilience is defined as the ability of Richmond’s residents, infrastructure, response systems, and natural systems to close the “climate gap” and prepare for, absorb, and recover from disruptions caused by climate change. The City of Richmond uses “climate gap” in the City’s Climate Action Plan to describe the disproportionate and unequal health and economic impact that climate change has on people of color and low-income communities.

The Project Area falls within the 85<sup>th</sup> to 95<sup>th</sup> percentile of census tracts as measured by the CalEnviroScreen 3.0 tool, meaning that the Project Area ranks in the top 85 to 95 percent among all tracts in California for level of vulnerability to pollution and related effects. When the four census tracts are averaged together, the area is also in the top 82<sup>nd</sup> percentile for linguistically isolated population, 80<sup>th</sup> percentile for populations in poverty, and 77<sup>th</sup> percentile for cost-burdened households.<sup>2</sup> The total pollution burden within the Project Area, on average, also falls within the 69<sup>th</sup> percentile of census tracts statewide.<sup>3</sup>

The high pollution burden, along with the historical and existing population characteristics, indicates that residents in the Project Area may not have the resources to invest in housing and neighborhood resilience, to create a community that is prepared and ready to withstand social and environmental challenges, and to recover equitably from disasters and disruptions. However, the Resilience Roadmap applied in the Project Area, developed to help the most disadvantaged areas of the City adapt to the effects of climate change, provides a suite of public projects that can increase the resiliency of community members, community facilities and services, businesses, and the neighborhoods to disruptions caused by climate change.

## 2. Climate Change and Climate Justice

The Project Area is located in an area subject to a disproportionate and unequal health and economic challenges due to climate change hazards and climate justice issues. This section summarizes the climate change hazards and climate justice issues within the community, and then provides an overview of existing adaptation and resilience policies the City currently has to close the “climate gap” and create resilient communities.

### 2.1 Summary of Climate Change Hazards in the Project Area

According to the California Fourth Climate Change Assessment, there is high confidence that temperatures are warming, sea levels are rising, and heavy precipitation events are becoming more intense, and droughts are becoming more frequent throughout the state.<sup>4</sup> The Project Area, like other areas of the city, is expected to experience multiple direct impacts including potential sea level rise, flooding, extreme weather events, and extreme heat.

#### Sea Level Rise

As global temperatures heat up, glaciers and other ice near the north and south poles melt and water expands in oceans. The water flows into the ocean, increasing sea levels across the globe gradually over years or decades. In California, guidance suggests that sea levels will increase in most places by 6 to 10 inches by 2030, 13 to 23 inches by 2050, and 41 to 83 inches by 2100, relative to the average sea levels between 1991 and 2009.<sup>5</sup> However, it is possible that sea level may increase faster than these

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projections. Eventually, sea levels may increase to a point that permanently floods low-lying areas near the Richmond shoreline, including the southern and western portions of the Project Area.

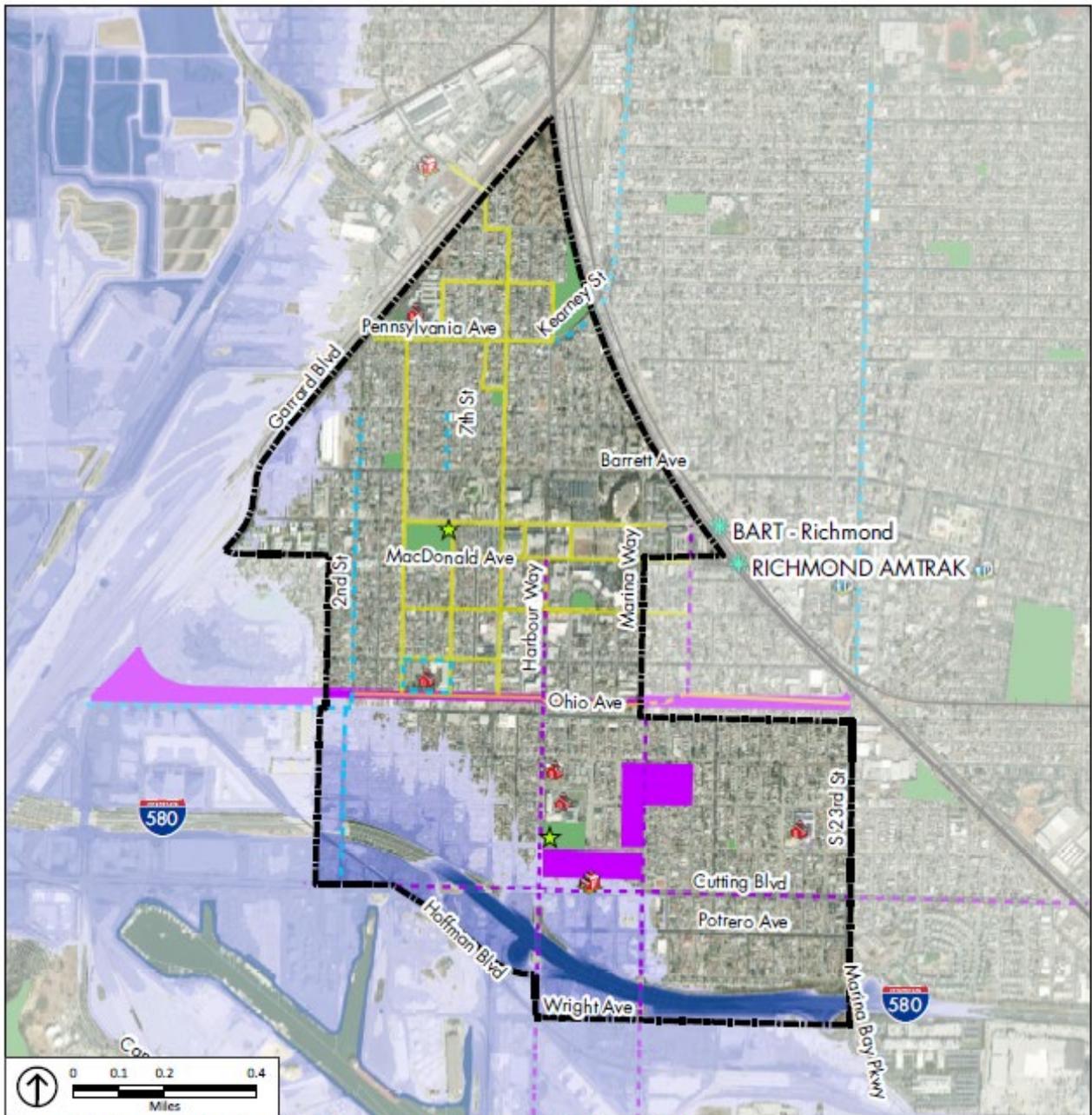
Rising sea levels also mean that bayshore flooding can become more severe and more frequent within the Project Area. With higher tidal levels during normal conditions, coastal floods such as king tides or storm surges can reach further onto land. A storm that may have a one in ten chance of occurring in a given year, also known as a ten-year storm, can create a temporary increase in sea levels of up to 28 to 30 inches. Therefore, if sea levels rise by 24 inches during normal conditions, a ten-year storm event would create a temporary sea level rise of around 52 inches.<sup>6</sup>

Both sea level rise and bayshore flooding can threaten buildings, roadways, and infrastructure that may be temporarily or permanently flooded by water. Bayshore flooding, in particular, can damage or destroy buildings in low-lying areas, disrupt transportation routes, and harm essential facilities within the Project Area. The Coronado and Santa Fe neighborhoods are especially vulnerable to sea level rise, as there are several low-lying areas along I-580, Cutting Boulevard, and Harbour Way that could be inundated by sea level rise and coastal storms.

Figure 2 shows the expected depth of sea level rise plus a 5-year storm in the Project Area by 2100, in conditions with a temporary bayshore flooding event.

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Figure 2 2100 Sea Level Rise + 5-Year Storm



Source: Adapting to Rising Tides, 2017; Contra Costa County, 2019; PlaceWorks, 2019.

- |                 |   |   |               |
|-----------------|---|---|---------------|
| Parks           | Law Enforcement                           | Yellow Brick Road™ streetscape projects | Depth in Feet |
| Railroad        | Fire Stations                             | Resilience Roadmap Corridor Projects    | 0 - 2         |
| Rail Stations   | Schools                                   | Other Corridor Projects                 | 2 - 4         |
| Resilience Hubs | Resilience Roadmap Site Specific Projects |   | 4 - 6         |
|                 |   |   | 6 - 8         |
|                 |   |   | 8 - 10        |
|                 |   |   | 10 - 12       |
|                 |   |   | 12+           |

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### Flooding

Flooding occurs when there is too much water in inland areas to be held in local water bodies, to be carried away by drains or creeks, or to soak into the soil. Floods can be caused by heavy rainfall, long periods of moderate rainfall, or clogged drains during period of normal rainfall. The water can build up and wash into normally dry areas, causing significant harm to buildings, people, and infrastructure. Floodwaters can be deep enough to drown people and may move fast enough to carry people or heavy objects (such as cars) away. Floods that develop very quickly are called flash floods and can be especially dangerous because there may be little or no warning. Flooding can also cause water to pool in areas with poor drainage, which can lead to increased populations of animals such as mosquitos, rodents, and ticks, creating a greater risk of diseases carried by these animals, such as Lyme disease, West Nile virus, and hantavirus pulmonary syndrome. Although precipitation levels are not projected to change very much within the city or the Project Area, climate change is expected to increase the frequency and intensity of droughts and floods within the region. Within the Project Area, the portion of the Santa Fe neighborhood south of I-580 is located in a 100-year flood zone.<sup>7</sup>

### Extreme Weather Events

Extreme weather includes strong winds, hail, and lightning, and is typically caused by intense storm systems or Diablo wind events. Severe winds, such as the Diablo winds, can damage or destroy buildings, knock over trees, and damage power lines and electrical equipment. Hail can damage buildings and plants (and in extreme cases injure people); and lightening can spark fires, injure people, or cause fatalities. Strong winds, including the Diablo winds during the spring and fall, are the most common type of severe weather in the region. In some cases, strong winds can reach between 40 and 80 mph and cause trees to fallen and damage power lines.<sup>8</sup> Diablo wind events have recently also caused power outages throughout the state, which can make it difficult to carry out daily activities and cause economic hardship.

### Extreme Heat

Extreme heat occurs when temperatures rise significantly above normal levels. “Extreme heat” is a relative term, as temperatures of 100 degrees are normal in locations like Palm Springs, but almost unprecedented in San Francisco. In the Project Area, the extreme heat threshold is approximately 90-degree Fahrenheit, which may seem lower than other areas in the region, but higher than usual temperatures can be particularly harmful for a community that is not accustomed to high heat levels. People living in typically cooler areas, such as the coastal climate zone, may be less acclimatized to heat, less likely to recognize the need to protect themselves from the negative health outcomes from heat, and have few options for cool, air conditioned spaces.<sup>9</sup> Extreme heat can harm residents in the Project Area by causing heat-related illnesses, such as heat cramps, heat exhaustion, and heat stroke, especially in areas that do not have shade structures or trees to reduce the urban heat island effect. Those most vulnerable to extreme heat include outdoor workers, households in poverty, persons without access to air conditioning or a vehicle, linguistically isolated populations, and those with existing chronic health conditions. According to the 2015 report *Climate Change Vulnerability in Contra Costa County: A Focus on Heat* developed by Contra Costa Health Services, the Project Area includes some of the highest scoring census tracts for heat vulnerability indicators in Contra Costa County.<sup>10</sup>

Historically, the Project Area has experienced an average of four extreme heat days a year. This number is expected to increase because of climate change. By the middle of the 21<sup>st</sup> century (2040-2070), the

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Project Area is likely to see an average of eight extreme heat days per year. By the end of the century, the Project Area is projected to experience an average of 14 extreme heat days per year.<sup>11</sup>

### 2.2 Summary of Climate Justice Issues

According to the California Fourth Climate Change Assessment and Pacific Institute, climate justice is “the concept that no group of people should disproportionately bear the burden of climate impacts or the costs of mitigation and adaptation”.<sup>12,13</sup> There are several climate justice issues within the Project Area that have formed a “climate gap” in the community, meaning that residents and businesses within these neighborhoods will be both the first ones impacted by climate change and the least capable of adapting to the resulting impacts.<sup>14</sup> The following sections describe the existing climate justice issues within the Project Area.

#### Race, Limited English Proficiency, and Disparities in Education

Climate change affects everyone though not all people are impacted equally. People of color and lower-income populations experience increased exposure and sensitivity to climate hazards and a reduced capacity to adapt. Lower-income populations and communities of color are often burdened with multiple, overlapping factors that cumulatively impact their ability to respond to hazards.<sup>15</sup>

Differences in health outcomes by race and ethnicity, income, educational attainment, and geographic location continue to occur and are increasing for certain health conditions. Disparities in education and limited English proficiency make it difficult for communities to adapt to climate change because they are less informed about the risks and may not understand, or even receive, instructions during climate-related disasters. Within the Project Area, according to the U.S. Census Bureau approximately 57 percent of the population is Hispanic, and 32 percent of the population is African American. The Project Area, when averaging the four census tracts in the area, is in the 82<sup>nd</sup> percentile of statewide census tracts for linguistically isolated populations, according to CalEnviroScreen 3.0. It is difficult to isolate race, ethnicity, and disparities in education as a cause for greater climate vulnerability instead of inequities from other socioeconomic factors. However, institutional, structural, and interpersonal racism often lead to an inequitable distribution or lack of resources and increase rates of health disparities that make it harder to adapt to climate change.<sup>16</sup>

**Climate Vulnerability:** the degree to which a system is exposed to, susceptible to, and unable to cope with the adverse effects of climate change.

**Impact:** an effect of climate change on the structure or function of a system.

**Adaptive Capacity:** the ability of a system to respond to climate change, moderate potential damages, take advantage of opportunities, and cope with the consequences.

#### Lack of Access to Financial Resources

A lack of access to financial resources decreases the adaptive capacity of a community, because adaptation and resilience efforts typically require access to a certain level of funding and related resources. CalEnviroScreen 3.0 identifies the Project Area is, on average, in the 80<sup>th</sup> percentile of statewide census tracts for households in poverty and 77<sup>th</sup> percentile of census tracts for households paying over 30 percent of their income towards housing costs. There are increased climate justice issues for this community because a lack of financial resources can mean that households may not be able to buy insurance or afford higher-quality housing that makes it easier to withstand or recover from a

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climate-related disaster.<sup>17</sup> Such households may also be unable to evacuate nor be able to afford air conditioning during periods of extreme heat, which can lead to devastating health consequences.

### An Urbanized Community

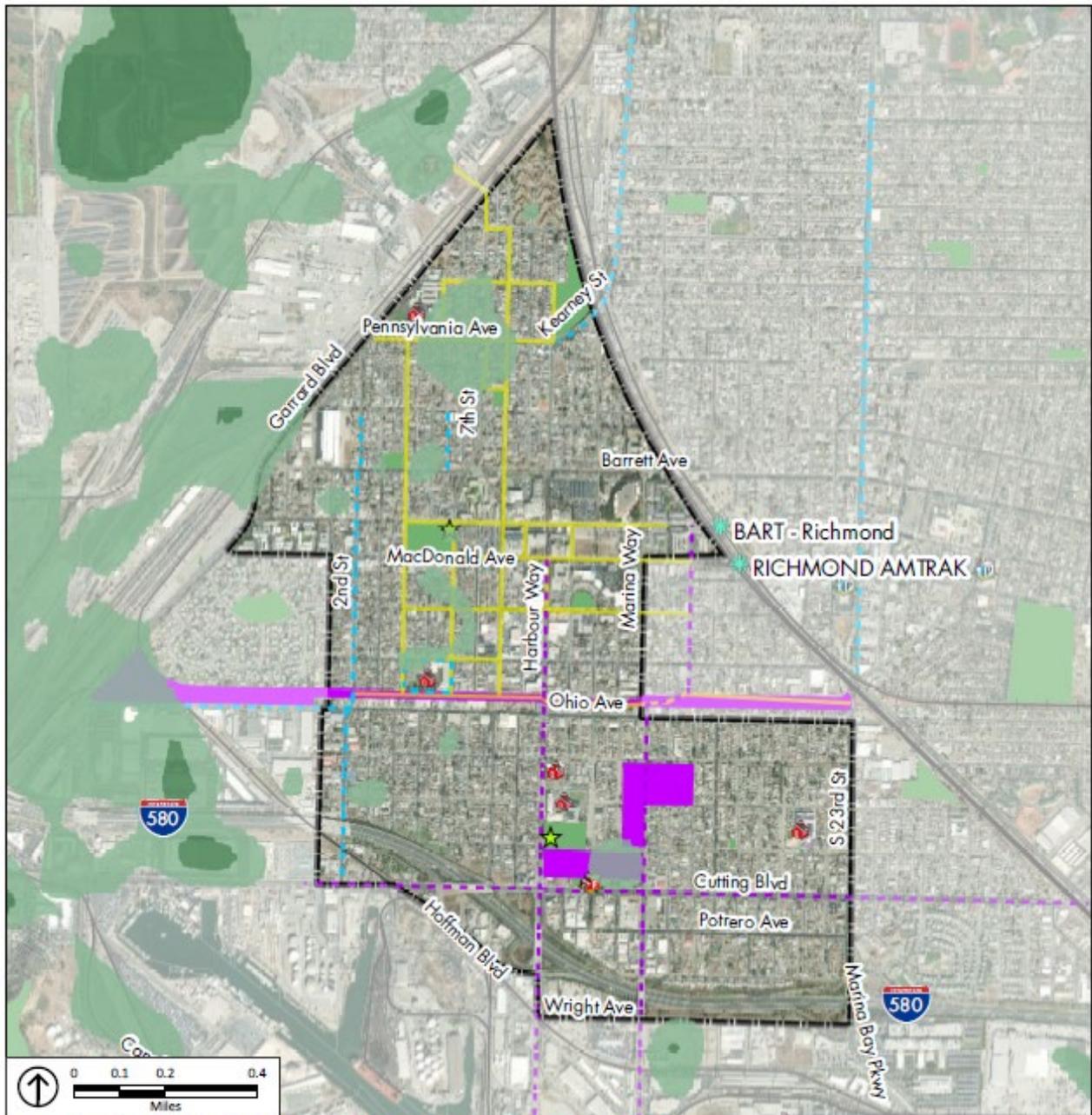
The Project Area is located in an urbanized community with few shade structures and abundance of impervious surface that contribute to the heat island effect. The Project Area currently suffers from heat island effects and residents may experience even higher temperatures from climate change, which are project to increase in frequency and severity within the community. Increased temperatures subsequently create a higher demand for electricity, which increases utility costs in a community that already experiences high rates of poverty and air pollution. Due to the close proximity to the San Francisco Bay, many homes may lack air conditioning and residents may not have access to cool locations during heat waves. Additionally, residents in the Project Area may not have access to a vehicle or public transit options to travel to cooling centers within the City to seek relief from the high temperatures. Figure 3 shows the Cool Priority Areas and Figure 4 shows the Connect Priority Areas designated by the Climate Smart Cities™ Richmond project, led by the City of Richmond, The Trust for Public Land, and members of the Technical Advisory Team created for the Climate Smart Cities™ Initiative.

### Existing Environmental Justice Issues

One of the primary climate justice issues within the Project Area is the existing environmental and public health problems within the community. As shown in Figure 5, CalEnviroScreen 3.0 identifies the Project Area, on average, as being in the 69<sup>th</sup> percentile of statewide census tracts for level of pollution burden. This is primarily due to the close proximity of the Project Area to heavy industrial areas and oil refineries, which cause both air and groundwater pollution to flow into the community. This in turn has caused high rates of asthma and cardiovascular diseases in residents within the community.<sup>18</sup> Populations who experience disproportionate impacts from air pollution, water pollution, and contaminated land are less likely to be able to adapt to climate change and may be further exposed to the release of pollutants from climate-related disasters.

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Figure 3 Cool Priority Areas within the Project Area

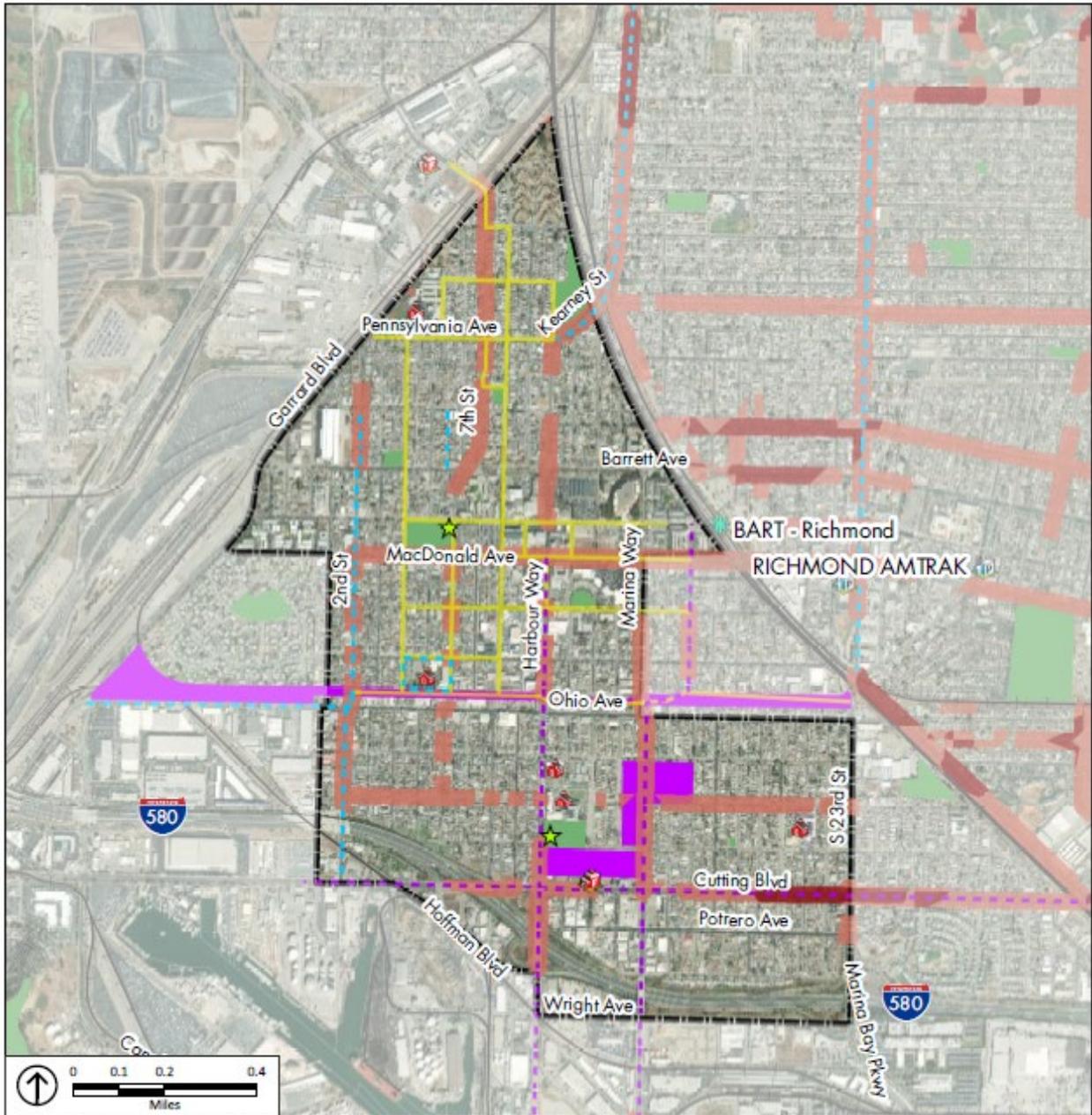


Source: Trust for Public Land, 2019; Contra Costa County, 2019; PlaceWorks, 2019.

- |                 |   |   |                            |
|-----------------|---|---|----------------------------|
| Parks           | Law Enforcement                           | Yellow Brick Road™ streetscape projects | <b>Cool Priority Areas</b> |
| Railroad        | Fire Stations                             | Resilience Roadmap Corridor Projects    | High                       |
| Rail Stations   | Schools                                   | Other Corridor Projects                 | Very High                  |
| Resilience Hubs | Resilience Roadmap Site Specific Projects |   |                            |

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Figure 4 Connect Priority Areas within the Project Area

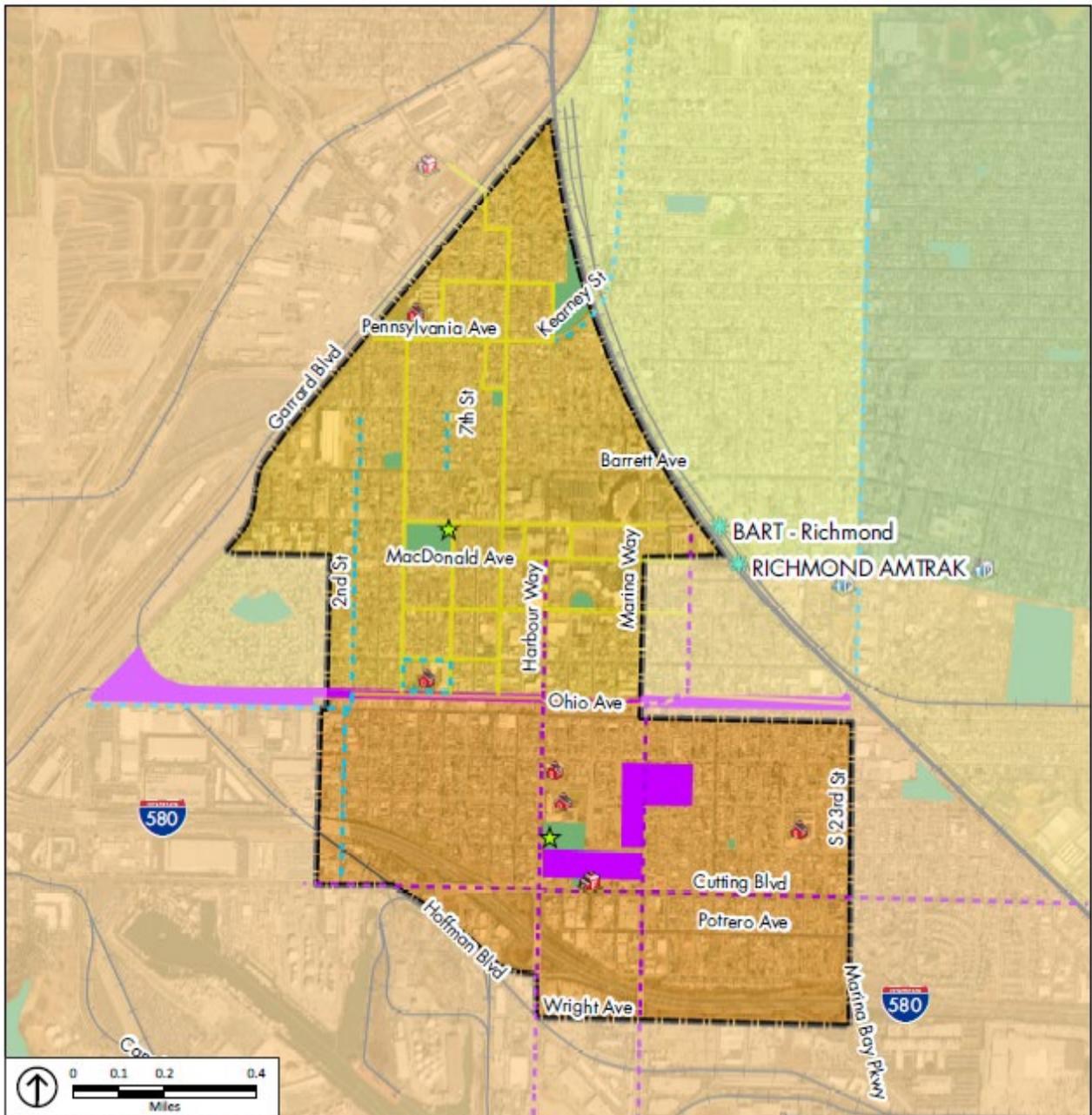


Source: Trust for Public Land, 2019; Contra Costa County, 2019; PlaceWorks, 2019.

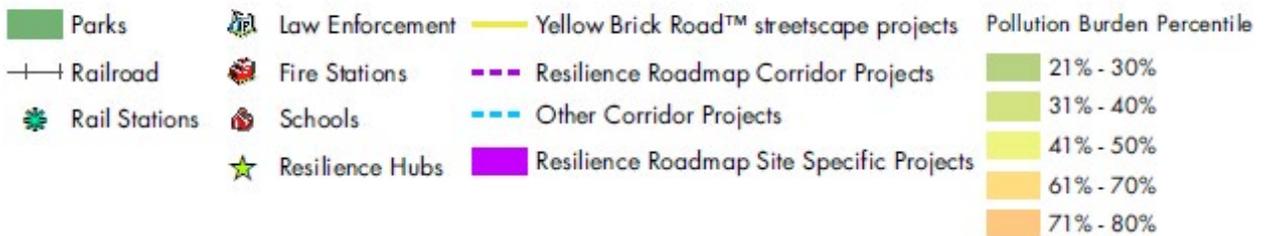
- |                 |   |   |                        |
|-----------------|---|---|------------------------|
| Parks           | Law Enforcement                           | Yellow Brick Road™ streetscape projects | Connect Priority Areas |
| Railroad        | Fire Stations                             | Resilience Roadmap Corridor Projects    | High                   |
| Rail Stations   | Schools                                   | Other Corridor Projects                 | Very High              |
| Resilience Hubs | Resilience Roadmap Site Specific Projects |   |                        |

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Figure 5 Pollution Burden in the Project Area



Source: OEHHA, 2017; Contra Costa County, 2019; PlaceWorks, 2019.



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### 2.3 Summary of Existing Adaptation and Resilience Policies

The City of Richmond has several policy documents that contain adaptation and resilience goals, policies, and programs to help the community, including the Project Area, adapt to the changing climate.

- The primary blueprint for the City, the 2030 General Plan adopted in April 2012, contains resilience strategies in the Energy and Climate Change Element and the Public Safety and Noise Element. These sections provide goals, policies, and actions in the Project Area for climate-resilient development, risk management of natural disasters, high levels of fire service, and emergency preparedness. Specific topic areas covered in the Energy and Climate Change Element, related to resiliency, include leadership in managing climate change, community revitalization and economic development, and climate-resilient communities.
- The City of Richmond Climate Action Plan, adopted in October 2016, contains sustainability and resilience policies that focus on resilient housing, ground transportation, energy infrastructure, water supply, and wastewater management to help the Project Area adapt to more frequent flooding, sea level rise, coastal storms, extreme heat, and extreme weather events.
- The City of Richmond also has an Urban Greening Master Plan, Bicycle Master Plan, and Pedestrian Plan, which indirectly can help increase resilience in the Project Area through reducing the heat island effect, capture and clean stormwater, and connect residents to the rest of the City through safe and healthy active transportation methods. The Pedestrian Plan also includes the Yellow Brick Road Iron Triangle Walkable Neighborhood Plan and the Richmond Wellness Trail, which increase safe active transportation opportunities and add urban greening elements in the Project Area.

The projects chosen as part of the Resilience Roadmap help implement the policies or programs within all of these plans.

## 3. Creating the Resilience Roadmap

### 3.1 Choosing the Resilience Projects

The projects selected for inclusion in the Richmond Resilience Roadmap were identified by looking at the existing planned projects within the Project Area and narrowing down the list based on specific criteria. When this effort began, the City of Richmond provided The Trust for Public Land and PlaceWorks with a list of over 40 projects that support resilience within the Project Area including the following project types: urban greening, access to healthy food options, complete streets and mobility, park improvements, affordable housing, energy efficiency and renewable energy, natural ecosystems, and waste reduction. This list was then narrowed to 21 projects based on project status, location, available information, and co-benefits. The chosen projects included those that were ready for construction, within the Project Area, had available information to analyze the project's consistency with TCC Implementation Grant Guidelines, and had several co-benefits to improve public health and environmental health within the Project Area. The team evaluated these projects based on a set of resilience and sustainability and resilience measures (discussed below). The project team then short-listed ten projects based on the evaluation and narrowed this list to eight projects based on if they aligned with climate adaptation and resilience goals, and Transformative Climate Communities (TCC) Strategies that reduce GHG emissions and achieve public

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health, environmental, and economic benefits. City staff determined a need for housing projects at different levels of construction readiness in the roadmap to meet the City's objectives, and therefore added a ninth project to the final list. Figure 6 shows the projects within the Richmond Resilience Roadmap. The nine projects are:

1. Nystrom Village Redevelopment
2. Martin Luther King Jr. Resilience Hub
3. Richmond Wellness Trail
4. Income-Linked Solar and Home Weatherization
5. Urban Greening Master Plan – Street Tree Planting Along Cutting Boulevard and Harbour Way
6. Harbour Way Complete Street Project
7. Richmond Greenway Master Plan
8. Nevin Resilience Hub
9. Hacienda Rehabilitation

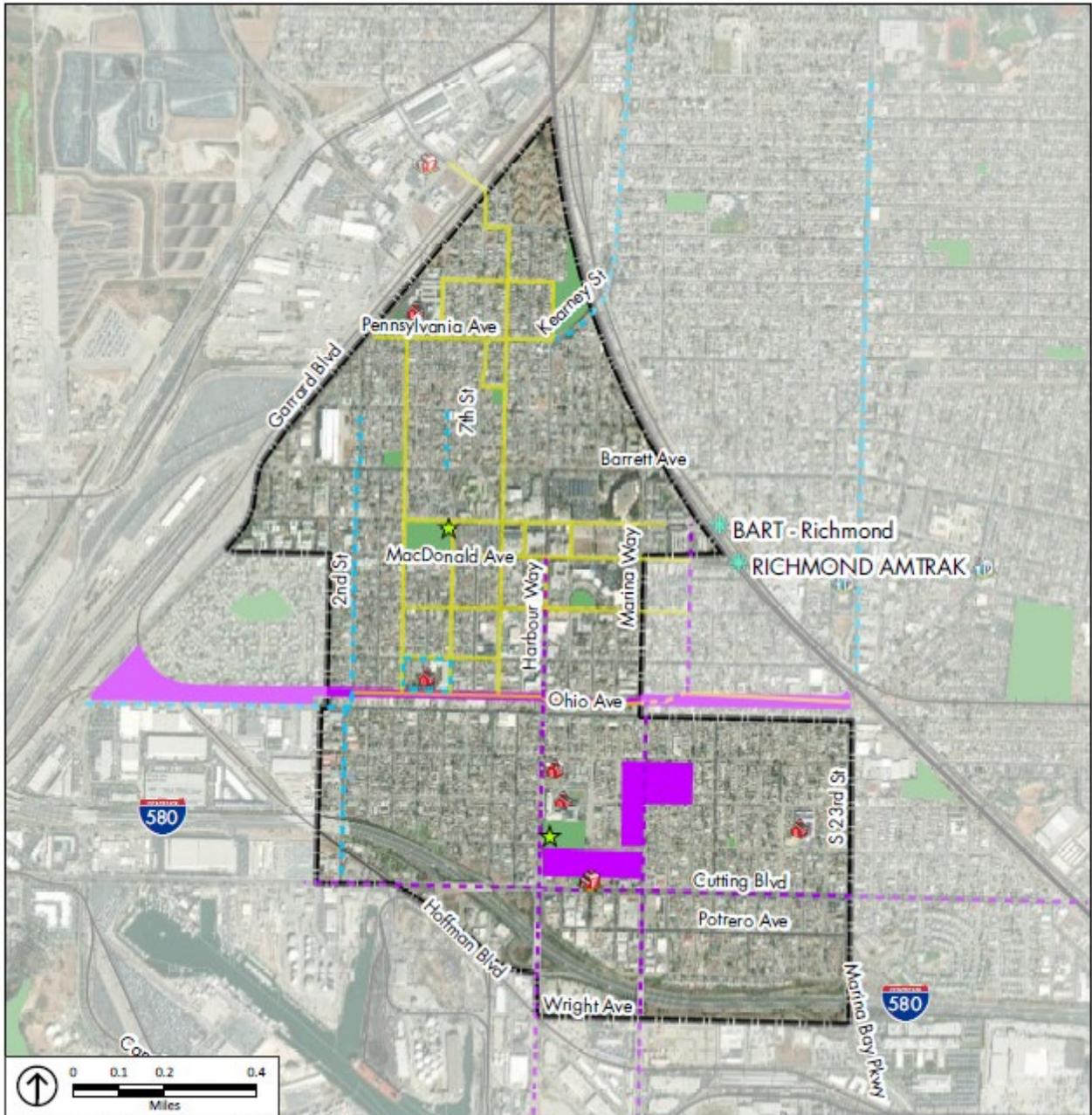
### **3.2 Climate Adaptation and Resiliency**

Each of the projects included in the Richmond Resilience Roadmap will increase the resilience of the Project Area, help the community adapt to climate change, and address climate justice issues. Many of the projects include multiple co-benefits and help implement the City's resilience goals. For example, the Nystrom Village Redevelopment project will not only provide affordable family units but will also provide community services, green infrastructure on-site, and will revitalize a historic site that is important to the community. Other projects, such as the Richmond Wellness Trail, Harbour Way Complete Street, and the Richmond Greenway Master Plan will provide the Project Area with safe pedestrian and bicyclist transportation routes. These projects will also provide green stormwater infrastructure, street trees that will naturally cool the area and reduce the urban heat island effect and improve the overall health and well-being of the residents in the Project Area.

An important component of the Resilience Roadmap is the development of two resilience hubs: The Martin Luther King Jr. Resilience Hub (new construction) and the Nevin Resilience Hub (renovations). Resilience hubs are neighborhood centers that support residents and offer community services, activities, and opportunities and help to increase community capacity to prepare for, respond to, and recover from climate-related disasters. They provide educational and capacity building resources and reliable, clean electricity year-round. Resilience hubs also provide shelter, food, medical supplies, information, and other supplies and resources in the event of an emergency. Resilience hubs are easily accessible to neighborhood residents, connect to community resources, and can provide up to 72 hours of renewable energy supply. They can be constructed as new facilities, or existing facilities such as libraries or community centers can be retrofitted to act as resilience hubs.

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Figure 6 Project Area



Source: Contra Costa County, 2019; PlaceWorks, 2019.

- |                 |   |   |
|-----------------|---|---|
| Parks           | Law Enforcement                           | Yellow Brick Road™ streetscape projects |
| Railroad        | Fire Stations                             | Resilience Roadmap Corridor Projects    |
| Rail Stations   | Schools                                   | Other Corridor Projects                 |
| Resilience Hubs | Resilience Roadmap Site Specific Projects |   |

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### 3.3 Data Collection and Indicator Tracking

When developing the Richmond Resilience Roadmap project list, the project team collected data on all of the 40+ projects. This data included site plans, conceptual designs, citywide planning documents, and previous grant applications. Based on the availability of project data and construction readiness of the projects, the project team narrowed down the list projects to 21 projects. These projects were then evaluated based on four core objectives of the Climate-Smart Cities™ Initiative, as shown in Figure 7 below. Appendix A provides an evaluation matrix used to assess each of the 21 projects. Each of the four objectives had a set of questions, developed by PlaceWorks, the Trust for Public Land, and the City of Richmond, to determine whether each of the projects fully met the objective. These questions were:

- **Connect**
  - Transit access and mobility - Does the project make it easier and safer for community members, especially those with limited or no vehicle access, to travel to and from key destinations in a low- or zero-carbon way?
  - Health and well-being - Does the project improve connections to places that improve public health and well-being, civic and social engagement, employment, or education?
- **Cool**
  - Land conservation and restoration - Does the project protect, restore, or expand natural ecosystems or ecosystem services?
  - Reduce Urban Heat Island - Does the project help protect residents from high temperatures and extreme weather events?
  - Decarbonized energy and energy efficiency - Does the project reduce energy use, support more renewable and zero net energy and building, or improve energy storage and energy independence?
- **Absorb**
  - Urban greening and green infrastructure - Does the project increase the number of parks or green spaces, street trees, permeable paving, bioswales, or other green infrastructure features?
  - Water efficiency - Does the project reduce water use, increase use of captured rainwater or greywater, or promote recycled water use?
- **Protect**
  - Materials management - Does the project reduce the amount of waste generated by the community, increase rates of recycling or composting, or allow waste materials to be reused locally?
  - Flood Protection - Does the project include natural elements that help safeguard infrastructure, neighborhoods, and residents from flooding events?
  - Equitable housing and neighborhood development - Does the project make it easier for current community members to stay in their homes while also improving the quality of existing homes or expanding the supply of locally affordable housing units?

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Figure 7 Four Core Objectives of the Climate-Smart Cities™ Initiative



**Connecting** the community by providing carbon-free transportation.



**Cooling** through creating shady green spaces that reduce the urban heat island effect.



**Absorbing** rainfall, reducing flooding, and recharging drinking water supplies.



**Protecting** the vulnerable infrastructure, neighborhoods, and residents from flooding and extreme weather events through shoreline parks and natural lands.

### 3.4 Community Engagement

The Richmond Resilience Roadmap included community engagement and outreach events throughout the community to provide community members the opportunity to give input and feedback. Community engagement activities included the project Kick-Off Meeting, National Night Out, NURVE meeting, and the Richmond Wellness Trail Fitness Zone Opening.

#### Project Kick-Off Meeting

The Project kick-off meeting was held on February 12, 2019, from 1:00 p.m. to 2:30 p.m. at Richmond City Hall. The Trust for Public Land and PlaceWorks met with staff from the City of Richmond to discuss the work plan and timeline for the Richmond Resilience Roadmap. Various City departments attended the meeting and helped identify projects and programs for the Resilience Roadmap. Participants included Lina Velasco (Department of Planning and Building), Tawfic Halaby (Department of Engineering and Public Improvements), Greg Hardesty (Parks and Landscaping Division), LaShonda White (City Manager's Office), Joanne Le (Water Resource Recovery), Adam Lenz (City Manager's Office), and Denee Evans (City Manager's Office, Transportation Services).

#### National Night Out

National Night Out is an annual event that takes place nationwide to promote police-community partnerships and neighborhood camaraderie, with the goal of making neighborhoods safer and more caring places to live. The City, Trust for Public Land, and PlaceWorks attended the National Night Out Event hosted by the Coronado Neighborhood Council on August 6, 2019, from 5:00 p.m. to 8:00 p.m. The community closed down a residential block in the Coronado neighborhood and made it a block party with a BBQ and other food, a bounce castle, a band, and other activities. The project team brought poster boards that included a map of the



*Annie Youngerman, of Trust for Public Land, engaging with a community member at National Night Out in the Coronado Neighborhood.*

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Resilience Roadmap, project descriptions, definitions of resilience, and maps of sea level rise, pollution burden, cool priorities, and connect priorities, as shown in Appendix B.

Many attendees came up and spoke to the project team and commented on the board and projects. They were very interested in the identified projects and were supportive of the City’s efforts to secure more funding to improve resilience in their neighborhoods. Many people had heard of some of the projects on the list and the three projects that stood out the most were the Nystrom Village Redevelopment, the Richmond Wellness Trail, and the Martin Luther King Jr. Resilience Hub.



*Residents of the Coronado Neighborhood attending the National Night Out event.*

### NURVE Meeting

On October 24, from 2:00 p.m to 3:30 p.m., the City Manager’s Office hosted a NURVE (Nystrom United Revitalization Effort) meeting, and the Resilience Roadmap team had the opportunity to present and get feedback. The NURVE area includes portions of the Santa Fe and Coronado neighborhoods, and is a longstanding group comprised of staff from the City of Richmond, West Contra Costa Unified School District, National Parks Service, and community members that meet quarterly. PlaceWorks presented the nine projects selected for the Resilience Road Map, and asked for feedback. The community members said that Richmond had done a lot of planning around the nine projects, and were excited to hear that the City would be applying for an implementation grant which could potentially make all the planning work a reality. The community and several city officials cautioned that maintenance costs must be considered during the planning and design process, especially for projects such as the Richmond Wellness Trail, given limited City resources.

### Richmond Wellness Trail Fitness Zone Opening

On October 27, 2019, from 10:00 a.m. to 1:00 p.m., The Trust for Public Land hosted an event at Martin Luther King Jr. Park to share the draft Resilience Roadmap with the community to receive comments, celebrate the opening of the Richmond Wellness Trail Fitness Zone, and get feedback about the design of Richmond Wellness Trail Phase 1 improvements. Unfortunately, attendance was not as high as expected, due to nearby wildfires and an ongoing Public Safety Power Shutoff. These significant events, however,



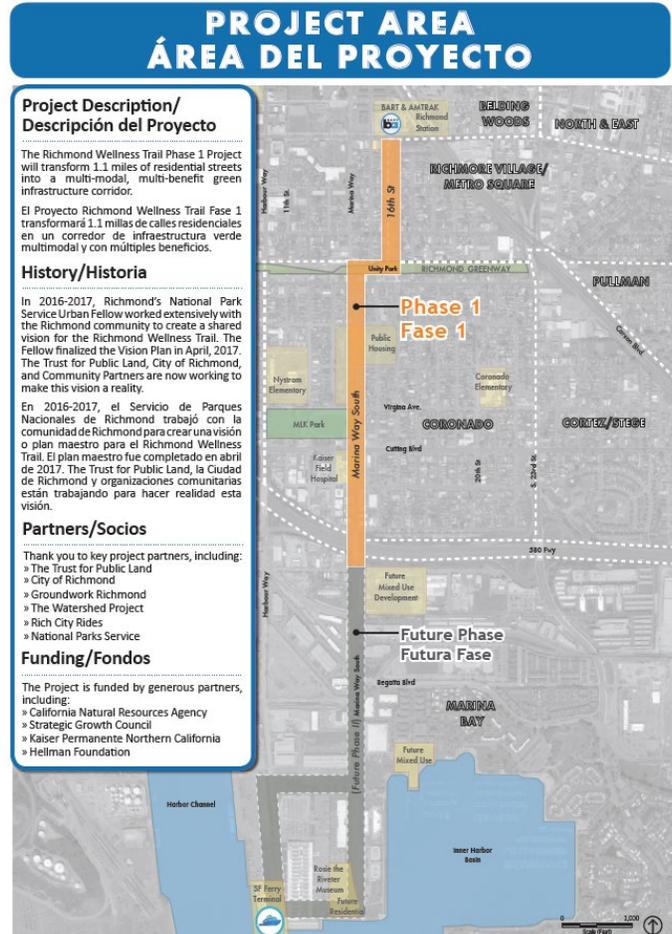
*Community members using the temporary version of the Richmond Wellness Trail and the Fitness Zone Opening Event.*

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only underscore the need for projects like the Resilience Roadmap to support community resilience planning.

The project team (The City of Richmond, The Trust for Public Land, and PlaceWorks) displayed boards with the Resilience Roadmap, resilience definitions, and draft list and graphics of resilience projects on the fence that separates Marina Way South and Martin Luther King Jr. Park. Several neighbors walking along Marina Way South stopped to read the boards and asked about the projects included in the roadmap. Neighbors said they were supportive of this idea of creating resilience hubs and agreed with the suite of projects. However, they were skeptical of the City's ability to finance these projects alone.

Because the team also had boards about the Richmond Wellness Trail (which is part of the Richmond Resilience Roadmap), many neighbors inquired about that project and seemed excited that the trail will link the different neighborhoods and provide connections to regional transportation. A few people said that the Richmond Wellness Trail will not help them because they need to use their cars to get to work east of Richmond in areas that are not easily accessible by public transportation. Others were excited to see Nystrom Village redevelopment as a potential project to get funding and said that Richmond really needs high quality housing. Many people also discussed the Public Safety Power Shutoffs and wildfires and were emphatic that resilience planning is one of their top priorities for the City.



*Project summary board of the Richmond Wellness Trail used at the Richmond Wellness Trail Fitness Zone Opening.*

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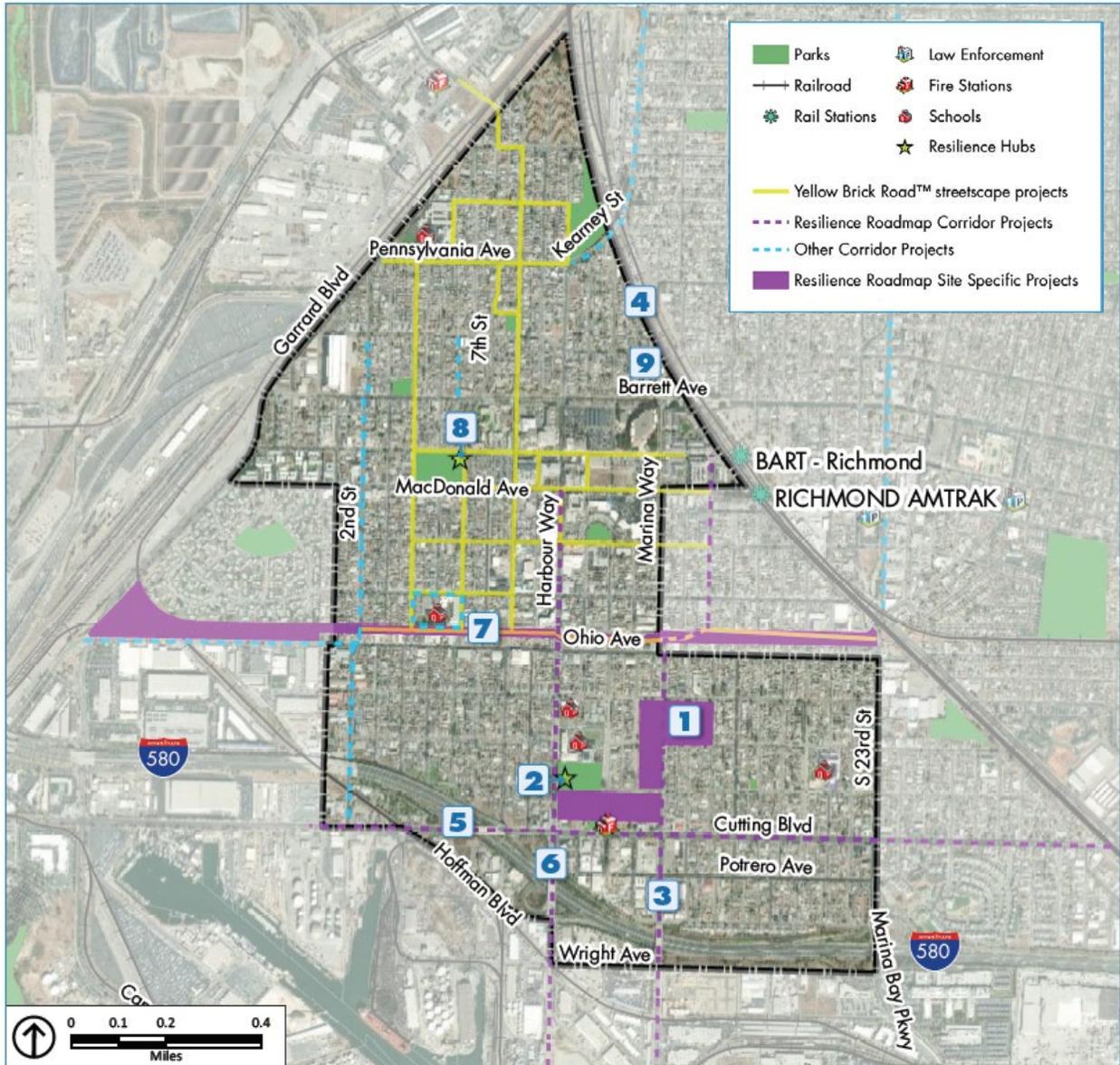
### 4. The Richmond Resilience Roadmap – Project Descriptions

The following sections describe each of the nine projects chosen for the Richmond Resilience Roadmap. There are two types of projects: 1) site specific projects and 2) corridor projects. The site-specific projects are those located on a parcel or set of parcels. Corridor projects are located along a roadway or bike path. Figure 8 shows the location of the projects on the Roadmap. Each of the project descriptions includes the following elements, which not only describe the projects, but also provide an overview of how the projects meet the different elements of the Transformative Climate Communities (TCC) Program:

- **Project Description:** An overview of the location, type of project, and project components.
- **TCC Program Objective Strategies:** A description of which objective strategies from the TCC Implementation Grant Guidelines the project meets and how the project will meet those strategies when implemented.
- **GHG Emission Reduction Potential:** A brief summary of how the project will reduce GHG emissions, including reducing the heat island effect, carbon sequestration, and reducing vehicle miles traveled.
- **Co-Benefits:** A description of the positive public health and environmental health benefits the project will generate.
- **Expanded Economic Opportunities and Shared Prosperity:** An overview of how the community was involved in developing and planning the project. This section also describes the economic benefits the project will create.
- **Consistency with Existing Land Use and Transportation Plans:** A list of the land use and transportation plans that the project must comply with, and a description of how the project complies with those plans.
- **Project Status:** Where the project is in development, the construction readiness, and the TCC readiness requirements in the TCC Implementation Grant Guidelines that still need to be met.

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Figure 8 Project Locations on the Richmond Resilience Roadmap



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### 4.1 Nystrom Village Redevelopment

#### Project Description

Nystrom Village Redevelopment is a redevelopment and historic preservation project located in the Coronado Neighborhood and encompasses four city blocks between Florida Avenue to the north, 16<sup>th</sup> Street to the east, Virginia Avenue to the south, and 13<sup>th</sup> Street to the west. Currently, the project site contains approximately 100 public-housing units, associated parking, and playgrounds. The first part of the Nystrom Village Redevelopment will be the rehabilitation of five historical buildings, which will be exempt from CEQA. These buildings will be rehabilitated to convey the historical significance of the housing site during World War II. The second part of the Nystrom Village Redevelopment is the development of affordable rental units, senior residential units, and for-sale homes, totaling up to 225 residential units. This phase includes proposed community facilities and street and infrastructure improvements. This phase has a preliminary concept, and the City intends to release a Request for Proposals for a developer and partner in the first few months of 2020.

#### TCC Program Objective Strategies

The Nystrom Village Redevelopment meets the following TCC Program Objectives:

- **Equitable Housing and Neighborhood Development.** This project will be required to conform to the Affordable Housing and Sustainable Communities Program Guidelines and conform to the Integrated Connectivity Project Area type guidelines to meet this objective. Nystrom Village Redevelopment will include new pedestrian facilities and other potential transportation services to residents and/or community members. The project will connect to the transit services along Cutting Boulevard and 23<sup>rd</sup> Street. The redevelopment will include pedestrian facilities such as new walkways, streetscape improvements, and street crossings.
- **Solar Installation and Energy Efficiency.** The Nystrom Redevelopment will demolish a portion of the four blocks of housing built during the WWII period to build affordable rental units, senior residential units, and for-sale homes that conform to current building and energy efficiency codes. One of the historic housing sections will be rehabilitated and preserved and converted into a non-profit and museum space. The project will also include streetscaping that will help reduce the urban heat island effect in the neighborhood.
- **Water Efficiency.** This project will include the replacement of inefficient appliances with high-efficiency models, replacement of inefficient fixtures with high-efficiency models, and water efficiency upgrades throughout the new buildings as part of the new development.
- **Urban Greening and Green Infrastructure.** This redevelopment project will plant streetscape and landscape vegetation and trees that will be strategically placed to shade the proposed structures, in addition to the surrounding roadways and pedestrian facilities. Due to stormwater and storm drain requirements in the city, the project will be required to install permeable surfaces, green infrastructure, and other low impact development elements to collect and convey stormwater. These landscaping and permeable elements will provide additional shade on-site and will enhance the community space provided by the rehabilitation of the historic Nystrom Village.

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### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Nystrom Village Redevelopment project is located, and the CalEnviroScreen population and pollution burden scores<sup>19</sup>:

- Census Tract: 6013379000
- CalEnviroScreen 3.0 Percentile: 90-95
- Pollution Burden Percentile Score: 77
- Population Burden Percentile Score: 97

### GHG Emission Reduction Potential

Many elements of the Nystrom Village Redevelopment can contribute to GHG emission reductions, including energy and water efficiency upgrades, urban greening, green infrastructure, connection to transit services, and pedestrian facilities. The energy and water efficiency elements would reduce the need for electricity use on-site, and therefore will reduce the GHG emissions generated to create the electricity. Urban greening, including trees and other landscaping, will provide shading for paved areas and buildings, which will reduce the need for air conditioning on-site and in the surrounding neighborhood, helping to reduce GHG emissions. Green infrastructure, which includes vegetation and permeable surfaces that collect and convey water, can reduce the electricity needed pump stormwater off of the site. Connection to transit services and the installation of pedestrian facilities encourages residents and the surrounding neighborhood to use public transit or active transportation options, which reduce the number of vehicle miles traveled and GHG emissions generated from vehicles.

### Co-Benefits: Improvements to Public Health and Environmental Health

The Nystrom Village Redevelopment will improve public and environmental health in the Coronado neighborhood. The streetscaping and landscaping, green infrastructure, and pedestrian pathways will increase the amount of shading and greenery within the neighborhood, which can both clean the air and reduce the heat island effect, helping to reduce asthma and cardiovascular illness rates. The green infrastructure could not only help reduce flooding hazards in the neighborhood but could also filter out harmful chemicals and heavy metals transported by stormwater runoff, to clean the stormwater prior to being discharged into the storm drain system, creating co-benefits for both public health and environmental health. The proposed pedestrian facilities will encourage walking by residents in the new development and surrounding neighborhood, which can improve health outcomes for all ages.

### Expanded Economic Opportunities and Shared Prosperity

Development of the project design included community engagement, which considered how this redevelopment project could both generate affordable housing while also considering the historical context of Nystrom Village and the surrounding neighborhood. This project will include affordable housing units that will reduce the chance for displacement within the community and ensure that current residents of the neighborhood will also benefit from the project. The proposed development of this project will also create construction, maintenance, and property management jobs within the neighborhood.

### Consistency with Existing Land Use and Transportation Plans

- **Zoning District:** The project site is zoned Medium Density Multi-Family Residential (RM-1), which is intended for single and multi-use family housing types. The maximum density is 26 dwelling units per acres and a minimum density of 10 units per acre, with a maximum of three stories and

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required landscaping of at least 15 percent of the project site. The Nystrom Village Redevelopment will be consistent with these requirements.

- **South Richmond Transportation Connectivity Plan:** The project will be located along Marina Way and in close proximity to Cutting Boulevard, with potential roadway and transit improvement areas in this plan and the General Plan.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Site Design	Not Construction Ready (Project designs still needed)	CEQA Documentation, Permits, Project Designs, Operations and Maintenance Plan

### 4.2 Martin Luther King Jr. Resilience Hub

#### Project Description

The Martin Luther King Jr. Resilience Hub will include the redesign and reconstruction of the MLK community center, which is located north of MLK Park along Harbour Way. The MLK community center will be rebuilt with resilience features to protect the building and provide resources to the community before, during, and after a natural disaster. The building will be zero net energy with solar energy generation and energy storage systems, and it will have the ability to operate at least 72 hours or longer, if a power outage occurs. In addition to the building, programming of the MLK Resilience Hub will provide the community with the tools to increase resilience. This project will have the ability to provide other essential resources to community members, such as food, ice, charging stations, and basic medical supplies during a natural disaster. This resilience hub will act as a cooling center during extreme heat days or as a clean air centers during days of severe air pollution. The MLK Resilience Hub could also be an education center for the community to learn about hazards, in addition to providing a place to gather, access information, and social support services.

**Zero Net Energy:** the actual annual consumed energy of the building is less than or equal to the on-site renewable generated energy.

#### TCC Program Objective Strategies

The MLK Resilience Hub meets the following TCC Program Objectives:

- **Solar Installation and Energy Efficiency.** The MLK Resilience Hub will install energy efficient components that will meet and exceed the 2019 California Building Energy Standards, in addition to constructing a photovoltaic solar system and energy storage system.
- **Water Efficiency.** This project will include the installation of water fixtures that are more water efficient than the fixtures in the previous community center. The construction of the MLK Resilience Hub will also include extensive water efficiency measures such as installation of low water use landscaping and water-efficient irrigation.
- **Health and Well-Being.** The MLK Resilience Hub will include food access elements that will improve community well-being, including a community kitchen or community garden.

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### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the MLK Resilience Hub project is located, and the CalEnviroScreen population and pollution burden scores<sup>20</sup>:

- Census Tract: 6013379000
- CalEnviroScreen 3.0 Percentile: 90-95
- Pollution Burden Percentile Score: 77
- Population Burden Percentile Score: 97

### GHG Emission Reduction Potential

The MLK Resilience Hub project will include the following element that will reduce GHG emissions: energy efficiency, renewable energy sources, and urban greening. The project will install energy efficient fixtures and appliances, in addition to a solar photovoltaic system and battery storage that will reduce the GHG emissions generated by electricity use. The landscaping of the project will provide urban greening that can add shade to the surrounding neighborhood and reduce the urban heat island effect that forces residents to use air conditioning. This project will also provide a place for local community members to gather or escape extreme heat or air pollution, which means they will not have to drive elsewhere to find cooling centers.

### Co-Benefits: Improvements to Public Health and Environmental Health

The MLK Resilience Hub will improve public health and climate justice issues within the Coronado and Santa Fe neighborhoods. This project will provide a place for community members to seek refuge during extreme heat events, severe air pollution, or other natural disasters. If there are power shutoffs, this resilience hub can provide ice and refrigeration for medicine, or electricity to power essential medical equipment. Programming at this center could include educational programs, sport programs, or community activities that will not only bring community members together but also encourage active lifestyle that can improve health outcomes within the community. Other co-benefits will include the installation of landscaping and green infrastructure as part of the project.

### Expanded Economic Opportunities and Shared Prosperity

Development and planning of this project will include community outreach to shape how the resilience hub can best meet the needs of the community. The MLK Resilience Hub could include educational and skill training programs to help residents secure jobs. This project will create construction jobs, in addition to programming positions for the various activities that the MLK Resilience Hub could support.

### Consistency with Existing Land Use and Transportation Plans

- **Zoning District:** The MLK Resilience Hub will be located on a parcel zoned Parks and Recreation, which allows parks and recreation facilities, government buildings, cultural facilities, and community gardens, but does not allow emergency shelters or public safety buildings.
- **General Plan:** This project will implement Goal EC6, Climate-Resilient Communities, of the General Plan Energy and Climate Change Element.
- **Climate Action Plan:** This project will be consistent with Strategy RC6 of the Climate Action Plan, which is to support programs and adaptation responses that protect public health and promote health equity.

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Project Status	Construction Readiness	TCC Readiness Requirements Needed
Planning	Not Construction Ready (Project designs still needed)	CEQA Documentation, Permits, Project Designs, Operations and Maintenance Plan

### 4.3 Richmond Wellness Trail

#### Project Description

The Richmond Wellness Trail is a four-mile trail designed to attract and inspire users to experience and build health and wellness-oriented activity into their daily lives, and function as a multi-benefit green infrastructure corridor with bioswales that slow and capture stormwater and trees that shade buildings and offset greenhouse gases. In addition to the stormwater and GHG-reducing design elements, the trail includes bicycle and pedestrian improvements, activity and rest areas, cultural and natural interpretive features, and interactive elements that support a healthy lifestyle. The Wellness Trail connects the BART and Amtrak station to the new San Francisco Ferry Terminal, while also creating smaller-scale connections to Unity Park, Richmond Greenway, Nystrom Village, Martin Luther King Jr. Park, and Kaiser Field Hospital.

Funding from a TCC Planning Grant supports preparation of technical drawings for Phase 1 of this project, the first 1.1 miles. Phase 1 is on schedule to start construction in December 2020. Appendix C provides additional project information on the Richmond Wellness Trail.

#### TCC Program Objective Strategies

The Richmond Wellness Trail meets the following TCC Program Objectives:

- **Active Transportation.** The Richmond Wellness Trail will include the construction of new bike lanes and pedestrian facilities. Project components include a new cycle track, streetscape improvements, and street crossing enhancements.
- **Water Efficiency.** The landscaping and green infrastructure along the Richmond Wellness Trail will include holistic water efficiency upgrades and native and drought tolerant plant palette where possible.
- **Urban Greening and Green Infrastructure.** This project will include urban tree planting and green infrastructure elements that will both provide shade in the neighborhood and capture and convey stormwater.
- **Health and Well-Being.** This project will increase access to parks and green space by the urban greening components of the project, in addition to providing a connection from the Richmond BART station to Unity Park, Richmond Greenway, Nystrom Village, and Martin Luther King Jr. Park.

#### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Richmond Wellness Trail project is located, and the CalEnviroScreen population and pollution burden scores<sup>21</sup>:

- Census Tracts: 6013376000, 6013377000, 66013379000, 6013380000
- CalEnviroScreen 3.0 Percentile: 85-95
- Pollution Burden Percentile Score: 62-80
- Population Burden Percentile Score: 78-97

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### GHG Emission Reduction Potential

GHG benefits from the Richmond Wellness Trail will be extensive. Phase 1 will add approximately 125 small trees and 15 large trees to the streetscape, which will provide carbon sequestration that will capture carbon dioxide and store it in the soil, reducing overall GHG emissions in the Project Area. A primary goal of the trail is to reduce vehicle miles traveled (VMT) by providing people with the opportunity to walk and bike in a safe and interesting environment. VMT will likely continue to decrease as additional segments are built. While the project does not yet have technical drawings for the remaining trail segments trees will likely be planted at similar intervals as Phase 1.

### Co-Benefits: Improvements to Public Health and Environmental Health

The co-benefits of improving public health and environmental health associated with the Richmond Wellness Trail will be significant. According to the Centers for Disease Control and Prevention, trails like the Richmond Wellness Trail can offer significant health benefits, such as weight control, reduce risk for cardiovascular disease, diabetes, and some cancers, strengthen bones and muscles, improve mental health, and help foster community.<sup>22</sup> Moreover, according to American Trails, trails like the Richmond Wellness Trail improve public safety and environmental health of the City.<sup>23</sup> Phase 1 will plant approximately 125 small trees and 15 large trees, install infrastructure to treat 13,000 gallons of stormwater, and decrease VMTs by encouraging people to drive less and instead use non-vehicular modes of transportation such as walking and biking. For the City of Richmond, which faces chronic air quality issues and flooding, the benefits of tree planting and capturing stormwater will have acutely positive impacts in the Santa Fe, Coronado, and Iron Triangle neighborhoods.

### Expanded Economic Opportunities and Shared Prosperity

Development of this project included outreach and community engagement during site design. Construction and maintenance of this project will provide temporary construction jobs and other maintenance positions. This project also connects the Iron Triangle and Coronado neighborhoods to several important centers and promotes active transportation methods within the Project Area.

### Consistency with Existing Land Use and Transportation Plans

- **City of Richmond General Plan:** The Richmond Wellness Trail was adopted as an Addendum to the Pedestrian Plan in the City of Richmond General Plan on April 25, 2017 and is therefore consistent with the plan.
- **Urban Greening Master Plan:** The Richmond Wellness Trail directly implements the Urban Greening Master Plan and will use the Approved Street Tree List and tree planting best practices.
- **Climate Action Plan:** The Richmond Wellness Trail complies with the policies of the Climate Action Plan, as urban greening is a strategy that helps reduce energy use, moderate temperature and urban heat island effect, reduce noise and air pollution, and enhance safety.
- **Richmond Wellness Trail Vision Plan:** This project directly implements the Richmond Wellness Trail Vision Plan, which is part of the Richmond Pedestrian Master Plan.
- **Parks Master Plan:** The Richmond Wellness Trail connects parks and open space within the City and will adhere to the Parks Master Plan design guidelines.

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- **Bicycle Master Plan:** The Richmond Wellness Trail includes a cycle track and elements proposed in the Bicycle Master Plan, which directly implements the plan.
- **California Statewide Plans:** This project is consistent with several state plans including the State Coastal Conservancy Strategic Plan, California Water Action Plan, California @ 50 Million, and California Climate Adaptation Strategy/Safeguarding California: Reducing Climate Risk Plan.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Site Design	Partially Construction Ready  (Phase 1 technical drawings are in progress. Anticipated construction start date in December 2020. Phase 2 of the project will need to go through technical design before construction can start. We already have the appropriate consultant team assembled and are just seeking funding.)	CEQA Documentation, Permits, Operations and Maintenance Plan

### 4.4 Income-Linked Solar and Home Weatherization

#### Project Description

Income-Linked Solar and Home Weatherization is an ongoing project that occurs throughout the Project Area. This project continues a partnership with GRID Alternatives to install community-wide solar within the Project Area. The Weatherization Program is available through Contra Costa Energy Programs, which assists low-income residents by testing and replacing gas appliances that are not working properly. This program offers home energy audits to recommend energy savings measures. GRID Alternatives, a 501(c)(3) non-profit organization based on Oakland, provides free solar energy systems to households that own and live in their home and makes less than 80 percent of the area median income. GRID Alternatives partners with local governments, utilities, the solar industry, and affordable housing providers to install solar photovoltaic (PV) systems, as well as provide workforce training programs.

#### TCC Program Objective Strategies

The Income-Linked Solar and Home Weatherization Project meets the following TCC Program Objectives:

- **Solar Installation and Energy Efficiency.** This project will include the installation of energy efficiency measures and solar PV systems, in addition to home weatherization elements to residential structures within the Project Area. They also meet the household income eligibility requirements for single family and multi-family buildings.

#### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Income-Linked Solar and Home Weatherization project is located, and the CalEnviroScreen population and pollution burden scores<sup>24</sup>:

- Census Tracts: 6013376000, 6013377000, 66013379000, 6013380000
- CalEnviroScreen 3.0 Percentile: 85-95
- Pollution Burden Percentile Score: 62-80
- Population Burden Percentile Score: 78-97

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### GHG Emission Reduction Potential

This project will install renewable energy sources and provide home weatherization elements that will directly reduce GHG emissions. The installation of solar PV systems will allow homeowners to be less dependent on the grid, which include non-renewable sources for its energy supply. The home weatherization retrofits will mean that residents will use less electricity to cool or heat their homes, reducing the overall amount of energy generation needed in the Project Area.

### Co-Benefits: Improvements to Public Health and Environmental Health

The primary co-benefits of the Income-Linked Solar and Home Weatherization Project are reducing energy bills for residents and improving the health of the indoor environment for residents in the Project Area. Solar installations provide free energy for residents and home weatherization retrofits reduce the energy use, which reduces the housing cost-burdens for households. Home weatherization retrofits can also help control the temperature and air quality within homes, to help indoor temperatures remain in an acceptable range and prevent air pollution from entering homes.

### Expanded Economic Opportunities and Shared Prosperity

Partnering with GRID Alternatives provides opportunities for workforce training programs for residents in the Project Area. Participants can learn hands-on installation skills such as array layout, module installation, electrical wiring, and electrical layout and mounting, which they can use to obtain jobs within the solar or construction industry.

### Consistency with Existing Land Use and Transportation Plans

- **Climate Action Plan:** This program directly implements the goals and strategies of the City's Climate Action Plan.
- **General Plan:** This project will implement Goal EC3, Sustainable and Efficiency Energy Systems, and Goal EC4, Sustainable Development, of the General Plan Energy and Climate Change Element.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Ongoing	Partially Construction Ready	Project Map, Project Designs, Operations and Maintenance Plan

## 4.5 Urban Greening Master Plan – Street Tree Planting along Cutting Boulevard and Harbour Way

### Project Description

The City of Richmond Urban Greening Master Plan, adopted in March 2017, identifies gaps in the tree canopy throughout the City and provides strategies and design guidelines to enhance and maintain the City's urban forest. The Project Area lies within Zones 3, 4, and 10 of the Urban Greening Master Plan. Within these zones, the Plan designates Cutting Boulevard and Harbour Way as areas for additional street tree planting. Groundwork Richmond and other groups are continuously trying to plant trees proposed in the Urban Greening Master Plan, through the City's Adopt-a-Tree Program. Cutting Boulevard has approximately 100 available planting locations and Harbour Way has approximately 120 available planting locations. The Urban Greening Master Plan will also include bioswales that help manage stormwater and provide more landscaped areas.

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### TCC Program Objective Strategies

The Urban Greening Master Plan – Street Tree Planting along Cutting Boulevard and Harbour Way Project meets the following TCC Program Objectives:

- **Urban Greening and Green Infrastructure.** This project will include the planting of trees and other vegetation along Cutting Boulevard and Harbour Way. These trees may or may not provide shade near buildings. Green infrastructure elements will also be included in this project.

### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Urban Greening Master Plan – Street Tree Planting along Cutting Boulevard and Harbour Way Project is located, and the CalEnviroScreen population and pollution burden scores<sup>25</sup>:

- Census Tracts: 6013377000, 66013379000
- CalEnviroScreen 3.0 Percentile: 90-95
- Pollution Burden Percentile Score: 69-77
- Population Burden Percentile Score: 97

### GHG Emission Reduction Potential

This project will indirectly reduce GHG emissions within the Project Area. Planting trees along these roadways will provide additional shade cover to the Project Area, which will reduce the heat island effect. If the temperatures within the Project Area decrease, then residents are likely to use less electricity to cool their homes during high temperatures, subsequently reducing GHG emissions. Adding trees and vegetation to the Project Area may also encourage residents to walk and bike instead of drive to destinations within the neighborhood. Furthermore, trees act to naturally sequester carbon, removing carbon dioxide from the air and storing it in the soil and in the biomass of the trees.

### Co-Benefits: Improvements to Public Health and Environmental Health

This project would provide urban greening that will promote both public and environmental health in the Project Area. Tree plantings will not only provide additional tree canopy cover to the neighborhood but can also help clean the air and water. This project will add pervious surfaces to an urbanized area, which will help prevent flooding by capturing water where it falls and filtering out toxins as it percolates through the soil. Additionally, urban greening can encourage residents to walk and bike instead of drive to destinations within the neighborhood, which promotes physical activity. This can increase positive health outcomes for residents in the Project Area.

### Expanded Economic Opportunities and Shared Prosperity

Installation and maintenance of this project will create temporary landscaping jobs and other maintenance positions for those in the community. The entire community will benefit from additional urban greening and reduction in the urban heat island effect.

### Consistency with Existing Land Use and Transportation Plans

- **General Plan:** This project complies with the Urban Greening Master Plan, which complies with General Plan policies.

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- **Climate Action Plan:** The Street Tree Planting along Cutting Boulevard and Harbour Way complies with the policies of the Climate Action Plan, as urban greening is a strategy that helps reduce energy use and moderate temperature and urban heat island effect.
- **Urban Greening Master Plan:** The Street Tree Planting along Cutting Boulevard and Harbour Way directly implements the Urban Greening Master Plan and will use the Approved Street Tree List and tree planting best practices.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Ongoing	Partially Construction Ready (Conceptual designs and CEQA documentation for the Urban Greening Master Plan complete, no permit needed)	Project Map, Project Designs, Operations and Maintenance Plan

### 4.6 Harbour Way Complete Street Project

#### Project Description

The Harbour Way Complete Street Project is located along Harbour Way from I-580 to Downtown and provides a connection between Downtown Richmond and Ford Peninsula area, through the Coronado and Santa Fe neighborhoods. This corridor currently includes four lanes of fast-moving traffic that create barriers to pedestrians and bicyclists between neighborhoods on either side. This project will include restriping Harbour Way from three lanes to two lanes, adding bike lanes, and adding pedestrian-scale lighting in the short-term. Medium term improvements will include raised medians, installing mid-block crossings, curb extensions, reducing lane width, painting sharrows, and planting medium to large trees in planting strips along the roadways. Long-term improvements will include a road diet from Ohio Avenue to Hoffman Boulevard.<sup>26</sup> This project will also connect MLK Park, the proposed MLK Resilience Hub, and Nystrom Elementary School to the Richmond Greenway and Downtown Richmond.

#### TCC Program Objective Strategies

The Harbour Way Complete Street Project meets the following TCC Program Objectives:

- **Active Transportation.** The Harbour Way Complete Street Project will include the construction of new bike lanes and pedestrian facilities. Project components include new bike lanes, streetscape improvements, street crossing enhancements, and traffic calming measures.
- **Water Efficiency.** The landscaping and green infrastructure along the Harbour Way Complete Street Project will include holistic water efficiency upgrades to any landscaping that is current on-site.
- **Urban Greening and Green Infrastructure.** This project will include urban tree planting and green infrastructure elements that will both provide shade in the neighborhood and capture and convey stormwater.
- **Health and Well-Being.** This project will increase access to parks and green space by the urban greening components of the project, in addition to providing a connection from the MLK Park, MLK Resilience Hub, and Nystrom Elementary School to the Richmond Greenway and Downtown Richmond.

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### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Harbour Way Complete Street project is located, and the CalEnviroScreen population and pollution burden scores<sup>27</sup>:

- Census Tracts: 6013377000, 66013379000
- CalEnviroScreen 3.0 Percentile: 90-95
- Pollution Burden Percentile Score: 69-77
- Population Burden Percentile Score: 97

### GHG Emission Reduction Potential

The Harbour Way Complete Streets Project will reduce GHG emissions through reducing VMTs and increasing urban greening. The road diet, pedestrian improvements, and installation of bicycle lanes will encourage active transportation and naturally slow traffic in the area. This will make it safer for community members to use Harbour Way to walk and bike to key destinations, therefore reducing the amount of GHG emissions generated by cars. Additionally, the streetscape and landscaping proposed as part of this project will provide shade to the surrounding area, reducing the need for air conditioning during hot days, and therefore reducing energy use. Furthermore, trees act to naturally sequester carbon, removing carbon dioxide from the air and storing it in the soil and in the biomass of the trees.

### Co-Benefits: Improvements to Public Health and Environmental Health

Co-benefits of this project include providing a safe environment that encourages physical activity, installing green infrastructure, and cleaning both the air and water. The road diet and pedestrian facility improvements will encourage walking and biking, as vehicle traffic will be generally slower. This will increase physical activity and positive health outcomes for residents in the area. The trees and vegetation will also provide green infrastructure, which will collect and convey stormwater to reduce flooding within the Project Area.

### Expanded Economic Opportunities and Shared Prosperity

This project is part of the City of Richmond Pedestrian Plan, which included outreach and community engagement as part of its development. Installation and maintenance of this project will create temporary jobs and other maintenance positions for those in the community. The entire community will benefit from slower traffic, safer pedestrian routes, urban greening, and reduction in the urban heat island effect.

### Consistency with Existing Land Use and Transportation Plans

- **General Plan:** This project will be consistent with Goals CR1, CR2, and CR3 of the General Plan Circulation Element. This project will also comply with goals in the Energy and Climate Element, Health and Wellness Element, and Public Safety and Noise Element.
- **Climate Action Plan:** This project will directly implement Objective 3: Sustainable Transportation and Land Use, Strategies TL2 and TL3 of the City of Richmond Climate Action Plan.
- **City of Richmond Pedestrian Plan:** This project is part of the City of Richmond Pedestrian Plan and will directly implement the plan objectives.
- **City of Richmond Bicycle Master Plan:** This project will provide Class II bike lanes along Harbour Way, which is consistent with the City of Richmond Bicycle Master Plan.

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Project Status	Construction Readiness	TCC Readiness Requirements Needed
Site Design	Not Construction Ready (Conceptual designs and CEQA documentation complete, no permit needed)	Detailed Project Designs, Operations and Maintenance Plan

### 4.7 Richmond Greenway Master Plan

#### Project Description

Greening the Last Mile includes completing the Richmond Greenway Master Plan from I-80 to Carlson Boulevard. Greening the Last Mile connects to the Project Area via the Portman Portal. This project will both provide urban greening and also external connectivity of the Project Area with other areas of Richmond via a safe active transportation route. The project includes six difference project areas that have pedestrian and landscape elements such as bioswales, meadows, linear orchards, tree plantings, access improvements, plazas, stormwater management, and access to the Ohlone Greenway and Baxter Creek Gateway.

#### TCC Program Objective Strategies

The Richmond Greenway Master Plan – Greening the Last Mile Project meets the following TCC Program Objectives:

- **Active Transportation.** The Greening the Last Mile Project will include the construction of new bike lanes and pedestrian facilities. Project components include new bike lanes and streetscape improvements.
- **Water Efficiency.** The landscaping and green infrastructure along Greening the Last Mile Project will include holistic water efficiency upgrades to any landscaping that is current on-site.
- **Urban Greening and Green Infrastructure.** This project will include urban tree planting and green infrastructure elements that will both provide shade in the neighborhood and capture and convey stormwater.
- **Health and Well-Being.** This project will increase access to parks and green space by the urban greening components of the project, in addition to providing food access through the installation of a linear orchard.

#### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Richmond Greenway Master Plan project is located, and the CalEnviroScreen population and pollution burden scores<sup>28</sup>:

- Census Tracts: 6013377000, 6013381000
- CalEnviroScreen 3.0 Percentile: 80-95
- Pollution Burden Percentile Score: 62-69
- Population Burden Percentile Score: 85-95

#### GHG Emission Reduction Potential

The Greening the Last Mile Project will reduce GHG emissions through reducing VMTs and increasing urban greening. The access improvements and pedestrian elements will encourage active transportation and make it safer for community members to connect to other neighborhoods in Richmond using the

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Richmond Greenway, therefore reducing the amount of GHG emissions generated by cars. Additionally, the landscaping improvements of this project will provide shade to the surrounding area, reducing the need for air conditioning during hot days, and therefore reducing energy use. Furthermore, trees act to naturally sequester carbon, removing carbon dioxide from the air and storing it in the soil and in the biomass of the trees.

### Co-Benefits: Improvements to Public Health and Environmental Health

Co-benefits of this project include providing a safe environment that encourages physical activity, installing green infrastructure, and cleaning both the air and water. The access and pedestrian facility improvements will encourage walking and biking to travel to the eastern portion of Richmond, which will increase physical activity and positive health outcomes for residents in the area. The trees and vegetation will also provide green infrastructure, which will collect and convey stormwater to reduce flooding within the Project Area. The linear orchard will provide food access to an area that is currently a food desert.

### Expanded Economic Opportunities and Shared Prosperity

This project is part of the Richmond Greenway Master Plan, which included outreach and community engagement as part of its development. Installation and maintenance of this project will create temporary jobs and other maintenance positions for those in the community. The entire community will benefit from safer pedestrian and bicycle routes, urban greening, and reduction in the urban heat island effect.

### Consistency with Existing Land Use and Transportation Plans

- **General Plan:** This project is consistent with goals and policies in the Energy and Climate Change Element and Health and Wellness Element of the General Plan.
- **Climate Action Plan:** This project will directly implement Objective 3: Sustainable Transportation and Land Use, Strategy TL3 of the City of Richmond Climate Action Plan.
- **Richmond Greenway Master Plan:** This project is part of the Richmond Greenway Master Plan and will directly implement the plan objectives.
- **City of Richmond Pedestrian Plan:** This project is consistent with the City of Richmond Pedestrian Plan and will directly implement the plan objectives.
- **City of Richmond Bicycle Master Plan:** This project will provide bike lanes along the Richmond Greenway route, which is consistent with the City of Richmond Bicycle Master Plan.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Site Design	Not Construction Ready (Conceptual designs and CEQA documentation for the Richmond Greenway Master Plan complete)	Permits (if needed), Detailed Project Designs, Operations and Maintenance Plan

## 4.8 Nevin Resilience Hub

### Project Description

With a few upgrades, the Nevin Community Center can act as a resilience hub in the future by providing shelter to community members during disasters, in addition to educational and community programming. The Nevin Resilience Hub will be renovated with sustainability features such as low-flow water fixtures,

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energy efficiency improvements, conversion of the HVAC from natural gas to electric, and installing solar panels to the roof of the building with batteries for energy storage. This resilience hub will include similar features to the MLK Resilience Hub but will be located in the Iron Triangle neighborhood.

### TCC Program Objective Strategies

The Nevin Resilience Hub meets the following TCC Program Objectives:

- **Solar Installation and Energy Efficiency.** The Nevin Resilience Hub will install energy efficient components that will go beyond state requirements, in addition to constructing a photovoltaic solar system and energy storage system, to create a zero net energy building.
- **Water Efficiency.** This project will include the installation of water fixtures that are more water efficient than the fixtures in the previous community center. The renovations to the Nevin Resilience Hub will also include extensive water efficiency measures such as installation of low water use landscaping and water efficient irrigation.
- **Health and Well-Being.** The Nevin Resilience Hub will include food access elements that will improve community well-being, including a community kitchen or community garden.

### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Nevin Resilience Hub project is located, and the CalEnviroScreen population and pollution burden scores<sup>29</sup>:

- Census Tracts: 6013377000
- CalEnviroScreen 3.0 Percentile: 90-95
- Pollution Burden Percentile Score: 69
- Population Burden Percentile Score: 97

### GHG Emission Reduction Potential

The Nevin Resilience Hub project will include the following element that will reduce GHG emissions: energy efficiency, renewable energy sources, and urban greening. The project will install energy efficient fixtures and appliances, in addition to a solar photovoltaic system and battery storage that will reduce the GHG emissions generated by electricity use. Additional landscaping or a community garden will provide urban greening that can add shade to the surrounding neighborhood and reduce the urban heat island effect that forces residents to use air conditioning. This project will also provide a place for local community members to gather or escape extreme heat or air pollution, which means they will not have to drive elsewhere to find cooling centers.

### Co-Benefits: Improvements to Public Health and Environmental Health

The Nevin Resilience Hub will improve public health and climate justice issues within the Iron Triangle neighborhood. This project will provide a place for community members to seek refuge during extreme heat events, severe air pollution, or other natural disasters. If there are power shutoffs, this resilience hub can provide ice and refrigeration for medicine, or electricity to power essential medical equipment. Programming at this center could include educational programs, sport programs, or community activities that will not only bring community members together but also encourage active lifestyle that can improve health outcomes within the community.

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### Expanded Economic Opportunities and Shared Prosperity

Development and planning of this project will include community outreach to shape how the resilience hub can best meet the needs of the community. The Nevin Resilience Hub could include educational and skill training programs to help residents secure jobs, in addition to the existing activities that already take place at the community center. This project will create construction jobs, in addition to programming positions for the various activities that the Nevin Resilience Hub could support.

### Consistency with Existing Land Use and Transportation Plans

- **Zoning District:** The Nevin Resilience Hub will be located on a parcel that is currently developed with a community center and park space. This project will only add resilience and sustainability features to the existing development and will not change the zoning.
- **General Plan:** This project will implement Goal EC6, Climate-Resilient Communities, of the General Plan Energy and Climate Change Element.
- **Climate Action Plan:** This project will be consistent with Strategy RC6 of the Climate Action Plan, which is to support programs and adaptation responses that protect public health and promote health equity.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Planning	Not Construction Ready (Conceptual designs needed)	CEQA Documentation, Permits (if needed), Project Designs, Operations and Maintenance Plan

## 4.9 Hacienda Rehabilitation

### Project Description

The Hacienda Rehabilitation project is located on Barrett Avenue, between 13<sup>th</sup> Street and Marina Way, on the eastern portion of the Iron Triangle neighborhood. This project includes the renovations of an existing 100 percent affordable senior housing apartment building and accessory off-street parking. Renovations involve site improvements, interior building improvements, exterior building improvements, and system modifications. Site improvements will include rehabilitation of landscaping and paving, repair of surface materials in the parking lot, and repairs to the lighting. Interior improvements will include refinishing the entire building, removing asbestos, bringing units up to accessibility code, and installing a fitness center. Exterior building improvements will involve the replacement of windows in all dwelling units, reroofing and insulating the roof, and balcony deck waterproofing. System modifications will include seismic retrofits to ensure safety of the occupants, updating and replacing the elevator system, and repairing or replacing equipment to improve energy efficiency on-site.

### TCC Program Objective Strategies

The Hacienda Rehabilitation project meets the following TCC Program Objectives:

- **Equitable Housing and Neighborhood Development.** The Hacienda Rehabilitation project will include a partnership with the City and Mercy Housing to renovate an existing affordable housing project that is less than 0.25 miles from a high-quality transit stop, including BART, Amtrak, and AC Transit transportation options.

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- **Solar Installation and Energy Efficiency.** The Hacienda Rehabilitation project will install energy efficient components that will increase energy efficiency on-site, such as low flow water fixture, high efficiency light fixtures, and re-paving the parking lot.
- **Water Efficiency.** This project will include the installation of water fixtures that are more water efficient than the fixtures in the original housing development. The renovations to the Hacienda housing complex will also include extensive water efficiency measures such as installation of low water use landscaping and water efficient irrigation.
- **Urban Greening and Green Infrastructure.** The Hacienda Rehabilitation project will include re-landscaping the project site, which will include planting trees that will provide shade for both the building and surrounding neighborhood. This landscaping may also include green infrastructure elements to reduce flooding on-site.
- **Health and Well-Being.** This project will include a community garden on the northwest portion of the project site. This can provide residents of the community the opportunity to care or the garden and provides access to fresh food.

### CalEnviroScreen 3.0 Score by Census Tract

The following describes the census tract where the Hacienda Rehabilitation project is located, and the CalEnviroScreen population and pollution burden scores<sup>30</sup>:

- Census Tracts: 601376000
- CalEnviroScreen 3.0 Percentile: 85-90
- Pollution Burden Percentile Score: 62
- Population Burden Percentile Score: 95

### GHG Emission Reduction Potential

Many elements of the Hacienda Rehabilitation project can contribute to GHG emission reductions, including energy and water efficiency upgrades, urban greening, and connection to transit services. The energy and water efficiency elements would reduce the need for electricity use on-site, and therefore will reduce the GHG emissions generated to create the electricity. Urban greening, including trees and other landscaping, will provide shading for paved areas and buildings, which will reduce the need for air conditioning on-site and in the surrounding neighborhood, helping to reduce GHG emissions. Connection to transit services encourages residents and the surrounding neighborhood to use public transit or active transportation options, which reduce the number of vehicle miles traveled and GHG emissions generated from vehicles.

### Co-Benefits: Improvements to Public Health and Environmental Health

The Hacienda Rehabilitation will improve public and environmental health in the Iron Triangle neighborhood. The streetscaping and landscaping will increase the amount of shading and greenery within the neighborhood, which can both clean the air and reduce the heat island effect, helping to reduce asthma and cardiovascular illness rates. The increase in landscaped and permeable surfaces could not only help reduce flooding hazards in the neighborhood but could also filter out harmful chemicals and heavy metals transported by stormwater runoff, to clean the stormwater prior to being discharged into the storm drain system, creating co-benefits for both public health and environmental health.

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### Expanded Economic Opportunities and Shared Prosperity

Development of the rehabilitation components included community engagement, which considered how this redevelopment project could improve affordable housing and the surrounding neighborhood. This project will include affordable housing units that will reduce the chance for displacement within the community and ensure that current residents of the neighborhood will also benefit from the project. The proposed development of this project will also create construction, maintenance, and property management jobs within the neighborhood.

### Consistency with Existing Land Use and Transportation Plans

- **Zoning District:** The project site is zoned Commercial Mixed-Use Activity Center (CM-5), which is intended for medium and high-rise mixed-use development at major activity centers. The zoning district allows for group residential units with a conditional use permit and has a maximum density of 40 units or 125 units per acre. The Hacienda Rehabilitation project meets the requirements of this zoning district and received an approved conditional use permit for the renovations to the existing building.

Project Status	Construction Readiness	TCC Readiness Requirements Needed
Building Permits	Construction Ready  (Site plans/designs, CEQA documentation, and approval of Conditional Use Permit complete. )	Operations and Maintenance Plan

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### 5. Sources

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- <sup>5</sup> California Coastal Commission, 2018, *California Coastal Commission Sea Level Rise Policy Guidance: Science Update – July 2018*, [https://documents.coastal.ca.gov/assets/slr/guidance/2018/3\\_Ch3\\_2018AdoptedSLRGuidanceUpdate.pdf](https://documents.coastal.ca.gov/assets/slr/guidance/2018/3_Ch3_2018AdoptedSLRGuidanceUpdate.pdf)
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- <sup>9</sup> Contra Costa Health Services. 2015. *Climate Change Vulnerability in Contra Costa County: A Focus on Heat*. <https://cchealth.org/health-data/pdf/2015-climate-change.pdf>
- <sup>10</sup> Contra Costa Health Services. 2015. *Climate Change Vulnerability in Contra Costa County: A Focus on Heat*. <https://cchealth.org/health-data/pdf/2015-climate-change.pdf>. Page 29.
- <sup>11</sup> California Energy Commission (CEC). 2018. “Cal-Adapt: Guidance on Using Climate Projections”. <http://cal-adapt.org/resources/using-climate-projections/>.
- <sup>12</sup> Roos, Michelle. (E4 Strategic Solutions), 2018, *Climate Justice Summary Report*, California’s Fourth Climate Change Assessment, Publication number: SUM-CCCA4-2018-012. Page 11.
- <sup>13</sup> Cooley, H., E. Moore, M. Heberger, and L. Allen (Pacific Institute), 2012, *Social Vulnerability to Climate Change in California: A White Paper from the California Energy Commission’s California Climate Change Center*, White Paper, California Energy Commission, 2012.
- <sup>14</sup> Roos, Michelle. (E4 Strategic Solutions), 2018, *Climate Justice Summary Report*, California’s Fourth Climate Change Assessment, Publication number: SUM-CCCA4-2018-012. Page 14.
- <sup>15</sup> Yuen, Tina, Eric Yurkovich, Lauren Grabowski, Beth Altshuler, 2017, Guide to Equitable Community-Driven Climate Preparedness Planning, Urban Sustainability Directors Network. Page 10.
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<sup>23</sup> American Trails, 2018, Trail Effects on Neighborhoods: Home Value, Safety, Quality of Life, <https://www.americantrails.org/resources/trail-effects-on-neighborhoods-home-value-safety-quality-of-life> accessed December 16, 2019.

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<sup>25</sup> California Office of Environmental Health Hazard Assessment, June 2018, *CalEnviroScreen 3.0*, <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30> accessed December 27, 2019.

<sup>26</sup> Local Government Commission, October 2011, City Richmond Pedestrian Plan, Pages 50 to 51.

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<sup>28</sup> California Office of Environmental Health Hazard Assessment, June 2018, *CalEnviroScreen 3.0*, <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30> accessed December 27, 2019.

<sup>29</sup> California Office of Environmental Health Hazard Assessment, June 2018, *CalEnviroScreen 3.0*, <https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-30> accessed December 27, 2019.

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APPENDIX A:  
PROJECT EVALUATION MATRIX

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Project Number	Project Name	Location	Has the Project been implemented?	Connect		Cool			Absorb			Protect			Count (Out of 10)
				Transit access and mobility - Does the project make it easier and safer for community members, especially those with limited or no vehicle access, to travel to and from key destinations in a low- or zero-carbon way?	Health and well-being - Does the project improve connections to places that improve public health and well-being, civic and social engagement, employment, and education?	Land conservation and restoration - Does the project protect, restore, or expand natural ecosystems or ecosystem services?	Does the project help protect residents from high temperatures and extreme weather events?	Decarbonized energy and energy efficiency - Does the project reduce energy use, support more renewable and zero net energy and building, or improve energy storage and energy independence?	Urban greening and green infrastructure - Does the project increase the number of parks or green spaces, street trees, permeable paving, bioswales, or other green infrastructure features?	Water efficiency - Does the project reduce water use, increase use of captured rainwater or greywater, or promote recycled water use?	Materials management - Does the project reduce the amount of waste generated by the community, increase rates of recycling or composting, or allow waste materials to be reused locally?	Does the project include natural elements that help safeguard infrastructure, neighborhoods, and residents from flooding events.	Equitable housing and neighborhood development - Does the project make it easier for current community members to stay in their homes while also improving the quality of existing homes or expanding the supply of locally-affordable housing units?		
1	Alleyway Greening Projects (Mathieu Court)	Mathieu Court Alley, between 5th and 6th Street and Ripley and Barrett Avenue.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	8
2	City-wide tree planting	Zone 4 and Zone 3 of the City Tree Inventory	No	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	6
3	Urban Greening Master Plan (UGMP)	Entire City of Richmond, specific projects in Mathieu Court and Unity Park	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	7
4	Stormwater and Drainage Improvements	1st and North Harbor Basins of sewer plan	Ongoing	No	No	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	5
5	2nd Street Project (PCB Focus)	2nd Street between Cutting Boulevard and Ripley Avenue	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	8
6	Urban Agricultural Assessment	Citywide	Ongoing	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	7
7	Yellow Brick Road Iron Triangle Walkable Neighborhood Plan	Iron Triangle neighborhood	Ongoing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	7
8	Richmond Greenway Master Plan	Richmond Greenway Trail in southern region of project area	Ongoing	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	9
9	Paving and Sidewalk Projects	Throughout the Project Area - Specific project at Cutting Boulevard, Portrero Avenue, and Harbour Way	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	8
10	Rumrill Boulevard and 13th Street Complete Streets Study	Northeast corner of the Iron Triangle	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	7

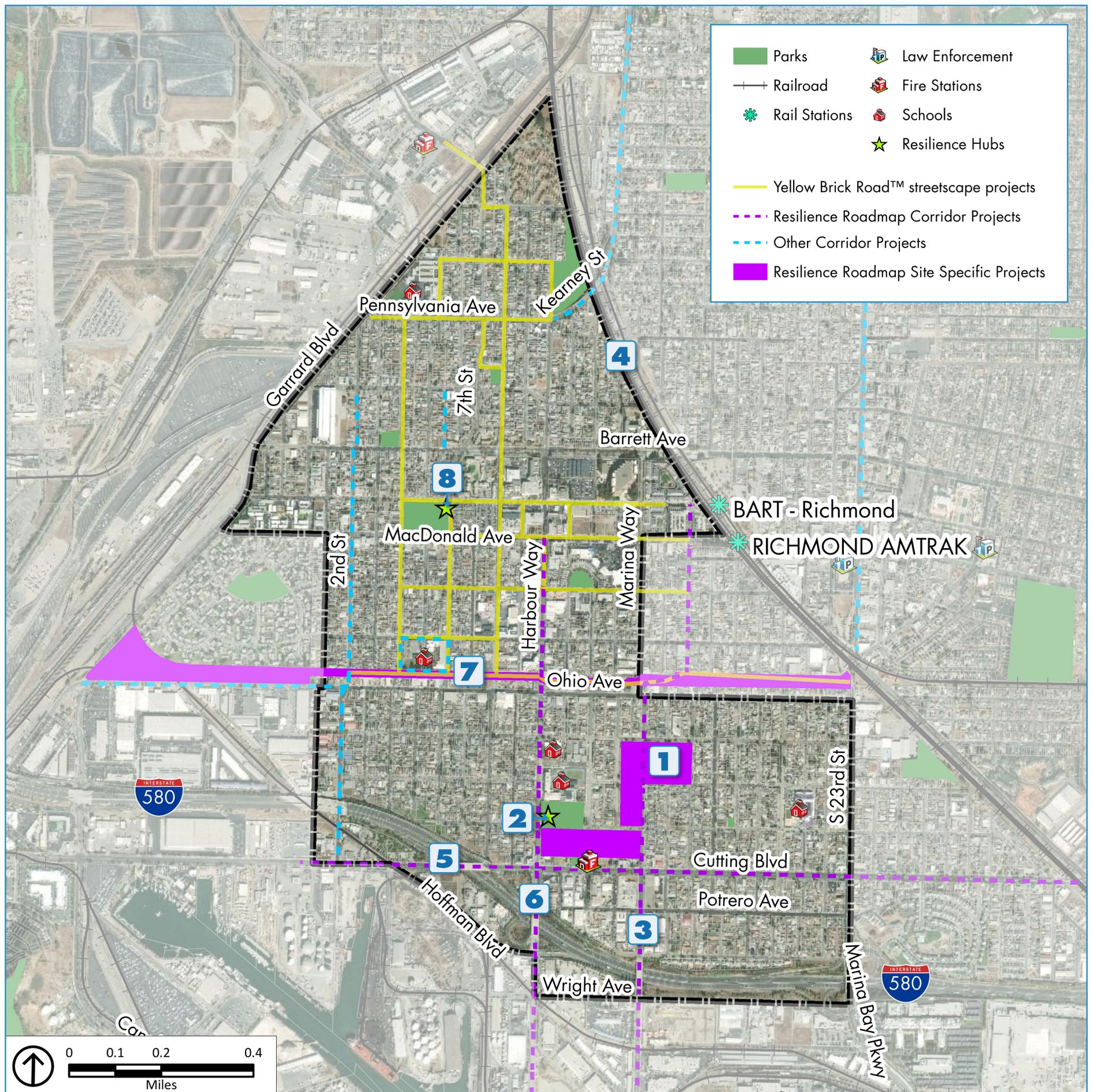
Project Number	Project Name	Location	Has the Project been implemented?	Connect		Cool				Absorb			Protect			Count (Out of 10)								
				Transit access and mobility - Does the project make it easier and safer for community members, especially those with limited or no vehicle access, to travel to and from key destinations in a low- or zero-carbon way?	Health and well-being - Does the project improve connections to places that improve public health and well-being, civic and social engagement, employment, and education?	Land conservation and restoration - Does the project protect, restore, or expand natural ecosystems or ecosystem services?	Does the project help protect residents from high temperatures and extreme weather events?	Decarbonized energy and energy efficiency - Does the project reduce energy use, support more renewable and zero net energy and building, or improve energy storage and energy independence?	Urban greening and green infrastructure - Does the project increase the number of parks or green spaces, street trees, permeable paving, bioswales, or other green infrastructure features?	Water efficiency - Does the project reduce water use, increase use of captured rainwater or greywater, or promote recycled water use?	Materials management - Does the project reduce the amount of waste generated by the community, increase rates of recycling or composting, or allow waste materials to be reused locally?	Does the project include natural elements that help safeguard infrastructure, neighborhoods, and residents from flooding events.	Equitable housing and neighborhood development - Does the project make it easier for current community members to stay in their homes while also improving the quality of existing homes or expanding the supply of locally-affordable housing units?											
11	South Richmond Connectivity Plan	Santa Fe and Coronado neighborhoods	No	Yes	This plan has specific measures to improve transit options, as well as pedestrian and bicycle connections between south Richmond and the north areas of the city, including the Ferry Terminal and BART stations. Protected bike lanes and curb extensions are proposed.	Yes	One of the primary principles of the plan is "Accessibility may also be enhanced through land use and development strategies that bring people, goods, and services closer together" and "Dense, connected networks of transportation facilities and services are a key condition for efficient mobility and in turn for providing accessibility"	Yes	The projects included in this plan all have landscaping components, which would restore or expand natural ecosystems in the project areas and provide ecosystem services such as reducing the heat island effect.	Yes	The landscaping components would include street trees, which would provide shade cover and ultimately reduce the heat island effect. This would help protect residents from high temperatures and extreme weather.	Yes	The street trees included in the landscaping component would provide shade cover in the area, which would also reduce the heat island effect. This would indirectly result in residents reducing their energy use for air conditioning during warmer periods of the year.	Yes	The project includes adding green infrastructure, street trees, and green spaces into the streetscape through complete street measures.	No	The project would preserve water resources and collect water where it falls through green infrastructure element. However, the project would not specifically reduce water use.	No	These projects do not discuss materials management, recycling, or waste reduction measures.	Yes	The project include several green infrastructure and bioswale elements that would collect and convey water where it falls, and therefore reduce stormwater runoff and flooding in the project area.	No	The project would make it easier for current community members to stay in their homes through due to street safety improvements. However, the project would not improve quality of existing homes or increase the supply of affordable housing.	7
12	Richmond Wellness Trail Vision Plan	Connection from BART/Amtrak station to Future SF Ferry Terminal along 16th street, Richmond Greenway, and Marina Way.	No	Yes	The project include bike and pedestrian safety measures that will make it easier and safer for community members to travel to key destinations. The street trees and landscaping elements will line the street and make it more pleasant to walk during warm weather.	Yes	The wellness trail connects the BART and Amtrak station to the Richmond Greenway, public housing, MLK park, Kaiser field hospital, and eventually the SF Ferry Terminal.	Yes	The project would have several landscaping components, which would expand the natural ecosystem and provide habitat for native birds and wildlife species.	Yes	The project include planting of street trees with large canopies that would provide shade cover that can protect residents from high temperatures and extreme weather events.	Yes	The street tree component of the landscaping would provide canopy cover that would reduce the heat island effect in the project area. This, in-turn, would reduce the need for air conditioning/energy use during warmer periods of the year.	Yes	The project would include landscaping and street trees that would increase the green space within the project area. Bioswales and other green infrastructure would also be used in the landscaping buffers for pedestrians and bicyclists.	No	The project includes rain gardens that will help collect water and landscaping that will be low water use. However the project does not specifically refer to water conservation measures.	No	The project does not discuss materials management, recycling, or waste reduction.	Yes	The project includes stormwater planters that collect and convey water into both natural systems and wastewater infrastructure. This will help protect residents from flooding.	No	The project does not include home improvements or expanding the supply of affordable housing units.	7
13	Richmond First/Last Mile Transportation Strategic Plan	Citywide, many of the projects go through the project area	No	Yes	Implementation of the Plan will include pedestrian/bicycle improvements, shuttle networks, bike share program, and e-scooters that will help community members travel from the project area to other areas of the City.	Yes	Implementation of the Plan would connect neighborhoods with medical, employment, educational, and civic centers through providing easier travel means from primary mobility hubs to other areas of the City.	Yes	Implementation of the Plan will expand or restore landscaped areas adjacent to pedestrian/bicycle improvements, which will enhance natural ecosystems to support habitat for native birds and wildlife species.	Yes	Implementation of the Plan will include complete street elements and pedestrian improvements that will include planting trees to provide shade cover and green infrastructure to help with extreme weather events.	Yes	The landscaping included as part of the implementation of this Plan will help reduce the heat island effect, which will in-turn reduce the need for energy use associated with air conditioning units.	Yes	Implementation of this Plan will increase the number of street trees and green infrastructure through the complete streets and Yellow brick road projects.	No	This plan does not include water efficiency measures nor promotes recycles water use.	No	The Plan does not discuss materials management, recycling, or waste reduction.	Yes	Implementation of the Plan would include stormwater infrastructure and provides more natural elements that may safeguard areas from flooding events.	No	Implementation of the Plan does not include home improvements or expanding the supply of affordable housing units.	7
14	Safe Routes to School Projects	Lincoln Elementary School, Peres Elementary School	No	Yes	The project includes pedestrian improvements that promote walking and bicycling that connect the iron triangle neighborhood to Lincoln Elementary School and Peres Elementary School.	Yes	The project would connect residential neighborhoods with Lincoln Elementary School and Peres Elementary School, which are education, employment, and social engagement centers.	Yes	The project will include landscaping and stormwater planters that will expand natural ecosystems with the neighborhood to provide habitat for native bird and wildlife species.	Yes	The landscaping component of the project would provide additional shade and reduce the heat island effect in the project area.	Yes	The reduction of the heat island effect will decrease the need for air conditioning use, which will reduce overall energy use.	Yes	The project includes landscaping and stormwater planters that will increase green space, street trees, and green infrastructure to the neighborhood.	No	The project includes stormwater planters, but does not include water efficiency elements other than complying with WELO requirements.	No	The project does not discuss materials management, recycling, or waste reduction.	Yes	The project includes stormwater planters that collect and convey water into both natural systems and wastewater infrastructure. This will help protect residents from flooding.	No	The project does not include home improvements or expanding the supply of affordable housing units.	7
15	Park Improvements	Boorman Park, Southside Park, MLK Park	No	Yes	The projects would improve park spaces and would encourage residents to use the parks more frequently, which would indirectly create a safer space for community members to walk or bike to and from key destinations.	No	The park improvements can act as a social engagement center, however, these projects will not improve connection to places in the community.	No	The projects do not include landscaping elements that would provide land conservation or restoration.	Yes	The projects may include shade structures that would protect residents using the park facilities from high temperatures.	No	The projects would not provide tree cover or other landscaping that would reduce the heat island effect. The projects would also not reduce energy use or provide energy storage.	Yes	The projects would improve underutilized parks within the project area and provide additional green space for residents to enjoy.	No	The projects do not include stormwater infrastructure or water efficiency elements.	No	The projects do not include elements that would reduce the amount of waste in the community or increase rates of recycling or composting.	No	The majority of these improvements will be structural playground/field improvements that may not include flood protection elements.	No	The projects do not include home improvements or expanding the supply of affordable housing units.	3
16	Renovation of the MLK Community Center	MLK Community Center Park	No	Yes	The project would most likely include walking/biking paths through the property that would make it easier for community members to travel to key destinations in the MLK Park area.	Yes	The project would create a new connection with a civic and social engagement center and provide educational and/or exercise programs to the community.	Yes	The project would most likely include new landscaping, which would expand the natural ecosystems in the area and provide habitat for native birds and wildlife species.	Yes	The project would most likely be air conditioned and could provide the community with a cooling center that would act as a refuge for community members during heat waves or poor air quality conditions.	Yes	The new community center would be required to be built to California Building Codes and Energy Efficiency Codes, and may include solar or EV charges as funding is available.	Yes	The project would increase and improve existing parks in the area, which would include street trees. Due to previous flooding events, the project would most likely include green infrastructure and bioswales to protect the new facilities from flooding.	Yes	The project may have greywater systems or promote recycled water use.	No	The project would most likely not include materials management. However, the programming at this facility could promote recycling and composting.	Yes	The project would most likely include natural elements that would safeguard the facility from flooding, due to previous events that have damaged the community center.	No	The community center would most likely not include home improvements or expand the supply of affordable housing.	8
17	Energy Efficiency Improvements at City facilities	Citywide	No	No	The project does not include transportation elements.	No	The project does not include elements that will connect people to key destinations.	No	The project does not contain elements of land conservation or land restoration.	Yes	Energy efficiency projects could protect City staff from hot weather through increasing insulation in City buildings.	Yes	Energy efficiency upgrades will reduce overall energy use for City facilities and support zero net energy buildings.	Yes	Energy efficiency upgrades can include adding permeable surfaces, bioswales, and other green infrastructure elements to buildings to reduce overall energy use in the buildings.	Yes	Energy efficiency upgrades can include using rainwater, greywater, or other other recycled water that decreases the need to pump water for landscaping or plumbing in buildings.	No	Energy efficiency upgrades would not include waste management elements.	No	Energy efficiency upgrades typically do not include safeguarding infrastructure.	Yes	Publicly owned housing is included in City facilities and thus would be improved and encourage community members to stay in their homes if energy upgrades area completed.	5
18	Income-linked Solar Energy Installations	Citywide	Ongoing	No	This project does not include transportation elements.	No	The project does not include elements that will connect people to key destinations.	No	The project would not include land conservation or restoration.	Yes	Income-linked solar programs would provide energy options that will work during extreme heat conditions and can allow homeowners to use air conditioning units without the high cost of electricity.	Yes	Income-linked solar installation would directly support renewable energy sources and improve energy independence from the grid.	No	The project would not include urban greening or green infrastructure.	No	The project would not include water efficiency measures.	No	The project would not include materials management elements.	No	The solar installations would not include flood protection features.	Yes	Income-linked solar installations would reduce overall energy bills and incentivize current residents to stay in their homes.	3
19	Solar energy installations on municipal buildings/public housing	Citywide	Ongoing	No	This project does not include transportation elements.	No	The project does not include elements that will connect people to key destinations.	No	The project would not include land conservation or restoration.	Yes	Solar energy installations would provide renewable energy options that would support increased energy use by air conditioning units during extreme heat conditions.	Yes	Solar installations would directly support renewable energy sources and improve energy independence from the grid.	No	The project would not include urban greening or green infrastructure.	No	The project would not include water efficiency measures.	No	The project would not include materials management elements.	No	The solar installations would not include flood protection features.	Yes	Solar installations on public housing would reduce energy bills and incentivize community members to stay in their homes.	3
20	Nystrom Village	Nystrom Village, Coronado neighborhood	No	Yes	The project would include street improvements that would enable community members to walk or bike more easily through the neighborhood. Nystrom Village would connect to the MLK Park and the future Community Center.	Yes	Nystrom Village revitalization would connect the housing development to MLK Park and Nystrom Elementary School.	Yes	The project would include new landscaping and open space areas that would expand natural ecosystems and provide habitat for native bird species and other wildlife.	Yes	The landscaping and street trees would help protect residents from extreme heat events. Newer, well-insulated, and air filtered buildings would also protect residents from heat events and poor air quality.	Yes	The project would build new buildings that would be required to comply with newer California building and energy efficiency codes, which would reduce the overall energy use and create more renewable buildings than what is currently on-site.	Yes	The project would include new landscaping and open space areas, which would provide street trees, bioswales, and other green infrastructure elements.	Yes	The housing project would be required to comply with current California building codes, which require more water efficient building and appliances than what are currently on-site. Recycled water or greywater systems could be included as part of the project.	No	This project would not include materials management elements.	Yes	The project would include landscaping elements such as bioswales and green infrastructure that would protect residents from flooding.	Yes	The project would improve the quality of housing and create additional affordable housing units in the neighborhood. This would expand the supply of affordable housing in the area and make it easier for current community members to stay in the community.	9
21	Hacienda Public Housing Development	Hacienda, Iron Triangle Neighborhood	No	No	The project would provide minimal street improvements, which may not make it easier or safer from community members without vehicles to travel to key destinations.	No	The project does not improve connections between places within the area.	Yes	The project includes expanding landscaped and open space areas within the housing development, which would restore natural ecosystems and provide habitat for native bird and wildlife species.	Yes	An upgraded building with new insulation and window replacements would protect residents from extreme heat events.	Yes	Upgrading the housing development with new windows and added insulation would reduce overall energy use and create a more energy efficient building.	Yes	The project would add green space to the project site and rehabilitate the existing landscaping.	No	The project would not include water efficiency measures.	No	The project would not include materials management elements.	No	The project does not have flood control elements.	Yes	The project includes rehabilitating in existing public housing development, which would improve the quality of existing housing in the neighborhood.	5

APPENDIX B:  
PROJECT BOARDS USED FOR  
OUTREACH



# RICHMOND RESILIENCE ROADMAP

FOR THE IRON TRIANGLE, SANTA FE, AND CORONADO NEIGHBORHOODS



What do you think about the Resilience Roadmap?

# RICHMOND RESILIENCE ROADMAP FOR THE IRON TRIANGLE, SANTA FE, AND CORONADO NEIGHBORHOODS



## WHAT IS THE RICHMOND RESILIENCE ROADMAP?

A collaborative effort between the City, community partners, and Trust for Public Land to identify, fund, and build public projects within Richmond's neighborhoods that will continue to increase the resiliency of community members, community facilities and services, businesses, and the neighborhoods to disruptions caused by climate change.

## WHY ARE WE DOING THIS PROJECT?

To create a roadmap of planned projects that support community resilience and require additional implementation funding support from state grants and other sources to be built and achieve multiple community goals. The roadmap connects and expands recent efforts, including the City's Climate Action Plan and the Climate-Smart Cities™ Initiative. The four core objectives of the Climate-Smart Cities™ Initiative are **connecting** the community by providing carbon-free transportation; **cooling** through creating shady green spaces that reduce the urban heat island effect; **absorbing** rainfall, reducing flooding, and recharging drinking water supplies; and **protecting** the vulnerable infrastructure, neighborhoods, and residents from flooding and extreme weather events through shoreline parks and natural lands.

## WHAT IS A COMMUNITY RESILIENCE HUB?

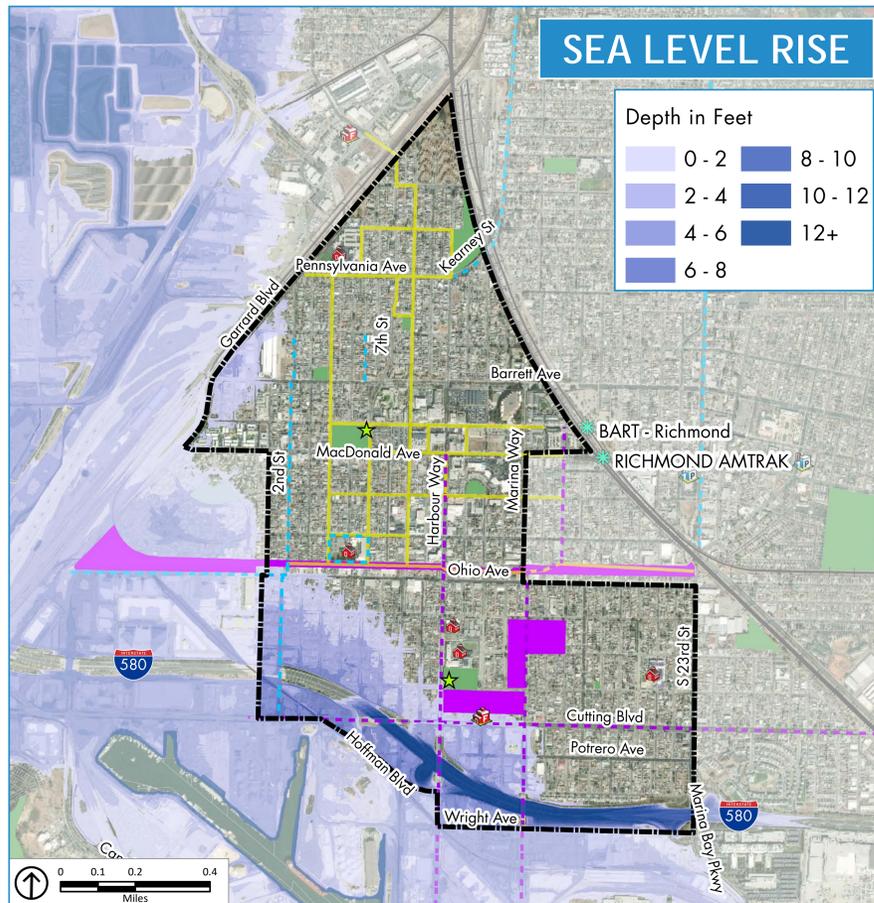
Resilience Hubs are existing neighborhood centers that support residents and offer community services, activities, and opportunities and help to increase community capacity to prepare for, respond to, and recover from extreme events. They provide educational and capacity building resources and reliable, clean electricity year-round. Resilience Hubs also provide shelter, food, medical supplies, information, and other supplies in the event of an emergency. Resilience Hubs are easily accessed by neighborhood residents, connect to community resources, and have low carbon footprint.

## RESILIENCE PROJECTS

## CLIMATE SMART OBJECTIVES

<p><b>1</b> Nystrom Village Redevelopment</p>	<p>The redevelopment of Nystrom Village encompasses 4 City blocks and will include affordable rental units, senior residential units, and for-sale homes. Other proposed features include community facilities, street and infrastructure improvements, and the rehabilitation of several of the historic buildings for interpretation on-site.</p>	<table border="1"> <tr> <td>Residential Homes = 212</td> <td>For-Sale Homes = 78</td> </tr> <tr> <td>1 Bedroom Flats = 32</td> <td>3 Bedroom Homes = 30</td> </tr> <tr> <td>2 Bedroom Flats = 44</td> <td>4 Bedroom Homes = 9</td> </tr> <tr> <td>3 Bedroom Townhomes = 41</td> <td>Senior Living Units = 100</td> </tr> <tr> <td>4 Bedroom Townhomes = 34</td> <td>1 Bedroom Flats = 100</td> </tr> <tr> <td colspan="2">Total = 461 Homes</td> </tr> </table>	Residential Homes = 212	For-Sale Homes = 78	1 Bedroom Flats = 32	3 Bedroom Homes = 30	2 Bedroom Flats = 44	4 Bedroom Homes = 9	3 Bedroom Townhomes = 41	Senior Living Units = 100	4 Bedroom Townhomes = 34	1 Bedroom Flats = 100	Total = 461 Homes		
Residential Homes = 212	For-Sale Homes = 78														
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3 Bedroom Townhomes = 41	Senior Living Units = 100														
4 Bedroom Townhomes = 34	1 Bedroom Flats = 100														
Total = 461 Homes															
<p><b>2</b> Martin Luther King Jr. Resilience Hub</p>	<p>The MLK Resilience Hub will include a reconstruction of the MLK community center, with resilience features to protect the building during a natural disaster. The building should be zero net energy with solar and energy storage systems. The MLK Resilience Hub can act as an education center for the community to learn about hazards and help community members better adapt to changing conditions.</p>														
<p><b>3</b> Richmond Wellness Trail</p>	<p>The Richmond Wellness Trail is a four-mile trail that is designed to attract and inspire users to experience and build health and wellness-oriented activity into their daily lives. The trail includes bicycle and pedestrian improvements, activity and rest areas, cultural and natural interpretive features, and interactive elements that support a healthy lifestyle. The Wellness Trail connects the BART and Amtrak station to the future San Francisco Ferry Terminal, while also creating smaller-scale connections to the Unity Park, Richmond Greenway, Nystrom Village, MLK Park, and Kaiser Field Hospital.</p>														
<p><b>4</b> Income-Linked Solar and Home Weatherization</p>	<p>GRID Alternatives provides free solar systems to households that own and live in their own home and make less than 80% of area median income. The Weatherization Program is available through Contra Costa County Energy Programs, which assists low-income residents by testing and replacing gas appliances that are not working properly. These programs also offer home energy audits to recommend energy saving measures.</p>														
<p><b>5</b> Urban Greening Master Plan - Street tree Planting Along Cutting Blvd and Harbour Way</p>	<p>The Urban Greening Master Plan designates Cutting Boulevard and Harbour Way as areas for additional street tree planting. Cutting Boulevard has approximately 100 available planting locations and Harbour Way has approximately 120 available planting locations. The Urban Greening Master Plan will also include bioswales, that help manage stormwater and provide more landscaped areas.</p>														
<p><b>6</b> Harbour Way Complete Street Project</p>	<p>The Harbour Way Complete Street Project would include restriping Harbour Way from 3 lanes to 2 lanes and adding pedestrian-scale lighting in the short-term. Medium term improvements would include raised medians, installing mid-block crossings, curb extensions, reduce lane widths, painting sharrows, and planting medium to large trees in planting strips along the roadways. Long-term improvements include a road diet south of Ohio Avenue.</p>														
<p><b>7</b> Richmond Greenway Master Plan - Greening and Last Mile</p>	<p>Greening the Last Mile includes completing the Richmond Greenway Master Plan from I-80 to Carlson Boulevard. This project includes 6 different project areas that have pedestrian and landscape elements such as bioswales, meadows, linear orchard, tree plantings, access improvements, plazas, stormwater management, and access to the Ohlone Greenway and Baxter Creek Gateway.</p>														
<p><b>8</b> Nevin Resilience Hub</p>	<p>Nevin Park and Community Center renovations included the revitalization of the park's sports fields and playgrounds with the help of the community. The community center can act as a resilience hub in the future by providing shelter to community members during disasters, in addition to educational and community programming. As a resilience hub, the community center would be renovated with sustainability features such as low-flow water fixtures, energy efficiency improvements, conversion of the HVAC from natural gas to electric, and installing solar panels to the roof of the building with batteries for energy storage.</p>														

# RICHMOND RESILIENCE ROADMAP FOR THE IRON TRIANGLE, SANTA FE, AND CORONADO NEIGHBORHOODS

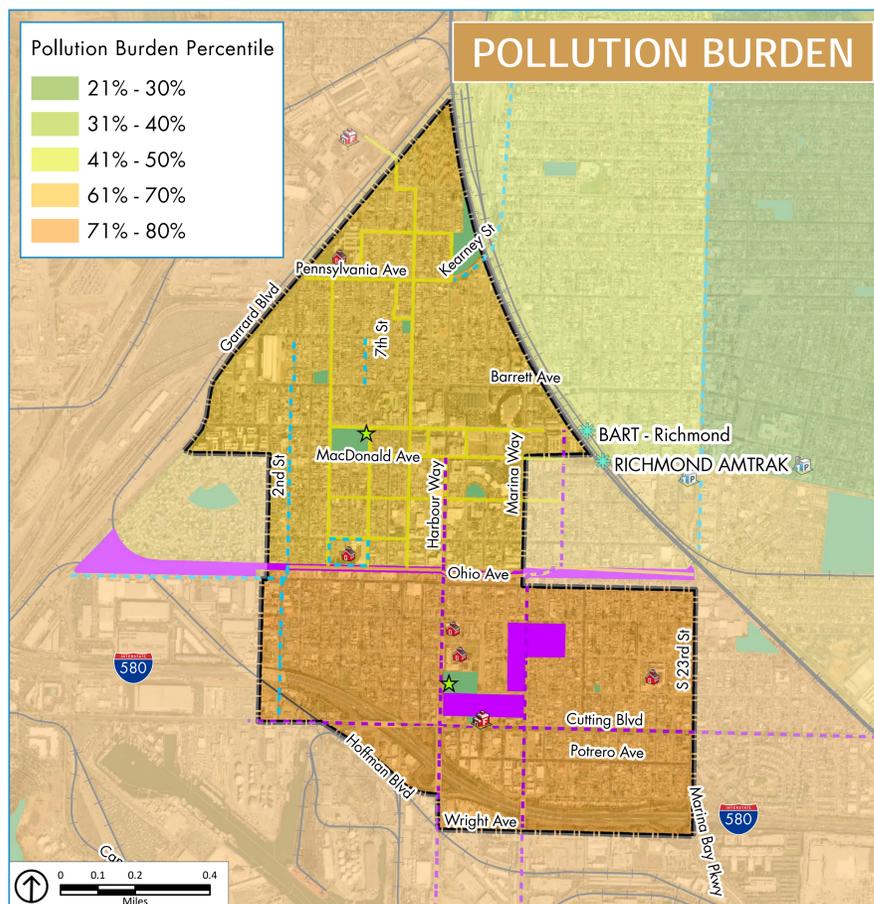
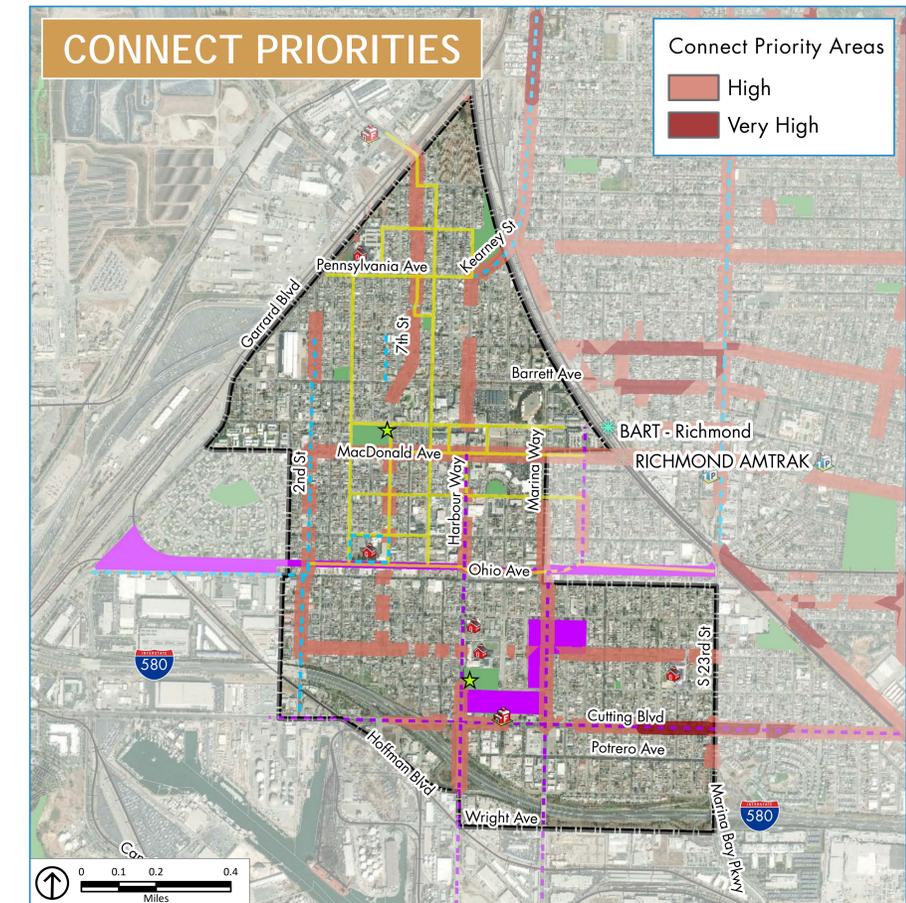


## DEFINING "RESILIENCE"

- » **Resilience:** The ability of Richmond's residents, infrastructure, response systems, and natural systems to close the "climate gap" and prepare for, absorb, and recover from disruptions caused by climate change.
- » **Resilient Community:** A community that is prepared and ready to withstand social and environmental challenges and can recover equitably from disasters and disruptions. (CAP 2016, p.70)
- » **Climate Gap:** The systematic disproportionate and unequal health and economic impact that climate change has on people of color and low-income communities. (CAP 2016, p.19)

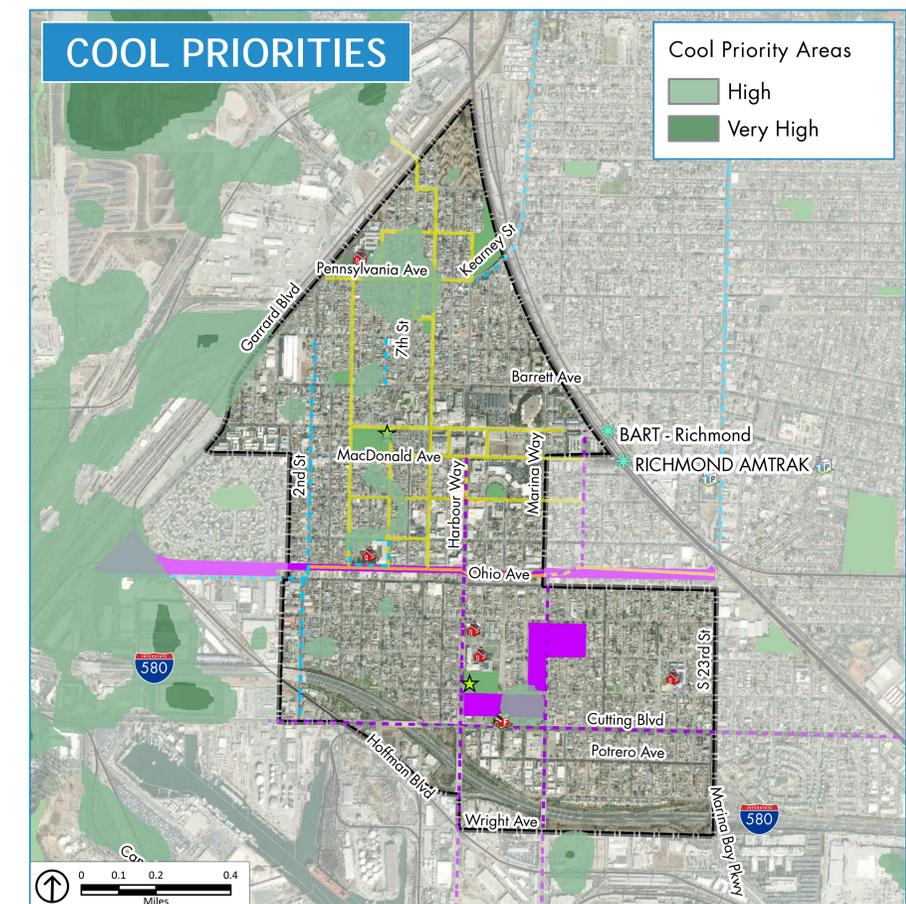
## WHY IS RESILIENCY IMPORTANT?

- » Resiliency ensures that Richmond neighborhoods and community members continue to prepare, respond, and recover from hazards caused by climate change.
- » Co-benefits, which are indirect positive impacts of projects, such as improved public health, increased employment, and additional educational opportunities, can occur with increased resiliency.



**Pollution burden score reflects the average of 7 exposure indicators and 5 environmental indicators, which are:**

<b>EXPOSURE INDICATORS</b>	<b>ENVIRONMENTAL EFFECTS INDICATORS</b>
» Ozone	» Cleanup sites
» Fine particle matter concentrations	» Impaired water bodies
» Diesel particulate matter	» Groundwater threats
» Drinking water contamination	» Hazardous waste facilities and generators
» Pesticide use	» Solid waste sites and facilities
» Toxic releases from facilities	
» Traffic density	



## Map Legend

- Parks
- Law Enforcement
- Yellow Brick Road™ streetscape projects
- Railroad
- Fire Stations
- Resilience Roadmap Corridor Projects
- Rail Stations
- Schools
- Other Corridor Projects
- Resilience Hubs
- Resilience Roadmap Site Specific Projects

APPENDIX C:  
RICHMOND WELLNESS TRAIL  
SUPPORTING DOCUMENTS





**California Air Resources Board  
 Calculator for the  
 California Natural Resources Agency  
 Urban Greening Grant Program  
 Greenhouse Gas Reduction Quantification Methodology  
 Fiscal Year 2016-2017**



**Read Me Worksheet**

The California Air Resources Board (ARB) is responsible for providing the quantification methodology to estimate greenhouse gas (GHG) emission reductions from California Climate Investment projects receiving monies from the Greenhouse Gas Reduction Fund (GGRF).

This Urban Greening GHG Calculator Tool accompanies the quantification methodology for the fiscal year (FY) 2016-17 GGRF Urban Greening Program available at: <http://www.arb.ca.gov/ccl-quantification>

Applicants must use this Urban Greening GHG Calculator Tool to estimate the net GHG benefit associated with the Urban Greening projects. **Refer to the quantification methodology document for background, step-by-step detailed instructions, and examples.** To use this Urban Greening GHG Calculator Tool, follow these steps:

**Step 1** Enter general project information: Enter the project name and the contact information for a person who can answer project specific questions from staff reviewers on the quantification calculations. Enter the date that the project completed the GHG calculations.

<b>Project Name:</b>	Richmond Wellness Trail Phase I
<b>Grant ID, if applicable:</b>	
<b>Contact Name:</b>	Trudy Garber
<b>Contact Phone Number:</b>	415-800-5274
<b>Contact Email:</b>	Trudy.Garber@tpl.org
<b>Date Completed:</b>	4/19/2017

**Step 2** Identify the proposed project component(s): the applicant must select the appropriate project component(s) from the list of eligible urban greening project components listed in the quantification methodology.

**Step 3** Determine the inputs needed: the applicant will use Tables 3 and 4 in the quantification methodology and the carbon calculator tools identified therein to determine the project information that must be input into this Urban Greening GHG Calculator Tool for the applicable project component(s) selected in Step 2. For tree planting activities, many of the inputs will come from the output of urban greening carbon calculators identified in the quantification methodology.

**Step 4** Estimate the net GHG benefit: the applicant will enter the project details identified in Step 3 into this calculator tool to calculate the net GHG benefit of the project.

**Step 5** Submit documentation: Save file for submittal. This file will be submitted with other documentation requirements. See Section C of the quantification methodology for additional documentation requirements.

This Urban Greening GHG Calculator Tool allows users to estimate the net GHG benefit from a variety of specific urban greening activities. Each eligible project component identified in Table 2 of the quantification methodology has a worksheet within the calculator (note: projects with tree planting components must select the "Carbon & Energy Savings" tab that is appropriate to the urban tree carbon accounting tool used). Applicants must input data into the worksheets that apply to the proposed project. The Urban Greening GHG Calculator Tool provides fields for users to input project specific information. User input fields are shaded yellow or green and calculator outputs of GHG emission reduction estimates are shaded grey. After the user inputs are entered for each proposed project component, the GHG Summary worksheet displays the GHG benefit from each component, the GHG emissions from project implementation, the net GHG benefit of the project, as well as the estimated total project GHG benefit per Urban Greening GGRF

**Cells Formatting Guide**

	User-input cells
	User-input cells with a drop-down menu (drop-down menu appears when the cell is activated)
	Cells with automated calculations

**Tabs Formatting Guide**

	READ ME	All applicants must enter data into the worksheets with a green tab
	Definitions	Information only; no data needs to be entered into worksheets with a black tab

For more information on ARB's efforts to support implementation of Greenhouse Gas Reduction Fund investments, see:  
 Questions on this document should be sent to:  
 Questions pertaining to the Urban Greening Program should be sent to CNRA. Contact information for CNRA can be found at:

[https://www.arb.ca.gov/auctionproceeds.GGRFProgram@arb.ca.gov](https://www.arb.ca.gov/auctionproceeds/GGRFProgram@arb.ca.gov)  
<http://resources.ca.gov/grants/urban-greening/>



**California Air Resources Board**  
**Calculator for the**  
**California Natural Resources Agency**  
**Urban Greening Grant Program**  
**Greenhouse Gas Reduction Quantification Methodology**  
**Fiscal Year 2016-2017**



<b>Project Name:</b>	<b>Richmond Wellness Trail Phase I</b>
<b>Grant ID, if applicable:</b>	

**GHG Benefit of Tree Planting**

Enter data below after using the i-Tree Streets to estimate tree carbon storage and electricity and natural gas savings of the population of project trees.

Carbon Stored in Population of Trees 40 Years After Project Start (lb CO <sub>2</sub> e)	Annual Electricity Savings From Population of Trees 40 Years After Project Start (MWh)	Annual Natural Gas Savings From Population of Trees 40 Years After Project Start (therms)	Trees Within Population to be Planted to Shade Buildings (i.e. within 60 ft) (%)
836,117	24.1	444.2	6%

<b>GHG Benefit of Carbon Stored in Live Project Trees (MT CO<sub>2</sub>e)</b>	368.21
<b>GHG Benefit from Energy Savings (MT CO<sub>2</sub>e)</b>	11.43
<b>GHG Emissions from Project Implementation</b>	18.98





**California Air Resources Board**  
**Calculator for the**  
**California Natural Resources Agency**  
**Urban Greening Grant Program**  
**Greenhouse Gas Reduction Quantification Methodology**  
**Fiscal Year 2016-2017**

California Environmental Protection Agency

<b>Project Name:</b>	<b>Richmond Wellness Trail Phase I</b>
<b>Grant ID, if applicable:</b>	

**GHG Summary Worksheet**

GHG Benefit of Carbon Stored in Live Project Trees Estimated Using the CTCC (MT CO <sub>2</sub> e)	0.00
GHG Benefit of Carbon Stored in Live Project Trees Estimated Using i-Tree Streets (MT CO <sub>2</sub> e)	368.21
GHG Benefit from Energy Savings Estimated Using the CTCC (MT CO <sub>2</sub> e)	0.00
GHG Benefit from Energy Savings Estimated Using i-Tree Streets (MT CO <sub>2</sub> e)	11.43
Avoided GHG from Establishment of New Bicycle and Pedestrian Facilities (MT CO <sub>2</sub> e)	289.76
GHG Emissions from Project Implementation (MT CO <sub>2</sub> e)	18.98

Net GHG Benefit (MT CO <sub>2</sub> e)	650.42
Urban Greening GGRF Funds Requested (\$)	\$3,114,025
Total GGRF Funds Requested (\$)	\$3,114,025
Net GHG Benefit/Urban Greening GGRF Funds Requested (MT CO <sub>2</sub> e/\$)	0.0002089
Net GHG Benefit/Total GGRF Funds Requested (MT CO <sub>2</sub> e/\$)	0.0002089



## TECHNICAL MEMORANDUM

**To:** Cynthia Greenberg  
**FROM:** Robert Stevens and Mike Vidra  
**DATE:** May 17, 2019  
**SUBJECT:** Richmond Wellness Trail – Hydraulic Analysis

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Our assessment of the hydraulic conditions along the Richmond Wellness Trail are summarized below:

Using the rational method for calculating stormwater discharge during a storm event is an appropriate method for this site. The rational method takes three factors into consideration to calculate stormwater discharge for a specific watershed area:

- A weighted stormwater runoff coefficient (C), based on surface type and grade,
- Rainfall intensity (i), based on historical data, and
- Surface tributary area (A), based on the site topography.

These factors are multiplied directly by one another to calculate stormwater discharge. Therefore, if one factor is increased by a set amount the resultant will also be increased by that same amount.

- The runoff coefficient (C) is assumed to be consistent since the surface material throughout the project consists of asphalt pavement, concrete pavement, roofs and landscaping. We used an average C factor for these types of typical surfaces and neighborhood layouts of 0.7.
- The rainfall intensity (i) for the average San Francisco Bay area project of this size was used for this project and is 2.0 in/hr
- The surface area (A) was calculated individually for each zone defined in the analysis below. We assumed the entire roadway pavement section as well as the private residential lots immediately adjacent to the road together equated to the total tributary area.

For reference a pipe flow capacity table is below which demonstrates the size of pipe required to carry a certain flow. Additionally, a 2-foot wide gutter pan running longitudinally down the side of road has the capacity equivalent to a 6-inch pipe. Therefore, if the flow of stormwater in the tributary area is greater than the capacity of two 6-inch pipes (two since there are two sides of the road), then spill over into the roadway will occur for a typical 10-year storm event.

### PIPE SIZE AND CAPACITY TABLE:

Pipe slope was set at 1.0% and assumed only flowing about 75% of full capacity.

Pipe Size (inch)	6	12	15	18	24	30	36	48
Flow (cfs)	0.5	3	5.5	9	18	36	50	125

### EXISTING HYDRAULIC ANALYSIS:

#### 16<sup>th</sup> Street: Macdonald Ave to Unity Park

- Macdonald to Bissell Ave: Flow = 5.5 cfs
  - Concentrated gutter flow
  - Storm drain curb inlet at south end
- Bissell Ave to Chanslor Ave: Flow = 4.3 cfs
  - Concentrated gutter flow
  - Storm drain curb inlet at south end
- Chanslor Ave to Unity Park: Flow = 3.0 cfs
  - Concentrated gutter flow
  - Storm drain curb inlet at south end

**Marina Way South:** Ohio Ave to Hoffman Blvd

- Ohio Ave to Florida Ave: Flow = 4.8 cfs
  - Concentrated gutter flow
  - Gutter flow continues down Florida Ave.
- Florida Ave to Maine Ave: Flow = 3.9 cfs
  - Concentrated gutter flow
  - Gutter flow continues down Maine Ave.
- Maine Ave to Virginia Ave: Flow = 3.5 cfs
  - Concentrated gutter flow
  - Gutter flow continues down Virginia Ave.
- Virginia Ave to Cutting Blvd: Flow = 3.9 cfs
  - Concentrated gutter flow
  - Connect to storm drain inlet at south end
- Cutting Blvd to Potrero Ave to Hoffman Blvd: Flow = 5.0 cfs
  - Concentrated gutter flow
  - Connect to storm drain inlet at south end

**STORMWATER CONSIDERATIONS:**

During the design of a project in the San Francisco Bay Area a consideration for stormwater treatment shall be evaluated and depending on the type of project implemented. A streetscape project along a roadway similar to 16<sup>th</sup> Street and Marina Way South are perfect examples of projects to receive stormwater treatment measures, such as:

- pervious paving,
- rain gardens,
- subsurface treatment such as silva cells,
- treatment tree planters,
- detention pipes, etc.

Designing systems such as these will improve many aspect related to stormwater issues, such as:

- reduce runoff and flooding,
- enhance stormwater discharge quality, and
- improve infiltration rates

One of the largest and most notable issues to be felt immediately upon installation of these types of measures is decreased flooding. Based on the calculations provided above flooding is a major concern requiring attention through this entire corridor. Due to the size of the tributary areas, any single stormwater treatment measure will not be sufficient. Typically a low impact development (LID) type treatment measure is calculated by taking the total impervious area and multiplying by 4 percent, which is your resultant treatment area size. However, a mechanic type or subsurface type treatment system is specifically designed to take on a set stormwater flow in units of cubic feet per second (cfs). A combined system using both type methods such as pervious paving within the parking section over an underground treatment & storage system with a subdrain, similar to a silva cell, would be ideal, but not always practical. Rain gardens placed in bulb-outs at the intersections and mid-block to collect, treat and detain stormwater are also appropriate methods. Bulb-outs designed appropriately with a subsurface drainage system may be the least impactful and most maintainable. This would be a reasonable consideration for 16<sup>th</sup> Street which currently has subsurface drainage system at the intersecting roadways. However, a subsurface drainage system extending the entire length of Marina Way South would prove quite costly, but still is the most appropriate method to relieve flooding. Once the subsurface drainage system is installed, adding the appropriate stormwater treatment measures would exponentially benefit the entire corridor.

Intersection of Marina Way South and Maine Avenue showing deep gutter flow



Post storm event flooding at the south end of 16<sup>th</sup> Street.





**TECHNICAL MEMORANDUM**

**To:** Cynthia Greenberg  
**FROM:** Robert Stevens and Mike Vidra  
**DATE:** May 16, 2019  
**SUBJECT:** Richmond Wellness Trail – Pavement Assessment

Our assessment of the vehicular roadway pavement conditions along the Richmond Wellness Trail are summarized below using the Pavement Condition Index (PCI) method of analyzing pavement. The pedestrian sidewalk throughout this corridor was reviewed separately and in a more general assessment. A further assessment of the sidewalk may be warranted as the scope of this project is further refined.

The PCI index chart below specifies how the numeric range value given to a section of pavement is related to the actual condition of the pavement and a generic remediation technique.

PCI Range	Description of Range	Remediation techniques
100-90	Excellent – Newly constructed road	no remediation required
90-85	Very Good – very minor cracking	Seal coat and crack sealing
85-70	Good - low levels of distress, cracking throughout	localized digouts required ranging from 4"-6", crack sealing
70-60	Fair - significant distress	large digouts required with minor grinding/overlay potential
60-25	Poor, deteriorating pavement	large areas requiring full replacement with grind/overlay
25-11	Very Poor, major distress	Full depth street section required
10-0	Failed, extremely rough pavement	Full design and study required

**ASSESSMENT OF PAVEMENT CONDITION:**

**16<sup>th</sup> Street**

- Cross slope of shoulders range from 2% to 5% with limited areas exceeding 5%
- Most severe pavement distress occurs in roadway shoulder
- Macdonald to Bissell Ave: PCI = 80
  - Very minor distress, few areas requiring digouts
  - Oil stains throughout
- Bissell Ave to Chanslor Ave: PCI = 68
  - Most distress is within the shoulders and at the intersections.
  - Longitudinal cracking extending full length
- Chanslor Ave to Unity Park: PCI = 50
  - Alligator cracking throughout
  - Longitudinal cracking throughout
  - Major distress within shoulder.

- Sidewalk along 16<sup>th</sup> Street:
  - The majority of the sidewalk has appropriate clearance and cross slope
  - Accessible curb ramps are incompliant
  - Areas of major upheaving caused by tree roots
  - Areas of cross sloping exceed accessibility standards (>2%)

**Greenway Trail at Unity Park**

- Upper Portion: PCI = 85
  - Very minor cracking
  - Cross slope ranging from 0.5% to 2%
- Lower Portion: PCI = 73
  - Longitudinal cracking throughout
  - Lateral cracking throughout, but sufficiently spaced
  - Cross slope ranging from 1% to 3%

**Marina Way South**

- Ohio Ave to Cutting Blvd: PCI = 62
  - Longitudinal cracking throughout
  - Localized areas requiring digouts
  - Steep shoulder along entire length ranging from 5% to 10%
  - Major distress within intersections requiring large amounts of digouts
- Sidewalk along Marina Way South from Ohio Ave to Cutting Blvd:
  - The majority of the sidewalk has appropriate clearance and cross slope.
- Cutting Blvd to Hoffman Blvd: PCI = 86
  - Minor longitudinal cracking
  - Concrete shoulder for parking shows most signs of distress.
    - Cross slope of concrete shoulders range from 2% to 4%
  - Asphalt shoulder ranges from 2% to 5%
  - Intersection at Hoffman Blvd shows major longitudinal cracks starting
- Sidewalk along Marina Way South Cutting Blvd to Hoffman Blvd:
  - Portion of sidewalk is missing adjacent immediately south of Cutting Blvd.
  - Joint Poles are within the sidewalk and do not allow proper clear width.
- Hoffman Blvd to Wright Ave: Concrete PCI = 88, Asphalt PCI = 80
  - Concrete section has location of very minor cracking
  - Concrete section shows slight raveling which is typical for a concrete roadway
  - Asphalt section has longitudinal and spaced out lateral cracking

Hoffman Blvd to Wright Ave concrete section: PCI = 88



Curb ramp along 16<sup>th</sup> Street



Typical Sidewalk along Marina Way South



Typical Sidewalk along 16<sup>th</sup> Street



Greenway Trail through Unity Park

Upper Portion: PCI = 85

Lower Portion: PCI = 73



Chanslor Ave to Unity Park: PCI = 50



Florida Ave to Maine Ave: PCI = 62



Intersection of Maine Ave and Marina Way South: PCI = 62



Cutting Blvd to Potrero Ave to Hoffman Blvd: PCI = 86



## TECHNICAL MEMORANDUM

**To:** Cynthia Greenberg  
**FROM:** Robert Stevens and Mike Vidra  
**DATE:** May 16, 2019  
**SUBJECT:** Richmond Wellness Trail – Photometric Analysis

Our assessment of the photometric analysis along the Richmond Wellness Trail are summarized below using standards from the American National Standards Institute (ANSI) and the Illuminating Engineering Society of North America (IESNA). Specifically focusing on standards for roadway & intersection lighting applications and calculation methods. Field investigations took place on March 7<sup>th</sup> & May 2<sup>nd</sup> of 2019.

The table below shows Table 2 from IESNA RP-8:

- Pedestrian conflict is defined as high, medium or low over a one-hour peak night time period:
  - high pedestrian conflict will have approximately 100 or more pedestrian,
    - The trail corridor of this project falls under this category
  - medium pedestrian conflict will have 11 to 99 pedestrians and
    - The road corridor of this project falls under this category
  - low pedestrian conflict will have under 10 pedestrian
- Pavement is classified as R1, R2, R3, or R4:
  - R1 = Portland-cement concrete
  - R2 & R3 = Asphalt, rough textured (typical roadway)
    - The corridor of this project falls under this category
  - R4 = Asphalt, smooth textured
- Road types shown below are defined as Collector and Local.
  - 16<sup>th</sup> street we are defining as a Local road
  - Greenway Trail was are defining as a Local Road
  - Marina Way South we are defining as a Collector road.
- 'Lux' is lumens per square meter
- 'FC' (foot-candles) is lumens per square foot. This is the preferred unit for California.

The below table was abridged to only show road types Collector and Local.

Road and Pedestrian Conflict Area		Pavement Classification <small>(Minimum Maintained Average Values)</small>			Uniformity Ratio $E_{avg}/E_{min}$	Veiling Luminance Ratio $L_{vmax}/L_{avg}$
Road	Pedestrian Conflict Area	R1 lux/fc	R2 & R3 lux/fc	R4 lux/fc		
Collector	High	8.0/0.8	12.0/1.2	10.0/1.0	4.0	0.4
	Medium	6.0/0.6	9.0/0.9	8.0/0.8	4.0	0.4
	Low	4.0/0.4	6.0/0.6	5.0/0.5	4.0	0.4
Local	High	6.0/0.6	9.0/0.9	8.0/0.8	6.0	0.4
	Medium	5.0/0.5	7.0/0.7	6.0/0.6	6.0	0.4
	Low	3.0/0.3	4.0/0.4	4.0/0.4	6.0	0.4

**PHOTOMETRIC ANALYSIS OF EXISTING CONDITIONS:**

**16<sup>th</sup> Street:** Macdonald Ave to Unity Park

- Curb to curb = approximately 30 feet
- Street lights are on the east side of 16<sup>th</sup> Street.
- Street lights are spaced approximately 100 to 120 feet with additional light poles at the intersections
  - There is at least one empty section between each of the blocks.
- The light projected from each street light illuminates the face of curb on the opposite side of the street from which the pole is mounted.
- PHOTOMETRIC CALCULATIONS: Macdonald Ave to Unity Park
  - Average foot-candles = 0.75
  - Max Foot Candles (FC) = 2.0
  - Min Foot Candles = 0.1
  - Minimum to Maximum FC Ratio: 0.03
  - Maximum to Minimum FC Ratio = 30.99
  - Average to Minimum FC Ratio = 11.75
  - Maximum to Average FC Ratio = 2.66

Typical Street Light along 16<sup>th</sup> Street



- Table summary of photometric calculations comparing existing and preferred IESNA standards

	IESNA Standard	Existing Condition	Compliance (Yes or No)
FC (average value)	0.7	0.75	Yes
Uniformity Ratio	6.0	11.75	No

- Conclusion: Additional light poles spaced appropriately throughout the entire corridor will increase the minimum FC Ratio and as a result lower the Uniformity Ratio closer to standard IESNA value of 6.0. Ideally the Uniformity Ratio is within 2.0 of the set IESNA Standard. Furthermore, adding additional light poles will have an adverse effect on the Average FC, but not substantial enough to increase the value so high as to be non-compliant.

**Greenway Trail at Unity Park:**

- Street lights are spaced approximately 115 to 125 feet
- PHOTOMETRIC CALCULATIONS: Macdonald Ave to Unity Park
  - Average foot-candles = 0.95
  - Max Foot Candles (FC) = 2.0
  - Min Foot Candles = 0.2
  - Minimum to Maximum FC Ratio: 0.1
  - Maximum to Minimum FC Ratio = 10.0
  - Average to Minimum FC Ratio = 4.8
  - Maximum to Average FC Ratio = 2.1

- Table summary of photometric calculations comparing existing and preferred IESNA standards

	IESNA Standard	Existing Condition	Compliance (Yes or No)
FC (average value)	0.9	0.95	Yes
Uniformity Ratio	9.0	4.8	No

- Conclusion: Additional light poles spaced appropriately along the lower portion of the Greenway Trail would help raise the uniformity ratio.

**Marina Way South:** Ohio Ave to Hoffman Blvd

- Curb to curb = 55-60 feet
- Street lights are on the east side of Marina Way South
- Streets lights are spaced with an average spacing 110 to 150 feet with additional light poles at the intersections
- The light projected from each street light illuminates past the centerline of the road and nearly to the curb on the opposite side from which the pole is mounted.
- PHOTOMETRIC CALCULATIONS: Ohio Ave to Hoffman Blvd
  - Average foot-candles = 0.43
  - Max Foot Candles = 2.9
  - Min Foot Candles = 0.0
  - Minimum to Maximum FC Ratio: (not calculable)
  - Maximum to Minimum FC Ratio = 992.71 (high due to no minimum)
  - Average to Minimum FC Ratio = 145.56 (high due to no minimum)
  - Maximum to Average FC Ratio = 6.75
- PHOTOMETRICS: Ohio Ave to Florida Ave
 

This more focused area was chosen since there is a more consistent spacing of light poles throughout this block. Allowing a more concise calculation of the photometric analysis and providing calculations as if all of the Marina Way South corridor had similar light pole spacing.

  - Average foot-candles = 0.7
  - Max Foot Candles = 2.0
  - Min Foot Candles = 0.1
  - Minimum to Maximum FC Ratio: 0.03
  - Maximum to Minimum FC Ratio = 36.66
  - Average to Minimum FC Ratio = 12.63
  - Maximum to Average FC Ratio = 2.90
- Table summary of photometric calculations comparing existing and preferred IESNA standards

	IESNA Standard	Existing Condition (Ohio to Florida)	Compliance (Yes or No)	Existing Condition (Ohio to Hoffman)	Compliance (Yes or No)
FC (average value)	0.9	0.7	Yes	0.43	No
Uniformity Ratio	4.0	12.63	No	145.56	No

- Conclusion: The block from Ohio Ave to Florida Ave was chosen as the comparable block due to the inconsistency of the light pole spacing between Florida Ave and Hoffman Blvd. Additional light poles spaced appropriately throughout the entire corridor will increase the minimum FC Ratio and as a result lower the Uniformity Ratio closer to standard IESNA value of 4.0. Ideally the Uniformity Ratio is within 2.0 of the set IESNA Standard. Furthermore, adding additional light poles will have an adverse effect on the Average FC, but not substantial enough to increase the value so high as to be in compliant.

Looking south from Ohio Ave down Marina Way South



Greenway Trail through Unity Park  
Upper Portion of Trail                      Lower Portion of Trail



Richmond Wellness Trail  
Tree Evaluation Data

Richmond Wellness Trail Tree Evaluation Data Matrix  
Individual Tree Data

**Health and Structural Rating Key:**

3.0 = moderate or better condition

2.5 = marginal to moderate

2.0 = marginal condition

1.5 = poor to marginal condition

1.0 = poor condition

**Suitability for Preservation Ratings:**

Good: Trees in good health and structural condition with high potential for longevity.

Moderate: Trees in fair health and/or with structural defects that can usually be abated with treatment.

Fair: Trees in marginal health or structural condition that could possibly be mitigated or improved.

Poor: Trees in poor health and/or structural condition that probably cannot be effectively abated.

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
001	camphor tree ( <i>Cinnamomum camphora</i> )	10.5	1	20	20	2.0	2.5	Semi-mature tree with closely spaced, multiple limb attachments forming at 5.5'. History of pruning. Vigor is variable with current flush of growth occurring. History of drought stress and branch dieback.	Poor to Fair	3' x 3'	Minor cracking.	Minor	No	5886, 5890
002	camphor tree	5	1	10	8	1.5	2.0	Stunted tree with asymmetrical form. Vigor is low with probable crown gall infection.	Poor	3' x 3'	None	None	No	5887, 5891
003	camphor tree	8; 10.5	2	20	20.0	2.0	2.5	Two trunk structure forming at 4'. Vigor is low. Marginal form.	Poor to Fair	3' x 3'	Significant displacement and cracking. 1.25" displacement.	Significant	No	5888, 5892
004	camphor tree	8.5	1	18	15	1.5	2.0	Marginal structural form. Vigor is low with crown gall infection and lower trunk canker.	Poor	3' x 3'	Minor displacement.	Minor	No	5889, 5893
005	red maple ( <i>Acer rubrum</i> )	5.5	1	15	18	2.5	2.5	Young tree with closely spaced, multiple limb attachments at 6'. Vigor is moderately low. Root collar suckering.	Fair	3' x 3'	None	None	No	5894; 95; 96; 97
006	crabapple ( <i>Malus spp.</i> )	8 (low)	multi	7	8	3.0	na	Pruned as shrub. Good health. Nearby European white birch and Hollywood juniper shown in image 5899.	?	6' X continuous	None	None	No	5898; 5899
007	Aristocrat flowering pear ( <i>Pyrus calleryana</i> 'Aristocrat')	2; 3; 3; 4.5; 5	5	20	18	2.5	2.5	Semi-mature tree with low multiple trunk structure. Vigor is moderately low. Root collar suckering.	Fair to Moderate	6' X continuous	None	None	Yes	5900
008	gingko (maidenhair tree) ( <i>Ginkgo biloba</i> )	9	1	22	30	3.0	2.5	Young tree with closely spaced, multiple limb attachments at 7'. Vigor and foliage density are good.	Good	1.5' x 1.5'	Significant displacement.	Significant	No	5901; 5902

Richmond WellNess Trail  
Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
009	Brisbane box ( <i>Lophostemon conferta</i> )	11	1	30	25	3.0	3.0	Semi-mature tree with no significant structural defects. Symmetrical crown form. Vigor and foliage density are moderate.	Good	6' X continuous	Moderate displacement and cracking.	Moderate	No	5903; 5904
010	London plane tree ( <i>Platanus hispanica</i> x 'Columbia')	0.75	1	7	3.5	3.0	3.0	New tree in moderate vigor with no significant structural defects. Appears to be the 'Columbia' cultivar.	Good	6' X continuous	History of displacement.	Minor	No	5905, 5906
011	Marina arbutus ( <i>Arbutus</i> x 'Marina')	4	1	10	12	3.0	3.0	Young tree with closely spaced, multiple limb attachments at 6'. Vigor is moderate. Probable aphid or scale infestation.	Good	6' X continuous	History of displacement.	Minor	No	5905; 5906
012	Marina arbutus	4.5	1	10	12	3.0	3.0	Young tree with closely spaced, multiple limb attachments at 6'. Vigor is moderate. Probable aphid or scale infestation.	Good	6' X continuous	History of displacement.	Minor	No	5905; 5907
013	water gum ( <i>Tristaniaopsis laurina</i> )	7	1	20	20	3.0	3.0	Young tree with closely spaced, multiple limb attachments at 6'. Vigor is moderate.	Good	6' X continuous	None	None	No	5908
014	purple-leaf plum ( <i>Prunus cerasifera</i> 'Krauter Vesuvius')	3.5	1	12	8	1.5	2.0	Stunted tree with severe aphid infestation. Marginal structure.	Poor	6' X continuous	None	None	Yes	5909
015	coast live oak ( <i>Quercus agrifolia</i> )	2	1	6	5	3.0	2.5	Young tree with somewhat marginal form. Vigor and foliage density are moderate. String trimmer damage to trunk.	Fair to Moderate	6' X continuous	None	None	No	5910
016	coast live oak	2	1	6	5	2.5	2.0	Tree is leaning and partially collapsed. Moderately low vigor and foliage density. String trimmer damage to trunk.	Fair	6' X continuous	None	None	No	missing
017	coast live oak	1.5	1	6	3.5	2.0	3.0	Young tree with multiple attachments. Vigor is low. String trimmer damage to trunk.	Fair	6' X continuous	None	None	No	5911
018	Chinese elm ( <i>Ulmus parvifolia</i> 'Drakes')	18	1	45	60	3.0	3.0	Mature tree with symmetrical crown form. No significant structural defects observed. Vigor and foliage density are moderate. Likely the 'Drake' cultivar (anthracnose resistant).	Good	6' X continuous	Limited sidewalk lift occurring.	Minor	No	5911; 5912; 5913
019	Chinese elm	18	1	40 to 45	35 to 40	3.0	3.0	Mature tree with symmetrical crown form. No significant structural defects observed. Vigor and foliage density are moderate.	Good	6' X continuous	Minor displacement.	Minor	No	5914; 5915; 5916
020	Chinese elm	19	1	40 to 45	35 to 40	3.0	3.0	Mature tree with symmetrical crown form. No significant structural defects observed. Vigor and foliage density are moderate.	Good	6' X continuous	Minor displacement.	Minor	No	5917
021	Chinese elm	19	1	40 to 45	35 to 40	3.0	3.0	Mature tree with symmetrical crown form. No significant structural defects observed. Vigor and foliage density are moderate. History of root pruning.	Good	6' X continuous	Minor displacement.	Minor	No	5918; 5919; 5920

Richmond WellNess Trail  
Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
022	Chinese elm	19.5	1	40 to 45	35 to 40	3.0	3.0	Mature tree with symmetrical crown form. No significant structural defects observed. Vigor and foliage density are moderate. History of root pruning. Topped on north side towards HV electrical lines.	Good	6' X continuous	Substantial displacement.	Significant	Partial	5921; 5922; 5923; 5924; 5925; 5926
023	black locust ( <i>Robinia pseudoacacia</i> )	23	1	30 to 35	25 to 30	1.5	1.5	Tree is in generally poor condition with significant limb dieback and a canker on the lower trunk. Vigor is low.	Poor	6' X continuous	Limited displacement occurring.	Minor	No	5927; 5928; 5929; 5930; 5931
024	Eastern redbud ( <i>Cercis canadensis</i> )	0.5	1	5.5	3	3.0	3.0	New tree in moderate vigor with no significant structural defects. Oleanders planted nearby.	Good	6' X continuous	None	None	Yes	5932; 5933
025	coast live oak	4	1	12	8 to 10	3.0	3.0	Young tree with good vigor and dense growth. No significant structural defects observed. Dead <i>Arbutus</i> 'Marina' around corner.	Good	6' X continuous	Recent sidewalk repair.	None	Yes	5934; 5935; 5936
026	Chinese elm	20	2 @ 7'	40 to 45	50 to 55	3.0	2.5	Mature tree that has been V-pruned for HV electrical line clearance. Co-dominant trunks form at 7'. History of root loss. Recent sidewalk repair.	Moderate	6' X continuous	Recent sidewalk repair.	None	Yes	5937; 5938; 5939
027	Chinese elm	19	1	40 to 45	30 to 35	3.0	2.0	Mature tree that has been partially topped pruned for electrical line clearance. Large trunk wound on south side. Pruned for electrical secondaries also.	Poor	6' X continuous	Recent sidewalk repair.	None	Yes	5947; 5948; 5949; 5950
028	Chinese elm	18.5	1	40 to 45	30 to 35	3.0	2.5	Mature tree that has been V-pruned for HV electrical line clearance. Asymmetrical root distribution. Recent sidewalk repair.	Moderate	6' X continuous	Minor displacement.	Minor	Yes	5947; 5948; 5949; 5950
029	Chinese elm	17.5	1	40 to 45	30 to 35	3.0	3.0	Mature tree that has been partially topped pruned for electrical line clearance. No significant structural defects observed.	Moderate	6' X continuous	Recent sidewalk repair.	None	Yes	5947; 5948; 5949; 5950
030	Japanese zelkova ( <i>Zelkova serrata</i> )	6	1	18 to 20	12 to 15	2.5	2.5	Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950

Richmond WellNess Trail  
Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
031	Japanese zelkova	7	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
032	Japanese zelkova	7	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
033	Japanese zelkova	6.5	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
034	Japanese zelkova	7.5	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
035	Japanese zelkova	6.5	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
036	Japanese zelkova	6.5	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950

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Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
037	Japanese zelkova	7	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
038	Japanese zelkova	6.5	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
039	Japanese zelkova	6	1	18 to 20	12 to 15			Young tree, pruned to rounded form below HV electrical lines. Closely spaced, multiple limb attachments. Vigor and foliage density are moderately low with limited twig/branch dieback occurring. Planting appears water stressed. Bubblers are present.	Moderate	6' X continuous	None	None	Yes	5947; 5948; 5949; 5950
040	mountain she oak ( <i>Allocauserina verticillata</i> ) ( <i>Casurina stricta</i> )	21	1	50 to 55	40 to 45	3.0	3.0	Mature tree with generally symmetrical crown form. No significant structural defects observed. Lower trunk damage present. Vigor and foliage density are moderate. Dense surface root system.	Moderate	7' x 7'	Significant sidewalk displacement occurring.	Significant	No	5951; 5952; 5953
041	mountain she oak	22	1	50 to 55	40 to 45	3.0	2.0	Mature tree with trunk deformity and probable crown gall infection. Damage on north side of trunk. Dense surface root system.	Poor to Fair	7' x 7'	Significant sidewalk displacement occurring.	Significant	No	5954; 5955; 5956; 5957; 5758
042	London plane tree ( <i>Platanus hispanica</i> x 'Bloodgood')	25	1	60	50 to 55	2.5	3.0	Mature tree with large symmetrical crown form. History of pruning. No significant structural defects observed. Typical foliar problems of mildew.	Moderate	6' x 5'	Significant sidewalk displacement occurring.	Significant	No	5959; 5960; 5961
043	pink iron bark ( <i>Eucalyptus sideroxylon</i> 'Rosea')	19	1	30	35	3.0	3.0	Mature tree with symmetrical crown form. Lower trunk damage present. No significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	Sidewalk displacement nearby with asphalt patch.	Significant	No	5986; 5987
044	coast redwood ( <i>Sequoia sempervirens</i> )	3	1	8	10	1.5	2.0	Stunted tree with extensive crown dieback. Variable vigor in response to winter rains.	Poor	Large, open area away from pavement.	None	None	No	5988

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Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
045	coast redwood	12; 16	2	20	20	2.0	2.0	Semi-mature tree with two trunk structure. Upper crown dieback occurring. Vigor is variable.	Fair	Large, open area away from pavement.	None	None	No	5989
046	pineapple guava ( <i>Feijoa sellowiana</i> )	2 to 3	5	10	12	2.5	2.0	Low, multiple trunk structure. Lower trunk damage from stem failure. Variable vigor.	Fair	Large, open area away from pavement.	None	None	No	5990
047	pineapple guava	7; 11	2	15	15	3.0	2.0	Low, two trunk structure. Lower trunk damage. Vigor and foliage density are moderate.	Fair	Large, open area away from pavement.	None	None	No	5991
048	Hollywood juniper ( <i>Juniperus chinensis</i> 'Torulosa')	20	1	25 to 30	15	3.0	2.0	Located on adjacent property. High branch structure. Lower trunk damage. Moderate vigor and foliage density.	Fair	None	None	None	No	5992
049	red maple ( <i>Acer rubrum</i> 'Autumn Fire')	1	1	8	3	2.0	3.0	Young tree with no significant structural defects. Drought stressed. Limited lower trunk damage from string trimmer.	Fair	Large, open area away from pavement.	None	None	No	5993
050	red maple Autumn Fire	1	1	8	3	2.0	3.0	Young tree with no significant structural defects. Drought stressed. Limited lower trunk damage from string trimmer.	Fair	Large, open area away from pavement.	None	None	No	5994
051	coast live oak	1	1	7	4	3.0	3.0	Young tree with no significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	5995
052	coast live oak	1.25	1	7	5	3.0	3.0	Young tree with no significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	5996; 5997
053	Deodar cedar ( <i>Cedrus deodara</i> )	2	1	7	5	3.0	3.0	Young tree with no significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	5998
054	red maple Autumn Fire	1.5	1	10	5	2.5	2.5	Young tree with no significant structural defects. Drought stressed with foliage in wilt. Lower trunk damage from string trimmer.	Fair to Moderate	Large, open area away from pavement.	None	None	No	5999; 6000

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Tree Evaluation Data

Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
055	Deodar cedar	2	1	7	5	3.0	3.0	Young tree with no significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	6001
056	red maple Autumn Fire	1.75	1	12	5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt. Vigor and foliage density are moderately low.	Moderate	Large, open area away from pavement.	None	None	No	6002
057	Deodar cedar	2.5	1	8	8	3.0	3.0	Young tree with no significant structural defects. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	missing
058	red maple Autumn Fire	1.5	1	10	5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt. Vigor and foliage density are moderately low.	Moderate	Large, open area away from pavement.	None	None	No	missing
059	red maple Autumn Fire	1.5	1	10	5	2.0	2.5	Young tree with lean. Drought stressed with dieback occurring. Vigor is low.	Fair	Large, open area away from pavement.	None	None	No	6003; 6005
060	red maple Autumn Fire	1	1	10	5	2.0	2.5	Young tree with no significant structural defects. Drought stressed with foliage in wilt. Lower trunk damage from string trimmer.	Fair	Large, open area away from pavement.	None	None	No	6004; 6005
061	Chinese pistache ( <i>Pistacia chinensis</i> )	1.5	1	12	5	3.0	3.0	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed.	Moderate	In planter area away from pavement.	None	None	No	6006; 6007
061	Chinese pistache	2	1	14	6	2.5	2.5	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed with low crown density.	Moderate	3' x continuous	None	None	No	6008
063	Chinese pistache	2	1	12	6	3.0	3.0	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed.	Moderate	3' x continuous	None	None	No	6009
064	Chinese pistache	1.75	1	15	6	3.0	3.0	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed.	Moderate	3' x continuous	None	None	No	6010
065	Chinese pistache	2	1	12	6	3.0	3.0	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed.	Moderate	3' x continuous	None	None	No	6011

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Tree # (GPS)	Species	Trunk Diameter @ 4.5' (inches)	# of Trunks	Crown Height (approx. feet)	Crown Diameter (approx. feet)	Health Rating	Structural Rating	Comments/Observations	Suitability for Preservation	Planter Size	Pavement Impact	Pavement Displacement Rating (Current)	Overhead HV Electrical	Tree Image Reference
066	Chinese pistache	1.75	1	12	8	3.0	3.0	Young tree with high-branched structure. No significant structural defects. Tree appears moderately water stressed.	Moderate	3' x continuous	None	None	No	6012
067	Chinese pistache	1	1	12	4	2.5	2.5	Young tree in need of structural pruning with secondary trunk becoming dominant. Vigor appears moderate low.	Fair to Moderate	3' x continuous	None	None	No	6013
068	Chinese pistache	2	1	15	4	2.5	2.0	Young tree with high-branched structure. Co-dominant trunks. Tree appears moderately water stressed with low crown density. Lean in trunk.	Fair to Moderate	3' x continuous	None	None	No	6014; 6015
069	Marina arbutus	4	1	15	12	3.0	3.0	Young tree with good vigor and dense growth. No significant structural defects observed.	Good	3' x continuous	None	None	No	6016
070	Marina arbutus	4	1	15	15	3.0	3.0	Young tree with good vigor and dense growth. No significant structural defects observed.	Good	3' x continuous	None	None	No	missing
071	Marina arbutus	6.5	1	15	15	3.0	3.0	Young tree with good vigor and dense growth. No significant structural defects observed.	Good	3' x continuous	None	None	No	6017
072	Marina arbutus	7	1	12	8	3.0	3.0	Young tree with good vigor and dense growth. No significant structural defects observed. Tree has been pruned for clearance for electrical service drop. Adjacent small fern pine and pineapple guava in planting strip.	Good	3' x continuous	None	None	No	6018; 6019
073	fern pine ( <i>Podocarpus gracilior</i> ) ( <i>Afrocarpus falcatus</i> )	8	2 @ 5'	18	20	3.0	3.0	Tree growing in front yard adjacent to sidewalk. Co-dominant trunk structure. Vigor and foliage density are good.	Good	front yard	None	None	No	6020
074	saucer magnolia ( <i>Magnolia soulangeana</i> )	1 to 5	multi	6	4	3.0	3.0	Young, small tree with low multiple trunk structures. Vigor and foliage density are good.	Good	3' x continuous	None	None	No	6021
075	fruiting apple ( <i>Malus domestica</i> )	4; 4.5; 6	3	15	12	3.0	3.0	Tree growing in front yard adjacent to sidewalk. No significant structural defects. Vigor and foliage density are good.	Good	front yard	None	None	No	6022
076	Brisbane box	6; 6; 7.5	3	20	20	2.5	2.0	Low three trunk structure with included attachments. Vigor and foliage density are moderately low. Probable aphid or scale infestation.	Fair	3' x continuous	Minor displacement.	Minor	No	6023; 6024
077	Southern magnolia ( <i>Magnolia grandiflora</i> )	10	1	20	20	3.0	3.0	Tree growing in front yard adjacent to sidewalk. No significant structural defects. Vigor and foliage density are good.	Good	front yard	Sidewalk crack.	Minor	No	6025; 6026

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Tree Evaluation Data

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078	Brisbane box	11	1	25	20 to 25	3.0	3.0	Semi-mature tree with narrow scaffold limb attachments mid-crown. Vigor and foliage density are moderate. Probable history of root pruning. Large Taxus growing in front yard nearby.	Moderate	3' x continuous	Limited displacement occurring.	Minor	No	6027; 6028; 6029; 6030
079	Aristocrat flowering pear	11	1	20	25	3.0	2.5	Semi-mature tree with closely spaced, multiple limb attachments occurring at 10'. Vigor and foliage density are moderate.	Moderate	3' x continuous	Significant sidewalk displacement occurring. Asphalt patch.	Significant	No	6031; 6032
080	Aristocrat flowering pear	11.5	1	25	25	2.5	2.5	Semi-mature tree with asymmetrical upper crown growing towards street due to pruning for building clearance. Branch dieback occurring in upper crown. Variable vigor.	Fair	3' x continuous	Significant sidewalk displacement occurring. Asphalt patch.	Significant	No	6033; 6034; 6035
081	Chinese pistache	5	1	15	12	2.5	3.0	Young tree with spreading crown form. Drought stressed with dieback occurring. Vigor is variable.	Moderate	Large, open area away from pavement.	None	None	No	6036
082	Chinese pistache	5.5	1	15	12	2.5	3.0	Young tree with spreading crown form. Drought stressed with dieback occurring. Vigor is variable.	Moderate	Large, open area away from pavement.	None	None	No	6037
083	purple-leaf plum	2 to 3.5	6	15	15	3.0	3.0	Low, multiple trunk structure. Vigor and foliage density are moderate.	Good	Large, open area away from pavement.	None	None	No	6038
084	red maple	2.5	1	15	5	1.5	3.0	Young tree in serious drought stress. Probable branch dieback. No significant structural defects. Vigor is very low.	Poor	3' circular planter with grate.	None	None	No	6039
085	red maple	1.5	1	12	6	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Moderate	4' x 4' landscape planter	None	None	No	6040
086	red maple	4.5	1	18	12	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Moderate	4' x 4' landscape planter	None	None	No	6041
087	water gum ( <i>Tristaniaopsis laurina</i> )	5	1	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	Limited displacement occurring.	Minor	Yes	6042

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088	water gum	6	1	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	Sidewalk crack.	Minor	Yes	6043; 6046
089	water gum	4; 5	2	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. Co-dominant trunks at 4'. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	Sidewalk crack.	Minor	Yes	6043; 6045
090	Mexican fan palm ( <i>Washingtonia robusta</i> )	20	1	100	15	3.0	3.0	Mature palm growing in front yard.	Moderate	front yard	None	None	No	6044
091	water gum	6	1	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	Significant displacement.	Significant	Yes	6043; 6047
092	water gum	6	1	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	Minor displacement occurring.	Minor	Yes	6048
093	water gum	3.5; 4	2	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. Co-dominant trunks at 4'. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	1" displacement lift.	Significant	Yes	6048
094	water gum	6	1	10	6	3.0	3.0	Semi-mature tree pruned low for clearance from overhead high voltage electrical lines. No significant structural defects. Vigor and foliage density are good.	Moderate	3' x 3'	1" displacement lift.	Significant	Yes	6048
095	saucer magnolia	.5 to 1	multi	4	5	3.0	3.0	Young, small tree with low multiple trunk structure. Vigor and foliage density are good.	Moderate	3' x 3'	None	None	Yes	6049
096	Japanese maple ( <i>Acer palmatum</i> )	.5 to 1	4	5	4	3.0	3.0	Young, small tree with low multiple trunk structure. Vigor and foliage density are good.	Moderate	3' x 3'	None	None	Yes	6050
097	Southern magnolia	9	1	15	15	2.5	3.0	Semi-mature tree with closely spaced, multiple limb attachments forming at 6'. Vigor is low with limited branch dieback occurring.	Fair	4' x continuous	None	None	No	6051
098	Saratoga laurel ( <i>Laurus 'Saratoga'</i> )	5.5	1	12	8	2.5	2.0	Semi-mature tree that has been subject to harsh pruning for clearance over street. Vigor is moderately low.	Fair	3' x continuous	Sidewalk repair adjacent to tree.	None	Yes	6052; 6053; 6054

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099	Saratoga laurel	6	1	12	10	3.0	2.0	Semi-mature tree that has been subject to harsh pruning for clearance over street. Vigor is moderately low.	Fair	3' x continuous	None	None	Yes	6055
100	Shamel ash ( <i>Fraxinus uhdei</i> )	12; 17	2	30	40	3.0	2.0	Mature tree with fused two trunk structure. Subject to top pruning for electrical line clearance. Vigor and foliage density are moderate.	Poor	3' x 4'	Severe displacement occurring including curb and street.	Significant	Yes	6056; 6057; 6058
101	red maple Red Sunset	1.5	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6059
102	red maple Red Sunset	1.25	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6059
103	red maple Red Sunset	1.5	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6059
104	red maple Red Sunset	1.25	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6060, 6061
105	red maple Red Sunset	1	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6060, 6061
106	red maple Red Sunset	1.25	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6060, 6061
107	red maple Red Sunset	1.5	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6060, 6061
108	red maple Red Sunset	1.5	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6060, 6061

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Tree Evaluation Data

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109	red maple Red Sunset	1.75	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6062
110	red maple Red Sunset	1.25	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6062
111	red maple Red Sunset	1.25	1	12 to 15	4 to 5	2.5	3.0	Young tree with no significant structural defects. Drought stressed with foliage in wilt.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6062
112	coast live oak	2.5	1	7	3	2.0	3.0	Young tree with no significant structural defects. Drought stressed with low vigor and twig dieback.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6063
113	coast live oak	2.5	1	7	3	2.5	3.0	Young tree with no significant structural defects. Drought stressed with low vigor.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6064
114	coast live oak	2.5	1	8	3	2.5	3.0	Young tree with no significant structural defects. Drought stressed with low vigor.	Fair to Moderate	Large, open area away from pavement.	None	None	No	6065
115	blackwood acacia ( <i>Acacia melanoxylon</i> )	12; 18	2	50	40	3.0	2.5	mature tree with low, two trunk structure, Possible lower trunk attachment defect. Vigor and foliage density are good. Pineapple guava growing on other side of overpass.	Moderate	Growing next to pedestrian overpass.	None	None	No	6066; 6067
116	coast live oak	10; 12	2	30	30	3.0	2.0	Semi-mature tree with low two trunk structure. Trunk union is include. Vigor and foliage density are good.	Moderate	None	None	No	No	6068; 6069