Climate Smart Cities Richmond

Model Criteria
August 29, 2017

Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Cool	**16.7%**						
		Urban Heat Islands Night	25.0%	Natural Breaks Classification: heat Islands classified from 3 to 5 increasing in intensity. 3 = 56.4 to 57.5 (F) 4 = 57.5 to 58.9 (F) 5 = 58.9 to 61.04 (F)	This model identifies urban heat islands within the within the Richmond planning area with elevated nighttime land surface temperature (LST) averaging at least 1.25 degrees Fahrenheit above the mean daily temperature during August and September of 2016. The model results were derived from MODIS/Aqua MYDA2 satellite data, which provides a 1km (0.6 mi) gridded average land surface temperature over 8 day periods derived using a split-window algorithm. Historical temperature records show that the warmest months in Richmond are August and September. Nine consecutive 8-day MODIS LST averages were compiled to create a 2-month average over the period of July 31 - September 31, 2016. This broad time span helps to alleviate issues relating to short-term temperature fluctuations and absence of satellite data in specific areas due to cloud cover or other issues.	2016 MODIS (Moderate Resolution Imaging Spectro radiometer) MYD11A2 Land Surface Temperature & Emissivity 8-Day L3 Global 1km SIN National Climatic Data Center Climate Normals and Records http://www.srh.noaa.gov/	MODIS land surface temperature - NASA 2017
		Urban Heat Islands Day (Landsat)	75.0%	Natural Breaks Classification: heat Islands classified from 3 to 5 increasing in intensity. 3 = 86.2 to 88.7 (F) 4 = 88.7 to 92.1 (F) 5 = 92.1 to 104.7 (F)	This model identifies urban heat islands within the Richmond planning area with elevated daytime land surface temperature (LST) averaging at least 1.25 degrees Fahrenheit above the mean daily temperature during August/September The model results were derived from Landsat satellite data, which provides a 30m downscaled average land surface temperature over 16 day period. Historical records show the warmest months in Richmond are august and September. The model used an average of 3Landsat scenes from August 14 2016, August 30, 2016 and September 15, 2016.	Landsat Land Surface Temperature was derived using a methodology developed by ESRI that converts the thermal bands of the imagery into degrees Fahrenheit using the raster function template editor. A more detailed description of the methodology can be found here - https://blogs.esri.com/esri/arcgis/2014/01/06/deriving-temperature-from-landsat-8-thermal-bands-tirs/	Landsat land surface temperature - NASA 2016

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Climate Equity	**16.7%**						
		People of Color	8.3%	Quantile Classification 92.6% to 100% = 5 80.2% to 92.5% = 4 62.1% to 80.1 % = 3	This model identifies socially vulnerable populations based on the percent of individuals within a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. The percentage of individuals identifying as a person of color were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 92.6% to 100% Moderate to High (4) = 80.2% to 92.5% Moderate (3) = 62.1% to 80.1 % Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes people of color, which is referred to as Percent Minority in the EPA dataset. Percent Minority is defined as the percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial. The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency
		Low Income Households	8.3%	Quantile Classification 46.2% to 82.5% = 5 28.9% to 46.1% = 4 22.2% to 28.8% = 3	This model identifies socially vulnerable populations based on the percent of households within a block group where the household income is less than or equal to twice the federal "poverty level." The percentage of households with incomes less than or equal to twice the federal "poverty level" were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 46.2% to 82.5% Moderate to High (4) = 28.9% to 46.1% Moderate (3) = 22.2% to 28.8% Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes low-income households, which is referred to as Percent Low-income in the EPA dataset. Percent Low-Income is defined as the percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level." The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency

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Climate Equity	**16.7%**						
		Linguistic Isolation	8.3%	Quantile Classification 12.3% to 42.9% = 5 7.9% to 12.2% = 4 4.6% to 7.8% = 3	This model identifies socially vulnerable populations based on the percent of people in a block group living in linguistically isolated households. A linguistically isolated household is a household in which all members age 14 years and over speak a language other than English and also speak English less than "very well" (have difficulty with English). Block groups with linguistically isolated households were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 12.3% to 42.9% Moderate to High (4) = 7.9% to 12.2% Moderate (3) = 4.6% to 7.8% Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes linguistically isolated households, which is referred to as Linguistic isolation in the EPA dataset. Linguistic isolation is defined as the percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is linguistically isolated. The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency
		Less than High School Degree	8.3%	Quantile Classification 32.5% to 71.6% = 5 16.8% to 32.4% = 4 9.1% to 16.7% = 3	This model identifies socially vulnerable populations based on the percent of people age 25 and older in a block group that do not have a high school diploma. Block groups with populations without a high school degree were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 32.5% to 71.6% Moderate to High (4) = 16.8% to 32.4% Moderate (3) = 9.1% to 16.7% Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes block groups with populations age 25 or older that have not obtained a high school diploma which is referred to as Less than high school education n the EPA dataset. Less than high school education is defined as the percent of people age 25 or older in a block group whose education is short of a high school diploma. The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency

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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Climate Equity	**16.7%**						
		Population Over 65	8.3%	Quantile Classification 16.3% to 61.0% = 5 14.1% to 16.2% = 4 10.0% to 14.0% = 3	This model identifies socially vulnerable populations based on the percent of people in a block group over the age of 64. Block groups with individuals over age 64 were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 16.3% to 61.0% Moderate to High (4) = 14.1% to 16.2% Moderate (3) = 10.0% to 14.0% Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes block groups with populations over the age of 64 which is referred to as Individuals over age 64 in the EPA dataset. Individuals over age 64 is defined as the percent of people in a block group over the age of 64. The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency
		Population Under 5	8.3%	Quantile Classification 9.7% to 19.4% = 5 7.6% to 9.6% = 4 6.1% to 7.5% = 3	This model identifies socially vulnerable populations based on the percent of people in a block group under the age of 5. Block groups with individuals under the age of 5 were broken into 0 to 5 priority classes using a natural breaks slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 9.7% to 19.4% Moderate to High (4) = 7.6% to 9.6% Moderate (3) = 6.1% to 7.5% Zero block groups and parks and natural areas were removed. The model is based on data collected for the EPA Environmental Justice Screening Tool. "EPA should pay particular attention to the vulnerabilities of these populations because they have historically been exposed to a combination of physical, chemical, biological, social, and cultural factors that have imposed greater environmental burdens on them than those imposed on the general population. (http://www.epa.gov/sites/production/files/2015-05/documents/ejscreen_technical_document_20150505.pdf)"	EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors. The EJSCREEN includes block groups with populations under the age of 5 which is referred to as Individuals under age 5 in the EPA dataset. Individuals under age 5 is defined as the percent of people in a block group under the age of 5. The source of all demographic data used in EJSCREEN is the American Community Survey (ACS) five-year summary file (2008 - 2012).	Environmental Protection Agency

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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Climate Equity	**16.7%**						
		Unemployment	8.3%	Quantile Classification 14.2% to 28.1% = 5 8.2% to 14.1% = 4 5.9% to 8.1% = 3	This model identifies socially vulnerable populations based on the percent of unemployed people. Block groups were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 14.2% to 28.1% Moderate to High (4) = 8.2% to 14.1% Moderate (3) = 5.9% to 8.1% Zero block groups and parks and natural areas were removed. The model is based on data collected by the US Census Bureau. " Because low socioeconomic status often goes hand-in-hand with high unemployment, the rate of unemployment is a factor commonly used in describing disadvantaged communities. On an individual level, unemployment is a source of stress, which is implicated in poor health reported by residents of such communities. Lack of employment and resulting low income often blige people to live in neighborhoods with higher levels of pollution and environmental degradation.(https://oehha.ca.gov/media/downloads/calenviroscreen/report/ces3report.pdf)"	The American Community Survey (ACS) is an ongoing survey of the US population conducted by the US Census Bureau. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as unemployment.	ACS
		Job Clusters	8.3%	Quantile Classification 166 to 272 = 5 150 to 165 = 4 65 to 149 = 3	In recent studies, the ICIC have found that clusters of businesses create economic opportunities for residents of inner cities, the nation’s most economically distressed urban areas. This model prioritizes block groups based on the number of businesses. High (5) = 166 to 272 Moderate to High (4) = 150 to 165 Moderate (3) = 65 to 149	ESRI Business Analyst: Businesses represent all registered businesses in the study area	ESRI Business Analyst

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Climate Equity	**16.7%**						
		Vehicle Ownership	8.3%	Quantile Classification 14.6% to 46.4% = 5 7.9% to 14.5% = 4 4.2% to 7.8% = 3	This model identifies socially vulnerable populations based on the percent of households that do not own a car. Block groups were broken into 0 to 5 priority classes using a quantile slice classification. The break points for the moderate to high priority classes were as follows: High (5) = 14.6% to 46.4% Moderate to High (4) = 7.9% to 14.5% Moderate (3) = 4.2% to 7.8% Zero block groups and parks and natural areas were removed. The model is based on data collected by the US Census Bureau. " Vehicle ownership is a measure of mobility and access to transportation. Transportation is a critical resource for survival, because it improves access to evacuation and shelter from environmental exposures, such as wildfire, air pollution, heat waves, and flooding, allowing people to move to cooler areas or other safe areas.(https://archive.cdph.ca.gov/programs/Documents/CalBRACE%202015CHPR/CarOwnership_37_Narrative_9-6-16.pdf)"	The American Community Survey (ACS) is an ongoing survey of the US population conducted by the US Census Bureau. Unlike the decennial census, which attempts to survey the entire population and collects a limited amount of information, the ACS releases results annually based on a sub-sample of the population and includes more detailed information on socioeconomic factors such as households that own a car.	ACS
		Asthma	8.3%	Quantile Classification 99 to 100 = 5 95 to 98 = 4 80 to 95 = 3	This model assigns value to census tract areas based on spatially modeled, ageadjusted rate of emergency department (ED) visits for asthma per 10,000 (averaged over 2011-2013) summarized for the CalEnviroScreen 3.0 tool and report. From the CalEnviroScreen 3.0 report: " While the causes of asthma are poorly understood, it is well established that exposure to traffic and outdoor air pollutants, including particulate matter, ozone, and diesel exhaust, can trigger asthma attacks. Nearly three million Californians currently have asthma and about five million have had it at some point in their lives. Children, the elderly and low-income Californians suffer disproportionately from asthma (California Health Interview Survey, 2009)." Priority values (0 to 5) were assigned to the data using a quantile classification increasing in percentile.	Original data sources include: California Office of Statewide Health Planning and Development (OSHPD), California Environmental Health Tracking Program (CEHTP),and California Department of Public Health.	Cal EnviroScreen v3.0

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Climate Equity	**16.7%**						
		Cardiovascular Disease	8.3%	Quantile Classification 85 to 92 = 5 80 to 84 = 4 68 to 79 = 3	This model assigns value to census tract areas based on spatially modeled, age adjusted rate of emergency department (ED) visits for AMI (acute myocardial infarction) per 10,000 (averaged over 2011-2013) summarized for the CalEnviroScreen 3.0 tool and report. From the CalEnviroScreen 3.0 report: " Short term exposure to air pollution, and specifically particulate matter, has been shown to increase the risk of cardiovascular mortality shortly following a heart attack. There is also growing evidence that long term exposure to air pollution may result in premature death for people that have had a heart attack. In addition to people with a previous AMI, the effects of pollution on cardiovascular disease may be more pronounced in the elderly and people with other preexisting health conditions." Priority values (0 to 5) were assigned to the data using a quantile classification increasing in percentile.	Original data sources include: California Office of Statewide Health Planning and Development (OSHPD), California Environmental Health Tracking Program (CEHTP), Environmental Health Investigations Branch, amd California Department of Public Health	Cal EnviroScreen v3.0
		Low Birth Weight	8.3%	Quantile Classification 87 to 96 = 5 77 to 86 = 4 68 to 76 = 3	This model assigns value to census tract areas based on percent low birth weight, spatially modeled (averaged over 2006-2012) summarized for the CalEnviroScreen 3.0 tool and report. From the CalEnviroScreen 3.0 report: " Infants born weighing less than 2,500 grams (about 5.5 pounds) are classified as low birth weight (LBW), a condition that is associated with increased risk of later health problems as well as infant mortality. Most LBW infants are small because they were born early. Infants born at full term (after 37 complete weeks of pregnancy) can also be LBW if their growth was restricted during pregnancy. Nutritional status, lack of prenatal care, stress, and maternal smoking are known risk factors for LBW. Studies also suggest links with environmental exposures to lead, air pollution, toxic air contaminants, traffic pollution, pesticides, and polychlorinated biphenyls (PCBs). These children are at risk for chronic health conditions that may make them more sensitive to environmental exposures after birth. " Priority values (0 to 5) were assigned to the data using a quantile classification increasing in percentile.	Original data source is California Department of Public Health (CDPH)	Cal EnviroScreen v3.0

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Protect	**16.7%**						
		Current Flood Zones	16.0%	SFHA VE 1% annual chance = 5 SFHA AE 1% annual chance = 4 1% annual chance = 3 0.2% annual chance = 2	This model assigns very high priority (5) to special flood hazards areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action; high priority to special flood hazard areas subject to inundation by the 1-percent-annual-chance flood event; and moderate priority to areas not identified as special flood hazard areas that subject to inundation by the 1-percent-annual-chance flood event with and without additional hazards due to storm-induced velocity wave action.	2015 FEMA DFIRM Flood Zones	Federal Emergency Management Agency (FEMA)
		Wetlands	5.0%	Wetlands and areas within 200 feet of existing wetlands = 5	Wetlands are critical natural infrastructure for mitigating and minimizing flood damage. Wetlands store precipitation and surface water and then slowly release the water into associated surface water resources, ground water, and the atmosphere. This model assigns high priority (5) to areas within 200 ft. of all existing wetlands as well as upland habitats adjacent to existing coastal wetlands that might provided function of a wetland under future climate scenarios.	National Wetland Inventory	US Fish and Wildlife Service

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Protect	**16.7%**						
		Innundation Zones	16.0%	Tsunami Inundation Zones = 5	This model assigns high priority (5) to areas mapped as tsunami inundation zones and represent a combination of the maximum considered tsunamis for each area.	Tsunami Inundation Maps Produced collectively by tsunami modelers, geologic hazard mapping specialists, and emergency planning scientists from CGS, Cal OES, and the Tsunami Research Center at the University of Southern California, the tsunami inundation maps for California cover most residentially and transient populated areas along the state's coastline. Coordinated by Cal OES, these official maps are developed for all populated areas at risk to tsunamis in California and represent a combination of the maximum considered tsunamis for each area. Click on the county or county name from the list below to view/download the Tsunami Inundation Maps. For local, county, and regional emergency preparedness information, explore the links at the bottom of the county page.	California Department of Conservation http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps
		2030 Future Flood Zone	16.0%	12 inch sea level rise plus a 0.1% annual chance of flooding = 5 0.1 % annual chance of flooding = 4 0.2% annual chance = 3	This model assigns high priority (5) to coastal flooding risk for the year 2030 based on a 12-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 12-inch sea level rise represents the upper range of sea level rise for the year 2030 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides

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Protect	**16.7%**						
		2050 Future Flood Zones	16.0%	24 inch sea level rise plus a 0.1% annual chance of flooding = 5 0.1 % annual chance of flooding = 4 0.2% annual chance = 3	This model assigns high priority (5) to coastal flooding risk for the year 2050 based on a 24-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 24-inch sea level rise represents the upper range of sea level rise for the year 2050 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides
		2030 Flood Innundation	5.0%	0" to 6" inundation = 5 6" to 12" inundation = 4 12"+ inundation = 3	This model assigns priority to inundation depths of coastal flooding risk for the year 2030 based on a 12-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 12-inch sea level rise represents the upper range of sea level rise for the year 2030 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California. Areas with an expected inundation level of less than 6 inches, where potential green infrastructure projects might be expected to have more impact in minimizing flooding impacts were assigned highest priority (5); areas of inundation between 6 inches and 12 inches were assigned a high (4) priority; and areas of inundation greater than 12 inches were assigned a moderate priority.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides

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Protect	**16.7%**						
		2050 Flood Innundation	5.0%	0" to 6" inundation = 5 6" to 12" inundation = 4 12"+ inundation = 3	This model assigns priority to inundation depths of coastal flooding risk for the year 2050 based on a 24-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 24-inch sea level rise represents the upper range of sea level rise for the year 2050 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California. Areas with an expected inundation level of less than 6 inches, where potential green infrastructure projects might be expected to have more impact in minimizing flooding impacts were assigned highest priority (5); areas of inundation between 6 inches and 12 inches were assigned a high (4) priority; and areas of inundation greater than 12 inches were assigned a moderate priority.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides
		2100 Future Flood Zones	16.0%	36 inch sea level rise plus a 0.1% annual chance of flooding = 5 0.1 % annual chance of flooding = 4 0.2% annual chance = 3	This model assigns high priority (5) to coastal flooding risk for the year 2050 based on a 36-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 36-inch sea level rise represents the upper range of sea level rise for the year 2100 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides

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Protect	**16.7%**						
		2100 Flood Innundation	5.0%	0" to 6" inundation = 5 6" to 12" inundation = 4 12"+ inundation = 3	This model assigns priority to inundation depths of coastal flooding risk for the year 2100 based on a 36-inch sea level rise and a 0.1% annual chance of flooding (i.e., 100 year event) scenario as identified by the Contra Costa County Adapting to Rising Tides Program. The 36-inch sea level rise represents the upper range of sea level rise for the year 2100 based on the National Research Council's 2013 report on Sea-Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future which was adopted by the California Ocean Protection Council (OPC) as the best available science on sea level rise for the State of California. Areas with an expected inundation level of less than 6 inches, where potential green infrastructure projects might be expected to have more impact in minimizing flooding impacts were assigned highest priority (5); areas of inundation between 6 inches and 12 inches were assigned a high (4) priority; and areas of inundation greater than 12 inches were assigned a moderate priority.	Contra Costa County Sea Level Rise Vulnerability Assessment The Contra Costa County Adapting to Rising Tides (ART) Program helps to identify and assess community resources at risk due to sea level rise and storm surge. Datasets produced from the program offer an assessment of Contra Costa County's exposure to flooding and/or inundation from sea level rise scenarios ranging from 0 to 66 inches as well as extreme tide events from 1-year to 500-year extremes.	Adapting to Rising Tides

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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Absorb	**16.7%**						
		Current Flood Zones	25.0%	SFHA VE 1% annual chance = 5 SFHA AE 1% annual chance = 4 1% annual chance = 3 0.2% annual chance = 2	This model assigns very high priority (5) to special flood hazards areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action; high priority to special flood hazard areas subject to inundation by the 1-percent-annual-chance flood event; and moderate priority to areas not identified as special flood hazard areas that subject to inundation by the 1-percent-annual-chance flood event with and without additional hazards due to storm-induced velocity wave action.	2015 FEMA DFIRM Flood Zones	Federal Emergency Management Agency (FEMA)
		Estimated Runoff Potential Water Quality (1/2" precipitation event)	25.0%	Natural Breaks Classification Greater than or equal to 0.31" = 5 0.22" to 0.3" = 4 0.14" to 0.21" = 3	This model identifies areas where there is high potential for runoff and estimates runoff volume for a 1/2" storm event using the NRCS Curve Number methodology, which considers soil and land use characteristics. Runoff levels were scored based on projected runoff using a natural breaks as follows: Greater than or equal to 0.31" = Highest Priority (5) 0.22" to 0.3" = Moderate-High Priority (4) 0.14" to 0.21" = Moderate Priority (3) Less than 0.13" = not scored	SSURGO Soil Hydrologic Groups 2011 National Landcover Dataset Purdue Runoff Curve Number Table	Natural Resource Conservation Service US Geological Survey Purdue University
		Estimated Runoff Potential Water Quantity (10yr 24hr event)	5.0%	Natural Breaks Classification Greater than or equal to 5.49" = 5 5.0" to 5.48" = 4 4.31" to 4.99" = 3	This model identifies areas where there is high potential for runoff and estimates runoff volume for a 5 1/2" storm event using the NRCS Curve Number methodology, which considers soil and land use characteristics. Runoff levels were scored based on projected runoff using a natural breaks as follows: Greater than or equal to 5.49" = Highest Priority (5) 5.0" to 5.48" = Moderate-High Priority (4) 4.31" to 4.99" = Moderate Priority (3) Less than 4.3" = not scored	SSURGO Soil Hydrologic Groups 2011 National Landcover Dataset Purdue Runoff Curve Number Table	Natural Resource Conservation Service US Geological Survey Purdue University

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Absorb	**16.7%**						
		Water Quality Priorities	10.0%	Natural Breaks Classification 91st to 96th percentile = 5 86th to 91st percentile = 4 76th to 86th percentile = 3	This model assigns water quality priorities based on the census tract's impaired water bodies percentile rank using a natural breaks classification. 91st to 96th percentile = high priority (5) 86th to 91st percentile = moderate to high priority (4) 76th to 86th percentile moderate priority (3) 29th to 76th percentile moderate to low priority (2) 15th to 29th percentile low priority (1)	CalEnviroScreen 3.0 Impaired Water Bodies This indicator provides a summary of the number of pollutants for all water bodies (lakes, streams, rivers) designated as impaired by the State Water Resources Control Board (SWRCB) as of 2012.	California Environmental Protection Agency California Office of Environmental Health Hazard Assessment
		Sinks	15.0%	Natural Breaks Classification -33.2' to -75' = 5 -17.3' to -33.1' = 4 -7.6' to -17.2' = 3	A sink is a depression in the landscape that can trap water. This model identifies sinks in the landscape where water is expected to be trapped. Sinks were identified using a 10 meter digital elevation model. The DEM was filled using the FILL tool from the ARCGIS hydrology data set. The new elevation model was subtracted from the original. Areas with negative elevation were identified as sinks and priority value was assigned using a natural breaks classification.	Esri Terrain 10m	Esri
		Flow Accummulation	20.0%	Natural Breaks Classification >=2,122 contributing areas (cells) = 5 898 to 2,122 contributing areas (cells) = 4 366 to 898 contributing areas (cells) = 3	This model assigns priority to areas with high surface flow accumulation within street rights of way. Areas were scored base on the number of cells flowing into each downslope cell using a natural breaks classification. >=2,122 contributing areas (cells) = high priority (5) 898 to 2,122 contributing areas (cells) = moderate to high priority (4) 366 to 898 contributing areas (cells) = moderate priority (3) 99 to 366 contributing areas (cells) = moderate to low priority (2) 0 to 99 contributing areas (cells) = low priority (1)	Esri Terrain 10m	Esri

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Connect	**16.7%**						
		Gaps in Parks	25.0%		This model prioritize areas of the city that are more than a 10 minute walk from a park or open space. Parks and Open Space within Richmond were buffered by 60 ft. and the intersection of these areas with walkable street network were used to derive service areas for the 10 minute walk. Areas more than a 10 minute walk from existing parks and open space were assigned priority based on the estimated population density.	Parks Suitable Streets Network	EBRP and C-PAD (edited with TAT input) The Trust for Public Land
		Gaps in Public Transportation	5.0%	Areas more than a 5-minute walk from a bus stop or greater than half of a mile from mass transit = 5	This model assigns high priority (5) to areas more than a five minute walk from a bus stops or 1/2 miles from mass transit.	Suitable Streets Network BART Stations Bus Stops	The Trust for Public Land Bay Area Rapid Transit City of Richmond
		GHG Analysis for Proposed Trail	25.0%	Natural Breaks Classification Proposed bicycle and/or walking routes resulting in 18,144 to 27,303 reduced driving trips per year = 5 Proposed bicycle and/or walking routes resulting in 10,693 to 18,143 reduced driving trips per year = 4 Proposed bicycle and/or walking routes resulting in 5,548 to 10,692 reduced driving trips per year = 3	This model quantifies the benefits of proposed active transportation projects (i.e., bicycle and pedestrian trails/routes) including reduced greenhouse gas emissions, reduced air pollution, household transportation savings, reduced mortality and reduced driving. At the heart of our methodology is a method for estimating reductions in vehicle trips and vehicle miles traveled due to bicycle facilities that was developed by the California Air Resources Board (ARB) in 2005. There are other methods available to estimate the transportation impacts of bicycle and pedestrian facilities, but the ARB methodology combines several key advantages: - Widely Used - Simple - Widely Applicable Proposed pedestrian and bicycle routes are prioritized based on the total number of reduced driving trips per year using a natural breaks classification.	Proposed Bike Trails Proposed Bay Trail Suitable Streets Network Average Annual Daily Traffic BART Station Libraries Community Centers Grocery Stores Healthcare Facilities Businesses Slope Derived from 10m Digital Elevation Model Area Type Derived from Population Density	City of Richmond City of Richmond Trust for Public Land Esri City of Richmond City of Richmond California Office of Statewide Health Planning and Development, Contra Costa Health Services, City of Richmond Esri Business Analyst Esri iTree Block Group

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Connect	**16.7%**						
		Safe Routes to Schools	15.0%	Areas within a 10-minute walk of a school = 5	This model assigns high priority to areas within a 10 minute walk of a school	Suitable Streets Network Public Schools	Trust for Public Land City of Richmond West Contra Costa Unified School District
		Connect People to Bay Trail	15.0%	Natural Breaks Classification Route provided most direct access from census block to the Bay Trail 55 to 398 times = 5 Route provided most direct access from census block to 5 closest medical facilities and 2 closest grocery stores 8 to 54 times = 4 Route provided most direct access from census block to 5 closest medical facilities and 2 closest grocery stores 2 to 7 times = 3	This model prioritizes the most direct routes from each block centroid to Bay Trail Access points. Routes were scored using a natural breaks classification based on the total number of times any given route was identified as providing the most direct access to reach the Bay Trail and then weighted higher if they coincided with proposed bikeways.	Suitable Street Network Census Blocks Existing Bay Trail	Trust for Public Land US Census Bureau City of Richmond

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Connect	**16.7%**						
		Connect People to Medical and Grocery	15.0%	Natural Breaks Classification Route provided most direct access from census block to 5 closest medical facilities and 2 closest grocery stores 189 to 271 times = 5 Route provided most direct access from census block to 5 closest medical facilities and 2 closest grocery stores 124 to 189 times = 4 Route provided most direct access from census block to 5 closest medical facilities and 2 closest grocery stores 80 to 124 times = 3	This model prioritizes the streets and/or trail routes that provide the shortest (most direct) access to the 5 closest medical facilities and the 2 closets grocery stores from each census blocks with a population greater than 0 people in the study area. Routes were scored using a natural breaks classification based on the total number of times the route was identified as the most direct to reach a medical facility or grocery store.	Suitable Street Network Census Blocks Healthcare Facilities Grocery Stores (Richmond Food Census)	Trust for Public Land US Census Bureau California Office of Statewide Health Planning and Development, Contra Costa Health Services, City of Richmond City of Richmond

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Critical Infrastructure	**16.7%**						
		Density of Essential Emergency Services	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of essential service facilities. Essential Services facilities include police stations, fire stations, EMS stations, and health care facilities. Point Density of essential service facilities was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. The resulting density raster was broken into priority classes using slice tool and a natural breaks classification using scale of 0 to 5.	Police and Fire Stations Healthcare facilities	City of Richmond CA OHPD
		Density of Key Transportation Infrastructure	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of key transportation infrastructure. Key transportation infrastructure include railroads, bus routes, major roads (as proxy for evacuation routes), Bart stations, entrance/exits to bridges and tunnels, and bus stops. Point Density of Bart stations, entrances and exits and bus stops was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. Line Density of railroads, bus routes, and major roads was derived using 1/8 mile radius. The resulting point and line density rasters density rasters were broken into priority classes using slice tool and a natural breaks classification using scale of 3 to 5. The priority rasters were then combined using the cell statistics tool (maximum) .	Railroads, Major Roads, Entrances and Exits to Bridges and Tunnels Bart Stations Bus Stops and Bus Routes	StreetMap Premium MTC City of Richmond
		Density of Utility Facilities	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of utility and communication facilities. Utility facilities include major transmission lines, major gas lines, and waste water treatment plants. Point Density of waste water treatment plants was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. Line Density of major transmission lines and gas lines was derived using 1/8 mile radius. The resulting point and line density rasters density rasters were broken into priority classes using slice tool and a natural breaks classification using scale of 3 to 5. The priority rasters were then combined using the cell statistics tool (maximum) .	Waste Water Treatment Plants Major Transmission Lines Major Gas Lines	City of Richmond ArcGIS Online (Oak Ridge National Laboratory (ORNL) Geographic Information Science and Technology (GIST) Group, Los Alamos National Laboratory (LANL), Idaho National Laboratory (INL), National Geospatial-Intelligence Agency (NGA) Homeland Security Infrastructure Program (HSIP) Team) The Trust for Public Land

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Model Criteria
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Goal	Goal Weights	Criteria	Criteria Weights	Data Interpretation to Scale 0 - 5	Methodology	Data (Description, Date, Resolution)	Data Source
Critical Infrastructure	**16.7%**						
		Density of Institutional Facilities	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of institutional facilities. Institutional facilities include colleges, universities, historic facilities, museums, libraries, city hall, and city council chambers. Point Density of institutional facilities was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. The resulting density raster was broken into priority classes using slice tool and a natural breaks classification using scale of 0 to 5.	City Institutional Facilities (City Hall, Council Chambers, Museum) Colleges and Universities Historical Sites Libraries	City of Richmond City of Richmond National Register of Historic Places City of Richmond
		Dependent Populations	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of dependent care facilities. Dependent care facilities include long-term care, nursing homes and elderly care facilities, daycares, and prisons. Point Density of high potential loss facilities was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. The resulting density raster was broken into priority classes using slice tool and a natural breaks classification using scale of 0 to 5.	Long-term care facilities Nursing home and elderly care facilities Daycare facilities Prisons	Esri Business Analyst 2016 Esri Business Analyst 2016 Esri Business Analyst 2016 Esri Business Analyst 2016
		Density of High Potential Loss Facilities	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of high potential loss facilities. High potential loss facilities include hazardous sites identified by EPA, USACE, FERC, BOR, DTSC, SWCRB. Point Density of high potential loss facilities was derived using 1/4 mile (equivalent to 5 minute walk) circular radius and was broken into priority classes using slice tool and a natural breaks classification using scale of 0 to 5.	Hazardous facilities	EPA, USACE, FERC, BOR, DTSC, SWCRB (download of March 2017). Cleaners and small sites removed and compared to City of Richmond download of 2011. Sites not included added.
		Density of Other Emergency Services	14.3%	Natural Breaks Classification	This model assigns critical infrastructure risk based upon density of locations of other emergency facilities. Other emergency facilities include public schools, community and recreational centers. Point Density of other emergency services facilities was derived using 1/4 mile (equivalent to 5 minute walk) circular radius. The resulting density raster was broken into priority classes using slice tool and a natural breaks classification using scale of 0 to 5.	Schools Community Centers and Recreational Centers	WCCUSD City of Richmond

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Administrative Boundaries		
CA Assembly Districts	ESRI ArcGIS Online	
CA Senate Districts	ESRI ArcGIS Online	
US Congressional Districts	ESRI ArcGIS Online	
City Boundaries	City of Richmond	
Census Block Group Boundary	US Census Bureau	
Census Tract Boundary	US Census Bureau	
Richmond Neighborhood Council Boundaries	City of Richmond	
City of Richmond Properties	City of Richmond	
General Plan 2030 Land Use (Richmond Only)	City of Richmond	
Zoning District (Richmond Only)	City of Richmond	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Green Infrastructure Suitability		
Hazardous Waste Sites (DTWS, FRS, SWRCB)	DTWS, EPA, SWRCB	This data layer changes often. TPL used a number of different sources to create the version displayed in the tool. TPL started with recent (April 2017) downloads from DWTS, EPA, and SWRCB. These layers were missing some of the hazardous sites contained in the 2011 version from the city. These layers were combined and duplicates removed.
SSURGO Soils	ESRI ArcGIS Online	
DEM	ESRI ArcGIS Online	elevation in feet
Impervious (NLCD2011)	Multi-Resolution Land Characteristics (MRLC) Consortium	Xian, G., Homer, C., Dewitz, J., Fry, J., Hossain, N., and Wickham, J., 2011. The change of impervious surface area between 2001 and 2006 in the conterminous United States. Photogrammetric Engineering and Remote Sensing, Vol. 77(8): 758-762.
Canopy Cover (NLCD2011)	Multi-Resolution Land Characteristics (MRLC) Consortium	
Landcover (NLCD2011)	Multi-Resolution Land Characteristics (MRLC) Consortium	Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354
Potentially Vacant City of Richmond Properties	City of Richmond	
Less than 3 Acres Parks per 1000 Residents	The Trust for Public Land	TPL derived layer using US Census Bureau Block Group Data and Parks and Open Space Layer created for this project. Methodology was intersect of block group with parks and calculation of park acreage by block group per 1000 residents.
Disadvantaged Community (AB-31, PROP1, PROP84)	US Census Bureau	A Disadvantaged Community is defined a Community with annual median household income (MHI) that is less than 80 percent of the Statewide annual MHI. This is a criteria included for some funding allocated in in State Bill AB-31 (the State Parks Bill) , Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014) and Proposition 84 (the Integrated Regional Water Management Grant Program).
General Plan 2030 Land Use (Richmond Only)	City of Richmond	
Zoning District (Richmond Only)	City of Richmond	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Cool		
Tree Location (Richmond Street Only)	City of Richmond	
Tree Opportunity Site (Richmond Street Only)	City of Richmond	
Average Land Surface Temperature Daytime - Landsat (F)	TPL Derived	The model results were derived from Landsat satellite data, which provides a 30m downscaled average land surface temperature over 16 day period. Historical records show the warmest months in Richmond are august and September. The model used an average of 3Landsat scenes from August 14 2016, August 30, 2016 and September 15, 2016.
Average Land Surface Temperature Nighttime - MODIS (F)	TPL Derived	The LST results were derived from MODIS/Aqua MYDA2 satellite data, which provides a 1km (0.6 mi) gridded average land surface temperature over 8 day periods derived using a split-window algorithm. Historical temperature records show that the warmest months in Richmond are August and September. Nine consecutive 8-day MODIS LST averages were compiled to create a 2-month average over the period of July31 - September 31, 2016.

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Connect		
Parks and Open Space	ParkServe, City of Richmond, and EBRPD	This layer was created by TPL using data from ParkServe data collection effort combined with a data layer provided by EBRPD. The TPL layer was reviewed and approved by the City of Richmond.
10 minute Walk to a Park	TPL Derived	Using parks and open space layer, TPL derived a 10 minute walk layer. Access points were created by finding intersection of walkable streets and areas within 60ft of a park and open space.
Richmond Food Census Places	Mayors Office City of Richmond	This layer shows all businesses that self identified as having groceries in the Food Census effort being conducted by the City of Richmond Mayor's Office.
Healthcare Facilities	California Office of Statewide Health Planning and Development, Contra Costa Health Services, City of Richmond	
Collision (SafeTREC.UCB)		These layers were downloaded from the Transit Injury Mapping System (TIMS) from the Safe Transportation Research and Education Center (SafeTREC) of UC Berkeley (UCB)
Pedestrian Crashes	SafeTREC and UCB	
Bicycle Crashes	SafeTREC and UCB	
Other Crashes	SafeTREC and UCB	
BART Station	City of Richmond	
Schools	WWCUD	geocoded list of schools
Bus Stops	City of Richmond	
Bus Route	City of Richmond	
BART Station - First Last Mile	The Trust for Public Land	TPL created a walkable service area from the point layer provided by the City of Richmond
Bus Stops - First Last Mile	The Trust for Public Land	TPL created a walkable service area from the point layer provided by the City of Richmond
BART Bike Service Area	The Trust for Public Land	TPL created a walkable service area from the point layer provided by the City of Richmond. Bike Service Area = 2.2 miles
Bay Trail Existing	City of Richmond	
Bay Trail Proposed	City of Richmond	
Bikeways Existing	City of Richmond	
Bikeways Proposed	City of Richmond	
Expected GHG Reduction from Proposed trails	The Trust for Public Land	calculated using TPL's Methodology described in Assessing the benefits of active transportation projects (https://www.tpl.org/methodology-benefits-active-transportation#sm.0000oh41r1q81eubxz121sluywuu9)
Pavement Condition	City of Richmond	
Walkable Streets	City of Richmond	Filtered to streets that are walkable (e.g. no interstate)
All Roads	City of Richmond	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Absorb		
Storm Hotspots (Richmond Only)	City of Richmond	Data provided City of Richmond in March 2017
Special Flood Hazard Area	FEMA	Filtered to show those areas identified in the FEMA Flood Zones Layer that are considered Special Flood Hazard Areas
FEMA Flood Zones	Federal Emergency Management Agency (FEMA)	2015
Watershed Boundaries (HUC12)	US Geological Survey	
303d Impaired Waters	US Environmental Protection Agency	
DEM	Esri	
Impervious Surface	US Geological Survey	
Hydrologic Soils Group	USDA Natural Resources Conservation Service	downloaded from ArcGIS online
Landcover (NLCD2011)	MLRC 2011	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Protect		
Waterbody (NHD)	National Hydrography Dataset	
Aquatic Resource (CARI v0.2)	San Francisco Estuary Institute California Aquatic Resource (CARI v0.2)	
Inundation Zone	California Department of Conservation	http://www.conservation.ca.gov/cgs/geologic_hazards/Tsunami/Inundation_Maps
FEMA Flood Zones	Federal Emergency Management Agency (FEMA)	2015
Sea Level Rise 12in and 100yr Event	Adapting to Rising Tides	
Sea Level Rise 24in and 100yr Event	Adapting to Rising Tides	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Climate Equity		
Less than 3 Acres Parks per 1000 Residents	The Trust for Public Land	TPL derived layer using US Census Bureau Block Group Data and Parks and Open Space Layer created for this project. Methodology was intersect of block group with parks and calculation of park acreage by block group per 1000 residents.
Disadvantaged Community (AB-31, PROP1, PROP84)	US Census Bureau	A Disadvantaged Community is defined a Community with annual median household income (MHI) that is less than 80 percent of the Statewide annual MHI. This is a criteria included for some funding allocated in in State Bill AB-31 (the State Parks Bill) , Proposition 1 (Water Quality, Supply, and Infrastructure Improvement Act of 2014) and Proposition 84 (the Integrated Regional Water Management Grant Program).
EJScreen Population Density Quantiles	EPA EJScreen	
EJScreen People of Color Quantiles	EPA EJScreen	
EJScreen Low Income Households Quantiles	EPA EJScreen	
EJScreen Linguistic Isolation Quantiles	EPA EJScreen	
EJScreen Less than High School Degree Quantiles	EPA EJScreen	
EJScreen Population Over 64 Quantiles	EPA EJScreen	
EJScreen Population Under 5 Quantiles	EPA EJScreen	
Block Group Job Clusters Quantiles	ESRI Business Analyst	ESRI Business Analyst: Businesses represent all registered businesses in the study area
Block Group Unemployment Rate Quantiles	ACS	
Block Group % Households with No Vehicle Quantiles	ACS	
CalEnviro Screen 3.0 Asthma Quantiles	CalEnviro Screen 3.0	
CalEnviro Screen 3.0 Cardiovascular Disease Quantiles	CalEnviro Screen 3.0	
CalEnviro Screen 3.0 Low Birth Weight Quantiles	CalEnviro Screen 3.0	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Critical Infrastructure		
Essential Emergency Services		
Police and Fire Stations	City of Richmond	
Hospitals	California Office of Statewide Health Planning and Development	
Key Transportation Infrastructure		
Bus Stops	City of Richmond	
Entrances/Exits to Bridges and Tunnels	Street Map NA 2013	TPL derived this layer using Street Map NA 2013. Points are the start and end of all streets classified as bridges and tunnels in source data layer
BART Station	Bay Area Rapid Transit	
Railroads	Street Map NA 2013	
Bus Route	City of Richmond	
Major Roads	City of Richmond	TPL filtered roads layer to show only major roads
Key Utility Infrastructure		
Waste Water Treatment Plant	City of Richmond	
Major Gaslines	The Trust for Public Land	Data represent approximate locations of pipelines based on maps published by the CA Energy Commission
Major Transmission Lines	ArcGIS Online	(Oak Ridge National Laboratory (ORNL) Geographic Information Science and Technology (GIST) Group, Los Alamos National Laboratory (LANL), Idaho National Laboratory (INL), National Geospatial-Intelligence Agency (NGA) Homeland Security Infrastructure Program (HSIP) Team)
Key Institutional Facilities		
Libraries	City of Richmond	
City Facilities	City of Richmond	
Colleges and Universities	City of Richmond	
Historical Sites	National Park Service	
Dependent Population Facilities		
Prisons	ESRI Business Analyst	
Long Term Care Facilities	ESRI Business Analyst	
Dependent Care Facilities	ESRI Business Analyst	
High Potential Loss Facilities		
Hazardous Waste Sites (DTWS, FRS, SWRCB)	DTWS, EPA, SWRCB	This data layer changes often. TPL used a number of different sources to create the version displayed in the tool. TPL started with recent (April 2017) downloads from DWTS, EPA, and SWRCB. These layers were missing some of the hazardous sites contained in the 2011 version from the city. These layers were combined and duplicates removed.
Other Emergency Services		
Community Center	City of Richmond	
Schools	City of Richmond	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Health		
Estimated Prevalence of Kidney Disease	CDC 500 Cities	
Estimated Prevalence of COPD	CDC 500 Cities	
Estimated Prevalence of Heart Disease	CDC 500 Cities	
Estimated Prevalence of Current Asthma	CDC 500 Cities	
Estimated Prevalence of Diabetes	CDC 500 Cities	
Estimated Prevalence of Obesity	CDC 500 Cities	

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Creative Placemaking		
Parks and Gathering Spaces		
Community Gardens		
Restaurants	ESRI Business Analyst	
Schools	City of Richmond	
Religious Organizations	ESRI Business Analyst	
Nonprofit Art Organizations	City of Richmond	
Libation and arts Tour Businesses	City of Richmond	
Proposed Libation and Arts Tour Route	The Trust for Public Land	TPL Derived from Business Locations provided by the City of Richmond
Libraries	City of Richmond	
Farmers Markets	Data.gov	https://catalog.data.gov/dataset/farmers-markets-geographic-data; TPL added City Hall farmer's market after review with the Advisory Team
Parks and Open Space	ParkServe, City of Richmond, and EBRPD	
Park Access Points	The Trust for Public Land	Data represent the intersection of walkable streets and a 60ft buffer of existing parks
Spaces to Gather Density	TPL Derived	Point data collected as the spaces to gather data overlay used as input in point density analysis to create a density layer for visualization in the tool.
Reasons to Gather		
Cultural Activity		
Percent of Population Attending Cultural Activities	ESRI Business Analyst	
Residential Stability and Cohesion		
Percent of School-aged Children	ESRI Business Analyst	
Median Year Householder Moved in	ESRI Business Analyst	
Percent Vacant Housing	ESRI Business Analyst	
Percent Local Workers (workers in COUNTY of Residence)	ESRI Business Analyst	
Age Diversity Index by Neighborhood	TPL Derived	Data are an indicator of diversity of ages with a block group. High number indicates more age groups represents as average for the city
Ability to Gather		
Food Census		
Food Census Locations		
Community Gardens		
Grocery (Food Census Mayor Office)	City of Richmond Mayor's Office	provided as a spreadsheet and geocoded by address
Farmers Markets	Data.gov	https://catalog.data.gov/dataset/farmers-markets-geographic-data
10 minute Walk to Grocery Store, Community Garden, or Farmer's Market	The Trust for Public Land	TPL created a walkable service area from the food census layers collected

Overlay Data Sources

Group/Layer Name	Data Source	Notes
Creative Placemaking		
Access to Public Transit		
BART Station	Bay Area Rapid Transit	
Bus Stops	City of Richmond	
10 minute Walk to Public Transit	The Trust for Public Land	TPL created a walkable service area from the public transit layers collected
Neighborhood Risks		
Crime by Neighborhood	ESRI Business Analyst	TPL summarized data from ESRI Business Analyst to the neighborhood council boundaries
Households Under the Poverty Line by Neighborhood	ESRI Business Analyst	TPL summarized data from ESRI Business Analyst to the neighborhood council boundaries
Physical Inactivity by Neighborhood	ESRI Business Analyst	TPL summarized data from ESRI Business Analyst to the neighborhood council boundaries