

# 2019 Annual Report: Sustainability



San Francisco Bay Area Rapid Transit District

# GM Message



I'm pleased to present to you BART's 2019 Annual Report: Sustainability. This document comes at a time of daunting challenges and unequalled uncertainty. Nevertheless, BART's mission to provide safe, reliable, clean, and quality transit service for riders remains unchanged.

BART is widely recognized as an environmental leader through its advancement of regional sustainability and improved public health outcomes. In the following pages, we think you will see that BART is making important strides in addressing climate change, environmental justice, and the housing crisis.

BART is far more than trains and tracks. The District, now operating in five Bay Area counties, includes real estate assets that can be used to catalyze transit-oriented development. BART leverages these opportunities by working in partnership with the communities we serve in order to implement our regional land use vision and achieve local and regional economic development goals. Additionally, BART has made improvements that help BART customers access our stations via sustainable forms of transportation. Strengthening the connections between people, places, and services enhances BART's value as a regional resource.

The Coliseum Connections project is a shining example. This residential project has exceptional access to public transportation and is a true mixed-income property, with half its 110 apartment units designated as moderate-income rentals and half set aside as affordable housing for those making 50%-60% of the median income for Oakland.

Also, consider that BART is one of Northern California's largest consumers of electricity. We have a responsibility to lead the way in green energy and conservation, and we do so in ways both large and small.

On a large scale, our Wholesale Electricity Policy has pushed BART to shift energy sourcing away from unspecified power sources and toward zero- and low-carbon sources, which has significantly reduced BART's GHG emissions.

On a smaller scale, LED lighting upgrades throughout stations and parking areas are conserving energy. And perhaps most noticeably, more of our new Fleet of the Future rail cars, which are designed to be at least 7% more efficient than legacy cars, are being added to service virtually every week.


Many more examples of BART's focus on sustainability follow in this report. Looking ahead to 2020 and beyond, it's likely that the challenging targets we have set for our metrics will be difficult to achieve in our new pandemic reality, but our commitment to making positive changes for our world is unwavering.

Bob Powers  
General Manager  
San Francisco Bay Area Rapid Transit District


# BART 2019 Sustainability Highlights





**124**  
Fleet of the Future Cars  
in operation



**181** mpg  
fuel efficiency equivalent  
in a BART car as compared to average single-occupancy car





**27** lbs  
of CO<sub>2</sub>e emissions avoided per average BART trip




**59**  
Bay Wheels bike share docks added next to BART stations  
Glen Park / Balboa Park

**61** high-security electronic bike rack spaces added

**1 NEW** bike station  
MacArthur (197 Additional Spaces)

**91%**  
of BART's contracted electric supply was GHG-free




**22** tons of metal salvaged for reuse  
from the first decommissioned legacy train car

Energy-efficient lighting  
Retrofitted elevators with LED lights at 10 stations.



Completed six transit-oriented development (TOD) projects  
which included 674 units, of which 232 are affordable, 410,000 sq ft of office space, and 29,700 sq ft of retail space



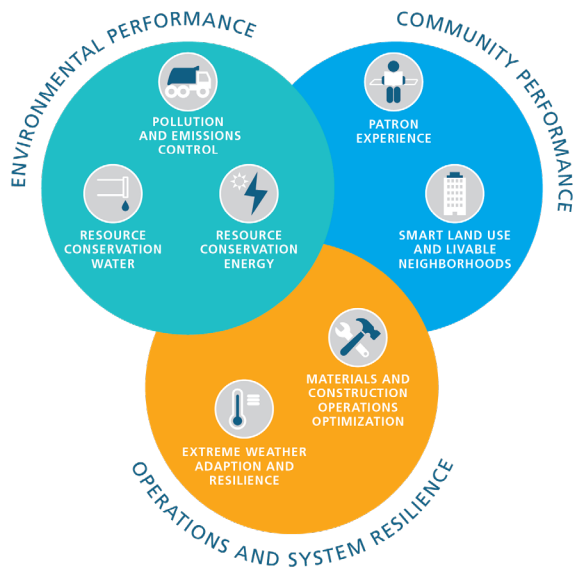
Walnut Creek Transit Village Multimodal Access  
Upgraded covered bus facility, a new passenger drop-off area, enhanced bike and pedestrian paths, and public art.




**379,000** kWh saved annually  
Swapped out 521 old light fixtures with energy-efficient LEDs at 5 parking lots

# Introduction

## 7 SUSTAINABILITY CATEGORIES



The *2019 Annual Report: Sustainability* communicates progress in BART's sustainability program. The purpose of the report is to provide transparency to the public and hold accountable BART's commitment to the goals of the program. The sustainability program aims to support a sustainable, healthy, and vibrant Bay Area through actions and investments that create a less car-dependent region and a greener transportation system.

### Report Format

The report contains a collection of case studies that highlight BART's achievements in sustainability for the reporting period and a summary of BART's sustainability performance metrics. In the Appendix, there are additional details about energy use, greenhouse gas emissions, and water use as well as status updates on each of the 120 action items identified in BART's Sustainability Action Plan.

### About the Sustainability Program

In concert with the District's Sustainability Policy, adopted in 2017, BART published a 10-year Sustainability Action Plan that details the targets, current progress, and future actions to integrate sustainability as a standard practice throughout BART. The plan was created with input from numerous BART departments and in coordination with broader regional and American Public Transportation Association (APTA) sustainability goals. The detailed roadmap includes performance metrics to measure outcomes of actions that support BART's commitment to provide safe, affordable, equitable, and environmentally-friendly transit. BART's energy, greenhouse emissions, and water targets were derived from Business as Usual (BAU) scenarios that utilize the baseline values in 2015 and planned growth in the number of stations, planned extensions to the existing lines, and expected improvements to the system. The committed and aspirational targets represent percentage reductions from the projected BAU values in 2025.

The Sustainability Action Plan contains 7 categories representing different aspects of BART's sustainability program. Each of the case studies, metrics, and actions contained in this report relate to goals identified in the Sustainability Action Plan for one or more of the categories.

The policy and action plan may be found at <https://www.bart.gov/sustainability/policies>.

### Reporting Period

The report focuses on efforts from the 2019 calendar year (i.e., January 1 to December 31).

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## BART's Earthquake Safety Program completed critical seismic retrofits at the Coliseum and Fruitvale Stations.

# Earthquake Safety

BART has made significant progress in making the BART system seismically safer and more resilient. As a critical lifeline to the region, BART cannot afford to sustain damage or recover slowly from potentially catastrophic events like earthquakes. BART's Earthquake Safety Program (ESP) was formed to seismically retrofit the system. The retrofit will make the BART system compliant with current standards for seismic performance, which are more robust than the 1960 building standards the BART system was designed to meet.

USGS predicts the next big earthquake in the Bay Area will occur in the next 30 years. The BART system crosses or is near many fault lines, so the epicenter of the next major earthquake could be situated close to the system.

To date, ESP is in its 16th year of implementation and is expected to complete all of the program's earthquake upgrades by 2022. The scope of the ESP includes retrofitting the system track, stations, Transbay Tube, maintenance yards, the BART Caldecott Tunnel, and other facilities and equipment, as well as dismantling the Lake Merritt Administration building.

In 2019, ESP completed critical seismic retrofits at the Coliseum and Fruitvale Stations. Work at these stations included retrofits of columns, column footings, and bent caps.

- Columns refer to the concrete vertical structures typically 5-6 feet in diameter that elevate the aerial portions of the BART track and station. ESP strengthened the columns with carbon fiber reinforced polymer reinforcement to provide more shear strength and concrete confinement.
- Column footings refer to the anchoring at the base of the columns. ESP implemented concrete overlays and vertical dowels, effectively increasing the size of the footings to better resist shear stress and bending.
- Bent caps sit on top of the columns and hold the beams of the aerial track system, effectively joining the vertical and horizontal elements. ESP strengthened the bent caps with new reinforced concrete bolsters containing drill and bond dowels. The retrofit provides additional confinement at the beam-column joint.
- Platforms, elevators, escalators, and pedestrian overcrossings were also upgraded at the Coliseum and Fruitvale stations.

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**Source:** Correspondence with Earthquake Safety Program.



**Developments like these encourage the region to rely on public transit rather than their personal cars to get to work, easing traffic and generating less pollution.**

## BART Public-private Partnership with Workday

In April 2019, BART accomplished a major milestone with its first public-private partnership with Workday as it opened its new World Development Center located next to the West Dublin/Pleasanton Station. The new 410,000–square–foot headquarters is expected to house 2,200 Workday employees who now have world-class access to BART. Developments like these encourage the region to rely on public transit rather than their personal cars to get to work, easing traffic and generating less pollution.

According to the Pleasanton Weekly, John McPartland, who represents Pleasanton and other Tri-Valley cities on the BART Board of Directors, said during opening day that the public-private partnership Workday has developed with BART and the city of Pleasanton “serves as a model for the nation.”

The headquarters has many sustainability features. BART supported Workday’s decision to build the headquarters to a design that targets LEED Platinum certification, the highest level of LEED certification. In addition to having close access to transit, the building has a ‘cool’ roof to mitigate the urban heat island effect. An 865-kilowatt solar array provides up to one-third of the building’s daily electricity needs. The onsite graywater recycling system is built to save up to 720,000 gallons of water annually. The employees have access to at least 50 electric vehicle charging stations in the employee parking garage and a bike facility that holds up to 100 bicycles.

The project has the added benefit of supporting a business center in a more suburban area of the BART system away from the region’s main business centers. This encourages riders to take the underutilized reverse commute and can help ease BART crowding in the opposite direction during rush hour.

The partnership with Workday allowed BART to leverage adjacent undeveloped BART property to bring in over \$26.5 million in private funding to assist construction of the West Dublin/Pleasanton Station and the two accompanying parking garages. The collaboration with Workday included them financing and building pedestrian and bike paths to and from the West Dublin/Pleasanton Station, 16 new bike lockers, a new bus zone, a new shared pick-up and drop-off zone, and enhanced wayfinding/signage. Another major addition was a new 3,000-square-foot police facility, which was financed and constructed by Workday and is shared between the BART Police Department and the Pleasanton Police Department. The new facility enhances the delivery of public safety services in and around the BART station.

**Source:** Correspondence with BART Real Estate.

**Source:** <https://www.bart.gov/about/business/tod/completed>

**Source:** <https://pleasantonweekly.com/news/2019/05/23/workday-opens-its-new-office-center-in-pleasanton>

**Source:** [https://www.independentnews.com/news/joint-pleasanton-bart-police-services-center-officially-opened/article\\_673c82a6-eb0c-11e9-88dd-7f839add79bd.html](https://www.independentnews.com/news/joint-pleasanton-bart-police-services-center-officially-opened/article_673c82a6-eb0c-11e9-88dd-7f839add79bd.html)

**Source:** <https://blog.workday.com/en-us/2019/built-from-the-ground-up-announcing-workdays-new-headquarters.html>



**In line with BART's TOD policy to make housing affordable at all income levels, affordable housing was a major component of this project, making it one of the few mixed-income residential projects in the state.**

## Coliseum Connections

In spring 2019, construction was completed for the Coliseum Connections (formerly known as the Coliseum Transit Village), a residential project next to the Coliseum BART Station. The project includes 110 rental units on the 1.32-acre parcel. BART provided a long-term lease of the land to the joint venture partners, Oakland Economic Development Corporation (OEDC) and UrbanCore, for development.

In line with BART's transit-oriented development (TOD) policy to make housing affordable at all income levels, affordable housing was a major component of the project, making it one of the few mixed-income residential projects in the state. Of the 110 units, half (or 55) of those units will have rents of \$1,100 to \$1,570, making it affordable for families that earn 50% to 60% of the area median income (AMI). The other half of the units are designated as moderate income housing with rents of \$2,200 to \$2,700, affordable to families that earn 80% to 120% of the AMI.

The project exemplifies how public funds can be leveraged to attract private investments to support regional housing needs. With \$24.5M in public funding (including funding from the City of Oakland, the state, Alameda County, and others), the project was able to leverage \$61M in private investment dollars. Public-sector funding enabled a larger number of affordable units, exceeding percentages typically found in projects financed only by private funds.

"This project shows tremendous progress towards our vision to see a complete community rise up at the steps of our Coliseum Station," said BART Director Robert Raburn. "I applaud Oakland Economic Development Corporation's and UrbanCore's tenacity over the years to overcome obstacles and make this development a reality."

In addition to the exceptional access to transit, the project features a community room for residents; a community café space; 86 residential parking spaces, three of which are electric vehicle charging spaces; a bicycle pavilion; and a 25-foot-wide landscaped walkway with bioswales to treat stormwater runoff. In addition, the City of Oakland financed the replacement of 90% of the parking displaced by the development with parking on adjacent city streets so that existing riders would not be significantly impacted.

**Source:** Correspondence with BART Real Estate

**Source:** <https://www.bart.gov/about/business/tod/completed>

**Source:** <https://www.oaklandca.gov/news/2019/local-leaders-agencies-developers-celebrate-completion-of-innovative-housing-project-with-grand-opening-of-coliseum-connections>





**BART estimates that up to 22 tons of metal are salvaged from each rail car, including 6 tons of aluminum, 1 ton of copper, and 15 tons of steel.**

## Decommissioning BART's Legacy Fleet

As BART brings the new Fleet of the Future cars into service, BART is beginning to decommission and retire its old fleet, which has lasted for many years beyond its expected life. In keeping with sustainability, BART is finding sustainable solutions to divert the old cars away from landfills.

On November 8th, 2019, BART retired the first of the 669 legacy rail cars. This is one out of the first ten (between November 8th, 2019 and February 7th, 2020) that were sold to a local metal recycling company in Oakland for scrap metal processing. Metal from the rail car is salvaged and reformed into new products. BART estimates that up to 22 tons of metal are salvaged from each rail car, including 6 tons of aluminum, 1 ton of copper, and 15 tons of steel. GHGs are reduced because recycling material avoids the use of virgin material for products. Based on available data, recycling the aluminum and steel instead of putting both in landfill reduces GHGs by 100 metric tons of CO<sub>2</sub>e (carbon dioxide equivalents)<sup>1</sup> for each car. Scrapping old cars for metal is also financially responsible, as BART can recoup some of the cost of the car through the value of the scrap metal.

As part of the decommissioning step before being recycled, BART salvages parts from old cars and reuses them in the existing fleet. By having salvaged parts available for reuse, BART can provide better reliability of the existing fleet and avoid spending money on parts. BART expects to save up to \$2 million from reused parts. In addition, hazardous materials are removed and properly disposed of. Hazardous materials in the car include batteries, fluorescent lightbulbs, and the brushes in the electric motors.

Beyond recycling, BART is exploring ways that the legacy rail cars may be reused. Ideas include reusing the old cars as artifacts in rail museums, emergency response drills/exercises for first responders, and others. There are many potential opportunities, and BART is continuing to solicit and review them.

<sup>1</sup>Based on Method for Estimating Greenhouse Gas Emission Reductions from Recycling, dated Nov 14, 2011 by CA Air Resource Board and CA EPA.

**Source:** <https://www.bart.gov/news/articles/2019/news20190104>

**Source:** <https://www.bart.gov/news/articles/2019/news20191108-1>

**Source:** <https://www.bart.gov/sites/default/files/docs/BART%20LEGACY%20FLEET%20DECOMMISSIONING-Presentation.pdf>

**Source:** <https://www.bart.gov/about/projects/legacy>



## Low impact development at Lafayette helped to maintain and restore Walnut Creek watershed's hydrologic and ecological function.

# Low Impact Development at Lafayette

In early 2019, BART completed the retrofit of the Lafayette station parking lots. The improvement project included a redesign of the bus and car zones of the station and installation of low impact development (LID), including permeable pavers and rain gardens to capture, detain, and treat storm water runoff from the site's parking and vehicular areas.

LID refers to systems and practices that use or mimic natural processes that result in infiltration, evapotranspiration, or use of storm water to protect water quality and associated aquatic habitat. Older conventional designs create impervious surfaces that direct the runoff to storm water drain systems without treatment, causing pollution and stress on natural habitats. LID takes a different approach by viewing storm water as a resource rather than a waste product.

LIDs help to maintain and restore a watershed's hydrologic and ecological function. The rain gardens and permeable pavement from this project help to protect Lafayette's Happy Valley Creek, which culverts directly under the project parking lots and the station. Happy Valley Creek and its connected waterways are a part of the Walnut Creek Watershed which supports diverse riparian habitat and attracts wildlife including Chinook salmon, coho salmon, and steelhead trout.

Contaminants in storm water runoff from the parking lots include hydrocarbons, sediments, heavy metals, trash and debris, oil and grease, and nutrients. Contaminants may come from pavement wear, vehicular traffic, maintenance activities, tire wear, brake lining wear, motor oil and gasoline leaks, auto body rust, atmospheric deposition, and trash.

"Low impact development is the law of the land today. It's important because at BART we want to be good stewards of the environment," said Norman Wong, a principal engineer at BART.

The LID included six rain gardens and eight permeable pavement sections in the parking lots. This translates into a total of 5,500 square feet of rain garden and 8,600 square feet of permeable pavers across six catchment areas. The retrofit was funded with support from the Contra Costa Transportation Authority through the Measure J transportation sales tax as well as the State Water Resources Control Board.

**Source:** <https://www.bart.gov/news/articles/2019/news20190123>

**Source:** <https://www.bart.gov/about/projects/lafayette>

**Source:** BART Lafayette Station Parking Lots Improvement Project, Final Report, Dated 02/28/2019.

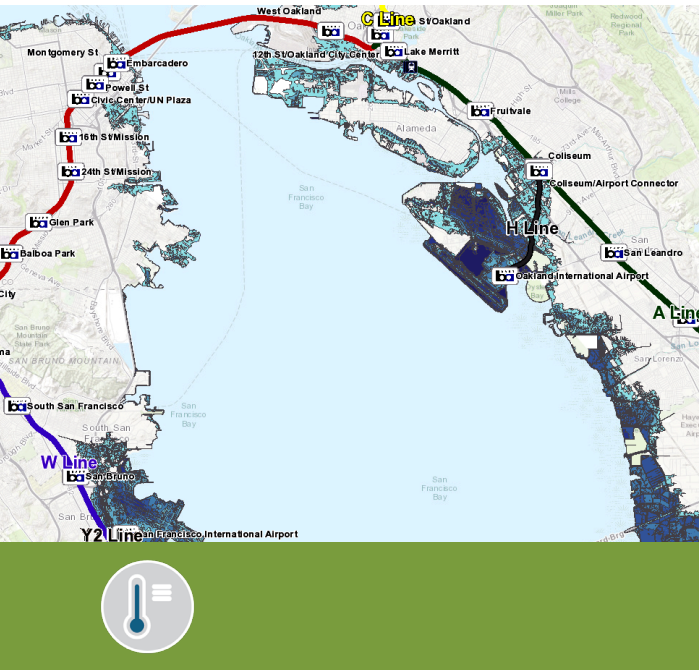
# Adapting to Climate Change: Flooding

Adaptation is the ability of a system to adjust to the (changing) conditions that support life in a certain climate region, including weather extremes in that region. BART recognizes that climate change is negatively impacting the region. Climate change exacerbates extreme weather, causes sea levels to rise, and thus diminishes BART's ability to provide safe and reliable transit services. For example, sea-level rise and extreme storm events may cause flooding of BART facilities and systems and disrupt services.

BART is working to address the future risks of climate change. In 2019, BART conducted the Sea-level Rise and Flooding Resiliency Study (Study) which evaluated the risk and developed adaptation solutions for flooding from sea-level rise (SLR) and the 1-in-100-year return storm surge. The combined flood level is anticipated to reach 64 inches above current water levels by 2050 and 108 inches above current water levels by 2090.

Findings from the Study estimate that without local and regional adaptation work, several BART facilities will be at risk of flooding. Recovery from a flood event could range from days to years depending on location and extent.

BART recognizes that to address sea-level rise, regional adaptation must be the highest priority and working with regional and local agencies will be integral. In addition, site-level adaptation will provide further safeguards to prevent the BART system from flooding. The Study proposes deployable features such as vent covers and temporary flood barriers to mitigate flood risks projected in year 2050.



**In 2019, BART engaged with several agencies on adaptation including the City and County of San Francisco, the City of Oakland, the Port of Oakland, San Mateo County, San Francisco Bay Conservation and Development Commission, and others.**



**The District sold \$723M  
in green bonds to support  
District projects.**

## Green Bonds

In 2019, BART issued green bonds, also known as climate bonds, for its eligible bond programs (Measure AA and Measure RR) and refunding of eligible sales tax revenue bonds used to finance railcars. Green bonds are bonds used for financing projects that reduce the impacts of climate change. As part of the green bond issuance process, BART voluntarily obtained third-party green bond certification by the Climate Bonds Initiative (CBI), an international nongovernmental organization dedicated to stimulating investment in projects and assets supporting a rapid transition to a low-carbon and climate-resilient economy.

Obtaining green bond certification affirms BART's critical role in reducing greenhouse gases and providing low-carbon transportation in the Bay Area. CBI recognizes that BART provides low-carbon mass transportation services with its electrified rail system.

In 2017, BART was the first transit agency in the Western US and second nationally to obtain third-party green bond certification. The District's controller/treasurer and sustainability team collaborated on this effort. BART has now issued green bonds on four occasions, which has expanded the District's pool of investors. In 2019, the District sold \$723M in green bonds to support District projects.

Green bonds were popularized starting in 2010 as a method for raising capital for climate-friendly projects across the globe. In 2019, \$259 billion in green bonds were issued worldwide according to the Climate Bonds Initiative.

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**Source:** Correspondence with Bryant Jenkins, Sperry Capital

**Source:** <https://www.bart.gov/news/articles/2017/news20170501-1>

**Source:** [https://www.bart.gov/sites/default/files/docs/BART\\_Measure\\_RR\\_AReport\\_6\\_27\\_18\\_WEB.pdf](https://www.bart.gov/sites/default/files/docs/BART_Measure_RR_AReport_6_27_18_WEB.pdf)

**Source:** [https://www.climatebonds.net/files/reports/cbi\\_asean\\_sotm\\_2019\\_final.pdf](https://www.climatebonds.net/files/reports/cbi_asean_sotm_2019_final.pdf)



**Carpooling to BART takes cars off the road, helping keep our region moving while also reducing emissions. Having an app-based payment process, as included in the new Carpool-to-BART program, improves the rider experience.**

## New Carpool-to-BART Parking Program

On June 17th, 2019, BART rolled out a new carpool program, accessible via the official BART mobile app, to make it easier to pay for a parking spot at BART. The Carpool-to-BART program was made available at four stations: Dublin/Pleasanton, Orinda, Antioch, and Warm Springs stations.

The program provides riders who carpool to a station the ability to pay for parking using the official BART mobile app and park in the permit section of the lot, which doesn't fill up as early as the daily fee section. The app accepts credit cards, debit cards, Venmo, or PayPal.

"This new program modernizes the payment process, something our riders have been asking for, and incentivizes riders to carpool by giving them access to permit parking areas, helping free up parking spaces for others," said Board Vice President Rebecca Saltzman. "Carpooling to BART takes cars off the road, helping keep our region moving while also reducing emissions. About 5% of our riders carpool to BART, and we want to encourage others to try it and then make it part of their daily routine."

Having an app-based payment process improves the rider experience. The older methods are not as seamless. Riders either wait in line to pay with cash or set up an EZ rider account, load it with funds, connect it to their Clipper card, and get a hang tag for their car. The new program takes care of setup, payment, and validation all within the app. The app system is more secure than the older carpool system because validation requires both riders in the carpool to enter the fare gates.

BART will use the four stations to test the new program before rolling it out to other stations. BART plans to expand app-based payment for parking to all riders in the future. However, to help promote carpooling to stations, BART is first offering it to customers who carpool.

BART will eventually phase out older carpool programs such as 511's carpool permit and the Scoop-to-BART program. Previously designated carpool parking sections will be converted into additional permit spaces at lots as the new program is rolled out to each station.

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**Source:** <https://www.bart.gov/guide/parking/carpool>

**Source:** <https://www.bart.gov/news/articles/2019/news20190617>

**Source:** <https://patch.com/california/dublin/bart-testing-new-carpool-app-dublin-pleasanton-station>



**The bike station is able to accommodate up to 200 bicycles.**

## MacArthur Plaza Improvements and Bike Station

In 2019, BART completed modernization improvements at MacArthur Station. The modernization improvements enhance the customer experience by making the station easier to access, making the plaza safer and more comfortable, and making the station overall a more welcoming place for the community.

One of the major improvements at MacArthur is a new self-park bike station that opened in May 2019. The bike station is able to accommodate up to 200 bicycles, including parking for oversize and cargo bicycles. Like the five other self-park bike stations and electronic bike lockers in the BART system, customers access the MacArthur bike station using a pre-paid BikeLink keycard. An entry kiosk monitors who enters and exits, helping to keep the facility secure.

Several other improvements were made to enhance the customer experience. New energy-efficient LED lighting and security cameras were installed to make the plaza safer and more secure. The flow of pedestrian traffic through the plaza was improved by removing existing bulky landscape planters. New seat walls and benches provided additional space for customers to sit.




The plaza improvements are part of the transit-oriented development (TOD) project next to the MacArthur Station. The improvements were paid for by taxpayers via Measure RR and by the TOD developer.

**Source:** <https://www.bart.gov/news/articles/2019/news20190805-0>

**Source:** <https://www.bart.gov/about/projects/macarthur-plaza>

**Source:** Feedback from Customer Access Dept.

# Performance Metrics

	Units	2015 Baseline	2016	2017	2018	2019	Target 2025 <sup>1,2,3,4</sup>	
 <b>RESOURCE CONSERVATION: ENERGY &amp; GHG EMISSIONS</b>								
Total energy use	Megajoules (MJ) / vehicle revenue mile (VRM)	21.19	19.93	20.52	20.89	21.13	<b>Committed 19.52</b>	<b>Aspirational 19.19</b>
Total greenhouse gas (GHG) emissions	Metric tons of carbon dioxide equivalent (MT CO2e) / thousand VRM	1.92	1.65	0.24	0.26	0.30	<b>Committed 0.31</b>	<b>Aspirational 0.24</b>
 <b>RESOURCE CONSERVATION: WATER</b>								
Total potable water use	Gallons / VRM	0.61	0.59	0.81	0.91	0.79	<b>Committed 0.42</b>	<b>Aspirational 0.37</b>
 <b>SMART LAND USE AND LIVABLE NEIGHBORHOODS</b>								
Residential units	# of units	1,416	1,506	1,975	1,975	2,649	<b>7,000</b>	
Affordable residential units	# of units	256	346	613	613	845	<b>2,400</b>	
Office/commercial square footage	Square feet	188,590	188,590	194,590	194,590	637,590	<b>1,000,000</b>	

<sup>1</sup>Total energy use: see Appendix for additional charts and information

<sup>2</sup>Total GHG emissions: see Appendix for additional charts and information

<sup>3</sup>Total potable water use: see Appendix for additional charts and information

<sup>4</sup>Residential units, affordable residential units, and office/commercial square footage: <https://www.bart.gov/about/business/tod>

# Performance Metrics

	Units	2015 Baseline	2016	2017	2018	2019	Target 2025 <sup>5,6,7,8</sup>
 <b>SMART LAND USE AND LIVABLE NEIGHBORHOODS</b>							
Mode share: active (walking and bicycling)	%	44%	Will be measured in Customer Access Survey planned for 2022				52%
Mode share: shared mobility	%	29%	Will be measured in Customer Access Survey planned for 2022				32%
Mode share: drive & park	%	27%	Will be measured in Customer Access Survey planned for 2022				16%
GHG emissions associated with passenger access to the station	%	TBD	Will be measured in Customer Access Survey planned for 2022				-24% reduction from 2015 baseline
 <b>PATRON EXPERIENCE</b>							
Quarterly reporting of safety and performance indicators			Complete				Complete
Has BART met all adopted Performance Standards for Safety and Patron Comfort?			No				Yes

<sup>5</sup>Mode share: <https://www.bart.gov/about/planning/station-access/policy>

<sup>6</sup>GHG emissions associated with passenger access to the station: methodology yet to be finalized

<sup>7</sup>Reporting on safety and performance indicators: <https://www.bart.gov/about/reports>

<sup>8</sup>The adopted Performance Standards for Safety and Patron Comfort consist of the following KPIs:

Safety KPI: <https://www.bart.gov/kpi/safety>

Customer Satisfaction KPI: <https://www.bart.gov/kpi/experience>

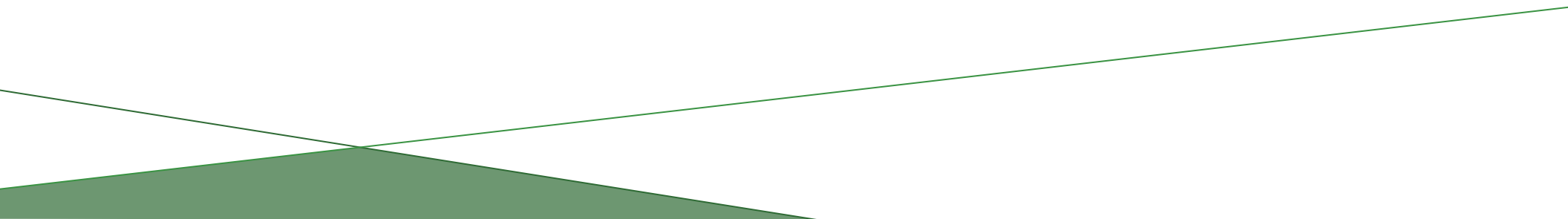


# Performance Metrics

	Units	2015 Baseline	2016	2017	2018	2019	Target 2025 <sup>9</sup>
 <b>EMISSION AND POLLUTION CONTROL</b>							
Total solid waste and landfill diversion rate		BART's Sustainability Team is developing a Master Waste Management Plan to address and improve landfill, recycling and composting across BART's facilities. As part of this Master Waste Management Plan, BART will collect data in order to establish a baseline and set realistic targets.					
 <b>MATERIALS AND CONSTRUCTION OPERATIONS OPTIMIZATION</b>							
Percentage of BART Project Delivery Staff trained in BART Facilities Standards (BFS) Sustainability Controls	%	Training has not yet commenced.					100%
 <b>EXTREME WEATHER ADAPTATION AND RESILIENCE</b>							
Percentage of High Priority Actions in the BART Local Hazard Mitigation Plan (LHMP) Actions underway or complete	%	Will be measured in 2022 when LHMP is updated.					100%

<sup>9</sup>High Priority Actions in the LHMP: <https://www.bart.gov/about/planning/policies/hazard>

# Appendix



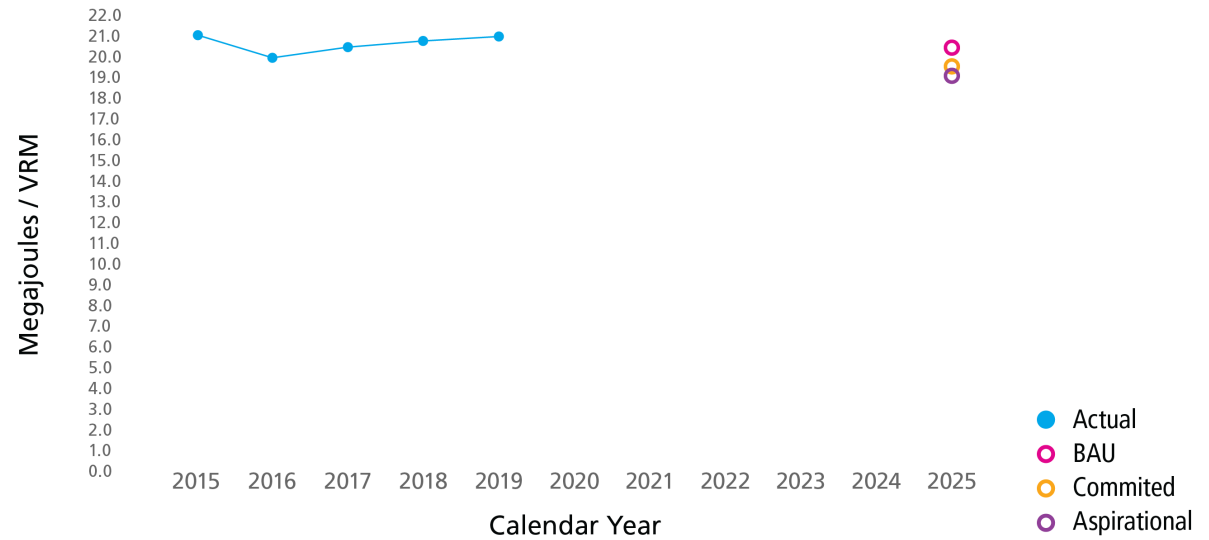
# Energy Use



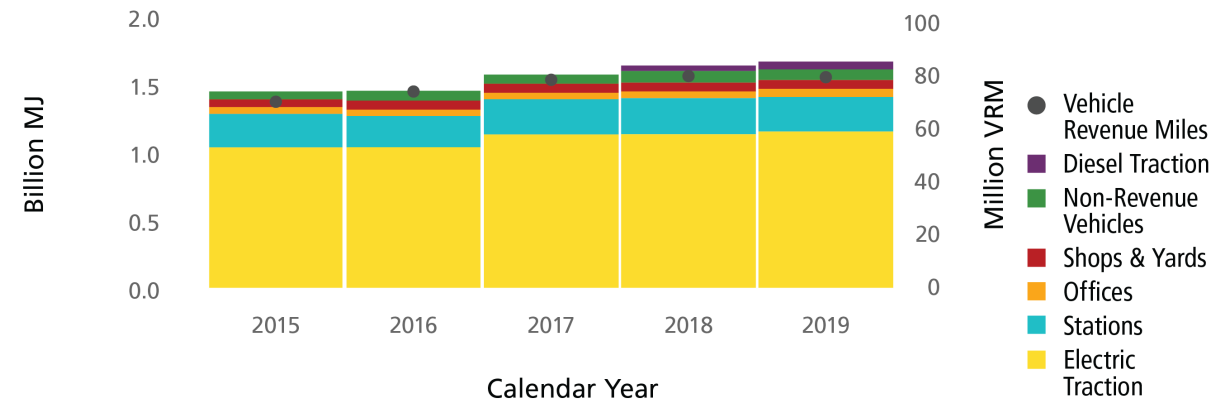
For the 2015-2019 period, BART generally increased energy usage due to increased train service and the addition of new stations. BART's Warm Springs Extension, a 5.4-mile extension connecting the existing Fremont Station to the new Warm Springs/South Fremont Station, opened in March 2017. The eBART Extension, a 10-mile extension connecting the Pittsburg/Bay Point and the Antioch Stations, opened in May 2018. eBART trains require more energy per VRM than the BART trains due to the different technology used; eBART uses diesel multiple unit technology instead of BART's electrified rail.

BART is undertaking actions to make the system more energy efficient. BART is continuing to increase the number of Fleet of the Future cars in service. These cars are built to be at least 7% more energy efficient than legacy vehicles and have features such as LED lighting, improved regenerative braking, and lightweight exteriors. BART is also pursuing LED lighting upgrades at stations across the system and retrofitting the lighting at parking garages and parking lots.

## Energy Use per Vehicle Revenue Mile (VRM)



## Energy Use by Asset Category

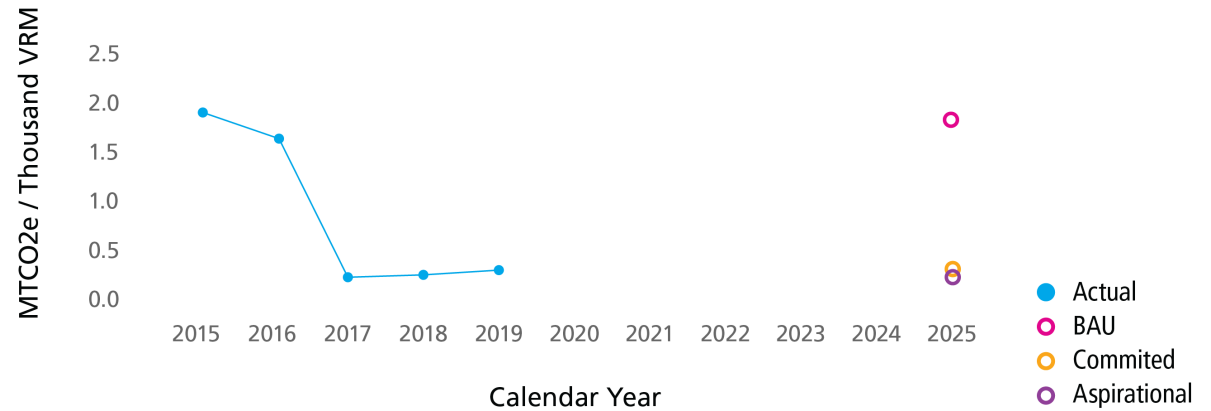


# Greenhouse Gas Emissions

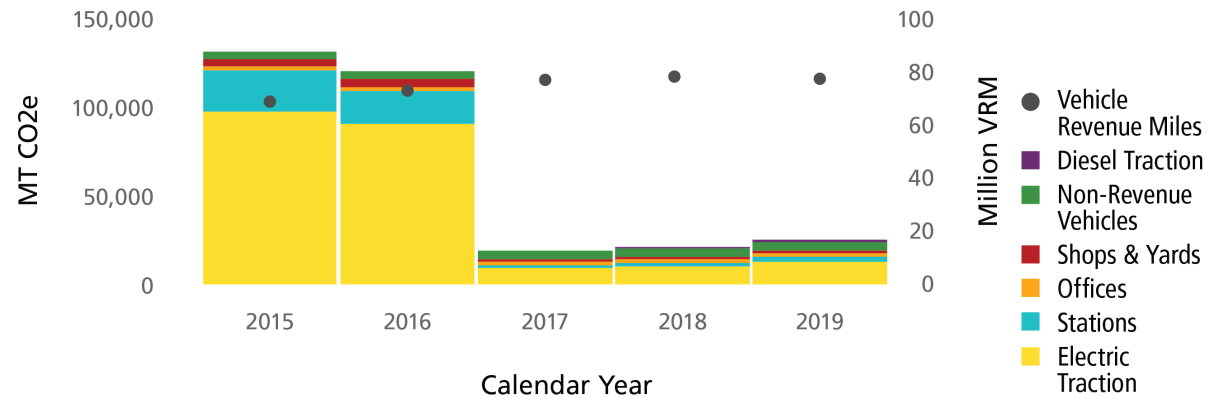


In 2019, 91% of BART's contracted electricity supply was GHG-free. The District's Wholesale Electricity Policy has pushed BART to shift energy sourcing away from unspecified power sources and toward zero- and low-carbon sources, which has significantly reduced BART's GHG emissions. The effective GHG emission factor for the District's contracted electric power has declined by approximately 89% since 2015. Additionally, the District has transitioned from conventional diesel to renewable diesel for use in eBART trains and the diesel-powered non-revenue fleet.

## GHG Emissions per Vehicle Revenue Mile (VRM)



## GHG Emissions by Asset Category



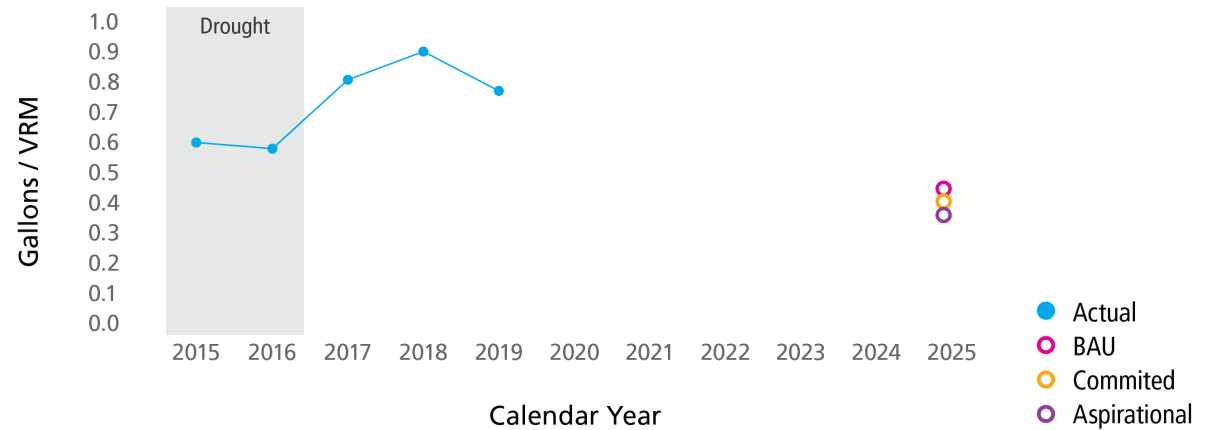
# Potable Water Use



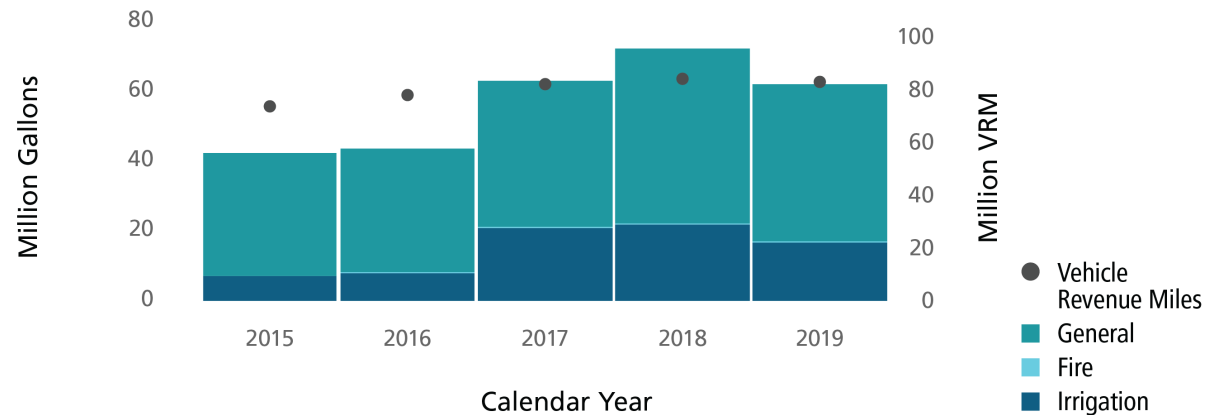
BART's overall water usage has increased compared to the baseline year. Due to drought conditions in 2015 and 2016, BART maintained low water usage by reducing the frequency of train car washing and irrigation. As drought conditions improved since late 2016, train car washing returned to the prior frequency and previously deactivated water fixtures for irrigation were reactivated, causing water use to increase.

Additionally, the Warm Springs Extension added a number of sites that increased water consumption in recent years. A wetland mitigation project near Fremont Central Park was initiated in 2017 as part of the extension. The project requires irrigation of over 50,000 plantings of native species on a 10-acre site. Irrigation at the site is anticipated to end in late 2020 pending adequate establishment of the plantings.

## Water Use per Vehicle Revenue Mile (VRM)

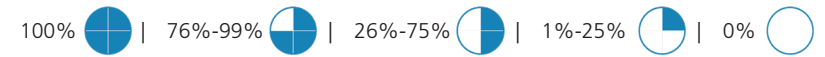



## Water Use by Type



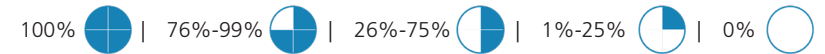
# Action Table

Each of the actions and subactions described in BART's Sustainability Action Plan were reviewed to determine their status as of December 2019. Actions in the Plan were inspired by BART initiatives that were either proposed or underway, as well as best practices from other transit agencies. The District's internal peer review of these actions reflects the professional input of relevant groups. The table below summarizes the status of each of the 120 actions and subactions.



 <b>RESOURCE CONSERVATION: ENERGY &amp; GHG EMISSIONS</b>			
ACTION	SUB-ACTION	STATUS	SUMMARY
RCE 1 - Increase Capacity to Support Regional GHG Goals	Enable expanded service for additional riders; increasing ridership capacity		As of 1/2020, 124 new trains out of planned total of 775 have been accepted. BART Board approved intent to award contract for new train control system. Federal Transit Administration allocated \$300 million for Transbay Corridor Core Capacity Project.
RCE 2 - Adopt a Strategic Energy Plan	2.1 - Develop plan to achieve low carbon energy procurement targets		Energy plan developed and targets identified.
	2.2 - Develop Wholesale Electricity Portfolio Policy		Wholesale Electricity Portfolio Policy adopted by Board.
	2.3 - Track and report energy indicators; set performance goal		Energy use by location and power type reported annually and used to develop performance goals. Exploring options to better analyze energy use over time.
RCE 3 - Make Renewable Energy Purchases	Continue to invest in wholesale low-carbon, zero-carbon, and renewable electricity purchases		BART executed two wholesale renewable PPAs totaling 107 MW. Both projects are currently expected to become operational in 2021.
RCE 4 - Invest in On-site Energy Generation	4.1 - Move forward with on-site solar power generation		Solar energy systems in place at Lafayette, Warm Springs, Richmond, and Hayward. Additional systems being considered for new stations.
	4.2 - Solar power generation vs. TOD and housing policies		5 potential solar sites were identified for solar generation that do not have plans for any TOD development within the next 20 years.
	4.3 - Seek funding to support PV installations and storage		Ongoing. Funding pursued as needed for new projects.
RCE 5 - Investigate Investment in Renewable Diesel	Explore feasibility of renewable fuels for eBART and non-revenue fleet		BART has transitioned to renewable diesel for both eBART and non-revenue vehicles.
RCE 6 - Conduct Station Energy Consumption Analysis	Complete energy monitoring study for representative stations		A study was completed examining three representative stations. Based on the lessons learned, BART has no further plans to study 3 additional underground stations.

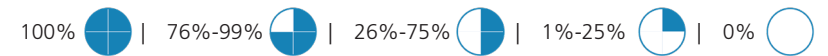
# Action Table



## RESOURCE CONSERVATION: ENERGY & GHG EMISSIONS

ACTION	SUB-ACTION	STATUS	SUMMARY
RCE 7 - Invest in District Lighting Retrofits	7.1 - Prioritize stations for energy-efficient lighting retrofits		10 of 48 stations, 1 of 15 parking garages, and 10 of 29 parking lots have been retrofitted.
	7.2 - Develop robust lighting design guidance		Lighting program to be expanded in 2020 with new Sustainability staff.
RCE 8 - New Energy Efficient Train Cars	Continue to fund the new train car procurement; conduct testing to confirm energy efficiency gains		As of January 2020, BART has accepted 124 new trains, out of a planned total of 775 trains.
RCE 9 - Reduce Electricity Losses from Traction Power	Explore and apply potential improvements to reduce traction power losses		BART will be installing reversible rectifiers at appropriate substations as the substations are replaced.
RCE 10 - Explore Opportunities for Energy Storage	10.1 - Funding options in coordination with new train car procurement		SGIP program would not apply for funding batteries for regenerative braking system. BART will continue exploring options for funding as opportunities arise.
	10.2 - Engineering-level study of system-wide energy storage		Study completed in 2016 indicated that storing energy from regenerative braking is not feasible due to battery limitations.
RCE 11 - Green Non-Revenue Fleet	11.1 - Replace retired vehicles with hybrids		There are 3 electric motorcycles and 1 hybrid SUV in the police fleet, with the potential for future purchases.
	11.2 - Right-size heavy equipment to save fuel		Department superintendents provide guidance on vehicle uses prior to replacement by maintenance. Multi-use vehicles are pursued when possible.
	11.3 - Implement operational strategies, e.g. anti-idle and fuel saving driving		Not started
RCE 12 - Employee Trip Reduction in Non-Revenue Vehicles	Reduce fuel and emissions for BART employee work-related travel		Not started
RCE 13 - Support Energy Efficiency Operations in Offices	Assess the feasibility of reducing BART's corporate energy use via employee training		Not started

# Action Table

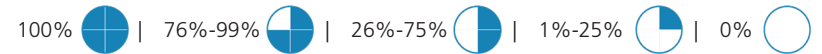



## RESOURCE CONSERVATION: ENERGY & GHG EMISSIONS

ACTION	SUB-ACTION	STATUS	SUMMARY
RCE 14 - EV Charging Policy and Implementation	14.1 - Pursue funding for installing EV charging stations		BART has identified two funding sources for installing EV charging thus far: BAAQMD and PG&E.
	14.2 - Pilot EV charging at Warm Springs Station		The EV charging pilot at Warm Springs has been implemented.
	14.3 - Develop expansion of station EV charging		EV charging implementation plan to be drafted in 2020.
	14.4 - Install EV charging at shops/ yards to enable EVs in non-revenue fleet		EV charging stations available at eBART and Hayward Maintenance Center for employees and non-revenue fleet.
	14.5 - Install EV charging for convenient employee use		EV charging stations available at eBART and Hayward Maintenance Center for employees and non-revenue fleet.

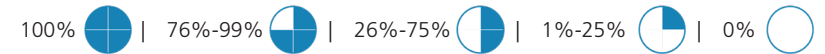


# Action Table



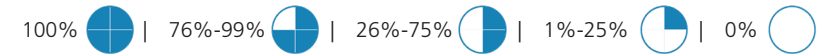
 <b>RESOURCE CONSERVATION: WATER</b>			
ACTION	SUB-ACTION	STATUS	SUMMARY
RCW 1 - Regularly Audit Water Use and Correct Issues	1.1 - Allocate resources to pilot water use data tracking		Water is tracked districtwide by meter. Currently exploring opportunities to expand tracking and analysis.
	1.2 - Leak detection and fixes		Ongoing. Calsense flow meters have been installed at 5 locations, including Warm Springs / South Fremont, to aid prompt leak detection. Leak detection at shops & yards will be enhanced upon installation of new water mains and piping. Water billing data and manual inspection techniques are used at other locations.
	1.3 - Electronic data from water suppliers		BART will complete an audit of our data intake methods in 2020 and subsequently develop a plan.
RCW 2 - Address Irrigation Usage and Infrastructure	2.1 - Prioritize and conduct irrigation upgrades		Data for individual meters compiled. Efforts to explore upgrades will begin in 2020.
	2.2 - Remote access controllers pilot and lessons learned		Pilot was completed at Warm Springs and lessons will be applied to future projects.
	2.3 - Update irrigation maintenance manual		Not started
RCW 3 - Upgrade Water Fixtures	3.1 - Prioritize and install water-saving fixtures		Water fixtures are upgraded during station modernization efforts. Other water fixtures needing repair are maintained according to their current specifications.
	3.2 - Audit existing fixtures		Audit completed to identify plumbing fixtures that are not low flow and do not meet current water efficiency requirements.
	3.3 - Pilot low flow fixtures and apply findings		Low-flow toilet was installed at Bay Fair. Design Matching Product (DMP) was updated to remove products that were noncompliant for water efficiency.
RCW 4 - Replace Water Systems in Shops and Yards	Identify leaks; consider upgrades to water systems		RR funding being used to replace old water mains at Concord, Richmond, and Hayward. New mains and piping will improve flow monitoring and leak detection capabilities.
RCW 5 - Investigate Train Car Washing	Determine the most water-efficient cycle/schedule		An audit of the train car washing schedule will be considered once the new cars are the majority of the fleet (anticipated late 2022).
RCW 6 - Engage Operations Staff for Water Conservation	Educate and engage relevant staff on ideas for water conservation in the workplace		Not started
RCW 7 - Participate in Water District Conservation Programs	Explore available rebates, incentives, and technical assistance		12th St. Oakland City Center Station has received the Water Smart Business Certification.


# Action Table



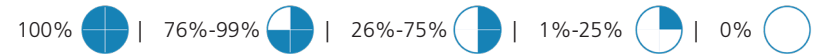
 SMART LAND USE AND LIVABLE NEIGHBORHOODS			
ACTION	SUB-ACTION	STATUS	SUMMARY
SLU 1 - Improve Station Character and Community Fit	1.1 - Implement the "Connect & Create Great Places" work plan		11 capital projects identified: 1 complete, 9 in progress, and 1 not started.
	1.2 - Seek funding for place-making investments via grants, bonds, etc.		Funding received for improvements at MacArthur Station's plaza, West Dublin/Pleasanton, Millbrae, and Coliseum. Bike channels funded at multiple stations.
	1.3 - Partner to implement complementary improvements on city streets		6 capital projects identified: 1 complete, 4 in progress, and 1 not started
SLU 2 - Continue to Lead the Region in Transit Oriented Development (TOD)	2.1 - Implement TOD Policy		Completed projects include Fruitvale Phase 2A, MacArthur Phase 1, San Leandro Phase 1 and 2, South Hayward Phase 1, MacArthur Parcel A and C, Coliseum, West Pleasanton.
	2.2 - Coordinate with local partners on Specific Plans or Station Area Plans		BART engaged in 2019 with cities on the specific plans in El Cerrito, Ashby, Bay Fair, downtown Hayward, and downtown Oakland.
	2.3 - Activate stations in coordination with system expansion		BART has been engaged in VTA's TOD strategy for Phase 1 and 2, the Bay Fair track feasibility study, and has been involved in the Valley Link Project.
SLU 3 - Station Access – Connect to Community	3.1 - Implement the Station Access Policy		3 RR-funded projects in construction to improve station access and install LED elevator lights at 10 stations. RR-funded multimodal improvements at Antioch station approved by BART Board. Other RR-funded projects are in the design phase.
	3.2 - Implement the BART Bike Plan and Bike Parking Capital Program		Added 258 new bike parking spaces and 59 Bay Wheels docks across system.
	3.3 - Incorporate Multimodal Access Design Guidelines into the BFS		The guidelines are listed as an appendix in the BFS.
	3.4 - Improve multi-modal transfers; fund access upgrades		Improvements completed at Walnut Creek, MacArthur, North Berkeley, Lake Merritt, and Daly City. New BART in-app carpool program is available at select stations and will be expanded to all stations with parking in 2020. Improved coordination with TNCs, including geofencing passenger loading zones.

# Action Table



 SMART LAND USE AND LIVABLE NEIGHBORHOODS			
ACTION	SUB-ACTION	STATUS	SUMMARY
SLU 4 - Participate in Local/Station and Regional Partnerships	4.1 - Identify opportunities for effective Plan Bay Area implementation		MTC is doing work now for Plan Bay Area 2050, which will be finalized/published by end of fall 2021. BART nominated the new Transbay rail crossing to MTC for inclusion into Play Bay Area 2050.
	4.2 - Serve on Technical Advisory Committees, lend expertise		BART engaged in 2019 with cities on the specific plans in El Cerrito, Ashby, Bay Fair, downtown Hayward, and downtown Oakland.
	4.3 - Participate in state legislation and rule making to support TOD		BART is progressing AB 2923 regulation and developing materials for cities to guide them in rezoning for TOD. BART supported SB 50, which would have required a local government to grant equitable communities incentives to eligible projects. BART has actively submitted funding grant applications from the Affordable Housing and Sustainable Communities (AHSC) Program, the Transit and Intercity Rail Capital Program (TIRCP), and the Low Carbon Transit Operations Program (LCTOP).
SLU 5 - Support Affordable Fares	Continue to explore strategies to support affordable fares		BART is planning to launch a 20% discount program for low-income riders. In addition, BART and MTC are conducting the Regional Fare Coordination and Integration Business Case Study to explore regional standards for discounts.

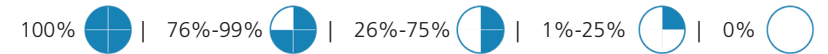
# Action Table



## PATRON EXPERIENCE

ACTION	SUB-ACTION	STATUS	SUMMARY
PE 1 - Create Clean Station Environments	1.1 - Invest in the Station Brightening Program and increase staff		Painting, pigeon mitigation, and repairs completed for West Oakland Brightening Project
	1.2 - Additional grounds maintenance crews to improve parking lot cleanliness		2 positions filled on maintenance crew
PE 2 - Create Safer Station Environments	2.1 - Support community-based policing		Zone Commander positions fully staffed for each of the 5 policing areas
	2.2 - Analysis of high crime stations; associated increase in police presence		New crime analyst position created. 63 police officers hired. Team of 10 officers created to patrol trains.
	2.3 - Update audibility of PA announcement system		PA Improvement project in design phase for Powell, Lafayette, and Richmond.
	2.4 - Improve real-time display (RTD) messages to communicate safety messages		RTDs installed at 33 stations. RTD Enhancement Project to provide additional RTDs at Downtown SF and Oakland stations.
PE 3 - Support Art in Transit	Develop an art program master plan		The Arts Master Plan includes guidelines, procedures, and metrics. Funding is currently on a project-by-project basis. BART is developing an art collection analysis that will detail maintenance and cleaning.
PE 4 - Invest in Employee Health and Wellness	Implement programs to enhance worker safety and wellness		BART's system safety updated the Public Transit Agency Safety Plan (PTASP). Safety has been enhancing Maximo to include safety reporting and safety data management. BART provides the employee assistance program (EAP) and various health and wellness events.
PE 5 - Design Stations for Patron Comfort	Develop guidelines and other procedural tools to promote quality of life at stations		Patron comfort addressed in various guidelines and requirements including the Station Experience Design Guideline, Powell Station improvement Guideline, and the BFS.
PE 6 - Attenuate Noise	6.1 - Feasibility of piloting a physical barrier to mitigate local noise impacts		Upon analysis, a physical barrier at West Oakland was deemed infeasible.
	6.2 - Continue regular wheel and rail maintenance to mitigate noise		BART converted 95 percent of our fleet wheels and 40 percent of the rails to a new profile that together help to reduce the screeching noise frequently heard on BART. In the worst areas of the system, interior train car noise measurements decreased from 95dB to 75dB.
	6.3 - Specify materials in BFS that help noise attenuation		BFS architecture criteria for passenger stations includes noise attenuation requirements.

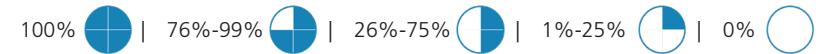
# Action Table



## PATRON EXPERIENCE

ACTION	SUB-ACTION	STATUS	SUMMARY
PE 7 - Support an Enhanced Wayfinding Program	Update wayfinding program; expand the use of electronic signs with realtime information		Phase 3 of wayfinding & signage improvement project on schedule. Phase 4 has 25 stations planned.
PE 8 - Build Awareness: Transit's Relationship to Public Health	8.1 - Explore opportunities for healthy behaviors, e.g. public art		BART promotes bike share and bike excursions on BARTable website.
	8.2 - Reflect public health benefits in emerging guidance for station design		BFS architecture criteria for passenger stations include requirements for bike stair channel to promote bike usage.

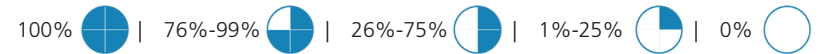
# Action Table




## EMISSIONS AND POLLUTION CONTROL

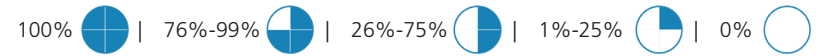
ACTION	SUB-ACTION	STATUS	SUMMARY
EP 1 - Support Solid Waste Reduction	1.1 - Review station recycling pilot; targets for landfill diversion and waste reduction	<input type="radio"/>	Efforts to improve data collection to begin in 2020.
	1.2 - Renegotiate waste hauling and recycling contracts	<input type="radio"/>	Efforts to identify and renegotiate terms of contracts to begin in 2020.
	1.3 - Public education and marketing campaigns for recycling	<input type="radio"/>	Not started
	1.4 - Hire workers to service and support station recycling	<input checked="" type="radio"/>	Current System Service workforce is sufficient to meet projected recycling management needs.
EP 2 - Pilot Station Dumpster Enclosures	Implement pilot project for dumpster enclosures	<input type="radio"/>	Not started
EP 3 - Pilot Facility-based Sustainability Program at Shop(s)/Yard(s)	3.1 - Opportunities for pilot of Sustainability Plan at shops/yards	<input type="radio"/>	Not started
	3.2 - Evaluate pilot; develop sustainability program for shops/yards	<input type="radio"/>	Not started
EP 4 - Improve Recycling at All District Shops and Yards	4.1 - Review Oakland shops' recycling, create plans for all other shops/yards	<input type="radio"/>	Efforts to review shop/yard recycling to commence in 2020.
	4.2 - Identify costs and resources needed for system-wide recycling plan	<input type="radio"/>	Not started
EP 5 - Incorporate Composting in Employee Worksites	5.1 - Develop composting and recycling program for administration offices	<input checked="" type="radio"/>	300 Lakeside has recycling and composting. Program will continue at 2150 Webster upon move.
	5.2 - Recycling and composting in staff rooms at shops/yards systemwide	<input type="radio"/>	Not started
	5.3 - Investigate potential to include composting at BART stations	<input type="radio"/>	Efforts to review composting at stations to commence in 2020.





# Action Table



 EMISSIONS AND POLLUTION CONTROL			
ACTION	SUB-ACTION	STATUS	SUMMARY
EP 6 - Improve Office Recycling and Re-use	6.1 - Inter-District "green team" to advance waste reduction strategies		Not started
	6.2 - Develop paperless policy; BoD all-digital pilot; review union contracts		Not started
	6.3 - Searchable database of materials available for salvage/re-use		Not started
EP 7 - Reduce District Hazardous Waste	7.1 - Specify non-hazardous materials in capital projects; seek alternatives		BART complies with applicable regulations for hazardous materials and waste. Efforts to look beyond regulatory requirements to reduce hazardous material and waste not started.
	7.2 - Expand program for reusing and laundering oily rags		Not started
EP 8 - Minimize and clean stormwater runoff	8.1 - Construct trash interceptors/storm drain diversion structures		Implementation plan developed for trash capture.
	8.2 - Increase crews to improve cleanliness and inspect storm drain inlets		2 positions have been filled on maintenance crew.
	8.3 - Pilot the capture, storage, and reuse of rainwater		A rainwater catchment system for the Hayward Maintenance Center is being pursued. A system at Colma station is also being considered.
	8.4 - Update BFS drainage sections to reflect best practices		Biofiltration specifications to be included as a standard in the next BFS update
EP 9 - Clean and Reuse Water	9.1 - Explore and implement the reuse of sump pump water		Upon analysis, reuse of sump pump water is currently infeasible for BART's operations.
	9.2 - Explore and implement grey water systems at the shops and yards		Due to public health concerns and metals in water discharge, grey water systems are currently infeasible for BART's operations.
	9.3 - Explore and implement storm water capture		Not started
EP 10 - Invest in Tree Planting	10.1 - Direct resources to prioritize tree coverage		Trees are considered and prioritized during planning for new stations. However, funding and staffing for maintaining existing and newly established trees have been identified as obstacles.
	10.2 - Include tree requirements in the BFS as possible		New landscape architect under Civil division is initiating review of landscape requirements in the BFS. Canopy requirements in the BFS will be considered.

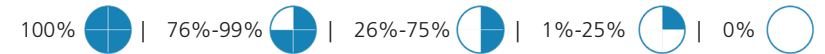
# Action Table



 EMISSIONS AND POLLUTION CONTROL				
ACTION	SUB-ACTION	STATUS	SUMMARY	
EP 11 - Replace Gas-Powered Tools with Electric	11.1 - Prioritize landscaping tool replacement		BART replaces tools on an ongoing basis. Electric tools are tested prior to implementation to ensure they meet our needs.	
	11.2 - Develop policy of purchasing electric (battery) tools		BART replaces tools on an ongoing basis. Electric tools are tested prior to implementation to ensure they meet our needs.	
	11.3 - Outfit hi-rail crew trucks with outlets and areas to charge batteries		All hi-rail crew trucks have generators and outlets.	



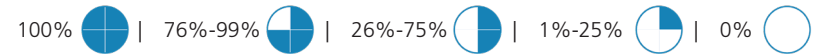
# Action Table




## MATERIALS AND CONSTRUCTION OPERATIONS OPTIMIZATION

ACTION	SUB-ACTION	STATUS	SUMMARY
MC 1 - Select Green, Sustainable Materials and Products	1.1 - Green Purchasing Policy		Procurement has begun developing a green purchasing policy and guideline.
	1.2 - Department-specific procurement guidelines		Procurement has begun developing a green purchasing policy and guideline.
MC 2 - Update BFS for Construction Activities	2.1 - Develop tools for BFS Sustainable Practices		Not started
	2.2 - Update BFS Construction Standard Specification		Not started
	2.3 - Modify BFS design standards to ensure resilient infrastructure design		Not started
MC 3 - Improve BFS Sustainability Guidance, Criteria and Standards	3.1 - Update guidelines and incorporate performance-based specifications		BFS Sustainability Guidelines have been revised.
	3.2 - Update specifications to include best practice-based requirements	N/A	Refer to MC 2.2. This action will be combined going forward.
MC 4 - Incorporate Sustainability into Operations and Maintenance Procedures	Identify operations and maintenance procedures	N/A	Refer to MC 3.1. This action will be combined going forward.
MC 5 - Sustainable Contractual Tools (Capital Projects)	Explore contracting tools to best leverage sustainability		Not started
MC 6 - Develop Sustainability Design Guidance	6.1 - Project guidance (sustainability targets, financial resource allocation)		Not started
	6.2 - Experience with green building and LEED certification in new contracts		BART includes LEED experience as a desired qualification in RFPs for On-Call Agreements.
	6.3 - Pilot project with INVEST or Envision		Not started

# Action Table



 <b>EXTREME WEATHER ADAPTATION AND RESILIENCE</b>			
ACTION	SUB-ACTION	STATUS	SUMMARY
EWA 1 - Coordinate with Regional Agencies in Climate Adaptation Planning and Implementation	1.1 - Consider climate change impacts as a part of project design		Not started
	1.2 - Seek funding or partner to adopt adaptation strategies		Awarded \$500K from Caltran's adaptation planning grant to conduct vulnerability assessment and adaptation development. Study completed in 2020.
	1.3 - Modify BFS design standards to ensure resilient infrastructure design		Included requirements in BFS for climate change adaptation.
EWA 2 - Conduct Hazard Mitigation Planning	2.1 - Incorporate LHMP (2016) considerations into capital improvement plans		Not started
	2.2 - Update LHMP (every 5 years)		LHMP anticipated to be updated in 2022.
EWA 3 - Expand the Water Intrusion program to respond to sea-level rise and extreme weather events	3.1 - Upgrade systems that track water inundation		Sump pump systems provide alert to Operations Control Center of water in the system. System is adequate. Upgrade not warranted at this time.
	3.2 - Expand Water Intrusion Program to identify vulnerable assets; develop risk mitigation program		Several RR-sponsored projects are in progress.
	3.3 - Partnerships with local watershed jurisdictions for runoff analysis		Flood-prone areas were evaluated in the LHMP using FEMA FIRM maps.
	3.4 - Partner with jurisdictions to protect around Transbay Tube portals		BART collaborated with SF Port and USACE on SF seawall vulnerability and adaptation work, and engaged Port of Oakland and City of Oakland on Oakland shoreline adaptation.
	3.5 - Waterproof venting structures and entrances for underground stations		Not started
EWA 4 - Train Control Resiliency	Implement the Train Control Modernization Program		Notice to proceed (NTP) is expected in July 2020. Flooding issues are a joint effort between CBTC and M&E as they do retrofits on these locations

